



**166 South Service Road East,
Oakville
Transportation Impact &
Parking Study
(2nd Submission)**

Paradigm Transportation Solutions Limited
BA Consulting Group Ltd

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Executive Summary

Content

Initial Official Plan Amendment (OPA), Zoning By-law Amendment (ZBA), and Draft Plan of Subdivision (DPoS) Submission, June 2022

BA Group and Paradigm Transportation Solutions Limited prepared a report entitled “166 South Service Road, Oakville Transportation Impact Study & Parking Study” dated June 2022, which was submitted to the Town of Oakville as part of a joint OPA, ZBA, and DPoS application for the development proposal. As part of this application, a total of 1,606 units, 1,191 parking spaces, 1,609 bicycle parking spaces, and 5 loading spaces were proposed.

Current OPA/ZBA/DPoS Resubmission, March 2024

Following the first OPA/ZBA/DPoS submission, comments regarding the development proposal were provided by Town and Regional staff dated November 2022 and subsequently updated in February 2023. A second OPA/ZBA/DPoS submission is now being made that reflects a development proposal and site plan that has been updated and refined in response to staff comments and as part of the ongoing design development process.

The development proposal for the site envisions a large-scale development of three towers with proposed heights of 52, 56, and 44 storeys, with Towers 2 and 3 on top of a mutual podium.

The development proposes 1,851 residential units, approximately 1,252 square metres (13,477 square feet) of retail Net Floor Area (NFA), and about 4,602 square metres (49,534 square feet) of commercial (health/fitness club) NFA. Vehicle access will be provided through two driveway connections: South Service Road East (North Access) and a new north-south local road ‘Street C’ (East Access) connecting South Service Road East to Cross Avenue.

It is assumed that the site will be developed in two phases:

- ▶ Phase 1 will open in 2028 and will include Tower 1, while
- ▶ Phase 2 will open in 2033 and consist of Towers 2 and 3.

It is also assumed the North Access will be the only access until 2038, when the new north-south local road is assumed to be constructed.



Conclusions

Development Concept Review

A review of the proposed Development Concept plans was undertaken with the following conclusions reached:

- ▶ Pedestrian, bicycle, and vehicular access to the Site provides appropriate mobility opportunities for all modes.
- ▶ The proposed Development Concept is consistent and compatible with short-term (prior to the development of adjacent properties) and long-term (with the fulfillment of the Mid-Town Oakville streets and blocks plan) Mid-Town Oakville conditions.

Vehicle Parking Considerations

Application of the parking standards outlined in Town of Oakville's Zoning By-law 2014-014 would result in a minimum requirement of 2,211 spaces (1,515 residential, 370 visitor, and 326 non-residential). This results in a residential parking requirement of 0.82 spaces per unit.

Notwithstanding the above, reduced parking standards have been proposed which would result in a minimum requirement of 1,214 total parking spaces to meet the needs of the Project. This includes 872 resident parking spaces (effective parking supply of 0.50 parking spaces per unit excluding studio units), 278 residential visitor parking spaces (effective ratio of 0.15 parking spaces per unit), and 64 parking spaces for the retail and commercial use (1.08 parking spaces per 100 m²)

Access to the underground parking facility is proposed from driveways off the Future Local Road 'Street C' and South Service Road East.

Both the reduced residential and non-residential parking supply is appropriate based on the provincial and local policy / plan that direct municipalities to reduce or eliminate minimum parking requirements; evolving transportation context and their reaches through the GTHA; comparison of other Zoning By-law standards and approvals within the GTHA, and the TDM plan proposed for the proposed development.



Loading Considerations

There are no loading requirements outlined in the Zoning By-law 2014-014.

Regardless, the total loading supply of 6 spaces including 1 refuse collection loading space, 2 full-sized loading space, and 3 smaller size loading space are proposed to service the site. The 3 smaller size loading spaces are proposed on the P1 level of the garage, and the remaining 3 loading spaces are provided in a consolidated area in close proximity to Tower 1.

Access to all loading spaces is proposed from the driveways off South Service Road East. The driveway off the Future Local Road 'Street C' will not permit loading access for the smaller sized loading spaces on the P1 level due to height restrictions. This access will be signed to warn drivers about the clear height. The loading areas for the proposed Towers have the requisite internal manoeuvring area and refuse bin staging area.

The proposed loading provisions meets the minimum loading requirements of Zoning By-law 2014-014.

Bicycle Parking Considerations

Application of the bicycle parking standards outlined in underlying Town of Oakville Zoning By-law 2014-014 requires a minimum of 1,858 bicycle parking spaces (1,395 long-term and 463 short-term bicycle parking spaces).

The site proposes 1,858 bicycle parking spaces, including 463 short-term spaces and 1,395 long-term spaces, which meets the minimum requirements specified under Zoning By-law 2014-014.

All bicycle parking is located on the mezzanine level, ground level, and P1 level of the site. Long-term bicycle parking is located within a secure, weather-protected facility.

3 bicycle repair stations will be provided for each tower to service the cycling needs of the site.

Transportation Impact Study

The proposed development will generate approximately 453 new vehicle trips during the weekday AM peak hour and 476 new vehicle trips during the weekday PM peak hour.



Detailed traffic analysis was conducted for each study area intersection under Base conditions, Opening Year (2028), Full Build-Out (2033), Five Years after Full Build-Out (2038) and Ten Years after Full Build-Out (2043) Background and Total conditions.

It is acknowledged that deficiencies currently exist at specific locations, primarily along the Trafalgar Road corridor within the study area. They can be expected to persist in the future with anticipated growth in traffic, independent of the development.

For clarification, delays along the Trafalgar Road corridor (external study area intersections) have been documented as a foreseeable issue without the proposed development in the Midtown Oakville EA. The EA identified several roadway improvements to address traffic growth's existing and long-term impacts. The construction of new direct off-ramps for the QEW at Trafalgar Road, a revised local road network for Midtown Oakville, an extension of Cross Avenue and a variety of intersection improvements are proposed. It is understood that these improvements will provide some relief to operational issues. However, vehicle capacity constraints will persist for the overall transportation network.

As the EA recognized capacity constraints, further remedial measures to improve intersection capacity are not likely to be implemented. Instead, future improvements to the transportation network are expected to primarily focus on sustainable forms of transportation, including an improved transit network by adding BRT along Trafalgar Road.

By shifting commuter travel to public transit, intersection operations could be expected to maintain the status quo (at capacity condition during peak hours) or improve if fewer vehicles transverse the intersections during the peak hours of a typical weekday. The Town of Oakville's Urban Mobility & Transportation Strategy¹ echoes this sentiment:

"The Town of Oakville and Halton Region must accept a crucial point: they will never solve congestion. There will always be someone new who fills up space on the road, regardless of whether that space was created by paving a new lane or having some drivers switch to buses. It is well established that the expansion of congested roadways does not reduce congestion – it just increases the number of people on those roadways. This is called induced demand."

¹ Oakville Urban Mobility & Transportation Strategy, Steer, November 2021



"Due to the principle of induced demand, vehicular congestion can never be solved completely, and Oakville should not fall into the trap of trying to prove otherwise. Oakville's current methodology for assessing traffic (and the impacts to traffic from new developments) fails to capture this fact, biases suburban developments over urban ones, and does not assess other modes such as walking, cycling and transit."

With respect to the internal study area intersections surrounding the subject site, the capacity analysis showed that deficiencies currently exist and are projected to occur at certain locations within the internal study area with anticipated growth in traffic, including the proposed development. The following capacity constraints at the study area intersections are identified.

Argus Road at South Service Road

The intersection of Argus Road and South Service Road East currently operates well during peak hours, with individual movements operating at LOS C or better. However, under the 2033 and 2038 background conditions, the southbound approach is expected to experience significant delays due to high volumes of traffic along Argus Road.

The 2043 background conditions are expected to cause extensive delays for the southbound approach due to the high volume of east-west traffic on Argus Road, leaving few gaps for the stop-controlled movements. In terms of development traffic implications, the southbound approach is particularly sensitive to additional traffic, as the high volumes along Argus Road make it difficult to manage. Therefore, the addition of site traffic under the 2033 Total horizon is projected to result in significant delays during the AM peak hour.

To accommodate projected traffic volumes, adjustments to the roadway geometry are necessary. Some possible upgrades include implementing the following:

- ▶ Traffic control signals with actuated uncoordinated control
- ▶ Separate left turn lane for eastbound traffic
- ▶ Additional westbound through lane
- ▶ Separate left turn lane for southbound traffic

An interim solution is also expected to be required at the intersection of Argus Road and South Service Road until the intersection can be upgraded. Future southbound left-turn movements from South Service Road East are forecast to operate at LOS F due to high east-west



volumes along Argus Road by-passing the Trafalgar Road / Cross Avenue intersection under the 2028 Total horizon (Opening Day).

Until road widenings occur through the dedication of land by way of future development within the area, it is recommended that the intersection operate with traffic control signals and the addition of a westbound right turn lane. It appears that the pavement width could be wide enough to accommodate the additional lanes through a restriping of pavement markings to provide 3.0m wide lanes.

To improve the operations, it is recommended that the following changes to the lane configuration occur for Opening Day:

- ▶ Restripe pavement markings along Argus Road to provide for a separate right turn lane for the westbound approach.
- ▶ Traffic control signals with actuated uncoordinated control

Argus Road at Cross Avenue

During the weekday peak hours, the majority of movements at the signalized intersection of Cross Avenue and Argus Road/GO Station Driveway operate at LOS C or better. However, based on the projections under 2033 background traffic conditions, the southbound left turn and shared through right turn movement is expected to operate at LOS F with a v/c ratio exceeding 1.00.

The implementation of the local road network under the 2038 Background conditions alleviates some congestion at the intersection, but the southbound left turn is still projected to operate at LOS F with a v/c ratio exceeding 1.00. No new critical movements are identified under the 2043 Background traffic conditions, but increased delay is expected. Development traffic implications are expected to be similar under the 2028-2043 Total conditions.

To accommodate projected traffic volumes, adjustments to the roadway geometry are necessary. Some possible upgrades include implementing the following:

- ▶ Double left turn lane for southbound traffic that is fully protected
- ▶ Prohibit eastbound left turn movements
- ▶ Repurpose the eastbound lane arrangement to have a separate right-turn lane
- ▶ Optimizing the timing of traffic signals



Cross Avenue at Lyons Lane/Commercial Driveway

During the weekday peak hours, the individual movements at the signalized intersection of Cross Avenue and Lyons Lane operate efficiently, at LOS C or better. However, it is predicted that the northbound left-turn operations will decline from LOS C to LOS E with a v/c ratio of 0.98 by 2043 under the background conditions. Despite an increase in site-generated traffic volumes, there will be only a slight increase in delay which does not impact operations.

To accommodate projected traffic volumes, adjustments to the roadway geometry are necessary. Some possible upgrades include implementing the following:

- ▶ Addition of permitted/protective phase for northbound approach

Cross Avenue at GO Station West Access/Street C

The Cross Avenue and GO Station West Access signalized intersection is currently operating well, with most movements grading at LOS B, except for the westbound approach which operates at a poor LOS F during weekday AM peak hour. This is due to the high volume of left-turning traffic travelling into the GO Station. Delay is expected to increase for the westbound approach under the 2028 Background horizon.

Furthermore, under the 2033 Background horizon, the north leg of the intersection will be operational, which will further add delay to the westbound approach, which will operate at LOS F with a v/c ratio exceeding 1.00.

The southbound left-turn will also operate at LOS F with a v/c ratio exceeding 1.00 during the weekday peak hours under the 2038 and 2043 Total (Ph 1+2) conditions, with the addition of site-generated traffic. Lastly, under the 2043 Total conditions, the eastbound approach is projected to operate at LOS D with a v/c ratio of 0.93.

To accommodate projected traffic volumes, adjustments to the roadway geometry are necessary. Some possible upgrades include implementing the following:

- ▶ Repurpose westbound lanes to have a double left turn lane for westbound traffic that is fully protected and a shared through/right turn lane
- ▶ Separate left turn lane for eastbound traffic
- ▶ Convert through lane to right turn lane



- ▶ Optimizing the timing of traffic signals

Street C at Street 1

The intersection of Street C and Street 1 will experience significant delays for westbound traffic during the AM peak hour in the 2038 Background scenario. This is due to the increased traffic from Argus Road being rerouted onto Street 1 and Street C to access the GO station. The proposed development is expected to further increase delays for the westbound approach. However, it is projected that the addition of site traffic will only result in delays of less than 35 seconds throughout the local road network.

To accommodate projected traffic volumes, the intersection should be designed to include the following:

- ▶ Traffic control signals with actuated uncoordinated control
- ▶ Separate left turn lane for eastbound traffic
- ▶ Separate left turn lane for westbound traffic

Transportation Demand Management Plan

A comprehensive TDM plan will be implemented to support the use of transit and active transportation while reducing the number of single-occupant vehicle trips during the peak hours. Specific TDM strategies proposed include, but are not limited to:

- ▶ provision of a reduced parking supply and unbundling the residential units and vehicle parking space sales;
- ▶ provision of on-site bicycle parking with repair stations;
- ▶ Considerations to provide a private on-site bicycle share station;
- ▶ Considerations to provide 5-10 car share on site;
- ▶ Considerations for the provisions of incentive programs designed to encourage the use of on-site services including corporate or private memberships for car-share, and/or carpool services for employees and staff, and potential private or shared micromobility devices; and
- ▶ provision of wayfinding and signage to / from area non-auto transportation services.

It should be noted that a limited parking supply is one of the most essential TDM measures. Research conducted focused on whether a relationship exists between the provision of off-street parking and the choice to drive among individuals travelling to or from the site.



Following data collection and an empirical review of the data, this research found that reductions in off-street vehicular parking for office, residential, and retail developments reduce the overall automobile mode share associated with those developments relative to projects with the same land uses in similar contexts that provide more off-street vehicular parking.

The role of parking management is a crucial element in helping Oakville meet its trip reduction goals. If free and unregulated parking is provided, there is little incentive for many residents and visitors to use alternative modes of transportation. The Town of Oakville's Urban Mobility & Transportation Strategy echoes this sentiment:

"The provision of free parking is a subsidy to drivers, and its removal or reduction can serve as an encouragement to switch to other modes of transport."

Recommendations

Based on the findings of this study, the following recommendations are identified:

- ▶ The Applicant be responsible for the costs related to constructing traffic control signals at the intersection of Argus Road and South Service Road along with the addition of a westbound right turn lane during the interim conditions through restriping of pavement markings.
- ▶ The Applicant implements unbundling resident parking where parking spaces are provided at a separate cost to residents.
- ▶ The Applicant provide a comprehensive TDM plan to maximize alternative mobility opportunities for residents, visitors and employees of the Project.
- ▶ As the increase in traffic at some of the internal study area intersections are a result of overall growth for the area, the Town is recommended to coordinate the improvement plan for additional improvements to the Argus Road and Cross Avenue corridors.



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1 Introduction

1.1 Overview

Initial Official Plan Amendment (OPA), Zoning By-law Amendment (ZBA), and Draft Plan of Subdivision (DPoS) Submission, June 2022

BA Group and Paradigm Transportation Solutions Limited prepared a report entitled “166 South Service Road, Oakville Transportation Impact Study & Parking Study” dated June 2022, which was submitted to the Town of Oakville as part of a joint OPA, ZBA, and DPoS application for the development proposal. As part of this application, a total of 1,606 units, 1,191 parking spaces, 1,609 bicycle parking spaces, and 5 loading spaces were proposed.

Current OPA/ZBA/DPoS Resubmission, March 2024

Following the first OPA/ZBA/DPoS submission, comments regarding the development proposal were provided by Town and Regional staff dated November 2022 and subsequently updated in February 2023. A second OPA/ZBA/DPoS submission is now being made that reflects a development proposal and site plan that has been updated and refined in response to staff comments and as part of the ongoing design development process.

The study aims to assess current traffic and the additional traffic generated by the proposed development, analyze the traffic impact on the adjacent roadway network, and provide the municipality and owner with improvements required to mitigate the identified effects of the site-generated traffic.

More specifically, the scope of this study is to:

- ▶ Forecast traffic from the proposed development;
- ▶ Assign the projected volumes to the surrounding road network based on the existing traffic patterns at the driveway connection;
- ▶ Assess total future traffic within the study area. The following horizons have been considered: Opening Year (2028), Full Build-Out (2033), Five Years after Full Build-Out (2038) and Ten Years after Full Build-Out (2043);
- ▶ Identify operational concerns and any mitigation measures that may be required to improve operations;



- ▶ Review and identify potential Transportation Demand Management (TDM) measures that can be implemented for the proposed development; and
- ▶ Review the proposed parking supply, and determine its adequacy compared to estimated parking demands.

This report adheres to the terms of reference developed by Paradigm and agreed upon by the Town of Oakville, Region of Halton, and the Ministry of Transportation, Ontario (MTO). The correspondence is provided in **Appendix A**.

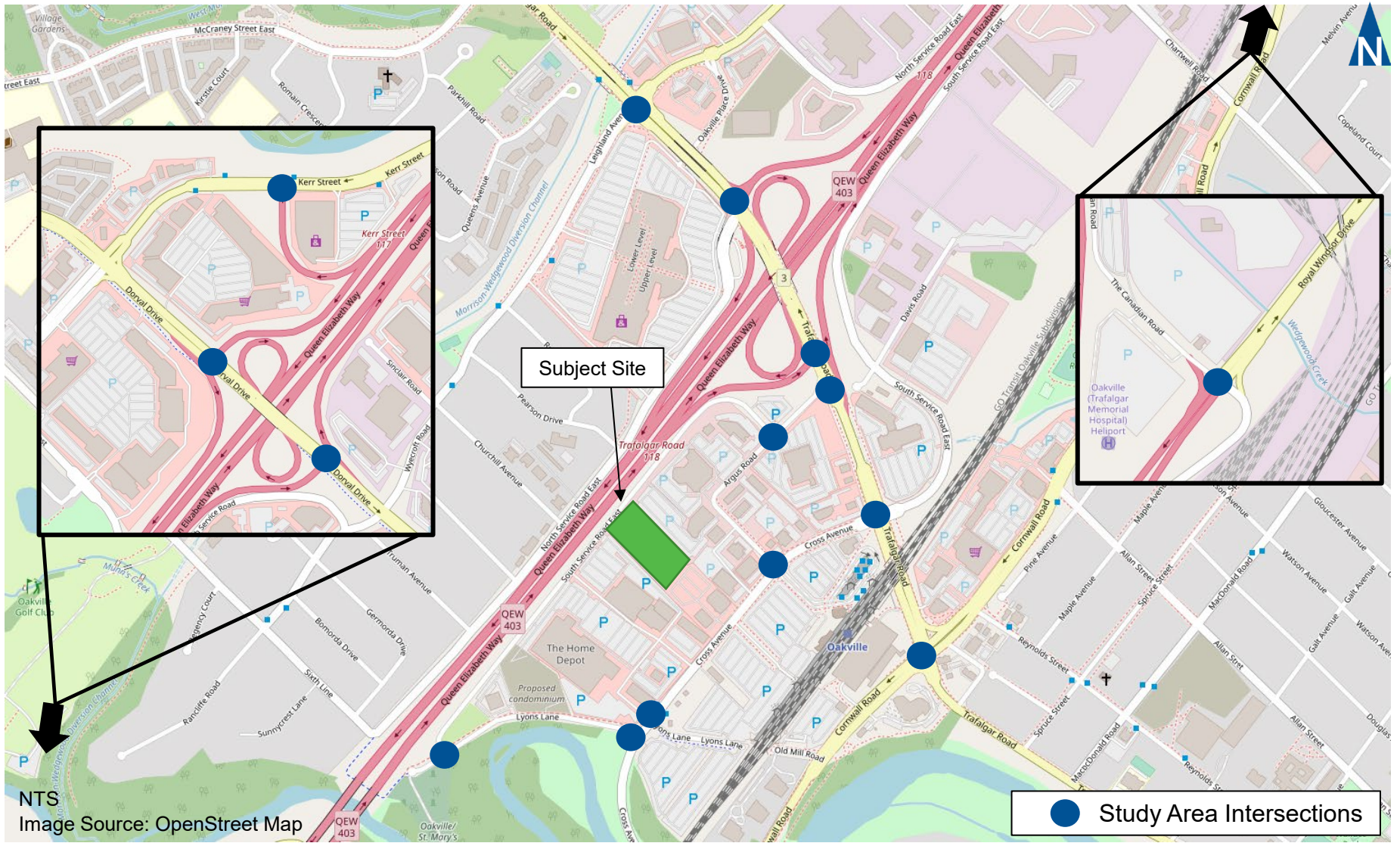
1.2 Study Area

The study area intersections assessed in this study include:

- ▶ Trafalgar Road and QEW Westbound Off-Ramp / North Service Road (Signalized);
- ▶ Trafalgar Road and QEW Eastbound Off-Ramp (Signalized);
- ▶ Trafalgar Road and Argus Road (Unsignalized);
- ▶ Trafalgar Road and Leighland Avenue / Iroquois Shore Road (signalized)
- ▶ Trafalgar Road and Cross Avenue / South Service Road (Signalized);
- ▶ Trafalgar Road and Cornwall Road (Signalized);
- ▶ Cross Avenue and Argus Road / GO Station Driveway (Signalized);
- ▶ Argus Road and South Service Road;
- ▶ Cross Avenue and Lyons Lane West;
- ▶ Cross Avenue and Lyons Lane East;
- ▶ Dorval Road and QEW Westbound Off-Ramp (signalized);
- ▶ Dorval Road and QEW Eastbound Off-Ramp (signalized);
- ▶ Kerr Street and QEW Westbound Off-Ramp (signalized);
- ▶ Canadian Road / South Service Road and Royal Windsor Drive / QEW Eastbound Off-Ramp;
- ▶ Future local Road and South Service Road East; and
- ▶ Two site driveways.

Figure 1.1 illustrates the study area intersections.





2 Existing Conditions

2.1 Roadway Characteristics

The roadways of interest within the study area include:

- ▶ **Trafalgar Road** (Halton Region Road 3) is an urban major arterial road from Cornwall Road northwards and an urban minor arterial road southward from Cornwall Road and is under the jurisdiction of Halton Region. The roadway consists of a six-lane cross-section from Cornwall Road northwards and tapers down to a two-lane cross-section southward. The posted speed limit along Trafalgar Road is 50 kilometres per hour. Pedestrian facilities are provided along both sides of the road in the study area.
- ▶ **Cross Avenue** is an urban minor arterial road from Trafalgar Road to Cornwall Road and is under the jurisdiction of the Town of Oakville. It provides access to the Oakville GO Station and the station's commercial businesses. East of Trafalgar Road, Cross Avenue continues as South Service Road, eastwards towards Royal Windsor Drive. The assumed speed limit of Cross Avenue is 50 kilometres per hour. Pedestrian facilities are provided along both sides of the road in the study area.
- ▶ **Lyons Lane** is a two-lane local road north of Cross Avenue is under the jurisdiction of the Town of Oakville. There is a west portion which runs north towards South Service Road and terminates as a cul-de-sac. There is a sidewalk on the east side of Lyons Lane. The assumed speed limit of Lyons Lane is 50 kilometres per hour.

Additionally, there is an east portion located approximately 40 metres west of the east section that runs southerly providing secondary access to the GO Oakville parking area. There is a sidewalk on the west side of Lyons Lane. The assumed speed limit of Lyons Lane is 50 kilometres per hour.

- ▶ **South Service Road East** is a two-lane local road that fronts the QEW and provides additional access to the existing built lands is under the jurisdiction of the Town of Oakville. From its west end of Lyons Lane, it runs east parallel to the QEW, turning south to intersect with Argus Road. The assumed speed limit of South Service Road is 50 kilometres per hour. There are no pedestrian facilities along South Service Road.
- ▶ **Argus Road** is a two-lane local road that connects Trafalgar Road to Cross Avenue is under the jurisdiction of the Town of Oakville. The assumed speed limit of Argus Road is 50

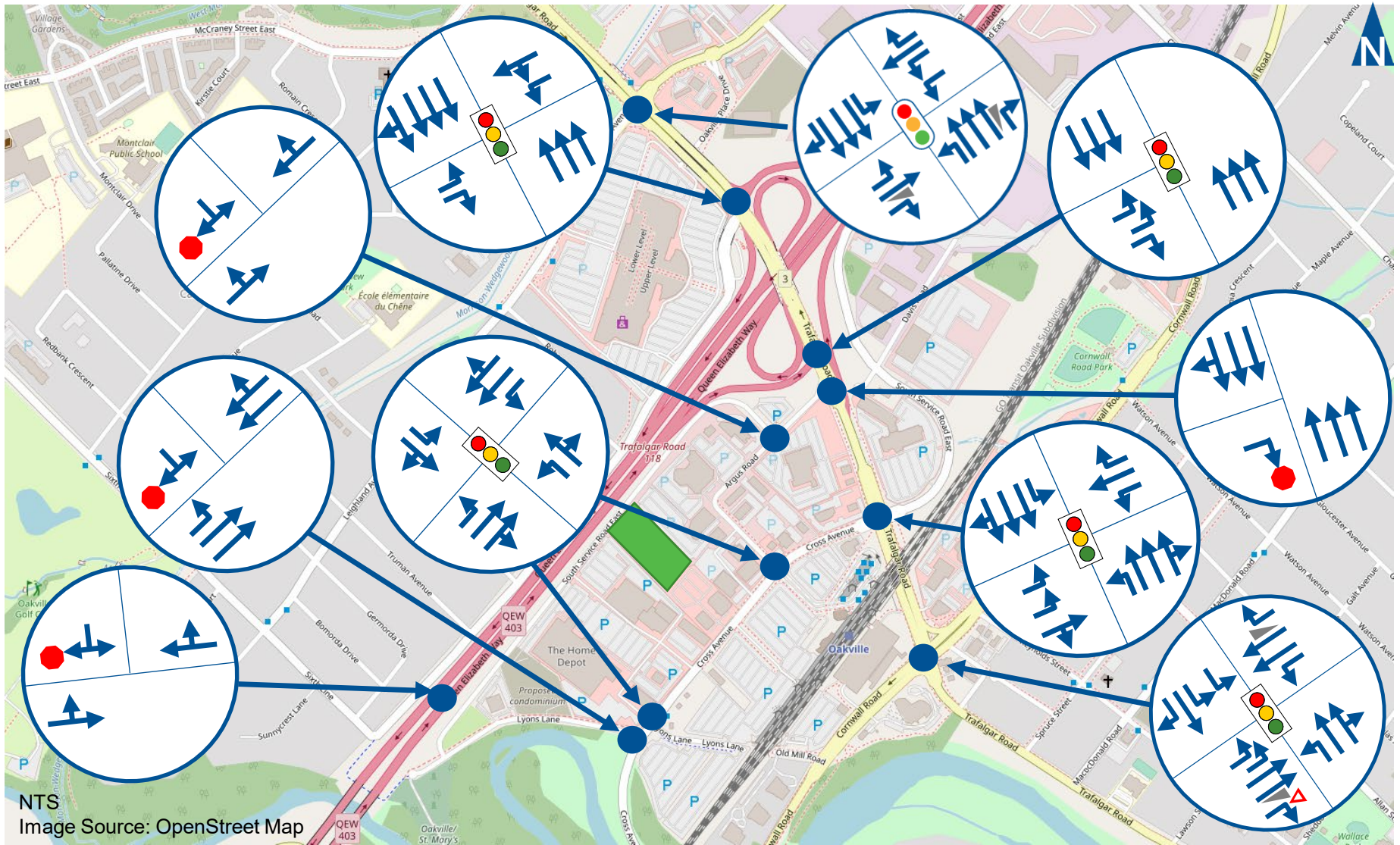


kilometres per hour. There is a sidewalk on the south and east side of the roadway.

- ▶ **Leighland Avenue / Iroquois Shore Road** is an east-west minor arterial road with a four-lane cross-section west of Trafalgar Road is under the jurisdiction of the Town of Oakville. East of Trafalgar is a multi-purpose arterial road with a two-lane cross-section. There is a sidewalk on both sides of the roadway. The posted speed limit is 50 kilometres per hour.
- ▶ **Dorval Road** is a north-south four-lane major arterial road is under the jurisdiction of the Town of Oakville. The posted speed limit is 60 kilometres per hour. There is a sidewalk on both sides of the roadway.
- ▶ **Kerr Street / North Service Road W** is an east-west four-lane minor arterial road is under the jurisdiction of the Town of Oakville. The posted speed limit is 60 kilometres per hour. There is a sidewalk on the south side of the roadway.
- ▶ **Royal Windsor Drive** is an east-west four-lane multi-purpose arterial road is under the jurisdiction of the Town of Oakville. The posted speed limit is 60 kilometres per hour. There is a sidewalk on the north side of the roadway.
- ▶ **Canadian Road** is a north-south two-lane local road is under the jurisdiction of the Town of Oakville. The posted speed limit is 40 kilometres per hour. There are no sidewalks along the roadway.

Figure 2.1 illustrates the study area's existing land configuration and traffic control.





NTS
Image Source: OpenStreet Map

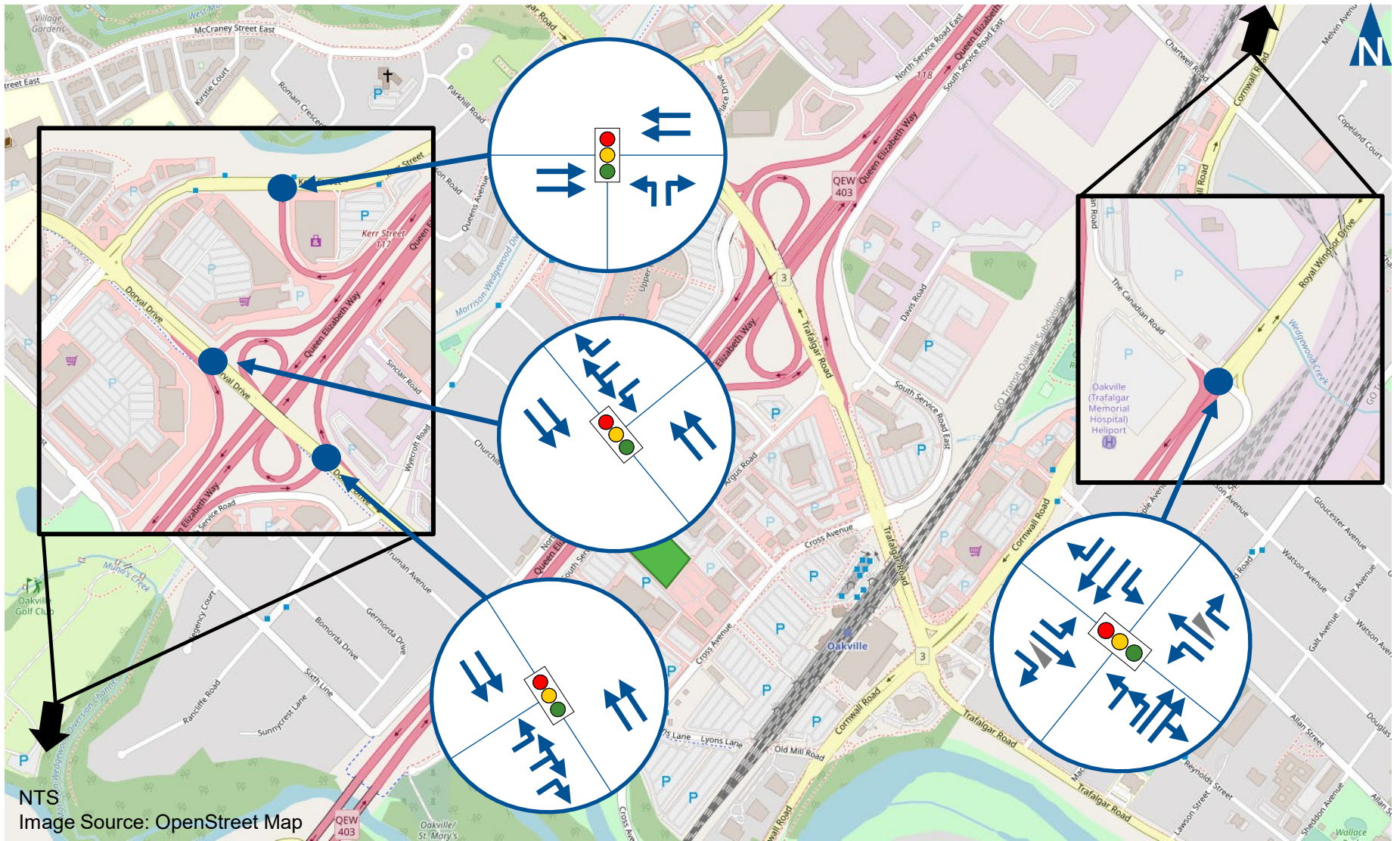


Existing Lane Configuration & Traffic Control (1/2)

166 South Service Road East, Oakville
210590



Figure 2.1A



NTS
Image Source: OpenStreet Map



Existing Lane Configuration & Traffic Control (2/2)

166 South Service Road East, Oakville
210590



Figure 2.1B

2.2 Existing Transit Service

2.2.1 Oakville Transit

Oakville Transit owns and operates the public transit system in Oakville. The subject site is located within the Midtown Oakville Urban Growth Area, one of the most transit-accessible locations within the Town. The subject site is approximately 800 metres (8-minute walk) from the Oakville GO Station, currently serviced by 16 out of 22 Oakville Transit Routes. Most of the transit routes which provide access to all of the Town of Oakville operate seven days a week from early morning to late evening, with headways generally between 10 and 30 minutes depending on the day of week and time of day.

Figure 2.2 illustrates the existing Oakville Transit network. **Appendix B** contains the transit schedules.

2.2.2 GO Inter-Regional Transit

The proposed development is approximately 800 metres (8-minute walk) from the Oakville GO Station. This station is located along the Lakeshore West Line, which currently operates a two-way all-day train service seven days a week and GO Bus connections to Hamilton and Sheridan College and York University via Highway 407. Service from GO Oakville is provided seven days a week starting at 5:16AM to 11:56PM for weekday service and from 5:10AM to 11:56PM for weekend service.

Figure 2.3 illustrates the GO Network's relation to the site. **Appendix B** contains the transit schedules.





Existing Oakville Transit Network

166 South Service Road East, Oakville
210590



Figure 2.2



Existing GO Transit Network

166 South Service Road East, Oakville
210590



Figure 2.3

2.3 Active Transportation

2.3.1 Pedestrians

The site is within walking distance of several retail opportunities providing a range of destinations for prospective residents of the proposed Development that can be readily accessed without using a vehicle.

Pedestrian sidewalks are provided on at least one side of streets through most study areas. Crosswalks, pedestrian pushbuttons, and indicators are provided for all approaches at the signalized intersections within the study area.

The site's proximity to such a range of amenities and destinations within walking distance reduces the need for residents to travel regularly using a car and own a vehicle.

2.3.2 Cycling

On-road cycling lanes are not currently provided on the streets in the study area. However, the Town of Oakville's Active Transportation Master Plan identifies that Trafalgar Road and Cross Avenue are proposed to be reconstructed with on-street cycle lanes, as indicated in **Figure 2.4**.

In addition, as cyclists are permitted to ride on most roads except controlled-access highways, the lack of separate bicycle lanes on all other local and collector roadways will not prohibit this type of travel.

2.3.3 Travel Characteristics

A review of existing modes of transportation by area residents has been completed. Data on primary modes of transportation for all trips within Ward 3 was extracted from the 2016 Transportation Tomorrow Survey (TTS)². The TTS data indicates that during the AM peak hour, the automobile accounts for 71 percent of trips made by residents, while transit accounts for 13 percent (one percent for local transit and 12 percent for GO Train). Walking and cycling (8 percent) and other modes (8 percent) account for the remaining percentages.

² Transportation Tomorrow Survey 2016, Regional Municipality of Halton Summary by Ward, March 2018, Malatest





NTS
Image Source: Oakville ATMP 2009



Proposed Cycle & Trail Network

166 South Service Road East, Oakville
210590



Figure 2.4

2.4 Traffic Volumes

Turning movement counts are used to quantify the movement of vehicles through the area to assess intersection operation. Existing traffic data at an intersection or road section forms the foundation for analysis. The counts are usually taken during peak periods at an intersection to complete the level of service analysis. **Appendix B** contains the traffic data utilized in this report.

Historic TMC data has been used and adjusted to provide reasonable traffic volumes for the baseline horizon (2023), using a growth rate of 2% per annum as outlined by the Region.

2.4.1 Traffic Data

Existing historical traffic counts were obtained from the Region of Halton, MTO, and collected by Paradigm. **Table 2.1** provides a summary of traffic count locations and sources.

TABLE 2.1: TRAFFIC COUNT SUMMARY

Intersection	Count Date		Provider	Weekday Peak Hour	
	Year	Month		AM	PM
Trafalgar Road and Leighland Avenue / Iroquois Shore Road	2019	December	Halton Region	7:45 - 8:45	4:30 - 5:30
Trafalgar Road and QEW Westbound Off-Ramp / North Service Road	2022	May	MTO	8:00 - 9:00	5:00 - 6:00
Trafalgar Road and QEW Eastbound Off-Ramp	2022	May	MTO	8:00 - 9:00	5:00 - 6:00
Trafalgar Road and Argus Road	2022	June	Halton Region	8:00 - 9:00	4:45 - 5:45
Trafalgar Road and Cross Avenue / South Service Road	2022	April	Spectrum	8:15 - 9:00	5:00 - 6:00
Trafalgar Road and Cornwall Road	2022	October	Halton Region	8:00 - 9:00	3:15 - 4:15
Argus Road and South Service Road	2019	January	Paradigm	7:30 - 8:30	4:00 - 5:00
Lyons Lane and South Service Road	2019	January	Paradigm	7:45 - 8:45	3:15 - 4:15
Cross Avenue and Argus Road / GO Station Driveway	2019	January	Paradigm	7:30 - 8:30	5:00 - 6:00
Cross Avenue and GO Oakville Driveway	2018	November	Trans Plan	7:15 - 8:15	5:00 - 6:00
Cross Avenue and Lyons Lane/Commercial Driveway	2019	January	Paradigm	7:30 - 8:30	5:00 - 6:00
Cross Avenue and Lyons Lane	2019	January	Paradigm	7:45 - 8:45	5:00 - 6:00
Cross Avenue and Cornwall Road/Speers Road	2021	November	Spectrum	8:00 - 9:00	4:30 - 5:30
Dorval Drive and QEW Westbound Off-Ramp	2018	August	MTO	8:00 - 9:00	4:30 - 5:30
Dorval Drive and QEW Eastbound Off-Ramp	2018	August	MTO	8:00 - 9:00	4:15 - 5:15
Kerr Street and QEW Westbound Off-Ramp	2018	August	MTO	8:00 - 9:00	4:45 - 5:45

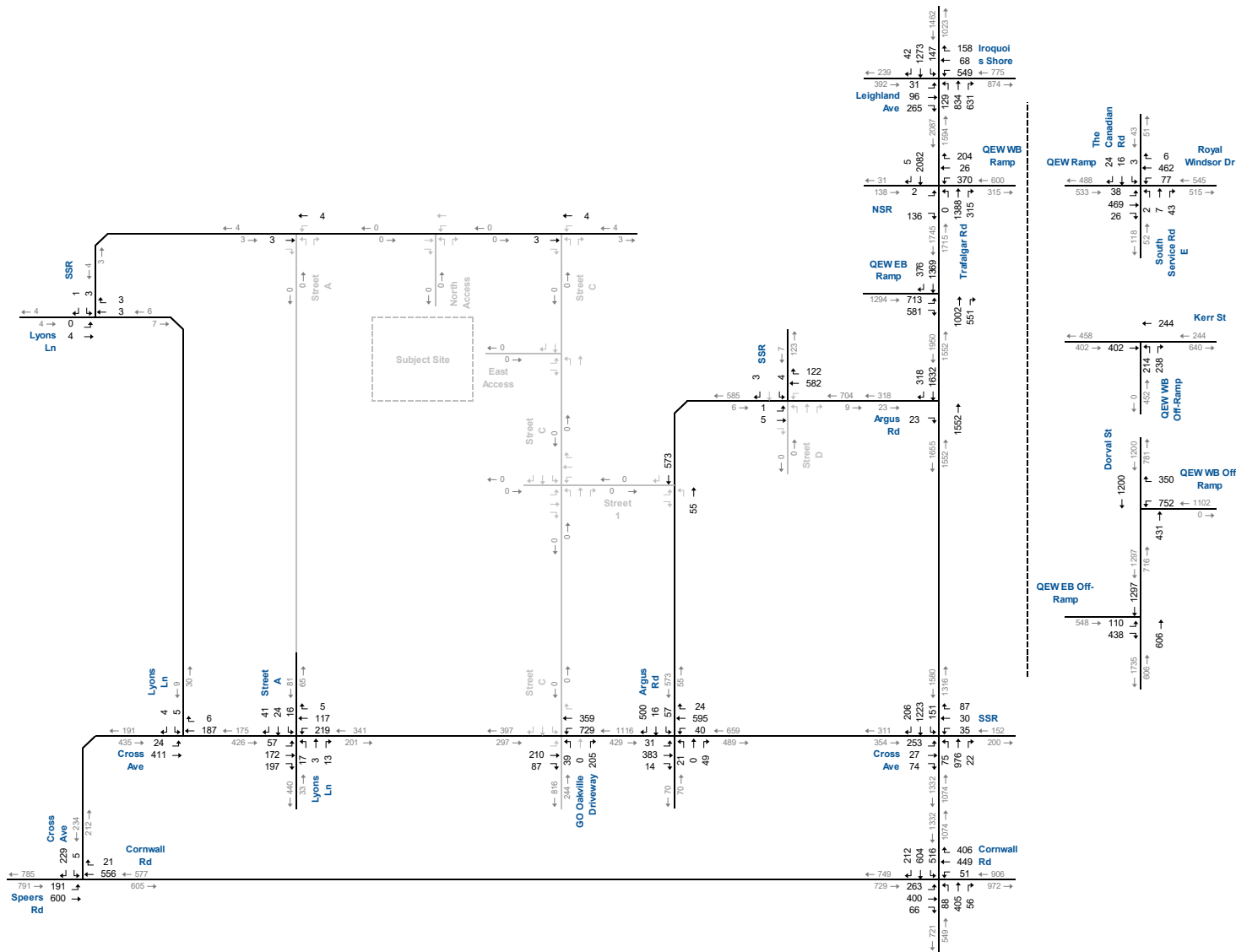


2.4.2 Volume Balancing

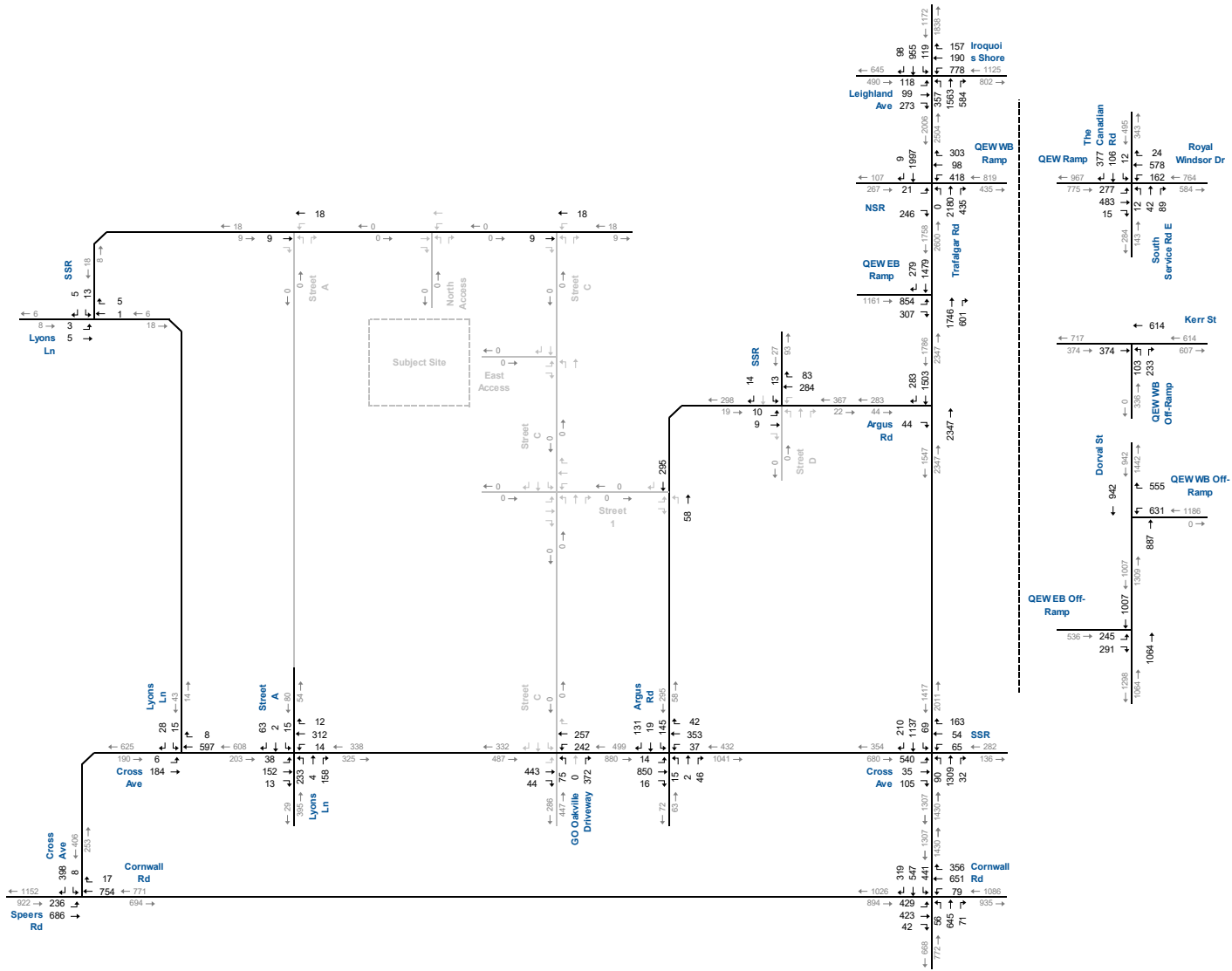
Volume balancing along Trafalgar Road has been applied to ensure that the corridor maintains reasonable upstream and downstream flow. No balancing however occurred with respect to intersections within Midtown Oakville given a number of commercial driveways and access to the GO station is provided.

Figures 2.5A and **2.5B** illustrate the adjusted base year traffic volumes during the weekday AM and PM peak hours.





Base Year Traffic Volumes AM Peak Hour



Base Year Traffic Volumes PM Peak Hour

166 South Service Road East, Oakville
210590



Figure 2.5B

3 Future Road Network

3.1 Trafalgar EA

The Trafalgar Road (Regional Road 3)³ Improvements Class Environmental Assessment Study from Cornwall Road to Highway 407 was completed in May 2015. It was recommended that Trafalgar Road be widened from four (4) to six (6) lanes and convert the curb lanes to high occupancy vehicle (HOV) or bus rapid transit (BRT) lanes after completion of the road widening by 2032.

Trafalgar Road is currently a six-lane cross-section plus exclusive left-turn lanes within the study area. The only modification to the road network for future analyses is removing the eastbound channelized right-turn at Trafalgar Road and Cornwall Road to be consistent with the preferred design.

3.2 Midtown Oakville EA

The Town of Oakville completed a Class Environmental Assessment (EA) for Midtown Oakville (MOEA)⁴ to guide the development of the transportation and municipal stormwater network needed to accommodate the planned growth in Midtown Oakville. The MOEA identified critical changes to the existing and planned road network that would be required to support intentional growth.

In addition, other master plans have been updated and technical studies completed, including the Halton Region Transportation Master Plan⁵, the Town of Oakville Transportation Master Plan – Switching Gears⁶, the Midtown Parking Strategy⁷, and Designing Midtown Oakville⁸. As a result, the Town has proposed an Official Plan Amendment (OPA) that would incorporate the results of these studies into the Official Plan and bring the policies and Schedules into alignment with the most current source documents.

³ Trafalgar Road Improvements Class Environmental Assessment Study from Cornwall Road to Highway 407, Town of Oakville, AECOM, April 2015.

⁴ Midtown Oakville Transportation and Stormwater Municipal Class Environmental Assessment, Cole Engineering, June 2015.

⁵ The Road to Change – Halton Region Transportation Master Plan, Dillion Consulting/GHD, October 2011

⁶ Town of Oakville Transportation Master Plan – Switching Gears, WSP + GLP, March 2018.

⁷ Midtown Oakville Parking Strategy, BA Group, May 2014.

⁸ Designing Midtown Oakville, Town of Oakville, September 2013.



The latest draft of the transportation network for the Midtown Oakville OPA is dated May 2023. The changes to the Midtown-related transportation network include modifications designed to the broader area network and changes to the local road network within Midtown Oakville. To accommodate traffic to and from Midtown Oakville and to provide an alternative to Trafalgar Road, several improvements are provided, including direct off-ramps from eastbound QEW at Trafalgar Road and new ramps to/from the QEW at Royal Windsor Drive;

- ▶ A direct route from eastbound QEW to Midtown Oakville is provided via a new off-ramp that crosses under Trafalgar Road. This reduces the impacts of future traffic demand on the existing constrained intersections along Trafalgar Road at the off-ramp and Cross Avenue. The underpass of Trafalgar Road also provides the opportunity for improved active transportation connections into Midtown Oakville.
- ▶ A direct route from eastbound QEW to Midtown Oakville is provided via a new off-ramp to Cross Avenue at the Royal Windsor Drive interchange. A direct route from Midtown Oakville to eastbound QEW is provided via a new on-ramp at Royal Windsor Drive opposite Cross Avenue. A new westbound QEW off-ramp at Royal Windsor Drive will offer an alternative route to Midtown Oakville and surrounding areas.
- ▶ Cross Avenue is extended from Trafalgar Road to Royal Windsor Drive, connecting with the enhanced QEW interchange. Cross Avenue will provide accessible facilities for pedestrians and cyclists to travel safely, on-street parking where appropriate and four vehicular travel lanes.
- ▶ For access and circulation within Midtown Oakville, a revised local road network for Midtown Oakville is designed to support and align with the broader transportation network determined through the MOEA. As part of the modified road network, Lyons Lane at Cross Avenue is proposed to be realigned to form a four-way signalized intersection. Other local road network changes include a north-south local road connecting South Service Road East and Cross Avenue and a new east-west road connecting Argus Road. For this study, the east-west local road is only assumed to extend between Argus Road and the new north-south local road. It is also assumed the realignment of Argus Road does not occur.



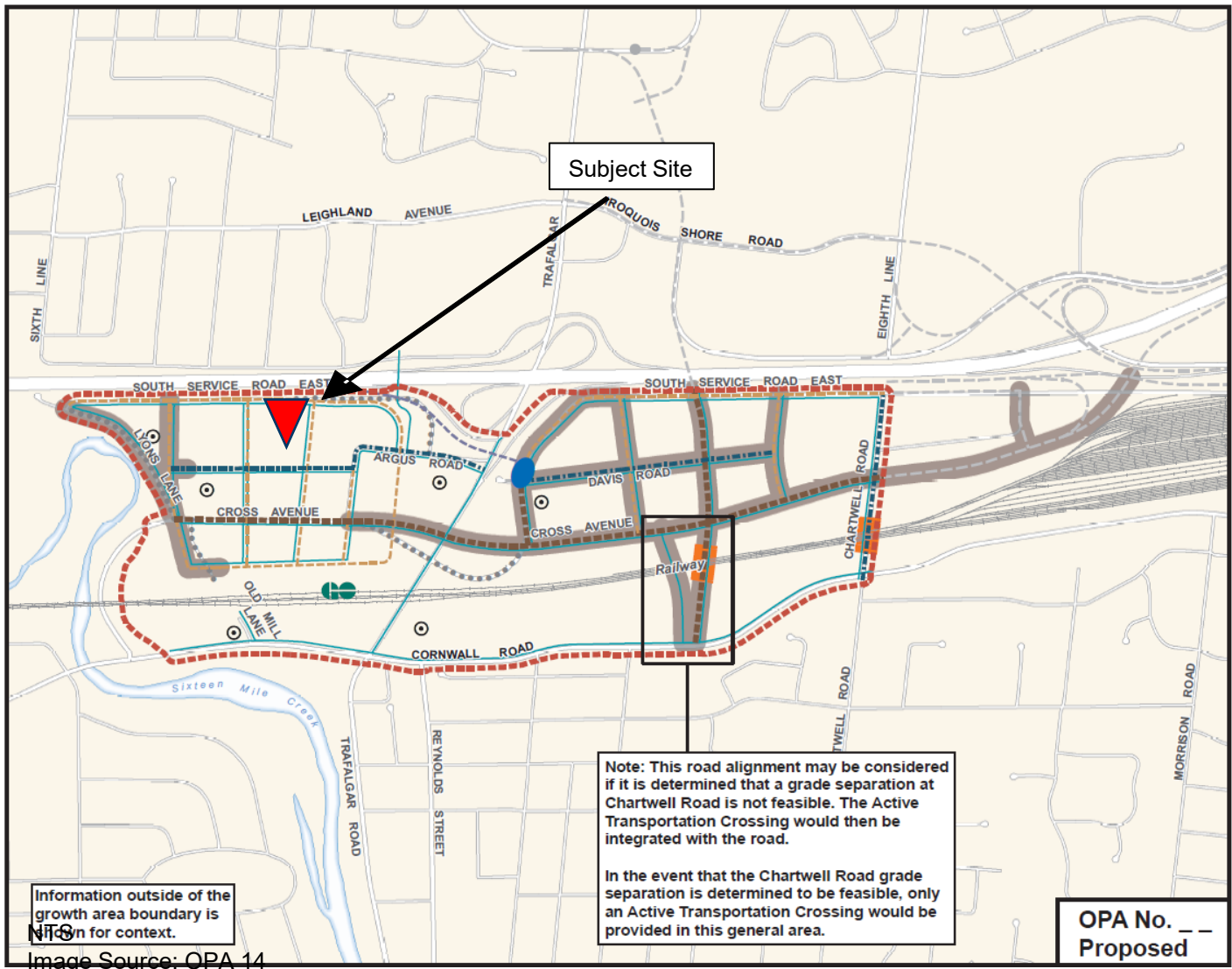
The proposed improvements are not expected to significantly impact the QEW mainline operations with the refinements to the design to accommodate weaving and merging better. The new ramps at Royal Windsor Drive and Trafalgar Road will accommodate the additional travel demand from Midtown Oakville's planned intensification, relieving the existing Trafalgar Road interchange.

Ramp network improvements are not assumed to be in place given the timeline of this study. However, the new local roads are assumed only in the 2037 horizon to assess the long-term impacts for the area.

Figures 3.1 and 3.2 illustrate the proposed transportation network for Midtown Oakville.

The MOEA recognized that the roadway improvements identified herein would provide some relief to operational issues; however, capacity constraints will persist for the overall vehicle transportation network.





SCHEDULE L3 MIDTOWN OAKVILLE TRANSPORTATION NETWORK

- URBAN GROWTH CENTRE / PROTECTED MAJOR TRANSIT STATION AREA / GROWTH AREA BOUNDARY
- EXISTING ROAD NETWORK
- FUTURE 35m ARTERIAL
- FUTURE 26m COLLECTOR
- FUTURE 22m LOCAL ROAD
- FUTURE RAMP
- FUTURE ACTIVE TRANSPORTATION FACILITY
- FINAL ROAD ALIGNMENT SUBJECT TO FURTHER STUDY
- ROAD PROPOSED TO BE ABANDONED
- INTERSECTION CONFIGURATION SUBJECT TO FURTHER STUDY
- FUTURE RAILWAY GRADE SEPARATION
- RAILWAY
- MAJOR TRANSIT STATION

REFER TO PART E, MIDTOWN OAKVILLE FOR GROWTH AREA POLICIES

REFER TO PART E, MIDTOWN OAKVILLE EXCEPTIONS

1:9,000
May 2, 2023

© DEPARTMENT OF PLANNING AND COMMUNITY DEVELOPMENT, OPA, REVISED, MIDTOWN PROPOSED SCHEDULE L3, PROPOSED, MIDTOWN.mxd

Information outside of the growth area boundary is shown for context.

Image Source: OPA 14

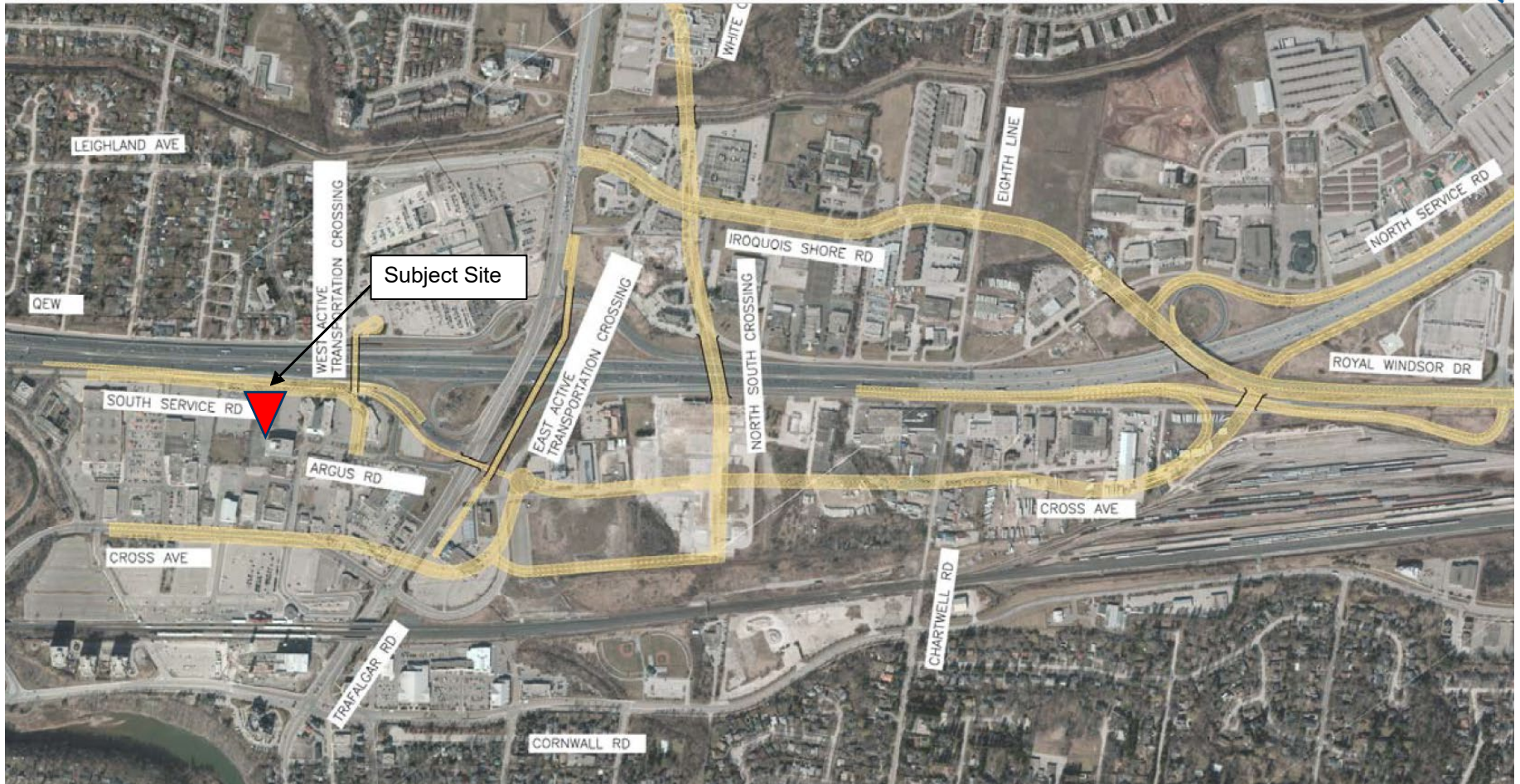


Midtown Oakville Proposed Road Network

166 South Service Road East, Oakville
210590



Figure 3.1



NTS

Image Source: Midtown Oakville Class EA



Midtown Oakville Broader Area Improvements

166 South Service Road East, Oakville
210590



Figure 3.2

3.3 Consortium

The consortium is a team of consultants that act as an extension of Town staff to deliver plans and studies needed to make Midtown Oakville ready for development. Their current scope of work for the Midtown Oakville area includes:

- ▶ Urban Planning and Design
 - Creating a Public Realm Master Plan for Midtown Oakville
 - Setting the Zoning By-law requirements for the Midtown Oakville area
 - Economic Development Strategies
 - Recommend a urban design direction
- ▶ Infrastructure Planning and Design
 - Creating a Transportation Master Plan for Midtown Oakville including street Right-of-Ways (ROW)
 - Integrating a network that prioritizes pedestrians, cyclists, and transit
 - Phasing and implementation strategy
 - Functional road plans
- ▶ Capital Plan and Financing Strategy
- ▶ Public Engagement, Communications, and Stakeholder Liaison

To date, the consortium has provided concept options for Midtown in November 2023 and January 2024 which illustrated street network considerations and master plan land use block concepts. Highlights included alternative street network options, land use concepts, parks and open space, community amenities, retail streets/districts, active transportation networks, and height and density ranges.



3.4 Midtown Oakville Street Network Modifications

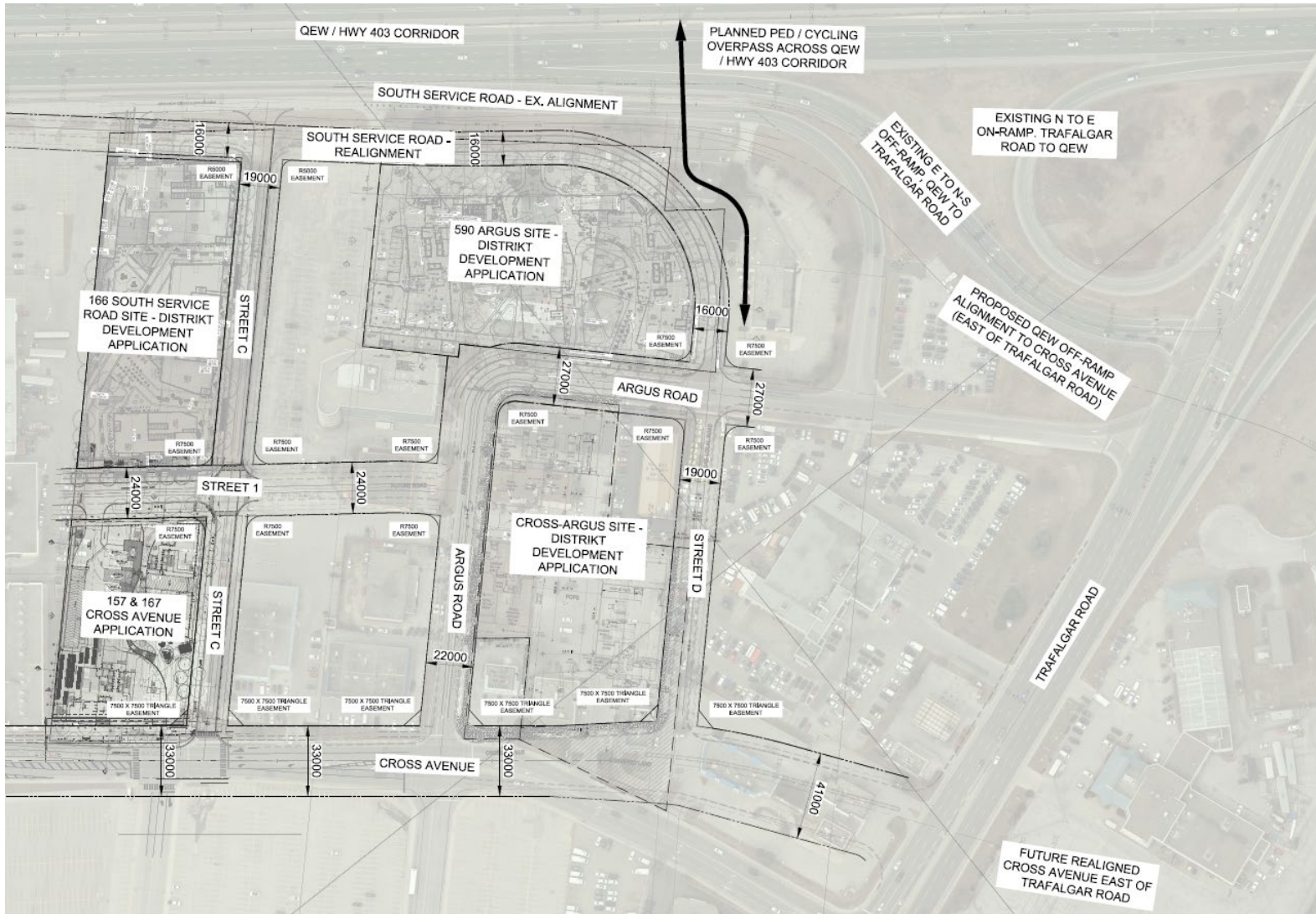
Through the Midtown Oakville Environmental Assessment Study (Midtown EA), the Town of Oakville has established a proposed street system to support intensification within the Midtown area of the Town. Central to this proposed street system, west of Trafalgar Road, are the following key components of the future Midtown street network illustrated in **Figure 3.2** (generally consistent with the Draft Proposed Midtown OPA Schedule L3):

- ▶ The realigned Cross Avenue as it crosses Trafalgar Road;
- ▶ The realigned South Service Road (to facilitate the introduction of a new eastbound off-ramp from the Queen Elizabeth Way (QEW)/Highway 403 corridor that would augment the existing eastbound QEW /403 off-ramp, by providing an additional direct link – underneath Trafalgar Road – to the realigned Cross Avenue on the east side of Trafalgar Road);
- ▶ New Local and Collector streets that would provide internal Midtown linkages between Cross Avenue, South Service Road, and Argus Road.

Providing these Midtown streets is essential to support transportation needs within the Midtown Oakville Urban Growth Centre. This area would accommodate the densest development planned within the Town of Oakville by creating:

- ▶ A structure of development blocks;
- ▶ Opportunities for direct vehicular access;
- ▶ Opportunities to substantially improve the multi-modal network afforded the planned intensification within Midtown; and,
- ▶ The necessary routing options for all modes to appropriately navigate between future development blocks and the key element within the protected Major Transit Station Area (MTSA), namely the Oakville GO Station Hub – housing Metrolinx’s GO Rail and GO Bus stations and the Oakville Transit Terminal.





NTS

3.4.1 Lane Configurations / ROW Widths / ROW Elements

As part of the review of the Midtown Oakville Street network outlined in the Draft Proposed Midtown OPA, the functional design requirements associated with each of the aforementioned streets was undertaken in order to determine an appropriate set of ROW dimensions that were driven by the functional needs of ROW components. A summary of that review and of the key ROW components and associated dimensions are provided in **Table 3.1**.

An important component of each Midtown street, regardless of its “classification” within the typical street hierarchy, was provision of appropriate space to accommodate a multi-modal public street network that exhibited a suitable “urban design” with well conceived space for pedestrians, including landscaping elements, cyclists, transit services (should they be routed along certain segments), general vehicular traffic, service vehicle traffic and emergency vehicle access and routing options.

The lane configurations contemplated along these Midtown streets reflect those generally identified in the Midtown EA. Key intersection design parameters have also generally been taken into consideration in the ultimate configuration of streets such as Cross Avenue, where vehicular capacity relative to the ultimate level of intensification of the broader Midtown area would be better defined on an area-wide assessment – something the Town of Oakville will be engaging in through their Midtown Consortium initiative that will get underway shortly.

At this juncture, the ROW’s have been accommodated along segments of Future Midtown public streets that abut the development and have made allowance for vehicular lane configurations consistent with anticipated vehicular volumes associated with the general level of intensification within the Midtown area. The scale of the Future Midtown public streets illustrated in **Figure 3.3** also balances the non-vehicular space required to appropriately accommodate and encourage active transportation modes to serve the local day-to-day needs of residents, visitors, employees, and commuters.

As **Table 3.1** notes, most Future Midtown streets are expected to devote at 50%, and up to 60%, of their ROW dimension to non-vehicular activities or uses. The exception being Cross Avenue, where the requisite number of vehicular lanes given its role in providing significant vehicular capacity in and out of the Midtown area (west of Trafalgar Road) is dictating a larger proportion of the overall ROW dimension. Where consideration of the potential Cross Avenue



Promenade is included, the non-vehicular component of the ROW is again in the 50% to 67% range of overall ROW.

In some instances, and in particular, along the developments frontage, the public sidewalk dimension of 2.0 metres (minimum, inclusive of the offset to the property line) will be augmented by private setbacks that will serve as additional amenity space, increasing the overall (seamless) publicly available space along the development edges. A review of individual Midtown Street segments follows.

TABLE 3.1: PROPOSED STREET SEGMENT DIMENSIONS

Street Elements	Cross Avenue @ Trafalgar	Cross Avenue @ 4 / 5-Lane Section ⁵	Argus Road @ 3 / 4 Lane Section	South Service Road	Street D	Street 1	Street C
Overall Right of Way dimension	41m (min.)	33m (min.)	22m – 27m	16m	19m	24m	19m
Vehicular Section							
• Curb-to-Curb ¹	24.8m	13.2m - 18.2m	9.6m - 13.2m	7.0m	8.5m	9.6m	8.5m
• # of Lanes	7	4 – 5	3 – 4	2	2	3	2
• Typ. Lane Width	3.3m (plus 2m for median island)	3.3m (plus 2m for median island in 5 lane section)	3.3m (3m centre lane in 3 lane section)	3.5m	3.25m (plus 2 m parking land one side)	3.3 m (3m centre lane)	3.25m (plus 2m parking land one side)
Bldv. Section							
• Total One Side	8.1m	7.4m - 9.9m	6.2m - 6.9m	6.5 m (south side); 2.5 m (north side)	5.25m	7.2m	5.25m
• S/W width ²	3m	3m - 4.5m	2.3 m	2.5 m (south side) n/a	2.5m	2.4m	2.5m
• Cycle Track ³	2.4m	2.4m	2.4 m	n/a	n/a	2.1m	n/a
• Landscape ⁴	2.7m	3m - 2.3m	1.5m - 2.2m	4.0 m (south side); 2.5 m (north side)	2.75m	2.7m	2.75m
% Total Blvd. space w/in ROW	40%	45% to 60%	56% - 51%	56%	55%	60%	55%

Notes:

1. Measured Curb face to curb face inclusive of 0.3 gutter dimension.
2. Inclusive of offset to Property Line
3. Inclusive of 0.6 m buffers to S/W
4. Inclusive of top of curb dimension of 0.2 m
5. Ranges are provided to capture a central median in certain segments of the road



3.4.2 Daylighting Triangles

Representing a conflict area for pedestrians, cyclists, and vehicles, public road intersections are a critical element in safe road design. Daylighting triangles are located at the four (4) corners of an intersection and are typically kept free of visual obstacles that restrict a driver's sight distance. The purpose of a daylighting triangle is to:

1. Minimize conflicts between pedestrian, cyclists, and vehicles;
2. Introduce utilities, streetscape and street furniture; and,
3. Widen sidewalks within the area.

The size of a daylight triangle is dependent on the road classification of the intersecting public roads. The minimum daylighting triangle sizes are provided in the Town of Oakville standard STD 8-4 and was last revised in July 1995. **Table 3.2** outlines these requirements.

TABLE 3.2: TOWN OF OAKVILLE DAYLIGHT TRIANGLE REQUIREMENTS

Road Classification	Minor Local Road	Local Road	Collector Road	Arterial Road
Minor Local / Local Road	N/A	N/A	7.5m Day Lighting Triangle	15.0m Day Lighting Triangle
Collector Road	7.5m Day Lighting Triangle	7.5m Day Lighting Triangle	7.5m Day Lighting Triangle	15.0m Day Lighting Triangle
Arterial Road	15.0m Day Lighting Triangle	15.0m Day Lighting Triangle	15.0m Day Lighting Triangle	15.0m Day Lighting Triangle

It should be noted that the Oakville OP policy: 8.12.3 states: ...*“Where appropriate and public safety is not affected, the Town will minimize the amount of land utilized for daylighting triangles to contribute to a more urban environment and maximize the efficient use of land.”*

Consistent with policy 8.12.3 and to ensure a more urban context is created at the junction of the local, collector, and arterial streets within Midtown, reduced daylighting triangles and corner roundings and are proposed at the junction of the local, collector, and arterial streets.



The proposed daylighting dimensions provided in **Table 3.3** are a combination of corner roundings and daylighting triangles for the public street junctions. Similar to the urban conditions of the City of Toronto, these areas are proposed to be surface easements in order to construct a compact and efficient underground parking garage.

TABLE 3.3: PROPOSED DAYLIGHT TRIANGLE AND CORNER ROUNDING

Road Classification	Minor Local Road	Local Road	Collector Road	Arterial Road
Minor Local / Local Road	5m Corner Rounding	5m Corner Rounding	7.5m Corner Rounding	7.5m Day Lighting Triangle
Collector Road	7.5m Corner Rounding	7.5m Corner Rounding	7.5m Corner Rounding	7.5m Day Lighting Triangle
Arterial Road	7.5m Day Lighting Triangle	7.5m Day Lighting Triangle	7.5m Day Lighting Triangle	7.5m Day Lighting Triangle

For context, the City of Toronto adopts corner roundings at junctions based upon the road ROW widths as seen in **Table 3.4**. The City of Toronto corner rounding requirements have been referenced to create a comparable guideline for the envisioned urban community in the Midtown Oakville area.

It should be noted that the City of Toronto, by way of context, allows development sites to use these corner roundings to function as a surface easement and permits underground structure to be built beneath the area. By keeping the at-grade area clear of visual obstructions, the corner rounding achieves what it is intended to do. Areas below grade will not influence the sight lines or cause additional conflict between pedestrians and vehicles.

TABLE 3.4: CITY OF TORONTO CORNER ROUNDING REQUIREMENTS

Intersection Approaches, ROW			ROW Rounding (m)
ROW Width (m)	X	ROW Width (m)	
<23	x	<23	5
23-36	x	23-36	6
<36	x	<36	8



3.5 Review of Selected Midtown Area Street Segments

3.5.1 South Service Road Changes

The Midtown EA Street network configuration contemplates the realignment of the South Service Road from a point just west of the Applicant's 166 South Service Road development lands, easterly to a new intersection with Argus Road, west of its current position.

This realignment results from the planned introduction of a new eastbound off-ramp from the QEW that will be parallel to, but south of, the existing eastbound off-ramp from the QEW, and extend beneath Trafalgar Road to connect with the realigned Cross Avenue, east of Trafalgar Road.

In realigning South Service Road, properties along the south side will have to accommodate the "shift" in South Service Road as well as the commensurate "shift" in the Ministry of Transportation, Ontario's (MTO) 14 metre setback provision. It is anticipated that the MTO's 14 metre setback provision would be required only along the portion of the realigned South Service Road that is parallel to MTO ROW limits.

The north-south realigned segment of the South Service Road that will intersect with Argus Road, will be paralleled (to its immediate east) by the Future Active Transportation bridge structure that will cross the QEW corridor. It is contemplated that this will involve a combination of retaining wall and earth structure.

The resulting intersection of the realigned South Service Road and Argus Road will align opposite Street D, as illustrated in **Figure 3.3**. It is contemplated that in the fullness of time, this intersection would be signalized to accommodate the resulting traffic volumes within the Midtown area as well as to provide a controlled crossing for pedestrians, given the Future Active Transportation bridge crossing of the QEW corridor.

The cross-section of the realigned South Service Road is envisioned to be a 16-metre-wide ROW. Given the relationship with the MTO facilities to the immediate north, the vehicular travelled portion of South Service Road would be positioned such that the boulevard between the travelled way and the north ROW limit would be 2.5 metres in width, inclusive of a 0.5 metre offset from the north ROW limit and a 2.0 metre landscaped strip which includes "top of curb." The travelled portion of South Service Road would consist of two 3.5-metre-wide lanes. The south boulevard of South Service Road would be 6.5 metres in width, inclusive of a 4.0 metre landscaped strip (including the



“top of curb”) and a 2.5 metre sidewalk (including the offset to the south ROW limit.

South Service Road would effectively resemble a 30-metre ROW from the perspective of the development side of its alignment. The adjacency to the MTO ROW allows for a reduced boulevard dimension without negatively impacting the effective relationship with the south (development) side of South Service Road.

3.5.2 “Swoosh” vs. Elbow – Alignment of Argus

The Town of Oakville Official Plan had originally considered retaining the existing “elbow” design along Argus Road in its Midtown Oakville transportation Network (Schedule L3 from August 2018).

An alternative to the “elbow” alignment had been considered by the Town – the so-called “swoosh” alignment – along Argus Road. This would have involved a continuous east-west alignment extension of Argus Road, further west, essentially connecting Argus to what is referred to as Street 1 on **Figure 3.3**. This was reflected in the Town’s 2021 Draft Proposed Midtown OPA Schedule L3.

The 2022 and current 2023 Draft Proposed Midtown OPA Schedule L3 reverts back to the “elbow” design with Argus Road retaining its alignment and connecting to the realigned Cross Avenue and introducing Street 1 (as shown in **Figure 3.1**) as the east-west collector street serving as the mid-block east-west collector in Midtown, north of Cross Avenue.

The impacts of the “swoosh” alignment were assessed during the preparation of the Applicant’s “Cross-Argus” development application (refer to **Figure 3.3**), as well as during the preparation of the traffic analysis of the Applicant’s “590 Argus Road” development application.

The evaluation, from the perspective of the “Cross-Argus” development site, identified substantive impacts on the viability of developing that particular development site. As such, the Cross-Argus development application adopted the “elbow” alignment of Argus Road.

As this assumption retained the existing Argus Road alignment, the 590 Argus Road assessment reviewed the ROW requirements of Argus Road and the associated operating conditions, in determining whether retaining the “elbow” alignment could be technically supported.

The “elbow” alignment was reviewed from a geometric perspective wherein a four-lane cross-section was provided ‘around the elbow,’ and one of those lanes (southbound right turn lane) was dropped at



Street 1 to both facilitate the demand for that southbound right turn and to enable a reduction in the ROW dimension along Argus Road, south of Street 1, thereby reducing the overall pavement width, but retaining the boulevard (active transportation) conditions.

The assessment of the operating conditions along Argus Road at Street 1 adopted a simplified lane configuration (single lane with shared turn lanes) in this area to ensure that the development levels adopted in that analysis could be accommodated accordingly. Allowance within the geometric design conditions for Argus Road for a four-lane cross-section and along Street 1 for a three-lane cross-section is intended to make provision for additional intensification further west within the Midtown area that has not yet been identified by any landowners west of the Applicant's "166 South Service Road" development site.

The review of the geometric and operational assessments of the Argus Road alignment indicates that the "elbow" alignment, currently reflected in the 2023 Draft Proposed Midtown OPA Schedule L3 appropriately accommodates the anticipated needs of Argus Road within the larger context of the intensification of the Midtown area.

3.5.3 E-W Collector Road (Street 1)

The East-West mid-block collector street, north of Cross Avenue in the Midtown area, referred to as Street 1 in **Figure 3.3**, has been assumed to reflect a three-lane cross-section with a 24-metre ROW dimension.

Street 1 is envisioned in the Town's Midtown OPA Schedule L3 (both current and proposed versions) to intersect with several north-south local streets, thereby providing options for both Active and vehicular modes to access the future development blocks within Midtown.

The proposed three-lane cross section, within a 24 metre ROW provides flexibility to accommodate both through and turning movements at any of the intersecting locals streets, while accommodating both appropriate pedestrian sidewalk conditions AND cycle tracks along with landscaping provisions. The ROW and cross-section configuration also permits the provision of on-street parking within lay-bys, where landscaping could be 'interrupted' in strategic locations, depending on the nature of the fronting development conditions.



3.5.4 Future Local Road (Street C)

The Future Local Road currently borders the east side of the proposed site and will connect to South Service Road East further north at the Argus Road intersection. The latest draft OPA proposes a revised 22.0 m Right-Of-Way (ROW) to provide options for both active and vehicular modes to access the future development blocks within Midtown. At this point, a minimum 19-metre ROW is anticipated for the local roads accommodating appropriate pedestrian sidewalk conditions and landscaping provisions. The ROW and cross-section configuration also permits the provision of on-street parking within lay-bys, where landscaping could be 'interrupted' in strategic locations, depending on the nature of the fronting development conditions.

3.5.5 Interim and Ultimate Conditions

The full build out of the new streets outlined in the draft OPA Midtown Oakville Transportation Network will depend on the development timing of the surrounding Midtown Oakville. Understanding that the proposed street changes will not be constructed at one time, an interim and ultimate condition must be considered. The proposed site plans have provided these two conditions and are detailed as follows:

The Interim Condition will illustrate:

- ▶ The existing South Service Road East alignment;
- ▶ The interim build out of Street C with a 13.5 m ROW; and,
- ▶ No Street 1.

It should be noted that the western curbs and elements of the interim build out of Street C are located in their ultimate position.

The Ultimate Condition will illustrate:

- ▶ The new preliminary alignment of South Service Road East with a 16 m ROW;
- ▶ The full build out of Street C with a 19 m ROW; and,
- ▶ The full build out of Street 1 with a 24 m ROW.

An interim and ultimate condition is illustrated in the architectural plans in **Appendix C**.



4 Development Proposal Review

4.1 Proposed Development Programme Elements

Since the previous submission made to the City in June 2022, the development scheme for the three towers has been revised to replace office use with commercial use, decrease the retail use, and an increase in the overall unit count, vehicle/bicycle parking supply, and loading supply. The parking supply change and its appropriateness is further discussed in **Section 5.0**. Loading space provisions for the development is consistent with the previous submission and is further discussed in **Section 6.0**. Bicycle parking provisions have also been revised and are discussed in **Section 7.0**.

It is noted that the design of the site access driveway, parking arrangements, loading arrangements and vehicular circulation routes for the site have generally remained unchanged when compared to the previous June 2022 submission. Reduced architectural plans are attached in **Appendix C**.

A comparison of the site development statistics associated with each application submission is summarized in **Table 4.1**.

TABLE 4.1: DEVELOPMENT PROGRAMME

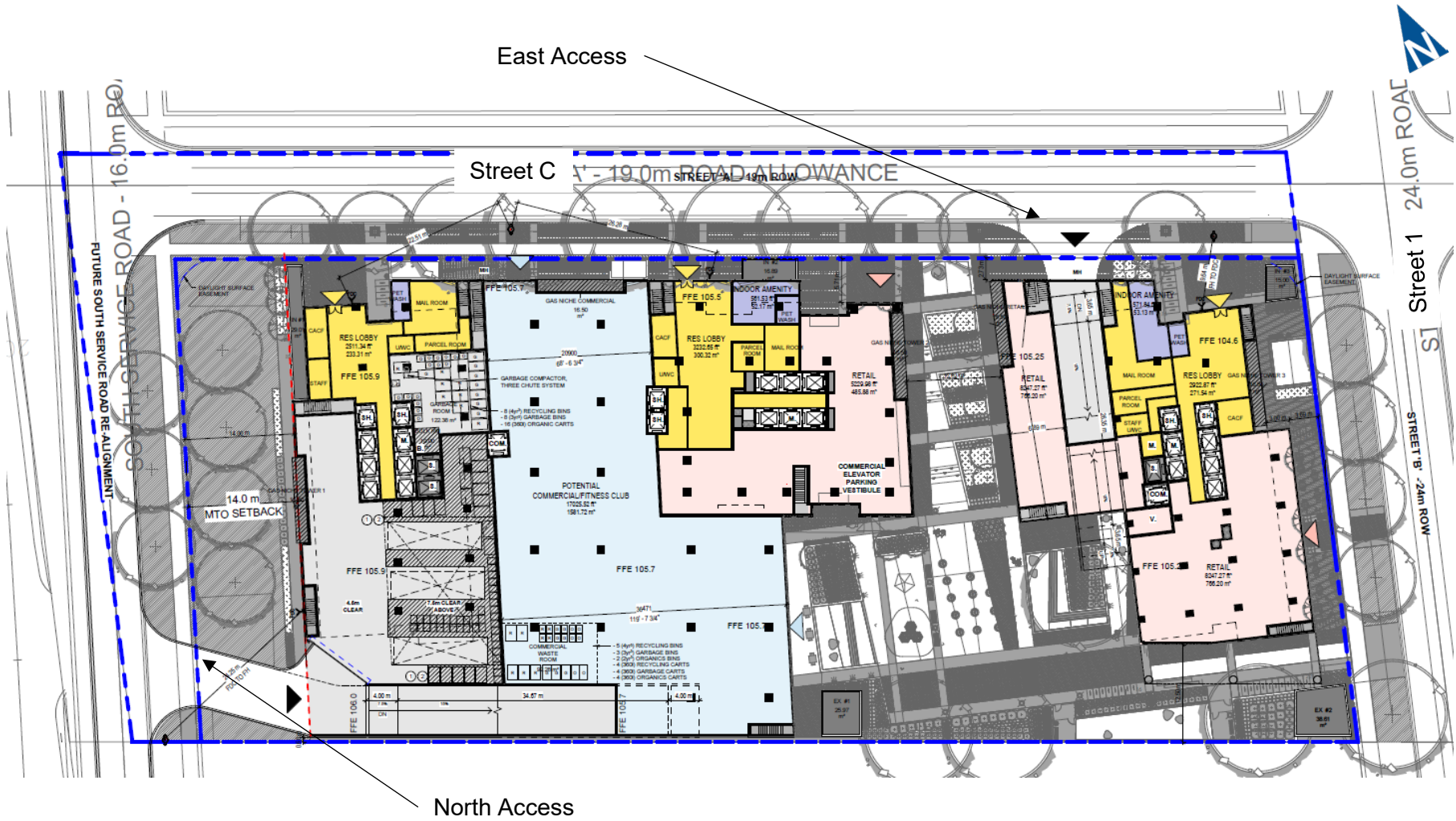
Land Use		June 2022 Submission[1]	Current Submission[2]	Net Change
Residential Use	<75m / unit	1,534 units	1,721 units (107 studio units)	+187 units
	>75m / unit	72 units	130 units	+58 units
	Total Units	1,606 units	1,851 units	+245 units
Non-Residential Use	Retail	2,014 m2 GFA	1,252 m2 GFA	-762 m2 GFA
	Office	3,891 m2 GFA	0 m2 GFA	-3,891 m2 GFA
	Daycare	0 m2 GFA	4,602 m2 GFA	+4,602 m2 GFA
Transportation Services	Parking Supply	1,191 spaces	1,297 spaces	+89 spaces
		(805 residential spaces and 386 non-residential spaces)	(872 residential spaces and 425 non-residential spaces)	(+67 residential spaces and +39 non-residential spaces)
	Loading Supply	5 loading spaces	6 loading spaces	+1 loading space
		(1 refuse collection space, 1 typical space, and 3 auxiliary spaces)	(1 refuse collection space, 2 typical spaces, and 3 auxiliary spaces)	(+1 typical space)
Bicycle Parking Supply	1,613 spaces	1,858 spaces	+244 spaces	
		(1,209 long-term spaces and 404 short-term spaces)	(1,395 long-term spaces and 463 short-term spaces)	(+186 long-term spaces and +59 short-term spaces)

Note:

1 Site statistics are based on architectural plans prepared by Sw eeny&Co Architects dated June 2022

2 Site statistics are based on architectural plans prepared by Sw eeny&Co Architects dated March 2024





NTS



Site Concept Plan

166 South Service Road East, Oakville
210590



Figure 4.1

4.2 Proposed Road Network

As part of the OPA, a draft Midtown Oakville Transportation Network has been proposed that outlines new road locations and adjustments to existing road alignments. Even though this transportation network has not been approved, considerations have been made to the site plan to incorporate the proposed changes. The following sections review the streets that impact the proposed site.

4.2.1 South Service Road East

South Service Road East currently borders the north side of the proposed site and is directly south of the QEW / Highway 403. The latest draft OPA proposes a revised 22.0 m Right-Of-Way (ROW) and a realignment for South Service Road East due to the relocation of the QEW/Highway 403 off-ramp. At this time definitive plans of the realignment are not available; however, the proposed site plan has illustrated a preliminary alignment and a reduced 16.0 m ROW. It should be noted that previous OPA transportation network drafts had proposed smaller ROW widths for South Service Road East.

4.2.2 Street 'A'

According to the latest draft OPA, Street 'A' is proposed to be a new 22.0 m ROW local street that borders the east side of the site and runs in the north-south direction. The current site plans have proposed a 19.0 m ROW which is in-line with a previous OPA transportation network draft dated May 2022.

4.2.3 Street 'B'

According to the latest draft OPA, Street 'B' is proposed to be a new 26.0 m ROW collector street that borders the south side of the site and runs in the east-west direction. The current site plans have proposed a 24.0 m ROW which is in-line with a previous OPA transportation network draft dated May 2022.

4.2.4 Interim and Ultimate Conditions

The full build out of the new streets outlined in the draft OPA Midtown Oakville Transportation Network will depend on the development timing of the surrounding Midtown Oakville. Understanding that the proposed street changes will not be constructed at one time, an interim and ultimate condition must be considered. The proposed site plans have provided these two conditions and are detailed as follows:



The Interim Condition will illustrate:

- ▶ The existing South Service Road East alignment;
- ▶ The interim build out of Street 'A' with a 13.5 m ROW; and,
- ▶ No Street 'B'.

It should be noted that the western curbs and elements of the interim build out of Street 'A' are located in their ultimate position.

The Ultimate Condition will illustrate:

- ▶ The new preliminary alignment of South Service Road East with a 16 m ROW;
- ▶ The full build out of Street 'A' with a 19 m ROW; and,
- ▶ The full build out of Street 'B' with a 24 m ROW.

An interim and ultimate condition is illustrated in the architectural plans in **Appendix C**.



4.3 Site Access Description

The following sections provide a description of the points of access for the site for the different modes of travel.

4.3.1 Pedestrian Access

All pedestrian accesses to the site are proposed off future local roads Street C or Street 1. The breakdown is as follows:

- ▶ Three (3) residential lobby accesses (one for each tower) are proposed off Street C;
- ▶ One (1) commercial access is proposed off Street C;
- ▶ One (1) retail access is proposed off Street C; and,
- ▶ One (1) retail access is proposed off Street 1.

Both proposed public roads (Street C and Street 1) will have minimum 1.5 m sidewalks and a privately owned public space (POPS) is proposed through the site connecting Street C and Street 1 with the intention to enhance the pedestrian realm.

4.3.2 Vehicular Access

There are two (2) driveways proposed for the site to serve the vehicular users. One (1) driveway is proposed off South Service Road East and the other is proposed off Street C.

The driveway off South Service Road East provides access to the at-grade loading area in Tower 1 and a ramp that leads to the underground parking garage. Loading spaces are also provided within the underground garage that are solely for move-in and move-out activities. The larger vehicles accessing these spaces will have to use the South Service Road East driveway because the ramp has been designed to have additional clear height.

The driveway off Street C will only service passenger vehicles accessing the underground garage. Larger loading vehicles for move-in and move-out activities cannot be accommodated because the ramp was not designed with the additional clear height. Signage will be proposed to inform loading vehicles of the height clearance deficiency.



4.3.3 Bicycle Access

Bicycle parking is provided both below and above grade to facilitate centralized storage rooms and secure, weather protected bike parking. Bike parking is generally situated on the mezzanine level and the P1 level below-grade and accessed from elevators adjacent to the bike storage rooms or a short distance from the elevator access or from stairs equipped with bike ramps.



5 Vehicular Parking Supply Review

5.1 Zoning Bylaw Requirements

The site is currently subject to the “Mixed Use Zones” parking standards under the Town of Oakville Zoning By-law 2014-014. Application of the supply requirements of Zoning-By-law 2014-014 to the proposed development would require the provision of a minimum of 2,211 parking spaces, including 1,515 resident spaces (effective rate of 0.82), 370 resident visitor spaces, 70 retail spaces, and 256 commercial spaces. The vehicular parking requirements are summarized in **Table 5.1**.

TABLE 5.1: ZONING BY-LAW PARKING REQUIREMENTS

Use	Units / GFA	Minimum Parking Rate ^[2]	Minimum Parking Requirement ^[2]
Resident			
Studio	107 units	0.80 spaces / unit	86 spaces
1 – Bedroom	1,111 units	0.80 spaces / unit	889 spaces
2 – Bedroom	503 units	0.80 spaces / unit	403 spaces
3 – Bedroom	130 units	1.05 spaces / unit	137 spaces
Subtotal			1,515 spaces
Non-Resident			
Residential Visitors	1,851 units	0.20 spaces / unit	370 spaces
Retail	1,252 m2 GFA	1.00 spaces / 18 m2	70 spaces
Commercial ⁵	4,602 m2 GFA	1.00 spaces / 18 m2	256 spaces
Subtotal			696 spaces
Total			2,211 spaces

Note:

1 Site statistics are based on architectural plans prepared by Sweeney&Co Architect dated March 2024

2 In accordance with Zoning By-law 2014-014, if the calculation of the number of required parking spaces results in a number with a fraction greater than 0.25, the number is rounded up to the nearest whole number.

3 Studio, 1-Bedroom and 2-Bedroom units have a net floor area less than 75 m2.

4 Residential rates incorporate a 0.20 visitor ratio.

5 Commercial uses assumes a fitness centre.



5.2 Parking Supply

Similar to the initial June 2022 submission, it is our opinion that the above noted parking standards summarized in **Table 5.1** overstate the site's parking demands by some margin, given the excellent existing and future transit and pedestrian/cycling nature of the proposed development and future Mid-Town Oakville environs. Proposed minimum parking rates and requirements are summarized in **Table 5.2**.

TABLE 5.2: PROPOSED MINIMUM PARKING REQUIREMENTS

Use	Units / GFA	Minimum Parking Rate ^[2]	Minimum Parking Requirement ^[2]
Resident			
Studio	107 units	0 spaces	0 spaces
1 – Bedroom 2 – Bedroom 3 – Bedroom	1,744 units	0.50 spaces / unit	872 spaces
Subtotal			872 spaces
Non-Resident			
Residential Visitors	1,851 units	0.15 spaces / unit	278 spaces
Retail	1,252 m2 GFA	1.08 spaces / 100 m2	14 spaces
Commercial ³	4,602 m2 GFA	1.08 spaces / 100 m2	50 spaces
Subtotal			342 spaces
Total			1,214 spaces

Note:

1 Site statistics are based on architectural plans prepared by Sweeny&Co Architect dated March 2024

2 In accordance with Zoning By-law 2014-014, if the calculation of the number of required parking spaces results in a number with a fraction greater than 0.25, the number is rounded up to the nearest whole number.

3 Commercial uses assumes a fitness centre.

It is proposed to provide a total of 1,297 total parking spaces to meet the needs of the Project. This includes 872 resident parking spaces, 278 residential visitor parking spaces, and 147 retail / commercial parking spaces. The parking supply will further incorporate 39 accessible spaces, distributed within the seven-level underground parking garage. Of the total accessible parking supply, 23 accessible spaces have been provided in the resident parking area and 16 accessible spaces have been provided in the resident visitor / non-resident parking area. In addition, shared 1.5 metre access aisles are provided adjacent to the spaces.

It's important to note that the total supply of non-resident parking – residential visitor and retail / commercial land uses – could potentially



be shared assuming an agreement between the residential condominiums and the commercial floor space purchasers. This approach would be pursued further through the detailed Site Plan stages of development and through the leasing and sales process of the overall Project.

5.3 Appropriateness of Proposed Parking Standards

The in-force parking requirements, as per Zoning By-law 2014-014, overstate the parking needs of contemporary developments in transit-accessible areas of Oakville, such as the site. The following parking standards are proposed:

- ▶ Resident: 0.50 spaces per unit excluding studio units
- ▶ Residential Visitor: 0.15 spaces per unit
- ▶ Commercial / Retail: 1.08 spaces per 100 m²

As such, the following sections discuss the appropriateness of the proposed (reduced) parking requirements, per use.



5.3.1 Resident Parking Assessment

Adoption of a reduced residential parking minimum standard is considered appropriate based upon the following considerations:

- ▶ Provincial and local policy / plan that direct municipalities to reduce or eliminate minimum parking requirements;
- ▶ Existing and planned transit and active transportation facilities in the area;
- ▶ The existing and future transit reach;
- ▶ Review of other residential parking By-law standards across Ontario;
- ▶ Observed precedence for residential parking approvals;
- ▶ Studio apartments will not have an opportunity to purchase a parking space; and,
- ▶ The TDM measures for the Site will influence parking demand on-Site and in the wider area.

The following provides an overview of the contextual factors influencing parking demand at residential developments in the Mid-Town Oakville area and the appropriateness of the proposed reduced parking supply in this instance.



5.3.2 Provincial, Regional & Local Policy

Many provincial plans and local policies provide a framework to guide development in Ontario municipalities. These plans and policies often contain direction regarding development along transit corridors, commenting on parking standards and the future regulations of parking minimums. A brief overview of the provincial and local plans and policies that support a reduced parking minimum and multi-modal lifestyle is outlined below.

There are many provincial plans and local policies that provide a framework to guide development in Ontario municipalities. These plans and policies often contain direction with regards to development along transit corridors, commenting on parking standards and the future regulations of parking minimums. A brief overview of the provincial and local plans and policies that support a reduced parking minimum and multi-modal lifestyle is outlined below.

Ontario's Five-Year Climate Change Action Plan

Ontario's Five-Year Climate Change Action Plan was announced in June 2016 (herein referred to as "the Plan"). The Plan emphasizes the importance of addressing climate change at the municipal level. Some of the key transportation and land-use planning actions outlined in the Plan are as follows:

- ▶ Support cycling and walking: Commuter cycling networks will be established across Ontario, targeting routes with high-commuting volume such as between residential communities, major transit stations and employment areas. There will be more cycling facilities in urban areas, including grade-separated routes and cycling signals. There will be more bicycle parking at transit stations and provincially owned, publicly accessible facilities. Ontario will revise provincial road and highway standards to require commuter cycling infrastructure be considered for all road and highway construction projects where it is safe and feasible. Ontario will do the same for major transit corridors.
- ▶ Reduce single-passenger vehicle trips: Ontario will provide grants to municipalities and large private employers to implement Transportation Demand Management (TDM) Plans. The plans will be designed to help increase walking, cycling, carpooling, telecommuting and flex-work schedules, thereby reducing overall fossil fuel consumption, traffic congestion and transportation emissions.



- ▶ Eliminate minimum parking requirements: Minimum parking requirements will be eliminated over the next five years for municipal zoning by-laws, especially in transit corridors and other high-density, highly walkable communities. Minimum parking requirements are a barrier to creating complete, compact and mixed-use communities. Instead, by-laws will encourage bike lanes, larger sidewalks, and enhanced tree canopies.

The idea to eliminate minimum parking requirements in transit accessible areas is not new in North America. Residential developments with lower parking requirements are being promoted, approved, and developed in Vaughan, Toronto, Calgary, Vancouver and other cities. This shift away from providing excess residential parking highlights a changing perspective. On this basis, a reduced minimum parking supply requirement for the subject site would be in conformance with Ontario's current vision for transit corridors.

Planning Act

The Planning Act directs municipalities to have regard to matters of provincial interest set out in Section 2 of the Planning Act, including:

- ▶ (q) the promotion of development that is designed to be sustainable, to support public transit and to be oriented to pedestrians;
- ▶ (s) the mitigation of greenhouse gas emissions and adaptation to a changing climate.

The proposed reduced parking standards has regard to the matters of Provincial interest and will promote sustainable, transit-supportive development, and the mitigation of greenhouse gas emissions. It will also support and encourage the use of existing higher order public transit by discouraging automobile ownership and demand for single-occupant vehicle trips.

Provincial Policy Statement (2020)

The Provincial Policy Statement (2020) (the "PPS") contains a number of policies which promote efficient development and the optimization of land and infrastructure.

Specifically, policy 1.1.1 e) states that healthy, liveable and safe communities are sustained by:

- ▶ "e) promoting the integration of land use planning, growth management, transit-supportive development, intensification



and infrastructure planning to achieve cost-effective development patterns, optimization of transit investments, and standards to minimize land consumption and servicing costs;”

Policy 1.1.3.2 states that “Land use patterns within settlement areas shall be based on densities and a mix of land uses which:

- ▶ a) efficiently use land and resources;
- ▶ b) are appropriate for, and efficiently use, the infrastructure and public service facilities which are planned or available, and avoid the need for their unjustified and/or uneconomical expansion;
- ▶ c) minimize negative impacts to air quality and climate change, and promote energy efficiency;
- ▶ d) prepare for the impacts of a changing climate;
- ▶ e) support active transportation;
- ▶ f) are transit-supportive, where transit is planned, exists or may be developed;

Policy 1.1.3.4. states that “Appropriate development standards should be promoted which facilitate intensification, redevelopment and compact form, while avoiding or mitigating risks to public health and safety.”

Policy 1.6.7.2. states that “Efficient use should be made of existing and planned infrastructure, including through the use of transportation demand management strategies (TDM), where feasible.”

Policy 1.6.7.4 states that “Appropriate land use patterns, density, and a mix of uses should be promoted to minimize the length and number of vehicle trips taken and to support current and future use of transit and active transportation.”

In summary, the PPS is supportive of the use of TDM, such as reduced parking rates, to support and increase the efficiency of more sustainable transportation options, including the various planned transportation improvements within the site vicinity, discussed further in **Section 8.0**.

The proposed reduction in resident parking rates associated with the development is consistent with the PPS and is an appropriate development standard to facilitate intensification and transit-supportive development as planned for the area.



Ontario's Growth Plan

Ontario's most recent A Place to Grow – Growth Plan for the Greater Golden Horseshoe (the 'Growth Plan') was published in May 2019, which outlines requirements for accommodating growth to 2041. The plan covers a wide range of areas and topics, many of which are applicable to this development.

- ▶ Transportation and Moving People – Public transit will be the first priority for major transportation investment. Transit growth will focus on increasing the capacity of existing transit systems while also expanding transit service to connect nearby neighbourhoods with urban growth centres and major transit station areas. These goals should increase the modal share of transit and reduce greenhouse gas emission.
- ▶ Active Transportation – In order to reduce single occupant vehicle trips and address climate change, municipalities should encourage and include in their own growth plan guidelines for active transportations networks. These networks provide sidewalks, bicycle lanes, and easy access to surrounding major transit station areas.
- ▶ Reduce single-passenger vehicle trips – The Growth Plan calls for municipalities to develop and implement local TDM policies and active transportations strategies to reduce single-occupant automobile trips. This will aid in shifting trip demand from the automobile to the strengthened multi-modal networks also proposed in the plan with the hopes of reducing the need for individual automobile ownership.

Furthermore, the Growth Plan explicitly shows support for reduced parking standards within major transit station areas (MTSAs) which are areas that are within an approximate 10-minute walk of an existing or planned higher order transit station. Per the Halton Region 2022 Official Plan, the site is located within the Oakville GO Station MTSA, as discussed in greater detail, below.

The Growth Plan encourages development in MTSAs to support transit and active transportation, as noted in Section 2.2.4.8:

- ▶ All major transit station areas will be planned and designed to be transit-supportive and to achieve multimodal access to stations and connections to nearby major trip generators by providing, where appropriate:
 - a. connections to local and regional transit services to support transit service integration;



- b. infrastructure to support active transportation, including sidewalks, bicycle lanes, and secure bicycle parking; and
- c. commuter pick-up/drop-off areas.

Additionally, the Growth Plan explicitly states that development in MTSA's should provide alternative development standards such as reduced parking standards in Section 2.2.4.9:

- ▶ Within all major transit station areas, development will be supported, where appropriate, by:
 - a. planning for a diverse mix of uses, including additional residential units and affordable housing, to support existing and planned transit service levels;
 - b. fostering collaboration between public and private sectors, such as joint development projects;
 - c. providing alternative development standards, such as reduced parking standards; and
 - d. prohibiting land uses and built form that would adversely affect the achievement of transit-supportive densities.

In summary, the Growth Plan shows support for TDM measures which may reduce private automobile trips and, instead, increase the modal share of transit and active transportation within MTSA areas. As such, the proposed resident parking reduction on-site (which is located within the Oakville GO station MTSA) aligns with policies within the Growth Plan and is considered appropriate.

2041 Metrolinx Regional Transportation Plan

The Metrolinx 2041 Regional Transportation Plan (2041 RTP) – adopted in 2018 as an update to The Big Move (2008) – provides a framework to create an integrated, multi-modal, and regional transportation system to support the growth of healthy, complete, and sustainable communities.

The 2041 RTP contains strategies that integrate land use and transportation planning to identify areas for investment and build new connections. Strategy 4.8 specifically addresses parking management, encouraging the Province to adopt a region-wide policy that “provides guidelines and encourages best practice in parking management.” The strategy states that “zoning standards should be reviewed, with the expectation that minimum parking requirements will be reduced, particularly in transit-supportive neighbourhoods”, such as the site



area. The 2041 RTP also speaks to embedding TDM strategies in land use planning and development to prioritize cycling, walking and transit use.

Additionally, the 2041 RTP identifies Midtown Oakville as a Mobility Hub, for which an additional framework was developed to help guide development in these areas.

Metrolinx Mobility Hub Guidelines

Per the 2041 RTP, Mobility Hubs are MTSAs at key intersection points on the Frequent Rapid Transit Network, which are intended to create strong transit connections and integrate multiple modes of transportation. The 2011 Metrolinx Mobility Hub Guidelines, currently under review to reflect updated Provincial policy and the 2041 RTP, build upon the strategies presented by Metrolinx to provide a framework that helps plan development at Mobility Hubs across the GTHA.

This framework is intended to ensure these areas surrounding key transit stations support more intense development and accommodate strong pedestrian, cycling, and transit facilities and connections. In conjunction with improving non-vehicular transportation infrastructure, the Guidelines recommend minimizing auto-use through the implementation of parking maximums to limit excess parking supply and suggests reviewing and possibly removing minimum parking standards in areas that have high accessibility to rapid transit stations. The proposed parking reduction for the development is consistent with Metrolinx's policies for Sites located within a Mobility Hub and in close proximity to higher-order transit.

Ontario Ministry of Transportation Transit-Supportive Guidelines

The Ontario Ministry of Transportation Transit-Supportive Guidelines aim to create an environment that is supportive of transit, and to develop services and programs intended to increase transit ridership. The guidelines also support the use of TDM strategies, particularly near transit routes. This may include the sharing of parking between site uses, the use of on-street parking during off-peak hours, and the reduction of minimum and maximum parking requirements as TDM measures are adopted. In this way, the proposed parking reduction proposed by the site is consistent with these provincial guidelines.

GO Rail Station Access Plan (2023)

The Metrolinx GO Rail Station Access Plan provides a high-level vision and policy guidance for the future planning, design, and access of GO Rail facilities, including the Allandale Waterfront GO Station near the



site. The station will be improved to provide greater transit access, opportunities, and safety for existing and future riders within the site area, overall supporting regional transit as a viable and reliable travel option. Overall, the site's reduced resident parking supply aligns with the GO Rail Station Access Plan as it encourages transit use, particularly the Waterfront GO station for inter-regional travel, and positions transit as a viable travel option for residents.

Halton Region Official Plan

The 2022 Halton Region Official Plan sets the framework for growth and development in the region that includes the Town of Oakville. As the region grows, the plan emphasises the need for sustainable communities and proper intensification in growth areas. The plan includes policies and objectives, which are outlined below, that encourage safe, convenient, accessible, affordable and efficient transportation systems and to support TDM and parking management as a way to achieve these goals.

Policy 172. (2) states the OP Objective... "To develop a balanced transportation system that:

- ▶ a) reduces dependency on automobile use;
- ▶ b) includes a safe, convenient, accessible, affordable and efficient public transit system that is competitive with the private automobile; and
- ▶ c) promotes active transportation.

Policy 172. (4) states the OP objective... " To improve transportation network efficiency through both travel demand management and transportation supply management strategies."

Policy 172. (10) states the OP objective... " To promote land use patterns and densities that foster strong live-work relationships and can be easily and effectively served by public transit and active transportation."

The proposed (reduced) parking supply is encouraged by the Official Plan, as it is a TDM measure aimed at reducing single occupancy automobile use and the reduced supply acknowledges the walking distance to transit (in this case the proximity to the Oakville GO Rail Hub within the MTSA) and complementary uses.



Livable Oakville – Growth Areas – Midtown Oakville

The Mid-Town Oakville District is envisioned as a higher density, transit-supportive, mixed-use area and as a strategic location to accommodate both population and employment growth. This district will include gateway features, urban park with pedestrian midblock connections and establish a mix of commercial and residential uses.

Livable Oakville describes the Mid-Town and its attributes as follows...”The Oakville GO/VIA Station is the Town’s primary hub for current and planned transit and is a major transit station. Rail and bus connections currently service the area and major improvements to the local and inter-regional transit network are planned. In addition to improvements to the local bus network, there will be express commuter rail service and bus rapid transit corridors along Trafalgar Road and Highway 403. The bus rapid transit systems will originate in Midtown Oakville and connect with the broader Greater Toronto and Hamilton Area transportation network.”

Within Livable Oakville, Part E – Growth Areas, Mid-Town Oakville, there are a number of relevant policies that support the intensification of the Mid-Town area and that speak directly to the mobility needs and requirements, supporting land use policies (internalization of trip making), and phasing necessary to fulfill those goals and objectives. These characteristics are consistent with the objective of reducing the reliance on the private automobile to support that intensification.

Policy 20.1 states that:

Goal

Midtown Oakville will be a vibrant, transit-supportive, mixed use urban community and employment area.

Policy 20.2.1 state that:

Objectives

To create transit-supportive development by:

- ▶ a) ensuring the entire area is developed as a pedestrian-oriented environment focused on access to, and from, transit;
- ▶ b) improving internal road circulation and connections to, and through, Midtown Oakville for public transit, pedestrians, cyclists and vehicles; and,
- ▶ c) promoting a compact urban form with higher density and higher intensity land uses.



Policy 20.4.1 states that:

Transportation

- ▶ e) Development shall promote safe, convenient and attractive pedestrian access to transit stops or stations. Barriers, such as boundary fences, shall be discouraged.

Town of Oakville Zoning By-laws

It is worth noting that the Town of Oakville’s Zoning Bylaws that govern the provision of vehicular parking recognize in some instances a variety of requirements to describe how parking must be provided for land use similar to those proposed within the Proposed Development.

Residential “Apartment – More than 4 storeys” as set out in the North Oakville Zoning Bylaw 2009-189 Section 5 has a “maximum” parking rate expressed but no minimum parking rate. Similarly, in Zoning Bylaw 2014—014, within Section 5.2.2 Minimum Number of Parking Spaces in Mixed-Use Zones, non-residential uses within the Downtown Oakville area have no minimum requirement.

These Zoning standards recognize that there are contextual differences across the Town that should be incorporated into the development and intensification of lands.

The Mid-Town Oakville area is an excellent example of where parking requirements should support the area’s goals and objectives as set out in the Livable Oakville document, while being consistent with Provincial and Regional policy. Reduced parking standards, as noted in the TDM section to follow, is one of the most effective ways to reduce the reliance upon the private automobile and encourage alternative forms of mobility.

5.3.3 Existing Transportation Context

The site is located approximately 150 m from the Oakville GO Station and approximately 100 m from Oakville Transit bus stops providing convenient access to the various higher-order local and regional public transit services.

The Oakville GO Station is serviced by the Lakeshore West line which connects to Toronto’s Union Station at the east end and Niagara Falls Station at the west end. Additionally, GO Train buses run between Oakville GO Station to numerous locations such as Union GO Station, Square One, Highway 407 Bus Terminal, etc.



Oakville Transit is the local transit service which provide local connections across the Town of Oakville. There are number bus stops along Cross Avenue located directly south of the site.

Overall, the site area is well served by transit under existing conditions.

Emerging Area Transit Improvements

There are numerous planned transit improvements in the vicinity of the site, including both Halton Region and GO Transit projects. These transit improvements / projects are summarized below.

Trafalgar Bus Rapid Transit was identified in Metrolinx's 2041 Regional Transportation Plan, and is planned to include dedicated bus lanes, frequent and reliable bus service and smart signals along Trafalgar Road, as well as include better connections to other transit modes. In 2021 the Town of Oakville council endorsed a proposed bus rapid transit (BRT) service along Trafalgar Road. Trafalgar Road is a north-south running regional road and is currently the only connection from north Oakville to the GO station. This proposed project would significantly improve the transit connectivity of the region and would advance the achievement of the Region's 20% targeted modal split as described in the Region's Transportation Master Plans, The Road to Change.

Complimentary to the proposed Trafalgar BRT installation, the Dundas BRT is a Metrolinx rapid transit project that's proposed to run along Dundas from Kipling Mobility Hub to Hamilton. This service would run east-west through north Oakville. This service would not provide direct access to Midtown Oakville, however, its alignment with the proposed Trafalgar BRT would provide a direct transit connection. The combination of these proposed projects would increase the function catchment area of origin and destination trips made to midtown Oakville.

The Metrolinx Regional Express Rail (RER) program is working to increase GO Transit service across the Greater Golden Horseshoe. As part of RER, GO Transit will offer more services with faster trains and more stations. New train technology with faster trains on the Lakeshore West GO Transit line will provide all-day, two-way services with 15 minutes or better transit service. The Town of Oakville, Metrolinx and TTC are collaborating to advance the SmartTrack and GO expansion in the area. New stations (Confederation and Beamsville) are proposed on the Lakeshore West line, which will provide the site with an increased transit reach via the Oakville GO Station.



Relevant Literature Review – Commuter Rail Station / Network

Density

Historically, North American commuter networks have experienced low population density within the station catchment areas. Given that heavy rail often has large catchment areas, it should be acknowledged that the feasibility of access via active transportation may be limited for riders on the periphery. The intensification of the station area with increased density mitigates this problem by increasing the share of riders who live within a distance reachable by active transportation.

Access Trips to Higher Order Transit Stations

From a transportation perspective, trips made via higher-order transit typically consist of three distinct trip legs, 1). The initial trip from origin to station; 2). The station-to-station trip; and 3). The station to destination trip. Throughout the GO network, this typically involves an initial private automobile trip to a GO station, a GO Train trip to the CBD, and a final trip from the CBD station to the destination typically made via active or feeder transportation. Unlike the final CBD station to destination to trip which is well served by feeder connections the initial origin to home station generally has fewer feeder transit options and active transport can be limited by access distance.

For the above reasons, there is a heavy reliance on private auto as the access mode to GO stations. However, as stated above, the expansion of parking facilities on the GO network is financially unsustainable and many station areas are land constrained. This operational problem has been well documented and has been studied by academics, transit authorities, and NGOs. Notable studies such as [Chan & Farber], [Graystone & Mitra], [Shantz & Casello], and [Skidmore]. These studies have highlighted a variety of different aspects to mitigate auto dependency on the first mile. Frequently discussed factors include:

- ▶ Enhancing active transportation facilities;
- ▶ Enhancing feeder transportation connectivity;
- ▶ Reducing free parking and expanding paid parking (Metrolinx's long-term vision is to reduce overall parking and increase the paid / car pool parking component of the future parking supply); and,
- ▶ Promoting density around the station area.

The above strategies aim to enhance the urban environment such that sustainable modes of travel become more attractive, and the dependency on auto ownership is reduced. The lands adjacent to the



GO station are positioned to benefit from the implementation of these strategies.

Existing and Emerging Pedestrian and Cycling Context

Sidewalks are present throughout all the public streets in Midtown Oakville however, there is no cycling infrastructure in proximity to the site area. However, substantially improved multi-modal connectivity within and beyond Midtown Oakville is planned as part of the Midtown Oakville Environmental Assessment (EA) and the Midtown Oakville OPA. The detailed improvements are not definitive and will be as part of an ongoing process.

It should be noted that the Town of Oakville's Active Transportation Master Plan (2017) has identified future pedestrian and cycling network improvements to the Midtown Oakville lands. However, the only multi-modal improvement within the site's area is a multi-use path along Argus Road.

5.3.4 Transit Reach Assessment

In order to understand the changing transportation context, transit service area analyses for the existing and future transit network was conducted using Geographic Information Systems (GIS). These analyses look at the service area of a transit network that a visitor of the Site has access to in a given time range. This type of analysis is useful in understanding the transit accessibility and can also be used to quantify the impact of transit service changes.

A 15-, 30-, and 45-minute transit reach from the Site during the weekday morning travel period was analysed for existing conditions as is illustrated in **Figures 5.1 and 5.2**. Transit travel times include walking time to and from transit stops, as well as the transit schedules during peak hour (i.e. service frequency and wait times), all of which are based upon existing transit service.

5.3.5 Future Transit Travel Reach

A review of projected transit travel times assumed the various public transit network improvements included in **Section 5.3.4** is illustrated in **Figures 5.3 and 5.4**. A comparison of areas that are reachable is provided in **Table 5.3** below.



TABLE 5.3: TRANSIT SERVICE AREA ANALYSIS COMPARISON

Transit Scenario	15 minute reach	30 minute reach	45 minute reach
<p>Existing Conditions</p> <p>(Travel Away From Site)</p>	<ul style="list-style-type: none"> North along Trafalgar Rd to before Upper Middle Rd; South along Trafalgar Rd, and Kerr St to before Rebecca St / Randall St (north of Lakeshore Rd W); East along Cornwall Rd to before Eighth Line / Chartwell Rd; and <p>West along Cornwall Rd / Speers Rd to just past Dorval Dr.</p>	<ul style="list-style-type: none"> North along Trafalgar Rd just past Dundas St E up to Threshing Mill Blvd, and north past Upper Middle Rd between Third Line and Joshua Creek Dr; South along Trafalgar Rd, Reynolds St, and Kerr St to the waterfront; East along Upper Middle Rd to before Ninth Line / Ford Dr, and east along Lakeshore West GO Line to Port Credit GO Station; and <p>West along Upper Middle Rd W to past Third Line, and west along Speers Rd and Wycroft Rd to Bronte Rd.</p>	<ul style="list-style-type: none"> North along Trafalgar Rd to beyond Hwy 407 before Lower Baseline E; South along Trafalgar Rd, Third Line, Reynolds St, and Kerr St to the waterfront; East along Dundas St E to Winston Churchill Blvd, and east along Lakeshore West GO Line to Mimico GO Station; and <p>West along Dundas St W to Bronte Rd, west along Lakeshore Rd to Burloak Dr, and west along Lakeshore West GO Line to Burlington GO Station.</p>
<p>Existing Conditions</p> <p>(Travel Towards Site)</p>	<ul style="list-style-type: none"> North along Trafalgar Rd to before Upper Middle Rd; South along Trafalgar Rd, and Kerr St to before Rebecca St / Randall St (north of Lakeshore Rd W); East along Cornwall Rd to before Eighth Line / Chartwell Rd; and <p>West along Cornwall Rd / Speers Rd to past Morden Rd (west of Dorval Dr).</p>	<ul style="list-style-type: none"> North along Trafalgar Rd just past Dundas St E up to Threshing Mill Blvd; South along Trafalgar Rd, Reynolds St, and Kerr St to the waterfront; East along Upper Middle Rd E to Hwy 403, and east along Lakeshore West GO Line to Clarkson GO Station; and <p>West along Upper Middle Rd W to past Third Line, and along Lakeshore West GO Line to Walkers Line (halfway to Burlington GO Station).</p>	<ul style="list-style-type: none"> North along Trafalgar Rd to beyond Hwy 407 before Lower Baseline E; South along Trafalgar, Third Line, Reynolds St, and Kerr St to the waterfront; East along Dundas St E to Winston Churchill Blvd, and east along Lakeshore West GO Line to Long Branch GO Station; and <p>West along Dundas St W to Bronte Rd, and west along Lakeshore West GO Line to Aldershot GO Station</p>
<p>Future Conditions</p> <p>(Travel Away From Site)</p> <p><i>with the addition of GO Expansion /RER, Trafalgar BRT, Dundas BRT, etc.</i></p>	<ul style="list-style-type: none"> North along Trafalgar Rd to before Oak Park Blvd / Postridge Dr (south of Dundas St E) via future Trafalgar BRT; South along Trafalgar Rd, and Kerr St to before Rebecca St / Randall St (north of Lakeshore Rd W); East along Lakeshore West GO Line to Clarkson GO Station; and <p>West along Lakeshore West GO Line to Bronte GO Station.</p>	<ul style="list-style-type: none"> North along Trafalgar Rd to Hwy 407 (via future Trafalgar BRT), and north along Erin Mills Pkwy to past Dundas St W; South along Trafalgar Rd, Reynolds St, Kerr St, and Appleby Line to the waterfront, and south along Southdown Rd to Lakeshore Rd W; East along Dundas St W Pkwy (via future Dundas BRT) to beyond Erin Mills, and east along Lakeshore West GO Line to Mimico Go Station; and <p>West along Upper Middle Rd W to past Third Line, and along Lakeshore West Go Line to Burlington GO Station.</p>	<ul style="list-style-type: none"> North along Trafalgar Rd to Lower Baseline E (via future Trafalgar BRT), north along Erin Mills Pkwy and Mississauga Rd to past Eglinton Ave W, and north along Hurontario St (via future Hazel McCallion LRT) to Hwy 403; South along Trafalgar Rd, Reynolds St, Kerr St, and Appleby Line to the waterfront; East along Dundas St E to past Dixie Rd (via future Dundas BRT), and east along Lakeshore West GO Line (and via Waterfront Reset LRT from Long Branch GO) to Union Station; and <p>West along Dundas St to Walkers Line (via future Dundas BRT), and along Lakeshore West Go Line to past Aldershot GO Station.</p>
<p>Future Conditions</p> <p>(Travel Towards Site)</p> <p><i>with the addition of GO Expansion /RER, Trafalgar BRT, Dundas BRT, etc.</i></p>	<ul style="list-style-type: none"> North along Trafalgar Rd to before Oak Park Blvd / Postridge Dr (south of Dundas St E) via future Trafalgar BRT; South along Trafalgar Rd, and Kerr St to before Rebecca St / Randall St (north of Lakeshore Rd W); East along Lakeshore West GO Line to Clarkson GO Station; and <p>West along Lakeshore West GO Line to Bronte GO Station.</p>	<ul style="list-style-type: none"> North along Trafalgar Rd to beyond Hwy 407 (via future Trafalgar BRT), and north along Erin Mills Pkwy to past Dundas St W; South along Trafalgar Rd, Reynolds St, and Kerr St to the waterfront; East along Dundas St W Pkwy (via future Dundas BRT) to beyond Erin Mills, and east along Lakeshore West GO Line to Mimico GO Station; and <p>West along Upper Middle Rd W to Bronte Rd, and along Lakeshore West GO Line to Burlington GO Station.</p>	<ul style="list-style-type: none"> North along Trafalgar Rd to Lower Baseline E (via future Trafalgar BRT), north along Winston Churchill Blvd and Erin Mills Pkwy to just before Eglinton Ave W, and north along Hurontario St (via future Hazel McCallion LRT) to Hwy 403; South along Trafalgar Rd, Reynolds St, Kerr St, and Appleby Line to the waterfront; East along Dundas St E to Hurontario St (via future Dundas BRT), and east along Lakeshore West GO Line (and via Waterfront Reset LRT from Long Branch GO) to Union Station; and <p>West along Dundas St to Cedar Springs Rd / Brant St (via future Dundas BRT), and along Lakeshore West Go Line to Hwy 6 (past Aldershot GO Station).</p>



Notable findings include:

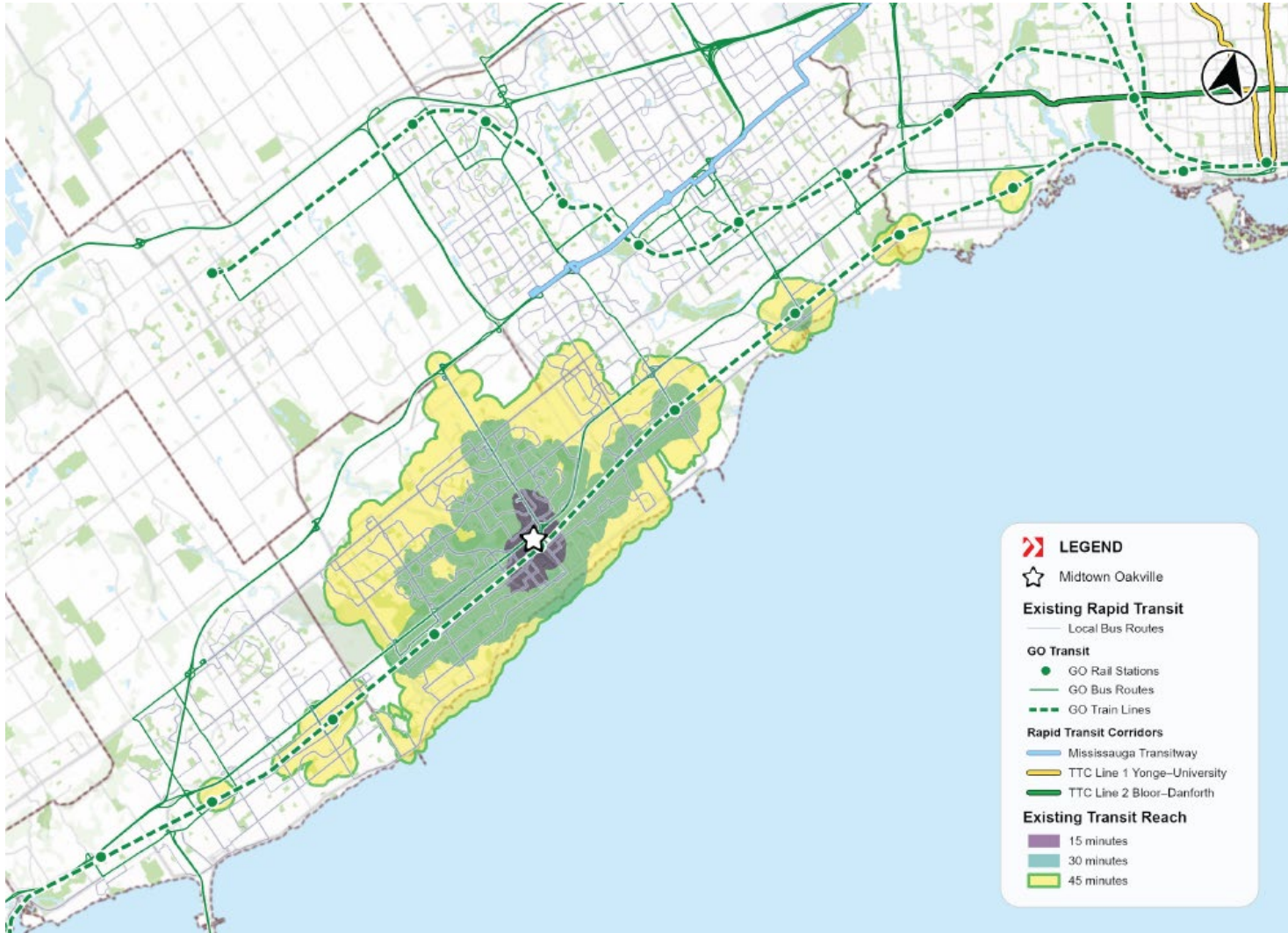
- ▶ Within 15 minutes, under existing conditions, a small area is accessible for travel towards and away midtown Oakville, primarily along Trafalgar Rd and Kerr St (for southbound travel). Under future conditions, namely the implementation of the Trafalgar BRT, travel northwards along Trafalgar Rd extends to just short of Dundas St E. Future GO improvements also greatly increase access east-west from midtown Oakville along the Lakeshore West GO Line.
- ▶ Within 30 minutes, north-south travel away and towards midtown Oakville reaches northwards just past Dundas St E and southwards to the waterfront via Trafalgar Rd. East-west travel is centralized along Upper Middle Rd. Travel away from the site eastward along the Lakeshore West GO Line reaches Port Credit GO Station, whereas travel towards the site westward extends from Appleby GO Station. Under future conditions, with the implementation of the Trafalgar BRT, access northbound along Trafalgar Rd reaches to past Highway 407 for both travel directions. In addition, the Trafalgar BRT provides improved access to other transit services. In combination with the future Dundas BRT, improved access along Dundas further increases north-south reach along Winston Churchill Blvd and Erin Mills Pkwy. Future GO infrastructure and electrification projects improve east travel to Mimico GO Station (travel away) and west travel to Burlington GO Station (both directions).
- ▶ Within 45 minutes, northbound reaches Lower Baseline E along Trafalgar Rd. Southbound travel extends to the waterfront across Oakville via existing local bus routes. Eastward travel away from midtown Oakville reaches Mimico GO Station, and westward travel towards midtown Oakville extends from Aldershot GO Station. Under future conditions, 45-minute reach spreads deep into surrounding municipalities of Burlington, Mississauga, and Toronto. The future Dundas BRT greatly increases east-west reach along Dundas; now reaching past Winston Churchill Blvd to Dixie Rd and past Bronte Rd to Walkers Line respectively. Improved access to other transit operations along Dundas also increases north reach along Winston Churchill Blvd and Erin Mills Pkwy just shy of Eglinton Ave W. The implementation of Hurontario LRT also improves northwards reach up to Highway 403 along Hurontario St. Implementation of GO expansion extends travel along the Lakeshore West GO Line, spanning between Union Station and Aldershot GO Station.

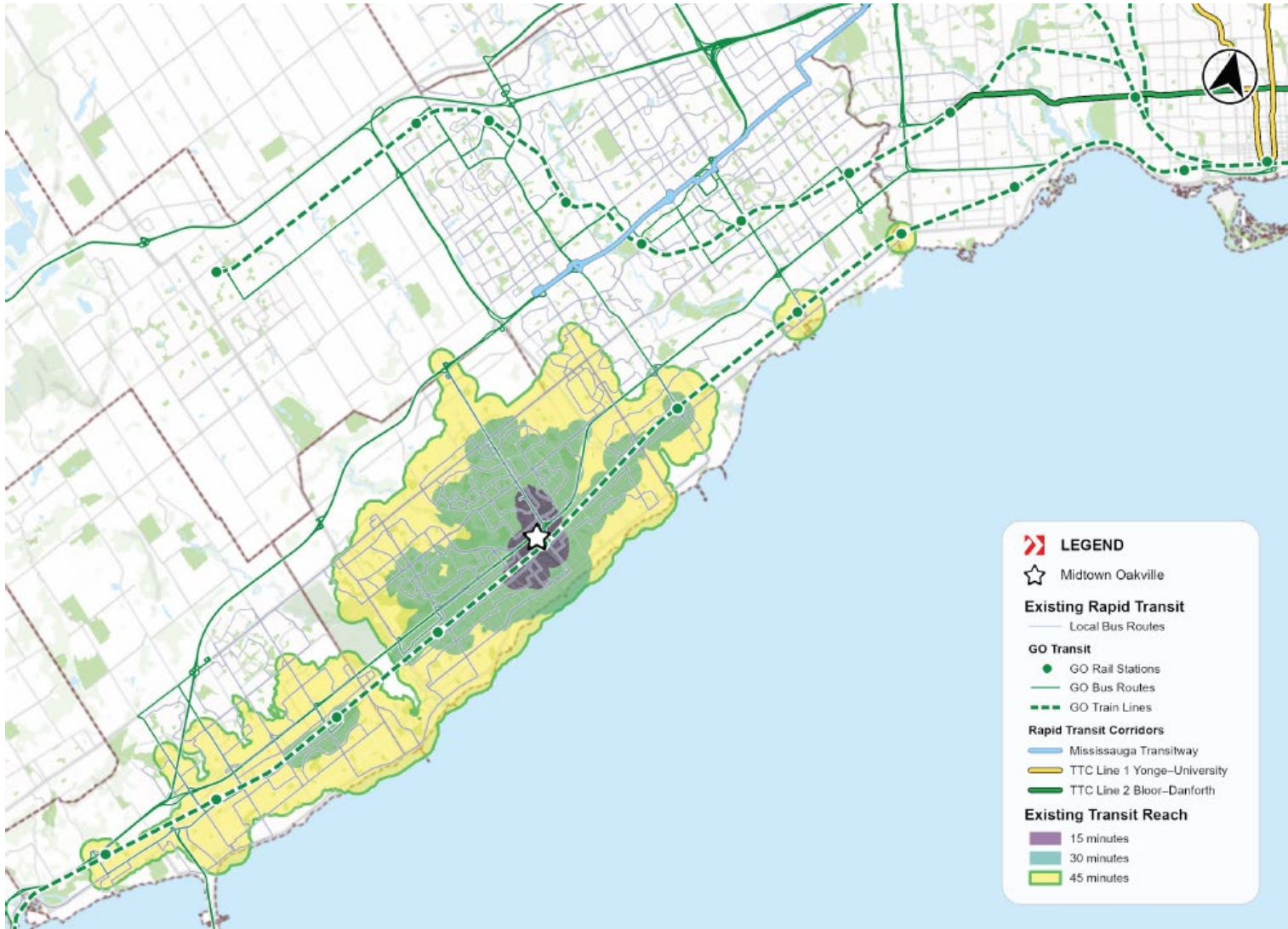


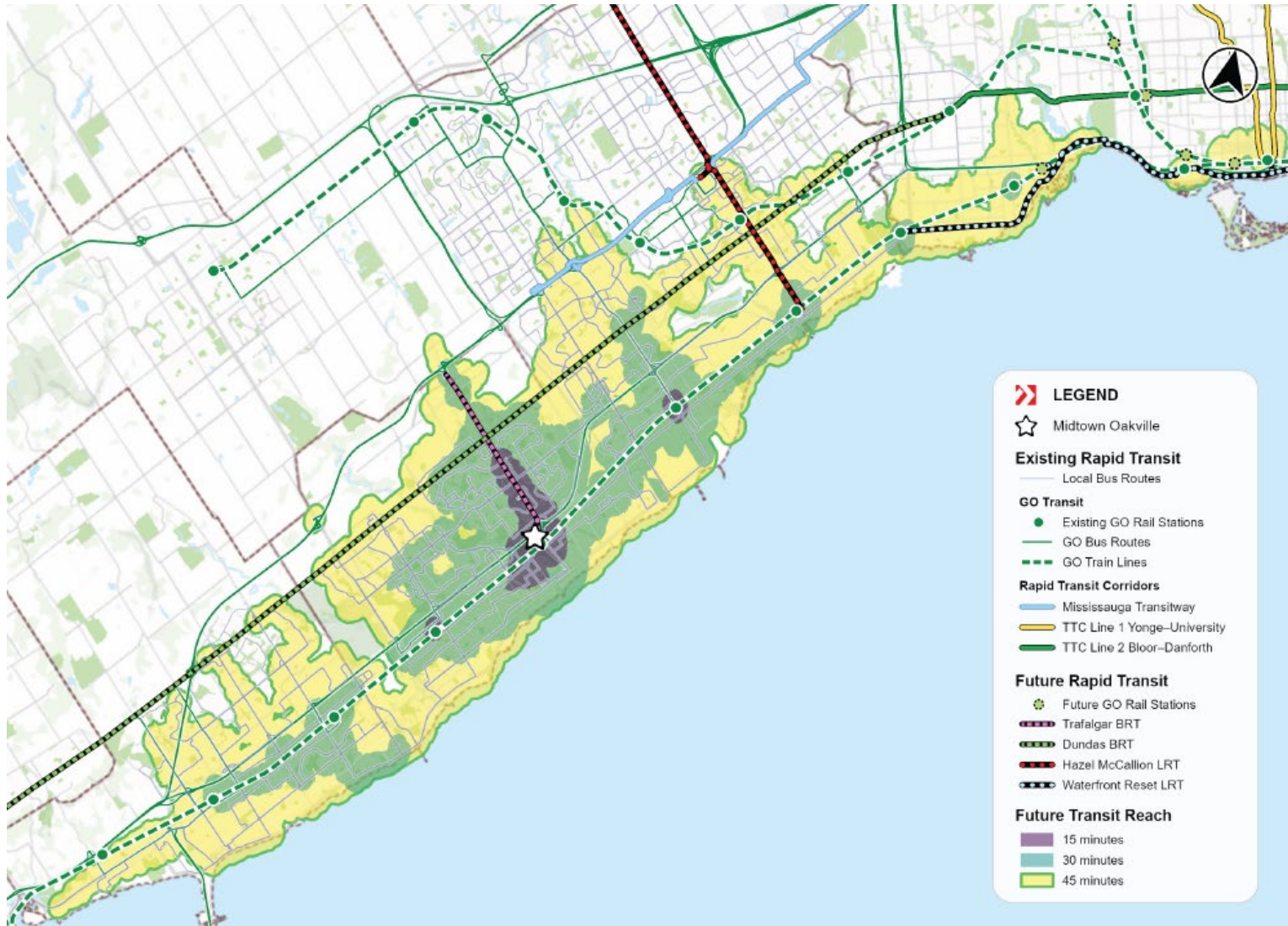
In summary, under present conditions the site of midtown Oakville is bound by the QEW corridor, limiting northwards travel to Trafalgar Rd. The nearby Oakville GO Station serves as the primary east-west route. In the future, the inclusion of Trafalgar BRT, Dundas BRT and GO Expansion greatly improves overall reach, opening greater opportunities for travel in all directions. The effect of future implementations is especially noticeable in longer travel reaches, as future 45-minute travel provides access to central Burlington, Mississauga City Center, and downtown Toronto.

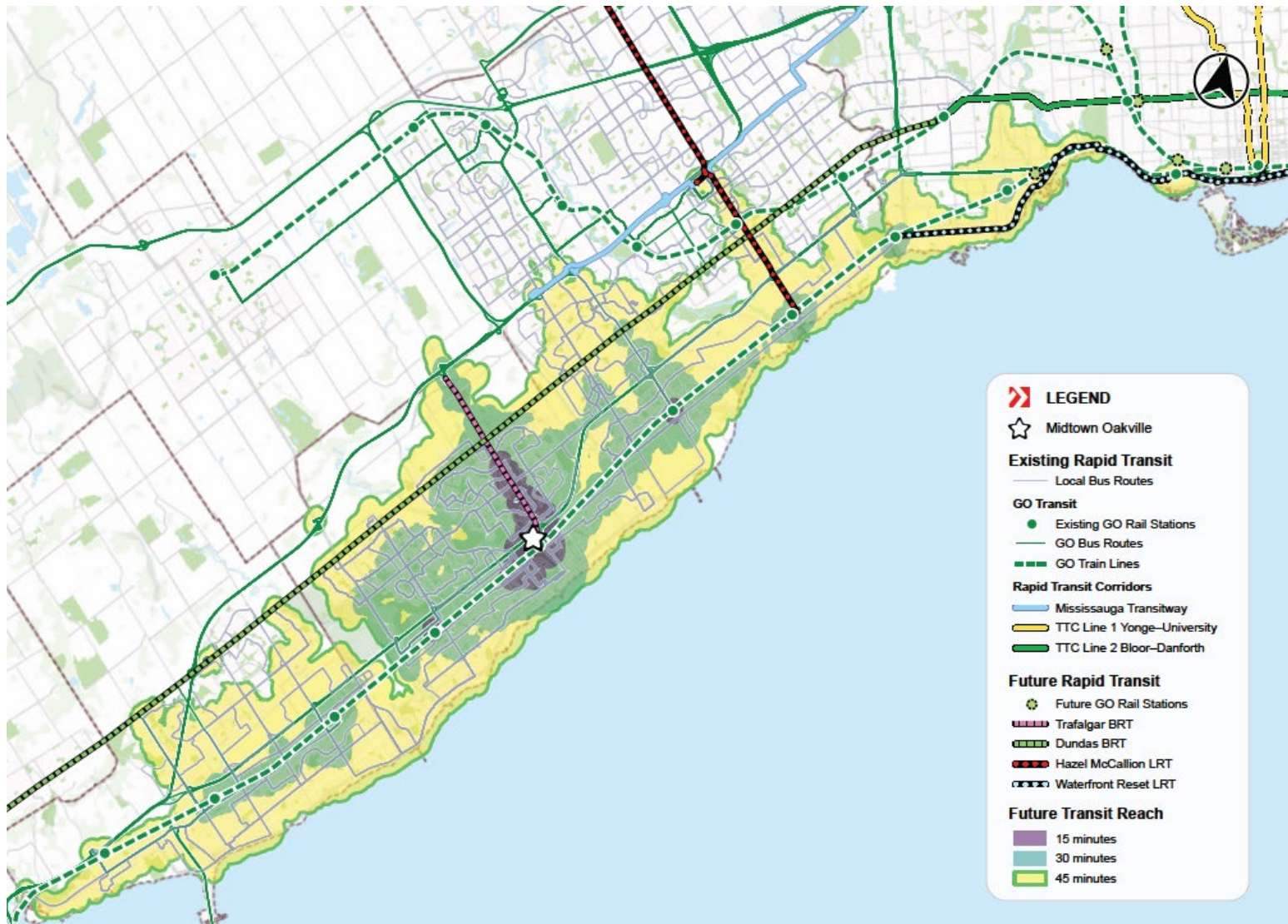
The evolving transportation context visualized in this analysis indicates that, at either local or intercity scales, there are suitable alternatives to driving or requiring a parking space for daily travel. The site is in a prime location that enables future site users to shift away from auto use and utilize the major transit investments being afforded within the area.











5.3.6 Zoning By-Law Review – Resident Parking Standards

A comprehensive Zoning By-law review has been undertaken which compares parking standards adopted across numerous municipalities across the GTHA and eastern Ontario with comparable transit access to the site. The selection of municipalities was primarily based on certain urban characteristics, including density and intensification patterns, conventionally auto-centric network, and a diversity of transit services available in the area. These minimum parking requirements reflect evolving transit contexts, mixed-use environments, and the emergence of alternative modes of travel.

A summary of resident Zoning By-law rates for comparable Ontario municipalities is provided in **Table 5.4**.



TABLE 5.4: RESIDENTIAL PARKING COMPARISON – ONTARIO

Municipality	Zoning By-law	City Area	Land Use Category	Nearby Transit Service	Minimum Resident Parking Requirement
166 South Service Road East, Oakville (Proposed)	--	Midtown	Mixed-Use Building	Oakville Local Bus Routes GO Train (Lakeshore West Line) Future Dundas and Trafalgar BRT	0.50 spaces / unit
Mississauga	By-law 0225-2007	Precinct 1	Condo / Rental Apartment	MiWay Bus Mississauga Transitway MiWay Express Bus GO Bus	0.80 spaces / unit
	Undergoing City staff investigation	Along future Hazel McCallion LRT	--	Future Hazel McCallion LRT	In June 2023, City of Mississauga's Council has motioned to investigate the feasibility of reducing, and possibly eliminating altogether, minimum residential parking requirements along the future Hazel McCallion Light Rail Transit line.
Vaughan	By-law 001-2021 (Passed)	VMC	Apartment Dwelling	TTC Bus / Subway GO Bus / Train YRT Bus YRT Viva BRT	0.40 spaces / unit
Toronto	By-law 569-2013	Parking Zone B	Mixed-Use Building	TTC Bus / Subway / Streetcar GO Bus / Train Miway Bus Future TTC Subway Future TTC Streetcar Future TTC BRT	No Minimum
Brampton	By-law 270-2004	Central Area / Downtown	Apartment Dwelling	GO Bus / Train Brampton Bus Brampton ZUM BRT Future Hazel McCallion LRT	No minimum
Ottawa ¹	By-law 2008-250	Area "X"	Mixed-Use Building (within 300 metres of a rapid transit station)	O-Train LRT OC Transpo Rapid Bus OC Transpo Frequent Bus	0.0 to 0.5 spaces / unit
Kingston	By-law 2022-62	Parking Area 1 (Downtown)	Mixed-Use Building	Kingston Transit Express Bus Kingston Transit Bus	0.40 spaces / unit
Kitchener	By-law 2019-051	Urban Growth Centre	Multiple Residential Buildings	GO Bus / Train GRT bus GRT Ipress Bus GRT ION LRT	No Minimum

Notes:

1. Along select streets within Central Ottawa and where the nearest active entrance of a mixed-use building is within 400 metres or less of a rapid transit station, the City of Ottawa Zoning By-law 2008-250 has no minimum resident parking standards for mixed-use buildings. Otherwise, a minimum standard of 0.5 spaces per unit applies.



A number of municipalities (Brampton, Kitchener, Toronto, Ottawa) have adopted substantial reductions in their residential parking rates within their downtown areas to align with goals of reducing non-auto modes of travel and promote existing and planned investments to transit, cycling, and pedestrian infrastructure. For example, the City of Brampton removed minimum resident parking requirements in the City's Central Area / Downtown with the passing of their most recent zoning by-law, and in June 2023 the City of Mississauga's Council directed City staff to investigate the feasibility of eliminating minimum parking requirements along the future Hazel McCallion LRT line.

Given that the level of existing and planned future transit service levels across the municipalities highlighted in **Table 5.4** are comparable to that of Midtown Oakville, it is evident that the minimum parking requirements stipulated in the prevailing Zoning By-law 2014-014 exceed what is otherwise considered appropriate in comparable municipalities with a similar transit context.

Collectively, the above indicates a general trend within municipalities across the GTHA and eastern Ontario to present a progressive outlook towards the provision of residential parking supply, particularly where transit and transportation context is, or is planned to be, conducive to non-automobile travel.

5.3.7 Observed Resident Parking Reduction Approvals

Consistent with the trend of reduced parking standards, there is a demonstrated trend towards parking supply reductions across the broader Greater Toronto and Hamilton Area (GTHA) beyond their respective Zoning By-law standards. BA Group has reviewed approvals for developments near GO Stations (with comparable transportation contexts as the site) for which reduced resident standards have been provided by City Council as part of the Zoning By-law Amendment process, by the Committee of Adjustment as part of Minor Variance applications, or at the Ontario Land Tribunal (OLT), formerly known as the Ontario Municipal Board (OMB) and the Local Planning Appeal Tribunal (LPAT).

A summary of these GTHA-wide resident parking reduction approvals for proxy sites with similar or less transit-supportive contexts as the proposed development are provided in **Table 5.5**.



TABLE 5.5: APPROVED GTHA-WIDE RESIDENT PARKING SUPPLY

Address	Nearest Major Transit Station	Approved Minimum Resident Parking Rate	Permission Through	Year of Approval
Proposed Development				
166 South Service Road East	Oakville GO Station (~400 m from site)	0.50 spaces / unit (proposed)	--	--
City of Mississauga				
151 City Centre Drive	City Centre Transit Terminal (~750m from site)	1-Bed – 0.62 spaces / unit 2-Bed – 0.72 spaces / unit	CoA File A355.21 (September 23, 2021)	2021
151 City Centre Drive	City Centre Transit Terminal (~750m from site)	0.62 spaces / unit	CoA File A308.23 (September 7, 2023)	2023
City of Hamilton				
90 Charlton Avenue West, 85 Robinson Street, and 220 Park Street South	Hamilton GO Centre Station (~700 m from site)	0.58 spaces / unit (effective)	Site-Specific By-law 14-118	2014
98 James Street South	Hamilton GO Centre Station (~150 m from site) West Harbour GO Station (~1.5km from site)	0.47 spaces / unit	Site-Specific By-law 15-024	2015
108 James Street North and 111 and 15 Hughson Street North	West Harbour GO Station (~850m from site)	0.50 spaces / unit	Site-Specific By-law 15-188	2015
71 Rebecca Street	Hamilton GO Centre Station (~750 m from site) West Harbour GO Station (~1.4km from site)	0.65 spaces / unit	Site-Specific By-law 18-293	2018
175 Catharine Street South and 117 Forest Avenue	Hamilton GO Centre Station (~350m from site)	0.65 spaces / unit	Site-Specific By-law 20-216	2020
600 James Street North	West Harbour GO Station (~900m from site)	0.58 spaces / unit	LPAT Case No. PL190517 Site-Specific By-law 21-053-LPAT	2021
City of Pickering				
Universal City 2 & 3 (Bayly Street & Liverpool Road)	Pickering GO Station (~550 m from site)	0.74 spaces / unit	CoA File P/CA60/19	2019
Universal City 6 (Bayly Street & Liverpool Road)	Pickering GO Station (~550 m from site)	0.71 spaces / unit	Site-Specific By-law 7810/21	2021
Universal City 4 & 5 (Bayly Street & Liverpool Road)	Pickering GO Station (~550 m from site)	0.65 spaces / unit	Site-Specific By-law 7936/22	2022
Universal City 7 (Bayly Street & Liverpool Road)	Pickering GO Station (~550 m from site)	0.65 spaces / unit	Site-Specific By-law 7924/22	2022
PTC Phase 1	Pickering GO Station (~750 m from site)	0.65 spaces / unit	Site-Specific By-law 7981/23	2023
1786-1790 Liverpool Road	Pickering GO Station (~700 m from site)	0.55 spaces / unit	Site-Specific By-law 8023/23	2023
City of Vaughan				
Transit City 3 ¹ (Millway Avenue & Portage Parkway)	Vaughan Metropolitan Centre Subway Station (~450 m from site)	0.33 spaces / unit	Site-Specific By-law 096-2018	2018
Transit City 4-6 ¹ (Jane Street & Portage Parkway)	Vaughan Metropolitan Centre Subway Station (~400 m from site)	0.41 spaces / unit	Site-Specific By-law 071-2019	2019
101 Edgeley Boulevard ¹ (Block A5)	Vaughan Metropolitan Centre Subway Station (~550 m from site)	0.18 spaces / unit	Site-Specific By-law 124-2021	2021
VMC Block 3 South (Interchange Way and Commerce Street)	Vaughan Metropolitan Centre Subway Station (~700 m from site)	0.30 spaces / unit	Site-Specific By-law 147-2022	2022
North-East Corner of Highway 7 & Commerce Street (Block E2)	Vaughan Metropolitan Centre Subway Station (~550 m from site)	0.18 spaces / unit	Site-Specific By-law 151-2022	2022
7800 Jane Street	Vaughan Metropolitan Centre Subway Station (~250 m from site)	0.37 spaces / unit	Site-Specific By-law 153-2022	2022
216 & 220 Doughton Rd	Vaughan Metropolitan Centre Subway Station (~700 m from site)	0.35 spaces / unit	Site-Specific By-law 155-2022	2022



Cities such as Hamilton, Pickering, and Vaughan have shown flexibility and pragmatism in adapting to the evolving transportation landscape as options become available to residents that were not available at the time when the Zoning By-law was enacted. For example, within the City of Pickering near the Pickering GO Station / Pickering Town Centre, decreasing parking supplies have been observed relative to the by-law requirement as the population continues to grow and as transit services levels continue to improve within its urban area. A review of these approvals, shown in **Table 5.5** illustrates a significant decline in resident parking rates over the last four years as there has been a reduction of 0.19 spaces per unit from 2019 to 2023.

Furthermore, this review of reduced parking approvals illustrates how numerous municipalities across the GTHA continue to approve resident parking standard reductions from their Zoning By-law standards, even for standards updated recently. For example, in 2023, the City of Mississauga approved a parking reduction of 0.62 spaces per unit (from 0.80 spaces per unit) for 151 City Centre Drive, a site located approximately 750 metres from the City Centre Bus Terminal. This approval represents a reduction of approximately 23% from the by-law standard. Furthermore, the applicable by-law standard of 0.80 spaces per unit was already the updated and reduced standard which the City of Mississauga passed in 2021. Therefore, it is not uncommon for municipalities to approve reduced resident parking rates from their Zoning By-law, even for standards updated recently.

In addition, the City of Pickering approved a resident parking reduction of 0.55 spaces per unit (from 0.80 spaces per unit) at 1786-1790 Liverpool Road, representing a reduction of approximately 38% from the by-law standard. The proposed resident parking rate for the site, 0.396 spaces per unit (from 0.6 spaces per unit), represents a reduction of approximately 33%. Therefore, the proposed reduction from the by-law standard is within the range of those seen in Mississauga and Pickering and is considered appropriate.

Further in the City of Vaughan, VMC Block 3 South and 216 and 220 Doughton Road are approximately 700 metres from the Vaughan Metropolitan Centre (VMC) subway station and were approved with a minimum resident parking requirement of 0.30 and 0.35 spaces per unit, respectively. By way of comparison, the proposed development is within one kilometre of the existing Allandale GO Station and will be within one kilometre of two transit hubs in the future. As such, the proposed development may be considered comparable to some degree to these VMC sites, further considering its future evolving site and mobility context, recognizing new cycling and pedestrian infrastructure and intensification policies on local and regional levels. Moreover, it is appropriate to compare the VMC sites and the proposed



development as they share comparable distances to higher-order transit facilities. As such, the proposed resident parking rate is viewed as proportionate to the parking approvals observed at other progressive centre areas, such as the VMC.

Overall, approved resident parking rates for comparable transit-oriented approvals within the GTHA range from 0.18 spaces per unit to 0.74 spaces per unit. The proposed resident rate (0.50 spaces per unit) is within this range and is, therefore, considered appropriate for the site's existing and, most notably, future transportation context.

5.3.8 Studio Unit Parking Strategy

In keeping with the objectives of Midtown Oakville to promote a compact urban form with higher density, improved local transit and an advanced mixed-use area; it is proposed to restrict the studio unit residents from purchasing a residential parking space.

This strategy aims to achieve the following goals:

- ▶ Encourage the use of sustainable transportation alternatives; and
- ▶ Foster good urban design

Alternative Transportation Options

Without access to a personal vehicle, these residents will be reliant on alternative modes of travel. On top of the existing infrastructure in place (Oakville GO Station and Oakville Transit buses), several improvements to the transit, pedestrian, and cycling network are intended for the future build out of the Oakville area as mentioned in **Section 5.3.3**. These improvements are:

- ▶ The Trafalgar Bus Rapid Transit;
- ▶ The Dundas Bus Rapid Transit;
- ▶ The Metrolinx Regional Express Rail program; and,
- ▶ New sidewalks and dedicated bicycle lanes within the future road network of Midtown Oakville

The existing and planned improvements to the transportation alternatives will accommodate the studio unit resident trips to and from the site.



Urban Design

Developers tend to provide parking in excess of the zoning bylaw requirements or of subsequent observations, partly from fear they will not have enough or often in response to unfounded marketing considerations. This approach is space intensive, requiring a large portion of land or building area to be devoted to parking. The resultant spread out nature of development is not pedestrian friendly or transit supportive, thereby encouraging single occupant vehicle travel and perpetuating the proliferation of parking.

Managing parking in order to minimize or eliminate excess supply will minimize wasted space and influence people's consideration of alternative modes of travel. Managing supply will also minimize the area required for parking, thereby reducing development costs and supporting compact urban development. While the proposed parking garage does have 7 levels of parking, this is a reduced rate and a step in the right direction.

The proposed parking strategy results in an effective resident parking ratio of 0.5 spaces per unit. While an effective 0.5 residential parking ratio is being proposed, it should be noted that this target is a minimum rate. The final parking numbers will be confirmed during subsequent applications which will aim to meet the residential demand from a sales perspective.

5.3.9 Proposed Resident Based TDM Strategies

As discussed in detail in **Section 8.0**, a TDM Plan for the site is proposed to guide the provision of viable, alternative personal transportation options beyond the single-occupant, private automobile. The objective is to encourage the use of active and sustainable transportation modes, respond to the mobility needs of site residents and reduce dependence on automobiles.

The future site context provides frequent, public transit services and improved pedestrian and cycling connectivity. The TDM Plan supplements and further leverages the physical infrastructure and attributes of the site area with a goal of reducing or minimizing auto-mode share. The proposed residential-based TDM strategies include, but are not limited to the following:

- ▶ Provision of a reduced resident parking supply;
- ▶ Unbundled parking from unit cost;
- ▶ Consideration to provide 5-10 car share spaces on site;



- ▶ Consideration to provide an annual car share membership for each residential unit;
- ▶ Provision of the required long-term bicycle parking supply, meeting the Zoning By-law standards;
- ▶ Consideration to provide a private bike station on site;
- ▶ Provision of bicycle repair stations;
- ▶ Consideration to provide private or shared micromobility devices; and
- ▶ Provision of direct pedestrian and cycling connections to building entrances, bicycle parking facilities, nearby transit stops, and the external / public network.

Overall, the proposed TDM strategies complement the site's resident parking reduction. It is noted that the reduced parking supply is, in and of itself, considered an effective TDM strategy. In addition, the overall TDM strategies are supportive of and conform to the current and evolving policies discussed in **Section 8.0**. As such, the proposed resident parking reduction can be appropriately accommodated through the proposed resident based TDM strategies.

5.3.10 Resident Parking Summary

In summary, it is proposed to adopt a reduced residential parking supply standard in comparison to the minimum requirements of Town of Oakville Zoning By-law 2014-014. The appropriateness of the proposed (reduced) residential parking requirements has been summarized by theme and is provided below in **Table 5.6**.



TABLE 5.6: SUMMARY OF RESIDENT PARKING RATIONALE

Theme/Initiative	Brief Description
Proposed Resident Parking Rate: 0.50 spaces per unit	
Progressive Inter-Governmental Policy Context	Numerous existing and evolving provincial, regional, and local policies prioritize more sustainable travel choices over automobiles, including providing support for parking management strategies (TDM) and reduced minimum parking requirements.
Availability of Non-Automobile Travel Options	The site is near existing and planned transit services, bicycle route facilities, and various transportation improvements that provide non-automobile dependent travel connections across the City and Region. These services include the existing Oakville GO Station, the planned BRT systems along Trafalgar and Dundas, and planned multi-modal improvements to Midtown Oakville.
Transit Reach	Figures illustrating existing and future transit reaches are provided during 15, 30, and 45 minute intervals. With the future improvements to public transit infrastructure, longer travel reaches can be achieved. Central Burlington, Mississauga City Center, and downtown Toronto can be reached within 45 minutes.
Comparison of Zoning By-laws across Ontario	The reduced resident parking standards proposed for the site is within the range of contemporary zoning standards across the Province of Ontario. Half of the municipalities reviewed have parking standards lower than the Town of Oakville's Zoning By-law 2014-014. Resident Zoning By-law Range Observed: 0.00 - 0.80 spaces per unit
Parking Requirement Reduction Approvals across the GTHA	Several resident parking reduction approvals have been granted for developments in comparable or slightly less transit supportive contexts. The proposed resident rate is within the midpoint of this range. Resident Reduction Approval Range Observed: 0.18 - 0.74 spaces per unit
Studio Unit Parking Strategy	It is proposed to prevent studio units from purchasing a residential parking space within the parking garage. This strategy aims to encourage the use of active and sustainable transportation modes and creates an urban design focused development. The effective residential parking rate will result in a 0.50 spaces per unit .
Resident-Based TDM Strategies	The proposed residential-based TDM strategies are supportive of the reduced supply, encourage the use of active and sustainable transportation modes, and aim to reduce reliance on private automobile ownership and usage. The proposed parking reduction can be well accommodated in combination with these measures.



5.4 Non-Resident Parking Assessment

The proposed non-resident parking standards have been assessed based on the following considerations:

- ▶ Emergence of non-auto supportive regional and local plans and policy directives;
- ▶ Existing and planned transit and active transportation facilities afforded to the area;
- ▶ The existing and future transit reach;
- ▶ Review of other residential visitor and non-residential parking By-law standards; and
- ▶ Support from the site's TDM strategy for visitors.

5.4.1 Provincial, Regional, And Local Policy

Similar to the resident parking assessment, the applicable provincial, regional, and local policies demonstrate increasing efforts to reduce auto-related trips for non-resident travel. Overall, increasing efforts and investments are being made to change the travel behaviour of future site visitors.

As discussed in **Section 5.3.2** Provincial policy documents such as the Provincial Policy Statement (PPS), the Growth Plan for the Greater Golden Horseshoe, Provincial Planning Statement, and the Ontario Ministry of Transportation Transit-Supportive Guidelines, support the use of appropriate development standards and TDM measures, such as reduced parking standards, to facilitate intensification and support transit-supportive development within site areas. In addition, Metrolinx policy documents, including the 2041 Regional Transportation Plan, Mobility Hub Guidelines, and the GO Rail Station Access Plan, prioritize the intensification of development near transit and the creation of a multi-modal regional transportation system. As such these documents directly state the potential to reduce and potentially remove minimum parking requirements in transit-supportive areas while also providing direction to improve the accessibility of regional transit, including the Oakville GO Station near the site. As such, these documents support the reduced non-residential parking standards.

Overall, a common theme across provincial and regional policy documents is to encourage the reduction of auto-related trips and increase the modal share of more active forms of transportation. The provision of a 0.15 residential visitor parking standard and a 1.08 per 100m² non-residential parking standard encourages visitors to utilize more active forms of transportation to travel to and from the site,



thereby facilitating intensification and supporting active transportation within the site area.

5.4.2 Review of Evolving Transportation Context

As described in **Section 5.3.3**, the site is within 800 m of the Oakville GO Station and Oakville Transit bus stops. It will also benefit from various planned improvements to the local area road, transit, cycling, and pedestrian network as part of the Midtown Oakville OPA and Metrolinx BRT projects. These improvements showcase the Town's direction towards prioritizing non-auto modes of travel and increasing the mode share of transit and active transportation, of which the reduced non-resident parking spaces would align with.

5.4.3 Transit Reach Assessment

As described in **Section 5.3.4**, 15, 30, and 45 minute transit reach to and from the Site during the weekday morning and afternoon travel periods were analyzed for existing and future conditions. Illustrative figures were created using Geographic Information Systems (GIS) and observed the service area of a transit network that a visitor of the Site has access to in a given time range.

5.4.4 Review of Residential Visitor Zoning By-Law Standards

In addition to the resident parking standards reviewed in **Section 5.3.6**, a comprehensive Zoning By-law review was also undertaken to compare residential visitor parking standards adopted across numerous municipalities in Ontario with comparable transit access to the proposed site, summarized in **Table 5.7**. The selection of municipalities was primarily based on certain urban characteristics, including density and intensification patterns, conventionally auto-centric network, and a diversity of transit services available in the area.

Several municipalities across Ontario have approved relatively low parking standards for residential visitor parking within their respective Zoning By-laws. These reduced minimum parking requirements reflect evolving transit contexts, mixed-use environments, and the emergence of alternative modes of travel.

Overall, the range of minimum resident visitor parking standards was observed to be between 0 to 0.20 spaces per unit. As such, the ratio of 0.15 spaces per unit proposed for the site is within the range observed for contemporary zoning standards across the GTHA and southern Ontario.

The above indicates a general trend within municipalities across the GTA towards a progressive outlook towards the provision of residential



visitor parking supply, particularly where transit and transportation context is existing or planned, conducive to non-automobile travel. Within many of these observed municipalities, the existing and planned transit context is comparable or less than those available near the site.



TABLE 5.7: COMPARABLE VISITOR PARKING SUPPLY RATIO

Municipality	Zoning By-law	Centre Area	Land Use Category	Nearby Transit Service	Minimum Parking Requirements (spaces per unit) Residential Visitor
166 South Service Road East, Oakville (Proposed)	-	Midtown Oakville	Mixed-Use Building	GO Train Oakville Transit	0.15
Barrie	Draft Zoning By-law (June 2023)	District 1 District 2	Any Dwelling Unit	GO Train Barrie Transit Bus	0.1
Mississauga	By-law 0225-2007	Precinct 1	Condo / Rental Apartment	MiWay Bus MiWay Express Bus Mississauga Transitway GO Bus / Train	0.2
		City Centre		Future Hurontario LRT Future Lakeshore BRT	0.15
Pickering	By-law 7553-17	City Centre	Apartment Dwelling	Durham Region Transit Bus GO Train Future Durham-Scarborough BRT	0.15
Waterloo	By-law 2018-050	Residential Mixed-Use Zones (Parking Area A)	Residential	Grand River Bus Grand River ION LRT GO Bus / Train	0.101
Vaughan	By-law 001-2021	VMC	Apartment Dwelling	YRT Bus YRT Viva BRT GO Bus / Train TTC Bus / Subway	0.15
Vaughan	Yonge-Steeles Secondary Plan (OLT)	Yonge-Steeles	Apartment Dwelling	YRT Bus YRT Viva BRT GO Bus TTC Bus / Subway Future Yonge North Subway Extension	0.15
Toronto	By-law 569-2013	Parking Zone B	All non-residential uses	TTC Bus / Subway / Streetcar GO Bus / Train Miway Bus Future TTC Subway Future TTC Streetcar Future TTC BRT	2 spaces + 0.05
Kingston	By-law 2022-62	Parking Area 1 (Downtown) & Parking Area 2 (Main Street Corridor)	Mixed-Use Building	Kingston Transit Bus Kingston Transit Express Bus	0.1
Hamilton	By-law 05-200	Downtown Zone	Multiple Dwelling	HSR Bus Future B-Line LRT Future A-Line BRT GO Bus / Train	Inclusive of minimum resident rate
Kitchener	By-law 2019-051	Urban Growth Centre / Downtown	Multiple Residential Buildings	Grand River Bus Grand River ION LRT GO Bus / Train	No minimum
Brampton	By-law 270-2004	Central Area / Downtown	Apartment Dwelling	Brampton Bus Brampton ZUM BRT GO Bus / Train Future Hurontario LRT	0.2

Notes:

- The City of Waterloo Zoning By-law 2018-050 provides parking standards for each Residential Mixed-Use (RMU) Zone. As such, the range of parking standards across the various RMUs is reported in this table.



5.4.5 Observed Residential Visitor Parking Approvals

Consistent with the trend of reduced residential visitor parking standards, there is a demonstrated trend towards parking supply reductions across the broader Greater Toronto and Hamilton Area (GTHA) beyond their respective Zoning By-law standards. BA Group has reviewed approvals for developments near GO Stations (with comparable transportation contexts as the site) for which reduced residential visitor standards have been provided by City Council as part of the Zoning By-law Amendment process, by the Committee of Adjustment as part of Minor Variance applications, or at the Ontario Land Tribunal (OLT), formerly known as the Ontario Municipal Board (OMB) and the Local Planning Appeal Tribunal (LPAT). The residential visitor parking approvals that are under review are for sites specifically within the Cities of Mississauga and Brampton where they have a minimum residential visitor parking rate of 0.20 spaces per unit and a further reduced rate of 0.15 spaces per unit was approved. These sites provide the best comparison given that the proposed site is proposing a 0.15 spaces per unit ratio within Oakville which has a minimum residential parking requirement of 0.20 spaces per unit.

A summary of these residential visitor parking reduction approvals for proxy sites with similar or less transit-supportive contexts as the proposed development are provided in **Table 5.8**.



TABLE 5.8: APPROVED GTHA VISITOR PARKING SUPPLY

Address	Nearest Major Transit Station	Approved Minimum Residential Visitor Parking Rate	Permission Through	Year of Approval
Proposed Development				
166 South Service Road East	Oakville GO Station (~400 m from site)	0.15 spaces / unit	--	--
		(proposed)		
City of Mississauga				
78 Park Street East and 22 – 28 Ann Street	Port Credit GO Station (~80 m from site)	0.10 spaces / unit	CoA File: A413.20	2020
			Site-Specific Zoning By-law 0054-2020	
86 Dundas Street East	Cooksville GO Station (~1 km from site)	0.15 spaces / unit	CoA File: A51/21	2021
70 Mississauga Road South & 181 Lakeshore Road West	Port Credit GO Station (~1.3 km from site)	0.15 spaces / unit	CoA File: A226/21	2021
180 Rutledge Road	Streetsville GO Station (~1 km from site)	0.10 spaces / unit	CoA File: A185/23	2023
City of Brampton				
245 Steeles Avenue West (Phase 1)	Brampton Innovation GO Station (~3.3km from site)	0.15 spaces / unit	CoA Application No. A-2022-0023	2022
Block 7 (Mount Pleasant Area)	Mount Pleasant GO Station (~200 m from site)	0.15 spaces / unit	OMB Cases: PL160478 & PL160479	2017
2 & 4 Hanover Road	Bramalea GO Station (~3.4km from site)	0.14 spaces / unit	Site-Specific Zoning By-law 48-2020	2020
80 Scott Street	Brampton Innovation GO Station (~650 m from site)	0.15 spaces / unit	Site-Specific Zoning By-law 140-2020	2020
499 Main Street South (Shoppers World Brampton)	Brampton Innovation GO Station (~3.3km from site)	0.15 spaces / unit	Site-Specific Zoning By-law 228-2020	2020



5.4.6 Review of Non-Residential Parking Standards

A comprehensive Zoning By-law comparison review for non-residential parking standards was also undertaken and is summarized in **Table 5.9**.

Similar to **Section 5.3.6**, several municipalities across Ontario have approved relatively low parking standards for non-residential parking within their respective Zoning By-laws.

Overall, the range of minimum non-residential parking standards was observed to be between 0.00 to 4.50 spaces per 100m² of non-residential GFA. As such, the proposed rate of 1.08 spaces per 100m² of non-residential GFA proposed for the site is within the range observed across the GTHA and southern Ontario.

The above indicates a general trend within municipalities across the GTA towards a progressive outlook towards the provision of non-residential parking supply, particularly where transit and transportation context is existing or planned, conducive to non-automobile travel. Within many of these observed municipalities, the existing and planned transit context is comparable or less than those available near the site.



TABLE 5.9: COMPARABLE NON-RESIDENTIAL PARKING RATIOS

Municipality	Zoning By-law	Centre Area	Land Use	Minimum Parking Requirements
				(spaces per 100m ²)
166 South Service Road East, Oakville (Proposed)	-	Midtown Oakville	Retail & Commercial	1.08 (for all non-residential uses)
Barrie	Draft Zoning By-law (June 2023)	District 1 District 2	All non-residential uses	No minimum
Mississauga	By-law 0225-2007 ¹	Precinct 1	Retail	3
			Recreational Establishment ²	4.5
			Office	2
Pickering	By-law 7553-17 ¹	City Centre	Retail	3.5
			Commercial Fitness	4.5
			Office	2.5
Vaughan	By-law 001-2021 ¹	VMC	Retail ³	0.7
			Health and Fitness Centre	0.9
			Office	0.5
Toronto	By-law 569-2013	Parking Zone B	All non-residential uses	No minimum
Kingston	By-law 2022-62	Parking Area 1 (Downtown) & Parking Area 2 (Main Street Corridor)	Retail & Office & Commercial	No minimum
Hamilton	By-law 05-200	Downtown Zone	Retail & Office & Commercial	No minimum
Kitchener	By-law 2019-051	Urban Growth Centre / Downtown	Retail	No minimum
			Fitness Centre	No minimum
			Office ⁴	No minimum
Brampton	By-law 270-2004	Central Area / Downtown	Retail	4.5
			Fitness Centre	4.5
			Office	4

Notes:

1. Shared parking calculations allow for visitor parking to accommodate non-residential uses as an option for providing non-residential parking
2. Recreational Establishment in Mississauga By-law includes fitness club.
3. Retail parking rate applies to establishments less than 5,000m² GFA
4. Office parking rate applies to establishments less than 4,000m² GFA



5.4.7 Review of Visitor TDM Strategies

As discussed in detail in **Section 8.0**, a TDM Plan for the site is proposed to guide the provision of viable, alternative personal transportation options beyond the single-occupant, private automobile. The objective is to encourage the use of active and sustainable transportation modes, respond to the mobility needs of site residents and reduce dependence on automobiles. The future site context provides frequent, public transit services and improved pedestrian and cycling connectivity. The TDM Plan further leverages the physical infrastructure and attributes of the site area with a goal of reducing or minimizing auto-mode share. The proposed non-residential-based TDM strategies include, but are not limited to, the following:

- ▶ Provision of a reduced non-residential parking supply; and
- ▶ Provision of the required short-term bicycle parking supply, meeting the Zoning By-law standards.

5.4.8 Non-Resident Parking Summary

In summary, it is proposed to adopt reduced non-resident parking supply standards in comparison to the minimum requirements of the Town of Oakville Zoning By-law 2014-014. The assessment of the proposed (reduced) non-resident parking requirements has been summarized by theme and is provided below in **Table 5.10**.



TABLE 5.10: REDUCED NON-RESIDENT PARKING RATIONALE

Theme/Initiative	Brief Description
Proposed Residential Visitor Rate: 0.15 spaces per unit and Non-Residential Parking Rate: 1.08 spaces per 100m²	
Progressive Inter-Governmental Policy Context	Numerous existing and evolving provincial, regional, and local policies prioritize more sustainable travel choices over automobiles, including support for parking management strategies and reduced minimum parking requirements.
Availability of Non-Automobile Travel Options	The site is near existing and planned transit services, bicycle route facilities, and various transportation improvements that provide non-automobile dependent travel connections across the City and Region. These services include the existing Oakville GO Station, the planned BRT systems along Trafalgar and Dundas, and planned multi-modal improvements to Midtown Oakville.
Transit Reach	Figures illustrating existing and future transit reaches are provided during 15, 30, and 45 minute intervals. With the future improvements to public transit infrastructure, longer travel reaches can be achieved. Central Burlington, Mississauga City Center, and downtown Toronto can be reached within 45 minutes.
Comparison of Zoning By-laws across Ontario	The reduced non-resident parking standards proposed for the site is within the low-end of the range of Zoning By-law standards observed across the GTHA and southern Ontario. Residential Visitor Zoning By-law Range Observed: 0.00 - 0.20 spaces per unit Non-Residential Zoning By-law Range Observed: 0.00 - 4.50 spaces per 100 m² GFA
Parking Requirement Reduction Approvals across the GTHA	Several residential visitor parking reduction approvals have been granted for developments in comparable or slightly less transit supportive contexts. The proposed resident rate is within the midpoint of this range. Resident Reduction Approval Range Observed: 0.10 - 0.15 spaces per unit
Residential Visitor-Based TDM Strategies	The proposed visitor-based TDM strategies, including the provision of short-term bicycle parking supply, meeting the Zoning By-law standards, and the provision of short-term / PUDO parking spaces along Street 'A' to encourage the use of active and sustainable transportation modes, reducing reliance on private automobile ownership and usage.



5.5 Parking Summary

It is proposed to provide a reduced vehicular parking supply to the requirements stipulated in Town of Oakville's Zoning By-law 2014-014. The appropriateness of the proposed parking standards, for all uses, are summarized in **Table 5.11**.

TABLE 5.11: SUMMARY PARKING RATIONALE

Theme/Initiative	Brief Description	
	Resident Proposed Resident Rate: 0.50 spaces per unit	Non-Resident Proposed Residential Visitor Rate: 0.15 spaces per unit
		Proposed Non-Residential Rate: 1.08 spaces per 100 m ²
Progressive Inter-Governmental Policy Context	Existing and evolving provincial, regional, and local policies prioritize sustainable travel choices over automobiles, supporting the use of parking management strategies and reduced minimum parking requirements.	
Availability of Non-Automobile Travel Options	The site is in close proximity to existing and planned transit services, bicycle route facilities, and various transportation improvements that encourage non-automobile dependent travel across the City.	
Transit Reach	Figures illustrating existing and future transit reaches are provided during 15, 30, and 45 minute intervals. With the future improvements to public transit infrastructure, longer travel reaches can be achieved. Central Burlington, Mississauga City Center, and downtown Toronto can be reached within 45 minutes.	
Comparison of Zoning By-laws across Ontario	Resident Zoning By-law Range: 0.00 - 0.80 spaces / unit	Residential Visitor Zoning By-law Range: 0.00 - 0.20 spaces / unit
		Non-Residential Zoning By-law Range: 0.00 – 4.50 spaces / 100 m² GFA
Parking Requirement Reduction Approvals across the GTHA	Resident Approval Range: 0.18 to 0.74 spaces / unit	Residential Visitor Approval Range: 0.10 to 0.15 spaces / unit -
TDM Strategies	The proposed TDM strategies encourage the use of sustainable transportation modes, reducing reliance on private automobile ownership and usage for both residents and visitors.	



6 Loading Considerations

6.1 Zoning By-law Loading Requirements

Application of the prevailing Zoning By-law-2014-014 loading standard to the proposed development does not require any loading spaces.

6.2 Loading Supply

It is proposed to provide 6 loading spaces across the three towers within the site. Tower 1 will contain 3 at-grade loading spaces configured as follows:

- ▶ Refuse Collection loading space capable of accommodating an overhead front-loading refuse collection vehicle or a large Single Unit delivery vehicle for the non-residential floor space / household moving vehicles; and,
- ▶ Two (2) full-sized loading spaces capable of accommodating large single unit delivery vehicles that can accommodate full sized delivery vehicles or household moving vehicles

The consolidated underground garage will each contain 3 loading space configured as follows:

- ▶ A smaller sized loading space capable of accommodating small delivery vehicles that will serve household move-in and move-out activities.

6.3 Operations and Manoeuvring

Vehicular access to Tower 1's at-grade loading area is proposed from the driveway off South Service Road East. It should be noted that a consolidated garbage pick up location is proposed in Tower 1's at-grade loading area which is similar to the June 2022 submission.

Vehicular access to the loading spaces in the underground garage is also proposed from the driveway off South Service Road East. The purpose of these loading spaces is to solely service move-in and move-out activities from the three towers. There is one smaller loading space positioned in close proximity to each of the three tower's elevator core. It should be noted that the second proposed driveway off Street C will not permit loading vehicle access and a height barrier and signage will be proposed to prevent loading vehicle access.

Vehicular manoeuvring diagrams (VMD's) have been developed which demonstrate the ability of service and delivery vehicles to manoeuvre within the site when entering / exiting each loading area. Each of the



vehicles enters and leaves the site via the site driveways in a forward motion. The design vehicles used in assessing the configuration of the proposed loading space are the Halton Region front-loading overhead refuse collection vehicle, single unit truck (TAC SU), heavy single unit truck (TAC HSU), and a cube van.

VMDs illustrating the service vehicle manoeuvring characteristics across the various loading areas are provided in **Appendix D**. These vehicular manoeuvring diagrams confirm that the proposed loading arrangements are appropriate and will facilitate the manoeuvring requirements of the vehicles that are expected to access the site. The VMDs also illustrate the loading manoeuvres for both the interim and ultimate conditions of South Service Road East since it is proposed to realign the street.

6.4 Height Clearances

A minimum height clearance of 4.5 m is maintained throughout the entire at-grade loading area, and 7.5 m for the loading spaces satisfying the minimum practical height clearance requirements associated with front loading overhead refuse collection vehicles.

A minimum height clearance of 3.5 m is maintained throughout the P1 level of the underground garage to solely accommodate smaller loading vehicles that will serve moving in / moving out operations.

6.5 Loading Summary

The proposed development incorporates a total of 6 loading space. The proposed loading arrangements are functionally and operationally appropriate and will facilitate the loading / unloading, moving, delivery and refuse collection needs of the proposed development.



7 Bicycle Parking Supply Review

7.1 Zoning Bylaw Bicycle Requirements

Application of the bicycle parking standards outlined in underlying Town of Oakville Zoning By-law 2014-014 requires a minimum of 1,858 bicycle parking spaces (1,395 long-term and 463 short-term bicycle parking spaces). A detailed summary of these requirements is provided in **Table 7.1**.

TABLE 7.1: ZONING BICYCLE PARKING REQUIREMENTS

Land Use		Units / NFA ^[1]	Minimum Parking Rate ^[2]	Minimum Parking Requirement ^[2]
Residential	Long-term	1,851 units	0.75 spaces / unit	1,388 spaces
	Short-term		0.25 spaces / unit	463 spaces
	Subtotal	1,851 units	--	1,851 spaces
Non-Residential	Retail Long-term	1,252 m2 GFA	Greater of 2 or 1 space / 1000 m2 GFA	2 spaces
	Commercial Long-term	4,602 m2 GFA	Greater of 2 or 1 space / 1000 m2 GFA	5 spaces
	Subtotal	--	--	7 spaces
Long-Term				1,395 spaces
Short-Term				463 spaces
Total				1,858 spaces

Note:

1 Site statistics are based on architectural plans prepared by Sweeny&Co Architects dated March 2024

2 Bicycle Parking Rates based upon Zoning By-law 2014-014 which also specifies that if the calculation of the number of required bicycle parking spaces results in a number with a fraction greater than 0.25, the number is rounded up to the nearest whole number.

7.2 Bicycle Parking Supply and Facilities

A total of 1,858 bicycle parking spaces are proposed across the Project on the Mezzanine, ground floor, and P1 levels. This includes 1,388 resident long term bike parking spaces, 463 residential visitor short term bike parking spaces and 7 long term bike parking spaces for the retail and commercial components of the development.

This proposed supply meets the Zoning By-law requirements of the site. Proposed access to the project's bicycle parking facilities is from the main tower elevator cores or from stairs equipped with a bicycle ramp. All stairs equipped with a bicycle ramp can be access from Street C. A bicycle repair station for each tower is also proposed in their respective long-term bicycle parking rooms.



7.3 Bicycle Parking Summary

The proposed bicycle parking supply of 1,858 bicycle parking spaces are considered appropriate and will accommodate the bicycle parking demands of the proposed development.



8 Transportation Demand Management

Transportation Demand Management (TDM) measures will be incorporated within 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 daily basis. The following outlines the proposed physical and operational strategies that complement the Site design with the goal of encouraging a shift in the travel pattern of future residents to sustainable modes of transportation.

The TDM Plan strives to reduce automobile use as a 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 objective of the TDM Plan is to reduce peak hour single occupant automobile traffic, to a certain degree, by focusing on four specific policy areas:

- ▶ Encourage the use of alternative travel modes (transit, cycling, and walking);
- ▶ Increase vehicle occupancy;
- ▶ Shift travel to off-peak periods; and
- ▶ Reduce vehicle kilometres travelled.

Further details are discussed below in **Section 8.1**.

8.1 TDM Plan Strategies

The existing and future area context provides for excellent public transit services as well as travel by active transportation which will reduce the need of future residents of the site to travel using an automobile. Additional TDM strategies, which have been recommended as part of the proposed development are summarized in **Table 8.1**.

Based upon the site context and proposed land use, the recommended TDM strategies have been selected to further support non-automobile modes of travel. The measures fall into two general categories: a 'hard' or 'soft' measure. A 'hard' TDM measure is a physical infrastructure component, where the applicant or land developer is responsible for implementations. A 'soft' TDM measure is where the applicant or land developer is responsible for notifying a third party for implementations (i.e. Town Staff or Transit Agency). The following sections provide additional details regarding each recommended TDM strategy.



TABLE 8.1: SUMMARY OF SITE TDM MEASURES

Measure	Description	TDM Plan Objective	Hard or Soft Measure
Reduce Car Ownership			
Reduced Vehicular Parking Supply	The following parking supply is proposed for the site (1,851 units): 872 resident parking spaces (0.47 ratio); 278 residential visitor (0.15 spaces per unit); and, 147 non-residential parking spaces This is a reduced provision in comparison with the minimum resident parking requirements. The future area context around the site's location will be rich in transit, cycling and close to key area destinations, which reduces the need to drive. Providing less parking is a key component in reducing single occupant vehicle trips The future area context around the site's location will be rich in transit, cycling and close to key area destinations, which reduces the need to drive. Providing less parking is a key component in reducing single occupant vehicle trips	Reduce auto-oriented dependence and the need for everyday travel. Promote non-auto modes of travel during peak travel periods.	Hard Measure
Unbundling of Residential Unit / Vehicle parking space sales	Unbundling of unit leases and parking leases will benefit potential tenants who do not need or want parking space. Studio units will not be provided an option to purchase a parking space.	Reduce auto-oriented dependence and the need for everyday travel	Soft Measure
Car Share Parking Spaces	Consideration to provide 5-10 car share spaces on site through a car share provider.	Promote alternative transportation service options besides car ownership	Hard Measure
Annual Car Share Memberships	Consideration to provide an optional annual car share membership per unit for the first year of occupancy.	Promote alternative transportation service options besides car ownership	Hard Measure
Bicycle Use			
Bicycle Parking	Provide bicycle parking in accordance with the Town standards. Provide 1,858 bicycle parking spaces (1,395 long-term and 463 short-term) in total for the residents and visitors of the site.	Make cycling an attractive option for travel during the peak travel periods.	Hard Measure
Bike Share	Consider providing two private bike share stations supporting 25 bicycles total for residents.	Promote alternative transportation service options besides car ownership	Hard Measure
Bike Repair Station	Provide 3 bicycle repair stations (one for each tower) within the residential bicycle parking storage area on site.	Make cycling an attractive option for travel during the peak travel periods.	Hard Measure
Micromobility Use			
Private / Shared Micromobility Devices	Explore the provision of micromobility devices (manual bikes, e-bikes, e-scooters, etc.) in concert with Town of Oakville policy review of micromobility to facilitate "last kilometer" trip making in the Midtown Oakville context	Promote alternative transportation service options besides car ownership	Hard Measure
Transit Use			
Transit Information Centre	Explore the provision of a television displaying real-time transit information in the resident lobby to assist residents in taking local transit services (e.g., bus and streetcar routes) and subway system.	Reduce car dependence and the need for everyday travel. Promote transit travel during peak travel periods	Hard Measure
Travel Mode Information Package	Implement marketing programs to ensure that new residents are aware of available modal choices in the area.	Reduce auto-oriented dependence. Promote non-auto modes of travel during peak periods.	Soft Measure
Pedestrian Access and Walkability			
Pedestrian & Cycling Connections	Provide direct connections to Street A, Street B, and South Service Road which connects pedestrians and cyclists to the surrounding area's bike lanes, Oakville Transit bus stops, and the Oakville GO Station.	Make walking and cycling an attractive option for travel during peak travel periods	Hard Measure



9 Development Concept Travel Forecasts

The development proposal for the site envisions a large-scale development of three towers with proposed heights of 52, 56, and 44 storeys, with Towers 2 and 3 on top of a mutual podium.

The development proposes 1,851 residential units, approximately 1,252 square metres (13,477 square feet) of retail Net Floor Area (NFA), and about 4,602 square metres (49,534 square feet) of health/fitness club NFA. Vehicle access will be provided through two driveway connections: South Service Road East (North Access) and a new north-south local road (East Access) connecting South Service Road East to Cross Avenue.

It is assumed that the site will be developed in two phases:

- ▶ Phase 1 will open in 2028 and will include Tower 1, while
- ▶ Phase 2 will open in 2033 and consist of Towers 2 and 3.

It is also assumed the North Access will be the only access until 2038, when the new north-south local road is assumed to be constructed.

Table 9.1 summarizes the development land uses for each tower.

TABLE 9.1: DEVELOPMENT LAND USES

Tower	Units	Health/Fitness Club (m ²)	Retail (m ²)
1	711	4,602	--
2 + 3	1,140	--	1,252
Total	1,851	4,602	1,252



9.1 Development Trip Generation

The following land use codes from the Institute of Transportation Engineers (ITE) Trip Generation 11th Edition⁹ were used to estimate the weekday AM and PM peak hour traffic volumes that the Development will generate:

- ▶ Multifamily Housing (High-Rise) (LUC 222);
- ▶ Health/Fitness Club (LUC 495); and
- ▶ Shopping Centre (LUC 822).

Data for the peak hour of adjacent street traffic were used to estimate trip generation. The resulting summation is the "raw" trip generation – unadjusted for modal split credits. The effects of these other factors on the actual net new trip generation on the local roadway system are discussed in detail in the following sections.

The trip generation rates used for the Multifamily Housing trips are for urban, multi-use developments nearby rail transit. The trip generation rates consider lower auto mode shares typically seen in these high-density, multi-modal areas. Additionally, through previous development applications within the study area, the MTO has previously advised that mode share should not be considered to provide a conservative approach. As such, no mode share reductions were applied to the trip generation.

9.1.1 Internal Capture

The ITE Trip Generation Handbook describes a multi-use development as a single project that consists of two or more ITE land use classifications in which trips can be made between land uses without using the off-site roadway system. Sharing trips between compatible land use is an internal capture without travelling off-site.

Based on this information, the proposed development is considered a multi-use development with compatible commercial land, uses that are likely to share – or capture – trips that do not require vehicular travel outside the site.

The ITE Trip Generation Handbook has been utilized to account for the development's internal trips. By way of example, some portion of the traffic destined to and from the retail uses located within site will likely

⁹ Trip Generation Manual 11th Edition + Supplement Institute of Transportation Engineers Washington DC 2020



originate from the on-site residential units, requiring only a walking trip. The detailed calculations are provided in **Appendix E**.

ITE data suggests an internal capture rate of 2% - 15% for the respective peak hours.

9.1.2 Net Trip Generations Estimates

Table 9.2 summarize the projected trip generation associated with the build-out of the development. As noted earlier, these estimates were based on the standardized ITE rates with internal credits.

The estimated trip generation for the Development indicates that 453 new trips are forecasted to be generated during the AM peak hour and 476 new trips during the PM peak hour.

TABLE 9.2: TRIP GENERATION

Phase	Tower	ITE Land Use Code / Number of Units	Trips	AM Peak Hour			PM Peak Hour				
				Rate	In	Out	Sum	Rate	In	Out	Sum
1	1	222 - Multifamily Housing (High-Rise) 711 Units	Total	0.22	15	124	139	0.19	80	36	116
			Internal	3%	1	3	4	14%	11	5	16
			New	97%	14	121	135	86%	69	31	100
		492 - Health/Fitness Club 49,534 sq.ft	Total	1.31	33	32	65	3.45	97	74	171
			Internal	6%	3	1	4	18%	10	20	30
			New	94%	30	31	61	82%	87	54	141
Phase 1 Total			Total	-	48	156	204	-	177	110	287
			Internal	4%	4	4	8	16%	21	25	46
			New	96%	44	152	196	84%	156	85	241
2	2	222 - Multifamily Housing (High-Rise) 646 Units	Total	0.22	14	113	127	0.19	74	33	107
			Internal	0%	0	0	0	15%	11	5	16
			New	100%	14	113	127	85%	63	28	91
		822 - Strip Retail Plaza 5,230 sq.ft	Total	2.36	7	5	12	6.59	17	17	34
			Internal	0%	0	0	0	21%	2	5	7
			New	100%	7	5	12	79%	15	12	27
	3	222 - Multifamily Housing (High-Rise) 494 Units	Total	0.22	11	88	99	0.19	58	26	84
			Internal	0%	0	0	0	15%	9	4	13
			New	100%	11	88	99	85%	49	22	71
		822 - Strip Retail Plaza 8,247 sq.ft	Total	2.36	12	7	19	6.59	27	27	54
			Internal	0%	0	0	0	15%	2	6	8
			New	100%	12	7	19	85%	25	21	46
Phase 2 Total			Total	-	44	213	257	-	176	103	279
			Internal	0%	0	0	0	16%	24	20	44
			New	100%	44	213	257	84%	152	83	235
Full-Build Out Total			Total	-	92	369	461	-	353	213	566
			Internal	2%	4	4	8	16%	45	45	90
			New	98%	88	365	453	84%	308	168	476



9.1.3 Trip Distribution and Assignment

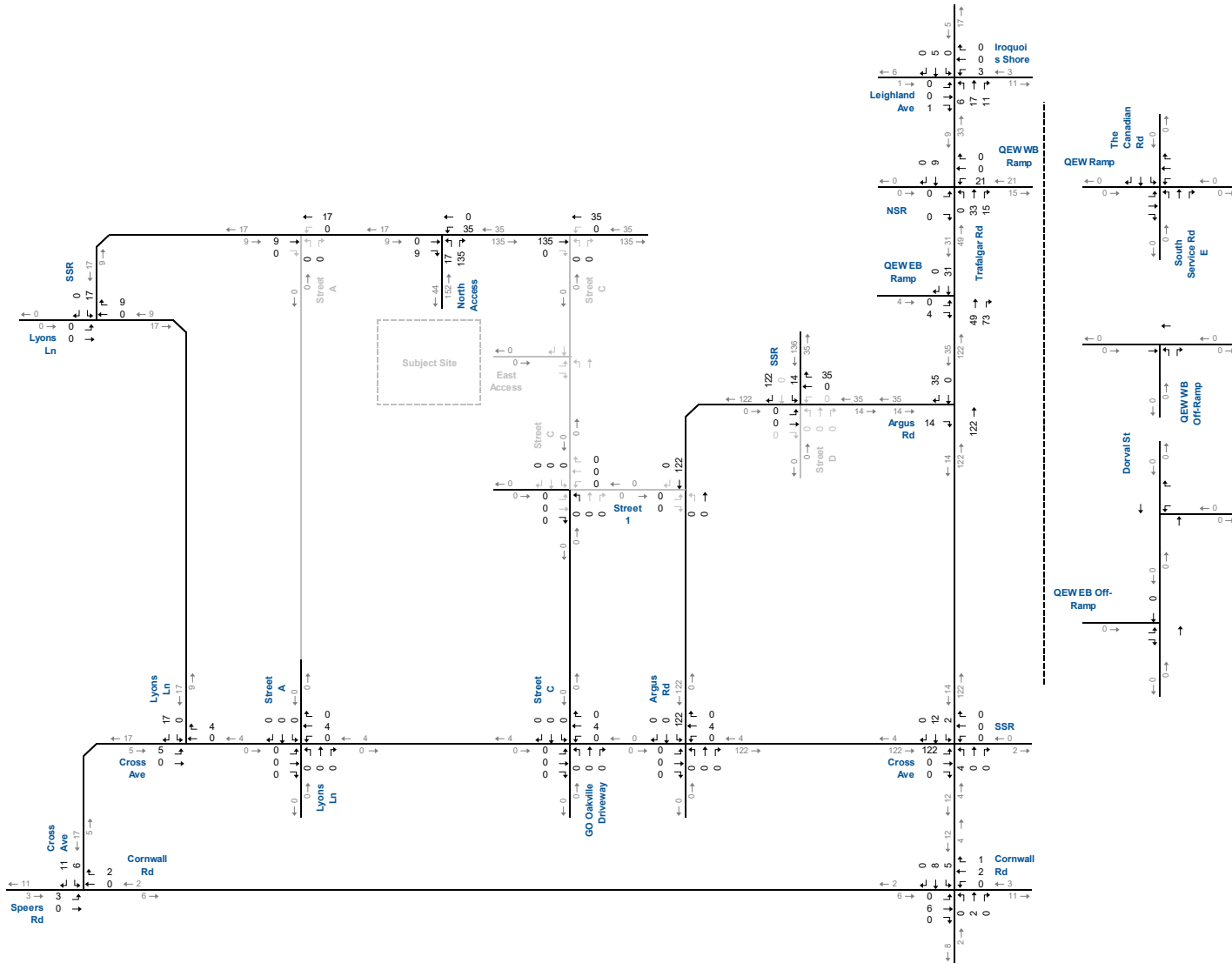
The area lends itself to commuter travel patterns, similar to what the development would exhibit. The site-generated trips were assigned to the road network based on the existing distribution of traffic at the study area intersections. The distribution is summarized in **Table 9.3**.

Figures 9.1 and 9.2 display the resulting Phase 1 and Full Build-Out AM and PM peak hour total trip assignments.

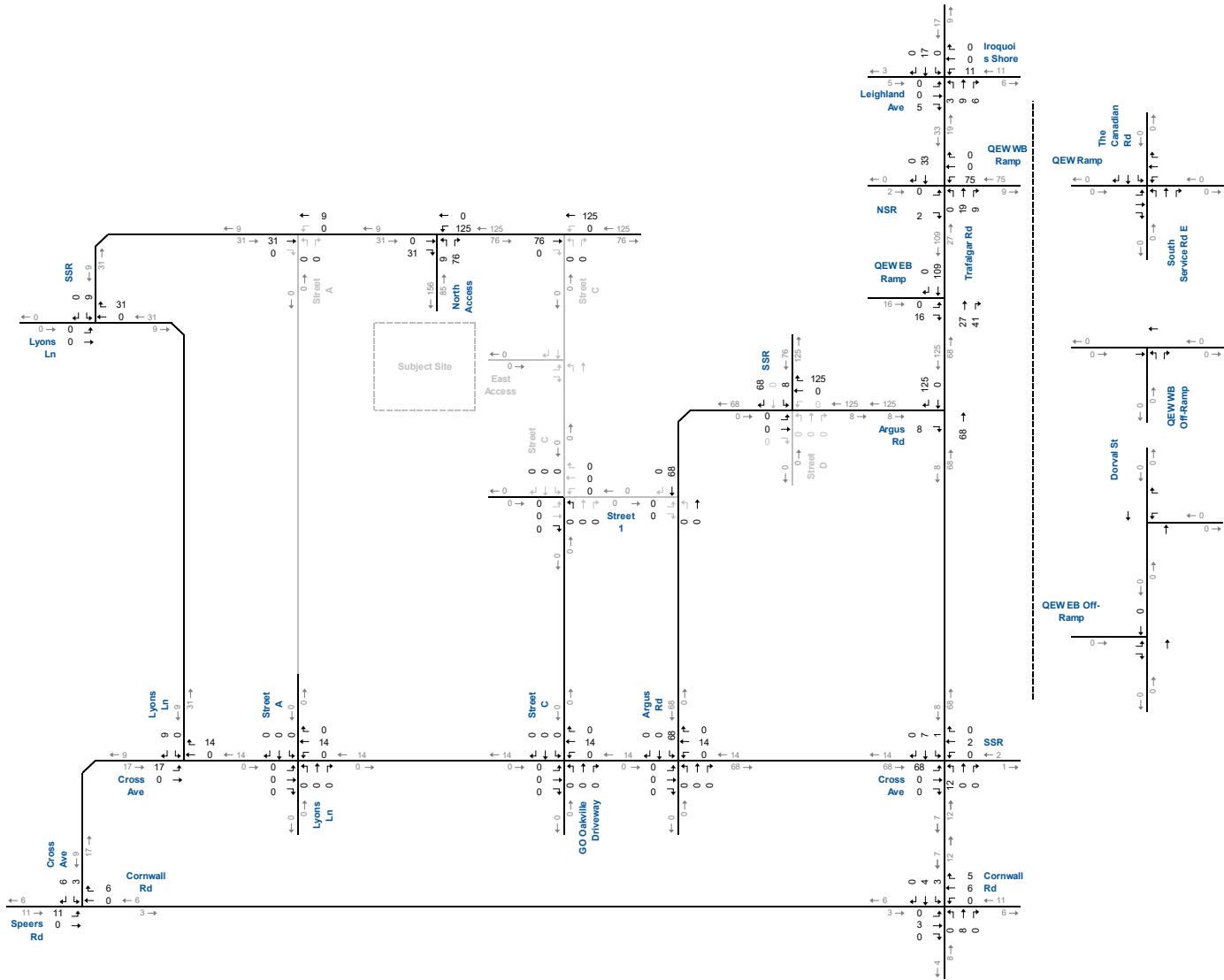
TABLE 9.3: TRIP DISTRIBUTION

Direction	Route	Distribution %
North	Trafalgar Road	11%
South	Trafalgar Road	5%
East	QEW Toronto Bound	48%
East	South Service Road	1%
East	Cornwall Road	7%
East	Iroquois Shore Road	7%
West	Leighland Avenue	3%
West	QEW Hamilton Bound	10%
West	Spears Road	7%
West	North Service Road	1%





Site Generated Traffic Volumes Phase 1 - AM Peak Hour

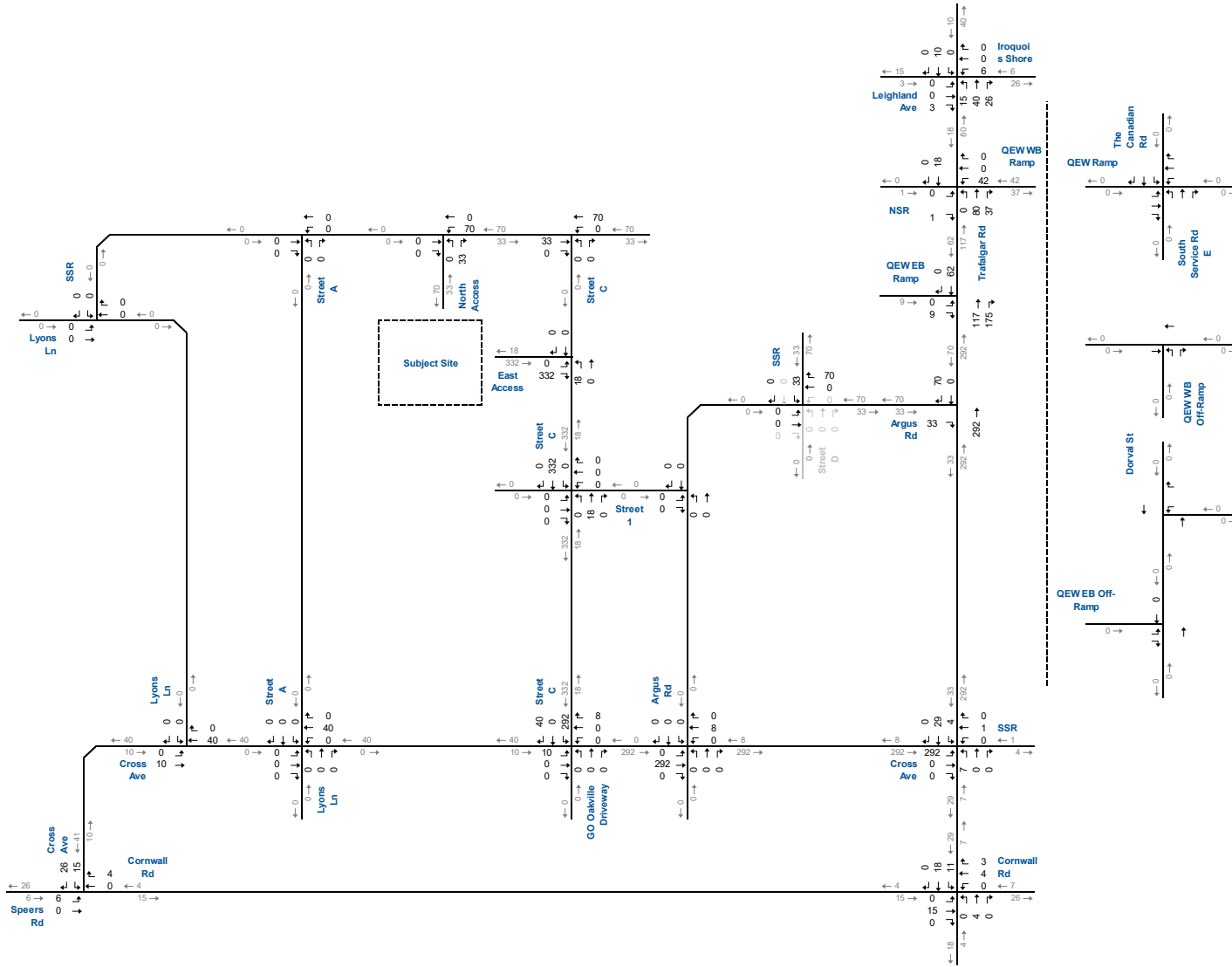


Site Generated Traffic Volumes Phase 1 - PM Peak Hour

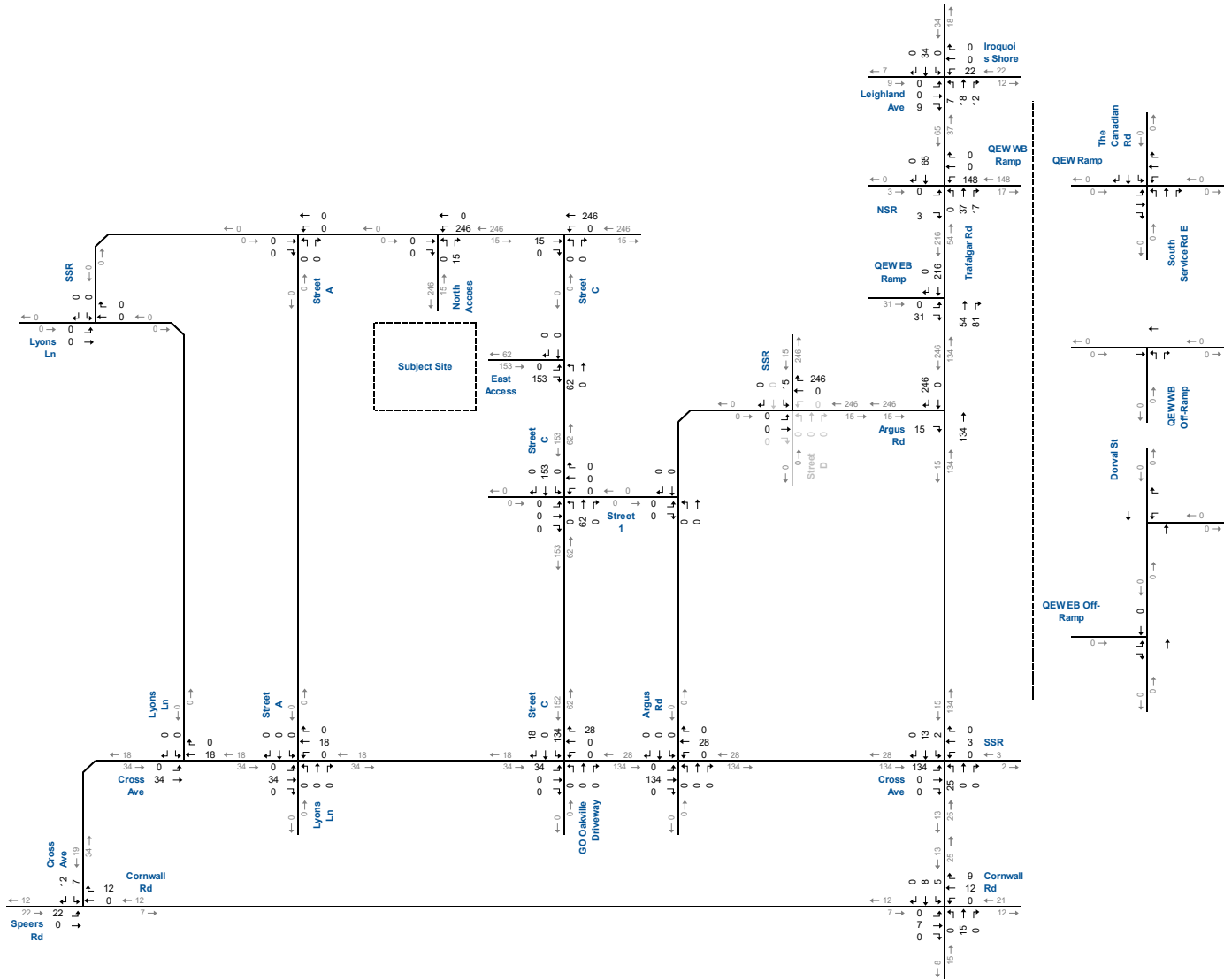
166 South Service Road East, Oakville
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Figure 9.1B



Site Generated Traffic Volumes Full Build-Out - AM Peak Hour



Site Generated Traffic Volumes Full Build-Out - PM Peak Hour

166 South Service Road East, Oakville
210590



Figure 9.2B

10 Future Conditions

To remain consistent with MTO and Region traffic impact study guidelines, the following horizon years have been assumed:

- ▶ 2028 (Opening Date),
- ▶ 2033 (5 years Phase 1),
- ▶ 2038 (10 years Phase 1),
- ▶ 2038 (5 Year Phase 2), and
- ▶ 2043 (10 Year Phase 2).

10.1 Trafalgar EA

The Trafalgar Road (Regional Road 3)¹⁰ Improvements Class Environmental Assessment Study from Cornwall Road to Highway 407 was completed in May 2015. It was recommended that Trafalgar Road be widened from four (4) to six (6) lanes and convert the curb lanes to high occupancy vehicle (HOV) or bus rapid transit (BRT) lanes after completion of the road widening by 2033. As noted through the EA, BRT or HOV would run from Leighland Avenue, north, towards Highway 407.

Trafalgar Road is currently a six-lane cross-section plus exclusive left-turn lanes within the study area. The only modification to the road network for future analyses is removing the eastbound channelized right-turn at Trafalgar Road and Cornwall Road to be consistent with the preferred design.

10.2 Midtown Oakville EA

The Town of Oakville completed a Class Environmental Assessment (EA) for Midtown Oakville (MOEA)¹¹ to guide the development of the transportation and municipal stormwater network needed to accommodate the planned growth in Midtown Oakville. The MOEA identified critical changes to the existing and planned road network that would be required to support intentional growth.

In addition, other master plans have been updated and technical studies completed, including the Halton Region Transportation Master

¹⁰ Trafalgar Road Improvements Class Environmental Assessment Study from Cornwall Road to Highway 407, Town of Oakville, AECOM, April 2015.

¹¹ Midtown Oakville Transportation and Stormwater Municipal Class Environmental Assessment, Cole Engineering, June 2015.



Plan¹², the Town of Oakville Transportation Master Plan – Switching Gears¹³, the Midtown Parking Strategy¹⁴, and Designing Midtown Oakville¹⁵. As a result, the Town has proposed an Official Plan Amendment (OPA) that would incorporate the results of these studies into the Official Plan and bring the policies and Schedules into alignment with the most current source documents.

The changes to the Midtown-related transportation network include modifications designed to the broader area network and changes to the local road network within Midtown Oakville. To accommodate traffic to and from Midtown Oakville and to provide an alternative to Trafalgar Road, several improvements are provided, including direct off-ramps from eastbound QEW at Trafalgar Road and new ramps to/from the QEW at Royal Windsor Drive;

- ▶ A direct route from eastbound QEW to Midtown Oakville is provided via a new off-ramp that crosses under Trafalgar Road. This reduces the impacts of future traffic demand on the existing constrained intersections along Trafalgar Road at the off-ramp and Cross Avenue. The underpass of Trafalgar Road also provides the opportunity for improved active transportation connections into Midtown Oakville.
- ▶ A direct route from eastbound QEW to Midtown Oakville is provided via a new off-ramp to Cross Avenue at the Royal Windsor Drive interchange. A direct route from Midtown Oakville to eastbound QEW is provided via a new on-ramp at Royal Windsor Drive opposite Cross Avenue. A new westbound QEW off-ramp at Royal Windsor Drive will offer an alternative route to Midtown Oakville and surrounding areas.
- ▶ Cross Avenue is extended from Trafalgar Road to Royal Windsor Drive, connecting with the enhanced QEW interchange. Cross Avenue will provide accessible facilities for pedestrians and cyclists to travel safely, on-street parking where appropriate and four vehicular travel lanes.
- ▶ For access and circulation within Midtown Oakville, a revised local road network for Midtown Oakville is designed to support and align with the broader transportation network determined through the MOEA. As part of the revised road network, Lyons Lane at Cross Avenue is proposed to be realigned to form a four-way signalized intersection. Other local road network changes include a north-south local road connecting South

¹² The Road to Change – Halton Region Transportation Master Plan, Dillion Consulting/GHD, October 2011

¹³ Town of Oakville Transportation Master Plan – Switching Gears, WSP + GLP, March 2018.

¹⁴ Midtown Oakville Parking Strategy, BA Group, May 2014.

¹⁵ Designing Midtown Oakville, Town of Oakville, September 2013.



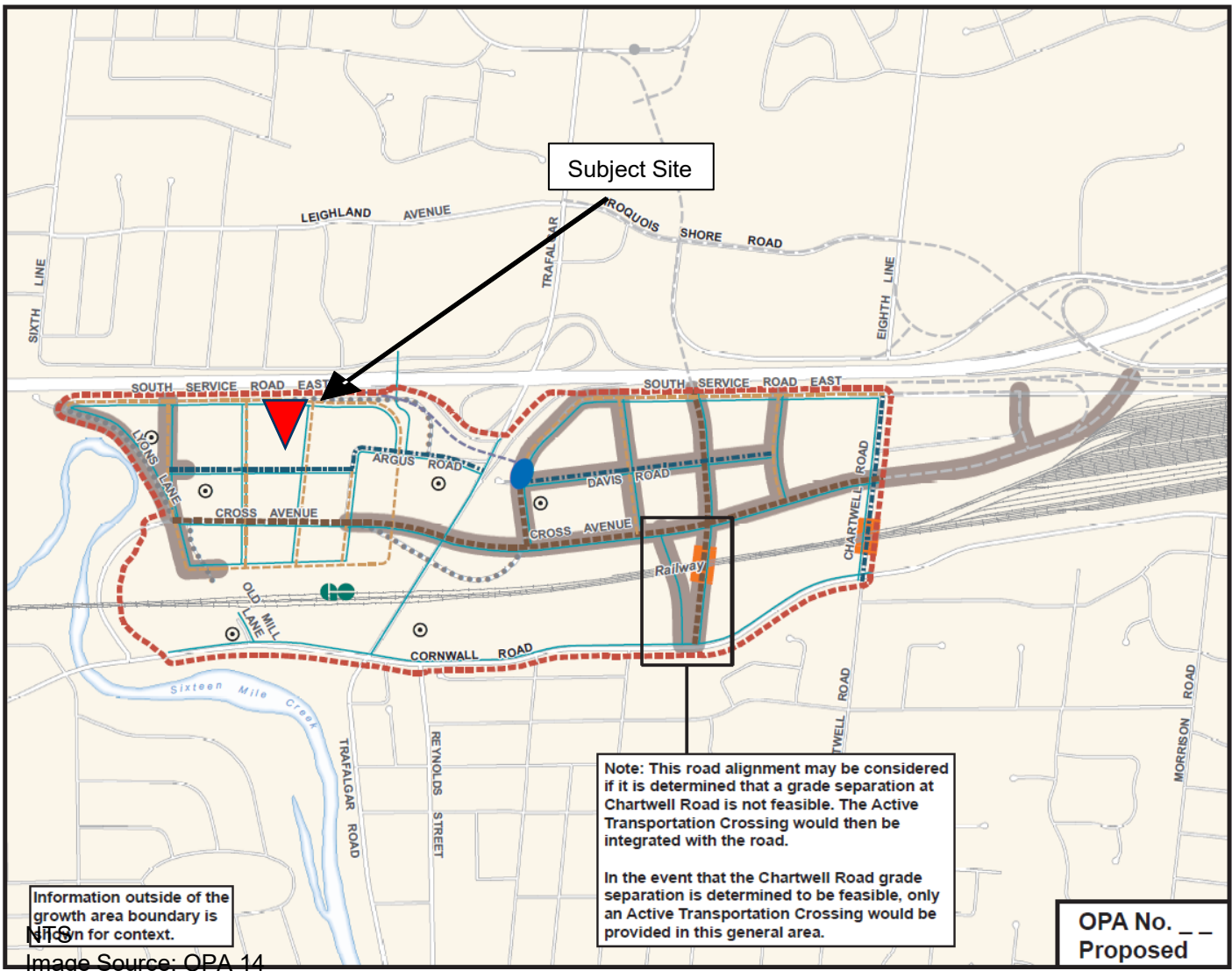
Service Road East and Cross Avenue and a new east-west road connecting Argus Road. For this study, the east-west local road is only assumed to extend between Argus Road and the new north-south local road. It is also assumed the realignment of Argus Road does not occur.

The proposed improvements are not expected to significantly impact the QEW mainline operations with the refinements to the design to accommodate weaving and merging better. The new ramps at Royal Windsor Drive and Trafalgar Road will accommodate the additional travel demand from Midtown Oakville's planned intensification, relieving the existing Trafalgar Road interchange.

Ramp network improvements however are not assumed to be in place, while the new local roads are assumed only in the 2038 horizon to assess the long-term impacts for the area.

Figure 10.1 illustrate the proposed transportation network for Midtown Oakville.





SCHEDULE L3 MIDTOWN OAKVILLE TRANSPORTATION NETWORK

- URBAN GROWTH CENTRE / PROTECTED MAJOR TRANSIT STATION AREA / GROWTH AREA BOUNDARY
- EXISTING ROAD NETWORK
- FUTURE 35m ARTERIAL
- FUTURE 26m COLLECTOR
- FUTURE 22m LOCAL ROAD
- FUTURE RAMP
- FUTURE ACTIVE TRANSPORTATION FACILITY
- FINAL ROAD ALIGNMENT SUBJECT TO FURTHER STUDY
- ROAD PROPOSED TO BE ABANDONED
- INTERSECTION CONFIGURATION SUBJECT TO FURTHER STUDY
- FUTURE RAILWAY GRADE SEPARATION
- RAILWAY
- MAJOR TRANSIT STATION

REFER TO PART E, MIDTOWN OAKVILLE FOR GROWTH AREA POLICIES

REFER TO PART E, MIDTOWN OAKVILLE EXCEPTIONS

1:9,000
May 2, 2023

© DEPARTMENT OF PLANNING AND COMMUNITY DEVELOPMENT, OAKVILLE 2023. L3_Proposed_Midtown.mxd

Information outside of the growth area boundary is shown for context.

Image Source: OPA 14

OPA No. --
Proposed

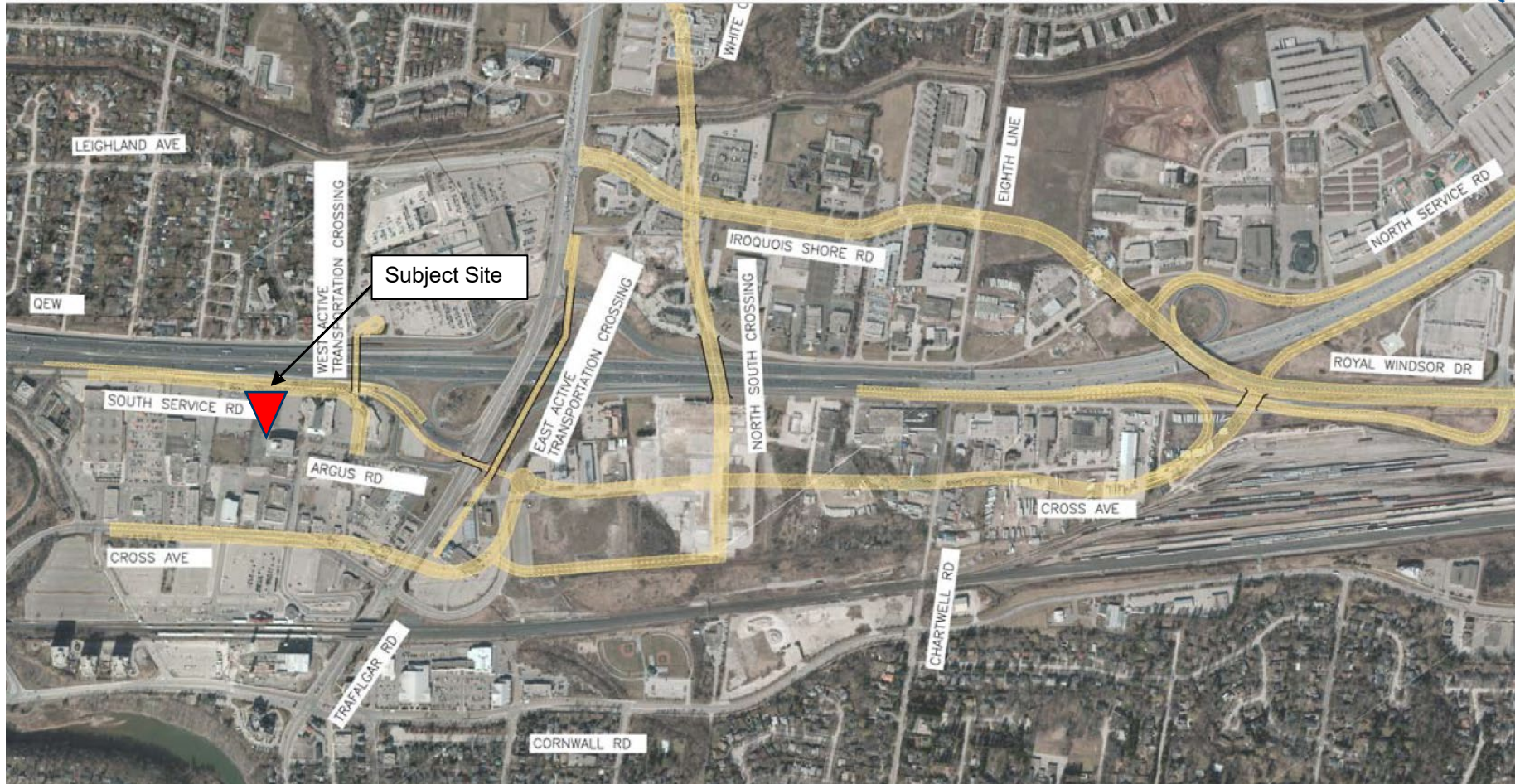


Midtown Oakville Proposed Road Network

166 South Service Road East, Oakville
210590



Figure 10.1A



NTS

Image Source: Midtown Oakville Class EA



Midtown Oakville Broader Area Improvements

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Figure 10.1B

10.3 Future Forecasts

Traffic growth on area roadways is a function of the expected land development, economic activity, and demographic changes. A frequently used procedure estimates an annual percentage increase and applies that increase to the study area traffic volumes. An alternative approach is to identify estimated traffic generated by specific planned significant developments that would be expected to affect the project study area roadways. For this assessment, both methods were utilized.

Based on discussions with Region of Halton staff, a growth rate of 2.0% was applied to the area roadways to account for population and employment growth.

In addition to the general traffic growth, it is assumed that a portion of Midtown Oakville's redevelopment will occur in the 2033 and 2038 horizons. The developments included in the redevelopment of Midtown Oakville are outlined in the following section.

In the 2038 horizon year, the new local road network will cause a portion of the Argus Road traffic to divert to the new east-west local road to access the GO Station. Based on existing volumes along Cross Avenue, it is assumed that approximately 70% of westbound vehicles in the AM peak hour (30% in the PM peak hour) are going to the GO Station. It is assumed that an equal portion of the vehicles along Argus Road are going to the GO station and would take the new local road network.



10.3.1 Background Developments

The following background developments are planned within the study horizon and are included in the background traffic:

The following background developments are planned within the study horizon and are included in the background traffic:

- ▶ 157-167 Cross Avenue – Located west of the Oakville GO Station Parking Access, the proposed Development is a mixed-use development with residential, office, and commercial units.
- ▶ 271 Cornwall Road – Located east of Trafalgar Road at Cornwall Road, the proposed development is two-mixed use towers with residential, office, and commercial uses.
- ▶ 570 Argus Road – Located north of Argus Road at Cross Avenue, the proposed development is two mixed-use towers with residential and commercial uses and a daycare and supermarket.
- ▶ 590 Argus Road – Located north of Argus Road, south of South Service Road, the proposed development is three mixed-use towers with residential and commercial uses.
- ▶ 599 Lyons Lane – The proposed development is a residential high-rise located north of Lyons Lane at Cross Avenue.
- ▶ 627 Lyons Lane – Located east of South Service Road East at Lyons Lane, the proposed development is a residential high-rise.
- ▶ 349 Davis Road – Located east of South Service Road and south of Davis Road, the proposed development is a mixed-use tower with residential and commercial uses.
- ▶ 320 Davis Road - Located south of David Road and east of South Service Road, the proposed development is a pumping station expansion.
- ▶ 271 Cornwall Road - Located east of Trafalgar Road, north of Cornwall Road, the proposed development is two mixed-use towers with residential and commercial.

Appendix F includes the background development traffic.

The Background traffic volumes for 2028, 2033, 2038 and 2043 are illustrated in **Figures 10.2 to 10.5**.

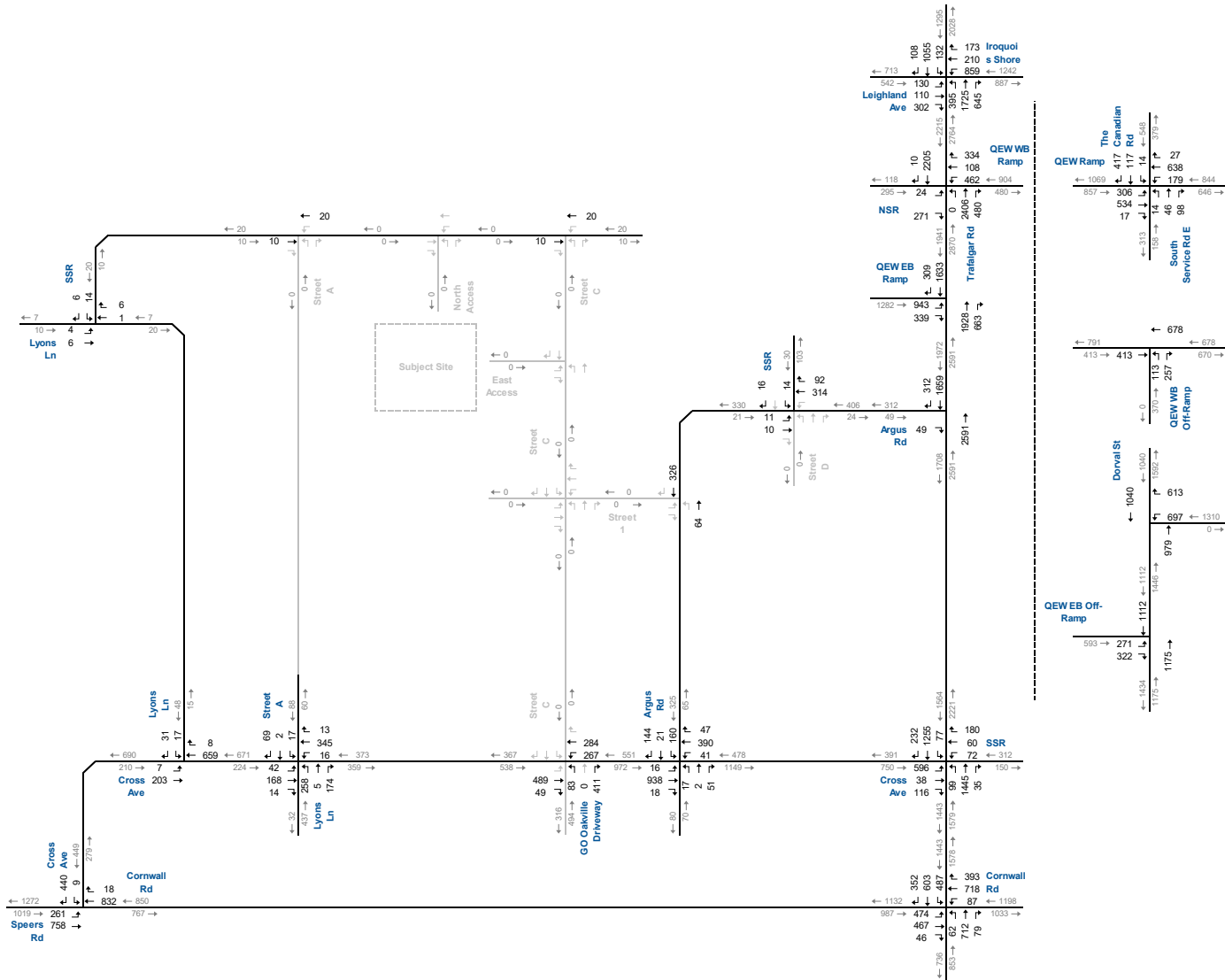


10.3.2 Total Projections

The projected site-generated traffic volumes were added to the Background projections to develop the Total traffic volumes. The Total traffic volumes vary due to rounding of site traffic volumes but provide a conservative trip generation estimate.

The weekday AM and PM peak hours Total traffic volumes for 2028, 2033, 2038 and 2043 are illustrated in **Figures 10.6 to 10.10**.



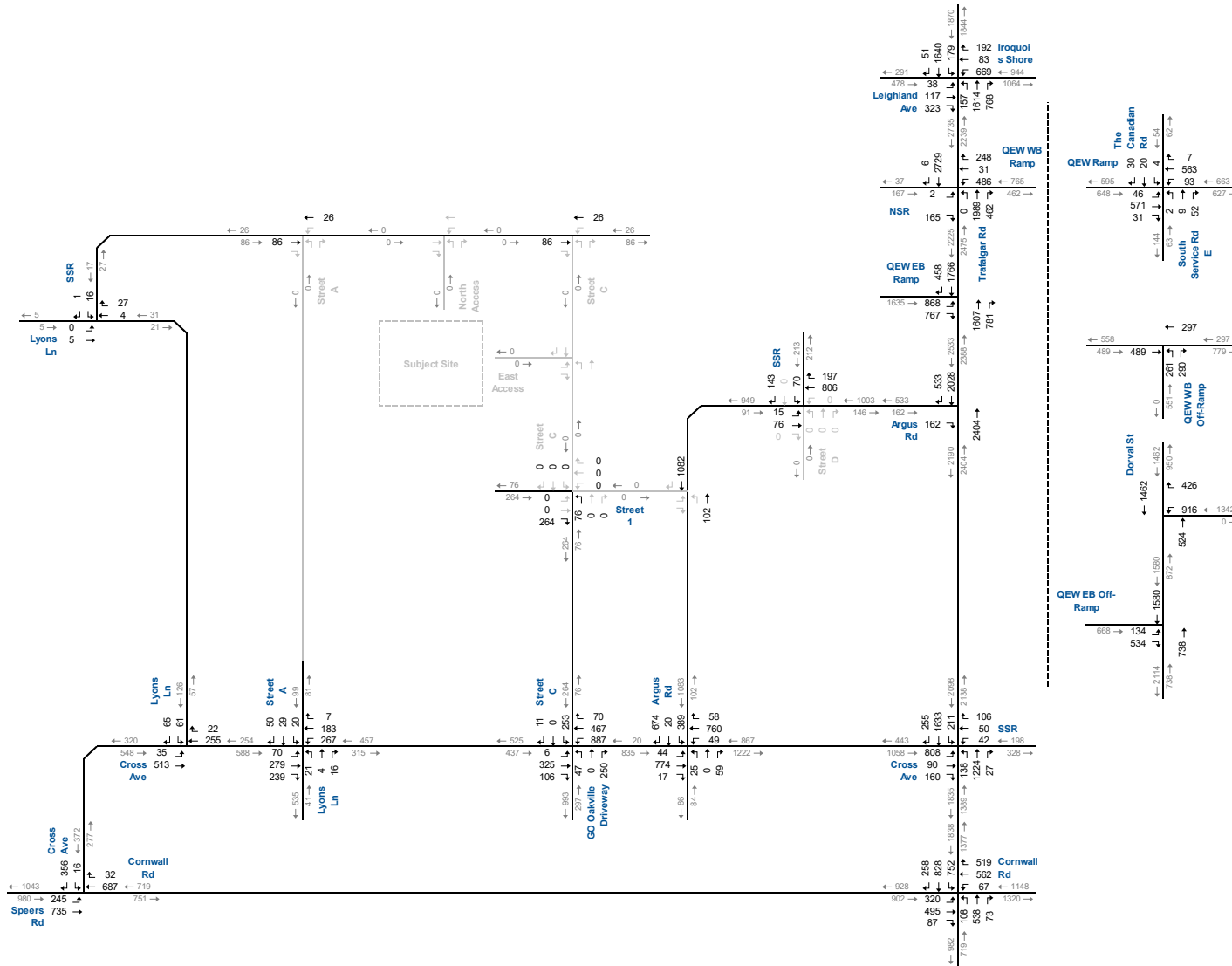


2028 Background Traffic Volumes PM Peak Hour

166 South Service Road East, Oakville
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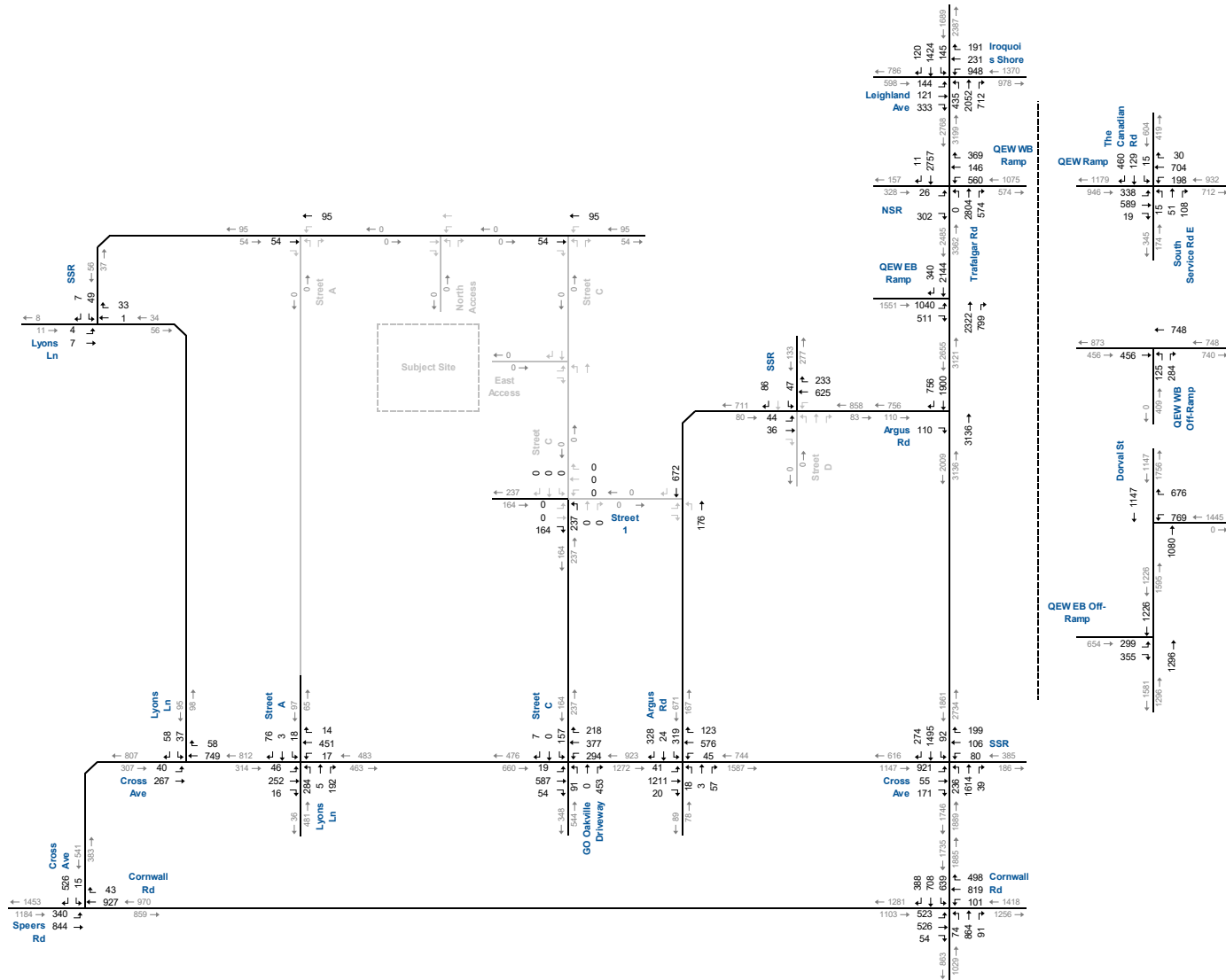


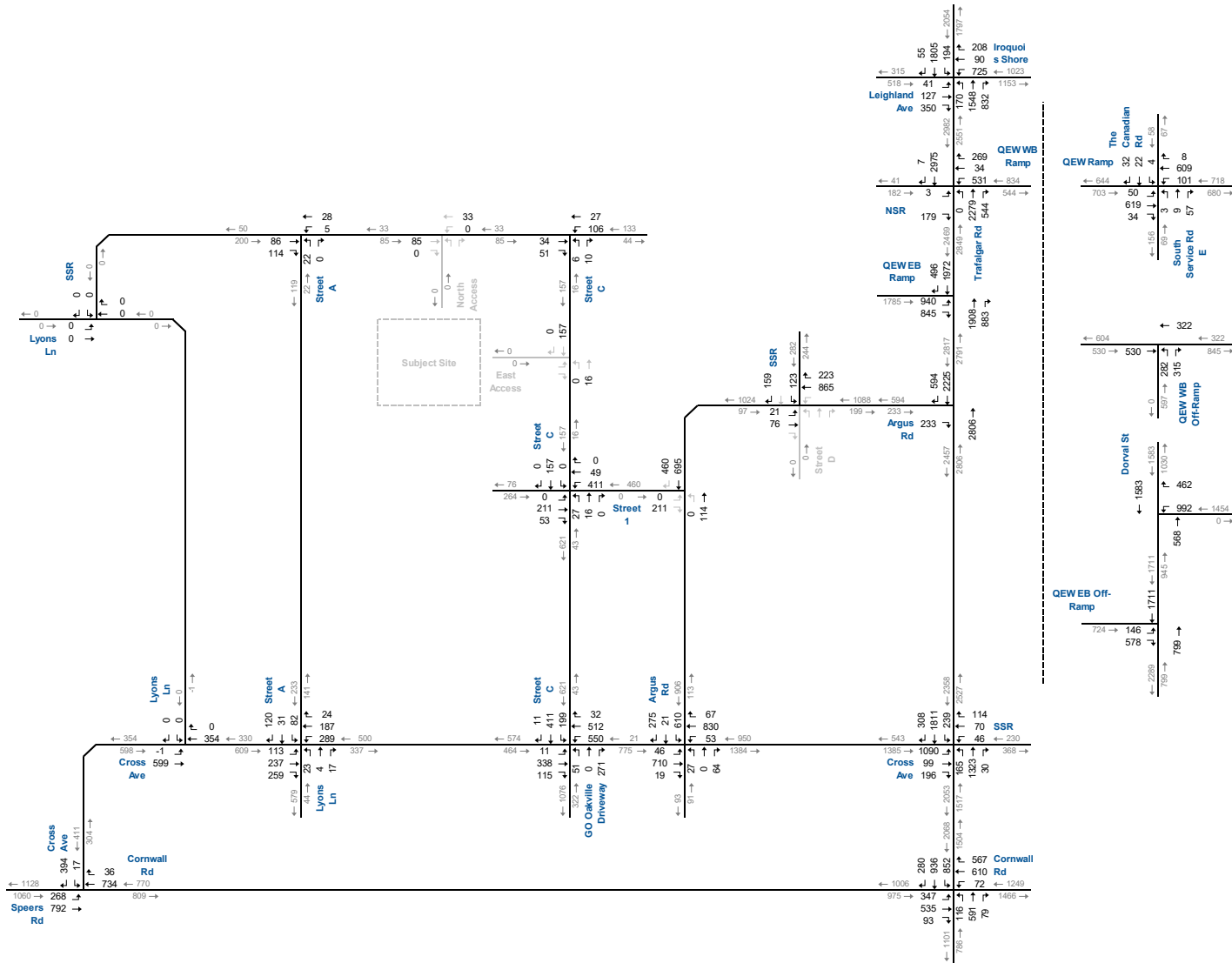
Figure 10.2B



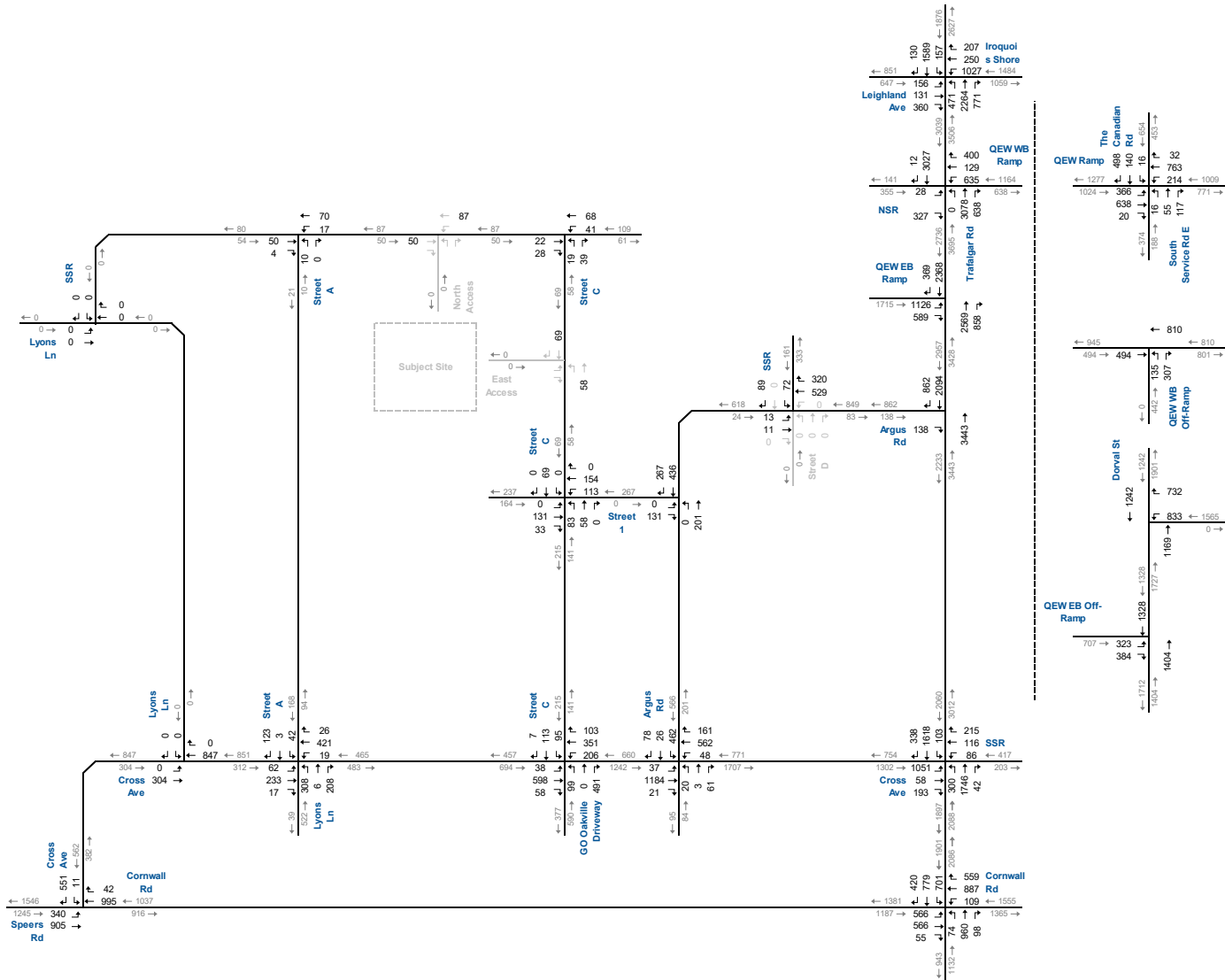
2033 Background Traffic Volumes AM Peak Hour

2033 Background Traffic Volumes PM Peak Hour





2038 Background Traffic Volumes AM Peak Hour



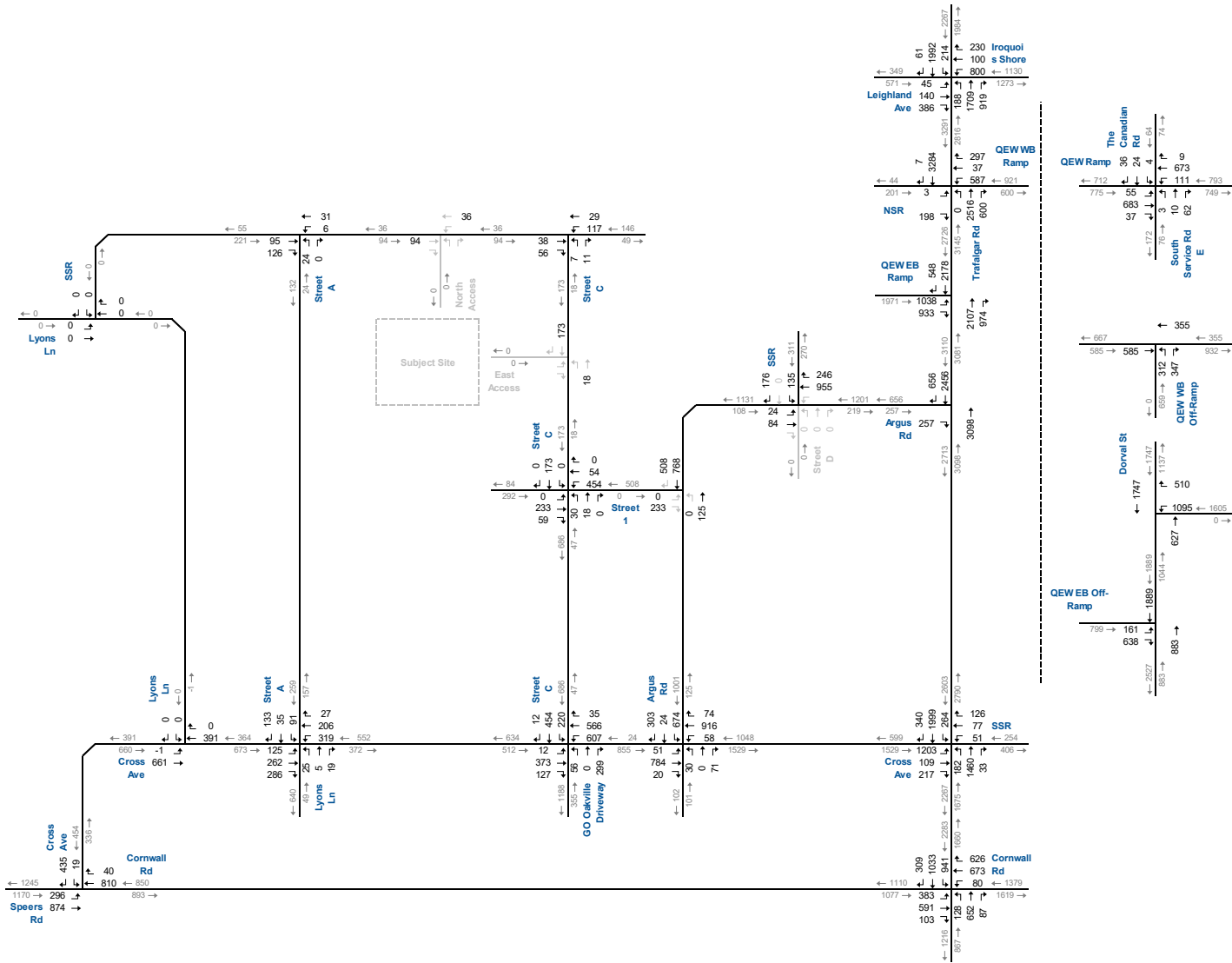
2038 Background Traffic Volumes PM Peak Hour



166 South Service Road East, Oakville
210590



Figure 10.4B

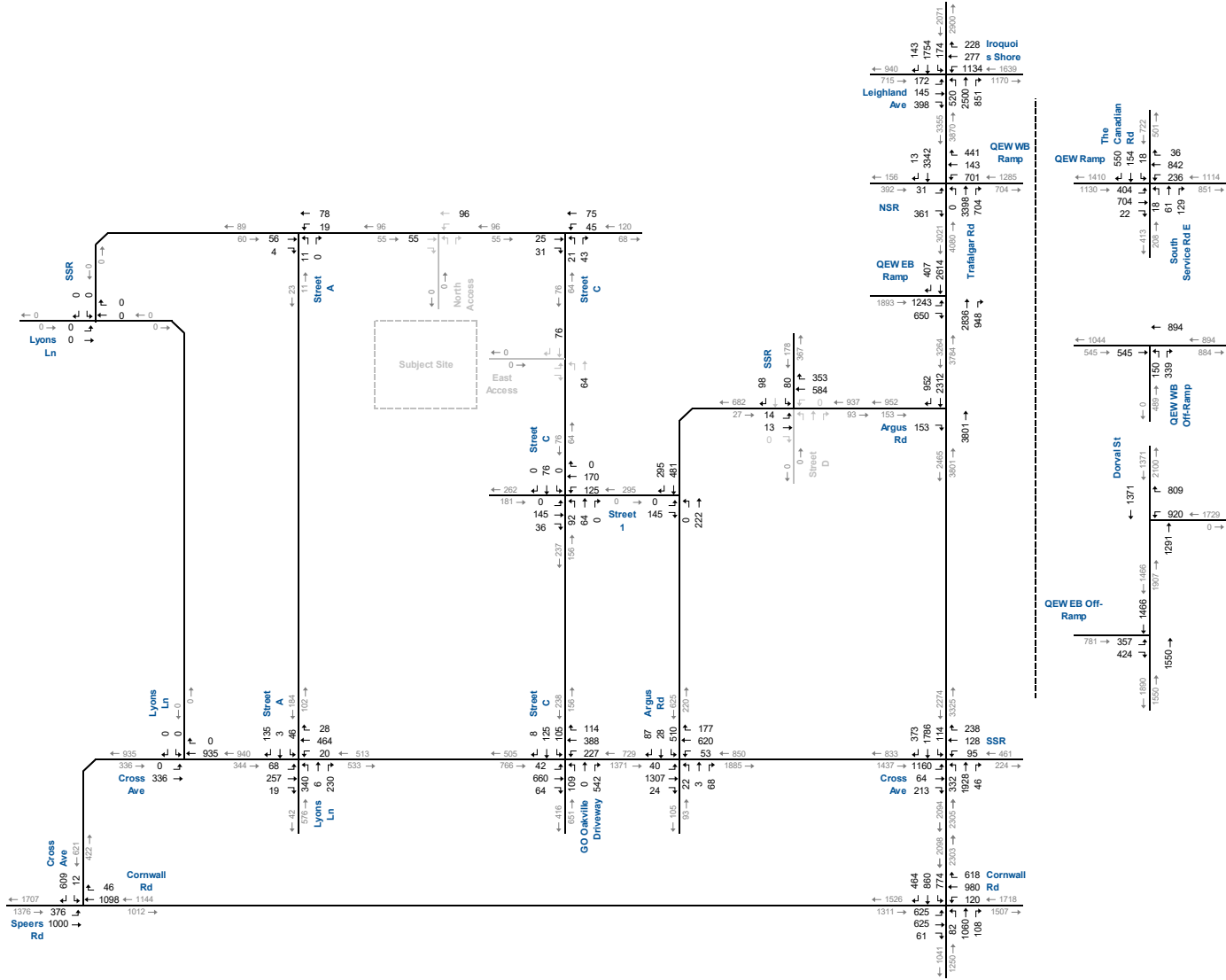


2043 Background Traffic Volumes AM Peak Hour

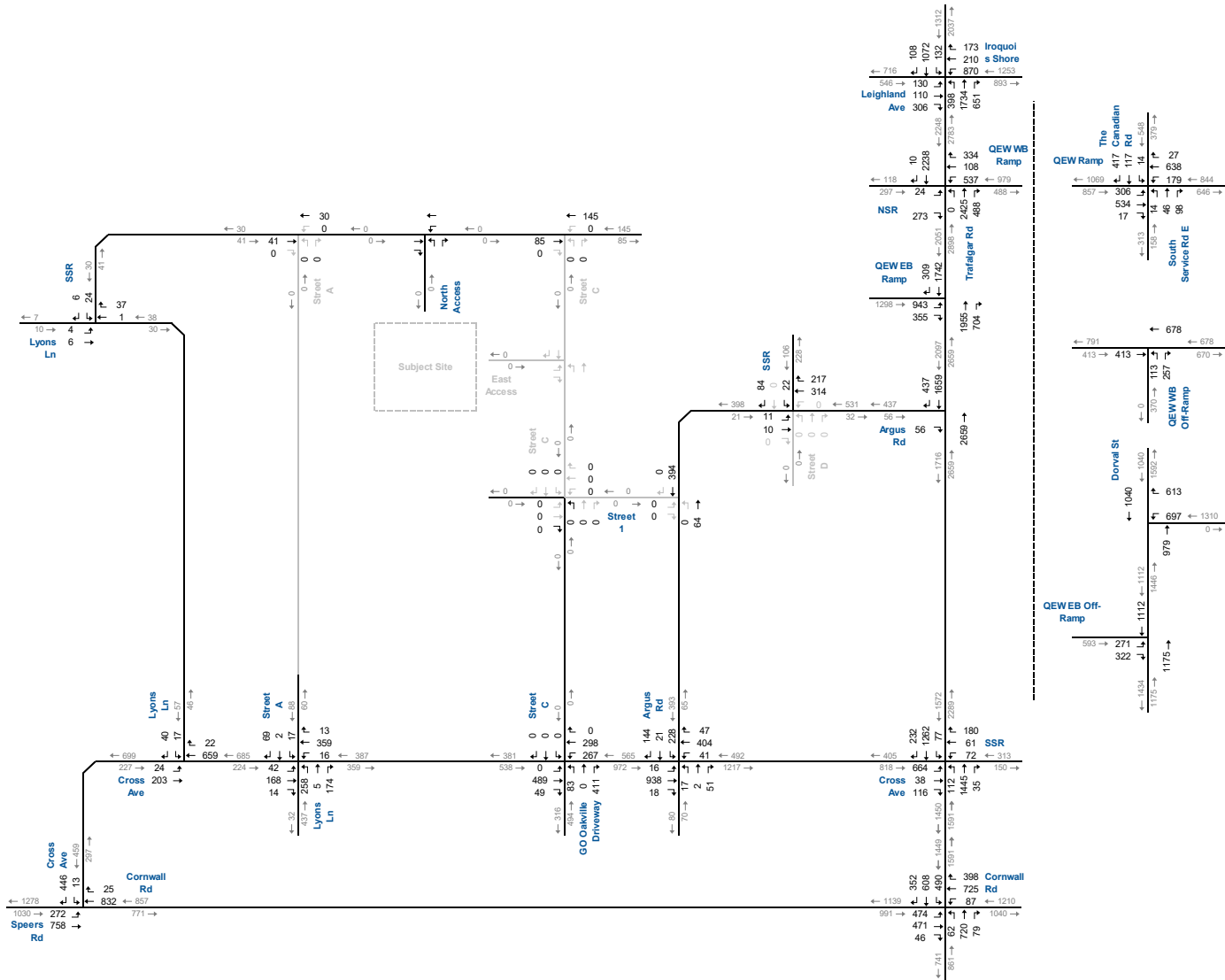
166 South Service Road East, Oakville
210590



Figure 10.5A



2043 Background Traffic Volumes PM Peak Hour

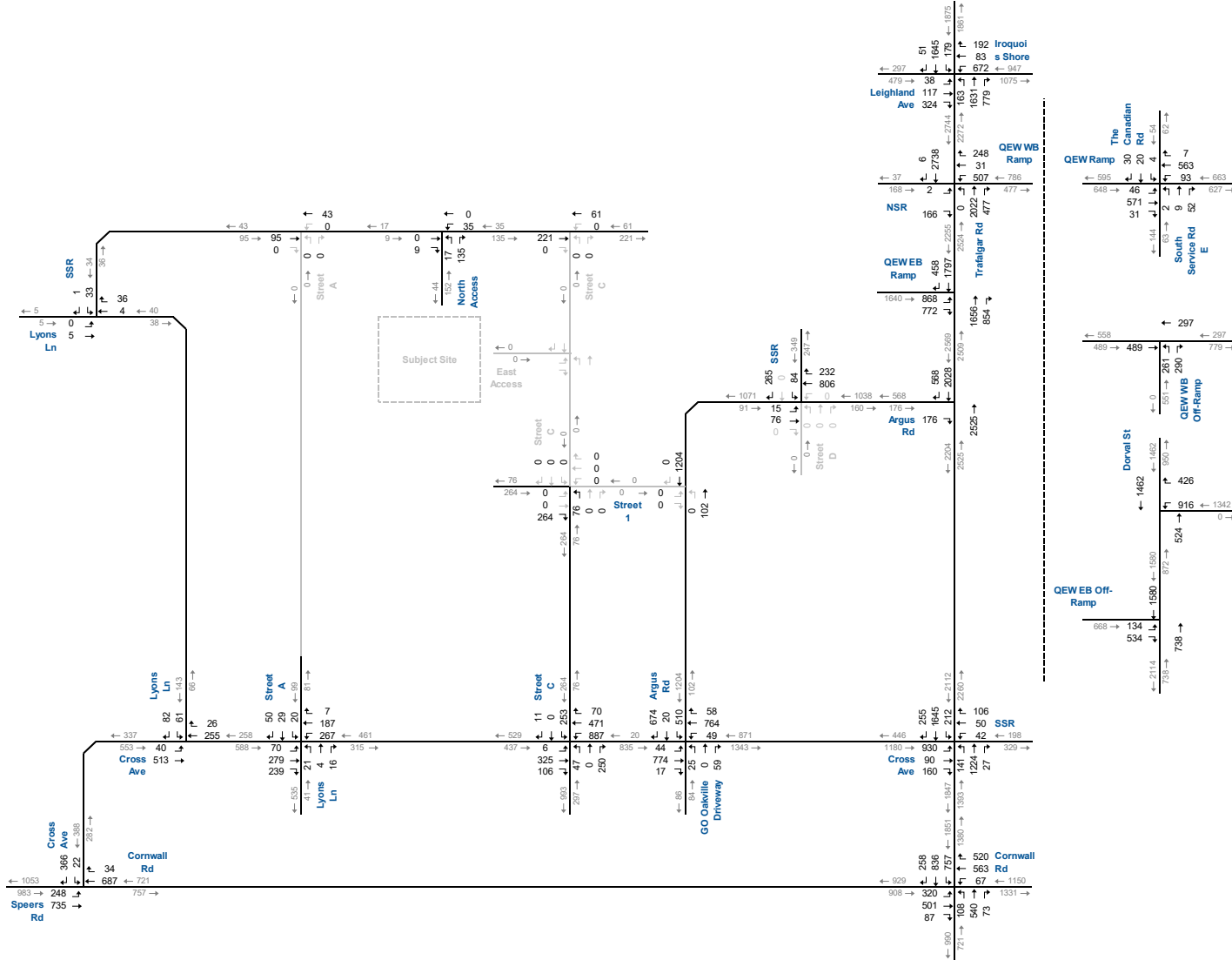


2028 Total (PH1) Traffic Volumes PM Peak Hour

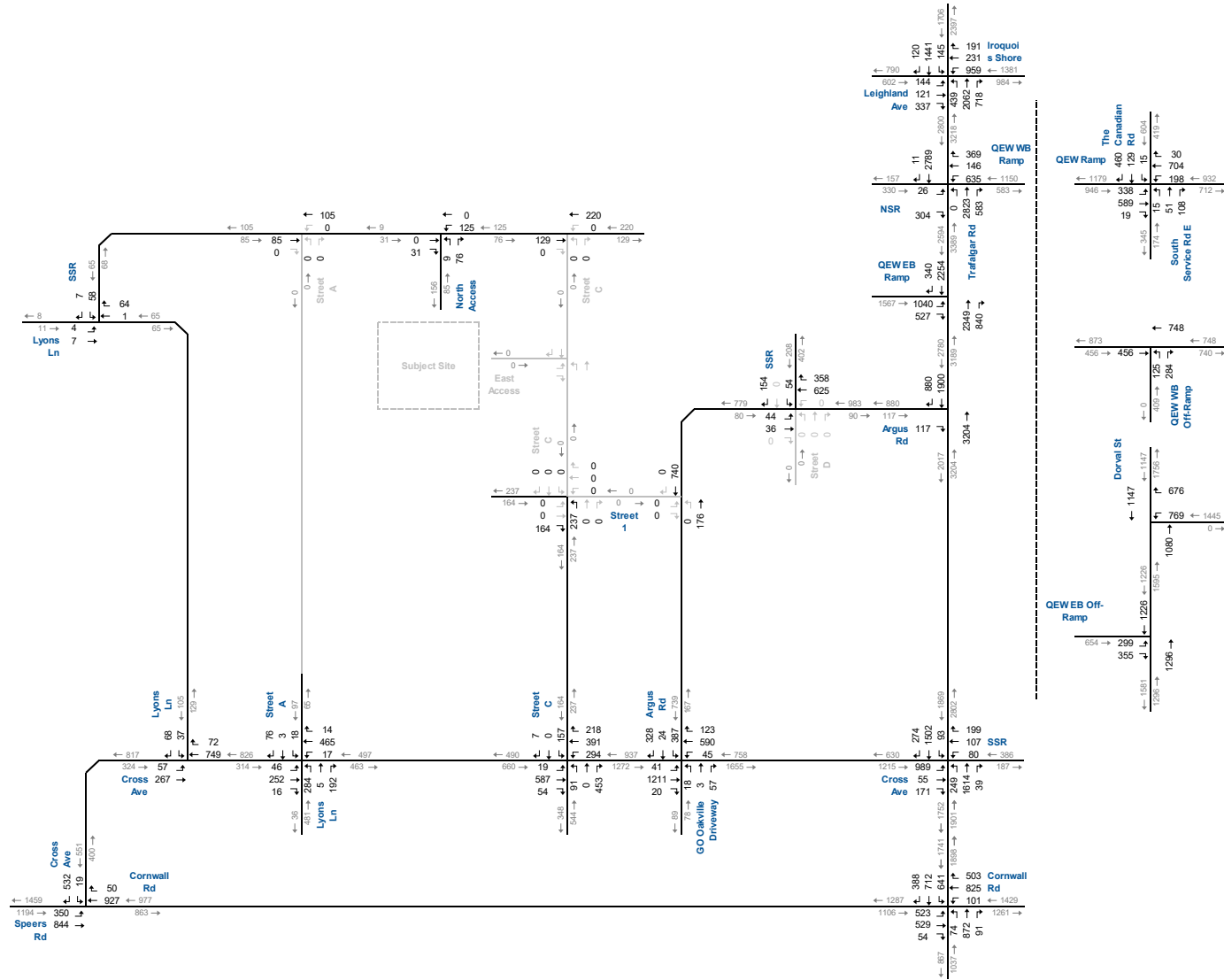
166 South Service Road East, Oakville
210590



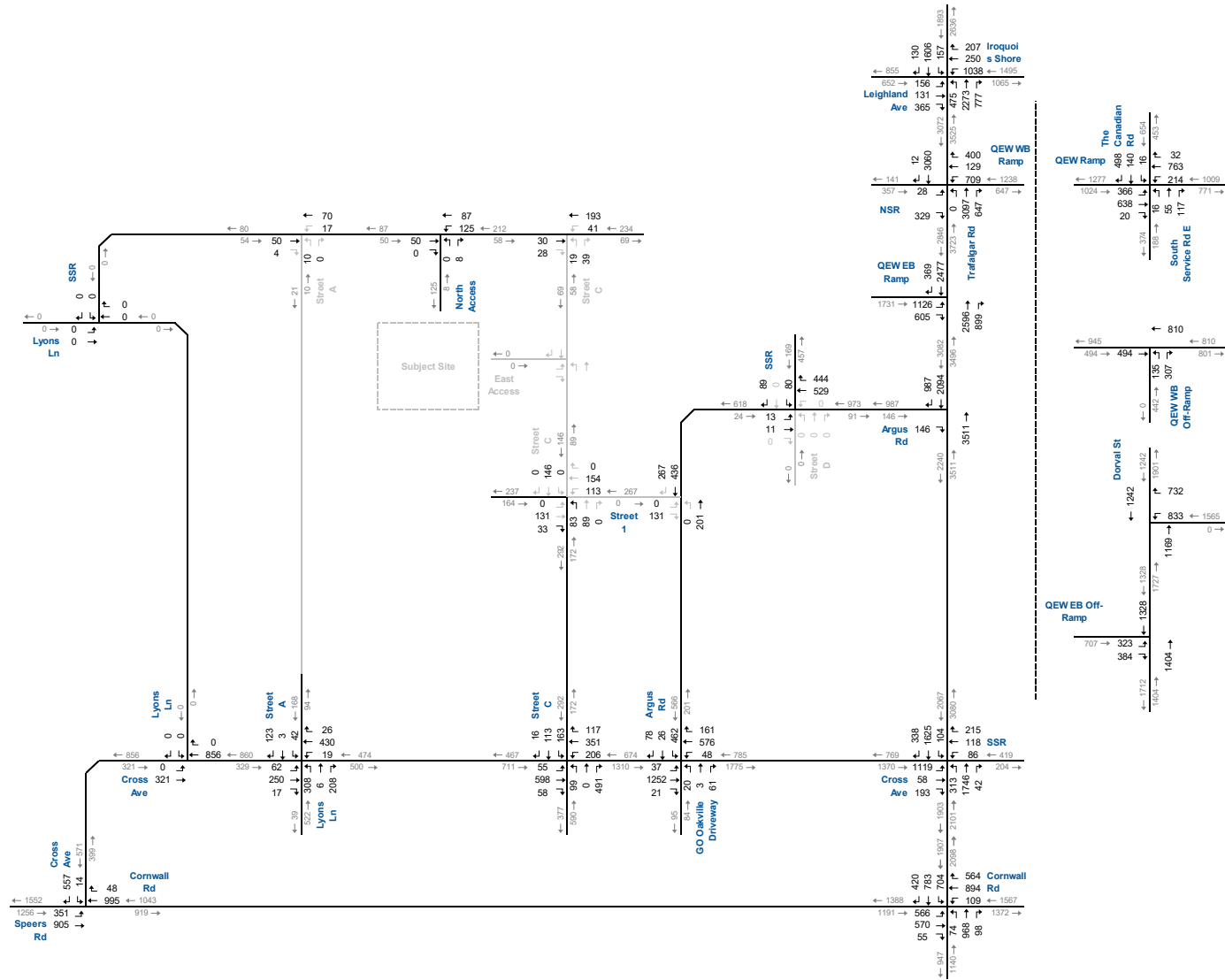
Figure 10.6B



2033 Total (PH1) Traffic Volumes AM Peak Hour



2033 Total (PH1) Traffic Volumes PM Peak Hour

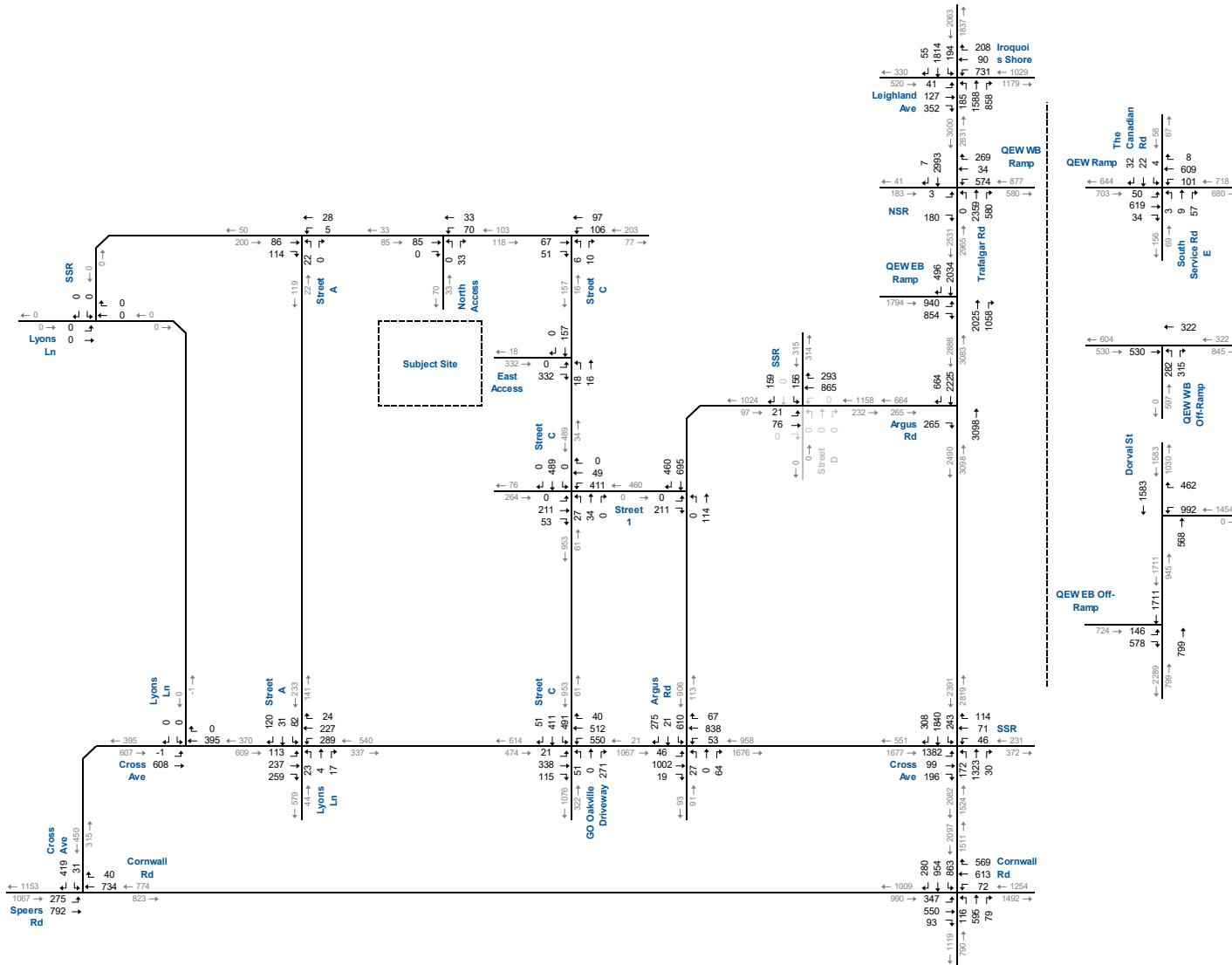


2038 Total (PH1) Traffic Volumes PM Peak Hour

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Figure 10.8B

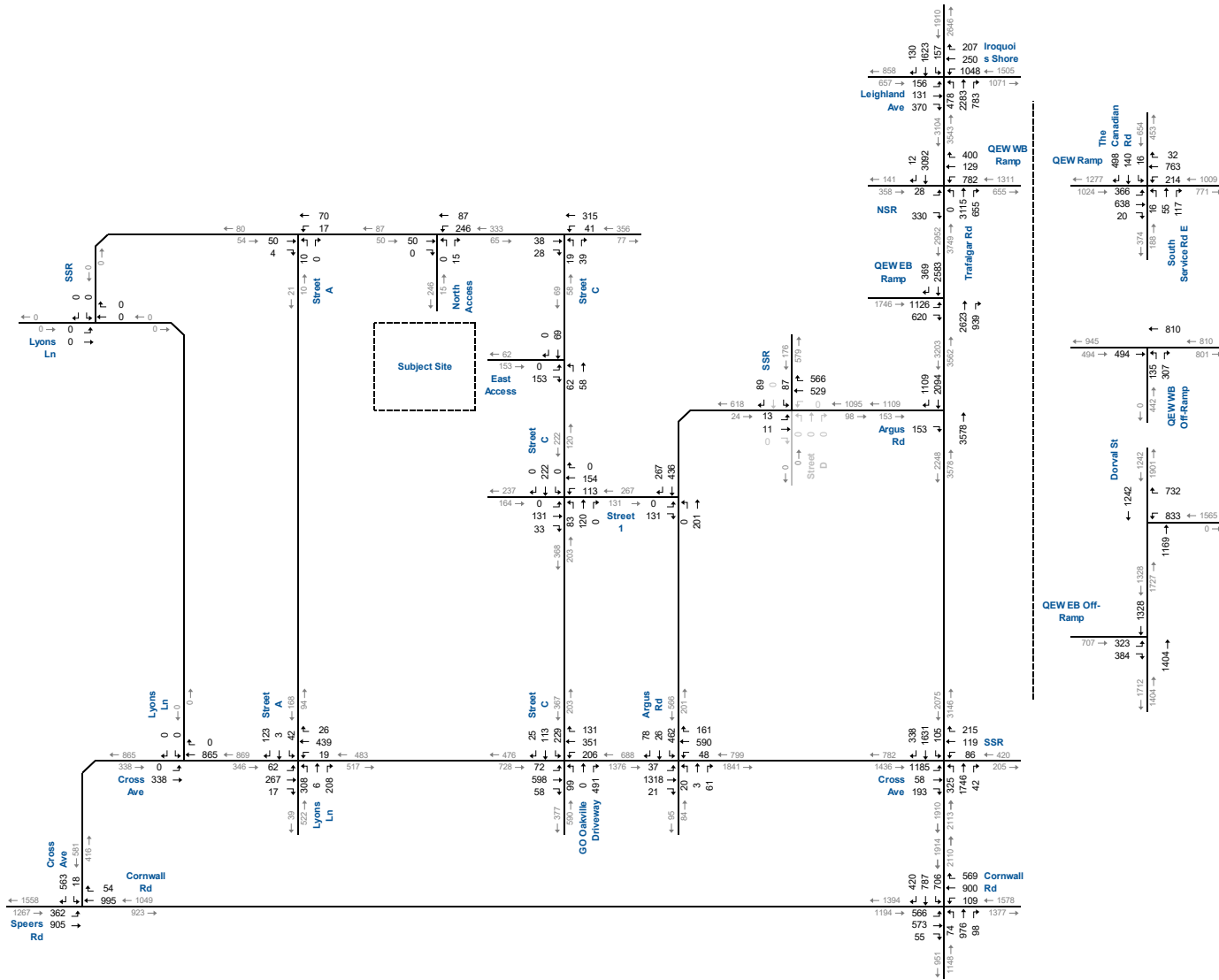


2038 Total (PH1+2) Traffic Volumes AM Peak Hour

166 South Service Road East, Oakville
210590



Figure 10.9A

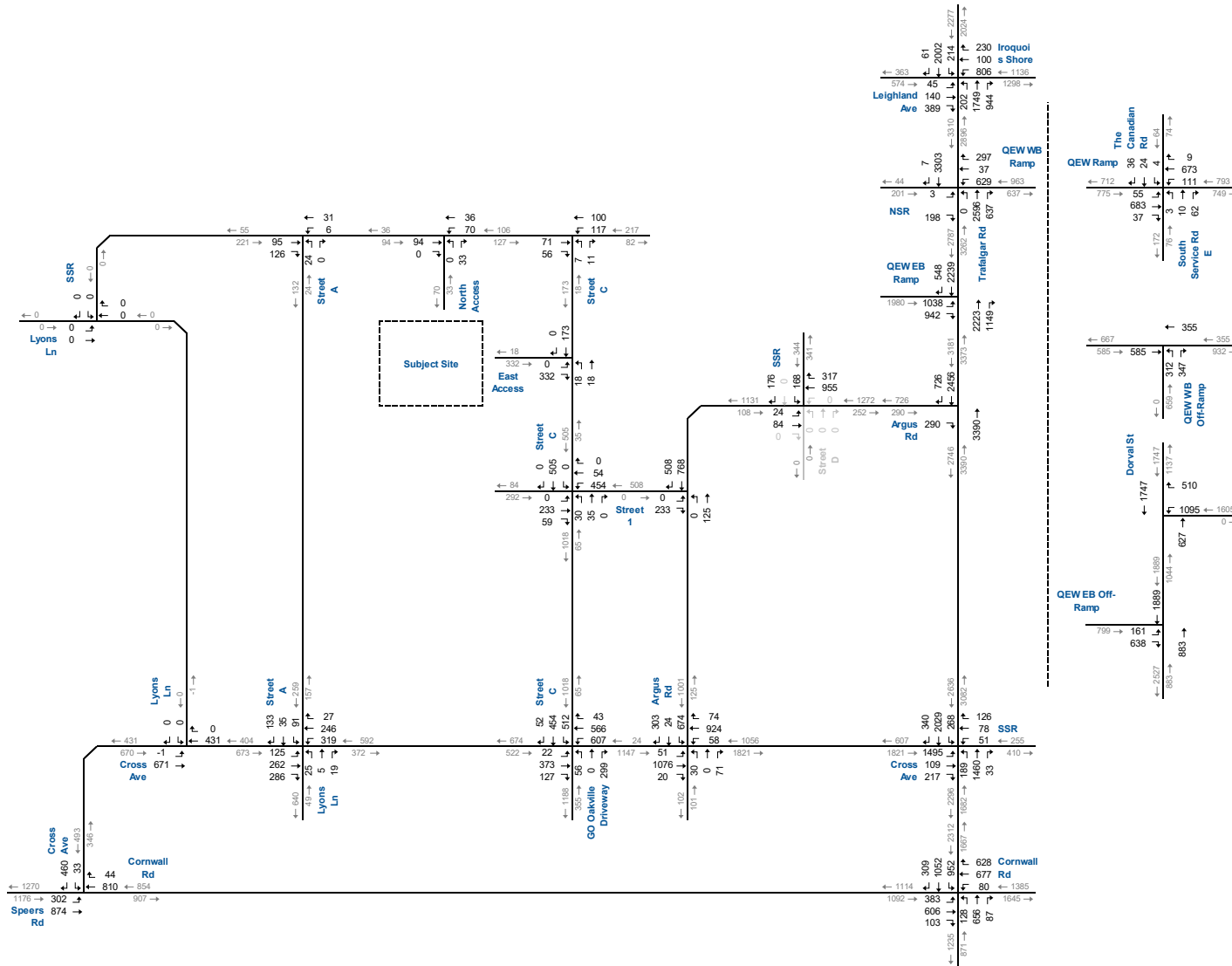


2038 Total (PH1+2) Traffic Volumes PM Peak Hour

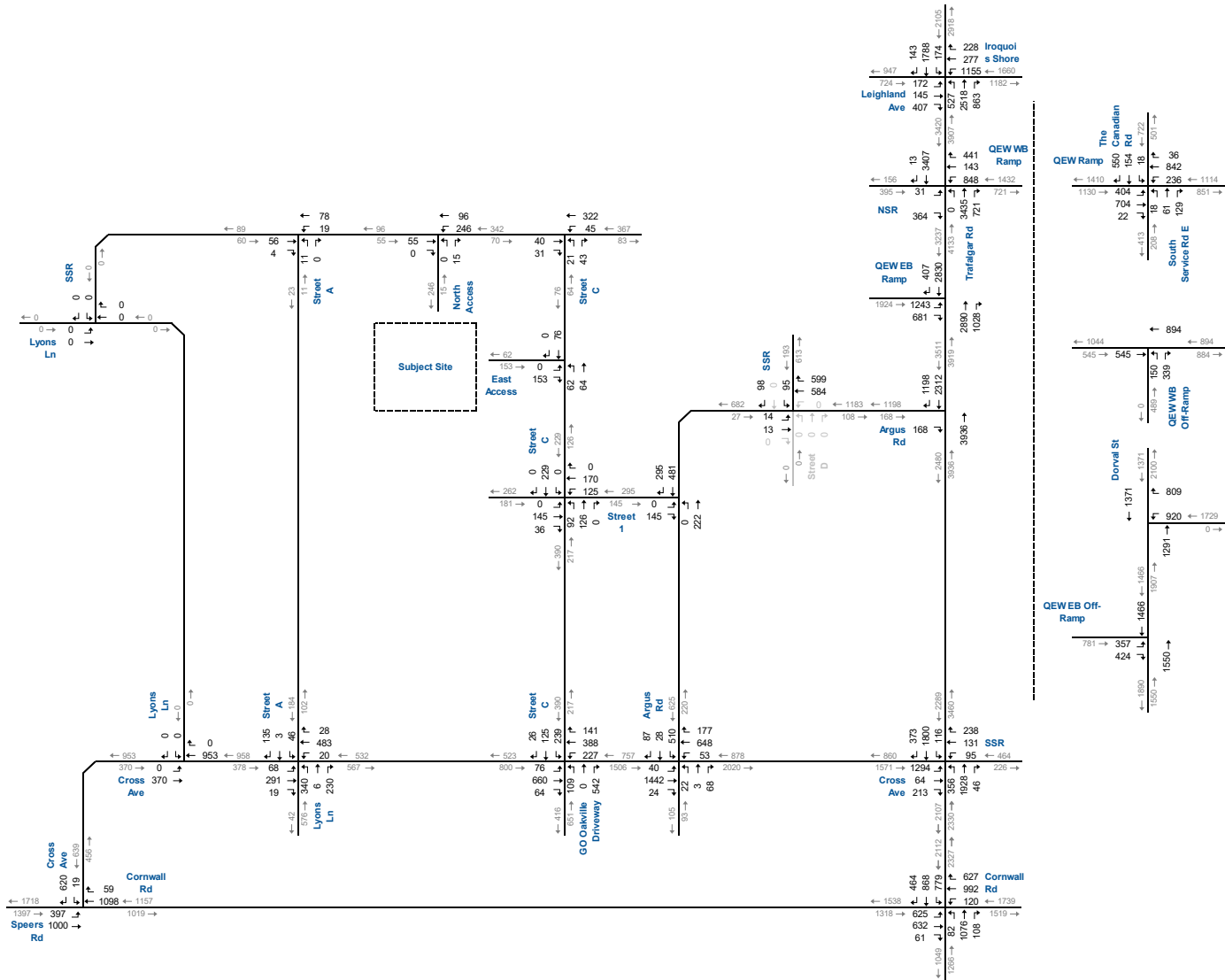
166 South Service Road East, Oakville
210590



Figure 10.9B



2043 Total (PH1+2) Traffic Volumes AM Peak Hour



2043 Total (PH1+2) Traffic Volumes PM Peak Hour

166 South Service Road East, Oakville
210590



Figure 10.10B

11 Operational Assessment

11.1 Level of Service Criteria

Level of service (LOS) is used to denote the different operating conditions that occur on a given roadway segment under various traffic volume loads. It is a qualitative measure that indexes the operational qualities of a roadway segment or an intersection with designations ranging from A to F, with LOS A representing the best operating conditions and LOS F representing the worst operating conditions.

For signalized intersections, the analysis considered the operation of each lane or lane group entering the intersection and the level of service for the overall conditions at the intersection. At signalized intersections, intersections with movements operating with a v/c ratio of 0.84 or less are classified as within capacity, a v/c ratio of 0.85-1.00 as approaching capacity and a v/c ratio over 1.00 as exceeding capacity.

For unsignalized intersections, the analysis assumes that traffic on the mainline is not affected by the traffic on the side streets. The level of service is only determined for left turns from the main street and all movements from the minor street. At unsignalized intersections, an overall LOS between A-C is classified as tolerable delays; an overall LOS D-E is classified as an increased delay and an overall LOS F is classified as Significant Delays.

The evaluation criteria for analyzing intersections are based on the 2000 Highway Capacity Manual (HCM)¹⁶.

11.2 Intersection Capacity Analysis

Intersection capacity analyses were conducted at all intersections in the study area. Analyses were conducted for the Base Conditions and years 2028, 2033, 2038 and 2043 (Background and Total Scenarios). Optimized signal timing splits have been utilized for the future horizon years to account for changing traffic patterns.

Tables 11.1 – 11.2 summarize the capacity analyses for the study area intersections for all horizon years. The capacity analysis results are included in **Appendix G**. The following sub-sections outline the operations of the study area intersections.

¹⁶ Transportation Research Board, Highway Capacity Manual, Washing, D.C. 2003.



11.2.1 Trafalgar Road at Leighland Avenue / Iroquois Shore Road

2023 Base Year Operations	Exceeding Capacity	●
2028 Background Operations	Exceeding Capacity	●
2028 Total Operations (PH 1)	Exceeding Capacity	●
2033 Background Operations	Exceeding Capacity	●
2033 Total Operations (PH 1)	Exceeding Capacity	●
2038 Background Operations	Exceeding Capacity	●
2038 Total Operations (PH 1)	Exceeding Capacity	●
2038 Total Operations (PH 1+2)	Exceeding Capacity	●
2043 Background Operations	Exceeding Capacity	●
2043 Total Operations (PH 1+2)	Exceeding Capacity	●

At the intersection of Trafalgar Road at Leighland Avenue / Iroquois Shore Road, the overall intersection operations are at LOS D during the existing weekday peak hours. A critical movement, however, is noted for the westbound left-turn movement, which operates at LOS F and a v/c ratio exceeding 1.00. The northbound left-turn operates at LOS E with a v/c ratio of 0.98.

Under the 2028 Background conditions, operations are expected to degrade with the southbound through movement operating at LOS E with a v/c ratio of 0.97. The northbound through movement is projected to operate at LOS D with a v/c ratio of 0.94. Under the 2033 Background conditions, the northbound and southbound through movements are projected to operate at LOS F with a v/c ratio exceeding 1.00. By the 2043 background horizon, the southbound left turn movement is projected to operate at LOS F with a v/c ratio over 1.00.

Under the Total conditions, the additional traffic generated by the site is forecasted to be relatively minor.

Critical Movements (V/C over 0.85 or Turn Lane V/C over 0.95)

- ▶ Westbound Left (2023 Base)
- ▶ Northbound Left (2023 Base)
- ▶ Northbound Through (2028 Background)
- ▶ Southbound Through (2028 Background)
- ▶ Southbound Left (2043 Background)



11.2.2 Trafalgar Road at QEW Westbound Ramp

2023 Base Year Operations	Approaching Capacity	●
2028 Background Operations	Approaching Capacity	●
2028 Total Operations (PH 1)	Exceeding Capacity	●
2033 Background Operations	Exceeding Capacity	●
2033 Total Operations (PH 1)	Exceeding Capacity	●
2038 Background Operations	Exceeding Capacity	●
2038 Total Operations (PH 1)	Exceeding Capacity	●
2038 Total Operations (PH 1+2)	Exceeding Capacity	●
2043 Background Operations	Exceeding Capacity	●
2043 Total Operations (PH 1+2)	Exceeding Capacity	●

At the intersection of Trafalgar Road and QEW Westbound Ramp, the northbound through movement along Trafalgar Road presently operates at LOS E with a v/c ratio of 0.86.

Under the 2028 Background conditions, northbound delays are forecast to increase with background traffic growth with the v/c ratio projected to be 0.98. The southbound through movement is also projected to operate with a v/c ratio of 0.87. Under the 2033 Background conditions, the westbound left and through movements is projected to degrade to LOS F, with a v/c ratio exceeding 1.00. The northbound and southbound approaches are also projected to operate with a v/c ratio over 1.00.

Under the 2038 and 2043 conditions, increase delay is projected to occur for the critical movements.

In terms of development traffic implications, similar levels of operation are expected under the Total conditions with only minor increases in delay resulting from site-generated traffic volumes.

Critical Movements (V/C over 0.85 and Ramp V/C over 0.75)

- ▶ Northbound Through (2023 Base)
- ▶ Southbound Through (2028 Background)
- ▶ Westbound Left (2033 Background/2028 Total)
- ▶ Westbound Through (2033 Background)



TABLE 11.1A: AM PEAK HOUR OPERATIONS (1 OF 11)

Peak Hour	Intersection	Horizon	Control Type	MOE	Direction / Movement / Approach																Overall	
					Eastbound				Westbound				Northbound				Southbound					
					Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach		
AM Peak Hour	1: Trafalgar Rd & Leighton Ave/Iroquois Shore Rd	2023 Existing	TCS	LOS Delay V/C Q	D 39 0.12 12	D 42 0.31 35	D 47 0.58 57	D 45	E 70 0.97 73	D 35 0.17 25	C 35 0.12 16	E 60	C 21 0.59 38	C 21 0.42 77	C 24 0.50 33	C 22	B 16 0.48 33	C 26 0.65 132	B 18 0.03 0	C 25	C 32 0.76	
		2028 Background	TCS	LOS Delay V/C Q	D 43 0.18 14	D 47 0.43 44	A 0 0.22 0	B 15	F 106 1.10 115	D 35 0.19 30	C 35 0.14 18	F 86	D 36 0.72 44	C 22 0.47 84	A 2 0.55 0	B 15	B 17 0.55 31	C 28 0.72 147	B 17 0.04 0	C 26	C 32 0.85	
		2028 Total (PH 1)	TCS	LOS Delay V/C Q	D 43 0.18 14	D 47 0.43 44	A 0 0.22 0	B 15	F 109 1.10 117	D 35 0.19 30	C 35 0.14 18	F 87	D 39 0.73 48	C 22 0.48 86	A 2 0.56 0	B 15	B 17 0.56 31	C 28 0.73 148	B 18 0.04 0	C 27	C 32 0.86	
		2033 Background	TCS	LOS Delay V/C Q	D 42 0.18 15	D 48 0.47 47	A 0 0.25 0	B 15	F 166 1.25 141	D 37 0.22 32	C 36 0.15 19	F 128	C 33 0.64 61	D 41 0.92 191	A 2 0.61 0	C 29	C 34 0.66 65	D 40 0.91 189	B 20 0.04 0	D 39	D 47 1	
		2033 Total (Ph 1)	TCS	LOS Delay V/C Q	D 42 0.18 15	D 48 0.47 47	A 0 0.25 0	B 15	F 168 1.25 142	D 37 0.22 32	C 36 0.15 19	F 130	C 35 0.66 62	D 42 0.93 194	A 2 0.62 0	C 30	C 34 0.66 66	D 41 0.92 194	B 20 0.04 0	D 40	D 48 1.01	
		2038 Background	TCS	LOS Delay V/C Q	D 42 0.20 16	D 47 0.49 50	A 1 0.27 0	B 15	F 212 1.36 162	D 36 0.23 33	C 36 0.17 19	F 161	D 35 0.65 73	A 41 0.91 181	C 3 0.66 0	C 28	D 36 0.69 74	E 71 1.05 223	C 21 0.04 0	E 67	E 62 1.11	
		2038 Total (PH 1)	TCS	LOS Delay V/C Q	D 42 0.20 16	D 47 0.49 50	A 1 0.27 0	B 15	F 215 1.36 163	D 36 0.23 33	C 36 0.17 19	F 163	D 36 0.67 75	A 45 0.94 181	C 3 0.67 0	C 30	C 34 0.67 77	E 74 1.06 224	C 21 0.04 0	E 69	E 64 1.12	
		2038 Total (PH 1+2)	TCS	LOS Delay V/C Q	D 42 0.20 16	D 47 0.49 50	A 1 0.27 0	B 15	F 218 1.37 164	D 36 0.23 33	C 36 0.17 19	F 165	D 37 0.67 80	A 44 0.94 189	C 3 0.68 0	C 30	D 36 0.69 73	E 84 1.08 229	C 22 0.04 0	E 77	E 67 1.13	
		2043 Background	TCS	LOS Delay V/C Q	D 41 0.21 17	D 47 0.52 54	A 1 0.29 0	B 15	F 272 1.50 185	D 36 0.25 36	C 35 0.25 28	F 203	D 51 0.81 94	E 77 1.06 214	A 3 0.73 0	D 51	D 39 0.71 92	F 96 1.12 254	C 20 0.05 0	F 89	F 86 1.23	
	2043 Total (PH 1+2)	TCS	LOS Delay V/C Q	D 41 0.21 17	D 47 0.52 54	A 1 0.30 0	B 15	F 277 1.51 187	D 36 0.25 36	C 35 0.23 25	F 207	D 54 0.84 101	E 77 1.06 219	A 4 0.75 0	D 52	D 41 0.74 95	F 108 1.15 259	C 21 0.05 0	F 100	F 90 1.25		
	2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp	2023 Existing	TCS	LOS Delay V/C Q	E 63 0.09 2	D 38 0.30 42	D 39	E 60 0.73 88	E 60 0.74 88	A 0.21 0.21 65	D 37	B 10 0.53 94	A 9	B 16 0.64 151	B 16 0.64 151	B 16 0.64 151	B 16 0.64 151	B 16 0.64 151	B 16 0.64 151	B 16 0.64 151	B 17 0.64	
		2028 Background	TCS	LOS Delay V/C Q	E 62 0.02 4	D 38 0.33 45	D 38	E 60 0.74 93	E 59 0.74 93	A 0.18 0.18 0	D 39	B 13 0.59 111	B 10	B 18 0.69 174	B 18 0.69 174	B 18 0.69 174	B 18 0.69 174	B 18 0.69 174	B 18 0.69 174	B 18 0.69 174	B 18 0.69 174	
		2028 Total (PH 1)	TCS	LOS Delay V/C Q	E 62 0.02 4	D 37 0.32 45	D 37	E 59 0.75 96	E 58 0.74 96	A 0.18 0.18 0	D 39	B 15 0.61 122	B 12	B 19 0.71 179	B 19 0.71 179	B 19 0.71 179	B 19 0.71 179	B 19 0.71 179	B 19 0.71 179	B 19 0.71 179	B 20 0.7	
		2033 Background	TCS	LOS Delay V/C Q	E 56 0.01 3	D 65 0.62 53	E 65	E 69 0.85 131	E 67 0.83 130	A 0.20 0.20 0	D 46	C 27 0.85 165	C 22	C 31 0.91 261	C 31 0.91 261	C 31 0.91 261	C 31 0.91 261	C 31 0.91 261	C 31 0.91 261	C 31 0.91 261	C 31 0.91 261	C 30 0.86
		2033 Total (Ph 1)	TCS	LOS Delay V/C Q	E 62 0.02 4	C 34 0.33 48	C 34	E 57 0.77 113	E 55 0.76 112	A 0.20 0.20 0	D 38	C 27 0.84 160	C 22	C 29 0.89 264	C 29 0.89 264	C 29 0.89 264	C 29 0.89 264	C 29 0.89 264	C 29 0.89 264	C 29 0.89 264	C 29 0.89 264	C 27 0.83
		2038 Background	TCS	LOS Delay V/C Q	E 63 0.03 4	C 33 0.34 53	C 33	E 55 0.77 119	E 54 0.76 119	A 0.22 0.22 0	D 37	C 34 0.97 166	C 28	D 41 0.98 319	D 41 0.98 319	D 41 0.98 319	D 41 0.98 319	D 41 0.98 319	D 41 0.98 319	D 41 0.98 319	D 41 0.98 319	D 35 0.9
		2038 Total (PH 1)	TCS	LOS Delay V/C Q	E 63 0.03 4	C 32 0.34 53	C 32	E 54 0.77 124	E 53 0.76 123	A 0.22 0.22 0	D 37	D 40 1.00 165	C 32	D 47 1.00 321	D 47 1.00 321	D 47 1.00 321	D 47 1.00 321	D 47 1.00 321	D 47 1.00 321	D 47 1.00 321	D 47 1.00 321	D 39 0.91
		2038 Total (PH 1+2)	TCS	LOS Delay V/C Q	E 63 0.03 4	C 30 0.33 53	C 31	E 53 0.77 131	E 51 0.75 129	A 0.22 0.22 0	D 36	D 52 1.04 166	D 42	E 55 1.03 322	E 55 1.03 322	E 55 1.03 322	E 55 1.03 322	E 55 1.03 322	E 55 1.03 322	E 55 1.03 322	E 55 1.03 322	E 47 0.93
2043 Background		TCS	LOS Delay V/C Q	E 63 0.03 4	C 30 0.36 59	C 31	D 52 0.77 134	D 51 0.76 134	A 0.24 0.24 0	C 35	F 88 1.12 171	E 71	F 101 1.14 376	F 101 1.14 376	F 101 1.14 376	F 101 1.14 376	F 101 1.14 376	F 101 1.14 376	F 101 1.14 376	F 101 1.14 376	F 79 0.99	
2043 Total (PH 1+2)	TCS	LOS Delay V/C Q	E 63 0.03 4	C 29 0.35 59	C 30	D 53 0.80 154	D 51 0.77 143	A 0.24 0.24 0	D 36	F 116 1.19 177	F 93	F 116 1.18 379	F 116 1.18 379	F 116 1.18 379	F 116 1.18 379	F 116 1.18 379	F 116 1.18 379	F 116 1.18 379	F 116 1.18 379	F 94 1.02		

MOE - Measure of Effectiveness
 LOS - Level of Service
 Delay - Average Delay per Vehicle in Seconds

Q - 95th Percentile Queue Length
 Ex. - Existing Available Storage
 Avail. - Available Storage

TCS - Traffic Control Signal
 TWSC - Two-Way Stop Control
 AWSC - All-Way Stop Control

RBT - Roundabout



TABLE 11.1B: PM PEAK HOUR OPERATIONS (1 OF 11)

Peak Hour	Intersection	Horizon	Control Type	MOE	Direction / Movement / Approach																Overall
					Eastbound				Westbound				Northbound				Southbound				
					Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
PM Peak Hour	1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd	2023 Existing	TCS	LOS Delay V/C Q	D 47 35	D 49 41	A 0 0.21	C 21	F 96 1.09	D 38 0.44	C 34 0.17	E 77	E 72 0.98	C 33 0.83	A 1 0.45	C 31	C 34 0.66	D 37 0.69	C 28 0.08	D 36	D 41 1.02
		2028 Background	TCS	LOS Delay V/C Q	D 49 37	D 49 46	A 0 0.23	C 22	F 112 1.14	D 36 0.46	C 32 0.20	F 88	E 58 0.93	D 43 0.94	A 1 0.50	D 36	D 50 0.77	E 63 0.97	C 34 0.08	E 60	D 51 1.05
		2028 Total (PH 1)	TCS	LOS Delay V/C Q	D 49 37	D 49 46	A 0 0.23	C 22	F 132 1.19	D 37 0.47	C 33 0.21	F 103	E 55 0.91	D 43 0.95	A 1 0.50	D 35	D 46 0.74	E 67 0.99	C 34 0.08	E 62	D 54 1.06
		2033 Background	TCS	LOS Delay V/C Q	D 54 41	D 50 50	A 0 0.25	C 23	F 150 1.23	D 36 0.48	C 32 0.25	F 114	F 180 1.27	F 97 1.12	A 2 0.55	F 87	F 80 0.93	F 101 1.11	C 30 0.09	F 94	F 89 1.26
		2033 Total (PH 1)	TCS	LOS Delay V/C Q	D 54 41	D 50 50	A 0 0.26	C 23	F 156 1.25	D 36 0.48	C 32 0.25	F 119	F 185 1.29	F 100 1.13	A 2 0.56	F 89	F 80 0.93	F 106 1.12	C 30 0.09	F 99	F 92 1.27
		2038 Background	TCS	LOS Delay V/C Q	E 56 44	D 49 52	A 0 0.27	C 24	F 230 1.42	D 37 0.54	C 34 0.30	F 170	248 1.43	147 1.24	A 2 0.60	F 129	E 78 0.93	F 126 1.17	C 29 0.10	F 115	F 124 1.43
		2038 Total (PH 1)	TCS	LOS Delay V/C Q	E 56 44	D 49 52	A 1 0.28	C 23	F 236 1.43	D 37 0.54	C 34 0.30	F 175	229 1.39	149 1.25	A 2 0.60	F 128	E 79 0.93	F 145 1.22	C 29 0.10	F 132	F 129 1.41
		2038 Total (PH 1+2)	TCS	LOS Delay V/C Q	E 56 44	D 49 52	A 1 0.28	C 23	F 242 1.45	D 37 0.54	C 34 0.30	F 180	258 1.46	152 1.25	A 2 0.61	F 133	E 78 0.93	F 137 1.20	C 29 0.10	F 125	F 131 1.45
		2043 Background	TCS	LOS Delay V/C Q	E 61 48	D 49 57	A 1 0.30	C 25	F 321 1.62	D 39 0.60	C 35 0.36	F 233	F 340 1.64	F 204 1.37	A 3 0.66	F 178	F 106 1.03	F 164 1.26	C 28 0.11	F 150	F 169 1.63
	2043 Total (PH 1+2)	TCS	LOS Delay V/C Q	E 61 48	D 49 57	A 1 0.31	C 25	F 334 1.65	D 39 0.60	C 35 0.36	F 243	F 350 1.67	F 208 1.38	A 3 0.67	F 182	F 106 1.03	F 174 1.29	C 28 0.11	F 159	F 175 1.66	
	2: Trafalgar Rd & North Service Rd/QEVB Off-Ramp	2023 Existing	TCS	LOS Delay V/C Q	E 63 16	D 38 0.51	A 0 0.76	D 40	E 59 108	E 57 110	A 0 0.24	D 37		20 0.86		B 17		22 0.76	22 0.76	C 22	C 23 0.82
		2028 Background	TCS	LOS Delay V/C Q	E 63 18	D 36 0.53	A 0 0.85	D 39	E 58 122	E 55 123	A 1 0.26	D 36		35 0.98		C 29		29 0.87	29 0.87	C 29	C 30 0.9
		2028 Total (PH 1)	TCS	LOS Delay V/C Q	E 63 18	D 32 0.49	A 0 0.86	C 35	E 54 0.79	D 51 0.75	A 1 0.26	C 35		59 1.06		D 49		38 0.94	38 0.94	D 38	D 42 0.93
		2033 Background	TCS	LOS Delay V/C Q	D 54 17	F 180 1.19	A 0 1.52	F 170	F 119 1.06	F 109 1.03	A 1 0.29	E 75		144 1.24		F 120		116 1.17	116 1.17	F 116	F 114 1.2
		2033 Total (PH 1)	TCS	LOS Delay V/C Q	E 63 17	D 32 0.52	A 0 0.97	C 34	E 66 0.90	E 60 0.87	A 1 0.29	D 43		156 1.27		F 129		129 1.20	129 1.20	F 129	F 112 1.1
		2038 Background	TCS	LOS Delay V/C Q	E 64 19	D 34 0.58	A 0 1.08	D 36	E 69 199	E 61 192	A 1 0.31	D 43		199 1.37		F 165		166 1.29	166 1.29	F 166	F 142 1.16
		2038 Total (PH 1)	TCS	LOS Delay V/C Q	E 64 19	D 31 0.55	A 0 1.05	C 34	E 71 217	E 62 210	A 1 0.31	D 45		231 1.43		F 191		198 1.36	198 1.36	F 198	F 165 1.2
		2038 Total (PH 1+2)	TCS	LOS Delay V/C Q	E 64 19	D 29 0.53	A 0 1.01	C 31	E 72 233	E 63 227	A 1 0.31	D 47		265 1.50		F 219		232 1.43	232 1.43	F 232	F 190 1.23
2043 Background		TCS	LOS Delay V/C Q	E 64 21	D 34 0.62	A 0 1.20	D 36	E 80 224	E 68 218	A 1 0.34	D 49		282 1.55		F 234		244 1.46	244 1.46	F 244	F 203 1.28	
2043 Total (PH 1+2)	TCS	LOS Delay V/C Q	E 64 21	D 29 0.58	A 0 1.14	C 32	E 90 1.02	F 78 0.98	A 1 0.34	E 58		346 1.68		F 286		308 1.60	308 1.60	F 308	F 249 1.35		

MOE - Measure of Effectiveness
 LOS - Level of Service
 Delay - Average Delay per Vehicle in Seconds
 Q - 95th Percentile Queue Length
 Ex. - Existing Available Storage
 Avail. - Available Storage
 TCS - Traffic Control Signal
 TWSC - Two-Way Stop Control
 AWSC - All-Way Stop Control
 RBT - Roundabout



11.2.3 Trafalgar Road at QEW Eastbound Ramp

2023 Base Year Operations	Approaching Capacity	●
2028 Background Operations	Approaching Capacity	●
2028 Total Operations (PH 1)	Approaching Capacity	●
2033 Background Operations	Exceeding Capacity	●
2033 Total Operations (PH 1)	Exceeding Capacity	●
2038 Background Operations	Exceeding Capacity	●
2038 Total Operations (PH 1)	Exceeding Capacity	●
2038 Total Operations (PH 1+2)	Exceeding Capacity	●
2043 Background Operations	Exceeding Capacity	●
2043 Total Operations (PH 1+2)	Exceeding Capacity	●

At the intersection of Trafalgar Road at QEW Eastbound Ramp, the eastbound left and right turn movement operates at LOS D with a v/c ratio of 0.88 and 0.80 during the weekday AM peak hour.

Under the 2028 Background conditions, delays are projected to be similar as noted under the base year conditions. It is noted that the southbound through movement is projected to operate with a v/c ratio of 0.88.

Under the 2033 Background conditions, the eastbound right is projected to operate at LOS F with a v/c ratio exceeding 1.00 while the eastbound left will operate at LOS E with a v/c ratio of 0.93. The northbound and southbound through movements are also projected to operate with a v/c ratio exceeding 1.00.

Under the 2038 Background conditions, the northbound through movement is projected to operate with a v/c ratio exceeding 1.00 and by 2043 Background conditions, increase delay is projected for all movements.

Under the Total conditions, the additional traffic generated by the site is forecasted to be relatively minor.

Critical Movements (V/C over 0.85 or Ramp V/C over 0.75)

- ▶ Eastbound Left (2023 Base)
- ▶ Eastbound Right (2023 Base)
- ▶ Southbound Through (2028 Background)
- ▶ Northbound Through (2033 Background)



11.2.4 Trafalgar Road at Argus Road

2023 Base Year Operations	Tolerable Delays	●
2028 Background Operations	Tolerable Delays	●
2028 Total Operations	Tolerable Delays	●
2033 Background Operations	Tolerable Delays	●
2033 Total Operations (PH 1)	Tolerable Delays	●
2038 Background Operations	Tolerable Delays	●
2038 Total Operations (PH 1)	Tolerable Delays	●
2038 Total Operations (PH 1+2)	Tolerable Delays	●
2043 Background Operations	Tolerable Delays	●
2043 Total Operations (PH 1+2)	Tolerable Delays	●

Individual movements at the unsignalized intersection of Trafalgar Road and Argus Road presently operate at LOS A or better during the weekday peak hours.

Similar levels of operation are expected under 2028-2043 Background conditions.

Under the Total conditions, the additional traffic generated by the site is forecasted to be relatively minor.

Critical Movements (LOS E/F)

- ▶ None



TABLE 11.2A: AM PEAK HOUR OPERATIONS (2 OF 11)

Peak Hour	Intersection	Horizon	Control Type	MOE	Direction / Movement / Approach																
					Eastbound				Westbound				Northbound				Southbound				Overall
					Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
AM Peak Hour	3: Trafalgar Rd & QEW EB-Off Ramp	2023 Existing	TCS	LOS Delay V/C Q	C 24 0.52 88	D 43 0.88 211	C 32							C 30 0.56 72	C 30	C 28 0.75 155	A 0 0.28 0	C 22	C 27 0.84 0		
		2028 Background	TCS	LOS Delay V/C Q	C 23 0.55 100	D 49 0.93 268	C 35							C 35 0.65 84	C 35	C 32 0.88 154	A 0 0.31 0	C 26	C 31 0.93		
		2028 Total (PH 1)	TCS	LOS Delay V/C Q	C 23 0.56 102	D 53 0.95 275	D 37								C 33 0.67 77	C 33	C 32 0.88 157	A 0 0.31 0	C 26	C 31 0.94	
		2033 Background	TCS	LOS Delay V/C Q	C 24 0.61 119	F 106 1.12 362	E 63								D 43 0.94 139	D 43	D 48 1.02 243	A 0 0.34 0	D 38	D 47 1.1	
		2033 Total (Ph 1)	TCS	LOS Delay V/C Q	C 24 0.60 117	F 102 1.12 363	E 61								D 49 0.99 144	D 49	E 62 1.05 255	A 0 0.34 0	D 49	D 52 1.11	
		2038 Background	TCS	LOS Delay V/C Q	C 26 0.66 133	F 152 1.24 415	F 86								F 93 1.12 163	F 93	F 94 1.13 275	A 0 0.37 0	E 75	F 84 1.22	
		2038 Total (PH 1)	TCS	LOS Delay V/C Q	C 26 0.66 133	F 155 1.24 418	F 87								F 106 1.15 152	F 106	F 102 1.15 275	A 0 0.37 0	F 82	F 91 1.23	
		2038 Total (PH 1+2)	TCS	LOS Delay V/C Q	C 26 0.67 135	F 166 1.27 425	F 93								F 117 1.17 169	F 117	F 100 1.15 269	A 0 0.37 0	F 81	F 96 1.25	
		2043 Background	TCS	LOS Delay V/C Q	C 27 0.72 152	F 199 1.35 469	F 108								F 157 1.26 232	F 157	F 157 1.27 268	A 0 0.41 0	F 125	F 130 1.35	
		2043 Total (PH 1 +2)	TCS	LOS Delay V/C Q	C 28 0.73 155	F 214 1.38 478	F 116								F 180 1.30 213	F 180	F 162 1.29 268	A 0 0.41 0	F 130	F 142 1.38	
	4: Trafalgar Rd & Argus Rd	2023 Existing	TWSC	LOS Delay V/C Q		A 10 0.06 1	A 10								A 0 0.33 0	A 0	A 0 0.40 0	A 0 0.43 0	A 0		
		2028 Background	TWSC	LOS Delay V/C Q		B 10 0.04 1	B 10									A 0 0.37 0	A 0	A 0 0.46 0	A 0 0.46 0	A 0	
		2028 Total (PH 1)	TWSC	LOS Delay V/C Q		B 11 0.06 2	B 11									A 0 0.39 0	A 0	A 0 0.46 0	A 0 0.48 0	A 0	
		2033 Background	TWSC	LOS Delay V/C Q		B 13 0.28 9	B 13									A 0 0.51 0	A 0	A 0 0.52 0	A 0 0.60 0	A 0	
		2033 Total (Ph 1)	TWSC	LOS Delay V/C Q		B 13 0.30 10	B 13									A 0 0.54 0	A 0	A 0 0.52 0	A 0 0.62 0	A 0	
		2038 Background	TWSC	LOS Delay V/C Q		B 15 0.41 16	B 15									A 0 0.60 0	A 0	A 0 0.57 0	A 0 0.66 0	A 0	
		2038 Total (PH 1)	TWSC	LOS Delay V/C Q		C 15 0.43 17	C 15									A 0 0.62 0	A 0	A 0 0.57 0	A 0 0.69 0	A 0	
		2038 Total (PH 1+2)	TWSC	LOS Delay V/C Q		C 16 0.47 20	C 16									A 0 0.66 0	A 0	A 0 0.57 0	A 0 0.71 0	A 0	
2043 Background		TWSC	LOS Delay V/C Q		C 15 0.44 18	C 15									A 0 0.66 0	A 0	A 0 0.63 0	A 0 0.73 0	A 0		
2043 Total (PH 1 +2)		TWSC	LOS Delay V/C Q		C 17 0.51 23	C 17									A 0 0.72 0	A 0	A 0 0.63 0	A 0 0.78 0	A 0		

MOE - Measure of Effectiveness
 LOS - Level of Service
 Delay - Average Delay per Vehicle in Seconds

Q - 95th Percentile Queue Length
 Ex - Existing Available Storage
 Avail. - Available Storage

TCS - Traffic Control Signal
 TWSC - Two-Way Stop Control
 AWSC - All-Way Stop Control

RBT - Roundabout



TABLE 11.2B: PM PEAK HOUR OPERATIONS (2 OF 11)

Peak Hour	Intersection	Horizon	Control Type	MOE	Direction / Movement / Approach																
					Eastbound				Westbound				Northbound				Southbound				Overall
					Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
PM Peak Hour	3: Trafalgar Rd & QEW EB-Off Ramp	2023 Existing	TCS	LOS Delay V/C Q	D 43 0.80 137	D 37 0.61 100	D 41				B 18 0.74 112	B 18	B 14 0.62 91	A 0 0.21 0	B 12	C 21 0.78 0					
		2028 Background	TCS	LOS Delay V/C Q	D 43 0.84 157	D 36 0.65 114	D 41				C 23 0.85 199	C 23	B 16 0.72 120	A 0 0.23 0	B 14	C 24 0.86					
		2028 Total (PH 1)	TCS	LOS Delay V/C Q	D 47 0.87 166	D 40 0.70 129	D 45				C 23 0.84 163	C 23	B 14 0.74 120	A 0 0.23 0	B 12	C 24 0.87					
		2033 Background	TCS	LOS Delay V/C Q	D 52 0.93 206	E 76 0.99 240	E 60				D 45 1.02 247	D 45	B 16 0.94 98	A 0 0.25 0	B 14	D 36 1.03					
		2033 Total (Ph 1)	TCS	LOS Delay V/C Q	D 60 0.96 212	F 98 1.06 258	E 73				D 39 1.00 223	D 39	B 16 0.96 112	A 0 0.25 0	B 14	D 37 1.05					
		2038 Background	TCS	LOS Delay V/C Q	E 75 1.02 239	F 134 1.16 298	F 95				E 79 1.11 281	E 79	C 29 1.02 119	A 0 0.28 0	C 25	E 62 1.16					
		2038 Total (PH 1)	TCS	LOS Delay V/C Q	E 69 1.00 235	F 138 1.17 307	F 93				F 92 1.14 282	F 92	D 55 1.08 122	A 0 0.28 0	D 47	E 75 1.18					
		2038 Total (PH 1+2)	TCS	LOS Delay V/C Q	E 63 0.99 232	F 140 1.18 314	F 91				F 105 1.16 276	F 105	F 82 1.15 132	A 0 0.28 0	E 72	F 88 1.2					
		2043 Background	TCS	LOS Delay V/C Q	F 103 1.11 275	F 174 1.26 338	F 127				F 138 1.24 297	F 138	F 81 1.14 120	A 0 0.30 0	E 70	F 109 1.28					
		2043 Total (PH 1+2)	TCS	LOS Delay V/C Q	F 88 1.07 268	F 178 1.28 351	F 120				F 166 1.30 295	F 166	F 138 1.27 138	A 0 0.30 0	F 121	F 137 1.32					
	4: Trafalgar Rd & Argus Rd	2023 Existing	TWSC	LOS Delay V/C Q		A 10 0.06 2	A 10				A 0 0.50 0	A 0	A 0 0.38 0	A 0 0.37 0	A 0						
		2028 Background	TWSC	LOS Delay V/C Q		B 10 0.07 2	B 10				A 0 0.55 0	A 0	A 0 0.42 0	A 0 0.41 0	A 0						
		2028 Total (PH 1)	TWSC	LOS Delay V/C Q		B 11 0.08 2	B 11				A 0 0.57 0	A 0	A 0 0.42 0	A 0 0.49 0	A 0						
		2033 Background	TWSC	LOS Delay V/C Q		B 13 0.22 7	B 13				A 0 0.67 0	A 0	A 0 0.49 0	A 0 0.73 0	A 0						
		2033 Total (Ph 1)	TWSC	LOS Delay V/C Q		B 14 0.25 8	B 14				A 0 0.68 0	A 0	A 0 0.49 0	A 0 0.81 0	A 0						
		2038 Background	TWSC	LOS Delay V/C Q		C 16 0.31 11	C 16				A 0 0.73 0	A 0	A 0 0.54 0	A 0 0.82 0	A 0						
		2038 Total (PH 1)	TWSC	LOS Delay V/C Q		C 16 0.33 11	C 16				A 0 0.75 0	A 0	A 0 0.54 0	A 0 0.90 0	A 0						
		2038 Total (PH 1+2)	TWSC	LOS Delay V/C Q		C 16 0.34 12	C 16				A 0 0.76 0	A 0	A 0 0.54 0	A 0 0.98 0	A 0						
		2043 Background	TWSC	LOS Delay V/C Q		C 16 0.34 12	C 16				A 0 0.81 0	A 0	A 0 0.59 0	A 0 0.90 0	A 0						
2043 Total (PH 1+2)		TWSC	LOS Delay V/C Q		C 16 0.37 13	C 16				A 0 0.84 0	A 0	A 0 0.59 0	A 0 1.06 0	A 0							

MOE - Measure of Effectiveness
 LOS - Level of Service
 Delay - Average Delay per Vehicle in Seconds

Q - 95th Percentile Queue Length
 Ex. - Existing Available Storage
 Avail. - Available Storage

TCS - Traffic Control Signal
 TWSC - Two-Way Stop Control
 AWS - All-Way Stop Control

RBT - Roundabout



11.2.5 Trafalgar Road at Cross Avenue/South Service Road

2023 Base Year Operations	Within Capacity	●
2028 Background Operations	Approaching Capacity	●
2028 Total Operations (PH 1)	Approaching Capacity	●
2033 Background Operations	Exceeding Capacity	●
2033 Total Operations (PH 1)	Exceeding Capacity	●
2038 Background Operations	Exceeding Capacity	●
2038 Total Operations (PH 1)	Exceeding Capacity	●
2038 Total Operations (PH 1+2)	Exceeding Capacity	●
2043 Background Operations	Exceeding Capacity	●
2043 Total Operations (PH 1+2)	Exceeding Capacity	●

The intersection of Trafalgar Road and Cross Avenue/South Service Road presently operates at a LOS D overall. Several movements operate at LOS E during the weekday AM peak hour and LOS E with a v/c ratio no greater than 0.77.

Under 2028 Background traffic conditions, the southbound shared through/right turn movement is projected to operate at LOS D with a v/c ratio of 0.89. Under the 2033 Background traffic conditions, the northbound and eastbound left turn movements are projected to operate at LOS F with a v/c ratio over 1.00. The northbound shared through/right turn movement is also projected to operate with a v/c ratio of 0.92. Under the 2038 Background traffic conditions, increased delay is projected, however no new critical movements are identified. By 2043, the southbound left turn movement is projected to operate at LOS F with a v/c ratio over 1.00.

Regarding development traffic implications, under the 2038 Total scenario (PH1+2), the southbound left turn movement is projected to degrade to LOS F with a v/c ratio over 1.00. The southbound approach is extremely sensitive to adding traffic due to the current high volumes projected at the intersection. This is reflective in the analysis given no new additional southbound left turns are projected because of the proposed development.

Critical Movements (V/C over 0.85 or Turn Lane V/C over 0.95)

- ▶ Southbound Through/Right (2028 Background)
- ▶ Northbound Left (2033 Background)
- ▶ Eastbound Left (2033 Background)
- ▶ Northbound Left/Through (2033 Background)
- ▶ Southbound Left (2043 Background/2038 Total PH1+2)



11.2.6 Trafalgar Road at Cornwall Road

2023 Base Year Operations	Exceeding Capacity	●
2028 Background Operations	Exceeding Capacity	●
2028 Total Operations (PH 1)	Exceeding Capacity	●
2033 Background Operations	Exceeding Capacity	●
2033 Total Operations (PH 1)	Exceeding Capacity	●
2038 Background Operations	Exceeding Capacity	●
2038 Total Operations (PH 1)	Exceeding Capacity	●
2038 Total Operations (PH 1+2)	Exceeding Capacity	●
2043 Background Operations	Exceeding Capacity	●
2043 Total Operations (PH 1+2)	Exceeding Capacity	●

Trafalgar Road and Cornwall Road intersection presently operates at a LOS F overall during the weekday peak hours. Several movements (eastbound left, northbound left and northbound through) operate at LOS E and F during the weekday peak hours with a v/c ratio exceeding 1.00. Under 2028 Background traffic conditions, the westbound through movement is projected to operate at LOS F with a v/c ratio exceeding 1.00.

Under 2033 Background conditions, increased delay is projected, however no new critical movements are identified. Under 2038 Background conditions, the eastbound through/right will operate at LOS E with a v/c ratio of 0.88. By 2043, the northbound left turn movement will operate at LOS F with a v/c ratio over 1.00.

Regarding development traffic implications, similar levels of operation are expected under the Total conditions with site-generated traffic volumes.

Critical Movements (V/C over 0.85 or Turn Lane V/C over 0.95)

- ▶ Eastbound Left (2023 Base)
- ▶ Northbound Left (2023 Base)
- ▶ Northbound Through/Right (2023 Base)
- ▶ Westbound Through (2028 Background)
- ▶ Eastbound Through/Right (2038 Background)
- ▶ Northbound Left (2043 Background)



TABLE 11.3A: AM PEAK HOUR OPERATIONS (3 OF 11)

Peak Hour	Intersection	Horizon	Control Type	MOE	Direction / Movement / Approach																	
					Eastbound				Westbound				Northbound				Southbound				Overall	
					Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach		
AM Peak Hour	5: Trafalgar Rd & Cross Ave/South Service Rd	2023 Existing	TCS	LOS Delay V/C Q	E 58 0.64 53	D 50 0.23 19	D 50 0.23 19	E 55	D 51 0.21 16	E 59 0.25 19	E 58 0.08 0	E 57	C 27 0.57 27	C 30 0.49 106	C 30 0.49 106	C 30	B 18 0.58 25	C 26 0.70 125	C 26 0.70 125	C 26	C 32 0.64 0.64	
		2028 Background	TCS	LOS Delay V/C Q	E 61 0.70 60	D 51 0.21 27	D 51 0.21 27	E 58	D 51 0.19 18	E 59 0.23 21	E 58 0.08 0	E 56	C 27 0.55 26	C 25 0.50 91	C 25 0.50 91	C 25	C 29 0.62 35	C 23 0.69 130	C 23 0.69 130	C 24	C 29 0.65 0.65	
		2028 Total (PH 1)	TCS	LOS Delay V/C Q	E 63 0.81 83	D 46 0.18 26	D 46 0.18 26	E 60	D 51 0.19 17	E 59 0.23 21	E 58 0.08 0	E 56	C 30 0.61 30	C 32 0.55 103	C 32 0.55 103	C 32	C 33 0.64 39	C 31 0.75 151	C 31 0.75 151	C 31	D 37 0.71 0.71	
		2033 Background	TCS	LOS Delay V/C Q	F 165 1.22 204	D 46 0.58 83	D 46 0.58 83	F 137	D 50 0.22 17	E 60 0.32 29	E 57 0.09 1	E 56	D 0.74 43	D 0.82 120	D 0.82 120	D 52	D 0.81 53	F 1.12 237	F 1.12 237	F 1.12 237	F 99 0	F 92 1.07 1.07
		2033 Total (PH 1)	TCS	LOS Delay V/C Q	F 180 1.27 233	D 42 0.53 79	D 42 0.53 79	F 151	D 50 0.22 16	E 60 0.32 29	E 57 0.09 1	E 56	D 0.78 46	E 0.89 130	E 0.89 130	E 60	D 0.82 53	F 1.45 238	F 1.45 238	F 1.45 238	F 135	F 114 1.12 1.12
		2038 Background	TCS	LOS Delay V/C Q	F 293 1.52 292	D 45 0.63 94	D 45 0.63 94	F 240	D 49 0.23 16	E 59 0.41 37	E 56 0.09 4	E 55	F 92 0.99 66	F 73 0.99 133	F 73 0.99 133	F 75	D 0.90 57	F 1.92 251	F 1.92 251	F 1.92 251	F 180	F 161 1.27 1.27
		2038 Total (PH 1)	TCS	LOS Delay V/C Q	F 329 1.61 327	D 42 0.60 92	D 42 0.60 92	F 273	D 49 0.23 16	E 59 0.41 37	E 56 0.09 4	E 55	F 99 0.99 67	F 88 1.03 136	F 88 1.03 136	F 89	D 0.91 57	F 1.38 256	F 1.38 256	F 1.38 256	F 206	F 186 1.32 1.32
		2038 Total (PH 1+2)	TCS	LOS Delay V/C Q	F 391 1.75 378	D 40 0.57 89	D 40 0.57 89	F 329	D 49 0.23 15	E 59 0.41 37	E 55 0.09 12	E 55	F 111 1.04 70	F 68 0.97 129	F 68 0.97 129	F 73	D 110 1.12 72	F 252 1.44 266	F 252 1.44 266	F 252 1.44 266	F 237	F 214 1.43 1.43
		2043 Background	TCS	LOS Delay V/C Q	F 383 1.73 333	D 49 0.71 110	D 49 0.71 110	F 312	D 49 0.25 18	E 59 0.44 17	E 55 0.10 0	E 55	F 132 1.12 89	F 60 0.97 149	F 60 0.97 149	F 68	D 158 1.23 73	F 241 1.43 248	F 241 1.43 248	F 241 1.43 248	F 233	F 200 1.44 1.44
	2043 Total (PH 1+2)	TCS	LOS Delay V/C Q	F 498 1.99 423	D 45 0.67 105	D 45 0.67 105	F 417	D 49 0.25 17	E 59 0.45 40	E 55 0.10 17	E 55	F 151 1.16 93	F 71 1.01 157	F 71 1.01 157	F 80	D 196 1.32 77	F 290 1.53 261	F 290 1.53 261	F 290 1.53 261	F 280	F 257 1.58 1.58	
	6: Trafalgar Rd & Cornwall Rd	2023 Existing	TCS	LOS Delay V/C Q	F 81 0.83 66	D 38 0.50 82	D 38 0.50 82	D 52	F 121 0.81 37	D 45 0.57 83	D 45 0.42 48	D 50	F 330 1.48 60	F 52 0.73 109	F 52 0.73 109	F 111	D 114 1.05 124	F 157 0.29 384	F 157 0.29 384	F 157 0.29 384	F 116	F 86 0.99 0.99
		2028 Background	TCS	LOS Delay V/C Q	F 160 1.14 87	E 56 0.74 100	E 56 0.74 100	F 93	F 74 0.48 33	E 55 0.72 98	A 0.35 0	C 32	F 223 1.19 77	D 46 0.66 111	D 46 0.66 111	E 74	E 79 1.23 123	F 83 1.08 389	F 83 1.08 389	F 83 1.08 389	E 72	E 66 1.01 1.01
		2028 Total (PH 1)	TCS	LOS Delay V/C Q	F 160 1.14 87	E 56 0.75 102	E 56 0.75 102	F 93	F 74 0.48 33	E 55 0.73 99	A 0.35 0	C 32	F 223 1.19 77	D 47 0.68 114	D 47 0.68 114	E 75	E 79 1.22 122	F 82 0.91 391	F 82 0.91 391	F 82 0.91 391	E 70	E 66 1.02 1.02
		2033 Background	TCS	LOS Delay V/C Q	F 249 1.36 102	E 59 0.82 115	E 59 0.82 115	F 126	F 95 0.70 47	E 61 0.82 113	A 0.41 0	D 36	F 273 1.33 86	E 64 0.89 157	E 64 0.89 157	F 95	F 86 0.98 121	F 179 0.32 29	F 179 0.32 29	F 179 0.32 29	F 119	F 96 1.21 1.21
		2033 Total (PH 1)	TCS	LOS Delay V/C Q	F 249 1.36 102	E 60 0.83 116	E 60 0.83 116	F 126	F 95 0.70 47	E 61 0.82 113	A 0.41 0	D 36	F 273 1.33 86	E 64 0.89 158	E 64 0.89 158	F 95	F 89 0.98 114	F 186 0.34 329	F 186 0.34 329	F 186 0.34 329	F 123	F 98 1.22 1.22
		2038 Background	TCS	LOS Delay V/C Q	F 297 1.47 111	E 65 0.88 134	E 65 0.88 134	F 147	F 101 0.74 51	E 67 0.89 133	A 0.45 0	D 39	F 246 1.27 90	F 78 0.98 183	F 78 0.98 183	F 103	F 133 1.20 120	F 264 1.52 357	F 264 1.52 357	F 264 1.52 357	F 177	F 126 1.34 1.34
		2038 Total (PH 1)	TCS	LOS Delay V/C Q	F 297 1.47 111	E 65 0.89 136	E 65 0.89 136	F 147	F 101 0.74 51	E 67 0.90 134	A 0.45 0	D 39	F 246 1.27 90	F 86 1.01 188	F 86 1.01 188	F 110	F 124 1.09 116	F 272 1.53 340	F 272 1.53 340	F 272 1.53 340	F 177	F 127 1.35 1.35
		2038 Total (PH 1+2)	TCS	LOS Delay V/C Q	F 297 1.47 111	E 67 0.90 139	E 67 0.90 139	F 148	F 101 0.74 51	E 68 0.90 134	A 0.45 0	D 39	F 246 1.27 90	F 87 1.01 189	F 87 1.01 189	F 110	F 124 1.09 112	F 286 1.55 322	F 286 1.55 322	F 286 1.55 322	F 184	F 130 1.36 1.36
2043 Background		TCS	LOS Delay V/C Q	F 363 1.62 124	E 73 0.95 154	E 73 0.95 154	F 176	F 137 0.92 61	F 83 0.99 156	A 0.49 0	D 49	F 297 1.40 99	D 44 0.78 159	D 44 0.78 159	F 81	F 515 1.96 163	F 325 1.68 376	F 325 1.68 376	F 325 1.68 376	F 360	F 205 1.58 1.58	
2043 Total (PH 1+2)	TCS	LOS Delay V/C Q	F 363 1.62 124	E 77 0.97 160	E 77 0.97 160	F 177	F 137 0.92 61	F 84 0.99 157	A 0.49 0	D 50	F 297 1.40 99	D 44 0.78 160	D 44 0.78 160	F 81	F 526 1.98 153	F 341 1.71 352	F 341 1.71 352	F 341 1.71 352	F 372	F 211 1.6 1.6		

MOE - Measure of Effectiveness
 LOS - Level of Service
 Delay - Average Delay per Vehicle in Seconds

Q - 95th Percentile Queue Length
 Ex - Existing Available Storage
 Avail. - Available Storage

TCS - Traffic Control Signal
 TWSC - Two-Way Stop Control
 AWSC - All-Way Stop Control

RBT - Roundabout



TABLE 11.3B: PM PEAK HOUR OPERATIONS (3 OF 11)

Peak Hour	Intersection	Horizon	Control Type	MOE	Direction / Movement / Approach																Overall
					Eastbound				Westbound				Northbound				Southbound				
					Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
PM Peak Hour	5: Trafalgar Rd & Cross Ave/South Service Rd	2023 Existing	TCS	LOS Delay V/C Q	E 55 0.79 102	C 26 0.15 18	C 26 0.15 18	D 49	E 68 0.60 36	E 55 0.26 29	E 55 0.25 30	E 58	D 46 0.60 26	D 52 0.73 124	D 52 0.73 124	D 51	D 41 0.48 30	D 40 0.77 194	D 40 0.77 194	D 40	D 47 0.72
		2028 Background	TCS	LOS Delay V/C Q	E 57 0.84 114	C 24 0.16 19	C 24 0.16 19	D 50	E 69 0.62 38	E 54 0.28 30	E 55 0.34 37	E 58	D 47 0.68 32	E 56 0.84 158	E 56 0.84 158	E 55	D 50 0.58 30	D 52 0.89 229	D 52 0.89 229	D 52	D 53 0.8
		2028 Total (PH 1)	TCS	LOS Delay V/C Q	E 68 0.93 143	C 25 0.17 22	C 25 0.17 22	E 60	E 79 0.70 43	E 56 0.31 33	E 60 0.51 50	E 63	D 58 0.77 33	D 45 0.81 132	D 45 0.81 132	D 46	D 47 0.61 25	D 42 0.86 151	D 42 0.86 151	D 42	D 48 0.83
		2033 Background	TCS	LOS Delay V/C Q	F 188 1.28 233	C 26 0.28 39	C 26 0.28 39	F 156	F 91 0.78 53	E 58 0.51 52	E 58 0.45 48	E 65	F 109 1.10 71	D 52 0.92 141	D 52 0.92 141	E 59	D 50 0.73 22	F 143 1.19 268	F 143 1.19 268	F 138	F 108 1.12
		2033 Total (PH 1)	TCS	LOS Delay V/C Q	F 213 1.34 253	C 26 0.28 38	C 26 0.28 38	F 178	F 91 0.78 53	E 58 0.51 52	E 58 0.45 48	E 65	F 157 1.22 82	D 53 0.94 140	D 53 0.94 140	E 67	D 50 0.74 21	F 145 1.20 256	F 145 1.20 256	F 140	F 117 1.16
		2038 Background	TCS	LOS Delay V/C Q	F 285 1.50 281	C 27 0.32 46	C 27 0.32 46	F 235	F 100 0.83 58	E 59 0.54 57	E 59 0.53 56	E 67	F 252 1.44 99	E 56 0.99 141	E 56 0.99 141	F 84	D 52 0.83 22	F 187 1.30 267	F 187 1.30 267	F 181	F 150 1.33
		2038 Total (PH 1)	TCS	LOS Delay V/C Q	F 328 1.60 304	C 27 0.32 46	C 27 0.32 46	F 273	F 100 0.83 58	E 59 0.55 57	E 59 0.53 56	E 67	F 279 1.50 107	E 56 0.99 143	E 56 0.99 143	F 89	D 46 0.84 21	F 189 1.30 248	F 189 1.30 248	F 182	F 162 1.39
		2038 Total (PH 1+2)	TCS	LOS Delay V/C Q	F 349 1.65 323	C 26 0.32 45	C 26 0.32 45	F 293	F 100 0.83 58	E 59 0.55 58	E 59 0.56 56	E 67	F 272 1.48 110	E 61 1.00 146	E 61 1.00 146	F 94	D 49 0.84 20	F 217 1.36 239	F 217 1.36 239	F 208	F 179 1.4
		2043 Background	TCS	LOS Delay V/C Q	F 355 1.66 318	C 27 0.37 55	C 27 0.37 55	F 291	F 116 0.90 67	E 60 0.58 62	E 63 0.64 73	E 73	F 343 1.64 105	E 100 1.10 146	E 100 1.10 146	F 135	D 51 0.92 22	F 248 1.43 266	F 248 1.43 266	F 238	F 201 1.49
	2043 Total (PH 1+2)	TCS	LOS Delay V/C Q	F 417 1.80 361	C 27 0.37 54	C 27 0.37 54	F 348	F 116 0.90 67	E 60 0.59 63	E 63 0.64 73	E 73	F 396 1.76 118	E 109 1.12 150	E 109 1.12 150	F 153	D 56 0.93 21	F 266 1.47 238	F 266 1.47 238	F 256	F 229 1.6	
	6: Trafalgar Rd & Cornwall Rd	2023 Existing	TCS	LOS Delay V/C Q	F 97 0.99 107	D 44 0.55 84	D 44 0.55 84	E 69	E 73 0.55 43	E 73 0.93 146	A 1 0.27 0	D 49	F 121 0.85 42	E 62 0.92 183	E 62 0.92 183	E 67	F 93 0.90 106	D 46 0.98 306	A 7 0.31 10	D 53	E 58 0.97
		2028 Background	TCS	LOS Delay V/C Q	F 127 1.09 124	D 48 0.64 96	D 48 0.64 96	F 86	E 69 0.53 46	F 94 1.03 170	A 1 0.30 0	E 61	F 94 0.76 47	F 82 1.01 215	F 82 1.01 215	F 83	F 109 0.99 108	F 81 1.10 324	B 10 0.37 8	E 73	F 75 1.08
		2028 Total (PH 1)	TCS	LOS Delay V/C Q	F 127 1.09 124	D 48 0.64 96	D 48 0.64 96	F 86	E 69 0.53 46	F 97 1.04 172	A 1 0.31 0	E 63	F 94 0.76 47	F 78 1.00 215	F 78 1.00 215	E 79	F 126 1.04 117	F 89 1.11 347	C 23 0.37 29	F 85	F 78 1.1
		2033 Background	TCS	LOS Delay V/C Q	F 250 1.39 151	D 49 0.71 109	D 49 0.71 109	F 144	F 92 0.76 63	E 131 1.14 202	A 1 0.38 0	F 83	F 131 0.91 58	F 125 1.14 273	F 125 1.14 273	F 125	F 245 1.36 116	F 142 1.25 273	B 14 0.44 14	F 151	F 126 1.29
		2033 Total (PH 1)	TCS	LOS Delay V/C Q	F 250 1.39 151	D 50 0.71 110	D 50 0.71 110	F 144	F 92 0.76 63	F 135 1.15 204	A 1 0.39 0	F 84	F 131 0.91 58	F 129 1.15 277	F 129 1.15 277	F 129	F 247 1.36 116	F 145 1.26 275	B 14 0.44 14	F 153	F 128 1.29
		2038 Background	TCS	LOS Delay V/C Q	F 338 1.59 170	D 53 0.78 119	D 53 0.78 119	F 189	F 89 0.75 66	E 154 1.20 222	A 1 0.43 0	F 94	F 131 0.91 58	F 164 1.24 313	F 164 1.24 313	F 162	F 334 1.56 125	F 196 1.38 289	B 15 0.50 14	F 207	F 164 1.64
		2038 Total (PH 1)	TCS	LOS Delay V/C Q	F 338 1.59 170	D 54 0.78 120	D 54 0.78 120	F 189	F 89 0.75 66	E 158 1.21 225	A 1 0.43 0	F 97	F 131 0.91 58	F 157 1.23 313	F 157 1.23 313	F 155	F 368 1.63 128	F 198 1.38 290	B 13 0.50 11	F 220	F 168 1.42
		2038 Total (PH 1+2)	TCS	LOS Delay V/C Q	F 338 1.59 170	D 54 0.78 121	D 54 0.78 121	F 189	F 89 0.75 66	E 161 1.22 227	A 1 0.44 0	F 98	F 131 0.91 58	F 161 1.24 317	F 161 1.24 317	F 159	F 371 1.64 122	F 202 1.39 274	B 12 0.50 6	F 223	F 169 1.42
2043 Background		TCS	LOS Delay V/C Q	F 411 1.75 191	E 56 0.84 133	E 56 0.84 133	F 225	F 90 0.77 72	F 175 1.25 248	A 1 0.48 0	F 107	F 165 1.01 65	F 220 1.37 359	F 220 1.37 359	F 216	F 479 1.88 135	F 280 1.50 307	B 19 0.59 14	F 296	F 215 1.58	
2043 Total (PH 1+2)	TCS	LOS Delay V/C Q	F 457 1.86 194	E 59 0.87 142	E 59 0.87 142	F 248	F 90 0.77 72	F 182 1.27 252	A 1 0.48 0	F 110	F 165 1.01 65	F 203 1.33 358	F 203 1.33 358	F 200	F 530 1.99 135	F 275 1.56 295	B 14 0.59 6	F 312	F 222 1.61		

MOE - Measure of Effectiveness
 LOS - Level of Service
 Delay - Average Delay per Vehicle in Seconds

Q - 95th Percentile Queue Length
 Ex - Existing Available Storage
 Avail - Available Storage

TCS - Traffic Control Signal
 TWSC - Two-Way Stop Control
 AWSC - All-Way Stop Control

RBT - Roundabout



11.2.7 Royal Windsor Drive at QEW Eastbound Ramp

2023 Base Year Operations	Within Capacity	●
2028 Background Operations	Within Capacity	●
2028 Total Operations	Within Capacity	●
2033 Background Operations	Within Capacity	●
2033 Total Operations (PH 1)	Within Capacity	●
2038 Background Operations	Within Capacity	●
2038 Total Operations (PH 1)	Within Capacity	●
2038 Total Operations (PH 1+2)	Within Capacity	●
2043 Background Operations	Within Capacity	●
2043 Total Operations (PH 1+2)	Within Capacity	●

Individual movements at the signalized Canadian Road / South Service Road at Royal Windsor Drive / QEW ramps presently operate at LOS D or better during the weekday peak hours. Similar levels of operation are expected under future Background and Total traffic conditions with only a minor increase in delay resulting from site-generated traffic volumes.

A negligible volume of site traffic is expected to utilize Royal Windsor Drive QEW ramps to access the site due to the distance and diversion such a route would impose.

Critical Movements (V/C over 0.85 or Ramp V/C over 0.75)

- ▶ None



11.2.8 Kerr Street at QEW Eastbound Ramp

2023 Base Year Operations	Within Capacity	●
2028 Background Operations	Within Capacity	●
2028 Total Operations	Within Capacity	●
2033 Background Operations	Within Capacity	●
2033 Total Operations (PH 1)	Within Capacity	●
2038 Background Operations	Within Capacity	●
2038 Total Operations (PH 1)	Within Capacity	●
2038 Total Operations (PH 1+2)	Within Capacity	●
2043 Background Operations	Within Capacity	●
2043 Total Operations (PH 1+2)	Within Capacity	●

Individual movements at the signalized Kerr Street at QEW Eastbound Ramp presently operate at LOS B or better during the weekday peak hours. Similar levels of operation are expected under future Background and Total traffic conditions with only a minor increase in delay resulting from site-generated traffic volumes.

A negligible volume of site traffic is expected to utilize Kerr Street at the QEW Eastbound Ramp to access the site due to the distance and diversion such a route would impose.

Critical Movements (V/C over 0.85 or Ramp V/C over 0.75)

- ▶ None



TABLE 11.4A: AM PEAK HOUR OPERATIONS (4 OF 11)

Peak Hour	Intersection	Horizon	Control Type	MOE	Direction / Movement / Approach																		
					Eastbound				Westbound				Northbound				Southbound				Overall		
					Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach			
AM Peak Hour	7: South Service Road/Canadian Road & QEW EB Off-Ramp/Royal Windsor Drive	2023 Existing	TCS	LOS Delay V/C Q	A 4 0.03 2	A 6 0.24 31	A 6 0.24 31	A 6	A 3 0.13 6	A 5 0.23 29	A 4 0.01 0	A 5	D 38 0.01 2	D 38 0.05 6	D 38 0.03 0	D 38	D 38 0.02 3	D 39 0.10 10	D 38 0.02 0	D 38	A 8 0.21		
		2028 Background	TCS	LOS Delay V/C Q	A 4 0.04 2	A 7 0.27 34	A 7 0.27 34	A 7	A 4 0.15 7	A 6 0.26 32	A 5 0.01 0	A 6	D 37 0.01 2	D 37 0.04 6	D 37 0.03 0	D 37	D 37 0.02 3	D 37 0.09 10	D 37 0.02 0	D 37	A 9 0.23		
		2028 Total (PH 1)	TCS	LOS Delay V/C Q	A 4 0.04 2	A 7 0.27 34	A 7 0.27 34	A 7	A 4 0.15 7	A 6 0.26 32	A 5 0.01 0	A 6	D 37 0.01 2	D 37 0.04 6	D 37 0.03 0	D 37	D 37 0.02 3	D 37 0.09 10	D 37 0.02 0	D 37	A 9 0.23		
		2033 Background	TCS	LOS Delay V/C Q	A 4 0.04 2	A 7 0.29 38	A 7 0.29 38	A 7	A 4 0.17 7	A 5 0.29 36	A 0 0.01 0	A 6	D 38 0.01 2	D 38 0.05 7	D 38 0.04 0	D 38	D 38 0.02 4	D 38 0.10 11	D 38 0.02 0	D 38	A 9 0.26		
		2033 Total (Ph 1)	TCS	LOS Delay V/C Q	A 4 0.04 2	A 7 0.29 38	A 7 0.29 38	A 7	A 4 0.17 7	A 5 0.29 36	A 0 0.01 0	A 6	D 38 0.01 2	D 38 0.05 7	D 38 0.04 0	D 38	D 38 0.02 4	D 38 0.10 11	D 38 0.02 0	D 38	A 9 0.26		
		2038 Background	TCS	LOS Delay V/C Q	A 4 0.05 2	A 8 0.33 42	A 8 0.33 42	A 8	A 4 0.19 8	A 5 0.31 39	A 0 0.01 0	A 7	D 38 0.02 3	D 38 0.05 7	D 38 0.04 0	D 38	D 38 0.02 4	D 38 0.11 12	D 38 0.02 0	D 38	A 10 0.28		
		2038 Total (PH 1)	TCS	LOS Delay V/C Q	A 4 0.05 2	A 8 0.33 42	A 8 0.33 42	A 8	A 4 0.19 8	A 5 0.31 39	A 0 0.01 0	A 7	D 38 0.02 3	D 38 0.05 7	D 38 0.04 0	D 38	D 38 0.02 4	D 38 0.11 12	D 38 0.02 0	D 38	A 10 0.28		
		2038 Total (PH 1+2)	TCS	LOS Delay V/C Q	A 4 0.05 2	A 8 0.33 42	A 8 0.33 42	A 8	A 4 0.19 8	A 5 0.31 39	A 0 0.01 0	A 7	D 38 0.02 3	D 38 0.05 7	D 38 0.04 0	D 38	D 38 0.02 4	D 38 0.11 12	D 38 0.02 0	D 38	A 10 0.28		
		2043 Background	TCS	LOS Delay V/C Q	A 4 0.06 2	A 8 0.36 48	A 8 0.36 48	A 8	A 4 0.22 8	A 5 0.35 44	A 0 0.01 0	A 7	D 38 0.02 3	D 38 0.06 7	D 38 0.05 0	D 38	D 38 0.02 4	D 38 0.12 12	D 38 0.03 0	D 38	A 10 0.31		
		2043 Total (PH 1+2)	TCS	LOS Delay V/C Q	A 4 0.06 2	A 8 0.36 48	A 8 0.36 48	A 8	A 4 0.22 8	A 5 0.35 44	A 0 0.01 0	A 7	D 38 0.02 3	D 38 0.06 7	D 38 0.05 0	D 38	D 38 0.02 4	D 38 0.12 12	D 38 0.03 0	D 38	A 10 0.31		
AM Peak Hour	8: QEW WB Off-Ramp & Kerr Street	2023 Existing	TCS	LOS Delay V/C Q	A 10 0.31 20	A 10 0.31 20	A 10	A 9 0.19 13	A 9 0.19 13	A 9	B 11 0.33 25	B 9 0.16 10	A 10								A 10 0.32		
		2028 Background	TCS	LOS Delay V/C Q	A 10 0.34 22	A 10 0.34 22	A 10	A 9 0.21 14	A 9 0.21 14	A 9	B 11 0.36 28	B 10 0.24 14	B 10									A 10 0.35	
		2028 Total (PH 1)	TCS	LOS Delay V/C Q	A 10 0.34 22	A 10 0.34 22	A 10	A 9 0.21 14	A 9 0.21 14	A 9	B 11 0.36 28	B 10 0.24 14	B 10									A 10 0.35	
		2033 Background	TCS	LOS Delay V/C Q	B 10 0.38 25	B 10 0.38 25	B 10	A 9 0.23 15	A 9 0.23 15	A 9	B 11 0.40 31	B 11 0.32 19	B 11										B 10 0.39
		2033 Total (Ph 1)	TCS	LOS Delay V/C Q	B 10 0.38 25	B 10 0.38 25	B 10	A 9 0.23 15	A 9 0.23 15	A 9	B 11 0.40 31	B 11 0.32 19	B 11										B 10 0.39
		2038 Background	TCS	LOS Delay V/C Q	B 11 0.41 27	B 11 0.41 27	B 11	A 9 0.25 17	A 9 0.25 17	A 9	B 12 0.43 33	B 11 0.38 25	B 12										B 11 0.42
		2038 Total (PH 1)	TCS	LOS Delay V/C Q	B 11 0.41 27	B 11 0.41 27	B 11	A 9 0.25 17	A 9 0.25 17	A 9	B 12 0.43 33	B 11 0.38 25	B 12										B 11 0.42
		2038 Total (PH 1+2)	TCS	LOS Delay V/C Q	B 11 0.41 27	B 11 0.41 27	B 11	A 9 0.25 17	A 9 0.25 17	A 9	B 12 0.43 33	B 11 0.38 25	B 12										B 11 0.42
		2043 Background	TCS	LOS Delay V/C Q	B 11 0.45 30	B 11 0.45 30	B 11	A 10 0.27 18	A 10 0.27 18	A 10	B 12 0.48 37	B 12 0.47 32	B 12										B 11 0.46
		2043 Total (PH 1+2)	TCS	LOS Delay V/C Q	B 11 0.45 30	B 11 0.45 30	B 11	A 10 0.27 18	A 10 0.27 18	A 10	B 12 0.48 37	B 12 0.47 32	B 12										B 11 0.46

MOE - Measure of Effectiveness
 LOS - Level of Service
 Delay - Average Delay per Vehicle in Seconds
 Q - 95th Percentile Queue Length
 Ex. - Existing Available Storage
 Avail. - Available Storage
 TCS - Traffic Control Signal
 TWSC - Two-Way Stop Control
 AWSC - All-Way Stop Control
 RBT - Roundabout



TABLE 11.4B: PM PEAK HOUR OPERATIONS (4 OF 11)

Peak Hour	Intersection	Horizon	Control Type	MOE	Direction / Movement / Approach																Overall		
					Eastbound				Westbound				Northbound				Southbound						
					Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach			
PM Peak Hour	7: South Service Road/Canadian Road & QEW EB Off-Ramp/Royal Windsor Drive	2023 Existing	TCS	LOS Delay V/C Q	A 0.25 14	A 0.26 44	B 0.26 44	A 8	A 0.27 19	B 0.30 53	A 0.02 0	A 10	D 0.07 8	D 0.15 19	D 0.06 3	D 36	D 0.06 8	D 0.37 39	D 0.26 27	D 38	B 0.31		
		2028 Background	TCS	LOS Delay V/C Q	A 0.29 18	B 0.29 55	B 0.29 55	A 9	A 0.32 23	B 0.34 65	A 0.02 0	B 11	D 0.08 9	D 0.15 20	D 0.07 6	D 36	D 0.06 9	D 0.38 43	D 0.38 38	D 39	B 0.34		
		2028 Total (PH 1)	TCS	LOS Delay V/C Q	A 0.29 18	B 0.29 55	B 0.29 55	A 9	A 0.32 23	B 0.34 65	A 0.02 0	B 11	D 0.08 9	D 0.15 20	D 0.07 6	D 36	D 0.06 9	D 0.38 43	D 0.38 38	D 39	B 0.34		
		2033 Background	TCS	LOS Delay V/C Q	A 0.34 21	B 0.33 66	B 0.33 66	B 10	A 0.38 28	B 0.38 78	B 0.02 0	B 12	D 0.08 9	D 0.15 22	D 0.07 8	D 36	D 0.06 9	D 0.39 47	D 0.58 63	D 42	B 0.42		
		2033 Total (PH 1)	TCS	LOS Delay V/C Q	A 0.34 21	B 0.33 66	B 0.33 66	B 10	A 0.38 28	B 0.38 78	B 0.02 0	B 12	D 0.08 9	D 0.15 22	D 0.07 8	D 36	D 0.06 9	D 0.39 47	D 0.58 63	D 42	B 0.42		
		2038 Background	TCS	LOS Delay V/C Q	A 0.40 23	B 0.37 75	B 0.37 75	B 12	A 0.44 30	B 0.43 87	B 0.02 0	B 14	D 0.08 10	D 0.15 23	D 0.08 10	D 36	D 0.06 10	D 0.38 51	D 0.71 87	D 46	C 0.49		
		2038 Total (PH 1)	TCS	LOS Delay V/C Q	A 0.40 23	B 0.37 75	B 0.37 75	B 12	A 0.44 30	B 0.43 87	B 0.02 0	B 14	D 0.08 10	D 0.15 23	D 0.08 10	D 36	D 0.06 10	D 0.38 51	D 0.71 87	D 46	C 0.49		
		2038 Total (PH 1+2)	TCS	LOS Delay V/C Q	A 0.40 23	B 0.37 75	B 0.37 75	B 12	A 0.44 30	B 0.43 87	B 0.02 0	B 14	D 0.08 10	D 0.15 23	D 0.08 10	D 36	D 0.06 10	D 0.38 51	D 0.71 87	D 46	C 0.49		
		2043 Background	TCS	LOS Delay V/C Q	B 0.59 41	C 0.54 115	C 0.54 115	C 21	B 0.60 53	C 0.59 129	C 0.02 0	C 22	C 0.06 8	C 0.11 20	C 0.09 13	C 26	C 0.05 8	C 0.28 44	C 0.77 110	D 37	C 0.66		
	2043 Total (PH 1+2)	TCS	LOS Delay V/C Q	B 0.59 41	C 0.54 115	C 0.54 115	C 21	B 0.60 53	C 0.59 129	C 0.02 0	C 22	C 0.06 8	C 0.11 20	C 0.09 13	C 26	C 0.05 8	C 0.28 44	C 0.77 110	D 37	C 0.66			
	8: QEW WB Off-Ramp & Kerr Street	2023 Existing	TCS	LOS Delay V/C Q	A 0.19	A 0.28	A 0.19	A 10	B 0.47 31	B 0.11 31	B 0.11 31	B 11	A 0.16 13	A 0.16 10	A 9	A 9						B 0.31	
		2028 Background	TCS	LOS Delay V/C Q	A 0.21	A 0.31	A 0.21	A 10	B 0.52 35	B 0.12 35	B 0.12 35	B 12	A 0.17 14	A 0.20 12	A 9	A 9						B 0.36	
		2028 Total (PH 1)	TCS	LOS Delay V/C Q	A 0.21	A 0.31	A 0.21	A 10	B 0.52 35	B 0.12 35	B 0.12 35	B 12	A 0.17 14	A 0.20 12	A 9	A 9						B 0.36	
		2033 Background	TCS	LOS Delay V/C Q	B 0.23	B 0.35	B 0.23	B 10	B 0.57 40	B 0.12 40	B 0.12 40	B 12	A 0.19 15	B 0.28 17	A 10	A 10							B 0.43
		2033 Total (PH 1)	TCS	LOS Delay V/C Q	B 0.23	B 0.35	B 0.23	B 10	B 0.57 40	B 0.12 40	B 0.12 40	B 12	A 0.19 15	B 0.28 17	A 10	A 10							B 0.43
		2038 Background	TCS	LOS Delay V/C Q	B 0.25	B 0.38	B 0.25	B 10	B 0.62 44	B 0.13 44	B 0.13 44	B 13	A 0.20 16	B 0.35 21	A 10	B 10							B 0.48
		2038 Total (PH 1)	TCS	LOS Delay V/C Q	B 0.25	B 0.38	B 0.25	B 10	B 0.62 44	B 0.13 44	B 0.13 44	B 13	A 0.20 16	B 0.35 21	A 10	B 10							B 0.48
		2038 Total (PH 1+2)	TCS	LOS Delay V/C Q	B 0.25	B 0.38	B 0.25	B 10	B 0.62 44	B 0.13 44	B 0.13 44	B 13	A 0.20 16	B 0.35 21	A 10	B 10							B 0.48
2043 Background		TCS	LOS Delay V/C Q	B 0.28	B 0.41	B 0.28	B 11	B 0.68 49	B 0.14 49	B 0.14 49	B 14	A 0.23 18	B 0.43 28	A 10	B 11							B 0.55	
2043 Total (PH 1+2)	TCS	LOS Delay V/C Q	B 0.28	B 0.41	B 0.28	B 11	B 0.68 49	B 0.14 49	B 0.14 49	B 14	A 0.23 18	B 0.43 28	A 10	B 11							B 0.55		

MOE - Measure of Effectiveness
 LOS - Level of Service
 Delay - Average Delay per Vehicle in Seconds











Q - 95th Percentile Queue Length
 Ex. - Existing Available Storage
 Avail. - Available Storage

TCS - Traffic Control Signal
 TWSC - Two-Way Stop Control
 AWSC - All-Way Stop Control

RBT - Roundabout



11.2.9 Kerr Street at QEW Westbound Ramp

2023 Base Year Operations	Within Capacity	
2028 Background Operations	Within Capacity	
2028 Total Operations	Within Capacity	
2033 Background Operations	Approaching Capacity	
2033 Total Operations (PH 1)	Approaching Capacity	
2038 Background Operations	Approaching Capacity	
2038 Total Operations (PH 1)	Approaching Capacity	
2038 Total Operations (PH 1+2)	Approaching Capacity	
2043 Background Operations	Exceeding Capacity	
2043 Total Operations (PH 1+2)	Exceeding Capacity	

Individual movements at the signalized Kerr Street at QEW Westbound Ramp presently operate at LOS D or better during the weekday peak hours. The westbound left turn movement presently operates at LOS D with a v/c ratio of 0.76. Similar levels of operation are expected under the 2028 Background conditions. Under the 2033 Background conditions, the westbound right turn movement is projected to operate at LOS D with a v/c ratio of 0.82. Similar operations are expected under then 2038 Background conditions.

Under the 2043 Background conditions, the westbound left and right turn movements are projected to operate at LOS E with a v/c ratio exceeding 1.00. The southbound through movement is also noted to operate at LOS C with a v/c ratio of 0.91.

A negligible volume of site traffic is expected to utilize Kerr Street at the QEW Westbound Ramp to access the site due to the distance and diversion such a route would impose, thus site traffic does not impact delays at this intersection.

Critical Movements (V/C over 0.85 or Ramp V/C over 0.75)

- ▶ Westbound Left (2023 Base)
- ▶ Westbound Right (2033 Background)
- ▶ Southbound Through (2043 Background)



11.2.10 Dorval Drive at QEW Eastbound Ramp

2023 Base Year Operations	Within Capacity	●
2028 Background Operations	Within Capacity	●
2028 Total Operations	Within Capacity	●
2033 Background Operations	Within Capacity	●
2033 Total Operations (PH 1)	Within Capacity	●
2038 Background Operations	Within Capacity	●
2038 Total Operations (PH 1)	Within Capacity	●
2038 Total Operations (PH 1+2)	Within Capacity	●
2043 Background Operations	Approaching Capacity	●
2043 Total Operations (PH 1+2)	Approaching Capacity	●

Individual movements at the signalized Dorval Drive at QEW Eastbound Ramp presently operate at LOS D or better during the weekday peak hours. Similar levels of operation are expected under the 2028 and 2033 Background conditions.

Under the 2038 Background conditions, the eastbound right turn movement is projected to operate at LOS D with a v/c ratio of 0.75. Similar levels of operation are expected under the 2043 Background conditions, however the southbound through movement is projected to operate at LOS C with a v/c ratio of 0.92.

A negligible volume of site traffic is expected to utilize Dorval Drive at the QEW Eastbound Ramp to access the site due to the distance and diversion such a route would impose.

Critical Movements (V/C over 0.85 or Ramp V/C over 0.75)

- ▶ Eastbound Right (2038 Background)
- ▶ Southbound Through (2043 Background)



TABLE 11.5A: AM PEAK HOUR OPERATIONS (5 OF 11)

Peak Hour	Intersection	Horizon	Control Type	MOE	Direction / Movement / Approach												Overall				
					Eastbound				Westbound				Northbound					Southbound			
					Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach		Left	Through	Right	Approach
AM Peak Hour	9: Donval Drive & QEW WB Off-Ramp	2023 Existing	TCS	LOS Delay V/C Q					D 39 0.76 118	C 29 0.24 23	D 36	B 11 0.22 37	B 11	B 16 0.61 128	B 16	C 23 0.66					
		2028 Background	TCS	LOS Delay V/C Q					D 41 0.81 134	C 30 0.30 33	D 38	B 12 0.25 41	B 12	B 18 0.68 150	B 18	C 25 0.73					
		2028 Total (PH 1)	TCS	LOS Delay V/C Q					D 41 0.81 134	C 30 0.30 33	D 38	B 12 0.25 41	B 12	B 18 0.68 150	B 18	C 25 0.73					
		2033 Background	TCS	LOS Delay V/C Q					D 45 0.88 155	C 31 0.43 58	D 41	B 12 0.27 45	B 12	C 21 0.76 177	C 21	C 28 0.81					
		2033 Total (Ph 1)	TCS	LOS Delay V/C Q					D 45 0.88 155	C 31 0.43 58	D 41	B 12 0.27 45	B 12	C 21 0.76 177	C 21	C 28 0.81					
		2038 Background	TCS	LOS Delay V/C Q					D 54 0.95 184	C 33 0.54 83	D 48	B 13 0.30 49	B 13	C 24 0.83 206	C 24	C 32 0.87					
		2038 Total (PH 1)	TCS	LOS Delay V/C Q					D 54 0.95 184	C 33 0.54 83	D 48	B 13 0.30 49	B 13	C 24 0.83 206	C 24	C 32 0.87					
		2038 Total (PH 1+2)	TCS	LOS Delay V/C Q					D 54 0.95 184	C 33 0.54 83	D 48	B 13 0.30 49	B 13	C 24 0.83 206	C 24	C 32 0.87					
		2043 Background	TCS	LOS Delay V/C Q					E 78 1.05 217	D 38 0.69 117	E 67	B 13 0.33 55	B 13	C 30 0.91 253	C 30	D 42 0.96					
		2043 Total (PH 1+2)	TCS	LOS Delay V/C Q					E 78 1.05 217	D 38 0.69 117	E 67	B 13 0.33 55	B 13	C 30 0.91 253	C 30	D 42 0.96					
	10: Donval Drive & QEW EB Off-Ramp	2023 Existing	TCS	LOS Delay V/C Q	C 35 0.45 43	D 40 0.64 69	D 37					A 6 0.27 43	A 6	A 9 0.57 119	A 9	B 14 0.59					
		2028 Background	TCS	LOS Delay V/C Q	C 34 0.47 48	D 41 0.68 81	D 37					A 7 0.30 54	A 7	B 11 0.65 156	B 11	B 16 0.66					
		2028 Total (PH 1)	TCS	LOS Delay V/C Q	C 34 0.47 48	D 41 0.68 81	D 37					A 7 0.30 54	A 7	B 11 0.65 156	B 11	B 16 0.66					
		2033 Background	TCS	LOS Delay V/C Q	C 34 0.49 54	D 42 0.71 92	D 37					A 9 0.35 66	A 9	B 15 0.74 205	B 15	B 18 0.73					
		2033 Total (Ph 1)	TCS	LOS Delay V/C Q	C 34 0.49 54	D 42 0.71 92	D 37					A 9 0.35 66	A 9	B 15 0.74 205	B 15	B 18 0.73					
		2038 Background	TCS	LOS Delay V/C Q	C 34 0.51 60	D 43 0.75 104	D 38					A 10 0.38 73	A 10	B 18 0.82 241	B 18	C 20 0.79					
		2038 Total (PH 1)	TCS	LOS Delay V/C Q	C 34 0.51 60	D 43 0.75 104	D 38					A 10 0.38 73	A 10	B 18 0.82 241	B 18	C 20 0.79					
		2038 Total (PH 1+2)	TCS	LOS Delay V/C Q	C 34 0.51 60	D 43 0.75 104	D 38					A 10 0.38 73	A 10	B 18 0.82 241	B 18	C 20 0.79					
2043 Background		TCS	LOS Delay V/C Q	C 34 0.54 67	D 46 0.78 118	D 38					B 11 0.43 83	B 11	C 27 0.92 319	C 27	C 25 0.88						
2043 Total (PH 1+2)		TCS	LOS Delay V/C Q	C 34 0.54 67	D 46 0.78 118	D 38					B 11 0.43 83	B 11	C 27 0.92 319	C 27	C 25 0.88						

MOE - Measure of Effectiveness
 LOS - Level of Service
 Delay - Average Delay per Vehicle in Seconds

Q - 95th Percentile Queue Length
 Ex - Existing Available Storage
 Avail. - Available Storage

TCS - Traffic Control Signal
 TWSC - Two-Way Stop Control
 AWSC - All-Way Stop Control

RBT - Roundabout



TABLE 11.5B: PM PEAK HOUR OPERATIONS (5 OF 11)

Peak Hour	Intersection	Horizon	Control Type	MOE	Direction / Movement / Approach												Overall				
					Eastbound				Westbound				Northbound					Southbound			
					Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach		Left	Through	Right	Approach
PM Peak Hour	9: Donval Drive & QEW WB Off-Ramp	2023 Existing	TCS	LOS Delay V/C Q					C 35 0.73 112	C 35 0.66 107	C 35	B 15 0.47 92	B 15	B 15 0.50 100	B 15	C 23 0.59					
		2028 Background	TCS	LOS Delay V/C Q					D 36 0.77 128	D 37 0.74 131	D 37	B 17 0.53 105	B 17	B 18 0.57 115	B 18	C 25 0.65					
		2028 Total (PH 1)	TCS	LOS Delay V/C Q					D 36 0.77 128	D 37 0.74 131	D 37	B 17 0.53 105	B 17	B 18 0.57 115	B 18	C 25 0.65					
		2033 Background	TCS	LOS Delay V/C Q					D 39 0.83 147	D 40 0.82 172	D 40	B 19 0.59 121	B 19	B 20 0.64 132	B 20	C 28 0.72					
		2033 Total (Ph 1)	TCS	LOS Delay V/C Q					D 39 0.83 147	D 40 0.82 172	D 40	B 19 0.59 121	B 19	B 20 0.64 132	B 20	C 28 0.72					
		2038 Background	TCS	LOS Delay V/C Q					D 43 0.89 168	D 46 0.90 202	D 46	C 21 0.65 136	C 21	C 22 0.70 150	C 22	C 31 0.78					
		2038 Total (PH 1)	TCS	LOS Delay V/C Q					D 43 0.89 168	D 46 0.90 202	D 46	C 21 0.65 136	C 21	C 22 0.70 150	C 22	C 31 0.78					
		2038 Total (PH 1+2)	TCS	LOS Delay V/C Q					D 43 0.89 168	D 46 0.90 202	D 46	C 21 0.65 136	C 21	C 22 0.70 150	C 22	C 31 0.78					
		2043 Background	TCS	LOS Delay V/C Q					E 57 0.98 209	E 64 1.01 242	E 64	C 23 0.72 158	C 23	C 24 0.77 176	C 24	D 39 0.87					
	2043 Total (PH 1+2)	TCS	LOS Delay V/C Q					E 57 0.98 209	E 64 1.01 242	E 64	C 23 0.72 158	C 23	C 24 0.77 176	C 24	D 39 0.87						
	10: Donval Drive & QEW EB Off-Ramp	2023 Existing	TCS	LOS Delay V/C Q	D 37 0.54 44	D 36 0.41 41	D 36				A 6 0.45 66	A 6	A 6 0.43 61	A 6	B 12 0.47						
		2028 Background	TCS	LOS Delay V/C Q	D 37 0.57 51	D 37 0.50 52	D 37				A 7 0.51 85	A 7	A 7 0.48 79	A 7	B 13 0.52						
		2028 Total (PH 1)	TCS	LOS Delay V/C Q	D 37 0.57 51	D 37 0.50 52	D 37				A 7 0.51 85	A 7	A 7 0.48 79	A 7	B 13 0.52						
		2033 Background	TCS	LOS Delay V/C Q	D 37 0.60 58	D 38 0.57 63	D 37				A 9 0.57 111	A 9	A 9 0.55 103	A 9	B 15 0.58						
		2033 Total (Ph 1)	TCS	LOS Delay V/C Q	D 37 0.60 58	D 38 0.57 63	D 37				A 9 0.57 111	A 9	A 9 0.55 103	A 9	B 15 0.58						
		2038 Background	TCS	LOS Delay V/C Q	D 37 0.62 64	D 38 0.61 71	D 37				B 11 0.63 142	B 11	B 10 0.60 130	B 10	B 16 0.63						
		2038 Total (PH 1)	TCS	LOS Delay V/C Q	D 37 0.62 64	D 38 0.61 71	D 37				B 11 0.63 142	B 11	B 10 0.60 130	B 10	B 16 0.63						
		2038 Total (PH 1+2)	TCS	LOS Delay V/C Q	D 37 0.62 64	D 38 0.61 71	D 37				B 11 0.63 142	B 11	B 10 0.60 130	B 10	B 16 0.63						
2043 Background		TCS	LOS Delay V/C Q	D 37 0.65 73	D 38 0.65 82	D 38				B 14 0.72 187	B 14	B 13 0.69 171	B 13	B 18 0.7							
2043 Total (PH 1+2)	TCS	LOS Delay V/C Q	D 37 0.65 73	D 38 0.65 82	D 38				B 14 0.72 187	B 14	B 13 0.69 171	B 13	B 18 0.7								

MOE - Measure of Effectiveness
 LOS - Level of Service
 Delay - Average Delay per Vehicle in Seconds

Q - 95th Percentile Queue Length
 Ex - Existing Available Storage
 Avail. - Available Storage

TCS - Traffic Control Signal
 TWSC - Two-Way Stop Control
 AWSC - All-Way Stop Control

RBT - Roundabout



11.2.11 Argus Road at South Service Road East

2023 Base Year Operations	Tolerable Delays	●
2028 Background Operations	Tolerable Delays	●
2028 Total Operations	Tolerable Delays	●
2033 Background Operations	Significant Delays	●
2033 Total Operations (PH 1)	Significant Delays	●
2038 Background Operations	Significant Delays	●
2038 Total Operations (PH 1)	Significant Delays	●
2038 Total Operations (PH 1+2)	Significant Delays	●
2043 Background Operations	Significant Delays	●
2043 Total Operations (PH 1+2)	Significant Delays	●

Individual movements at the unsignalized intersection of Argus Road and South Service Road East presently operate at LOS C or better during the weekday peak hours.

Under the 2028 Background traffic conditions, similar operations are projected. Under the 2033 background conditions, the southbound approach is forecast to operate at LOS F with a v/c ratio of 0.85. Similar operations are expected under then 2038 background conditions; however, the southbound approach is projected to operate with a v/c ratio over 1.00. By 2043 Background conditions, extensive delay is projected for the southbound approach due to high volumes of east-west traffic along Argus Road, leaving few gaps for southbound stop-controlled movements.

Regarding development traffic implications, the southbound approach is extremely sensitive to the addition of any traffic due to the high volumes of east-west traffic along Argus Road. As a result, the addition of site traffic under the 2033 Total horizon results in significant delays in the AM peak hour.

Critical Movements (LOS E/F)

- ▶ Southbound Left (2033 Background)
- ▶ Southbound Right (2033 Background)



11.2.12 South Service Road at Lyons Lane

2023 Base Year Operations	Tolerable Delays	●
2028 Background Operations	Tolerable Delays	●
2028 Total Operations	Tolerable Delays	●
2033 Background Operations	Tolerable Delays	●
2033 Total Operations	Tolerable Delays	●

Individual movements presently operate at LOS A during the weekday peak hours with similar levels of operation are expected under future Background and Total traffic conditions.

Critical Movements (LOS E/F)

- ▶ None



TABLE 11.6A: AM PEAK HOUR OPERATIONS (6 OF 11)

Peak Hour	Intersection	Horizon	Control Type	MOE	Direction / Movement / Approach																Overall					
					Eastbound				Westbound				Northbound				Southbound									
					Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach						
AM Peak Hour	11: Argus Rd & South Service Rd	2023 Existing	TWSC	LOS Delay V/C Q	A 3 0.01 0	A 3 0.01 0	A 3 0.01 0	A 3 0.01 0	A 3 0.01 0	A 3 0.01 0	A 3 0.01 0	A 3 0.01 0	A 3 0.01 0	A 3 0.01 0	A 3 0.01 0	A 3 0.01 0	A 3 0.01 0	A 3 0.01 0	A 3 0.01 0	A 3 0.01 0	A 3 0.01 0	C 15 0.07 2	C 15 0.07 2	C 15 0.07 2	C 15 0.07 2	
		2028 Background	TWSC	LOS Delay V/C Q	A 2 0.00 0	A 2 0.00 0	A 2 0.00 0	A 2 0.00 0	A 2 0.00 0	A 2 0.00 0	A 2 0.00 0	A 2 0.00 0	A 2 0.00 0	A 2 0.00 0	A 2 0.00 0	A 2 0.00 0	A 2 0.00 0	A 2 0.00 0	A 2 0.00 0	A 2 0.00 0	A 2 0.00 0	B 15 0.02 1	B 15 0.02 1	B 15 0.02 1	B 15 0.02 1	
		2028 Total (PH 1)	TWSC	LOS Delay V/C Q	A 2 0.00 0	A 2 0.00 0	A 2 0.00 0	A 2 0.00 0	A 2 0.00 0	A 2 0.00 0	A 2 0.00 0	A 2 0.00 0	A 2 0.00 0	A 2 0.00 0	A 2 0.00 0	A 2 0.00 0	A 2 0.00 0	A 2 0.00 0	A 2 0.00 0	A 2 0.00 0	A 2 0.00 0	C 21 0.40 15	C 21 0.40 15	C 21 0.40 15	C 21 0.40 15	
		2033 Background	TWSC	LOS Delay V/C Q	A 3 0.04 1	A 3 0.04 1	A 3 0.04 1	A 3 0.04 1	A 3 0.04 1	A 3 0.04 1	A 3 0.04 1	A 3 0.04 1	A 3 0.04 1	A 3 0.04 1	A 3 0.04 1	A 3 0.04 1	A 3 0.04 1	A 3 0.04 1	A 3 0.04 1	A 3 0.04 1	A 3 0.04 1	A 3 0.04 1	F 63 0.85 57	F 63 0.85 57	F 63 0.85 57	F 63 0.85 57
		2033 Total (Ph 1)	TWSC	LOS Delay V/C Q	A 3 0.04 1	A 3 0.04 1	A 3 0.04 1	A 3 0.04 1	A 3 0.04 1	A 3 0.04 1	A 3 0.04 1	A 3 0.04 1	A 3 0.04 1	A 3 0.04 1	A 3 0.04 1	A 3 0.04 1	A 3 0.04 1	A 3 0.04 1	A 3 0.04 1	A 3 0.04 1	A 3 0.04 1	A 3 0.04 1	F 233 1.39 163	F 233 1.39 163	F 233 1.39 163	F 233 1.39 163
		2038 Background	TWSC	LOS Delay V/C Q	A 4 0.07 2	A 4 0.07 2	A 4 0.07 2	A 4 0.07 2	A 4 0.07 2	A 4 0.07 2	A 4 0.07 2	A 4 0.07 2	A 4 0.07 2	A 4 0.07 2	A 4 0.07 2	A 4 0.07 2	A 4 0.07 2	A 4 0.07 2	A 4 0.07 2	A 4 0.07 2	A 4 0.07 2	A 4 0.07 2	F 216 1.33 132	F 216 1.33 132	F 216 1.33 132	F 216 1.33 132
		2038 Total (PH 1)	TWSC	LOS Delay V/C Q	A 5 0.07 2	A 5 0.07 2	A 5 0.07 2	A 5 0.07 2	A 5 0.07 2	A 5 0.07 2	A 5 0.07 2	A 5 0.07 2	A 5 0.07 2	A 5 0.07 2	A 5 0.07 2	A 5 0.07 2	A 5 0.07 2	A 5 0.07 2	A 5 0.07 2	A 5 0.07 2	A 5 0.07 2	A 5 0.07 2	F 263 1.44 150	F 263 1.44 150	F 263 1.44 150	F 263 1.44 150
		2038 Total (PH 1+2)	TWSC	LOS Delay V/C Q	A 5 0.07 2	A 5 0.07 2	A 5 0.07 2	A 5 0.07 2	A 5 0.07 2	A 5 0.07 2	A 5 0.07 2	A 5 0.07 2	A 5 0.07 2	A 5 0.07 2	A 5 0.07 2	A 5 0.07 2	A 5 0.07 2	A 5 0.07 2	A 5 0.07 2	A 5 0.07 2	A 5 0.07 2	A 5 0.07 2	F 332 1.60 176	F 332 1.60 176	F 332 1.60 176	F 332 1.60 176
		2043 Background	TWSC	LOS Delay V/C Q	A 5 0.09 2	A 5 0.09 2	A 5 0.09 2	A 5 0.09 2	A 5 0.09 2	A 5 0.09 2	A 5 0.09 2	A 5 0.09 2	A 5 0.09 2	A 5 0.09 2	A 5 0.09 2	A 5 0.09 2	A 5 0.09 2	A 5 0.09 2	A 5 0.09 2	A 5 0.09 2	A 5 0.09 2	A 5 0.09 2	F 394 1.74 187	F 394 1.74 187	F 394 1.74 187	F 394 1.74 187
		2043 Total (PH 1 +2)	TWSC	LOS Delay V/C Q	A 6 0.09 2	A 6 0.09 2	A 6 0.09 2	A 6 0.09 2	A 6 0.09 2	A 6 0.09 2	A 6 0.09 2	A 6 0.09 2	A 6 0.09 2	A 6 0.09 2	A 6 0.09 2	A 6 0.09 2	A 6 0.09 2	A 6 0.09 2	A 6 0.09 2	A 6 0.09 2	A 6 0.09 2	A 6 0.09 2	F 547 2.08 233	F 547 2.08 233	F 547 2.08 233	F 547 2.08 233
AM Peak Hour	12: Lyons Lane & South Service Road	2023 Existing	TCS	LOS Delay V/C Q	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 9 0.01 0	A 9 0.01 0	A 9 0.01 0	A 9 0.01 0	
		2028 Background	TWSC	LOS Delay V/C Q	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 9 0.01 0	A 9 0.01 0	A 9 0.01 0	A 9 0.01 0	
		2028 Total (PH 1)	TWSC	LOS Delay V/C Q	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 9 0.02 1	A 9 0.02 1	A 9 0.02 1	A 9 0.02 1	
		2033 Background	TWSC	LOS Delay V/C Q	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 9 0.02 1	A 9 0.02 1	A 9 0.02 1	A 9 0.02 1
		2033 Total (Ph 1)	TWSC	LOS Delay V/C Q	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 9 0.04 1	A 9 0.04 1	A 9 0.04 1	A 9 0.04 1

MOE - Measure of Effectiveness
 LOS - Level of Service
 Delay - Average Delay per Vehicle in Seconds

Q - 95th Percentile Queue Length
 Ex. - Existing Available Storage
 Avail. - Available Storage

TCS - Traffic Control Signal
 TWSC - Two-Way Stop Control
 AWSC - All-Way Stop Control

RBT - Roundabout



TABLE 11.6B: PM PEAK HOUR OPERATIONS (6 OF 11)

Peak Hour	Intersection	Horizon	Control Type	MOE	Direction / Movement / Approach																Overall
					Eastbound				Westbound				Northbound				Southbound				
					Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
PM Peak Hour	11: Argus Rd & South Service Rd	2023 Existing	TWSC	LOS Delay V/C Q	A 4 0.01 0	A 4 0.01 0	A 4 0.01 0	A 4 0.01 0	A 0 0.23 0	A 0 0.23 0	A 0 0.23 0	A 0 0.23 0			B 11 0.04 1	B 11 0.04 1	B 11 0.04 1				
		2028 Background	TWSC	LOS Delay V/C Q	A 4 0.01 0	A 4 0.01 0	A 4 0.01 0	A 4 0.01 0	A 0 0.26 0	A 0 0.26 0	A 0 0.26 0	A 0 0.26 0			B 11 0.05 1	B 11 0.05 1	B 11 0.05 1				
		2028 Total (PH 1)	TWSC	LOS Delay V/C Q	A 5 0.01 0	A 5 0.01 0	A 5 0.01 0	A 5 0.01 0	A 0 0.34 0	A 0 0.34 0	A 0 0.34 0	A 0 0.34 0			B 13 0.20 6	B 13 0.20 6	B 13 0.20 6				
		2033 Background	TWSC	LOS Delay V/C Q	A 6 0.06 2	A 6 0.06 2	A 6 0.06 2	A 6 0.06 2	A 0 0.55 0	A 0 0.55 0	A 0 0.55 0	A 0 0.55 0			C 24 0.43 17	C 24 0.43 17	C 24 0.43 17				
		2033 Total (Ph 1)	TWSC	LOS Delay V/C Q	A 6 0.07 2	A 6 0.07 2	A 6 0.07 2	A 6 0.07 2	A 0 0.63 0	A 0 0.63 0	A 0 0.63 0	A 0 0.63 0			E 40 0.71 41	E 40 0.71 41	E 40 0.71 41				
		2038 Background	TWSC	LOS Delay V/C Q	A 5 0.02 1	A 5 0.02 1	A 5 0.02 1	A 5 0.02 1	A 0 0.54 0	A 0 0.54 0	A 0 0.54 0	A 0 0.54 0			C 22 0.46 18	C 22 0.46 18	C 22 0.46 18				
		2038 Total (PH 1)	TWSC	LOS Delay V/C Q	A 6 0.02 1	A 6 0.02 1	A 6 0.02 1	A 6 0.02 1	A 0 0.62 0	A 0 0.62 0	A 0 0.62 0	A 0 0.62 0			D 26 0.53 23	D 26 0.53 23	D 26 0.53 23				
		2038 Total (PH 1+2)	TWSC	LOS Delay V/C Q	A 6 0.02 1	A 6 0.02 1	A 6 0.02 1	A 6 0.02 1	A 0 0.70 0	A 0 0.70 0	A 0 0.70 0	A 0 0.70 0			D 32 0.60 30	D 32 0.60 30	D 32 0.60 30				
		2043 Background	TWSC	LOS Delay V/C Q	A 6 0.02 1	A 6 0.02 1	A 6 0.02 1	A 6 0.02 1	A 0 0.60 0	A 0 0.60 0	A 0 0.60 0	A 0 0.60 0			D 28 0.56 26	D 28 0.56 26	D 28 0.56 26				
		2043 Total (PH 1 +2)	TWSC	LOS Delay V/C Q	A 6 0.03 1	A 6 0.03 1	A 6 0.03 1	A 6 0.03 1	A 0 0.76 0	A 0 0.76 0	A 0 0.76 0	A 0 0.76 0			E 46 0.74 43	E 46 0.74 43	E 46 0.74 43				
	2023 Existing	TCS	LOS Delay V/C Q	A 3 0.00 0	A 3 0.00 0	A 3 0.00 0	A 3 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0			A 9 0.02 1	A 9 0.02 1	A 9 0.02 1					
	2028 Background	TWSC	LOS Delay V/C Q	A 3 0.00 0	A 3 0.00 0	A 3 0.00 0	A 3 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0			A 9 0.02 1	A 9 0.02 1	A 9 0.02 1					
	2028 Total (PH 1)	TWSC	LOS Delay V/C Q	A 3 0.00 0	A 3 0.00 0	A 3 0.00 0	A 3 0.00 0	A 0 0.02 0	A 0 0.02 0	A 0 0.02 0	A 0 0.02 0			A 9 0.03 1	A 9 0.03 1	A 9 0.03 1					
	2033 Background	TWSC	LOS Delay V/C Q	A 2 0.00 0	A 2 0.00 0	A 2 0.00 0	A 2 0.00 0	A 0 0.02 0	A 0 0.02 0	A 0 0.02 0	A 0 0.02 0			A 9 0.06 2	A 9 0.06 2	A 9 0.06 2					
	2033 Total (Ph 1)	TWSC	LOS Delay V/C Q	A 3 0.00 0	A 3 0.00 0	A 3 0.00 0	A 3 0.00 0	A 0 0.04 0	A 0 0.04 0	A 0 0.04 0	A 0 0.04 0			A 9 0.07 2	A 9 0.07 2	A 9 0.07 2					
	2023 Existing	TCS	LOS Delay V/C Q	A 3 0.00 0	A 3 0.00 0	A 3 0.00 0	A 3 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0			A 9 0.02 1	A 9 0.02 1	A 9 0.02 1					
	2028 Background	TWSC	LOS Delay V/C Q	A 3 0.00 0	A 3 0.00 0	A 3 0.00 0	A 3 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0			A 9 0.02 1	A 9 0.02 1	A 9 0.02 1					
	2028 Total (PH 1)	TWSC	LOS Delay V/C Q	A 3 0.00 0	A 3 0.00 0	A 3 0.00 0	A 3 0.00 0	A 0 0.02 0	A 0 0.02 0	A 0 0.02 0	A 0 0.02 0			A 9 0.03 1	A 9 0.03 1	A 9 0.03 1					
	2033 Background	TWSC	LOS Delay V/C Q	A 2 0.00 0	A 2 0.00 0	A 2 0.00 0	A 2 0.00 0	A 0 0.02 0	A 0 0.02 0	A 0 0.02 0	A 0 0.02 0			A 9 0.06 2	A 9 0.06 2	A 9 0.06 2					
2033 Total (Ph 1)	TWSC	LOS Delay V/C Q	A 3 0.00 0	A 3 0.00 0	A 3 0.00 0	A 3 0.00 0	A 0 0.04 0	A 0 0.04 0	A 0 0.04 0	A 0 0.04 0			A 9 0.07 2	A 9 0.07 2	A 9 0.07 2						

MOE - Measure of Effectiveness
LOS - Level of Service
Delay - Average Delay per Vehicle in Seconds

Q - 95th Percentile Queue Length
Ex. - Existing Available Storage
Avail. - Available Storage

TCS - Traffic Control Signal
TWSC - Two-Way Stop Control
AWSC - All-Way Stop Control

RBT - Roundabout



11.2.13 Cross Avenue at Argus Road/GO Station Driveway

2023 Base Year Operations	Within Capacity	●
2028 Background Operations	Approaching Capacity	●
2028 Total Operations	Approaching Capacity	●
2033 Background Operations	Exceeding Capacity	●
2033 Total Operations (PH 1)	Exceeding Capacity	●
2038 Background Operations	Exceeding Capacity	●
2038 Total Operations (PH 1)	Exceeding Capacity	●
2038 Total Operations (PH 1+2)	Exceeding Capacity	●
2043 Background Operations	Exceeding Capacity	●
2043 Total Operations (PH 1+2)	Exceeding Capacity	●

The majority of movements at Cross Avenue and Argus Road/GO Station Driveway's signalized intersection presently operate at LOS C or better during the weekday peak hours.

Under the 2028 Background conditions, the southbound shared through/right turn is projected to operate at LOS D with a v/c ratio of 0.89. Under the 2033 Background conditions, the southbound left turn and shared through right turn movement is projected to operate at LOS F with a v/c ratio exceeding 1.00.

Under the 2038 Background conditions, the implementation of the local road network alleviates some congestion at the intersection by allowing alternative routing in the study area. As a result, the southbound through/right turn movement is no longer identified as a critical movement, however the southbound left turn is projected to continue to operate at LOS F with a v/c ratio exceeding 1.00.

Under the 2043 Background traffic conditions, increased delay is projected, however no new critical movements are identified.

In terms of development traffic implications, similar operations are expected under the 2028-2043 Total conditions.

Critical Movements (V/C over 0.85 or Turn Lane V/C over 0.95)

- ▶ *Southbound Through/Right (2028 Background)
- ▶ Eastbound Through/Right (2033 Background)
- ▶ Southbound Left (2033 Background)

*Critical movement alleviated in 2038 with new internal road network



11.2.14 Cross Avenue at Lyons Lane/Future Street A

2023 Base Year Operations	Within Capacity	●
2028 Background Operations	Within Capacity	●
2028 Total Operations	Within Capacity	●
2033 Background Operations	Within Capacity	●
2033 Total Operations (PH 1)	Within Capacity	●
2038 Background Operations	Approaching Capacity	●
2038 Total Operations (PH 1)	Approaching Capacity	●
2038 Total Operations (PH 1+2)	Approaching Capacity	●
2043 Background Operations	Approaching Capacity	●
2043 Total Operations (PH 1+2)	Approaching Capacity	●

Individual movements at the signalized intersection of Cross Avenue and Lyons Lane presently operate at LOS C or better during the weekday peak hours. Northbound left-turn operations are forecast to degrade from LOS C to LOS E with a v/c ratio of 0.98 under the 2043 Background conditions.

Similar levels of operation are forecast between future Background and Total traffic conditions with only a minor increase in delay resulting from site-generated traffic volumes.

Critical Movements (V/C over 0.85 or Turn Lane V/C over 0.95)

- ▶ Northbound Left (2043 Background)



TABLE 11.7A: AM PEAK HOUR OPERATIONS (7 OF 11)

Peak Hour	Intersection	Horizon	Control Type	MOE	Direction / Movement / Approach																Overall
					Eastbound				Westbound				Northbound				Southbound				
					Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
AM Peak Hour	13: GO Bus Terminal/Argus Rd & Cross Ave	2023 Existing	TCS	LOS Delay V/C Q	B 19 0.28 8	B 19 0.45 38	B 19 0.45 38	B 19	B 11 0.24 8	B 12 0.44 43	B 12 0.44 43	B 12	E 67 0.75 11	B 15 0.09 0	B 15 0.09 0	C 34	B 15 0.16 14	C 30 0.81 37	C 30 0.81 37	C 28	C 20 0.64
		2028 Background	TCS	LOS Delay V/C Q	B 18 0.19 11	B 20 0.46 41	B 20 0.46 41	B 19	B 12 0.24 9	B 12 0.46 47	B 12 0.46 47	B 12	C 33 0.54 16	B 14 0.08 0	B 14 0.08 0	B 20	B 15 0.15 15	D 38 0.89 129	D 38 0.89 129	D 35	C 22 0.69
		2028 Total (PH 1)	TCS	LOS Delay V/C Q	B 18 0.19 11	B 20 0.46 41	B 20 0.46 41	B 19	B 12 0.24 9	B 12 0.46 47	B 12 0.46 47	B 12	C 33 0.54 16	B 14 0.08 0	B 14 0.08 0	B 20	B 18 0.45 41	D 38 0.89 130	D 38 0.89 130	C 33	C 22 0.69
		2033 Background	TCS	LOS Delay V/C Q	B 17 0.22 13	C 22 0.67 78	C 22 0.67 78	C 21	B 13 0.36 9	B 12 0.50 56	B 12 0.50 56	B 12	E 58 0.66 21	B 18 0.09 0	B 18 0.09 0	C 30	F 87 1.05 150	F 183 1.32 230	F 183 1.32 230	F 149	E 67 0.92
		2033 Total (PH 1)	TCS	LOS Delay V/C Q	B 17 0.22 13	C 22 0.67 78	C 22 0.67 78	C 21	B 13 0.36 9	B 12 0.50 57	B 12 0.50 57	B 12	E 58 0.66 21	B 18 0.09 0	B 18 0.09 0	C 30	F 213 1.38 206	F 184 1.32 231	F 184 1.32 231	F 196	F 89 0.95
		2038 Background	TCS	LOS Delay V/C Q	B 18 0.26 14	C 21 0.64 70	C 21 0.64 70	C 21	B 13 0.37 10	B 12 0.56 65	B 12 0.56 65	B 12	B 20 0.23 12	B 18 0.10 0	B 18 0.10 0	B 18	F 322 1.63 252	F 21 0.47 55	F 21 0.47 55	F 224	F 85 1.05
		2038 Total (PH 1)	TCS	LOS Delay V/C Q	B 17 0.25 14	C 22 0.70 86	C 22 0.70 86	C 22	B 13 0.41 10	B 12 0.54 65	B 12 0.54 65	B 12	C 22 0.25 12	B 19 0.10 0	B 19 0.10 0	B 20	F 358 1.71 252	F 23 0.49 55	F 23 0.49 55	F 248	F 90 1.09
		2038 Total (PH 1+2)	TCS	LOS Delay V/C Q	B 16 0.23 14	C 24 0.78 111	C 24 0.78 111	C 24	B 15 0.48 13	B 11 0.52 65	B 11 0.52 65	B 11	C 24 0.28 13	C 21 0.10 0	C 21 0.10 0	C 22	F 401 1.80 252	F 26 0.51 55	F 26 0.51 55	F 278	F 96 1.14
		2043 Background	TCS	LOS Delay V/C Q	B 18 0.31 16	C 22 0.68 80	C 22 0.68 80	C 22	B 13 0.43 10	B 13 0.60 74	B 13 0.60 74	B 13	C 22 0.31 14	B 19 0.10 0	B 19 0.10 0	B 20	F 426 1.87 282	F 25 0.59 71	F 25 0.59 71	F 295	F 110 1.16
	2043 Total (PH 1+2)	TCS	LOS Delay V/C Q	B 17 0.28 16	C 26 0.83 124	C 26 0.83 124	C 26	B 15 0.55 19	B 12 0.57 75	B 12 0.57 75	B 12	C 23 0.37 15	C 22 0.11 0	C 22 0.11 0	C 23	F 501 2.02 282	F 29 0.64 71	F 29 0.64 71	F 347	F 119 1.25	
	14: Lyons Lane/Street A & Cross Ave	2023 Existing	TCS	LOS Delay V/C Q	A 9 0.14 11	A 10 0.24 14	A 10 0.24 14	A 10	A 6 0.56 16	A 3 0.08 4	A 3 0.08 4	A 5	C 26 0.11 8	C 25 0.03 5	C 25 0.03 5	C 25	C 26 0.13 7	C 26 0.13 15	C 26 0.13 15	C 26	A 10 0.48
		2028 Background	TCS	LOS Delay V/C Q	A 9 0.12 12	A 9 0.22 16	A 9 0.22 16	A 9	A 5 0.44 19	A 3 0.07 5	A 3 0.07 5	A 4	C 25 0.10 9	C 24 0.03 6	C 24 0.03 6	C 25	C 25 0.10 8	C 25 0.14 15	C 25 0.14 15	C 25	A 9 0.38
		2028 Total (PH 1)	TCS	LOS Delay V/C Q	A 9 0.12 12	A 9 0.22 16	A 9 0.22 16	A 9	A 5 0.44 19	A 3 0.08 5	A 3 0.08 5	A 4	C 25 0.10 9	C 24 0.03 6	C 24 0.03 6	C 25	C 25 0.10 8	C 25 0.14 15	C 25 0.14 15	C 25	A 9 0.38
		2033 Background	TCS	LOS Delay V/C Q	A 9 0.15 14	A 10 0.30 23	A 10 0.30 23	A 10	A 6 0.53 22	A 3 0.11 7	A 3 0.11 7	A 5	C 25 0.11 9	C 25 0.03 6	C 25 0.03 6	C 25	C 25 0.11 9	C 25 0.16 16	C 25 0.16 16	C 25	A 10 0.46
		2033 Total (PH 1)	TCS	LOS Delay V/C Q	A 9 0.15 14	A 10 0.30 23	A 10 0.30 23	A 10	A 6 0.53 22	A 3 0.11 7	A 3 0.11 7	A 5	C 25 0.11 9	C 25 0.03 6	C 25 0.03 6	C 25	C 25 0.11 9	C 25 0.16 16	C 25 0.16 16	C 25	A 10 0.46
		2038 Background	TCS	LOS Delay V/C Q	B 12 0.25 27	B 11 0.29 26	B 11 0.29 26	B 11	A 7 0.57 32	A 4 0.12 10	A 4 0.12 10	A 6	C 25 0.14 10	C 24 0.03 6	C 24 0.03 6	C 25	C 28 0.40 27	C 26 0.21 21	C 26 0.21 21	C 27	B 12 0.54
		2038 Total (PH 1)	TCS	LOS Delay V/C Q	B 12 0.26 27	B 11 0.29 26	B 11 0.29 26	B 12	A 7 0.57 32	A 4 0.13 10	A 4 0.13 10	A 6	C 25 0.14 10	C 24 0.03 6	C 24 0.03 6	C 25	C 28 0.40 27	C 26 0.21 21	C 26 0.21 21	C 27	B 12 0.54
		2038 Total (PH 1+2)	TCS	LOS Delay V/C Q	B 12 0.26 27	B 11 0.29 26	B 11 0.29 26	B 12	A 7 0.57 32	A 4 0.14 12	A 4 0.14 12	A 5	C 25 0.14 10	C 24 0.03 6	C 24 0.03 6	C 25	C 28 0.40 27	C 26 0.21 21	C 26 0.21 21	C 27	B 12 0.54
2043 Background		TCS	LOS Delay V/C Q	B 13 0.29 31	B 12 0.32 30	B 12 0.32 30	B 12	A 9 0.66 38	A 4 0.13 11	A 4 0.13 11	A 7	C 25 0.16 11	C 25 0.03 7	C 25 0.03 7	C 25	C 29 0.43 29	C 26 0.23 22	C 26 0.23 22	C 27	B 13 0.61	
2043 Total (PH 1+2)	TCS	LOS Delay V/C Q	B 13 0.30 31	B 12 0.32 30	B 12 0.32 30	B 12	A 9 0.66 38	A 4 0.15 11	A 4 0.15 11	A 7	C 25 0.16 11	C 25 0.03 7	C 25 0.03 7	C 25	C 29 0.43 29	C 26 0.23 22	C 26 0.23 22	C 27	B 13 0.61		

MOE - Measure of Effectiveness
 LOS - Level of Service
 Delay - Average Delay per Vehicle in Seconds

Q - 95th Percentile Queue Length
 Ex - Existing Available Storage
 Avail. - Available Storage

TCS - Traffic Control Signal
 TWSC - Two-Way Stop Control
 AWSC - All-Way Stop Control

RBT - Roundabout



TABLE 11.7B: PM PEAK HOUR OPERATIONS (7 OF 11)

Peak Hour	Intersection	Horizon	Control Type	MOE	Direction / Movement / Approach																Overall
					Eastbound				Westbound				Northbound				Southbound				
					Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
PM Peak Hour	13: GO Bus Terminal/Argus Rd & Cross Ave	2023 Existing	TCS	LOS Delay V/C Q	B 11 0.04 5	B 16 0.64 85	B 16 0.64 85	B 16	A 0.24 7	A 0.21 23	A 0.21 23	A 6	C 0.13 7	C 0.08 9	C 0.08 9	C 21	C 0.53 42	C 0.17 18	C 0.17 18	C 23	B 15 0.55
		2028 Background	TCS	LOS Delay V/C Q	B 0.05 5	B 0.69 98	B 0.69 98	B 17	A 0.30 8	A 0.23 25	A 0.23 25	A 6	C 0.15 8	C 0.09 9	C 0.09 9	C 22	C 0.58 47	C 0.19 19	C 0.19 19	C 25	B 16 0.61
		2028 Total (PH 1)	TCS	LOS Delay V/C Q	B 0.05 5	B 0.71 98	B 0.71 98	B 19	A 0.32 8	A 0.25 26	A 0.25 26	A 8	C 0.13 8	C 0.09 9	C 0.09 9	C 21	C 0.74 75	C 0.22 19	C 0.18 19	C 29	B 19 0.67
		2033 Background	TCS	LOS Delay V/C Q	B 0.16 12	B 0.89 160	B 0.89 160	B 28	A 0.45 12	A 0.39 43	A 0.39 43	A 10	C 0.29 10	C 0.10 10	C 0.10 10	C 24	E 1.00 120	C 0.47 46	C 0.47 46	D 51	B 29 0.88
		2033 Total (PH 1)	TCS	LOS Delay V/C Q	B 0.16 12	B 0.89 160	B 0.89 160	B 28	A 0.45 12	A 0.39 44	A 0.39 44	A 10	C 0.29 10	C 0.10 10	C 0.10 10	C 24	F 1.21 152	C 0.48 48	C 0.48 48	F 91	D 40 0.95
		2038 Background	TCS	LOS Delay V/C Q	B 0.15 11	B 0.87 144	B 0.87 144	B 27	A 0.17 13	A 0.40 43	A 0.40 43	A 10	C 0.13 9	C 0.11 11	C 0.11 11	C 23	F 1.44 187	C 0.15 17	C 0.15 17	F 205	E 60 1.03
		2038 Total (PH 1)	TCS	LOS Delay V/C Q	B 0.15 11	B 0.92 170	B 0.92 170	B 31	A 0.47 13	A 0.41 45	A 0.41 45	A 10	C 0.13 9	C 0.11 11	C 0.11 11	C 23	F 1.45 187	C 0.15 17	C 0.15 17	F 208	E 61 1.05
		2038 Total (PH 1+2)	TCS	LOS Delay V/C Q	B 0.15 11	B 0.96 185	B 0.96 185	B 38	A 0.47 13	A 0.41 46	A 0.41 46	A 10	C 0.13 9	C 0.11 11	C 0.11 11	C 23	F 1.45 187	C 0.15 17	C 0.15 17	F 208	E 64 1.08
		2043 Background	TCS	LOS Delay V/C Q	B 0.17 11	B 0.96 183	B 0.96 183	B 37	A 0.53 17	A 0.44 50	A 0.44 50	B 10	C 0.15 10	C 0.12 11	C 0.12 11	C 23	F 1.61 209	C 0.16 17	C 0.16 17	F 265	E 77 1.14
	2043 Total (PH 1+2)	TCS	LOS Delay V/C Q	B 0.17 11	B 1.05 213	B 1.05 213	B 61	C 0.52 17	A 0.46 52	A 0.46 52	B 11	C 0.15 10	C 0.12 11	C 0.12 11	C 23	F 1.61 209	C 0.16 17	C 0.16 17	F 265	F 87 1.19	
	14: Lyons Lane/Street A & Cross Ave	2023 Existing	TCS	LOS Delay V/C Q	B 0.10 11	B 0.13 16	B 0.13 16	B 13	A 0.02 4	A 0.19 23	A 0.19 23	A 8	C 0.71 63	C 0.13 14	C 0.13 14	C 28	C 0.05 6	C 0.05 9	C 0.05 9	C 20	B 18 0.38
		2028 Background	TCS	LOS Delay V/C Q	B 0.12 12	B 0.15 18	B 0.15 18	B 14	A 0.03 4	A 0.21 25	A 0.21 25	A 8	C 0.75 72	C 0.14 15	C 0.14 15	C 29	C 0.06 7	C 0.06 9	C 0.06 9	B 20	B 18 0.43
		2028 Total (PH 1)	TCS	LOS Delay V/C Q	B 0.13 12	B 0.15 18	B 0.15 18	B 14	A 0.03 4	A 0.22 26	A 0.22 26	A 8	C 0.77 72	C 0.14 15	C 0.14 15	C 30	C 0.06 7	C 0.06 9	C 0.06 9	C 20	B 18 0.43
		2033 Background	TCS	LOS Delay V/C Q	B 0.16 14	B 0.23 26	B 0.23 26	B 16	A 0.03 4	A 0.29 34	A 0.29 34	A 10	D 0.79 89	C 0.16 15	C 0.16 15	C 30	B 0.07 7	C 0.06 10	C 0.06 10	B 19	B 19 0.5
		2033 Total (PH 1)	TCS	LOS Delay V/C Q	B 0.16 14	B 0.23 26	B 0.23 26	B 15	A 0.03 4	A 0.29 35	A 0.29 35	A 9	D 0.81 89	C 0.16 15	C 0.16 15	C 31	B 0.07 7	C 0.07 10	C 0.07 10	B 20	B 19 0.51
		2038 Background	TCS	LOS Delay V/C Q	B 0.21 17	B 0.22 24	B 0.22 24	B 17	A 0.04 5	A 0.28 32	A 0.28 32	B 11	D 0.86 105	C 0.17 16	C 0.17 16	C 34	B 0.15 14	C 0.10 12	C 0.10 12	B 19	C 21 0.54
		2038 Total (PH 1)	TCS	LOS Delay V/C Q	B 0.21 17	B 0.23 26	B 0.23 26	B 17	A 0.04 5	A 0.29 32	A 0.29 32	B 10	D 0.89 105	C 0.17 16	C 0.17 16	C 37	B 0.15 14	C 0.10 12	C 0.10 12	B 20	C 22 0.54
		2038 Total (PH 1+2)	TCS	LOS Delay V/C Q	B 0.21 17	B 0.25 27	B 0.25 27	B 17	A 0.04 5	A 0.29 32	A 0.29 32	B 10	D 0.89 105	C 0.17 16	C 0.17 16	C 37	B 0.15 14	C 0.10 12	C 0.10 12	B 20	C 22 0.55
2043 Background		TCS	LOS Delay V/C Q	B 0.25 19	B 0.24 27	B 0.24 27	B 17	A 0.04 5	A 0.31 35	A 0.31 35	B 11	E 0.98 123	C 0.19 17	C 0.19 17	D 49	B 0.17 15	C 0.11 13	C 0.11 13	B 19	C 27 0.61	
2043 Total (PH 1+2)	TCS	LOS Delay V/C Q	B 0.25 19	B 0.27 30	B 0.27 30	B 18	A 0.05 5	A 0.33 37	A 0.33 37	B 11	E 0.98 123	C 0.19 17	C 0.19 17	D 49	B 0.17 15	C 0.11 13	C 0.11 13	B 19	C 26 0.61		

MOE - Measure of Effectiveness
 LOS - Level of Service
 Delay - Average Delay per Vehicle in Seconds

Q - 95th Percentile Queue Length
 Ex - Existing Available Storage
 Avail. - Available Storage

TCS - Traffic Control Signal
 TWSC - Two-Way Stop Control
 AWSC - All-Way Stop Control

RBT - Roundabout



11.2.15 Cross Avenue at Lyons Lane (Three Leg)

2023 Base Year Operations	Tolerable Delays	●
2028 Background Operations	Tolerable Delays	●
2028 Total Operations	Tolerable Delays	●
2033 Background Operations	Tolerable Delays	●
2033 Total Operations	Tolerable Delays	●

Individual movements at the unsignalized intersection of Cross Avenue and Lyons Lane presently operate at LOS B or better during the weekday peak hours. Similar operations are expected under then 2028 Background conditions.

Under the 2033 Background conditions, similar operations are projected; the southbound approach is projected to degrade from LOS B to LOS C.

With additional traffic generated from the proposed development, similar operations are projected.

Critical Movements (LOS E/F)

- ▶ None



11.2.16 Cross Avenue at Cornwall Road/Speers Road

2023 Base Year Operations	Within Capacity	●
2028 Background Operations	Within Capacity	●
2028 Total Operations	Within Capacity	●
2033 Background Operations	Within Capacity	●
2033 Total Operations (PH 1)	Within Capacity	●
2038 Background Operations	Within Capacity	●
2038 Total Operations (PH 1)	Within Capacity	●
2038 Total Operations (PH 1+2)	Within Capacity	●
2043 Background Operations	Approaching Capacity	●
2043 Total Operations (PH 1+2)	Approaching Capacity	●

Individual movements at the signalized intersection of Cross Avenue and Cornwall Road/Speers Road presently operate at LOS B or better during the weekday peak hours.

Similar levels of operation are forecast in the future Background and Total traffic conditions with only a minor increase in delay resulting from site-generated traffic volumes.

Critical Movements (V/C over 0.85 or Turn Lane V/C over 0.95)

- ▶ None



TABLE 11.8A: AM PEAK HOUR OPERATIONS (8 OF 11)

Peak Hour	Intersection	Horizon	Control Type	MOE	Direction / Movement / Approach																Overall
					Eastbound				Westbound				Northbound				Southbound				
					Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
AM Peak Hour	15: Cross Ave & Lyons Lane	2023 Existing	TWSC	LOS Delay V/C Q	A 8 0.03 1	A 0 0.21 0	A 0 0 0	A 0 0.08 0	A 0 0.05 0	A 0 0 0	A 0 0 0	A 0 0 0	B 12 0.03 1	B 12 0.03 1	B 12 0.03 1	B 12 0.03 1					
		2028 Background	TWSC	LOS Delay V/C Q	A 8 0.02 1	A 0 0.14 0	A 0 0 0	A 0 0.09 0	A 0 0.05 0	A 0 0 0	A 0 0 0	A 0 0 0	B 12 0.02 1	B 12 0.02 1	B 12 0.02 1	B 12 0.02 1					
		2028 Total (PH 1)	TWSC	LOS Delay V/C Q	A 8 0.03 1	A 0 0.14 0	A 0 0 0	A 0 0.09 0	A 0 0.05 0	A 0 0 0	A 0 0 0	A 0 0 0	A 0 0 0	B 10 0.04 1	B 10 0.04 1	B 10 0.04 1	B 10 0.04 1				
		2033 Background	TWSC	LOS Delay V/C Q	A 8 0.03 1	A 0 0.16 0	A 0 0 0	A 0 0.11 0	A 0 0.07 0	A 0 0 0	A 0 0 0	A 0 0 0	A 0 0 0	B 14 0.26 8	B 14 0.26 8	B 14 0.26 8	B 14 0.26 8				
		2033 Total (PH 1)	TWSC	LOS Delay V/C Q	A 8 0.03 1	A 0 0.16 0	A 0 0 0	A 0 0.11 0	A 0 0.07 0	A 0 0 0	A 0 0 0	A 0 0 0	A 0 0 0	B 14 0.29 9	B 14 0.29 9	B 14 0.29 9	B 14 0.29 9				
	16: Speers Road/Cornwall Road & Cross Avenue	2023 Existing	TCS	LOS Delay V/C Q	A 4 0.34 14	A 3 0.25 20	A 3 0 0	A 3 0.32 39	A 9 0.32 39	A 9 0.32 39	A 9 0.32 39	A 9 0.32 39	A 9 0.32 39	C 31 0.03 4	C 31 0.09 11	C 31 0.09 11	C 31 0.09 11	A 0 0 0	A 10 0.34 0		
		2028 Background	TCS	LOS Delay V/C Q	A 4 0.40 16	A 3 0.27 22	A 3 0 0	A 3 0.36 45	A 10 0.36 45	A 10 0.36 45	A 10 0.36 45	A 10 0.36 45	A 10 0.36 45	C 31 0.04 5	C 31 0.10 11	C 31 0.10 11	C 31 0.10 11	A 0 0 0	A 10 0.39 0		
		2028 Total (PH 1)	TCS	LOS Delay V/C Q	A 4 0.41 16	A 3 0.27 23	A 4 0 0	A 4 0.36 45	A 10 0.36 45	A 10 0.36 45	A 10 0.36 45	A 10 0.36 45	A 10 0.36 45	C 31 0.08 7	C 31 0.10 12	C 31 0.10 12	C 31 0.10 12	A 0 0 0	A 10 0.4 0		
		2033 Background	TCS	LOS Delay V/C Q	A 5 0.49 19	A 4 0.30 27	A 4 0 0	A 4 0.42 58	A 11 0.42 58	A 11 0.42 58	A 11 0.42 58	A 11 0.42 58	A 11 0.42 58	C 31 0.10 8	C 31 0.14 13	C 31 0.14 13	C 31 0.14 13	A 0 0 0	B 11 0.48 0		
		2033 Total (PH 1)	TCS	LOS Delay V/C Q	A 5 0.50 20	A 4 0.30 27	A 4 0 0	A 4 0.42 59	A 11 0.42 59	A 11 0.42 59	A 11 0.42 59	A 11 0.42 59	A 11 0.42 59	C 31 0.14 10	C 31 0.14 13	C 31 0.14 13	C 31 0.14 13	A 0 0 0	B 11 0.48 0		
		2038 Background	TCS	LOS Delay V/C Q	A 6 0.55 22	A 4 0.33 30	A 4 0 0	A 4 0.46 69	A 12 0.46 69	A 12 0.46 69	A 12 0.46 69	A 12 0.46 69	A 12 0.46 69	C 31 0.11 8	C 31 0.15 14	C 31 0.15 14	C 31 0.15 14	A 0 0 0	B 12 0.53 0		
		2038 Total (PH 1)	TCS	LOS Delay V/C Q	A 6 0.55 22	A 4 0.33 30	A 4 0 0	A 4 0.47 70	A 13 0.47 70	A 13 0.47 70	A 13 0.47 70	A 13 0.47 70	A 13 0.47 70	C 31 0.14 10	C 31 0.16 14	C 31 0.16 14	C 31 0.16 14	A 0 0 0	B 12 0.53 0		
		2038 Total (PH 1+2)	TCS	LOS Delay V/C Q	A 6 0.56 22	A 4 0.33 31	A 4 0 0	A 4 0.47 71	A 13 0.47 71	A 13 0.47 71	A 13 0.47 71	A 13 0.47 71	A 13 0.47 71	C 31 0.19 13	C 31 0.16 14	C 31 0.16 14	C 31 0.16 14	A 0 0 0	B 12 0.55 0		
		2043 Background	TCS	LOS Delay V/C Q	A 8 0.61 34	A 4 0.36 35	A 5 0 0	A 5 0.54 84	A 15 0.54 84	A 15 0.54 84	A 15 0.54 84	A 15 0.54 84	A 15 0.54 84	C 31 0.12 9	C 31 0.17 14	C 31 0.17 14	C 31 0.17 14	A 0 0 0	B 13 0.59 0		
	2043 Total (PH 1+2)	TCS	LOS Delay V/C Q	A 9 0.63 36	A 4 0.36 35	A 5 0 0	A 5 0.55 85	A 15 0.55 85	A 15 0.55 85	A 15 0.55 85	A 15 0.55 85	A 15 0.55 85	C 31 0.20 13	C 31 0.18 14	C 31 0.18 14	C 31 0.18 14	A 0 0 0	B 14 0.61 0			

MOE - Measure of Effectiveness
 LOS - Level of Service
 Delay - Average Delay per Vehicle in Seconds

Q - 95th Percentile Queue Length
 Ex. - Existing Available Storage
 Avail. - Available Storage

TCS - Traffic Control Signal
 TWSC - Two-Way Stop Control
 AWS - All-Way Stop Control

RBT - Roundabout



TABLE 11.8B: PM PEAK HOUR OPERATIONS (8 OF 11)

Peak Hour	Intersection	Horizon	Control Type	MOE	Direction / Movement / Approach																
					Eastbound				Westbound				Northbound				Southbound				Overall
					Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
PM Peak Hour	15: Cross Ave & Lyons Lane	2023 Existing	TWSC	LOS Delay V/C Q	A 9 0.01 0	A 0 0.06 0	A 0 0	0	A 0 0.25 0	A 0 0.13 0					B 12 0.08 2	B 12 0.08 2	B 12 0.08 2				
		2028 Background	TWSC	LOS Delay V/C Q	A 9 0.01 0	A 0 0.07 0	A 0 0	0	A 0 0.28 0	A 0 0.15 0					B 13 0.10 3	B 13 0.10 3	B 13 0.10 3				
		2028 Total (PH 1)	TWSC	LOS Delay V/C Q	A 10 0.03 1	A 0 0.07 0	A 0 0	1	A 0 0.28 0	A 0 0.15 0					B 13 0.12 3	B 13 0.12 3	B 13 0.12 3				
		2033 Background	TWSC	LOS Delay V/C Q	B 10 0.06 2	A 0 0.09 0	A 0 0	1	A 0 0.32 0	A 0 0.20 0					C 17 0.26 8	C 17 0.26 8	C 17 0.26 8				
		2033 Total (Ph 1)	TWSC	LOS Delay V/C Q	B 10 0.09 2	A 0 0.09 0	A 0 0	2	A 0 0.32 0	A 0 0.21 0					C 18 0.29 10	C 18 0.29 10	C 18 0.29 10				
	16: Speers Road/Cornwall Road & Cross Avenue	2023 Existing	TCS	LOS Delay V/C Q	A 5 0.50 19	A 3 0.28 26	A 4 0	4	B 11 0.44 62	B 11 0.44 62	B 11 0				C 31 0.05 5	C 32 0.16 14	A 0 0	B 12 0.49 0			
		2028 Background	TCS	LOS Delay V/C Q	A 7 0.58 23	A 4 0.31 29	A 4 0	4	B 12 0.49 77	B 12 0.49 77	B 12 0				C 31 0.06 6	C 32 0.17 14	A 0 0	B 13 0.56 0			
		2028 Total (PH 1)	TCS	LOS Delay V/C Q	A 7 0.60 27	A 4 0.31 30	A 5 0	5	B 13 0.50 78	B 13 0.50 78	B 13 0				C 31 0.08 7	C 32 0.17 14	A 0 0	B 13 0.58 0			
		2033 Background	TCS	LOS Delay V/C Q	B 18 0.73 69	A 4 0.35 35	A 8 0	8	B 18 0.65 93	B 18 0.65 93	B 18 0				C 31 0.09 8	C 32 0.21 15	A 0 0	B 16 0.7 0			
		2033 Total (Ph 1)	TCS	LOS Delay V/C Q	B 20 0.74 75	A 4 0.35 35	A 8 0	8	B 18 0.66 94	B 18 0.66 94	B 18 0				C 31 0.12 9	C 32 0.21 15	A 0 0	B 17 0.71 0			
		2038 Background	TCS	LOS Delay V/C Q	C 22 0.76 78	A 4 0.37 39	A 9 0	9	B 19 0.69 103	B 19 0.69 103	B 19 0				C 31 0.07 6	C 32 0.22 15	A 0 0	B 17 0.73 0			
		2038 Total (PH 1)	TCS	LOS Delay V/C Q	C 24 0.78 86	A 4 0.38 41	A 10 0	10	B 19 0.71 106	B 19 0.71 106	B 19 0				C 31 0.08 7	C 32 0.22 15	A 0 0	B 18 0.74 0			
		2038 Total (PH 1+2)	TCS	LOS Delay V/C Q	C 27 0.80 92	A 4 0.38 41	B 10 0	10	B 20 0.72 107	B 20 0.72 107	B 20 0				C 31 0.11 9	C 32 0.22 15	A 0 0	B 18 0.76 0			
		2043 Background	TCS	LOS Delay V/C Q	D 37 0.87 108	A 4 0.42 51	B 13 0	13	C 22 0.79 130	C 22 0.79 130	C 22 0				C 31 0.07 7	C 32 0.33 18	A 0 0	C 20 0.84 0			
	2043 Total (PH 1 +2)	TCS	LOS Delay V/C Q	D 46 0.93 119	A 5 0.42 52	B 16 0	16	C 23 0.80 142	C 23 0.80 142	C 23 0				C 31 0.11 9	C 32 0.36 19	A 0 0	C 22 0.89 0				

MOE - Measure of Effectiveness
 LOS - Level of Service
 Delay - Average Delay per Vehicle in Seconds

Q - 95th Percentile Queue Length
 Ex - Existing Available Storage
 Avail. - Available Storage

TCS - Traffic Control Signal
 TWSC - Two-Way Stop Control
 AWSC - All-Way Stop Control

RBT - Roundabout



11.2.17 GO Station West Access at Cross Avenue

2023 Base Year Operations	Exceeding Capacity	●
2028 Background Operations	Exceeding Capacity	●
2028 Total Operations	Exceeding Capacity	●
2033 Background Operations	Exceeding Capacity	●
2033 Total Operations (PH 1)	Exceeding Capacity	●
2038 Background Operations	Exceeding Capacity	●
2038 Total Operations (PH 1)	Exceeding Capacity	●
2038 Total Operations (PH 1+2)	Exceeding Capacity	●
2043 Background Operations	Exceeding Capacity	●
2043 Total Operations (PH 1+2)	Exceeding Capacity	●

Individual movements at the signalized intersection of Cross Avenue and GO Station West Access presently operate at LOS B. Exception to this is the westbound approach that operates at LOS F with a v/c ratio exceeding 1.00 during the weekday AM peak hour due to the high volume of left-turning traffic travelling into the GO Station.

Under the 2028 Background horizon, increased delay is projected for the westbound approach.

Under the 2033 Background horizon, it is assumed that the north leg of the intersection will be operational, and the westbound approach is projected to continue to operate at LOS F with a v/c ratio exceeding 1.00.

With the addition of site-generated traffic, the southbound left-turn under the 2038 and 2043 Total (Ph 1+2) conditions is projected to operate at LOS F with a v/c ratio exceeding 1.00 during the weekday peak hours. Additionally, under the 2043 Total conditions, the eastbound approach is projected to operate at LOS D with a v/c ratio of 0.93.

Critical Movements (V/C over 0.85 or Turn Lane V/C over 0.95)

- ▶ Westbound Left/Through (2023 Base)
- ▶ Westbound Right (2033 Background)
- ▶ Southbound Left (2038 Total PH 1+2)
- ▶ Eastbound Left/Through/Right (2043 Total)



TABLE 11.9A: AM PEAK HOUR OPERATIONS (9 OF 11)

Peak Hour	Intersection	Horizon	Control Type	MOE	Direction / Movement / Approach																
					Eastbound				Westbound				Northbound				Southbound				Overall
					Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
AM Peak Hour	23: GO Station West Access/Street C & Cross Ave	2023 Existing	TCS	LOS Delay V/C Q	B 11 0.21 14	B 11 0.21 14	B 11	F 179 2.02 114	F 179 2.02 114	F 179	B 10 0.08 7	B 11 0.14 0	B 11					F 123 0.74			
		2028 Background	TCS	LOS Delay V/C Q	B 11 0.23 15	B 11 0.23 15	B 11	F 250 2.29 129	F 250 2.29 129	F 250	B 10 0.09 8	B 11 0.16 0	B 11					F 170 0.83			
		2028 Total (PH 1)	TCS	LOS Delay V/C Q	B 11 0.23 15	B 11 0.23 15	B 11	F 252 2.29 129	F 252 2.29 129	F 252	B 10 0.09 8	B 11 0.16 0	B 11					F 172 0.83			
		2033 Background	TCS	LOS Delay V/C Q	B 12 0.44 24	B 12 0.44 24	B 12	F 408 2.78 163	F 408 2.78 163	F 408	B 10 0.10 8	B 11 0.17 8	B 11	C 21 0.66 50	A 10 0.01 0	A 10 0.01 0	C 20	F 246 1.26			
		2033 Total (PH 1)	TCS	LOS Delay V/C Q	B 12 0.44 24	B 12 0.44 24	B 12	F 411 2.78 163	F 411 2.78 163	F 411	B 10 0.10 8	B 11 0.17 8	B 11	C 21 0.66 50	A 10 0.01 0	A 10 0.01 0	C 20	F 247 1.26			
		2038 Background	TCS	LOS Delay V/C Q	B 12 0.39 24	B 12 0.39 24	B 12	F 199 1.79 119	F 199 1.79 119	F 199	B 12 0.21 10	B 11 0.19 11	B 11	C 17 0.53 33	A 17 0.65 60	A 17 0.65 60	C 17	F 95 1.02			
		2038 Total (PH 1)	TCS	LOS Delay V/C Q	B 12 0.41 24	B 12 0.41 24	B 12	F 202 1.79 119	F 202 1.79 119	F 202	B 13 0.22 10	B 11 0.19 11	B 11	D 34 0.86 71	C 18 0.67 62	C 18 0.67 62	C 25	F 94 1.13			
		2038 Total (PH 1+2)	TCS	LOS Delay V/C Q	B 12 0.44 25	B 12 0.44 25	B 12	F 206 1.80 120	F 206 1.80 120	F 206	B 13 0.24 10	B 11 0.19 11	B 11	F 171 1.31 116	C 19 0.71 72	C 19 0.71 72	F 98	F 115 1.36			
		2043 Background	TCS	LOS Delay V/C Q	B 12 0.47 28	B 12 0.47 28	B 12	F 277 2.08 135	F 277 2.08 135	F 277	B 14 0.27 11	B 12 0.26 16	B 12	C 20 0.63 45	C 19 0.72 79	C 19 0.72 79	C 20	F 130 1.14			
		2043 Total (PH 1 +2)	TCS	LOS Delay V/C Q	B 13 0.53 30	B 13 0.53 30	B 13	F 286 2.12 136	F 286 2.12 136	F 286	C 15 0.31 12	B 12 0.26 16	B 12	F 237 1.46 124	C 22 0.78 89	C 22 0.78 89	F 130	F 158 1.52			

MOE - Measure of Effectiveness
 LOS - Level of Service
 Delay - Average Delay per Vehicle in Seconds

Q - 95th Percentile Queue Length
 Ex. - Existing Available Storage
 Avail. - Available Storage

TCS - Traffic Control Signal
 TWSC - Two-Way Stop Control
 AWSC - All-Way Stop Control

RBT - Roundabout



TABLE 11.9B: PM PEAK HOUR OPERATIONS (9 OF 11)

Peak Hour	Intersection	Horizon	Control Type	MOE	Direction / Movement / Approach																Overall	
					Eastbound				Westbound				Northbound				Southbound					
					Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach		
PM Peak Hour	23: GO Station West Access/Street C & Cross Ave	2023 Existing	TCS	LOS Delay V/C Q	B 13 0.45 27	B 13 0.45 27	B 13	C 18 0.95 34	C 18 0.95 34		C 18	A 9 0.14 12	B 12 0.43 32				B 11			B 14 0.56		
		2028 Background	TCS	LOS Delay V/C Q	B 13 0.47 30	B 13 0.47 30	B 13	C 20 1.08 42	C 20 1.08 42		C 20	A 10 0.16 13	B 14 0.54 43					B 13			C 15 0.66	
		2028 Total (PH 1)	TCS	LOS Delay V/C Q	B 13 0.47 30	B 13 0.47 30	B 13	C 21 1.07 47	C 21 1.07 47		C 21	A 10 0.16 13	B 14 0.54 43					B 13			C 16 0.66	
		2033 Background	TCS	LOS Delay V/C Q	B 13 0.59 39	B 13 0.59 39	B 13	F 99 1.15 85	F 99 1.15 85	F 99	F 99	F 105	B 11 0.19 14	C 20 0.71 70	C 20 0.71 70	D 30 0.72 40	A 9 0.01 0	A 9 0.01 0	D 29			E 49 0.93
		2033 Total (Ph 1)	TCS	LOS Delay V/C Q	B 13 0.59 39	B 13 0.59 39	B 13	F 105 1.17 87	F 105 1.17 87	F 105	F 105	F 105	B 11 0.19 14	C 20 0.71 70	C 20 0.71 70	D 30 0.72 40	A 9 0.01 0	A 9 0.01 0	D 29			F 52 0.94
		2038 Background	TCS	LOS Delay V/C Q	B 14 0.66 42	B 14 0.66 42	B 14	D 29 0.90 59	D 29 0.90 59	D 29	D 29	D 29	B 11 0.22 15	C 22 0.76 81	C 22 0.76 81	C 20	C 18	B 10 0.18 23	B 10 0.18 16	B 14		C 20 0.83
		2038 Total (PH 1)	TCS	LOS Delay V/C Q	C 15 0.71 45	C 15 0.71 45	C 15	D 31 0.92 61	D 31 0.92 61	D 31	D 31	D 31	B 11 0.23 15	C 22 0.77 81	C 22 0.77 81	C 20	E 42 0.82 44	B 10 0.18 16	B 10 0.18 16	D 28		C 23 0.87
		2038 Total (PH 1+2)	TCS	LOS Delay V/C Q	C 17 0.78 58	C 17 0.78 58	C 17	D 33 0.93 62	D 33 0.93 62	D 33	D 33	D 33	B 11 0.23 15	C 23 0.78 81	C 23 0.78 81	F 136 1.19 63	B 11 0.19 17	B 11 0.19 17	F 89			D 34 1.06
		2043 Background	TCS	LOS Delay V/C Q	C 15 0.72 49	C 15 0.72 49	C 15	F 52 1.13 70	F 52 1.13 70	F 52	F 52	F 52	B 12 0.25 16	D 34 0.90 98	D 34 0.90 98	D 30	E 36 0.71 31	B 11 0.20 17	B 11 0.20 17	C 22		C 31 0.96
		2043 Total (PH 1 +2)	TCS	LOS Delay V/C Q	C 25 0.89 70	C 25 0.89 70	C 25	F 67 1.15 73	F 67 1.15 73	F 67	F 67	F 67	B 12 0.26 17	D 34 0.90 98	D 34 0.90 98	D 30	F 319 1.61 60	B 11 0.22 18	B 11 0.22 18	F 200		F 65 1.34

MOE - Measure of Effectiveness
 LOS - Level of Service
 Delay - Average Delay per Vehicle in Seconds

Q - 95th Percentile Queue Length
 Ex. - Existing Available Storage
 Avail. - Available Storage

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 TWSC - Two-Way Stop Control
 AWSC - All-Way Stop Control

RBT - Roundabout



11.2.18 Future Local Road Network

In the 2038 Background scenario, the new north-south and east-west local roads are generally forecast to operate at LOS B or better during weekday peak hours.

The westbound movement at the intersection of Street C and Street 1 is forecast to operate at LOS F in the 2038 Background scenario AM peak hour. This delay is due to westbound traffic rerouting from Argus Road to Street 1 and onto Street C to access the GO station. With additional traffic generated by the proposed development, the intersection is projected to operate with increased delay for the westbound approach.

Overall, adding site traffic is expected to increase delays generally less than 35 seconds throughout the local road network.

Critical Movements (LOS E/F)

- ▶ Street C and Street 1 Westbound Left/Through/Right (2038 Background)

11.2.19 Development Access

Under the future traffic conditions, the north and east accesses are expected to operate at LOS B or better during the weekday peak hours under the Total conditions.



TABLE 11.10A: AM PEAK HOUR OPERATIONS (10 OF 11)

Peak Hour	Intersection	Horizon	Control Type	MOE	Direction / Movement / Approach																Overall
					Eastbound				Westbound				Northbound				Southbound				
					Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
AM Peak Hour	17: North Access & South Service Road	2028 Total (PH 1)	TWSC	LOS Delay V/C Q	A 0 0.01 0	A 0 0.01 0	A 0 0.01 0	A 7 0.02 1	A 7 0.02 1	A 7 0.02 1	A 7 0.02 1	A 9 0.16 4	A 9 0.16 4	A 9 0.16 4							
		2033 Total (Ph 1)	TWSC	LOS Delay V/C Q	A 0 0.01 0	A 0 0.01 0	A 0 0.01 0	A 7 0.02 1	A 7 0.02 1	A 7 0.02 1	A 7 0.02 1	A 9 0.16 4	A 9 0.16 4	A 9 0.16 4							
		2038 Total (PH 1)	TWSC	LOS Delay V/C Q	A 0 0.05 0	A 0 0.05 0	A 0 0.05 0	A 4 0.03 1	A 4 0.03 1	A 4 0.03 1	A 4 0.03 1	A 9 0.02 0	A 9 0.02 0	A 9 0.02 0							
		2038 Total (PH 1+2)	TWSC	LOS Delay V/C Q	A 0 0.05 0	A 0 0.05 0	A 0 0.05 0	A 5 0.05 1	A 5 0.05 1	A 5 0.05 1	A 5 0.05 1	A 9 0.04 1	A 9 0.04 1	A 9 0.04 1							
		2043 Total (PH 1+2)	TWSC	LOS Delay V/C Q	A 0 0.06 0	A 0 0.06 0	A 0 0.06 0	A 5 0.05 1	A 5 0.05 1	A 5 0.05 1	A 5 0.05 1	A 9 0.04 1	A 9 0.04 1	A 9 0.04 1							
	18: Street C & East Access	2038 Total (PH 1)	TWSC	LOS Delay V/C Q	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0					A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	
		2038 Total (PH 1+2)	TWSC	LOS Delay V/C Q	B 12 0.41 16	B 12 0.41 16	B 12 0.41 16					A 4 0.01 0	A 4 0.01 0	A 4 0.01 0	A 4 0.01 0	A 0 0.10 0	A 0 0.10 0	A 0 0.10 0	A 0 0.10 0	A 0 0.10 0	
		2043 Total (PH 1+2)	TWSC	LOS Delay V/C Q	B 12 0.42 17	B 12 0.42 17	B 12 0.42 17					A 4 0.01 0	A 4 0.01 0	A 4 0.01 0	A 4 0.01 0	A 0 0.11 0	A 0 0.11 0	A 0 0.11 0	A 0 0.11 0	A 0 0.11 0	
	19: Street C & South Service Road	2038 Background	TWSC	LOS Delay V/C Q	A 0 0.05 0	A 0 0.05 0	A 0 0.05 0					A 6 0.08 2	A 6 0.08 2	A 6 0.08 2	A 6 0.08 2	A 10 0.02 1	A 10 0.02 1	A 10 0.02 1	A 10 0.02 1	A 10 0.02 1	
		2038 Total (PH 1)	TWSC	LOS Delay V/C Q	A 0 0.06 0	A 0 0.06 0	A 0 0.06 0					A 5 0.08 2	A 5 0.08 2	A 5 0.08 2	A 5 0.08 2	A 10 0.02 1	A 10 0.02 1	A 10 0.02 1	A 10 0.02 1	A 10 0.02 1	
		2038 Total (PH 1+2)	TWSC	LOS Delay V/C Q	A 0 0.08 0	A 0 0.08 0	A 0 0.08 0					A 4 0.08 2	A 4 0.08 2	A 4 0.08 2	A 4 0.08 2	B 10 0.02 1	B 10 0.02 1	B 10 0.02 1	B 10 0.02 1	B 10 0.02 1	
		2043 Background	TWSC	LOS Delay V/C Q	A 0 0.06 0	A 0 0.06 0	A 0 0.06 0					A 6 0.09 2	A 6 0.09 2	A 6 0.09 2	A 6 0.09 2	A 10 0.03 1	A 10 0.03 1	A 10 0.03 1	A 10 0.03 1	A 10 0.03 1	
		2043 Total (PH 1+2)	TWSC	LOS Delay V/C Q	A 0 0.08 0	A 0 0.08 0	A 0 0.08 0					A 5 0.09 2	A 5 0.09 2	A 5 0.09 2	A 5 0.09 2	B 10 0.03 1	B 10 0.03 1	B 10 0.03 1	B 10 0.03 1	B 10 0.03 1	

MOE - Measure of Effectiveness
 LOS - Level of Service
 Delay - Average Delay per Vehicle in Seconds

Q - 95th Percentile Queue Length
 Ex. - Existing Available Storage
 Avail. - Available Storage

TCS - Traffic Control Signal
 TWSC - Two-Way Stop Control
 AWSC - All-Way Stop Control

RBT - Roundabout



TABLE 11.10B: PM PEAK HOUR OPERATIONS (10 OF 11)

Peak Hour	Intersection	Horizon	Control Type	MOE	Direction / Movement / Approach																
					Eastbound				Westbound				Northbound				Southbound				Overall
					Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
PM Peak Hour	17: North Access & South Service Road	2028 Total (PH 1)	TWSC	LOS Delay V/C Q	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0				
		2033 Total (PH 1)	TWSC	LOS Delay V/C Q	A 0 0.02 0	A 0 0.02 0	A 0 0.02 0	A 0 0.02 0	A 8 0.09 2	A 8 0.09 2	A 8 0.09 2	A 8 0.09 2	A 8 0.09 2	A 8 0.09 2	A 8 0.09 2	A 8 0.09 2	A 8 0.09 2	A 8 0.09 2			
		2033 Total (PH 1)	TWSC	LOS Delay V/C Q	A 0 0.03 0	A 0 0.03 0	A 0 0.03 0	A 0 0.03 0	A 5 0.09 2	A 5 0.09 2	A 5 0.09 2	A 5 0.09 2	A 5 0.09 2	A 5 0.09 2	A 5 0.09 2	A 5 0.09 2	A 5 0.09 2	A 5 0.09 2	A 5 0.09 2		
		2038 Total (PH 1+2)	TWSC	LOS Delay V/C Q	A 0 0.03 0	A 0 0.03 0	A 0 0.03 0	A 0 0.03 0	A 6 0.17 5	A 6 0.17 5	A 6 0.17 5	A 6 0.17 5	A 6 0.17 5	A 6 0.17 5	A 6 0.17 5	A 6 0.17 5	A 6 0.17 5	A 6 0.17 5	A 6 0.17 5		
		2043 Total (PH 1+2)	TWSC	LOS Delay V/C Q	A 0 0.04 0	A 0 0.04 0	A 0 0.04 0	A 0 0.04 0	A 6 0.17 5	A 6 0.17 5	A 6 0.17 5	A 6 0.17 5	A 6 0.17 5	A 6 0.17 5	A 6 0.17 5	A 6 0.17 5	A 6 0.17 5	A 6 0.17 5	A 6 0.17 5		
	18: Street C & East Access	2038 Total (PH 1)	TWSC	LOS Delay V/C Q	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0					A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0		
		2038 Total (PH 1+2)	TWSC	LOS Delay V/C Q	A 9 0.17 5	A 9 0.17 5	A 9 0.17 5	A 9 0.17 5					A 4 0.04 1	A 4 0.04 1	A 4 0.04 1	A 4 0.04 1	A 4 0.04 1	A 4 0.04 1	A 4 0.04 1		
		2043 Total (PH 1+2)	TWSC	LOS Delay V/C Q	A 9 0.17 5	A 9 0.17 5	A 9 0.17 5	A 9 0.17 5					A 4 0.04 1	A 4 0.04 1	A 4 0.04 1	A 4 0.04 1	A 4 0.04 1	A 4 0.04 1	A 4 0.04 1		
	19: Street C & South Service Road	2038 Background	TWSC	LOS Delay V/C Q	A 0 0.03 0	A 0 0.03 0	A 0 0.03 0	A 0 0.03 0					A 3 0.03 1	A 3 0.03 1	A 3 0.03 1	A 3 0.03 1	A 3 0.03 1	A 3 0.03 1	A 3 0.03 1		
		2038 Total (PH 1)	TWSC	LOS Delay V/C Q	A 0 0.04 0	A 0 0.04 0	A 0 0.04 0	A 0 0.04 0					A 2 0.03 1	A 2 0.03 1	A 2 0.03 1	A 2 0.03 1	A 2 0.03 1	A 2 0.03 1	A 2 0.03 1		
		2038 Total (PH 1+2)	TWSC	LOS Delay V/C Q	A 0 0.04 0	A 0 0.04 0	A 0 0.04 0	A 0 0.04 0					A 1 0.03 1	A 1 0.03 1	A 1 0.03 1	A 1 0.03 1	A 1 0.03 1	A 1 0.03 1	A 1 0.03 1		
		2043 Background	TWSC	LOS Delay V/C Q	A 0 0.04 0	A 0 0.04 0	A 0 0.04 0	A 0 0.04 0					A 3 0.03 1	A 3 0.03 1	A 3 0.03 1	A 3 0.03 1	A 3 0.03 1	A 3 0.03 1	A 3 0.03 1		
		2043 Total (PH 1+2)	TWSC	LOS Delay V/C Q	A 0 0.05 0	A 0 0.05 0	A 0 0.05 0	A 0 0.05 0					A 1 0.03 1	A 1 0.03 1	A 1 0.03 1	A 1 0.03 1	A 1 0.03 1	A 1 0.03 1	A 1 0.03 1		

MOE - Measure of Effectiveness
 LOS - Level of Service
 Delay - Average Delay per Vehicle in Seconds

Q - 95th Percentile Queue Length
 Ex. - Existing Available Storage
 Avail. - Available Storage

TCS - Traffic Control Signal
 TWSC - Two-Way Stop Control
 AWSC - All-Way Stop Control

RBT - Roundabout



TABLE 11.11A: AM PEAK HOUR OPERATIONS (11 OF 11)

Peak Hour	Intersection	Horizon	Control Type	MOE	Direction / Movement / Approach																Overall
					Eastbound				Westbound				Northbound				Southbound				
					Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
AM Peak Hour	20: Street A & South Service Road	2038 Background	TWSC	LOS Delay V/C Q	A 0 0.13 0	A 0 0.13 0	A 0 0.13 0	A 0 0.13 0	A 1 0.00 0	A 1 0.00 0	A 1 0.00 0	A 1 0.00 0	A 10 0.03 1	A 10 0.03 1	A 10 0.03 1	A 10 0.03 1					
		2038 Total (PH 1)	TWSC	LOS Delay V/C Q	A 0 0.13 0	A 0 0.13 0	A 0 0.13 0	A 0 0.13 0	A 1 0.00 0	A 1 0.00 0	A 1 0.00 0	A 1 0.00 0	A 10 0.03 1	A 10 0.03 1	A 10 0.03 1	A 10 0.03 1					
		2038 Total (PH 1+2)	TWSC	LOS Delay V/C Q	A 0 0.13 0	A 0 0.13 0	A 0 0.13 0	A 0 0.13 0	A 1 0.00 0	A 1 0.00 0	A 1 0.00 0	A 1 0.00 0	A 10 0.03 1	A 10 0.03 1	A 10 0.03 1	A 10 0.03 1					
		2043 Background	TWSC	LOS Delay V/C Q	A 0 0.14 0	A 0 0.14 0	A 0 0.14 0	A 0 0.14 0	A 1 0.01 0	A 1 0.01 0	A 1 0.01 0	A 1 0.01 0	A 10 0.03 1	A 10 0.03 1	A 10 0.03 1	A 10 0.03 1					
		2043 Total (PH 1+2)	TWSC	LOS Delay V/C Q	A 0 0.14 0	A 0 0.14 0	A 0 0.14 0	A 0 0.14 0	A 1 0.01 0	A 1 0.01 0	A 1 0.01 0	A 1 0.01 0	A 10 0.03 1	A 10 0.03 1	A 10 0.03 1	A 10 0.03 1					
	21: Argus Rd & Street 1	2038 Background	TWSC	LOS Delay V/C Q	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0					A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0.74 0.74 0.00	A 0.74 0.74 0.00	A 0.74 0.74 0.00		
		2038 Total (PH 1)	TWSC	LOS Delay V/C Q	F 50 0.78 49	F 50 0.78 49	F 50 0.78 49	F 50 0.78 49					A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0.74 0.74 0.00	A 0.74 0.74 0.00	A 0.74 0.74 0.00		
		2038 Total (PH 1+2)	TWSC	LOS Delay V/C Q	F 50 0.78 49	F 50 0.78 49	F 50 0.78 49	F 50 0.78 49					A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0.74 0.74 0.00	A 0.74 0.74 0.00	A 0.74 0.74 0.00		
		2043 Background	TWSC	LOS Delay V/C Q	F 98 0.99 77	F 98 0.99 77	F 98 0.99 77	F 98 0.99 77					A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0.82 0.82 0.00	A 0.82 0.82 0.00	A 0.82 0.82 0.00		
		2043 Total (PH 1+2)	TWSC	LOS Delay V/C Q	F 98 0.99 77	F 98 0.99 77	F 98 0.99 77	F 98 0.99 77					A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0.82 0.82 0.00	A 0.82 0.82 0.00	A 0.82 0.82 0.00		
	22: Street C & Street 1	2033 Background	TWSC	LOS Delay V/C Q	A 10 0.26 9	A 10 0.26 9	A 10 0.26 9	A 10 0.26 9	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 7 0.05 1	A 7 0.05 1	A 7 0.05 1	A 7 0.05 1	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	
		2033 Total (Ph 1)	TWSC	LOS Delay V/C Q	A 10 0.26 9	A 10 0.26 9	A 10 0.26 9	A 10 0.26 9	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 7 0.05 1	A 7 0.05 1	A 7 0.05 1	A 7 0.05 1	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	
		2038 Background	TWSC	LOS Delay V/C Q	B 14 0.42 17	B 14 0.42 17	B 14 0.42 17	B 14 0.42 17	F 189 1.32 185	F 189 1.32 185	F 189 1.32 185	F 189 1.32 185	F 189 1.32 185	A 5 0.02 1	A 5 0.02 1	A 5 0.02 1	A 5 0.02 1	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	
		2038 Total (PH 1)	TWSC	LOS Delay V/C Q	C 18 0.52 24	C 18 0.52 24	C 18 0.52 24	C 18 0.52 24	F 435 1.87 276	F 435 1.87 276	F 435 1.87 276	F 435 1.87 276	F 435 1.87 276	A 4 0.02 1	A 4 0.02 1	A 4 0.02 1	A 4 0.02 1	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	
		2038 Total (PH 1+2)	TWSC	LOS Delay V/C Q	D 31 0.69 41	D 31 0.69 41	D 31 0.69 41	D 31 0.69 41	F Err 4.60 Err	F Err 4.60 Err	F Err 4.60 Err	F Err 4.60 Err	F Err 4.60 Err	A 4 0.03 1	A 4 0.03 1	A 4 0.03 1	A 4 0.03 1	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	
		2043 Background	TWSC	LOS Delay V/C Q	C 16 0.48 21	C 16 0.48 21	C 16 0.48 21	C 16 0.48 21	F 339 1.66 269	F 339 1.66 269	F 339 1.66 269	F 339 1.66 269	F 339 1.66 269	A 5 0.02 1	A 5 0.02 1	A 5 0.02 1	A 5 0.02 1	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	
		2043 Total (PH 1+2)	TWSC	LOS Delay V/C Q	E 41 0.80 56	E 41 0.80 56	E 41 0.80 56	E 41 0.80 56	F Err 4.60 Err	F Err 4.60 Err	F Err 4.60 Err	F Err 4.60 Err	F Err 4.60 Err	A 4 0.03 1	A 4 0.03 1	A 4 0.03 1	A 4 0.03 1	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	

MOE - Measure of Effectiveness
 LOS - Level of Service
 Delay - Average Delay per Vehicle in Seconds
 Q - 95th Percentile Queue Length
 Ex. - Existing Available Storage
 Avail. - Available Storage
 TCS - Traffic Control Signal
 TWSC - Two-Way Stop Control
 AWSC - All-Way Stop Control
 RBT - Roundabout

TABLE 11.11B: PM PEAK HOUR OPERATIONS (11 OF 11)

Peak Hour	Intersection	Horizon	Control Type	MOE	Direction / Movement / Approach																Overall
					Eastbound				Westbound				Northbound				Southbound				
					Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
PM Peak Hour	20: Street A & South Service Road	2038 Background	TWSC	LOS Delay V/C Q	A 0 0.03 0	A 0 0.03 0	A 0 0.03 0	A 0 0.03 0	A 2 0.01 0	A 2 0.01 0	A 2 0.01 0	A 2 0.01 0	A 10 0.01 0	A 10 0.01 0	A 10 0.01 0	A 10 0.01 0					
		2038 Total (PH 1)	TWSC	LOS Delay V/C Q	A 0 0.03 0	A 0 0.03 0	A 0 0.03 0	A 0 0.03 0	A 2 0.01 0	A 2 0.01 0	A 2 0.01 0	A 2 0.01 0	A 10 0.01 0	A 10 0.01 0	A 10 0.01 0	A 10 0.01 0					
		2038 Total (PH 1+2)	TWSC	LOS Delay V/C Q	A 0 0.03 0	A 0 0.03 0	A 0 0.03 0	A 0 0.03 0	A 2 0.01 0	A 2 0.01 0	A 2 0.01 0	A 2 0.01 0	A 2 0.01 0	A 10 0.01 0	A 10 0.01 0	A 10 0.01 0	A 10 0.01 0				
		2043 Background	TWSC	LOS Delay V/C Q	A 0 0.04 0	A 0 0.04 0	A 0 0.04 0	A 0 0.04 0	A 2 0.01 0	A 2 0.01 0	A 2 0.01 0	A 2 0.01 0	A 2 0.01 0	A 10 0.02 0	A 10 0.02 0	A 10 0.02 0	A 10 0.02 0				
		2043 Total (PH 1 +2)	TWSC	LOS Delay V/C Q	A 0 0.04 0	A 0 0.04 0	A 0 0.04 0	A 0 0.04 0	A 2 0.01 0	A 2 0.01 0	A 2 0.01 0	A 2 0.01 0	A 2 0.01 0	A 10 0.02 0	A 10 0.02 0	A 10 0.02 0	A 10 0.02 0				
	21: Argus Rd & Street 1	2038 Background	TWSC	LOS Delay V/C Q	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0						A 0 0.00 0	A 0 0.00 0			A 0.45 0	A 0.45 0	A 0 0	
		2038 Total (PH 1)	TWSC	LOS Delay V/C Q	C 15 0.29 10	C 15 0.29 10	C 15 0.29 10	C 15 0.29 10						A 0 0.00 0	A 0 0.00 0			A 0.45 0	A 0.45 0	A 0 0	
		2038 Total (PH 1+2)	TWSC	LOS Delay V/C Q	C 15 0.29 10	C 15 0.29 10	C 15 0.29 10	C 15 0.29 10						A 0 0.00 0	A 0 0.00 0			A 0.45 0	A 0.45 0	A 0 0	
		2043 Background	TWSC	LOS Delay V/C Q	C 17 0.35 13	C 17 0.35 13	C 17 0.35 13	C 17 0.35 13						A 0 0.00 0	A 0 0.00 0			A 0.50 0	A 0.50 0	A 0 0	
		2043 Total (PH 1 +2)	TWSC	LOS Delay V/C Q	C 17 0.35 13	C 17 0.35 13	C 17 0.35 13	C 17 0.35 13						A 0 0.00 0	A 0 0.00 0			A 0.50 0	A 0.50 0	A 0 0	
	22: Street C & Street 1	2033 Background	TWSC	LOS Delay V/C Q	A 9 0.16 5	A 9 0.16 5	A 9 0.16 5	A 9 0.16 5	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 8 0.16 5	A 8 0.16 5	A 8 0.16 5	A 8 0.16 5	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 0
		2033 Total (Ph 1)	TWSC	LOS Delay V/C Q	A 9 0.16 5	A 9 0.16 5	A 9 0.16 5	A 9 0.16 5	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 8 0.16 5	A 8 0.16 5	A 8 0.16 5	A 8 0.16 5	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 0
		2038 Background	TWSC	LOS Delay V/C Q	B 13 0.29 10	B 13 0.29 10	B 13 0.29 10	B 13 0.29 10	C 23 0.60 31	C 23 0.60 31	C 23 0.60 31	C 23 0.60 31	C 23 0.60 31	A 5 0.06 2	A 5 0.06 2	A 5 0.06 2	A 5 0.06 2	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 0
		2038 Total (PH 1)	TWSC	LOS Delay V/C Q	C 15 0.34 12	C 15 0.34 12	C 15 0.34 12	C 15 0.34 12	E 35 0.73 46	E 35 0.73 46	E 35 0.73 46	E 35 0.73 46	E 35 0.73 46	A 4 0.06 2	A 4 0.06 2	A 4 0.06 2	A 4 0.06 2	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 0
		2038 Total (PH 1+2)	TWSC	LOS Delay V/C Q	C 18 0.39 15	C 18 0.39 15	C 18 0.39 15	C 18 0.39 15	F 63 0.89 68	F 63 0.89 68	F 63 0.89 68	F 63 0.89 68	F 63 0.89 68	A 4 0.07 2	A 4 0.07 2	A 4 0.07 2	A 4 0.07 2	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 0
		2043 Background	TWSC	LOS Delay V/C Q	B 14 0.34 12	B 14 0.34 12	B 14 0.34 12	B 14 0.34 12	D 32 0.73 47	D 32 0.73 47	D 32 0.73 47	D 32 0.73 47	D 32 0.73 47	A 5 0.07 2	A 5 0.07 2	A 5 0.07 2	A 5 0.07 2	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 0
		2043 Total (PH 1 +2)	TWSC	LOS Delay V/C Q	C 20 0.45 19	C 20 0.45 19	C 20 0.45 19	C 20 0.45 19	F 122 1.10 104	F 122 1.10 104	F 122 1.10 104	F 122 1.10 104	F 122 1.10 104	A 4 0.08 2	A 4 0.08 2	A 4 0.08 2	A 4 0.08 2	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 0

MOE - Measure of Effectiveness
 LOS - Level of Service
 Delay - Average Delay per Vehicle in Seconds

Q - 95th Percentile Queue Length
 Ex. - Existing Available Storage
 Avail. - Available Storage

TCS - Traffic Control Signal
 TWSC - Two-Way Stop Control
 AWSC - All-Way Stop Control

RBT - Roundabout



12 MMLOS Assessment

Intersection Level of Service (LOS) is a recognized metric for categorizing the delay experienced by drivers at intersections. The term “Level of Service” denotes how well a traffic movement operates under given traffic demands, lane arrangements, and traffic controls. It converts average delay at intersections into a scale from A to F, where A indicates the least delay and F indicates the greatest delay. The metric is extensively used in transportation planning, but it is limited to the experience of car drivers.

Multi-modal Level of Service (MMLOS) extends this concept to incorporate the experience of modes beyond car drivers. It converts a variety of factors into a scale from A to F for each mode; A indicates the best experience for users of that mode, and F shows the worst experience. As the output is a *set* of indicators, it reveals where changes have different (or opposite) effects on each mode.

12.1 OTC MMLOS

The OTC MMLOS Guidelines¹⁷ were published in February of 2022 to provide a methodology to assess the performance of all travel modes in municipalities across Ontario. The guidelines identify nine general street types for analysis. The guidelines were developed after reviewing national and international best practices in MMLOS analysis. **Table 12.1** outlines the roadway categories assumed for the study area intersections.

TABLE 12.1: MMLOS STREET TYPE CLASSIFICATION

Roadway	Classification	MMLOS Applicable Classification
Trafalgar Road	Urban Major Arterial	Neighbourhood Connector
Cross Avenue	Urban Minor Arterial	Neighbourhood Main Street
Lyons Lane	Local	Urban Boulevard
South Service Road	Local	Urban Boulevard
Argus Road	Local	Urban Boulevard
Leighland Avenue	Urban Minor Arterial	Neighbourhood Main Street
Iroquois Shore Road	Urban Minor Arterial	Neighbourhood Main Street

¹⁷ Dillion Consulting. *Multi-Modal Level of Service Guidelines*. (Toronto: Ontario Traffic Council, 2022)



12.1.1 Level of Service Target

Based on the street type, the MMLOS guidelines provide base LOS targets, ultimately identifying which modes should be prioritized. The base LOS targets for Roadways within the study area are given in **Table 12.2**.

The level of service along segments for pedestrians is determined based on three criteria: facility width, buffer width and maximum distance between controlled crossings. Concerning cyclists, the criteria include facility width, buffer width and conflicts with other modes (in-lane conflicts and crossing point conflicts)

TABLE 12.2: MMLOS TARGETS PER STREET TYPE

Street Classification	Pedestrians	Cyclists
Urban Main Street	C	C
Urban Boulevard	C	B
Neighbourhood Connector	E	D
Neighbourhood Main Street	C	C

12.1.2 MMLOS Segment Analysis

Table 12.3 summarizes the MMLOS analysis for the corridor roadways. The existing and future conditions for the segment's lengths are assumed to be the same and are considered in a single row.

Pedestrian MMLOS throughout the study area ranges between D and F, with the LOS only met for Trafalgar Road, with all other roadways falling short of the targets, in most situations, by a single grade. Additional buffer and an increase in the sidewalk width will be required to meet the pedestrian LOS targets. In addition, as the South Service Road does not currently have a sidewalk, provision of one would greatly improve the LOS target. While the development will provide the necessary ROW dedication along the frontages, the proposed development will not directly impact the pedestrian MMLOS.

Regarding the cyclist's LOS, as Trafalgar Road, Cross Avenue, Leighland Avenue and Iroquois Shore Road does not pass the design check (i.e., at a minimum protected facility is required), assessing the target level is not feasible.

However, the MOEA identified future additional links for pedestrians and cyclists are recommended by two grade-separated, active transportation crossings of the QEW. This crossing will encourage residents of the development and general area to explore active



transportation mode choices and provide for improved pedestrian and cyclist accommodations for the overall area.

TABLE 12.3: MMLOS SEGMENT ANALYSIS

Segment	NB		SB		Target	
	Ped.	Bikes	Ped.	Bikes	Ped.	Bikes
Trafalgar Road (Leighland to Corwall)	E	N/A	E	N/A	E	B
Lyons Lane (Cross Avenue to South Service Road)	N/A	B	D	B	C	B

Segment	EB		WB		Target	
	Ped.	Bikes	Ped.	Bikes	Ped.	Bikes
Argus Road (Trafalgar Road to Cross Avenue)	D	D	F	D	C	B
South Service Road (Argus Road to Lyons Lane)	F	C	F	B	C	B
Cross Avenue (Speers Road to Trafalgar Road)	E	N/A	E	N/A	C	C
Leighland Avenue (Trafalgar Road to Robarts Road)	D	N/A	D	N/A	C	C
Iroquois Shore Road (Trafalgar Road to North Service Road)	E	N/A	D	N/A	C	C



13 Mitigation

As summarized in the analysis tables in the previous chapter, several study area locations either currently experience or are projected to experience operational deficiencies independent of the Development.

13.1 External Study Area Intersections

Mitigation measures at several external study area intersections have been identified through the Midtown Oakville Environmental Assessment (MOEA). The MOEA developed a strategy to guide the development of the transportation and municipal storm water network needed to accommodate the planned growth in Midtown Oakville, as identified in the Livable Oakville Plan, the town's official plan.

As the GO Oakville Station is located centrally within the study area, the Trafalgar Road corridor experiences many trips during the weekday peak hours. In most circumstances, widening existing roads or building new ones will infringe on private property, impact mature trees and green space, or compromise the public realm (e.g. sidewalks, boulevards). The Midtown Oakville and Trafalgar Road EA recognize this and identify roadway improvements that will provide some relief to operational issues; however, vehicle capacity constraints will persist for the overall transportation network.

The MOEA developed a practical, long-term strategy to guide the development of the transportation and municipal stormwater network needed to accommodate the planned growth in Midtown Oakville, as identified in the Livable Oakville Plan, the town's official plan.

As noted within this study as well as the MOEA, without improvements made to the transportation network, most signalized intersections along the Trafalgar Road corridor will operate with significant capacity constraints. The existing municipal road network does not have enough reserve capacity to accommodate full build-out of Midtown Oakville and transit service on Trafalgar Road and Cross Avenue will be significantly impacted by traffic delays on the road network.

To meet the need for additional north-south capacity over the QEW, the critical transportation network improvements as recommended through the MOEA include the following:

- ▶ The extension of Cross Avenue eastward to Royal Windsor Drive and the QEW. This extension will likely divert eastbound left turns at Cross Avenue and Trafalgar Road to the QEW and Royal Windsor Drive interchange. In addition to the extension,



Cross Avenue will be widened from Trafalgar Road to Lyons Lane.

- ▶ A new north-south crossing of the QEW east of Trafalgar Road. This north-south road will connect the Cross Avenue extension with Iroquois Shore Road and Trafalgar Road at McCraney Street. This new street will have pedestrian and cycling infrastructure, dedicated transit, and general-purpose lanes. The purpose of the new roadway is to divert north/south traffic on Trafalgar Road;
- ▶ Realignment of the Trafalgar Road and QEW Eastbound Off-Ramp Terminal. A new eastbound QEW direct off-ramp will be constructed under Trafalgar Road and connect with the Cross Avenue extension. This new off-ramp will divert eastbound right-turns that will generally turn onto Trafalgar Road. The realignment of South Service Road and Argus Road to the west of its current location will be needed to accommodate this new off-ramp;
- ▶ Two new active transportation crossings of the QEW are west and east of Trafalgar Road. The west crossing will connect Oakville Place to the realigned Argus Road. The crossing east of Trafalgar Road will connect to a new north-south arterial road;
- ▶ Improvements to the QEW and Royal Windsor Drive interchange will include a new westbound off-ramp, eastbound on-ramp, eastbound direct off-ramp to Cross Avenue extension, and widening and extension of Royal Windsor Drive to Iroquois Shore Road at Eighth Line. The improvements to this interchange will likely divert traffic to/from the Trafalgar Road interchanges.

The proposed improvements will provide much needed capacity for the study area roadway. The MOEA however acknowledge, some capacity constraints will persist particularly at the intersections of Trafalgar Road with Cross Avenue and Cornwall Road.



13.2 Sustainable Transportation Strategy

In creating a livable community, it is important to aim for sustainable development, including a mix of residential, employment and commercial uses, in order to attract different users throughout the day. Midtown Oakville is being planned to not only become an ideal location for mixed-use development, but also as a transit centre where accessibility, life and work come together.

The strategy is to further focus on providing a sustainable transportation strategy to move more people per kilometre by walking, cycling and transit or in combination with high occupancy vehicles. Halton's Transportation Master Plan¹⁸ 2011 utilizes a transit mode split of 10% for 2021, 15% for 2026 and 20% for 2031, projecting a significant shift to transit increase.

Although these mode splits have not been accounted for in the traffic projections at the request of the MTO, areas that focus more on density which provide good access to public transit and active transportation routes are more productive in terms of reducing vehicle traffic.

13.3 Internal Study Area Intersections

Midtown Oakville's new local road network gives access to new developments and provides additional connectivity between South Service Road East, Cross Avenue, and Argus Road.

Given the additional connections and reassignment of traffic volumes, the following section discusses the potential remedial measures that could be considered to better accommodate the forecasted traffic volumes with respect to the internal intersections within the study area.

13.3.1 Argus Road at South Service Road

At the intersection of Argus Road and South Service Road, some possible upgrades include implementing the following:

- ▶ Traffic control signals with actuated uncoordinated control
- ▶ Separate left turn lane for eastbound traffic
- ▶ Additional westbound through lane
- ▶ Separate left turn lane for southbound traffic

¹⁸ Halton Region Transportation Master Plan (2031) – The Road to Change, 2011



13.3.2 Argus Road at Street 1

At the intersection of Argus Road and Street 1, some possible upgrades include implementing the following:

- ▶ Separate southbound right turn lane.

13.3.3 Argus Road at Cross Avenue

At the intersection of Argus Road and Cross Avenue, some possible upgrades include implementing the following:

- ▶ Double left turn lane for southbound traffic that is fully protected
- ▶ Prohibit eastbound left turn movements
- ▶ Repurpose the eastbound lane arrangement to have a separate right-turn lane
- ▶ Optimizing the timing of traffic signals

13.3.4 Cross Avenue at GO Driveway/Street C

At the intersection of Cross Avenue and GO Driveway/Street C, some possible upgrades include implementing the following:

- ▶ Repurpose westbound lanes to have a double left turn lane that is fully protected and a shared through/right turn lane;
- ▶ Separate left turn lane for eastbound traffic;
- ▶ Convert eastbound through lane to right turn lane
- ▶ Optimizing the timing of traffic signals

13.3.5 Cross Avenue at Lyons Lane/Street A

At the intersection of Cross Avenue and Lyons Lane/Street A, some possible upgrades include implementing the following:

- ▶ Addition of permitted/protective phase for northbound approach

13.3.6 Street C at Street 1

At the intersection of Street C and Street 1, some possible upgrades include implementing the following:

- ▶ Traffic control signals with actuated uncoordinated control
- ▶ Separate left turn lane for eastbound traffic
- ▶ Separate left turn lane for westbound traffic



13.3.7 Future Lane Arrangement

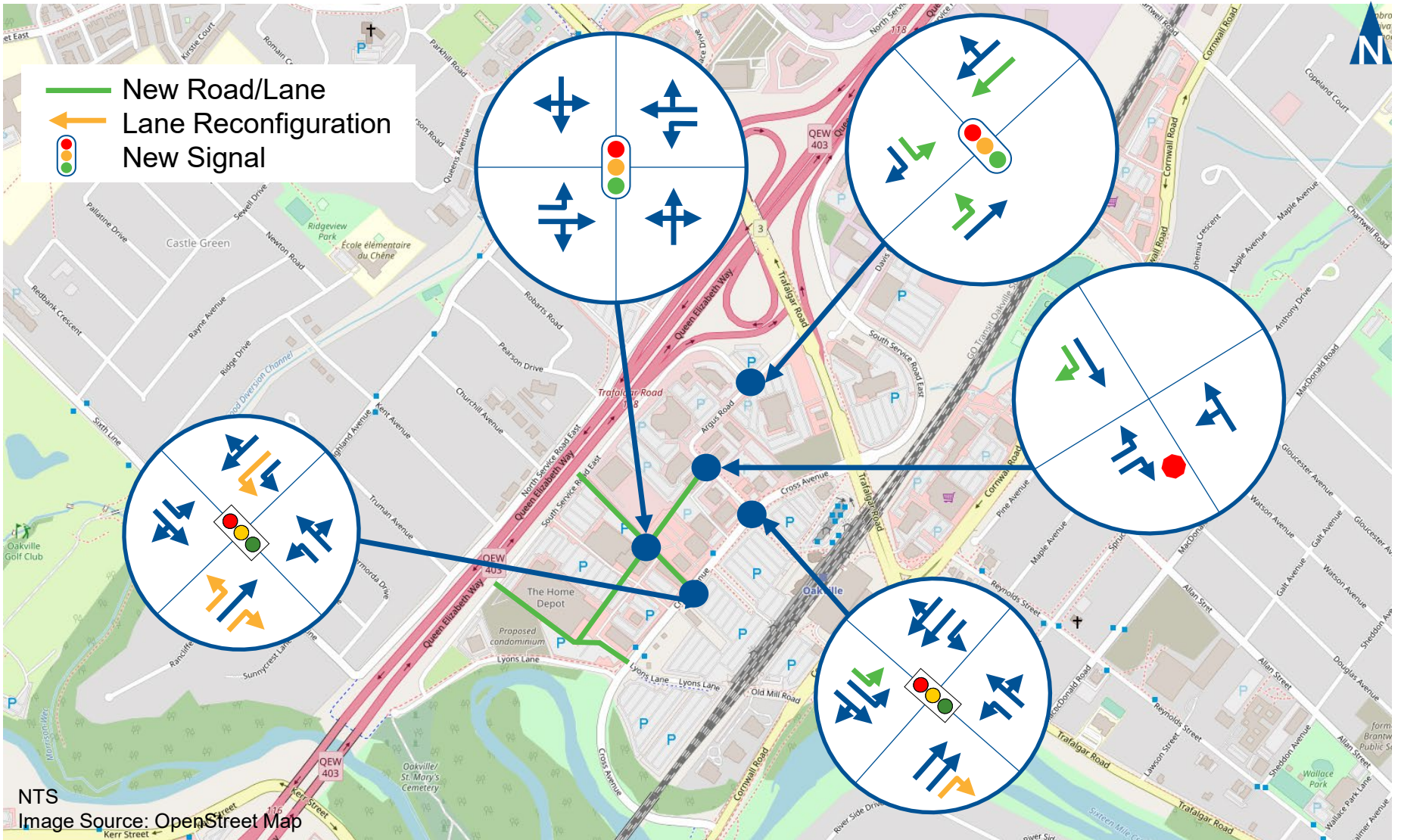
The future lane arrangement and traffic control for the internal study area intersections are outlined in **Figure 13.1**

13.3.8 Sensitivity Analysis

A sensitivity analysis to assess the identified improvements noted above at the study area intersections have been undertaken for the Total traffic conditions. **Figure 13.1** illustrates the proposed future lane configurations and traffic controls.

Table 13.1 summarizes the results of the sensitivity analysis. **Appendix H** contains the detailed Synchro reports. Overall, the intersections within the study area are expected to operate with considerable improvements with all movement operating with a v/c ratio not expected to exceed 1.00.





NTS
Image Source: OpenStreet Map



Recommended Future Configuration

166 South Service Road East, Oakville
210590



Figure 13.1

TABLE 13.1: 2038 SENSITIVITY ANALYSIS

Peak Hour	Intersection	Control Type	MOE	Direction / Movement / Approach																Overall
				Eastbound				Westbound				Northbound				Southbound				
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
AM Peak Hour	11: Argus Rd & South Service Road	TCS	LOS Delay V/C Q	C 20 0.32 10	A 7 0.08 10		A 10		B 12 0.67 65	B 12 0.67 65	B 12				C 17 0.30 28		C 17 0.30 28	C 16	B 13 0.53	
	13: GO Bus Terminal/Argus Rd & Cross Ave	TCS	LOS Delay V/C Q		D 38 0.87 148	D 38 0.87 148	D 37	C 29 0.60 24	B 20 0.61 99	B 20 0.61 99	C 21	D 37 0.25 10	D 42 0.10 0	D 42 0.10 0	D 40	D 43 0.82 90	D 43 0.82 90	D 43 0.82 90	D 38	C 32 0.78
	14: Lyons Lane/Street A & Cross Ave	TCS	LOS Delay V/C Q	B 12 0.26 27	B 11 0.29 26	B 11 0.29 26	B 12	A 7 0.57 32	A 4 0.14 12	A 4 0.14 12	A 5	C 25 0.14 10	C 24 0.03 6	C 24 0.03 6	C 25	C 28 0.40 27	C 26 0.21 21	C 26 0.21 21	C 27	B 12 0.54
	22: Street C & Street 1	TCS	LOS Delay V/C Q	C 21 0.63 46	C 21 0.63 46	C 21 0.63 46	C 21	A 7 0.06 7	A 7 0.06 7	A 7 0.06 7	C 25	A 0 0.00 0	B 13 0.17 14	B 13 0.17 14	B 13	D 28 0.85 112	D 28 0.85 112	D 28 0.85 112	D 28	C 25 0.94
	23: GO Station West Access/Street C & Cross Ave	TCS	LOS Delay V/C Q	F 66 0.90 151	F 66 0.90 151	F 66 0.90 151	F 59	E 46 0.87 218	E 46 0.87 218	E 46 0.87 218	F 60	F 54 0.40 26	E 45 0.19 15	E 45 0.19 15	E 47	F 73 1.00 185	D 27 0.59 120	D 27 0.59 120	D 27 0.59 120	F 51
PM Peak Hour	11: Argus Rd & South Service Road	TCS	LOS Delay V/C Q	A 5 0.07 2	A 4 0.02 2		A 5		A 7 0.63 23	A 7 0.63 23	A 7				B 10 0.24 16		B 10 0.24 16	A 10	A 8 0.5	
	13: GO Bus Terminal/Argus Rd & Cross Ave	TCS	LOS Delay V/C Q		D 36 0.87 244	D 36 0.87 244	D 36	D 42 0.64 29	B 15 0.43 82	B 15 0.43 82	B 16	D 51 0.23 11	D 55 0.13 17	D 55 0.13 17	D 54	E 61 0.82 103	E 61 0.82 103	E 61 0.82 103	E 56	C 35 0.76
	14: Lyons Lane/Street A & Cross Ave	TCS	LOS Delay V/C Q	B 12 0.20 15	B 12 0.22 24	B 12 0.22 24	B 12	B 12 0.05 6	B 13 0.34 39	B 13 0.34 39	B 13	B 20 0.66 58	B 14 0.17 13	B 14 0.17 13	B 18	C 29 0.27 16	C 28 0.11 15	C 28 0.11 15	C 28	B 16 0.51
	22: Street C & Street 1	TCS	LOS Delay V/C Q	A 10 0.36 15	A 10 0.36 15	A 10 0.36 15	A 10	A 10 0.36 15	A 10 0.36 15	A 10	A 10	A 0 0.00 0	A 6 0.34 19	A 6 0.34 19	A 6	A 5 0.29 19	A 5 0.29 19	A 5 0.29 19	A 5	A 8 0.37
	23: GO Station West Access/Street C & Cross Ave	TCS	LOS Delay V/C Q	F 52 0.95 189	F 52 0.95 189	F 52 0.95 189	E 50	D 29 0.75 136	D 29 0.75 136	D 29 0.75 136	E 39	D 33 0.38 32	F 70 0.95 122	F 70 0.95 122	F 64	F 80 1.00 76	C 20 0.21 30	C 20 0.21 30	C 20 0.21 30	F 57

MOE - Measure of Effectiveness Q - 95th Percentile Queue Length TCS - Traffic Control Signal RBT - Roundabout
 LOS - Level of Service Ex - Existing Available Storage TWSC - Two-Way Stop Control
 Delay - Average Delay per Vehicle in Second Avail. - Available Storage AWSC - All-Way Stop Control



13.4 Interim Design – Argus at South Service Road

An interim solution is also expected to be required at the intersection of Arugs Road and South Service Road until the intersection can be upgraded. Future southbound left-turn movements from South Service Road East are forecast to operate at LOS F due to high east-west volumes along Argus Road by-passing the Trafalgar Road / Cross Avenue intersection under the 2028 Total horizon (Opening Day).

Ultimately, it is recommended that traffic control signals along with separate left turn lanes for all approaches and the addition of a westbound through lane be provided. However, until road widening occurs through the dedication of land by way of future development within the area, it is recommended that the intersection operate with traffic control signals and the addition of a westbound right turn lane. It appears that the pavement width could be wide enough to accommodate the additional lanes through a restriping of pavement markings to provide 3.0m wide lanes.

An interim analysis was completed for the intersection of Argus Road and South Service Road for the 2033 horizon to assess the interim configuration.

Table 13.2 summarizes the results of the interim analysis. **Appendix I** contains the detailed Synchro reports. Overall, the intersection of Argus Road and South Service Road is expected to operate with minima delay.

TABLE 13.2: 2033 INTERIM ANALYSIS

Peak Hour	Intersection	Control Type	MOE	Direction / Movement / Approach																
				Eastbound				Westbound				Northbound				Southbound				Overall
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
AM Peak Hour	11: Argus Rd & South Service Road	TCS	LOS Delay V/C Q	C 7 0.13 11	A 7 0.13 11		B 7 0.13 11		B 19 0.85 128	B 7 0.16 7	B 16 0.16 7					C 23 0.53 78		C 23 0.53 78	C 23 0.53 78	B 17 0.73 78
PM Peak Hour	11: Argus Rd & South Service Road	TCS	LOS Delay V/C Q	A 4 0.14 8	A 4 0.14 8		A 4 0.14 8		A 10 0.76 84	A 5 0.27 8	A 8 0.27 8					B 14 0.30 20		B 14 0.30 20	B 14 0.30 20	A 9 0.64 20

MOE - Measure of Effectiveness
 LOS - Level of Service
 Delay - Average Delay per Vehicle in Second Avail. - Available Storage
 Q - 95th Percentile Queue Length
 Ex - Existing Available Storage
 TCS - Traffic Control Signal
 TWSC - Two-Way Stop Control
 AWSC - All-Way Stop Control
 RBT - Roundabout



13.5 Transportation Network Overview

The vehicle traffic analyses of intersection performance concluded overall conditions are expected to experience congestion during the weekday peak hours. This area surrounds one of the busiest GO Transit stations within the province¹⁹; the area is expected to experience vehicle capacity constraints for two to four hours a day on a typical weekday. The other 20 hours of the weekday, weekends and holidays would be expected to exhibit better vehicle traffic conditions.

Widening arterial roads to accommodate vehicular traffic volumes is not recommended in the study area. This would be counterintuitive to the vision of a people-centric, pedestrian-friendly environment of Midtown Oakville that expects people to use more sustainable modes to travel. Any potential road widening will accommodate dedicated bus lanes to improve transit capacity and efficiency.

Conditions for pedestrians, cyclists and transit users will be expected to be significantly improved from existing conditions in the study area based on the proposed changes to Trafalgar Road and roadway design within Midtown Oakville. The smaller block size and wide sidewalks on both sides of any new roads will aid in pedestrian connectivity through pedestrian pathways. Wider sidewalks and multi-use paths are anticipated in the highest pedestrian demand areas.

Cycling infrastructure presently is limited in the study area. The cycling network is expected to expand through redevelopment, and gaps in the network are expected to be filled.

Increased frequency of GO trains and buses and Oakville Transit buses are expected to make transit more convenient. Transit priority measures are recommended to be explored further by the Town to help make transit schedules more reliable and make transit more attractive.

There is forecast to be more vehicle traffic congestion, longer delays and long queues at full build-out of the study area. At the same time, with the people-centric approach to Midtown Oakville, there are expected to be more amenities, better connectivity for pedestrians and cyclists, and more frequent, reliable, and convenient service for transit passengers. The finer grain road network is proposed to provide enhanced multi-modal connectivity and access.

¹⁹ Ridership Performance Year-to-Date, Metrolinx, 2019
<https://blog.metrolinx.com/wp-content/uploads/2020/02/click-here-to-see-the-above-ridership-map-in-detail.pdf>



13.6 Development Impacts

The Ministry of Ontario released a guideline called "A Guideline for Highway Improvements Associated with Development" to clarify who is responsible for roadway improvements when land use development requires it. This guide outlines the steps municipalities and stakeholders must follow when constructing improvements to a roadway, whether directly or indirectly. Although this guide is primarily intended for roads under Provincial jurisdiction, it provides valuable insight into the responsibilities involved in these projects. **Section 3A** of the guideline outlines the following:

"Where a proposed Development will gain access to a provincial highway either directly by private entrance or by a new municipal road, the Proponent is responsible (financially or otherwise) for all warranted Highway Improvements, identified in the approved Traffic Impact Study. The Proponent is also responsible for any Highway Improvements that are not required immediately but that have been identified as being warranted in the future as a result of the Development. Any such future Highway Improvements are the responsibility (financially or otherwise) of the Proponent and must be addressed to MTO's satisfaction before MTO permits will be issued."

Section 3C of the guideline outlines the following:

"Based upon MTO's review of a Proponent's Traffic Impact Study, it identifies a warrant for Highway Improvements based on existing and/or projected background traffic volumes. The Proponent would be responsible (financially or otherwise) for any additional Highway Improvements required over and above the existing and/or projected background traffic volumes, in order to accommodate the proposed Development traffic."

Based on the above, the Applicant will be responsible for the costs related to constructing traffic control signals at the intersection of Argus Road and South Service Road along with the addition of a westbound right turn lane during the interim conditions. As land from adjacent properties is acquired by the Town of Oakville, additional traffic lanes could be implemented to improve operations at the Argus Road and South Service Road intersection.



14 Conclusions and Recommendations

14.1 Conclusions

Development Concept Review

A review of the proposed Development Concept plans was undertaken with the following conclusions reached:

- ▶ Pedestrian, bicycle, and vehicular access to the Site provides appropriate mobility opportunities for all modes.
- ▶ The proposed Development Concept is consistent and compatible with short-term (prior to the development of adjacent properties) and long-term (with the fulfillment of the Mid-Town Oakville streets and blocks plan) Mid-Town Oakville conditions.

Vehicle Parking Considerations

Application of the parking standards outlined in Town of Oakville's Zoning By-law 2014-014 would result in a minimum requirement of 2,211 spaces (1,515 residential, 370 visitor, and 326 non-residential). This results in a residential parking requirement of 0.82 spaces per unit.

Notwithstanding the above, reduced parking standards have been proposed which would result in a minimum requirement of 1,214 total parking spaces to meet the needs of the Project. This includes 872 resident parking spaces (effective parking supply of 0.50 parking spaces per unit excluding studio units), 278 residential visitor parking spaces (effective ratio of 0.15 parking spaces per unit), and 64 parking spaces for the retail and commercial use (1.08 parking spaces per 100 m²)

Access to the underground parking facility is proposed from driveways off the Future Local Road 'Street C' and South Service Road East.

Both the reduced residential and non-residential parking supply is appropriate based on the provincial and local policy / plan that direct municipalities to reduce or eliminate minimum parking requirements; evolving transportation context and their reaches through the GTHA; comparison of other Zoning By-law standards and approvals within the GTHA, and the TDM plan proposed for the proposed development.



Loading Considerations

There are no loading requirements outlined in the Zoning By-law 2014-014.

Regardless, the total loading supply of 6 spaces including 1 refuse collection loading space, 2 full-sized loading space, and 3 smaller size loading space are proposed to service the site. The 3 smaller size loading spaces are proposed on the P1 level of the garage, and the remaining 3 loading spaces are provided in a consolidated area in close proximity to Tower 1.

Access to all loading spaces is proposed from the driveways off South Service Road East. The driveway off the Future Local Road 'Street C' will not permit loading access for the smaller sized loading spaces on the P1 level due to height restrictions. This access will be signed to warn drivers about the clear height. The loading areas for the proposed Towers have the requisite internal manoeuvring area and refuse bin staging area.

The proposed loading provisions meets the minimum loading requirements of Zoning By-law 2014-014.

Bicycle Parking Considerations

Application of the bicycle parking standards outlined in underlying Town of Oakville Zoning By-law 2014-014 requires a minimum of 1,858 bicycle parking spaces (1,395 long-term and 463 short-term bicycle parking spaces).

The site proposes 1,858 bicycle parking spaces, including 463 short-term spaces and 1,395 long-term spaces, which meets the minimum requirements specified under Zoning By-law 2014-014.

All bicycle parking is located on the mezzanine level, ground level, and P1 level of the site. Long-term bicycle parking is located within a secure, weather-protected facility.

3 bicycle repair stations will be provided for each tower to service the cycling needs of the site.

Transportation Impact Study

The proposed development will generate approximately 453 new vehicle trips during the weekday AM peak hour and 476 new vehicle trips during the weekday PM peak hour.



Detailed traffic analysis was conducted for each study area intersection under Base conditions, Opening Year (2028), Full Build-Out (2033), Five Years after Full Build-Out (2038) and Ten Years after Full Build-Out (2043) Background and Total conditions.

It is acknowledged that deficiencies currently exist at specific locations, primarily along the Trafalgar Road corridor within the study area. They can be expected to persist in the future with anticipated growth in traffic, independent of the development.

For clarification, delays along the Trafalgar Road corridor (external study area intersections) have been documented as a foreseeable issue without the proposed development in the Midtown Oakville EA. The EA identified several roadway improvements to address traffic growth's existing and long-term impacts. The construction of new direct off-ramps for the QEW at Trafalgar Road, a revised local road network for Midtown Oakville, an extension of Cross Avenue and a variety of intersection improvements are proposed. It is understood that these improvements will provide some relief to operational issues. However, vehicle capacity constraints will persist for the overall transportation network.

As the EA recognized capacity constraints, further remedial measures to improve intersection capacity are not likely to be implemented. Instead, future improvements to the transportation network are expected to primarily focus on sustainable forms of transportation, including an improved transit network by adding BRT along Trafalgar Road.

By shifting commuter travel to public transit, intersection operations could be expected to maintain the status quo (at capacity condition during peak hours) or improve if fewer vehicles transverse the intersections during the peak hours of a typical weekday. The Town of Oakville's Urban Mobility & Transportation Strategy²⁰ echoes this sentiment:

"The Town of Oakville and Halton Region must accept a crucial point: they will never solve congestion. There will always be someone new who fills up space on the road, regardless of whether that space was created by paving a new lane or having some drivers switch to buses. It is well established that the expansion of congested roadways does not reduce congestion – it just increases the number of people on those roadways. This is called induced demand."

²⁰ Oakville Urban Mobility & Transportation Strategy, Steer, November 2021



"Due to the principle of induced demand, vehicular congestion can never be solved completely, and Oakville should not fall into the trap of trying to prove otherwise. Oakville's current methodology for assessing traffic (and the impacts to traffic from new developments) fails to capture this fact, biases suburban developments over urban ones, and does not assess other modes such as walking, cycling and transit."

With respect to the internal study area intersections surrounding the subject site, the capacity analysis showed that deficiencies currently exist and are projected to occur at certain locations within the internal study area with anticipated growth in traffic, including the proposed development. The following capacity constraints at the study area intersections are identified.

Argus Road at South Service Road

The intersection of Argus Road and South Service Road East currently operates well during peak hours, with individual movements operating at LOS C or better. However, under the 2033 and 2038 background conditions, the southbound approach is expected to experience significant delays due to high volumes of traffic along Argus Road.

The 2043 background conditions are expected to cause extensive delays for the southbound approach due to the high volume of east-west traffic on Argus Road, leaving few gaps for the stop-controlled movements. In terms of development traffic implications, the southbound approach is particularly sensitive to additional traffic, as the high volumes along Argus Road make it difficult to manage. Therefore, the addition of site traffic under the 2033 Total horizon is projected to result in significant delays during the AM peak hour.

To accommodate projected traffic volumes, adjustments to the roadway geometry are necessary. Some possible upgrades include implementing the following:

- ▶ Traffic control signals with actuated uncoordinated control
- ▶ Separate left turn lane for eastbound traffic
- ▶ Additional westbound through lane
- ▶ Separate left turn lane for southbound traffic

An interim solution is also expected to be required at the intersection of Argus Road and South Service Road until the intersection can be upgraded. Future southbound left-turn movements from South Service Road East are forecast to operate at LOS F due to high east-west



volumes along Argus Road by-passing the Trafalgar Road / Cross Avenue intersection under the 2028 Total horizon (Opening Day).

Until road widenings occur through the dedication of land by way of future development within the area, it is recommended that the intersection operate with traffic control signals and the addition of a westbound right turn lane. It appears that the pavement width could be wide enough to accommodate the additional lanes through a restriping of pavement markings to provide 3.0m wide lanes.

To improve the operations, it is recommended that the following changes to the lane configuration occur for Opening Day:

- ▶ Restripe pavement markings along Argus Road to provide for a separate right turn lane for the westbound approach.
- ▶ Traffic control signals with actuated uncoordinated control

Argus Road at Cross Avenue

During the weekday peak hours, the majority of movements at the signalized intersection of Cross Avenue and Argus Road/GO Station Driveway operate at LOS C or better. However, based on the projections under 2033 background traffic conditions, the southbound left turn and shared through right turn movement is expected to operate at LOS F with a v/c ratio exceeding 1.00.

The implementation of the local road network under the 2038 Background conditions alleviates some congestion at the intersection, but the southbound left turn is still projected to operate at LOS F with a v/c ratio exceeding 1.00. No new critical movements are identified under the 2043 Background traffic conditions, but increased delay is expected. Development traffic implications are expected to be similar under the 2028-2043 Total conditions.

To accommodate projected traffic volumes, adjustments to the roadway geometry are necessary. Some possible upgrades include implementing the following:

- ▶ Double left turn lane for southbound traffic that is fully protected
- ▶ Prohibit eastbound left turn movements
- ▶ Repurpose the eastbound lane arrangement to have a separate right-turn lane
- ▶ Optimizing the timing of traffic signals



Cross Avenue at Lyons Lane/Commercial Driveway

During the weekday peak hours, the individual movements at the signalized intersection of Cross Avenue and Lyons Lane operate efficiently, at LOS C or better. However, it is predicted that the northbound left-turn operations will decline from LOS C to LOS E with a v/c ratio of 0.98 by 2043 under the background conditions. Despite an increase in site-generated traffic volumes, there will be only a slight increase in delay which does not impact operations.

To accommodate projected traffic volumes, adjustments to the roadway geometry are necessary. Some possible upgrades include implementing the following:

- ▶ Addition of permitted/protective phase for northbound approach

Cross Avenue at GO Station West Access/Street C

The Cross Avenue and GO Station West Access signalized intersection is currently operating well, with most movements grading at LOS B, except for the westbound approach which operates at a poor LOS F during weekday AM peak hour. This is due to the high volume of left-turning traffic travelling into the GO Station. Delay is expected to increase for the westbound approach under the 2028 Background horizon.

Furthermore, under the 2033 Background horizon, the north leg of the intersection will be operational, which will further add delay to the westbound approach, which will operate at LOS F with a v/c ratio exceeding 1.00.

The southbound left-turn will also operate at LOS F with a v/c ratio exceeding 1.00 during the weekday peak hours under the 2038 and 2043 Total (Ph 1+2) conditions, with the addition of site-generated traffic. Lastly, under the 2043 Total conditions, the eastbound approach is projected to operate at LOS D with a v/c ratio of 0.93.

To accommodate projected traffic volumes, adjustments to the roadway geometry are necessary. Some possible upgrades include implementing the following:

- ▶ Repurpose westbound lanes to have a double left turn lane for westbound traffic that is fully protected and a shared through/right turn lane
- ▶ Separate left turn lane for eastbound traffic
- ▶ Convert through lane to right turn lane



- ▶ Optimizing the timing of traffic signals

Street C at Street 1

The intersection of Street C and Street 1 will experience significant delays for westbound traffic during the AM peak hour in the 2038 Background scenario. This is due to the increased traffic from Argus Road being rerouted onto Street 1 and Street C to access the GO station. The proposed development is expected to further increase delays for the westbound approach. However, it is projected that the addition of site traffic will only result in delays of less than 35 seconds throughout the local road network.

To accommodate projected traffic volumes, the intersection should be designed to include the following:

- ▶ Traffic control signals with actuated uncoordinated control
- ▶ Separate left turn lane for eastbound traffic
- ▶ Separate left turn lane for westbound traffic

Transportation Demand Management Plan

A comprehensive TDM plan will be implemented to support the use of transit and active transportation while reducing the number of single-occupant vehicle trips during the peak hours. Specific TDM strategies proposed include, but are not limited to:

- ▶ provision of a reduced parking supply and unbundling the residential units and vehicle parking space sales;
- ▶ provision of on-site bicycle parking with repair stations;
- ▶ Considerations to provide a private on-site bicycle share station;
- ▶ Considerations to provide 5-10 car share on site;
- ▶ Considerations for the provisions of incentive programs designed to encourage the use of on-site services including corporate or private memberships for car-share, and/or carpool services for employees and staff, and potential private or shared micromobility devices; and
- ▶ provision of wayfinding and signage to / from area non-auto transportation services.

It should be noted that a limited parking supply is one of the most essential TDM measures. Research conducted focused on whether a relationship exists between the provision of off-street parking and the choice to drive among individuals travelling to or from the site.



Following data collection and an empirical review of the data, this research found that reductions in off-street vehicular parking for office, residential, and retail developments reduce the overall automobile mode share associated with those developments relative to projects with the same land uses in similar contexts that provide more off-street vehicular parking.

The role of parking management is a crucial element in helping Oakville meet its trip reduction goals. If free and unregulated parking is provided, there is little incentive for many residents and visitors to use alternative modes of transportation. The Town of Oakville's Urban Mobility & Transportation Strategy echoes this sentiment:

"The provision of free parking is a subsidy to drivers, and its removal or reduction can serve as an encouragement to switch to other modes of transport."

14.2 Recommendations

Based on the findings of this study, the following recommendations are identified:

- ▶ The Applicant be responsible for the costs related to constructing traffic control signals at the intersection of Argus Road and South Service Road along with the addition of a westbound right turn lane during the interim conditions through restriping of pavement markings.
- ▶ The Applicant implements unbundling resident parking where parking spaces are provided at a separate cost to residents.
- ▶ The Applicant provide a comprehensive TDM plan to maximize alternative mobility opportunities for residents, visitors and employees of the Project.
- ▶ As the increase in traffic at some of the internal study area intersections are a result of overall growth for the area, the Town is recommended to coordinate the improvement plan for additional improvements to the Argus Road and Cross Avenue corridors.



Appendix A

Terms of Reference



Greg Lue

From: Aquisha Khan <aquisha.khan@oakville.ca>
Sent: January 7, 2022 11:20 AM
To: Adam Makarewicz; Greg Lue
Cc: Steiger, Bernie; White, Mark J. (MTO); 'Krusto, Matt'; Tricia Collingwood
Subject: RE: 210590 - 166 South Service Road Oakville Traffic and Parking Study - Terms of Reference

Good Morning Mr. Makarewicz;

Thank you for confirming that there are no historical counts for the Trafalgar Village Plaza intersections.

- Trafalgar Plaza Village & South Service Road
- Trafalgar Plaza Village & Cross Avenue

At this time due to unforeseen circumstances, it is acknowledged that the turning movement counts would not be conducted.

The Town is in support of negating the analysis of these intersections at this time and will accept a supplemental addendum for these intersections analysis at a later date.

Regards;

Aquisha Khan, P. Eng.

Transportation Engineer,
Transportation and Engineering Department,
Town of Oakville | P: 905-845-6601 | www.oakville.ca

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From: Adam Makarewicz <amakarewicz@ptsl.com>
Sent: January 7, 2022 9:54 AM
To: Aquisha Khan <aquisha.khan@oakville.ca>; Greg Lue <glue@ptsl.com>
Cc: Steiger, Bernie <Bernie.Steiger@halton.ca>; White, Mark J. (MTO) <Mark.J.White@ontario.ca>; 'Krusto, Matt' <Matt.Krusto@halton.ca>
Subject: RE: 210590 - 166 South Service Road Oakville Traffic and Parking Study - Terms of Reference

SECURITY CAUTION: This email originated from outside of The Town of Oakville. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Hi Aquisha,

Unfortunately, there are no historical counts at the Trafalgar Village Plaza driveways.

As a result, will you consider removing these two intersections from the operational analysis for the current report? Once the situation has improved, we can re-analyze these intersections through a supplemental addendum.

All the best,

Adam J. Makarewicz

Senior Project Manager



Paradigm Transportation Solutions Limited

5A-150 Pinebush Road, Cambridge ON N1R 8J8

p: 905.381.2229 x303

e: amakarewicz@ptsl.com

w: www.ptsl.com

From: Adam Makarewicz

Sent: 6-Jan-22 1:53 PM

To: Aquisha Khan <aquisha.khan@oakville.ca>; Greg Lue <glue@ptsl.com>

Cc: Steiger, Bernie <Bernie.Steiger@halton.ca>; White, Mark J. (MTO) <Mark.J.White@ontario.ca>; 'Krusto, Matt' <Matt.Krusto@halton.ca>

Subject: RE: 210590 - 166 South Service Road Oakville Traffic and Parking Study - Terms of Reference

Hi Aquisha,

We have reached out to Service Oakville to check on historical counts. We will follow up once we know the historic data situation.

All the best,

Adam J. Makarewicz

Senior Project Manager



Paradigm Transportation Solutions Limited

5A-150 Pinebush Road, Cambridge ON N1R 8J8

p: 905.381.2229 x303

e: amakarewicz@ptsl.com

w: www.ptsl.com

From: Aquisha Khan <aquisha.khan@oakville.ca>

Sent: 6-Jan-22 11:55 AM

To: Adam Makarewicz <amakarewicz@ptsl.com>; Greg Lue <glue@ptsl.com>

Cc: Steiger, Bernie <Bernie.Steiger@halton.ca>; White, Mark J. (MTO) <Mark.J.White@ontario.ca>; 'Krusto, Matt' <Matt.Krusto@halton.ca>

Subject: RE: 210590 - 166 South Service Road Oakville Traffic and Parking Study - Terms of Reference

Hi Adam;

Please send a request to serviceoakville@oakville.ca to request for or confirm if there are any historical traffic counts at the intersections.

Thank you.

Regards;

Aquisha Khan, P. Eng.

Transportation Engineer,

Transportation and Engineering Department,

Town of Oakville | P: 905-845-6601 | www.oakville.ca

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From: Adam Makarewicz <amakarewicz@ptsl.com>

Sent: January 6, 2022 9:53 AM

To: Aquisha Khan <aquisha.khan@oakville.ca>; Greg Lue <glue@ptsl.com>

Cc: Pasquini-Smith, Alexandria <Alex.Pasquini-Smith@halton.ca>; Steiger, Bernie <Bernie.Steiger@halton.ca>; White, Mark J. (MTO) <Mark.J.White@ontario.ca>; 'Krusto, Matt' <Matt.Krusto@halton.ca>

Subject: RE: 210590 - 166 South Service Road Oakville Traffic and Parking Study - Terms of Reference

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Good Morning and Happy New Year Aquisha,

We were planning to have the intersections of Trafalgar Village Plaza with South Service Road, and Cross Avenue counted next week. However, given the current lockdown with schools closed and retail stores having reduced capacity, completing traffic counts would be underrepresented in terms of volumes.

Does the Town have any historical traffic data for these two intersections? If not, would you consider removing these two intersections from the operational analysis?

We can consider re-analyzing these intersections once the situation has improved and actual counts can be completed through a supplemental addendum.

All the best,

Adam J. Makarewicz

Senior Project Manager



Paradigm Transportation Solutions Limited

5A-150 Pinebush Road, Cambridge ON N1R 8J8

p: 905.381.2229 x303

e: amakarewicz@ptsl.com

w: www.ptsl.com

From: Aquisha Khan <aquisha.khan@oakville.ca>

Sent: 30-Nov-21 4:25 PM

To: Greg Lue <glue@ptsl.com>

Cc: Pasquini-Smith, Alexandria <Alex.Pasquini-Smith@halton.ca>; Steiger, Bernie <Bernie.Steiger@halton.ca>; White, Mark J. (MTO) <Mark.J.White@ontario.ca>; Adam Makarewicz <amakarewicz@ptsl.com>; 'Krusto, Matt' <Matt.Krusto@halton.ca>

Subject: RE: 210590 - 166 South Service Road Oakville Traffic and Parking Study - Terms of Reference

Hello Greg;

Thank you for providing your Terms of Reference for our review. Please see the Town of Oakville comments in green:

Study Intersections:

The study intersections identified for this study will include the following:

Proposed

- Trafalgar Road at QEW WB Ramp (signalized);
- Trafalgar Road at QEW EB Ramp (signalized);
- Trafalgar Road at Cross Avenue/South Service Road (signalized);
- Trafalgar Road at Cornwall Road (signalized);
- Cross Avenue and Argus Road/GO Station Driveway (signalized);
- Trafalgar Road at Argus Road (unsignalized);
- Argus Road and South Service Road (unsignalized); and
- One site driveway – (Site access at Future Local Road).

Additional intersections

- Trafalgar Road at Leighland/Iroquois Shore
- Cross Avenue at Lyons Lane West
- Future Local Road at South Service Road East
- Trafalgar Village Plaza Access at South Service Road East
- Trafalgar Village at Cross Avenue

Existing Data

- For all Town of Oakville Intersections, please contact serviceoakville@oakville.ca to request the most recent traffic data and signal timing plan where applicable.

Background Traffic

- Background developments to include in study are as follows:
 - 418 – 450 Iroquois Shore Road
 - 157 Cross Avenue
 - 217-227 Cross Avenue
 - 130 Cornwall Road
 - 271 Cornwall Road

- 571 Argus Road
- 599 Lyons Lane
- 627 Lyons Lane
- Midtown Oakville EA Study

Transit Modal Split to be incorporated as per Halton Region guidelines.

TIA to confirm the ownership of South Service Road and the ROW requirements as per MTO restrictions.
TIA to include lane configuration plans of the existing and future lane configurations with traffic control devices.

If there are any other questions, please feel free to contact me.

Regards;

Aquisha Khan, P. Eng.

Transportation Engineer,
Transportation Services,
Town of Oakville | 905-845-6601 x3236, | www.oakville.ca

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Aquisha Khan, P. Eng.

Transportation Engineer
Transportation and Engineering
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From: Krusto, Matt <Matt.Krusto@halton.ca>

Sent: November 30, 2021 1:59 PM

To: 'glue@ptsl.com' <glue@ptsl.com>

Cc: Pasquini-Smith, Aleksandria <Alex.Pasquini-Smith@halton.ca>; Steiger, Bernie <Bernie.Steiger@halton.ca>; White, Mark J. (MTO) <Mark.J.White@ontario.ca>; Aquisha Khan <aquisha.khan@oakville.ca>; amakarewicz@ptsl.com

Subject: RE: 210590 - 166 South Service Road Oakville Traffic and Parking Study - Terms of Reference

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Hi Greg,

Thank you for providing the terms of reference. I have reviewed the terms of reference and have the following comments:

As noted in the terms of reference, the study area intersections will be:

- Trafalgar Road at QEW WB Ramp (signalized);
- Trafalgar Road at QEW EB Ramp (signalized);
- Trafalgar Road at Cross Avenue/South Service Road (signalized);
- Trafalgar Road at Cornwall Road (signalized);
- Cross Avenue and Argus Road/GO Station Driveway (signalized);
- Trafalgar Road at Argus Road (unsignalized);
- Argus Road and South Service Road (unsignalized); and
- One site driveway.

Please add the intersection of Trafalgar Road at Leighland/Iroquois Shore.

It is stated in the terms of reference “Existing TMC data in the study area from 2017 and 2019 will be utilized for a 2021 base year”. It must be first checked with Halton Region if there are any existing 2018 or 2019 counts available, before proceeding with the use of a 2017 count with a growth rate. Requests for traffic data and traffic signal timings can be made to trafficdatarequests@halton.ca

It is stated in the terms of reference “Historic traffic growth trends at Trafalgar Rd & QEW ramps showed a decrease in traffic of 3-4% between 2015 and 2017. Thus, we would assume no growth from TMC year to Base year”. This cannot be supported for the following reasons:

- It should be noted, in a 2017 memo by Town staff on another area development file, it was stated: “Please note the former hospital site was closed on December 13, 2015 and the bridge work along Trafalgar Road has yet to be completed. MTO is completing the bridge work in phases and although was expected to be completed in December 2016, will now be completed by the summer of 2017. Currently all six (6) lanes of traffic are open, however, please confirm with MTO that the lanes will remain open at the time of any traffic counts.” Therefore, the decrease in traffic counts when comparing 2015 to 2017 was, in all likelihood, due to the MTO bridge works during the 2016-2017 time period. The 3-4% decrease is explainable and, not applying growth rates to the 2017 and 2019 count data is unacceptable. Further, Town of Oakville comments from the previous area development (which recommending the same decrease) also did not support a decrease in traffic volumes to be used in the study. Additionally, on this same area development, MTO did not support this decrease as well (MTO data previously showed the volume was not decreasing).
- Halton’s transportation model predicts growth rates averaging two percent per annum, to the year 2031, on various sections of Trafalgar Road and the crossings streets.

For the traffic volume counts and traffic signal timing (from Halton Region), information can be requested from our Road Operations group at trafficdatarequests@halton.ca.

The Background Developments must be confirmed and approved by the Town of Oakville. Town staff will also provide, if available, any Midtown Oakville traffic assumptions.

Transit Mode Splits:

Halton’s Transportation Master Plan 2011 utilizes a transit mode split of 10% for 2021, 15% for 2026 and 20% for 2031. Assumption of travel via other modes (active transportation i.e.: walk, cycle) should utilize a 5% mode split for 2031. Transportation Demand Management (TDM) assumptions of 3% for 2031 would also be acceptable. **Transit mode splits will need to be adjusted from the 2011 TMP assumptions to reasonable percentages based on current**

year (2021), 2026 and 2031 planned and proposed mode splits (based on existing facilities and service in the area to date (planned &/or proposed). Reasonable assumptions and rationale must be clearly outlined in the Study.

The Study must document all mitigation measures required based on the approved Study & analysis, either based on the development traffic impacts or based on the overall analysis (unrelated to the development traffic impacts).

Other general Study comments include:

The TIS report will include:

- *Site Plan and Map,*
- *Size & Number of Development Phases,*
- *Existing Conditions (Study Area Intersections, Road Network, Pedestrian Routes, Cycling Routes, Transit Services),*
- *Existing Traffic Conditions (Site Operating Characteristics, Data Collection/Traffic Counts, Analysis Periods (5 years Ahead),*
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- *TDM recommendations (Transit, Pedestrian & Cycling Facilities Analysis)*
- *Conclusions*

Let me know if there are any questions.

Matt

Matt Krusto

Supervisor, Transportation Development Review

Infrastructure Planning & Policy

Public Works

Halton Region

905-825-6000, ext. 7225 | 1-866-442-5866

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Greg Lue

From: White, Mark J. (MTO) <Mark.J.White@ontario.ca>
Sent: December 8, 2021 8:55 AM
To: Greg Lue
Subject: FW: 210590 - 166 South Service Road Oakville Traffic and Parking Study - Terms of Reference

Good morning Greg,

Please see comments from our Traffic office:

- TIS should Include TO/FROM trips/traffic to all accesses from site to QEW EB/WB at 3 ICs: Dorval Dr., Trafalgar Road and Royal Windsor Dr.
- It is expected that the proposed TIS would take into account the finalized ramps at the RWD IC that are included in the Oakville Midtown Plan.
- The TIS should consider both QEW existing ramps and the future ramps.
- It is already December so base year can be 2022.

Our project delivery office had comments to provide when a full site plan is submitted:

- Please show EA-approved locations of relocated roads and highways as well as new roads on the site plan.
- 14m setback from the new South Service Road location is required.

Regards,

Mark White

Corridor Management Planner
Ministry of Transportation | Central Region
159 Sir William Hearst Ave. 7th Floor,
Toronto, ON M3M 0B7
Mark.j.white@ontario.ca

From: Krusto, Matt <Matt.Krusto@halton.ca>
Sent: November 30, 2021 1:59 PM
To: 'glue@ptsl.com' <glue@ptsl.com>
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Other general Study comments include:

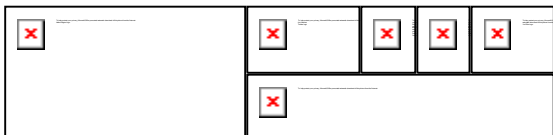
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Matt

Matt Krusto
Supervisor, Transportation Development Review
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From: Greg Lue <glue@ptsl.com>
Sent: November 24, 2021 4:29 PM
To: Krusto, Matt <Matt.Krusto@halton.ca>; Mark.J.White@ontario.ca; Aquisha Khan <aquisha.khan@oakville.ca>
Cc: Adam Makarewicz <amakarewicz@ptsl.com>
Subject: 210590 - 166 South Service Road Oakville Traffic and Parking Study - Terms of Reference

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Hi all,

Paradigm Transportations Solutions Limited has been retained to conduct a Transportation Impact Analysis and Parking Study for a proposed development located 166 South Service Road in the Town of Oakville. The preliminary site plan envisions a large-scale mixed-use residential development of three towers with proposed heights of 58, 50, and 44 storeys on top of a podium (preliminary site plan attached). The development would include approximately 1,720 units with a parking ratio of 0.49 spaces per unit. Vehicle access will be provided through a driveway connection to South Service Road.

Road network changes outlined in the Oakville Midtown EA will be included in the future road network. Specifically, the horizontal alignment of the existing South Service Road will be modified to accommodate the new Queen Elizabeth Way (QEW) eastbound off ramp to Cross Avenue at the Trafalgar Road interchange. The alignment of South Service Road will be shifted to the south and will form a new intersection with Argus Road. Impacts to the local roadway include a cul-de-sac proposed along the South Service Road at Lyons Lane, extension of the South Service to Cross Avenue and realignment of Lyons Lane at Cross Avenue. Trafalgar Road will also be assumed to operate as a six-lane corridor with HOV curb lanes with the eastbound channelized right turn at Trafalgar Road and Cornwall Road assumed to be removed.

Proposed Terms of Reference

Study Area Intersections

- Trafalgar Road at QEW WB Ramp (signalized);
- Trafalgar Road at QEW EB Ramp (signalized);
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- Argus Road and South Service Road (unsignalized); and
- One site driveway.

Existing Data

- Existing TMC data in the study area from 2017 and 2019 will be utilized for a 2021 base year
- Historic traffic growth trends at Trafalgar Rd & QEW ramps showed a decrease in traffic of 3-4% between 2015 and 2017. Thus, we would assume no growth from TMC year to Base year.

Horizon Years

- 2021 Base Year
- Opening Date
- 5 and 10-years from opening date

Analysis Periods

- Weekday AM peak hour
- Weekday PM peak hour

Analysis

- Synchro 10
- HCM 2000
- SimTraffic Queueing (five 60-min iterations)

Background Traffic

- Generalized growth rate 2% per annum
- Redevelopment of Midtown Oakville traffic will be included based on forecasts from the Midtown Oakville Transportation and Stormwater Municipal Class EA 2015
- Can you comment on this and provide any other relevant studies or inputs to estimate the traffic for the site(s)?

Site Traffic Estimates

- ITE Trip Generation Data 10th Edition
- Modal split reductions will be considered for horizon years based on planned/proposed transit service and network improvements. Mode split reductions will be confirmed with Town of Oakville staff.

Site Traffic Distribution

- Existing travel patterns/TTS 2016 data

Access and Circulation Review

- Front End Garbage Truck
- Fire Truck
- Other vehicles TBD based on Clients input/needs

Transportation Demand Management

- Discuss TDM measures and how they would be incorporated

Parking Study

- Parking generation for the site will be calculated using parking rates obtained from ITE Parking Generation Manual, Zoning By-Law comparisons, and other sources.
- A parking rate will be recommended that is deemed applicable to the subject site taking into account the development's location. The recommended rate will then be used to estimate the number of parking spaces needed to meet the projected parking demand. The estimated parking supply needed will be compared to the By-law required supply to assess the feasibility of providing less than the By-law supply requirements. In the event that the parking review determines that a parking reduction cannot be justified, the report will speak to this point.

Report

- We will document the study methodologies, findings, and conclusions in a report with appendices containing the detailed analysis results and any data collected.



Please let us know your comments on the study. Thanks !

Greg Lue, M.A.Sc., P.Eng.
Transportation Engineer



Paradigm Transportation Solutions Limited

5A-150 Pinebush Road, Cambridge ON N1R 8J8

p: 905.381.2229 x307

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e: glue@ptsl.com

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Appendix B

Existing Traffic Data





Ministry of Transportation
Ministère des Transports

Intersection Layout Sheet

Version: 1.0 Feb 1, 2016

Contract # 9015-E-0009

Work Order # 027

Date: Aug 14 Day: Tue Hrs: 7-9 + 11-14 + 15-18

Location: QEW @ Dorval Dr - Kerr STIC-116 Ramps: NRT1

Reg/Mun: CR Town/City: Oakville Area: _____

File Name: 1101330000 Device: Gretch / Jamar Unit # 121 Interval 1: AM NN / PM

Observer: Renat Shuliko Weather: Clear Clear Road Condition: Dry / Dry

LHRS & O/S: 10133 0.00 Comments: _____

GPS: G-Star IV

Datum: WGS 84 QI N

Lat: 43.447395

Long: -79.701587

SIGNALIZED (Y) / N

If intersection is unsignalized;
Sign Type: Stop / Yield

Sign Size: _____ cm x _____ cm

Sign Condition: _____

NA: New / Good / Poor / Missing

SA: New / Good / Poor / Missing

WA: New / Good / Poor / Missing

EA: New / Good / Poor / Missing

Photograph all approach's
including all Signs (Y) / N

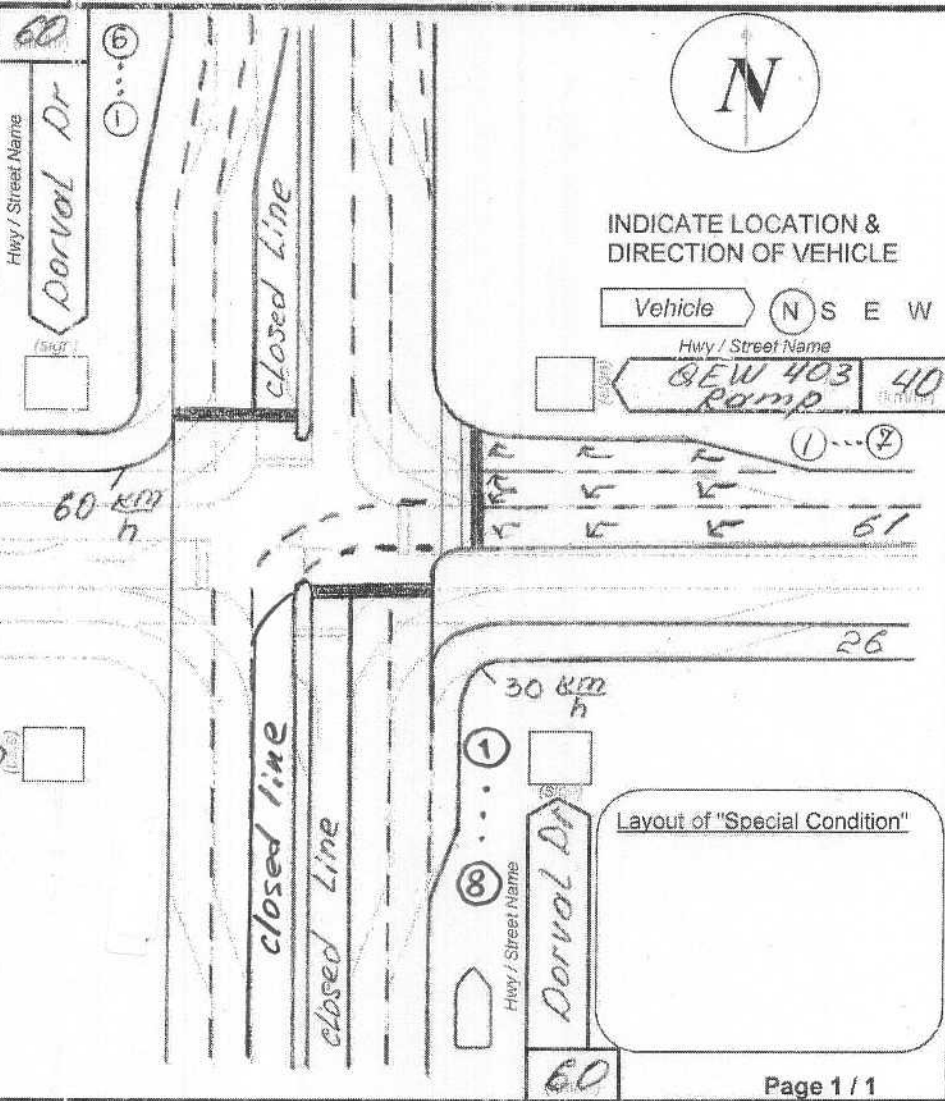
36

60 km/h

30 km/h



Note: Show all lanes approaching and leaving the intersection.
Show all channelization
If there are two or more through lane in one direction, indicate if these lanes are not continuous
Show pedestrian crosswalks





TVIS II - Traffic Volume Information System

Turning Movement Total Count and Peak Summary Report

Ministry of Transportation

Description: **Dorval Dr - Kerr St IC116 (NRT)**

Region: **CENTRAL**

Survey Type: **TM - Interchange**

Hwy: **QEW**

Start Date: **14-Aug-2018 (Tue)**

I/C Side: **N**

LHRS: **10133**

End Date: **14-Aug-2018 (Tue)**

Int. Type: **Four Leg**

Offset: **0**

Schedule Summary: **TUES-THURS, 07:00-09:00, 11:00-14:00, 15:00-18:00**

Total Count Number of hours: 8

		Dorval Dr				
Ped. 19	Total Vehicles	2% (T+LT) 1417	2% (T+LT) 6942	0% (T+LT) 0	↑ 7514	Ped. 0
					QEW; 61	
←	1417	↙	↓	↘	↑	2855 4% (T+LT)
0% (T+LT)	0	↗	←	0	0% (T+LT)	
0% (T+LT)	0	→	↓	4410	11% (T+LT)	
0% (T+LT)	0	↘	↙	↑	↗	2380
QEW; 36	11352	0	4659	2380	Total Vehicles	Ped. 17
Ped. 0	↓	0% (T+LT)	2% (T+LT)	3% (T+LT)		
		Dorval Dr				

AM Peak Hour Report Start Time: 08:00

		Dorval Dr				
Ped. 1	Total Vehicles	3% (T+LT) 194	2% (T+LT) 1087	0% (T+LT) 0	↑ 707	Ped. 0
					QEW; 61	
←	194	↙	↓	↘	↑	317 7% (T+LT)
0% (T+LT)	0	↗	←	0	0% (T+LT)	
0% (T+LT)	0	→	↓	681	12% (T+LT)	
0% (T+LT)	0	↘	↙	↑	↗	258
QEW; 36	1768	0	390	258	Total Vehicles	Ped. 4
Ped. 0	↓	0% (T+LT)	4% (T+LT)	3% (T+LT)		
		Dorval Dr				

Midday Peak Hour Report Start Time: 12:00

		Dorval Dr				
Ped. 1	Total Vehicles	1% (T+LT) 221	2% (T+LT) 917	0% (T+LT) 0	↑ 1047	Ped. 0
					QEW; 61	
←	221	↙	↓	↘	↑	355 4% (T+LT)
0% (T+LT)	0	↗	←	0	0% (T+LT)	
0% (T+LT)	0	→	↓	463	19% (T+LT)	
0% (T+LT)	0	↘	↙	↑	↗	306
QEW; 36	1380	0	692	306	Total Vehicles	Ped. 2
Ped. 0	↓	0% (T+LT)	1% (T+LT)	5% (T+LT)		
		Dorval Dr				

PM Peak Hour Report Start Time: 16:30

		Dorval Dr				
Ped. 1	Total Vehicles	3% (T+LT) 188	2% (T+LT) 853	0% (T+LT) 0	↑ 1306	Ped. 0
					QEW; 61	
←	188	↙	↓	↘	↑	503 1% (T+LT)
0% (T+LT)	0	↗	←	0	0% (T+LT)	
0% (T+LT)	0	→	↓	572	3% (T+LT)	
0% (T+LT)	0	↘	↙	↑	↗	371
QEW; 36	1425	0	803	371	Total Vehicles	Ped. 1
Ped. 0	↓	0% (T+LT)	1% (T+LT)	2% (T+LT)		
		Dorval Dr				



TVIS II - Traffic Volume Information System
Turning Movement 15 Minute Report

Description: Dorval Dr - Kerr St IC116 (NRT)

Region: CENTRAL

Survey Type: TM - Interchange

Hwy: QEW

Start Date: 14-Aug-2018 (Tue)

I/C Side: N

LHRS: 10133

End Date: 14-Aug-2018 (Tue)

Int. Type: Four Leg

Offset: 0

Schedule Summary: TUES-THURS, 07:00-09:00, 11:00-14:00, 15:00-18:00

Table with columns for Major Road Approaches (North/South Dorval Dr) and Minor Road Approaches (East/West QEW). Rows include Start Time, vehicle counts (Cars, Trucks, Long Trucks) for various directions, and Total Veh. per 15-minute period.



TVIS II - Traffic Volume Information System
Turning Movement 15 Minute Report

Description: **Dorval Dr - Kerr St IC116 (NRT)**

Region: **CENTRAL**

Survey Type: **TM – Interchange**

Hwy: **QEW**

Start Date: **14-Aug-2018 (Tue)**

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Schedule Summary: **TUES-THURS, 07:00-09:00, 11:00-14:00, 15:00-18:00**

Start Time	Major Road Approaches										Minor Road Approaches										Total Veh.																				
	North Dorval Dr					South Dorval Dr					East QEW: Ramp(s): 61					West QEW																									
	Cars			Trucks		Long Trucks		Ped	Cars			Trucks		Long Trucks		Ped	Cars			Trucks		Heavy Trucks		Ped																	
←	↑	→	←	→	←	→	←		↑	→	←	↑	→	←	↑		→	←	↑	→	←	↑	→																		
15:30	0	164	35	0	4	0	0	2	1	0	0	176	89	0	0	1	0	1	2	0	133	0	79	4	0	2	5	0	0	2	0	0	0	0	0	0	0	0	0	2	698
15:45	0	229	32	0	6	0	0	2	0	0	0	187	65	0	2	2	0	3	1	0	143	0	106	12	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	794
16:00	0	202	33	0	5	0	0	3	0	0	0	200	77	0	0	0	0	0	0	0	120	0	100	3	0	0	5	0	1	0	0	0	0	0	0	0	0	0	0	1	749
16:15	0	208	38	0	0	0	0	1	0	0	0	179	88	0	2	3	0	1	3	0	155	0	112	5	0	1	5	0	3	0	0	0	0	0	0	0	0	0	0	0	804
16:30	0	191	45	0	1	1	0	2	0	0	0	184	108	0	3	0	0	1	1	0	129	0	106	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	774
16:45	0	208	51	0	2	1	0	2	1	0	0	180	62	0	0	2	0	2	1	0	151	0	127	5	0	2	3	0	1	0	0	0	0	0	0	0	0	0	0	0	801
17:00	0	222	40	0	2	0	0	1	0	0	0	238	113	0	0	2	0	2	0	0	147	0	130	2	0	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	902
17:15	0	218	47	0	3	2	0	1	0	0	0	192	81	0	0	1	0	1	0	0	127	0	134	1	0	2	3	0	0	1	0	0	0	0	0	0	0	0	0	1	813
17:30	0	182	34	0	2	0	0	2	0	0	0	190	75	0	0	0	0	1	0	0	124	0	127	5	0	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	744
17:45	0	197	44	0	2	1	0	1	0	0	0	140	69	0	0	2	0	1	0	0	118	0	131	1	0	0	1	0	0	2	0	0	0	0	0	0	0	0	0	0	708



Intersection Layout Sheet

Contract # 9015-E-0009
Work Order # 028

Date: Aug 14/18 Day: Tue 1 Hrs: 7-9 + 11-14 + 15-18

Location: REW @ Dorval Dr - Kerr STIC-116 Ramps: SRT1

Reg/Mun: CR Town/City: Oakville Area: _____

File Name: 2101330000 Device: Gretch / Jamar Unit #: 121 Interval 1: (AM) NN / PM

Observer: Renat Shalix Weather: Clear Clear Road Condition: Dry / Dry

LHRS & O/S: 10/33 0.00 Comments: _____

GPS: E-STAR IV

Datum: WGS 84 (N)

Lat: 43.445528

Long: -79.698691

SIGNALIZED (Y) N

If intersection is unsignalized:
Sign Type: Stop / Yield

Sign Size: _____ cm x _____ cm

Sign Condition:

NA: New / Good / Poor / Missing

SA: New / Good / Poor / Missing

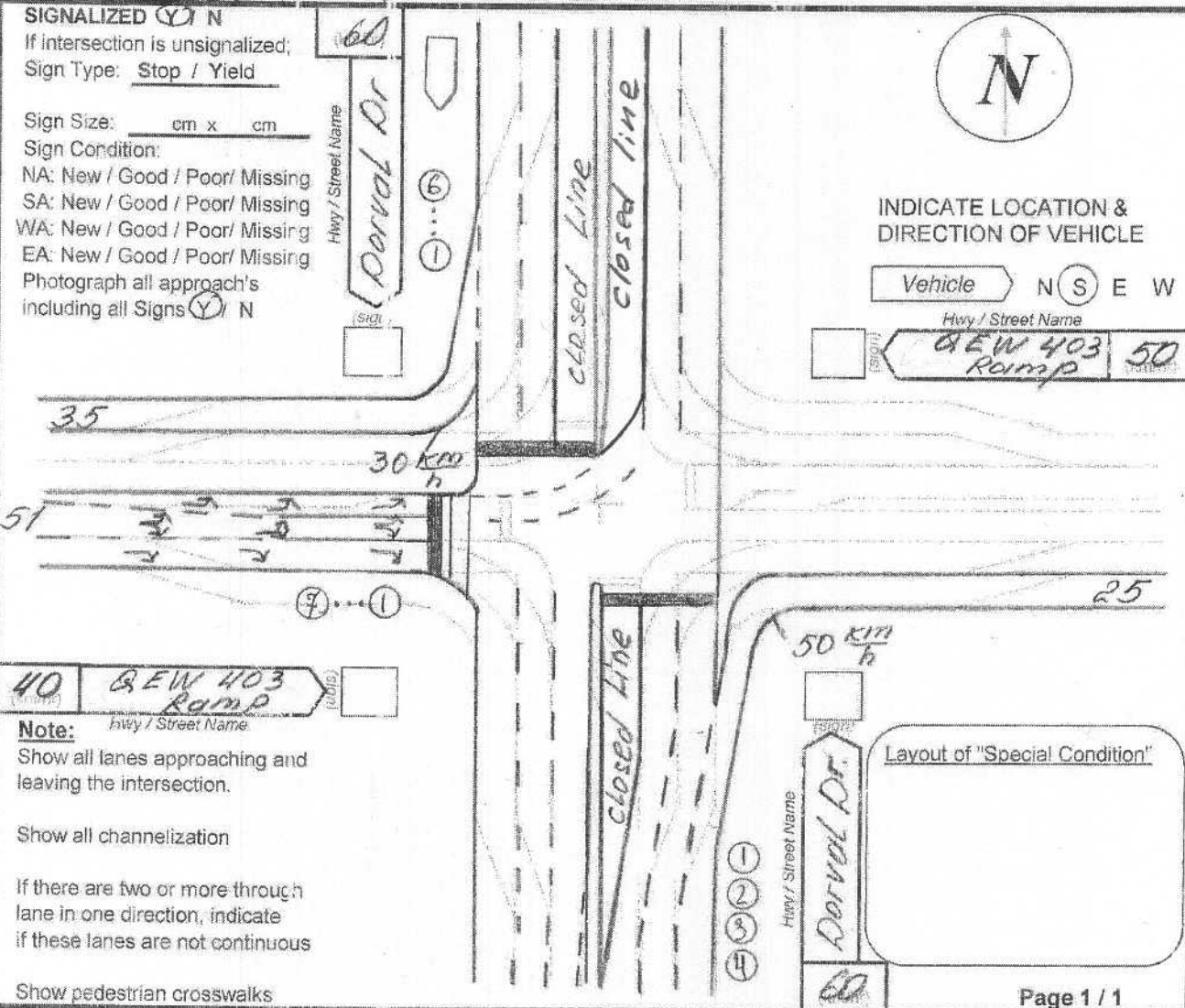
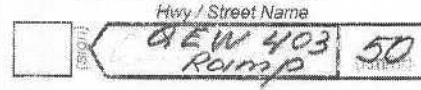
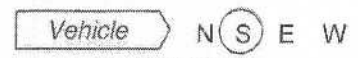
WA: New / Good / Poor / Missing

EA: New / Good / Poor / Missing

Photograph all approach's including all Signs (Y) N



INDICATE LOCATION & DIRECTION OF VEHICLE



Note:
Show all lanes approaching and leaving the intersection.

Show all channelization

If there are two or more through lane in one direction, indicate if these lanes are not continuous

Show pedestrian crosswalks

Layout of "Special Condition"



TVIS II - Traffic Volume Information System

Turning Movement Total Count and Peak Summary Report

Ministry of Transportation

Description: **Dorval Dr - Kerr St IC-116 (SRT)**

Region: **CENTRAL**

Survey Type: **TM - Interchange**

Hwy: **QEW**

Start Date: **14-Aug-2018 (Tue)**

I/C Side: **S**

LHRS: **10133**

End Date: **14-Aug-2018 (Tue)**

Int. Type: **T - W**

Offset: **0**

Schedule Summary: **TUES-THURS, 07:00-09:00, 11:00-14:00, 15:00-18:00**

Total Count

Number of hours: **8**

		Dorval Dr				
Ped. 19	Total Vehicles	2% (T+LT) 3983	8% (T+LT) 7267	0% (T+LT) 0	↑ 7064	Ped. 0 Not Configured
←	3983	↙	↓	↘	↑	0 0% (T+LT)
2% (T+LT)	1363	↗		←	0 0% (T+LT)	
0% (T+LT)	0	→		↓	0 0% (T+LT)	
3% (T+LT)	2647	↘	↙	↑	↗	6127 →
QEW; 51	9914	0	5701	6127	Total Vehicles	Ped. 0
Ped. 0	↓	0% (T+LT)	2% (T+LT)	10% (T+LT)		
		Dorval Dr				

AM Peak Hour Report

Start Time: **08:00**

		Dorval Dr				
Ped. 2	Total Vehicles	2% (T+LT) 582	8% (T+LT) 1175	0% (T+LT) 0	↑ 649	Ped. 0 Not Configured
←	582	↙	↓	↘	↑	0 0% (T+LT)
4% (T+LT)	100	↗		←	0 0% (T+LT)	
0% (T+LT)	0	→		↓	0 0% (T+LT)	
2% (T+LT)	397	↘	↙	↑	↗	786 →
QEW; 51	1572	0	549	786	Total Vehicles	Ped. 6
Ped. 0	↓	0% (T+LT)	3% (T+LT)	7% (T+LT)		
		Dorval Dr				

Midday Peak Hour Report

Start Time: **12:00**

		Dorval Dr				
Ped. 3	Total Vehicles	3% (T+LT) 539	11% (T+LT) 835	0% (T+LT) 0	↑ 1006	Ped. 0 Not Configured
←	539	↙	↓	↘	↑	0 0% (T+LT)
1% (T+LT)	213	↗		←	0 0% (T+LT)	
0% (T+LT)	0	→		↓	0 0% (T+LT)	
3% (T+LT)	374	↘	↙	↑	↗	721 →
QEW; 51	1209	0	793	721	Total Vehicles	Ped. 1
Ped. 0	↓	0% (T+LT)	3% (T+LT)	12% (T+LT)		
		Dorval Dr				

PM Peak Hour Report

Start Time: **16:15**

		Dorval Dr				
Ped. 0	Total Vehicles	2% (T+LT) 526	3% (T+LT) 912	0% (T+LT) 0	↑ 1186	Ped. 0 Not Configured
←	526	↙	↓	↘	↑	0 0% (T+LT)
3% (T+LT)	222	↗		←	0 0% (T+LT)	
0% (T+LT)	0	→		↓	0 0% (T+LT)	
2% (T+LT)	264	↘	↙	↑	↗	979 →
QEW; 51	1176	0	964	979	Total Vehicles	Ped. 0
Ped. 0	↓	0% (T+LT)	2% (T+LT)	7% (T+LT)		
		Dorval Dr				



TVIS II - Traffic Volume Information System
Turning Movement 15 Minute Report

Description: Dorval Dr - Kerr St IC-116 (SRT)

Region: CENTRAL

Survey Type: TM - Interchange

Hwy: QEW

Start Date: 14-Aug-2018 (Tue)

I/C Side: S

LHRS: 10133

End Date: 14-Aug-2018 (Tue)

Int. Type: T - W

Offset: 0

Schedule Summary: TUES-THURS, 07:00-09:00, 11:00-14:00, 15:00-18:00

Table with columns for Major Road Approaches (North/South Dorval Dr) and Minor Road Approaches (West/Not Configured). Rows include Start Time, vehicle counts (Cars, Trucks, Long Trucks, Ped), and Total Veh. for various 15-minute periods.



TVIS II - Traffic Volume Information System
Turning Movement 15 Minute Report

Description: **Dorval Dr - Kerr St IC-116 (SRT)**

Region: **CENTRAL**

Survey Type: **TM – Interchange**

Hwy: **QEW**

Start Date: **14-Aug-2018 (Tue)**

I/C Side: **S**

LHRS: **10133**

End Date: **14-Aug-2018 (Tue)**

Int. Type: **T - W**

Offset: **0**

Schedule Summary: **TUES-THURS, 07:00-09:00, 11:00-14:00, 15:00-18:00**

Start Time	Major Road Approaches													Minor Road Approaches											Total Veh.						
	North Dorval Dr						South Dorval Dr						West QEW: Ramp(s): 51						Not Configured												
	Cars			Trucks			Long Trucks			Ped	Cars			Trucks			Long Trucks			Ped	Cars			Trucks		Heavy Trucks		Ped			
←	↑	→	←	↑	→	←	↑	→	←		↑	→	←	↑	→	←	↑	→	←		↑	→	←	↑	→	←	↑		→	←	↑
15:30	0	229	92	0	7	2	0	4	3	0	0	217	199	0	1	9	0	3	13	0	43	0	64	0	0	2	0	0	3	1	891
15:45	0	231	102	0	10	3	0	5	1	0	0	186	161	0	2	13	0	3	14	0	54	0	98	2	0	1	1	0	0	0	887
16:00	0	210	144	0	8	4	0	6	1	0	0	216	200	0	0	7	0	0	11	0	63	0	74	0	0	0	0	0	0	1	944
16:15	0	211	104	0	4	0	0	6	0	0	0	220	221	0	2	6	0	4	13	0	51	0	68	2	0	3	0	0	0	0	915
16:30	0	219	147	0	1	0	0	2	2	0	0	247	244	0	1	7	0	2	10	0	47	0	61	2	0	1	0	0	1	0	994
16:45	0	207	117	0	4	2	0	3	1	0	0	188	205	0	3	12	0	3	12	0	53	0	56	0	0	0	0	0	1	0	867
17:00	0	248	150	0	2	2	0	5	1	0	0	292	241	0	2	5	0	0	3	0	65	0	73	1	0	0	1	0	0	0	1091
17:15	0	199	123	0	2	2	0	3	1	0	0	219	223	0	1	4	0	1	9	0	49	0	60	0	0	0	0	0	0	1	896
17:30	0	198	122	0	5	1	0	2	1	0	0	209	197	0	0	6	0	0	8	0	54	0	65	0	0	0	0	0	0	0	868
17:45	0	190	101	0	4	1	0	1	1	0	0	163	166	0	2	3	0	2	10	0	39	0	58	0	0	2	0	0	0	0	743



Intersection Layout Sheet

Contract # 9015-E-0009

Work Order # 026

2018

Date: Aug 14/1 Day: Tue 1 Hrs: 8-9 + 11-14 + 15-18

Location: BEW @ Kerr St Ramps: NRT 1

Reg/Mun: CR Town/City: Oakville Area: _____

File Name: 0101330000 Device: Gretch / Jamar Unit # 121 Interval 1: (AM) NN / PM

Observer: Renat Shukras Weather: Clear / Clear Road Condition: Dry / Dry

LHRS & OIS: 10133 0.00 Comments: _____

GPS: G-Star IV

Datum: WGS 84 (Y) N

Lat: 43.450691

Long: -79.699845

SIGNALIZED Y I (N)

If intersection is unsignalized;
Sign Type: Stop / Yield

Sign Size: 60 cm x 60 cm

Sign Condition:

NA: New / Good / Poor / Missing

SA: New / (Good) / Poor / Missing

WA: New / Good / Poor / Missir g

EA: New / Good / Poor / Missir g

Photograph all approach's including all Signs (Y) / N

(km/hr)

Hwy / Street Name

(sign)



INDICATE LOCATION & DIRECTION OF VEHICLE

Vehicle N S E (W)

Hwy / Street Name

Kerr St 50

begins 50

① ② ③ ④

60 begins

60 Nort Service Rd

Note: Hwy / Street Name

Show all lanes approaching and leaving the intersection.

Show all channelization

If there are two or more through lane in one direction, indicate if these lanes are not continuous

Show pedestrian crosswalks

③ ② ①

①

⑥

STOP

Hwy / Street Name

BEW 403 RAMP

40

Layout of "Special Condition"



TVIS II - Traffic Volume Information System

Turning Movement Total Count and Peak Summary Report

Ministry of Transportation

Description: **Kerr St**

Region: **CENTRAL**

Survey Type: **TM – Interchange**

Hwy: **QEW**

Start Date: **14-Aug-2018 (Tue)**

I/C Side: **E**

LHRS: **10133**

End Date: **14-Aug-2018 (Tue)**

Int. Type: **T - S**

Offset: **0**

Schedule Summary: **TUES-THURS, 07:00-09:00, 11:00-14:00, 15:00-18:00**

Total Count		Number of hours: 8	
Not Configured			
Ped. 0	Total Vehicles	0% (T+LT) 0	0% (T+LT) 0
		0% (T+LT) 0	↑ Ped. 0
			Kerr St
←	3689	↙	↓
		↘	↗
		↖	↕
		↔	0
			0% (T+LT)
			2894
			2% (T+LT)
			0
			0% (T+LT)
			2837
			2% (T+LT)
			0
			0% (T+LT)
			4287
			0% (T+LT)
			795
			0
			1450
			Total Vehicles
			Ped. 0
			0
			3% (T+LT)
			0% (T+LT)
			4% (T+LT)
			57
			Ped. 57
			QEW; 62, 63

AM Peak Hour Report		Start Time: 08:00	
Not Configured			
Ped. 0	Total Vehicles	0% (T+LT) 0	0% (T+LT) 0
		0% (T+LT) 0	↑ Ped. 0
			Kerr St
←	415	↙	↓
		↘	↗
		↖	↕
		↔	0
			0% (T+LT)
			221
			4% (T+LT)
			0
			0% (T+LT)
			364
			3% (T+LT)
			0
			0% (T+LT)
			580
			0% (T+LT)
			194
			0
			216
			Total Vehicles
			Ped. 0
			0
			2% (T+LT)
			0% (T+LT)
			2% (T+LT)
			1
			Ped. 1
			QEW; 62, 63

Midday Peak Hour Report		Start Time: 12:00	
Not Configured			
Ped. 0	Total Vehicles	0% (T+LT) 0	0% (T+LT) 0
		0% (T+LT) 0	↑ Ped. 0
			Kerr St
←	493	↙	↓
		↘	↗
		↖	↕
		↔	0
			0% (T+LT)
			422
			2% (T+LT)
			0
			0% (T+LT)
			428
			2% (T+LT)
			0
			0% (T+LT)
			598
			0% (T+LT)
			71
			0
			170
			Total Vehicles
			Ped. 0
			0
			6% (T+LT)
			0% (T+LT)
			6% (T+LT)
			13
			Ped. 13
			QEW; 62, 63

PM Peak Hour Report		Start Time: 16:45	
Not Configured			
Ped. 0	Total Vehicles	0% (T+LT) 0	0% (T+LT) 0
		0% (T+LT) 0	↑ Ped. 0
			Kerr St
←	649	↙	↓
		↘	↗
		↖	↕
		↔	0
			0% (T+LT)
			556
			1% (T+LT)
			0
			0% (T+LT)
			339
			1% (T+LT)
			0
			0% (T+LT)
			550
			0% (T+LT)
			93
			0
			211
			Total Vehicles
			Ped. 0
			0
			0% (T+LT)
			0% (T+LT)
			1% (T+LT)
			7
			Ped. 7
			QEW; 62, 63



TVIS II - Traffic Volume Information System
Turning Movement 15 Minute Report

Description: **Kerr St**

Region: **CENTRAL**

Start Date: **14-Aug-2018 (Tue)**

End Date: **14-Aug-2018 (Tue)**

Survey Type: **TM - Interchange**

I/C Side: **E**

Int. Type: **T - S**

Hwy: **QEW**

LHRS: **10133**

Offset: **0**

Schedule Summary: **TUES-THURS, 07:00-09:00, 11:00-14:00, 15:00-18:00**

Start Time	Major Road Approaches										Minor Road Approaches										Total Veh.							
	East Kerr St					West Kerr St					South QEW: Ramp(s): 62, 63					Not Configured												
	Cars			Trucks		Long Trucks		Ped	Cars			Trucks		Long Trucks		Ped	Cars			Trucks		Heavy Trucks		Ped				
←	↑	→	←	→	←	→	←		↑	→	←	↑	→	←	↑		→	←	↑	→	←	↑	→					
Period 1																												
07:00	0	21	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	16	0	27	0	0	1	2	0	0	1	120
07:15	0	26	0	0	1	0	0	1	0	0	0	1	0	0	1	0	0	19	0	32	0	0	0	0	0	0	0	130
07:30	0	36	0	0	0	0	0	1	0	0	0	2	0	0	1	0	0	32	0	40	0	0	2	2	0	1	2	181
07:45	0	42	0	0	0	0	0	3	0	0	0	1	0	0	1	0	0	29	0	57	0	0	1	0	0	1	1	229
08:00	0	39	0	0	1	0	0	1	0	0	0	1	0	0	3	0	0	37	0	38	1	0	0	0	0	1	1	213
08:15	0	49	0	0	2	0	0	1	0	0	0	2	0	0	1	0	0	48	0	51	1	0	2	0	0	0	0	236
08:30	0	62	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	49	0	58	2	0	0	0	0	1	0	266
08:45	0	62	0	0	1	0	0	2	0	0	0	0	0	0	2	0	0	56	0	64	0	0	0	0	0	1	0	280
Period 2																												
11:00	0	76	0	0	3	0	0	0	0	0	0	2	0	0	2	0	0	19	0	41	1	0	5	0	0	2	4	232
11:15	0	82	0	0	2	0	0	2	0	0	0	1	0	0	1	0	0	19	0	28	1	0	1	0	0	1	0	222
11:30	0	81	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	23	0	40	1	0	0	0	0	0	5	240
11:45	0	92	0	0	3	0	0	1	0	0	0	2	0	0	2	0	0	20	0	40	0	0	1	0	0	0	4	262
12:00	0	119	0	0	2	0	0	0	0	0	0	2	0	0	2	0	0	16	0	38	1	0	2	1	0	1	4	276
12:15	0	107	0	0	2	0	0	1	0	0	0	0	0	0	1	0	0	15	0	38	1	0	2	0	0	0	2	275
12:30	0	76	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	15	0	39	0	0	1	0	0	1	3	251
12:45	0	112	0	0	2	0	0	1	0	0	0	0	0	0	1	0	0	21	0	45	0	0	2	1	0	1	4	289
13:00	0	95	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	0	39	0	0	4	0	0	1	0	269
13:15	0	85	0	0	0	0	0	2	0	0	0	0	0	0	1	0	0	23	0	44	2	0	0	0	0	0	2	252
13:30	0	90	0	0	1	0	0	2	0	0	0	1	0	0	1	0	0	17	0	41	0	0	2	0	0	0	3	240
13:45	0	83	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	23	0	38	0	0	2	0	0	2	3	256
Period 3																												
15:00	0	89	0	0	1	0	0	0	0	0	0	2	0	0	1	0	0	16	0	35	2	0	2	0	0	2	2	228
15:15	0	92	0	0	1	0	0	1	0	0	0	1	0	0	1	0	0	22	0	36	1	0	0	0	0	1	2	229



TVIS II - Traffic Volume Information System
Turning Movement 15 Minute Report

Description: **Kerr St**

Region: **CENTRAL**

Start Date: **14-Aug-2018 (Tue)**

End Date: **14-Aug-2018 (Tue)**

Survey Type: **TM – Interchange**

I/C Side: **E**

Int. Type: **T - S**

Hwy: **QEW**

LHRS: **10133**

Offset: **0**

Schedule Summary: **TUES-THURS, 07:00-09:00, 11:00-14:00, 15:00-18:00**

Start Time	Major Road Approaches													Minor Road Approaches												Total Veh.					
	East Kerr St						West Kerr St						South QEW: Ramp(s): 62, 63						Not Configured												
	Cars			Trucks			Long Trucks			Ped	Cars			Trucks			Long Trucks			Ped	Cars			Trucks			Heavy Trucks			Ped	
←	↑	→	←	↑	→	←	↑	→	←		↑	→	←	↑	→	←	↑	→	←		↑	→	←	↑	→	←	↑	→	←		↑
15:30	0	87	0	0	1	0	0	2	0	0	0	74	0	0	0	0	0	0	0	0	15	0	40	0	0	1	0	0	1	1	221
15:45	0	76	0	0	0	0	0	1	0	0	0	101	0	0	0	0	0	1	0	0	25	0	43	0	0	2	0	0	0	2	249
16:00	0	120	0	0	1	0	0	0	0	0	0	86	0	0	1	0	0	1	0	0	20	0	57	0	0	2	0	0	0	0	288
16:15	0	114	0	0	1	0	0	1	0	0	0	79	0	0	0	0	0	0	0	0	20	0	44	1	0	0	0	0	0	2	260
16:30	0	137	0	0	1	0	0	1	0	0	0	92	0	0	2	0	0	1	0	0	24	0	51	0	0	0	0	0	0	2	309
16:45	0	109	0	0	2	0	0	1	0	0	0	85	0	0	0	0	0	0	0	0	29	0	55	0	0	0	0	0	0	1	281
17:00	0	146	0	0	1	0	0	0	0	0	0	92	0	0	1	0	0	2	0	0	21	0	60	0	0	1	0	0	1	3	325
17:15	0	134	0	0	0	0	0	1	0	0	0	80	0	0	0	0	0	0	0	0	20	0	42	0	0	0	0	0	0	0	277
17:30	0	160	0	0	1	0	0	1	0	0	0	78	0	0	0	0	0	1	0	0	23	0	52	0	0	0	0	0	0	3	316
17:45	0	129	0	0	0	0	0	1	0	0	0	75	0	0	0	0	0	0	0	0	27	0	42	0	0	0	0	0	0	0	274

Trafalgar Rd @ Cornwall Rd

Morning Peak Diagram

Specified Period

From: 7:00:00

To: 9:00:00

One Hour Peak

From: 8:00:00

To: 9:00:00

Municipality: Halton Region
Site #: 1030770100
Intersection: Trafalgar Rd & Cornwall Rd
TFR File #: 3
Count date: 5-Oct-2022

Weather conditions:
Sunny/Dry
Person(s) who counted:
Ela

**** Signalized Intersection ****

Major Road: Trafalgar Rd runs N/S

North Leg Total: 2981
 North Entering: 1604
 North Peds: 12
 Peds Cross: \bowtie

Heavys	3	10	10	23
Trucks	12	11	24	47
Cars	241	705	588	1534
Totals	256	726	622	



Heavys	21
Trucks	42
Cars	1314
Totals	1377

East Leg Total: 2084
 East Entering: 1015
 East Peds: 10
 Peds Cross: \bowtie

Heavys	Trucks	Cars	Totals
12	25	745	782

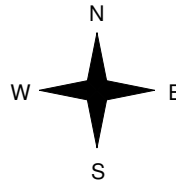


Trafalgar Rd

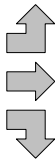
Cars	Trucks	Heavys	Totals
492	22	11	525
420	11	9	440
47	3	0	50
959	36	20	



Cornwall Rd



Heavys	Trucks	Cars	Totals
7	12	316	335
4	15	373	392
0	4	61	65
11	31	750	



Cornwall Rd



Cars	Trucks	Heavys	Totals
1012	43	14	1069

Peds Cross: \bowtie
 West Peds: 5
 West Entering: 792
 West Leg Total: 1574

Cars	813	Cars	84	506	51	641
Trucks	18	Trucks	2	8	4	14
Heavys	10	Heavys	0	3	0	3
Totals	841	Totals	86	517	55	



Peds Cross: \bowtie
 South Peds: 5
 South Entering: 658
 South Leg Total: 1499

Comments

Trafalgar Rd @ Cornwall Rd

Mid-day Peak Diagram

Specified Period

From: 11:00:00

To: 14:00:00

One Hour Peak

From: 11:30:00

To: 12:30:00

Municipality: Halton Region
Site #: 1030770100
Intersection: Trafalgar Rd & Cornwall Rd
TFR File #: 3
Count date: 5-Oct-2022

Weather conditions:
Sunny/Dry
Person(s) who counted:
Ela

**** Signalized Intersection ****

Major Road: Trafalgar Rd runs N/S

North Leg Total: 2450
 North Entering: 1370
 North Peds: 32
 Peds Cross: \bowtie

Heavys	4	2	4	10
Trucks	5	13	25	43
Cars	187	647	483	1317
Totals	196	662	512	



Heavys	17
Trucks	25
Cars	1038
Totals	1080

East Leg Total: 1645
 East Entering: 742
 East Peds: 3
 Peds Cross: \bowtie

Heavys	Trucks	Cars	Totals
6	29	587	622

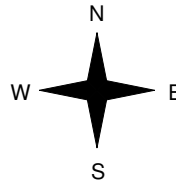


Trafalgar Rd

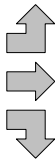
Cars	Trucks	Heavys	Totals
258	11	8	277
361	22	2	385
76	4	0	80
695	37	10	



Cornwall Rd



Heavys	Trucks	Cars	Totals
7	6	256	269
7	13	303	323
1	1	42	44
15	20	601	



Cornwall Rd



Peds Cross: \bowtie
 West Peds: 8
 West Entering: 636
 West Leg Total: 1258

Cars	765	Cars	39	524	64	627
Trucks	18	Trucks	2	8	3	13
Heavys	3	Heavys	0	2	1	3
Totals	786	Totals	41	534	68	



Trafalgar Rd



Peds Cross: \bowtie
 South Peds: 7
 South Entering: 643
 South Leg Total: 1429

Comments

Trafalgar Rd @ Cornwall Rd

Afternoon Peak Diagram

Specified Period

From: 15:00:00

To: 18:00:00

One Hour Peak

From: 15:15:00

To: 16:15:00

Municipality: Halton Region
Site #: 1030770100
Intersection: Trafalgar Rd & Cornwall Rd
TFR File #: 3
Count date: 5-Oct-2022

Weather conditions:
Sunny/Dry
Person(s) who counted:
Ela

**** Signalized Intersection ****

Major Road: Trafalgar Rd runs N/S

North Leg Total: 2570
 North Entering: 1385
 North Peds: 3
 Peds Cross: \times

Heavys	1	0	6	7
Trucks	16	8	17	41
Cars	320	572	445	1337
Totals	337	580	468	



Heavys	12
Trucks	40
Cars	1133
Totals	1185

East Leg Total: 1962
 East Entering: 1009
 East Peds: 6
 Peds Cross: \times

Heavys	Trucks	Cars	Totals
15	38	977	1030

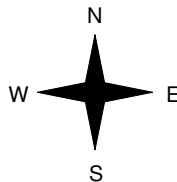


Trafalgar Rd

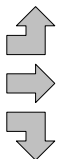
Cars	Trucks	Heavys	Totals
276	12	6	294
604	20	14	638
75	2	0	77
955	34	20	



Cornwall Rd



Heavys	Trucks	Cars	Totals
5	15	336	356
5	20	390	415
0	1	40	41
10	36	766	



Cornwall Rd



Peds Cross: \times
 West Peds: 9
 West Entering: 812
 West Leg Total: 1842

Cars	687	Cars	53	521	67	641
Trucks	11	Trucks	2	13	3	18
Heavys	0	Heavys	0	1	0	1
Totals	698	Totals	55	535	70	



Trafalgar Rd



Peds Cross: \times
 South Peds: 5
 South Entering: 660
 South Leg Total: 1358

Comments

Trafalgar Rd @ Cornwall Rd

Total Count Diagram

Municipality: Halton Region
Site #: 1030770100
Intersection: Trafalgar Rd & Cornwall Rd
TFR File #: 3
Count date: 5-Oct-2022

Weather conditions:
 Sunny/Dry
Person(s) who counted:
 Ela

**** Signalized Intersection ****

Major Road: Trafalgar Rd runs N/S

North Leg Total: 18829
 North Entering: 10371
 North Peds: 125
 Peds Cross: \times

Heavys	20	24	46	90
Trucks	61	89	122	272
Cars	1886	4569	3554	10009
Totals	1967	4682	3722	



Heavys	111
Trucks	227
Cars	8120
Totals	8458

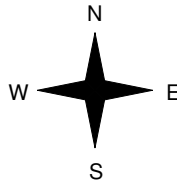
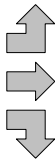
East Leg Total: 12957
 East Entering: 6144
 East Peds: 62
 Peds Cross: \times

Heavys	Trucks	Cars	Totals
58	202	5396	5656



Cornwall Rd

Heavys	Trucks	Cars	Totals
39	64	2301	2404
34	99	2561	2694
2	16	355	373
75	179	5217	



Trafalgar Rd

Cars	Trucks	Heavys	Totals
2165	92	57	2314
3144	128	37	3309
508	13	0	521
5817	233	94	

Cornwall Rd



Cars	Trucks	Heavys	Totals
6490	239	84	6813

Peds Cross: \times
 West Peds: 68
 West Entering: 5471
 West Leg Total: 11127

Cars	5432
Trucks	118
Heavys	26
Totals	5576



Cars	366	3654	375	4395
Trucks	13	71	18	102
Heavys	1	15	4	20
Totals	380	3740	397	

Peds Cross: \times
 South Peds: 42
 South Entering: 4517
 South Leg Total: 10093

Comments

Trafalgar Rd @ Cross Ave / SSR

Morning Peak Diagram

Specified Period

From: 7:00:00

To: 9:00:00

One Hour Peak

From: 7:45:00

To: 8:45:00

Municipality: Halton Region

Site #: 1030780100

Intersection: Trafalgar Rd & Cross Ave / SSR

TFR File #: 6

Count date: 13-Jun-2011

Weather conditions:

Cloudy/Dry

Person(s) who counted:

Dave

Ela

**** Signalized Intersection ****

Major Road: Trafalgar Rd runs N/S

North Leg Total: 3482

North Entering: 1980

North Peds: 0

Peds Cross: \times

Heavys	10	9	3	22
Trucks	17	37	0	54
Cars	319	1399	186	1904
Totals	346	1445	189	



Heavys 12

Trucks 33

Cars 1457

Totals 1502

East Leg Total: 421

East Entering: 171

East Peds: 14

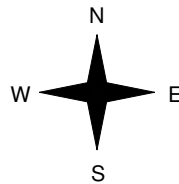
Peds Cross: \times

Heavys	11	Trucks	28	Cars	501	Totals	540
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Cross Ave

Heavys	7	Trucks	17	Cars	285	Totals	309
	0		0		38		38
	1		10		77		88
Totals	8	27	400				



Trafalgar Rd

Cars	58	Trucks	2	Heavys	2	Totals	62
	75		0		1		76
	29		4		0		33
Totals	162	6	3				

South Service Rd



Cars	243	Trucks	4	Heavys	3	Totals	250
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Peds Cross: \times

West Peds: 12

West Entering: 435

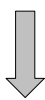
West Leg Total: 975

Cars 1505

Trucks 51

Heavys 10

Totals 1566



Cars 107 1114 19 1240

Trucks 11 14 4 29

Heavys 0 3 0 3

Totals 118 1131 23

Peds Cross: \times

South Peds: 36

South Entering: 1272

South Leg Total: 2838

Comments

Trafalgar Rd @ Cross Ave / SSR

Mid-day Peak Diagram

Specified Period

From: 11:00:00
To: 14:00:00

One Hour Peak

From: 12:30:00
To: 13:30:00

Municipality: Halton Region
Site #: 1030780100
Intersection: Trafalgar Rd & Cross Ave / SSR
TFR File #: 6
Count date: 13-Jun-2011

Weather conditions:
Cloudy/Dry
Person(s) who counted:
Dave
Ela

**** Signalized Intersection ****

Major Road: Trafalgar Rd runs N/S

North Leg Total: 3424
North Entering: 1596
North Peds: 1
Peds Cross: \bowtie

Heavys	19	16	0	35
Trucks	4	68	2	74
Cars	127	1254	106	1487
Totals	150	1338	108	



Heavys	32
Trucks	29
Cars	1767
Totals	1828

East Leg Total: 348
East Entering: 152
East Peds: 2
Peds Cross: \bowtie

Heavys	24
Trucks	11
Cars	371
Totals	406

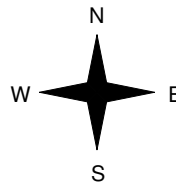


Trafalgar Rd

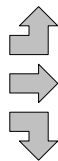
Cars	42	Trucks	3	Heavys	0	Totals	45
	84		0		0		84
	23		0		0		23
Totals	149	3	0				



Cross Ave



Heavys	21			
Trucks	4			
Cars	412			
Totals	437			
	0	0	63	63
	4	4	122	130
Totals	25	8	597	



South Service Rd



Cars	193	Trucks	3	Heavys	0	Totals	196
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Peds Cross: \bowtie
West Peds: 4
West Entering: 630
West Leg Total: 1036

Cars	1399
Trucks	72
Heavys	20
Totals	1491



Cars	160	1313	24	1497
Trucks	7	22	1	30
Heavys	5	11	0	16
Totals	172	1346	25	

Peds Cross: \bowtie
South Peds: 6
South Entering: 1543
South Leg Total: 3034

Comments

Trafalgar Rd @ Cross Ave / SSR

Afternoon Peak Diagram

Specified Period

From: 15:00:00
To: 18:00:00

One Hour Peak

From: 17:00:00
To: 18:00:00

Municipality: Halton Region
Site #: 1030780100
Intersection: Trafalgar Rd & Cross Ave / SSR
TFR File #: 6
Count date: 13-Jun-2011

Weather conditions:
Cloudy/Dry
Person(s) who counted:
Dave
Ela

**** Signalized Intersection ****

Major Road: Trafalgar Rd runs N/S

North Leg Total: 4324
North Entering: 1707
North Peds: 0
Peds Cross: \times

Heavys	24	5	2	31
Trucks	0	9	4	13
Cars	157	1336	170	1663
Totals	181	1350	176	



Heavys	34
Trucks	18
Cars	2565
Totals	2617

East Leg Total: 682
East Entering: 430
East Peds: 8
Peds Cross: \times

Heavys	33
Trucks	1
Cars	420
Totals	454

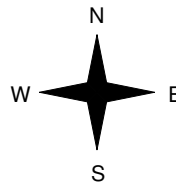


Trafalgar Rd

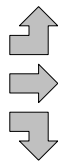
Cars	206	Trucks	3	Heavys	0	Totals	209
Cars	138	Trucks	1	Heavys	1	Totals	140
Cars	79	Trucks	2	Heavys	0	Totals	81
Cars	423	Trucks	6	Heavys	1	Totals	



Cross Ave



Heavys	31
Trucks	0
Cars	911
Totals	942
Heavys	0
Trucks	0
Cars	57
Totals	57
Heavys	8
Trucks	1
Cars	134
Totals	143
Heavys	39
Trucks	1
Cars	1102
Totals	



South Service Rd



Cars	243	Trucks	7	Heavys	2	Totals	252
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Peds Cross: \times
West Peds: 18
West Entering: 1142
West Leg Total: 1596

Cars	1549
Trucks	12
Heavys	13
Totals	1574



Cars	125	1448	16	1589
Trucks	0	15	3	18
Heavys	8	3	0	11
Totals	133	1466	19	

Peds Cross: \times
South Peds: 36
South Entering: 1618
South Leg Total: 3192

Comments

Trafalgar Rd @ Cross Ave / SSR

Total Count Diagram

Municipality: Halton Region
Site #: 1030780100
Intersection: Trafalgar Rd & Cross Ave / SSR
TFR File #: 6
Count date: 13-Jun-2011

Weather conditions:
 Cloudy/Dry
Person(s) who counted:
 Dave
 Ela

**** Signalized Intersection ****

Major Road: Trafalgar Rd runs N/S

North Leg Total: 28685
 North Entering: 13475
 North Peds: 5
 Peds Cross: \times

Heavys	137	81	11	229
Trucks	49	219	18	286
Cars	1638	10304	1018	12960
Totals	1824	10604	1047	



Heavys	191
Trucks	308
Cars	14711
Totals	15210

East Leg Total: 3529
 East Entering: 1902
 East Peds: 50
 Peds Cross: \times

Heavys	Trucks	Cars	Totals
176	101	3456	3733

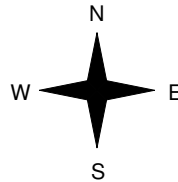


Trafalgar Rd

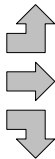
Cars	Trucks	Heavys	Totals
790	17	11	818
756	11	10	777
286	21	0	307
1832	49	21	



Cross Ave



Heavys	Trucks	Cars	Totals
121	106	3736	3963
1	3	354	358
27	35	806	868
149	144	4896	



South Service Rd



Cars	Trucks	Heavys	Totals
1575	38	14	1627

Trafalgar Rd



Peds Cross: \times
 West Peds: 94
 West Entering: 5189
 West Leg Total: 8922

Cars	11396
Trucks	275
Heavys	108
Totals	11779



Cars	1062	10185	203	11450
Trucks	41	185	17	243
Heavys	29	59	2	90
Totals	1132	10429	222	

Peds Cross: \times
 South Peds: 160
 South Entering: 11783
 South Leg Total: 23562

Comments

Trafalgar Rd @ Argus Rd

Morning Peak Diagram

Specified Period

From: 7:00:00

To: 9:00:00

One Hour Peak

From: 8:00:00

To: 9:00:00

Municipality: Halton Region
Site #: 1030800100
Intersection: Trafalgar Rd & Argus Rd
TFR File #: 3
Count date: 28-Jun-2022

Weather conditions:
Sunny/Dry
Person(s) who counted:
Bronek
Radek

**** Non-Signalized Intersection ****

Major Road: Trafalgar Rd runs N/S

North Leg Total: 2594
 North Entering: 1793
 North Peds: 0
 Peds Cross: ∇

Heavys	9	24	33
Trucks	2	33	35
Cars	282	1443	1725
Totals	293	1500	



Heavys	28
Trucks	25
Cars	748
Totals	801

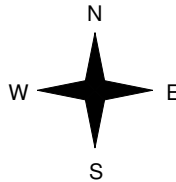
Heavys	Trucks	Cars	Totals
9	2	282	293



Trafalgar Rd



Argus Rd



Heavys	Trucks	Cars	Totals
0	0	0	0
0	0	21	21
0	0	21	



Trafalgar Rd



Peds Cross: ∇
 West Peds: 9
 West Entering: 21
 West Leg Total: 314

Cars	1464
Trucks	33
Heavys	24
Totals	1521



Cars	0	748	748
Trucks	0	25	25
Heavys	0	28	28
Totals	0	801	

Peds Cross: ∇
 South Peds: 0
 South Entering: 801
 South Leg Total: 2322

Comments

Trafalgar Rd @ Argus Rd

Mid-day Peak Diagram

Specified Period

From: 11:00:00

To: 14:00:00

One Hour Peak

From: 12:00:00

To: 13:00:00

Municipality: Halton Region
Site #: 1030800100
Intersection: Trafalgar Rd & Argus Rd
TFR File #: 3
Count date: 28-Jun-2022

Weather conditions:
Sunny/Dry
Person(s) who counted:
Bronek
Radek

**** Non-Signalized Intersection ****

Major Road: Trafalgar Rd runs N/S

North Leg Total: 3033
 North Entering: 1708
 North Peds: 0
 Peds Cross: ∇

Heavys	9	20	29
Trucks	4	20	24
Cars	264	1391	1655
Totals	277	1431	



Heavys	22
Trucks	25
Cars	1278
Totals	1325

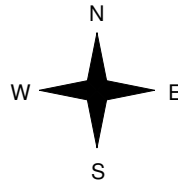
Heavys	Trucks	Cars	Totals
9	4	264	277



Trafalgar Rd



Argus Rd



Heavys	Trucks	Cars	Totals
0	0	0	0
0	2	45	47
0	2	45	



Trafalgar Rd



Peds Cross: ∇
 West Peds: 13
 West Entering: 47
 West Leg Total: 324

Cars	1436
Trucks	22
Heavys	20
Totals	1478



Cars	0	1278	1278
Trucks	0	25	25
Heavys	0	22	22
Totals	0	1325	

Peds Cross: ∇
 South Peds: 0
 South Entering: 1325
 South Leg Total: 2803

Comments

Trafalgar Rd @ Argus Rd

Afternoon Peak Diagram

Specified Period

From: 15:00:00

To: 18:00:00

One Hour Peak

From: 16:45:00

To: 17:45:00

Municipality: Halton Region
Site #: 1030800100
Intersection: Trafalgar Rd & Argus Rd
TFR File #: 3
Count date: 28-Jun-2022

Weather conditions:
Sunny/Dry
Person(s) who counted:
Bronek
Radek

**** Non-Signalized Intersection ****

Major Road: Trafalgar Rd runs N/S

North Leg Total: 3333
 North Entering: 1701
 North Peds: 0
 Peds Cross: \times

Heavys	13	18	31
Trucks	0	5	5
Cars	255	1410	1665
Totals	268	1433	



Heavys	27
Trucks	8
Cars	1597
Totals	1632

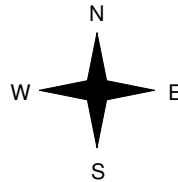
Heavys	Trucks	Cars	Totals
13	0	255	268



Trafalgar Rd



Argus Rd



Heavys	Trucks	Cars	Totals
0	0	0	0
1	0	39	40
1	0	39	



Trafalgar Rd



Peds Cross: \times
 West Peds: 17
 West Entering: 40
 West Leg Total: 308

Cars	1449
Trucks	5
Heavys	19
Totals	1473



Cars	0	1597	1597
Trucks	0	8	8
Heavys	0	27	27
Totals	0	1632	

Peds Cross: \times
 South Peds: 0
 South Entering: 1632
 South Leg Total: 3105

Comments

Trafalgar Rd @ Argus Rd

Total Count Diagram

Municipality: Halton Region
Site #: 1030800100
Intersection: Trafalgar Rd & Argus Rd
TFR File #: 3
Count date: 28-Jun-2022

Weather conditions:
 Sunny/Dry
Person(s) who counted:
 Bronek
 Radek

**** Non-Signalized Intersection ****

Major Road: Trafalgar Rd runs N/S

North Leg Total: 22683
 North Entering: 13034
 North Peds: 0
 Peds Cross: ∇

Heavys	81	159	240
Trucks	18	178	196
Cars	2077	10521	12598
Totals	2176	10858	

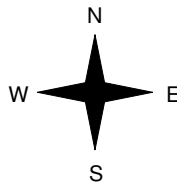
Heavys	215
Trucks	155
Cars	9279
Totals	9649

Heavys	Trucks	Cars	Totals
81	18	2077	2176



Argus Rd

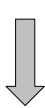
Heavys	Trucks	Cars	Totals
0	0	0	0
5	8	272	285
5	8	272	



Trafalgar Rd

Peds Cross: ∇
 West Peds: 122
 West Entering: 285
 West Leg Total: 2461

Cars	10793
Trucks	186
Heavys	164
Totals	11143



Cars	0	9279	9279
Trucks	0	155	155
Heavys	0	215	215
Totals	0	9649	

Peds Cross: ∇
 South Peds: 1
 South Entering: 9649
 South Leg Total: 20792

Comments

Trafalgar Rd @ Leighland Ave

Morning Peak Diagram

Specified Period

From: 7:00:00

To: 9:00:00

One Hour Peak

From: 7:45:00

To: 8:45:00

Municipality: Halton Region
Site #: 0000003409
Intersection: Trafalgar Rd & Leighland Ave
TFR File #: 18
Count date: 9-Dec-2019

Weather conditions:
Overcast/Wet
Person(s) who counted:
Cam

**** Signalized Intersection ****

Major Road: Trafalgar Rd runs N/S

North Leg Total: 2993
 North Entering: 1956
 North Peds: 14
 Peds Cross: \times

Heavys	2	41	4	47
Trucks	0	8	2	10
Cars	36	1736	127	1899
Totals	38	1785	133	



Heavys	36
Trucks	12
Cars	989
Totals	1037

East Leg Total: 1859
 East Entering: 987
 East Peds: 10
 Peds Cross: \times

Heavys	Trucks	Cars	Totals
8	3	222	233

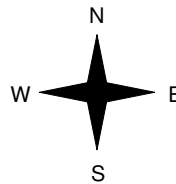


Trafalgar Rd

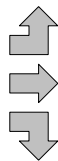
Cars	Trucks	Heavys	Totals
136	3	4	143
60	1	1	62
763	5	14	782
959	9	19	



Leighland Ave



Heavys	Trucks	Cars	Totals
1	2	25	28
2	0	85	87
7	2	368	377
10	4	478	



Iroquois Shore Rd



Peds Cross: \times
 West Peds: 17
 West Entering: 492
 West Leg Total: 725

Cars	2867
Trucks	15
Heavys	62
Totals	2944



Cars	126	828	632	1586
Trucks	2	7	5	14
Heavys	5	31	15	51
Totals	133	866	652	

Peds Cross: \times
 South Peds: 0
 South Entering: 1651
 South Leg Total: 4595

Comments

Trafalgar Rd @ Leighland Ave

Mid-day Peak Diagram

Specified Period

From: 11:00:00
To: 14:00:00

One Hour Peak

From: 12:00:00
To: 13:00:00

Municipality: Halton Region
Site #: 0000003409
Intersection: Trafalgar Rd & Leighland Ave
TFR File #: 18
Count date: 9-Dec-2019

Weather conditions:
Overcast/Wet
Person(s) who counted:
Cam

**** Signalized Intersection ****

Major Road: Trafalgar Rd runs N/S

North Leg Total: 2605
North Entering: 1352
North Peds: 21
Peds Cross: \times

Heavys	2	21	1	24
Trucks	1	11	4	16
Cars	190	1015	107	1312
Totals	193	1047	112	



Heavys	26
Trucks	17
Cars	1210
Totals	1253

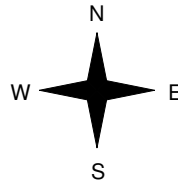
East Leg Total: 1640
East Entering: 752
East Peds: 5
Peds Cross: \times

Heavys	Trucks	Cars	Totals
6	4	553	563



Leighland Ave

Heavys	Trucks	Cars	Totals
1	2	133	136
1	0	130	131
6	0	328	334
8	2	591	



Trafalgar Rd

Cars	Trucks	Heavys	Totals
144	0	4	148
103	0	1	104
481	5	14	500
728	5	19	

Iroquois Shore Rd



Cars	Trucks	Heavys	Totals
863	10	15	888

Peds Cross: \times
West Peds: 37
West Entering: 601
West Leg Total: 1164

Cars	1824
Trucks	16
Heavys	41
Totals	1881



Cars	260	933	626	1819
Trucks	3	15	6	24
Heavys	3	21	13	37
Totals	266	969	645	

Peds Cross: \times
South Peds: 1
South Entering: 1880
South Leg Total: 3761

Comments

Trafalgar Rd @ Leighland Ave

Afternoon Peak Diagram

Specified Period

From: 15:00:00

To: 18:00:00

One Hour Peak

From: 16:30:00

To: 17:30:00

Municipality: Halton Region
Site #: 0000003409
Intersection: Trafalgar Rd & Leighland Ave
TFR File #: 18
Count date: 9-Dec-2019

Weather conditions:
Overcast/Wet
Person(s) who counted:
Cam

**** Signalized Intersection ****

Major Road: Trafalgar Rd runs N/S

North Leg Total: 2810
 North Entering: 1113
 North Peds: 31
 Peds Cross: \times

Heavys	0	15	0	15
Trucks	1	12	1	14
Cars	88	889	107	1084
Totals	89	916	108	



Heavys	22
Trucks	7
Cars	1668
Totals	1697

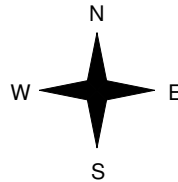
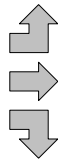
East Leg Total: 1799
 East Entering: 1059
 East Peds: 18
 Peds Cross: \times

Heavys	Trucks	Cars	Totals
6	3	583	592



Leighland Ave

Heavys	Trucks	Cars	Totals
0	1	106	107
0	1	89	90
1	0	261	262
1	2	456	



Trafalgar Rd

Cars	Trucks	Heavys	Totals
139	2	1	142
171	1	0	172
730	3	12	745
1040	6	13	

Iroquois Shore Rd



Cars	Trucks	Heavys	Totals
736	4	0	740

Peds Cross: \times
 West Peds: 13
 West Entering: 459
 West Leg Total: 1051

Cars	1880
Trucks	15
Heavys	28
Totals	1923



Cars	324	1423	540	2287
Trucks	1	4	2	7
Heavys	6	21	0	27
Totals	331	1448	542	

Peds Cross: \times
 South Peds: 0
 South Entering: 2321
 South Leg Total: 4244

Comments

Trafalgar Rd @ Leighland Ave

Total Count Diagram

Municipality: Halton Region
Site #: 0000003409
Intersection: Trafalgar Rd & Leighland Ave
TFR File #: 18
Count date: 9-Dec-2019

Weather conditions:
 Overcast/Wet
Person(s) who counted:
 Cam

**** Signalized Intersection ****

Major Road: Trafalgar Rd runs N/S

North Leg Total: 21091
 North Entering: 11004
 North Peds: 164
 Peds Cross: \bowtie

Heavys	5	214	12	231
Trucks	5	76	14	95
Cars	841	8992	845	10678
Totals	851	9282	871	



Heavys	232
Trucks	89
Cars	9766
Totals	10087

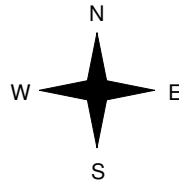
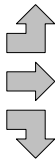
East Leg Total: 13269
 East Entering: 6738
 East Peds: 65
 Peds Cross: \bowtie

Heavys	Trucks	Cars	Totals
46	25	3515	3586



Leighland Ave

Heavys	Trucks	Cars	Totals
4	8	781	793
4	3	754	761
36	11	2499	2546
44	22	4034	



Trafalgar Rd

Cars	Trucks	Heavys	Totals
1086	15	23	1124
776	3	6	785
4655	52	122	4829
6517	70	151	



Iroquois Shore Rd



Cars	Trucks	Heavys	Totals
6378	56	97	6531

Peds Cross: \bowtie
 West Peds: 171
 West Entering: 4100
 West Leg Total: 7686

Cars	16146
Trucks	139
Heavys	372
Totals	16657



Cars	1898	7899	4779	14576
Trucks	17	66	39	122
Heavys	35	205	81	321
Totals	1950	8170	4899	

Peds Cross: \bowtie
 South Peds: 3
 South Entering: 15019
 South Leg Total: 31676

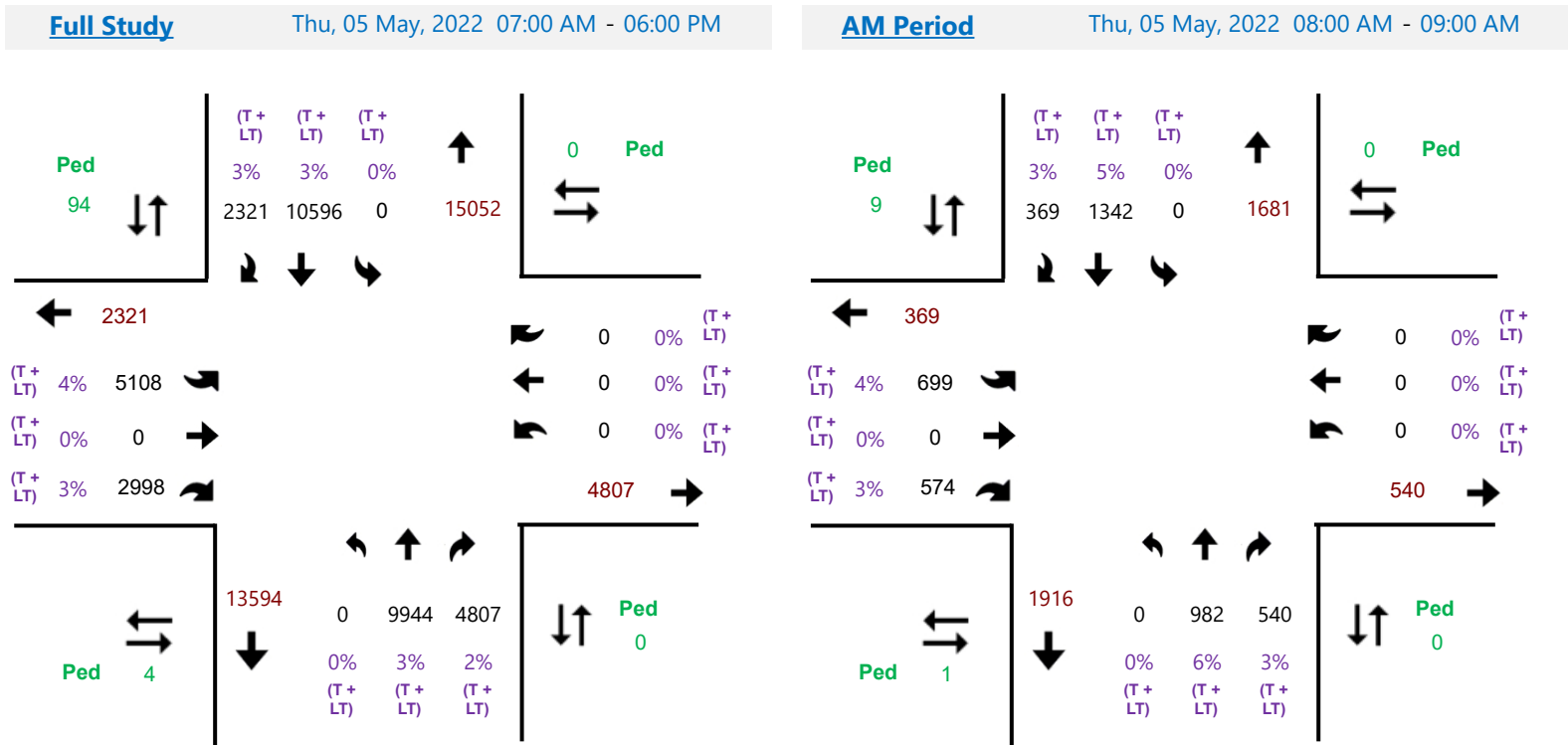
Comments



TES - Traffic Engineering System

Turning Movement Total Count and Peak Summary Report

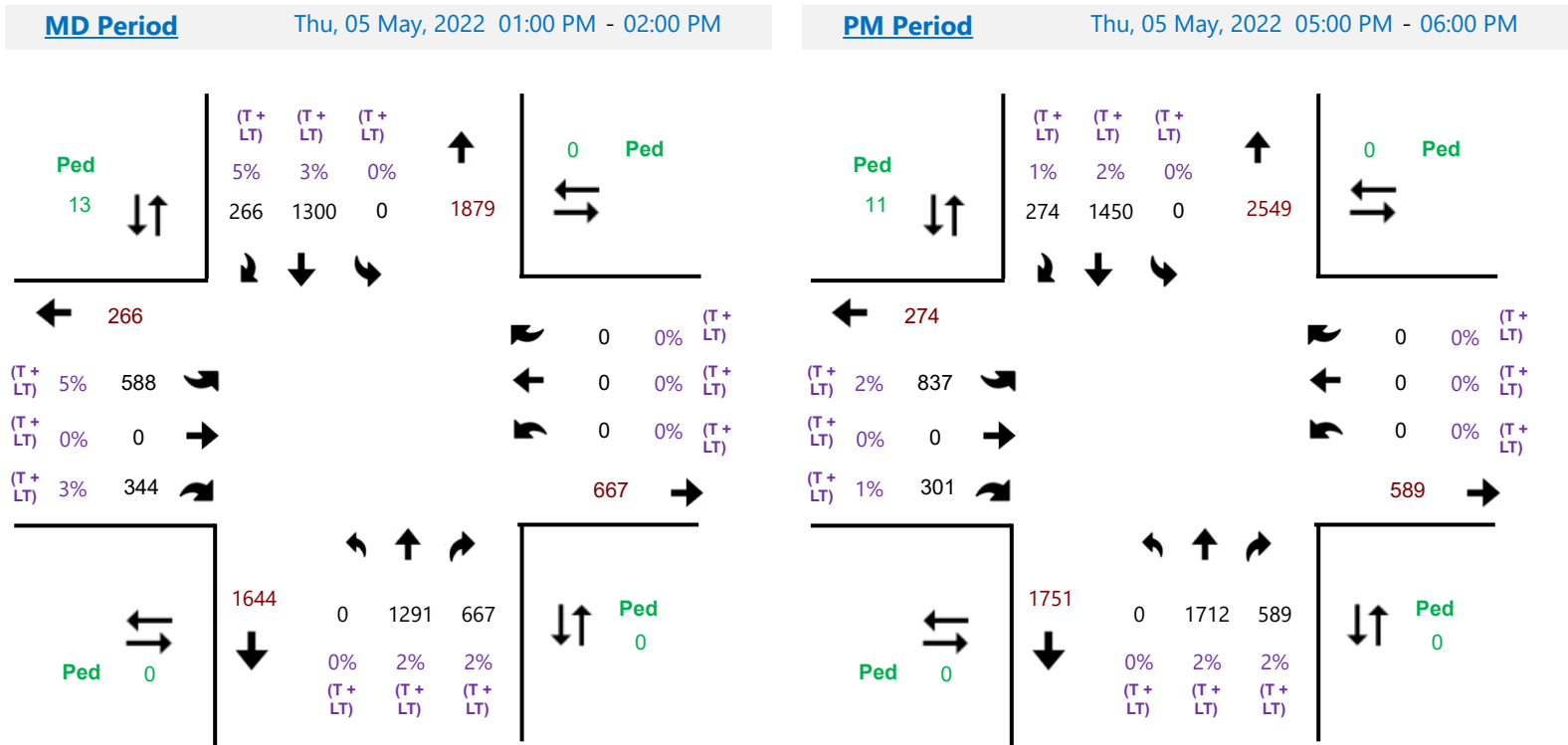
Description: HWY 1 @ TRAFALGAR RD - RAMP 51
Region: CENTRAL **Hwy #:** HWY 1
LHRS_Offset: 10135_0000_51T **Int. Type:** Cross
Count Date: Thursday, 05 May, 2022





TES - Traffic Engineering System Turning Movement Total Count and Peak Summary Report

Description:	HWY 1 @ TRAFALGAR RD - RAMP 51		
Region	CENTRAL	Hwy #:	HWY 1
LHRS_Offset:	10135_0000_51T	Int. Type:	Cross
Count Date:	Thursday, 05 May, 2022		





TES - Traffic Engineering System

Turning Movement Total Count and Peak Summary Report

Description: HWY 1 @ TRAFALGAR RD - RAMP 61
Region: CENTRAL **Hwy #:** HWY 1
LHRS_Offset: 10135_0000_61T **Int. Type:** Cross
Count Date: Thursday, 05 May, 2022

Full Study Thu, 05 May, 2022 07:00 AM - 06:00 PM

AM Period Thu, 05 May, 2022 08:00 AM - 09:00 AM

Full Study Data (07:00 AM - 06:00 PM):

Direction	Movement	Count	Percentage
Northbound	Left	56	18%
	Through	15110	4%
	Right	0	0%
	Pedestrian	49	-
Southbound	Left	1465	2%
	Through	19558	3%
	Right	2554	3%
	Pedestrian	0	-
Eastbound	Left	1803	4%
	Through	2983	4%
	Right	2554	-
	Pedestrian	3	-
Westbound	Left	449	2%
	Through	506	-
	Right	106	0%
	Pedestrian	0	-

AM Period Data (08:00 AM - 09:00 AM):

Direction	Movement	Count	Percentage
Northbound	Left	5	40%
	Through	2041	4%
	Right	0	0%
	Pedestrian	3	-
Southbound	Left	133	2%
	Through	2537	5%
	Right	309	5%
	Pedestrian	0	-
Eastbound	Left	200	6%
	Through	363	6%
	Right	309	-
	Pedestrian	0	-
Westbound	Left	25	8%
	Through	30	-
	Right	2	0%
	Pedestrian	0	-

Monday, July 24, 2023

Page 1 of 2



TES - Traffic Engineering System

Turning Movement Total Count and Peak Summary Report

Description: HWY 1 @ TRAFALGAR RD - RAMP 61
Region: CENTRAL **Hwy #:** HWY 1
LHRS_Offset: 10135_0000_61T **Int. Type:** Cross
Count Date: Thursday, 05 May, 2022

MD Period Thu, 05 May, 2022 12:15 PM - 01:15 PM

PM Period Thu, 05 May, 2022 05:00 PM - 06:00 PM

MD Period Data:

Direction	Movement	Count	(T+ LT) %
Northbound	Left	70	0%
	Through	18	0%
	Right	0	0%
Southbound	Left	206	5%
	Through	1766	22%
	Right	1902	4%
Eastbound	Left	221	4%
	Through	61	2%
	Right	375	4%
Westbound	Left	312	0%
	Through	1527	3%
	Right	312	4%

PM Period Data:

Direction	Movement	Count	(T+ LT) %
Northbound	Left	105	0%
	Through	21	0%
	Right	0	0%
Southbound	Left	241	0%
	Through	2455	11%
	Right	1958	2%
Eastbound	Left	297	1%
	Through	96	0%
	Right	410	1%
Westbound	Left	426	0%
	Through	2137	2%
	Right	426	1%

Date: 3-8-2016

Intersection: Leighland Avenue/Iroquois Shore Road & Trafalgar

8 Phase Basic Timing Sheet												
	1	2	3	4	5	6	7	8	2 Ped	4 Ped	6 Ped	8 Ped
Phases in use	x	x	x	x	x	x	x	x	x	x	x	x
Direction	SEL	NWT	NEL	SWT	NWL	SET	SWL	NET				
Min Green	6	15	6	10	6	15	6	10				
Veh Ext.	3.0		3.0	3.0	3.0		3.0	3.0				
Yellow	3	4	3	4	3	4	3	4				
Red	1	3	1	3	1	3	2	3				
Walk	-	7	-	7	-	7	-	-				
Don't Walk	-	20	-	29	-	20	-	-				
Max 1	15	40	15	40	20	40	15	35				
Max 2												
Max 3												
Veh Recall												
Ped Recall												
Notes:												

<p>Pattern 1 Time: 6:00 Cycle Length: 120 Offset (%): 28%</p> <table border="0"> <tr><td colspan="5"> </td></tr> <tr><td>Direction</td><td></td><td></td><td></td><td></td></tr> <tr><td>Phase</td><td>1</td><td>2</td><td>3</td><td>4</td></tr> <tr><td>%</td><td>10%</td><td>44%</td><td>10%</td><td>36%</td></tr> <tr><td>Direction</td><td></td><td></td><td></td><td></td></tr> <tr><td>Phase</td><td>5</td><td>6</td><td>7</td><td>8</td></tr> <tr><td>%</td><td>10%</td><td>44%</td><td>31%</td><td>15%</td></tr> </table>						Direction					Phase	1	2	3	4	%	10%	44%	10%	36%	Direction					Phase	5	6	7	8	%	10%	44%	31%	15%	<p>Pattern 2 Time: 10:00 Cycle Length: 120 Offset (%): 98%</p> <table border="0"> <tr><td colspan="5"> </td></tr> <tr><td>Direction</td><td></td><td></td><td></td><td></td></tr> <tr><td>Phase</td><td>1</td><td>2</td><td>3</td><td>4</td></tr> <tr><td>%</td><td>13%</td><td>41%</td><td>10%</td><td>36%</td></tr> <tr><td>Direction</td><td></td><td></td><td></td><td></td></tr> <tr><td>Phase</td><td>5</td><td>6</td><td>7</td><td>8</td></tr> <tr><td>%</td><td>16%</td><td>38%</td><td>31%</td><td>15%</td></tr> </table>						Direction					Phase	1	2	3	4	%	13%	41%	10%	36%	Direction					Phase	5	6	7	8	%	16%	38%	31%	15%
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<p>Pattern 3 Time: 15:15 Cycle Length: 120 Offset (%): 88%</p> <table border="0"> <tr><td colspan="5"> </td></tr> <tr><td>Direction</td><td></td><td></td><td></td><td></td></tr> <tr><td>Phase</td><td>1</td><td>2</td><td>3</td><td>4</td></tr> <tr><td>%</td><td>10%</td><td>44%</td><td>10%</td><td>36%</td></tr> <tr><td>Direction</td><td></td><td></td><td></td><td></td></tr> <tr><td>Phase</td><td>5</td><td>6</td><td>7</td><td>8</td></tr> <tr><td>%</td><td>14%</td><td>40%</td><td>31%</td><td>15%</td></tr> </table>						Direction					Phase	1	2	3	4	%	10%	44%	10%	36%	Direction					Phase	5	6	7	8	%	14%	40%	31%	15%	<p>Pattern 4 Time: 19:00 Cycle Length: 110 Offset (%): 27%</p> <table border="0"> <tr><td colspan="5"> </td></tr> <tr><td>Direction</td><td></td><td></td><td></td><td></td></tr> <tr><td>Phase</td><td>1</td><td>2</td><td>3</td><td>4</td></tr> <tr><td>%</td><td>12%</td><td>35%</td><td>13%</td><td>40%</td></tr> <tr><td>Direction</td><td></td><td></td><td></td><td></td></tr> <tr><td>Phase</td><td>5</td><td>6</td><td>7</td><td>8</td></tr> <tr><td>%</td><td>12%</td><td>35%</td><td>20%</td><td>33%</td></tr> </table>						Direction					Phase	1	2	3	4	%	12%	35%	13%	40%	Direction					Phase	5	6	7	8	%	12%	35%	20%	33%
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<p>Pattern 5 Time: Weekend Cycle Length: 120 Offset (%): 98%</p> <table border="0"> <tr><td colspan="5"> </td></tr> <tr><td>Direction</td><td></td><td></td><td></td><td></td></tr> <tr><td>Phase</td><td>1</td><td>2</td><td>3</td><td>4</td></tr> <tr><td>%</td><td>13%</td><td>41%</td><td>10%</td><td>36%</td></tr> <tr><td>Direction</td><td></td><td></td><td></td><td></td></tr> <tr><td>Phase</td><td>5</td><td>6</td><td>7</td><td>8</td></tr> <tr><td>%</td><td>16%</td><td>38%</td><td>31%</td><td>15%</td></tr> </table>						Direction					Phase	1	2	3	4	%	13%	41%	10%	36%	Direction					Phase	5	6	7	8	%	16%	38%	31%	15%	<p>Pattern 6 Time: Cycle Length: Local Offset (%):</p> <table border="0"> <tr><td colspan="5"> </td></tr> <tr><td>Direction</td><td></td><td></td><td></td><td></td></tr> <tr><td>Phase</td><td>1</td><td>2</td><td>3</td><td>4</td></tr> <tr><td>%</td><td>x</td><td>x</td><td>x</td><td>x</td></tr> <tr><td>Direction</td><td></td><td></td><td></td><td></td></tr> <tr><td>Phase</td><td>5</td><td>6</td><td>7</td><td>8</td></tr> <tr><td>%</td><td>x</td><td>x</td><td>x</td><td>x</td></tr> </table>						Direction					Phase	1	2	3	4	%	x	x	x	x	Direction					Phase	5	6	7	8	%	x	x	x	x
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Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 cbowness@ptsl.com

Count Name: Cross Avenue & Argus Road
Site Code:
Start Date: 01/10/2019
Page No: 1

Turning Movement Data

Start Time	Cross Avenue Eastbound						Cross Avenue Westbound						GO Bus Station Northbound						Argus Road Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
7:00 AM	2	75	5	0	1	82	12	134	0	0	1	146	7	0	14	0	0	21	5	2	85	0	1	92	341
7:15 AM	3	82	2	0	3	87	7	154	2	0	10	163	1	0	7	0	0	8	13	2	112	0	2	127	385
7:30 AM	2	90	5	0	1	97	9	131	5	0	8	145	6	0	14	0	1	20	11	3	103	0	0	117	379
7:45 AM	6	87	2	0	1	95	7	157	4	0	3	168	1	0	9	0	0	10	17	6	130	0	0	153	426
Hourly Total	13	334	14	0	6	361	35	576	11	0	22	622	15	0	44	0	1	59	46	13	430	0	3	489	1531
8:00 AM	7	76	5	0	0	88	11	118	7	0	5	136	9	0	16	0	2	25	11	4	110	0	1	125	374
8:15 AM	14	102	1	0	1	117	10	145	6	0	4	161	3	0	6	0	0	9	14	2	120	0	0	136	423
8:30 AM	10	88	6	0	1	104	10	96	6	0	2	112	9	0	13	0	0	22	17	2	39	0	0	58	296
8:45 AM	12	81	2	0	1	95	8	84	8	0	3	100	4	1	3	0	0	8	8	4	57	0	0	69	272
Hourly Total	43	347	14	0	3	404	39	443	27	0	14	509	25	1	38	0	2	64	50	12	326	0	1	388	1365
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11:00 AM	6	81	4	0	1	91	6	59	7	0	3	72	6	0	8	0	1	14	20	4	22	0	0	46	223
11:15 AM	4	73	2	0	2	79	2	66	10	0	1	78	0	0	3	0	0	3	20	0	30	0	0	50	210
11:30 AM	7	76	7	0	1	90	7	66	7	0	3	80	7	0	11	0	1	18	21	2	33	0	2	56	244
11:45 AM	3	94	1	0	1	98	1	67	8	1	1	77	0	0	3	0	0	3	28	2	24	0	1	54	232
Hourly Total	20	324	14	0	5	358	16	258	32	1	8	307	13	0	25	0	2	38	89	8	109	0	3	206	909
12:00 PM	3	77	4	0	4	84	7	73	6	0	4	86	3	0	4	0	1	7	31	3	20	0	1	54	231
12:15 PM	7	88	1	0	0	96	2	78	4	0	1	84	4	0	7	0	0	11	23	0	37	0	1	60	251
12:30 PM	1	97	4	0	3	102	7	76	9	0	4	92	4	0	8	0	0	12	25	3	19	0	0	47	253
12:45 PM	7	98	1	0	2	106	3	82	7	0	1	92	1	0	3	0	0	4	26	1	21	0	3	48	250
Hourly Total	18	360	10	0	9	388	19	309	26	0	10	354	12	0	22	0	1	34	105	7	97	0	5	209	985
1:00 PM	7	117	4	0	2	128	8	89	10	0	1	107	9	0	9	0	1	18	18	4	19	0	2	41	294
1:15 PM	4	99	1	0	0	104	3	76	9	0	3	88	1	0	2	0	0	3	18	0	25	0	2	43	238
1:30 PM	3	75	6	0	2	84	8	69	4	0	1	81	7	0	8	0	1	15	22	1	23	0	0	46	226
1:45 PM	5	84	1	0	1	90	1	82	13	0	4	96	0	0	4	0	1	4	17	1	18	0	2	36	226
Hourly Total	19	375	12	0	5	406	20	316	36	0	9	372	17	0	23	0	3	40	75	6	85	0	6	166	984
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3:00 PM	4	92	4	0	4	100	8	82	10	0	10	100	7	0	10	0	6	17	24	4	24	0	0	52	269
3:15 PM	6	108	1	0	0	115	3	83	9	0	6	95	3	0	2	0	0	5	22	4	27	0	1	53	268
3:30 PM	7	101	4	0	5	112	9	63	14	0	8	86	5	0	10	0	1	15	11	3	25	0	10	39	252
3:45 PM	4	84	1	0	1	89	1	87	4	0	2	92	3	0	2	0	0	5	19	3	27	0	3	49	235
Hourly Total	21	385	10	0	10	416	21	315	37	0	26	373	18	0	24	0	7	42	76	14	103	0	14	193	1024
4:00 PM	4	145	4	0	0	153	8	72	6	0	6	86	5	0	11	0	1	16	27	5	34	0	0	66	321
4:15 PM	5	90	2	0	0	97	4	72	4	0	3	80	2	1	7	0	2	10	23	3	33	0	1	59	246
4:30 PM	3	195	4	1	1	203	4	64	10	0	5	78	2	0	13	0	1	15	25	6	36	0	3	67	363
4:45 PM	2	122	5	0	0	129	4	72	5	0	2	81	5	0	10	0	0	15	25	3	37	0	1	65	290
Hourly Total	14	552	15	1	1	582	20	280	25	0	16	325	14	1	41	0	4	56	100	17	140	0	5	257	1220

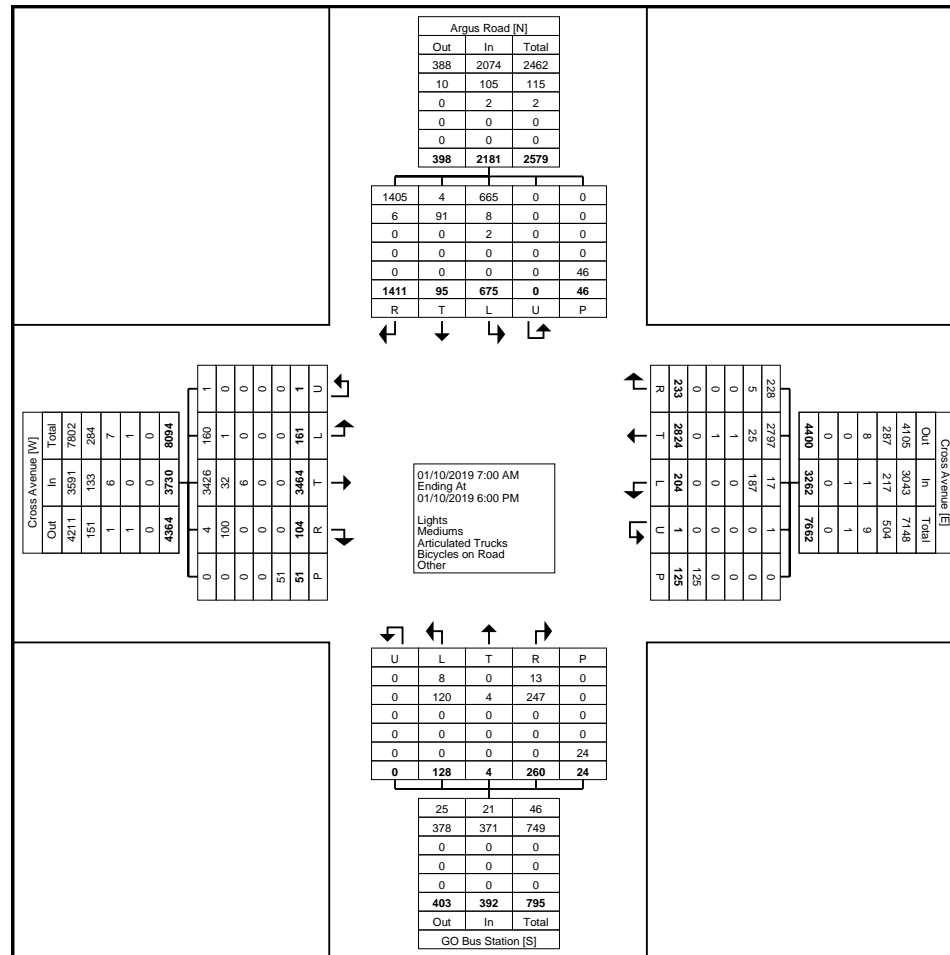
5:00 PM	2	212	5	0	2	219	9	83	8	0	4	100	3	0	14	0	1	17	39	6	21	0	0	66	402
5:15 PM	4	108	3	0	6	115	8	82	12	0	8	102	4	0	8	0	2	12	32	2	30	0	2	64	293
5:30 PM	2	225	5	0	2	232	8	86	8	0	3	102	2	0	16	0	0	18	24	4	31	0	4	59	411
5:45 PM	5	242	2	0	2	249	9	76	11	0	5	96	5	2	5	0	1	12	39	6	39	0	3	84	441
Hourly Total	13	787	15	0	12	815	34	327	39	0	20	400	14	2	43	0	4	59	134	18	121	0	9	273	1547
Grand Total	161	3464	104	1	51	3730	204	2824	233	1	125	3262	128	4	260	0	24	392	675	95	1411	0	46	2181	9565
Approach %	4.3	92.9	2.8	0.0	-	-	6.3	86.6	7.1	0.0	-	-	32.7	1.0	66.3	0.0	-	-	30.9	4.4	64.7	0.0	-	-	-
Total %	1.7	36.2	1.1	0.0	-	39.0	2.1	29.5	2.4	0.0	-	34.1	1.3	0.0	2.7	0.0	-	4.1	7.1	1.0	14.8	0.0	-	22.8	-
Lights	160	3426	4	1	-	3591	17	2797	228	1	-	3043	8	0	13	0	-	21	665	4	1405	0	-	2074	8729
% Lights	99.4	98.9	3.8	100.0	-	96.3	8.3	99.0	97.9	100.0	-	93.3	6.3	0.0	5.0	-	-	5.4	98.5	4.2	99.6	-	-	95.1	91.3
Mediums	1	32	100	0	-	133	187	25	5	0	-	217	120	4	247	0	-	371	8	91	6	0	-	105	826
% Mediums	0.6	0.9	96.2	0.0	-	3.6	91.7	0.9	2.1	0.0	-	6.7	93.8	100.0	95.0	-	-	94.6	1.2	95.8	0.4	-	-	4.8	8.6
Articulated Trucks	0	6	0	0	-	6	0	1	0	0	-	1	0	0	0	0	-	0	2	0	0	0	-	2	9
% Articulated Trucks	0.0	0.2	0.0	0.0	-	0.2	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	-	0.0	0.3	0.0	0.0	-	-	0.1	0.1
Bicycles on Road	0	0	0	0	-	0	0	1	0	0	-	1	0	0	0	0	-	0	0	0	0	0	-	0	1
% Bicycles on Road	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	3	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	6.5	-	-
Pedestrians	-	-	-	-	51	-	-	-	-	-	125	-	-	-	-	-	24	-	-	-	-	-	43	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	93.5	-	-



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Count Name: Cross Avenue & Argus Road
Site Code:
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Turning Movement Data Plot



Paradigm Transportation Solutions Limited
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Count Name: Cross Avenue & Argus Road
Site Code:
Start Date: 01/10/2019
Page No: 4

Turning Movement Peak Hour Data (7:30 AM)

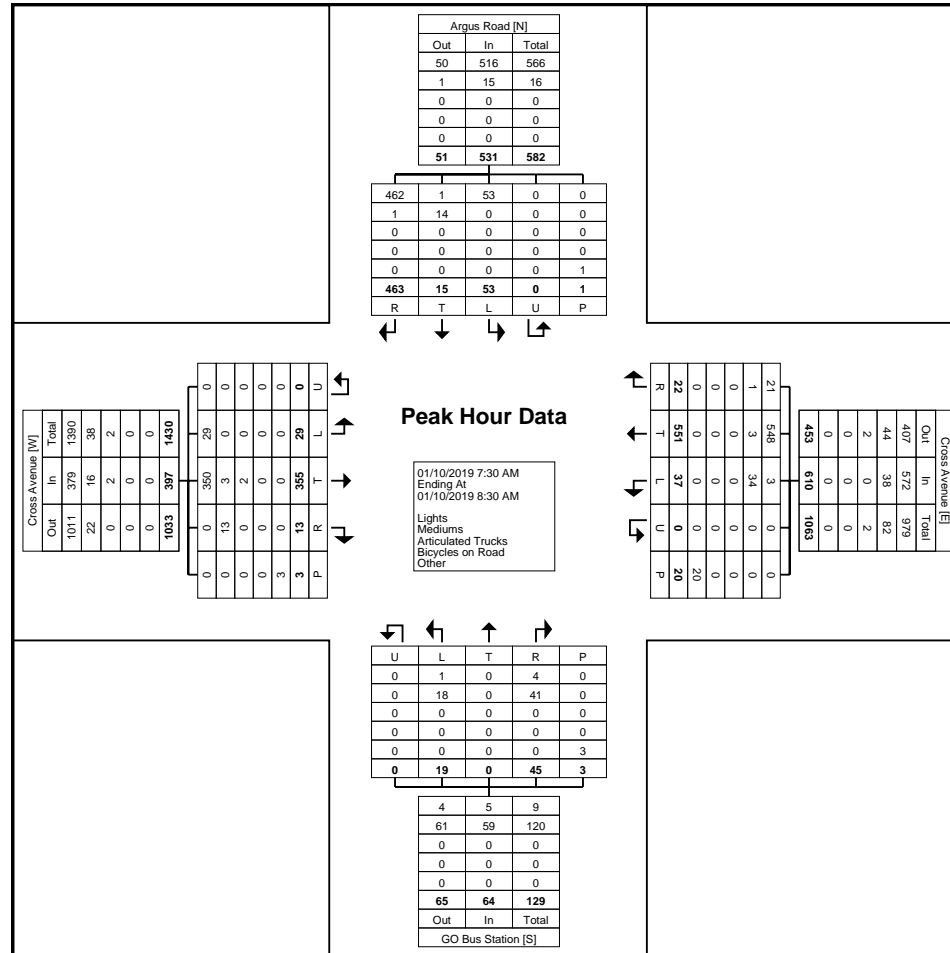
Start Time	Cross Avenue Eastbound						Cross Avenue Westbound						GO Bus Station Northbound						Argus Road Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
7:30 AM	2	90	5	0	1	97	9	131	5	0	8	145	6	0	14	0	1	20	11	3	103	0	0	117	379
7:45 AM	6	87	2	0	1	95	7	157	4	0	3	168	1	0	9	0	0	10	17	6	130	0	0	153	426
8:00 AM	7	76	5	0	0	88	11	118	7	0	5	136	9	0	16	0	2	25	11	4	110	0	1	125	374
8:15 AM	14	102	1	0	1	117	10	145	6	0	4	161	3	0	6	0	0	9	14	2	120	0	0	136	423
Total	29	355	13	0	3	397	37	551	22	0	20	610	19	0	45	0	3	64	53	15	463	0	1	531	1602
Approach %	7.3	89.4	3.3	0.0	-	-	6.1	90.3	3.6	0.0	-	-	29.7	0.0	70.3	0.0	-	-	10.0	2.8	87.2	0.0	-	-	-
Total %	1.8	22.2	0.8	0.0	-	24.8	2.3	34.4	1.4	0.0	-	38.1	1.2	0.0	2.8	0.0	-	4.0	3.3	0.9	28.9	0.0	-	33.1	-
PHF	0.518	0.870	0.650	0.000	-	0.848	0.841	0.877	0.786	0.000	-	0.908	0.528	0.000	0.703	0.000	-	0.640	0.779	0.625	0.890	0.000	-	0.868	0.940
Lights	29	350	0	0	-	379	3	548	21	0	-	572	1	0	4	0	-	5	53	1	462	0	-	516	1472
% Lights	100.0	98.6	0.0	-	-	95.5	8.1	99.5	95.5	-	-	93.8	5.3	-	8.9	-	-	7.8	100.0	6.7	99.8	-	-	97.2	91.9
Mediums	0	3	13	0	-	16	34	3	1	0	-	38	18	0	41	0	-	59	0	14	1	0	-	15	128
% Mediums	0.0	0.8	100.0	-	-	4.0	91.9	0.5	4.5	-	-	6.2	94.7	-	91.1	-	-	92.2	0.0	93.3	0.2	-	-	2.8	8.0
Articulated Trucks	0	2	0	0	-	2	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	2
% Articulated Trucks	0.0	0.6	0.0	-	-	0.5	0.0	0.0	0.0	-	-	0.0	0.0	-	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.1
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	-	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	1	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	100.0	-	-
Pedestrians	-	-	-	-	3	-	-	-	-	-	20	-	-	-	-	-	3	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	0.0	-	-



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Count Name: Cross Avenue & Argus Road
Site Code:
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Page No: 5



Turning Movement Peak Hour Data Plot (7:30 AM)



Paradigm Transportation Solutions Limited
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Count Name: Cross Avenue & Argus Road
Site Code:
Start Date: 01/10/2019
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Turning Movement Peak Hour Data (12:15 PM)

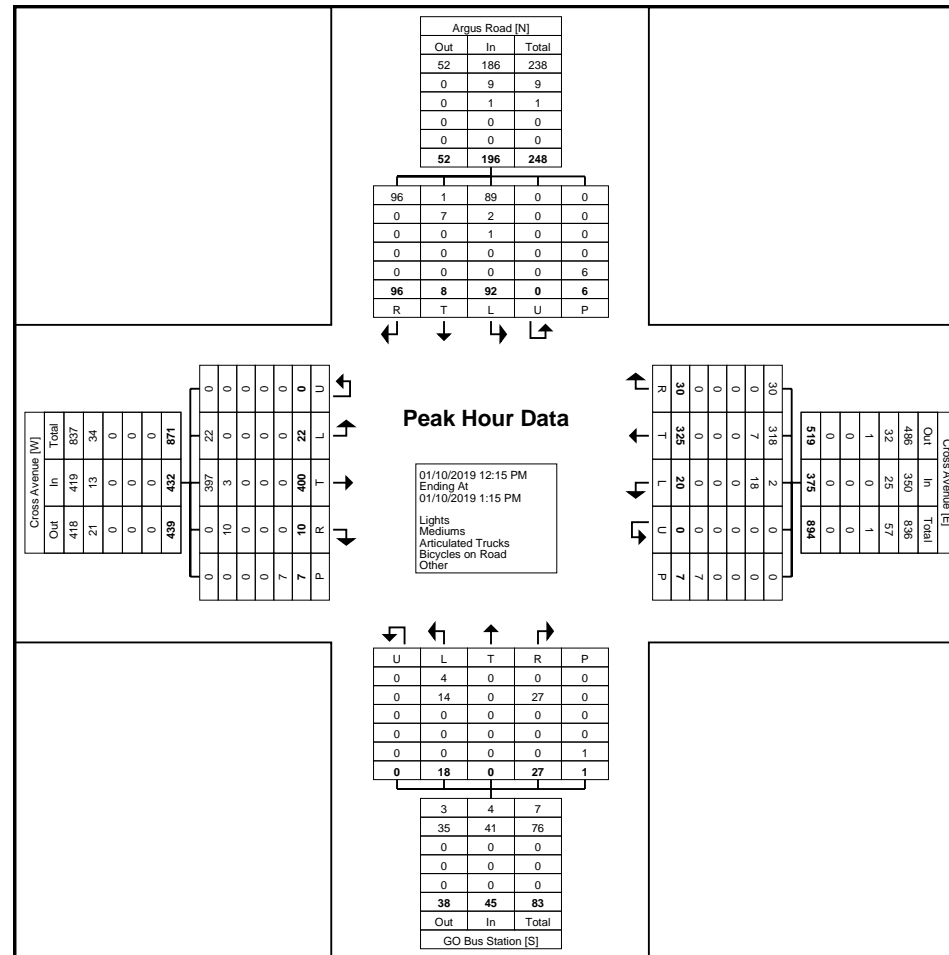
Start Time	Cross Avenue Eastbound						Cross Avenue Westbound						GO Bus Station Northbound						Argus Road Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
12:15 PM	7	88	1	0	0	96	2	78	4	0	1	84	4	0	7	0	0	11	23	0	37	0	1	60	251
12:30 PM	1	97	4	0	3	102	7	76	9	0	4	92	4	0	8	0	0	12	25	3	19	0	0	47	253
12:45 PM	7	98	1	0	2	106	3	82	7	0	1	92	1	0	3	0	0	4	26	1	21	0	3	48	250
1:00 PM	7	117	4	0	2	128	8	89	10	0	1	107	9	0	9	0	1	18	18	4	19	0	2	41	294
Total	22	400	10	0	7	432	20	325	30	0	7	375	18	0	27	0	1	45	92	8	96	0	6	196	1048
Approach %	5.1	92.6	2.3	0.0	-	-	5.3	86.7	8.0	0.0	-	-	40.0	0.0	60.0	0.0	-	-	46.9	4.1	49.0	0.0	-	-	-
Total %	2.1	38.2	1.0	0.0	-	41.2	1.9	31.0	2.9	0.0	-	35.8	1.7	0.0	2.6	0.0	-	4.3	8.8	0.8	9.2	0.0	-	18.7	-
PHF	0.786	0.855	0.625	0.000	-	0.844	0.625	0.913	0.750	0.000	-	0.876	0.500	0.000	0.750	0.000	-	0.625	0.885	0.500	0.649	0.000	-	0.817	0.891
Lights	22	397	0	0	-	419	2	318	30	0	-	350	4	0	0	0	-	4	89	1	96	0	-	186	959
% Lights	100.0	99.3	0.0	-	-	97.0	10.0	97.8	100.0	-	-	93.3	22.2	-	0.0	-	-	8.9	96.7	12.5	100.0	-	-	94.9	91.5
Mediums	0	3	10	0	-	13	18	7	0	0	-	25	14	0	27	0	-	41	2	7	0	0	-	9	88
% Mediums	0.0	0.8	100.0	-	-	3.0	90.0	2.2	0.0	-	-	6.7	77.8	-	100.0	-	-	91.1	2.2	87.5	0.0	-	-	4.6	8.4
Articulated Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	1	0	0	0	-	1	1
% Articulated Trucks	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	-	0.0	-	-	0.0	1.1	0.0	0.0	-	-	0.5	0.1
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	-	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	7	-	-	-	-	-	7	-	-	-	-	-	1	-	-	-	-	-	6	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-



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Count Name: Cross Avenue & Argus Road
Site Code:
Start Date: 01/10/2019
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Turning Movement Peak Hour Data Plot (12:15 PM)



Paradigm Transportation Solutions Limited
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Count Name: Cross Avenue & Argus Road
Site Code:
Start Date: 01/10/2019
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Turning Movement Peak Hour Data (5:00 PM)

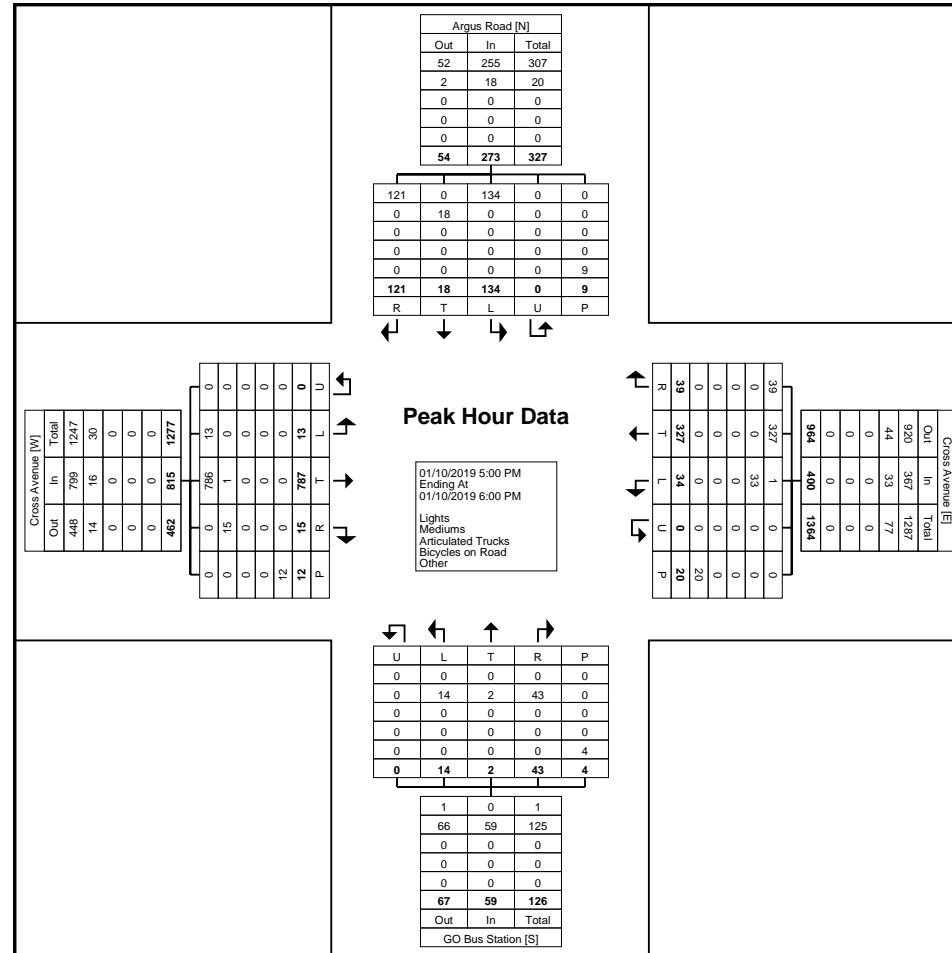
Start Time	Cross Avenue Eastbound						Cross Avenue Westbound						GO Bus Station Northbound						Argus Road Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
5:00 PM	2	212	5	0	2	219	9	83	8	0	4	100	3	0	14	0	1	17	39	6	21	0	0	66	402
5:15 PM	4	108	3	0	6	115	8	82	12	0	8	102	4	0	8	0	2	12	32	2	30	0	2	64	293
5:30 PM	2	225	5	0	2	232	8	86	8	0	3	102	2	0	16	0	0	18	24	4	31	0	4	59	411
5:45 PM	5	242	2	0	2	249	9	76	11	0	5	96	5	2	5	0	1	12	39	6	39	0	3	84	441
Total	13	787	15	0	12	815	34	327	39	0	20	400	14	2	43	0	4	59	134	18	121	0	9	273	1547
Approach %	1.6	96.6	1.8	0.0	-	-	8.5	81.8	9.8	0.0	-	-	23.7	3.4	72.9	0.0	-	-	49.1	6.6	44.3	0.0	-	-	-
Total %	0.8	50.9	1.0	0.0	-	52.7	2.2	21.1	2.5	0.0	-	25.9	0.9	0.1	2.8	0.0	-	3.8	8.7	1.2	7.8	0.0	-	17.6	-
PHF	0.650	0.813	0.750	0.000	-	0.818	0.944	0.951	0.813	0.000	-	0.980	0.700	0.250	0.672	0.000	-	0.819	0.859	0.750	0.776	0.000	-	0.813	0.877
Lights	13	786	0	0	-	799	1	327	39	0	-	367	0	0	0	0	-	0	134	0	121	0	-	255	1421
% Lights	100.0	99.9	0.0	-	-	98.0	2.9	100.0	100.0	-	-	91.8	0.0	0.0	0.0	-	-	0.0	100.0	0.0	100.0	-	-	93.4	91.9
Mediums	0	1	15	0	-	16	33	0	0	0	-	33	14	2	43	0	-	59	0	18	0	0	-	18	126
% Mediums	0.0	0.1	100.0	-	-	2.0	97.1	0.0	0.0	-	-	8.3	100.0	100.0	100.0	-	-	100.0	0.0	100.0	0.0	-	-	6.6	8.1
Articulated Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Articulated Trucks	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	1	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	11.1	-	-
Pedestrians	-	-	-	-	12	-	-	-	-	-	20	-	-	-	-	-	4	-	-	-	-	-	8	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	88.9	-	-



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Count Name: Cross Avenue & Argus Road
Site Code:
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Turning Movement Peak Hour Data Plot (5:00 PM)



Paradigm Transportation Solutions Limited
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Count Name: Cross Avenue & Argus Road
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Paradigm Transportation Solutions Limited
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Count Name: Cross Avenue & Lyons
Lane/Commercial Plaza
Site Code:
Start Date: 01/10/2019
Page No: 1

Turning Movement Data

Start Time	Cross Avenue Eastbound						Cross Avenue Westbound						Lyons Lane Northbound						Plaza Entrance Southbound						Int. Total	
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total		
7:00 AM	7	27	26	0	0	60	29	15	3	0	1	47	2	1	0	0	1	3	3	2	4	0	1	9	119	
7:15 AM	5	50	46	0	2	101	64	20	1	0	1	85	2	0	8	0	0	10	3	2	6	0	2	11	207	
7:30 AM	12	37	42	0	0	91	35	22	3	0	1	60	4	0	3	0	0	7	6	6	8	0	0	20	178	
7:45 AM	8	34	62	0	2	104	46	21	1	0	1	68	2	1	2	0	0	5	1	6	11	0	5	18	195	
Hourly Total	32	148	176	0	4	356	174	78	8	0	4	260	10	2	13	0	1	25	13	16	29	0	8	58	699	
8:00 AM	16	39	43	0	0	98	45	34	1	0	1	80	5	1	2	0	1	8	6	5	9	0	0	20	206	
8:15 AM	17	49	35	0	1	101	77	31	0	0	0	108	5	1	5	0	0	11	2	5	10	0	0	17	237	
8:30 AM	17	41	22	0	2	80	28	35	3	0	0	66	2	1	2	0	0	5	12	4	11	0	1	27	178	
8:45 AM	12	53	7	0	0	72	23	29	5	0	0	57	0	0	1	0	0	1	7	2	15	0	0	24	154	
Hourly Total	62	182	107	0	3	351	173	129	9	0	1	311	12	3	10	0	1	25	27	16	45	0	1	88	775	
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11:00 AM	19	33	2	0	1	54	0	38	3	0	0	41	0	0	0	0	0	0	8	1	21	0	2	30	125	
11:15 AM	20	34	0	0	1	54	1	46	2	0	0	49	0	1	0	0	1	1	4	0	16	0	0	20	124	
11:30 AM	14	38	1	0	0	53	2	59	7	0	1	68	1	0	1	0	1	2	5	0	23	0	0	28	151	
11:45 AM	16	32	0	0	1	48	1	52	4	0	1	57	2	0	1	0	0	3	3	0	12	0	1	15	123	
Hourly Total	69	137	3	0	3	209	4	195	16	0	2	215	3	1	2	0	2	6	20	1	72	0	3	93	523	
12:00 PM	16	45	0	0	0	61	0	49	8	0	4	57	0	0	0	0	0	0	4	0	18	0	1	22	140	
12:15 PM	17	39	1	0	0	57	0	56	10	0	0	66	3	0	3	0	0	6	9	0	13	0	1	22	151	
12:30 PM	16	47	4	0	0	67	3	47	4	0	1	54	2	0	2	0	0	4	5	0	28	0	1	33	158	
12:45 PM	16	30	0	0	0	46	0	41	6	0	0	47	1	0	3	0	0	4	9	1	18	0	0	28	125	
Hourly Total	65	161	5	0	0	231	3	193	28	0	5	224	6	0	8	0	0	14	27	1	77	0	3	105	574	
1:00 PM	19	33	1	0	1	53	0	51	7	0	1	58	0	1	0	0	0	1	7	0	23	0	0	30	142	
1:15 PM	14	37	0	0	0	51	2	55	6	0	0	63	5	0	0	0	0	5	4	0	27	0	1	31	150	
1:30 PM	12	43	0	0	1	55	1	56	2	0	0	59	0	1	2	0	1	3	7	0	17	0	1	24	141	
1:45 PM	16	37	2	0	1	55	0	42	5	0	0	47	3	1	1	0	0	5	9	0	23	0	1	32	139	
Hourly Total	61	150	3	0	3	214	3	204	20	0	1	227	8	3	3	0	1	14	27	0	90	0	3	117	572	
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3:00 PM	15	43	1	0	1	59	0	72	4	0	0	76	0	0	1	0	0	1	6	0	20	0	0	26	162	
3:15 PM	11	50	0	0	1	61	0	83	4	0	1	87	2	0	7	0	1	9	6	0	16	0	3	22	179	
3:30 PM	15	42	2	0	1	59	0	53	2	0	0	55	0	0	2	0	1	2	2	0	17	0	0	19	135	
3:45 PM	13	39	3	0	0	55	2	78	5	0	3	85	5	1	4	0	1	10	5	0	19	0	1	24	174	
Hourly Total	54	174	6	0	3	234	2	286	15	0	4	303	7	1	14	0	3	22	19	0	72	0	4	91	650	
4:00 PM	11	38	1	0	0	50	1	93	3	0	0	97	13	1	18	0	0	32	5	0	14	0	2	19	198	
4:15 PM	8	33	2	0	0	43	3	59	1	0	0	63	6	1	5	0	0	12	5	0	14	0	1	19	137	
4:30 PM	14	43	5	0	1	62	4	68	4	0	1	76	26	0	21	0	1	47	3	0	20	0	1	23	208	
4:45 PM	12	46	5	0	3	63	3	72	3	0	0	78	11	1	11	0	1	23	8	0	23	0	0	31	195	
Hourly Total	45	160	13	0	4	218	11	292	11	0	1	314	56	3	55	0	2	114	21	0	71	0	4	92	738	

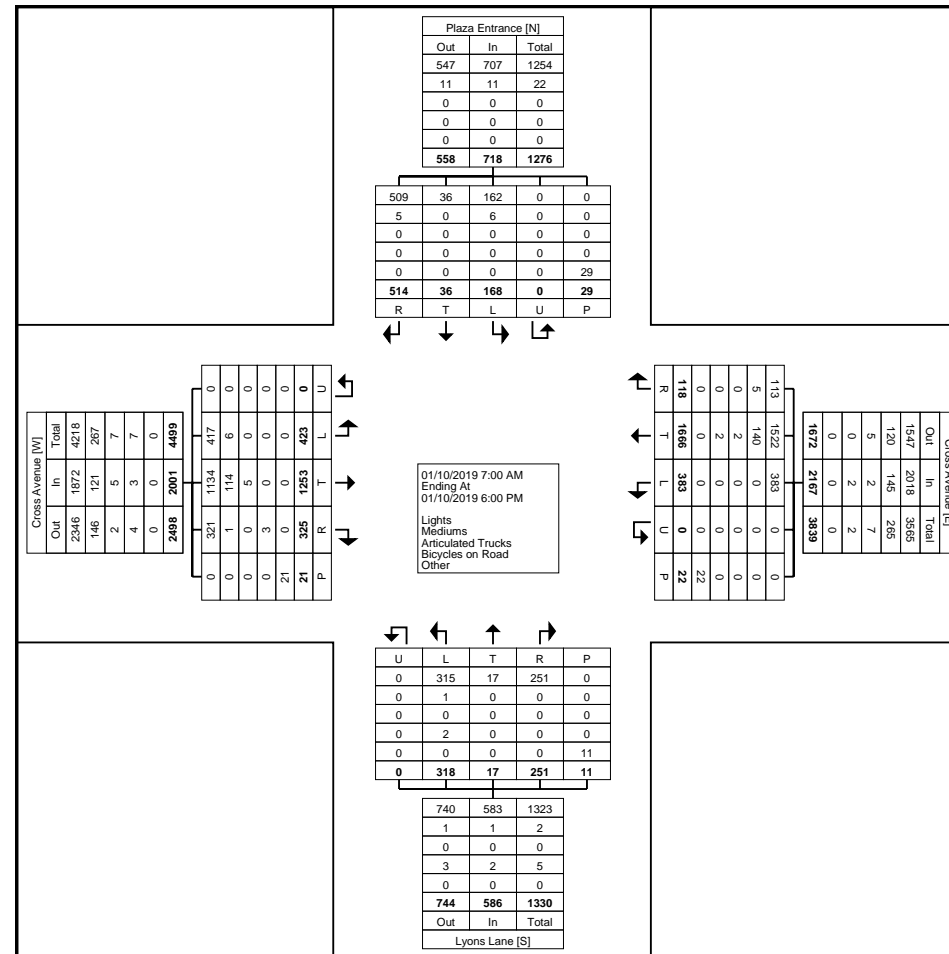
5:00 PM	9	41	0	0	0	50	1	76	2	0	0	79	73	0	32	0	1	105	5	0	24	0	0	29	263
5:15 PM	7	24	4	0	1	35	6	73	3	0	1	82	24	0	24	0	0	48	3	0	14	0	1	17	182
5:30 PM	15	42	4	0	0	61	2	66	5	0	1	73	59	1	46	0	0	106	4	1	10	0	1	15	255
5:45 PM	4	34	4	0	0	42	4	74	1	0	2	79	60	3	44	0	0	107	2	1	10	0	1	13	241
Hourly Total	35	141	12	0	1	188	13	289	11	0	4	313	216	4	146	0	1	366	14	2	58	0	3	74	941
Grand Total	423	1253	325	0	21	2001	383	1666	118	0	22	2167	318	17	251	0	11	586	168	36	514	0	29	718	5472
Approach %	21.1	62.6	16.2	0.0	-	-	17.7	76.9	5.4	0.0	-	-	54.3	2.9	42.8	0.0	-	-	23.4	5.0	71.6	0.0	-	-	-
Total %	7.7	22.9	5.9	0.0	-	36.6	7.0	30.4	2.2	0.0	-	39.6	5.8	0.3	4.6	0.0	-	10.7	3.1	0.7	9.4	0.0	-	13.1	-
Lights	417	1134	321	0	-	1872	383	1522	113	0	-	2018	315	17	251	0	-	583	162	36	509	0	-	707	5180
% Lights	98.6	90.5	98.8	-	-	93.6	100.0	91.4	95.8	-	-	93.1	99.1	100.0	100.0	-	-	99.5	96.4	100.0	99.0	-	-	98.5	94.7
Mediums	6	114	1	0	-	121	0	140	5	0	-	145	1	0	0	0	-	1	6	0	5	0	-	11	278
% Mediums	1.4	9.1	0.3	-	-	6.0	0.0	8.4	4.2	-	-	6.7	0.3	0.0	0.0	-	-	0.2	3.6	0.0	1.0	-	-	1.5	5.1
Articulated Trucks	0	5	0	0	-	5	0	2	0	0	-	2	0	0	0	0	-	0	0	0	0	0	-	0	7
% Articulated Trucks	0.0	0.4	0.0	-	-	0.2	0.0	0.1	0.0	-	-	0.1	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.1
Bicycles on Road	0	0	3	0	-	3	0	2	0	0	-	2	2	0	0	0	-	2	0	0	0	0	-	0	7
% Bicycles on Road	0.0	0.0	0.9	-	-	0.1	0.0	0.1	0.0	-	-	0.1	0.6	0.0	0.0	-	-	0.3	0.0	0.0	0.0	-	-	0.0	0.1
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	3	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	10.3	-	-
Pedestrians	-	-	-	-	21	-	-	-	-	-	22	-	-	-	-	-	11	-	-	-	-	-	26	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	89.7	-	-



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Count Name: Cross Avenue & Lyons
Lane/Commercial Plaza
Site Code:
Start Date: 01/10/2019
Page No: 3



Turning Movement Data Plot



Paradigm Transportation Solutions Limited
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Count Name: Cross Avenue & Lyons
Lane/Commercial Plaza
Site Code:
Start Date: 01/10/2019
Page No: 4

Turning Movement Peak Hour Data (7:30 AM)

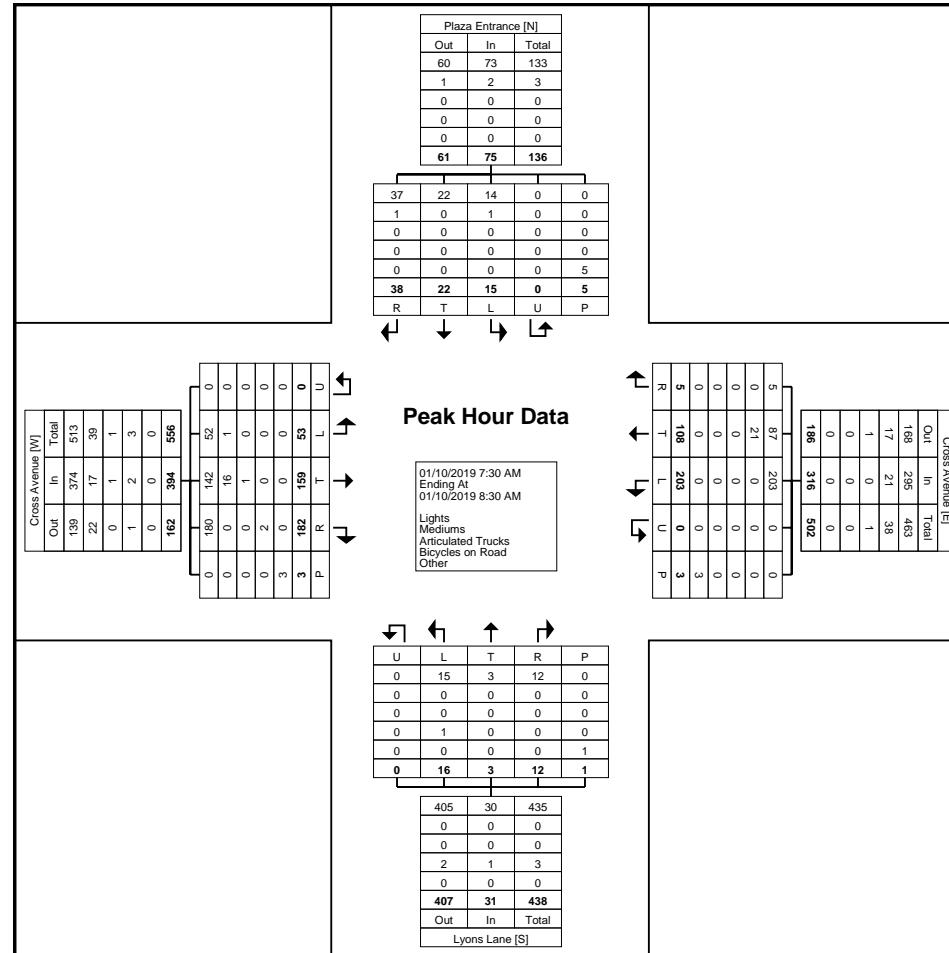
Start Time	Cross Avenue Eastbound						Cross Avenue Westbound						Lyons Lane Northbound						Plaza Entrance Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
7:30 AM	12	37	42	0	0	91	35	22	3	0	1	60	4	0	3	0	0	7	6	6	8	0	0	20	178
7:45 AM	8	34	62	0	2	104	46	21	1	0	1	68	2	1	2	0	0	5	1	6	11	0	5	18	195
8:00 AM	16	39	43	0	0	98	45	34	1	0	1	80	5	1	2	0	1	8	6	5	9	0	0	20	206
8:15 AM	17	49	35	0	1	101	77	31	0	0	0	108	5	1	5	0	0	11	2	5	10	0	0	17	237
Total	53	159	182	0	3	394	203	108	5	0	3	316	16	3	12	0	1	31	15	22	38	0	5	75	816
Approach %	13.5	40.4	46.2	0.0	-	-	64.2	34.2	1.6	0.0	-	-	51.6	9.7	38.7	0.0	-	-	20.0	29.3	50.7	0.0	-	-	-
Total %	6.5	19.5	22.3	0.0	-	48.3	24.9	13.2	0.6	0.0	-	38.7	2.0	0.4	1.5	0.0	-	3.8	1.8	2.7	4.7	0.0	-	9.2	-
PHF	0.779	0.811	0.734	0.000	-	0.947	0.659	0.794	0.417	0.000	-	0.731	0.800	0.750	0.600	0.000	-	0.705	0.625	0.917	0.864	0.000	-	0.938	0.861
Lights	52	142	180	0	-	374	203	87	5	0	-	295	15	3	12	0	-	30	14	22	37	0	-	73	772
% Lights	98.1	89.3	98.9	-	-	94.9	100.0	80.6	100.0	-	-	93.4	93.8	100.0	100.0	-	-	96.8	93.3	100.0	97.4	-	-	97.3	94.6
Mediums	1	16	0	0	-	17	0	21	0	0	-	21	0	0	0	0	-	0	1	0	1	0	-	2	40
% Mediums	1.9	10.1	0.0	-	-	4.3	0.0	19.4	0.0	-	-	6.6	0.0	0.0	0.0	-	-	0.0	6.7	0.0	2.6	-	-	2.7	4.9
Articulated Trucks	0	1	0	0	-	1	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	1
% Articulated Trucks	0.0	0.6	0.0	-	-	0.3	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.1
Bicycles on Road	0	0	2	0	-	2	0	0	0	0	-	0	1	0	0	0	-	1	0	0	0	0	-	0	3
% Bicycles on Road	0.0	0.0	1.1	-	-	0.5	0.0	0.0	0.0	-	-	0.0	6.3	0.0	0.0	-	-	3.2	0.0	0.0	0.0	-	-	0.0	0.4
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	1	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	20.0	-	-
Pedestrians	-	-	-	-	3	-	-	-	-	-	3	-	-	-	-	-	1	-	-	-	-	-	4	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	80.0	-	-



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Count Name: Cross Avenue & Lyons
Lane/Commercial Plaza
Site Code:
Start Date: 01/10/2019
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Turning Movement Peak Hour Data Plot (7:30 AM)



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Count Name: Cross Avenue & Lyons
Lane/Commercial Plaza
Site Code:
Start Date: 01/10/2019
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Turning Movement Peak Hour Data (12:15 PM)

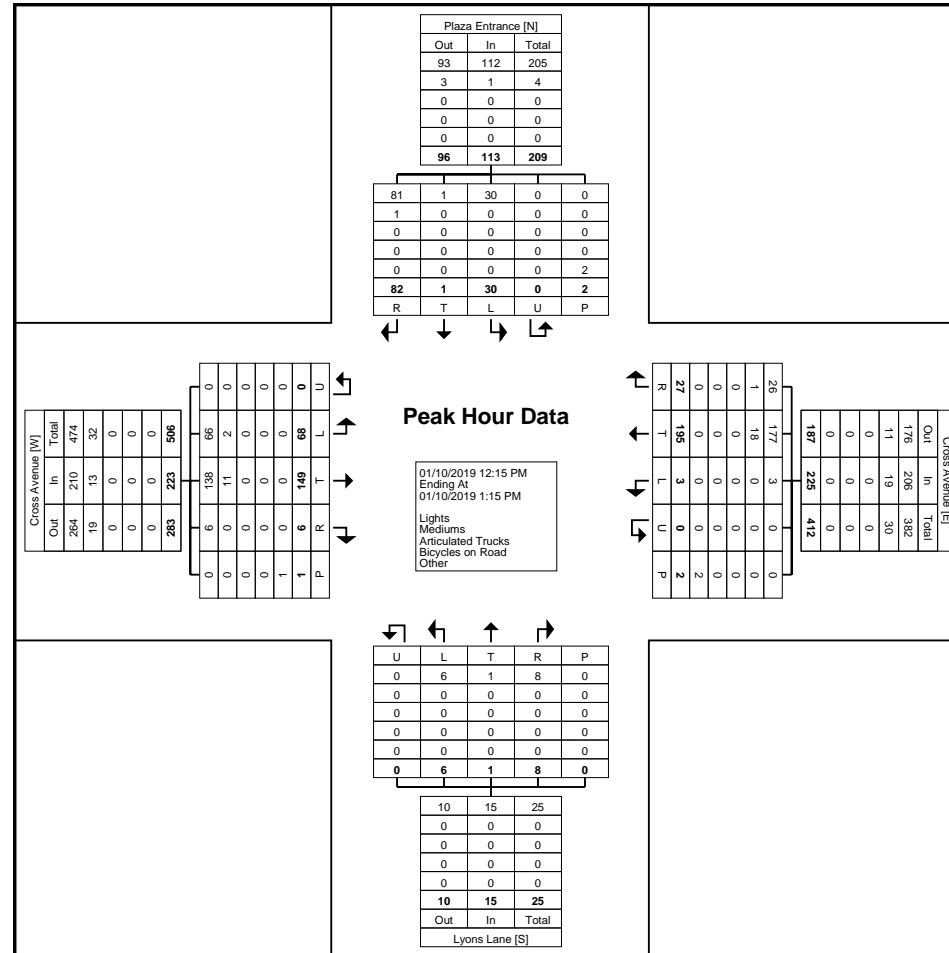
Start Time	Cross Avenue Eastbound						Cross Avenue Westbound						Lyons Lane Northbound						Plaza Entrance Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
12:15 PM	17	39	1	0	0	57	0	56	10	0	0	66	3	0	3	0	0	6	9	0	13	0	1	22	151
12:30 PM	16	47	4	0	0	67	3	47	4	0	1	54	2	0	2	0	0	4	5	0	28	0	1	33	158
12:45 PM	16	30	0	0	0	46	0	41	6	0	0	47	1	0	3	0	0	4	9	1	18	0	0	28	125
1:00 PM	19	33	1	0	1	53	0	51	7	0	1	58	0	1	0	0	0	1	7	0	23	0	0	30	142
Total	68	149	6	0	1	223	3	195	27	0	2	225	6	1	8	0	0	15	30	1	82	0	2	113	576
Approach %	30.5	66.8	2.7	0.0	-	-	1.3	86.7	12.0	0.0	-	-	40.0	6.7	53.3	0.0	-	-	26.5	0.9	72.6	0.0	-	-	-
Total %	11.8	25.9	1.0	0.0	-	38.7	0.5	33.9	4.7	0.0	-	39.1	1.0	0.2	1.4	0.0	-	2.6	5.2	0.2	14.2	0.0	-	19.6	-
PHF	0.895	0.793	0.375	0.000	-	0.832	0.250	0.871	0.675	0.000	-	0.852	0.500	0.250	0.667	0.000	-	0.625	0.833	0.250	0.732	0.000	-	0.856	0.911
Lights	66	138	6	0	-	210	3	177	26	0	-	206	6	1	8	0	-	15	30	1	81	0	-	112	543
% Lights	97.1	92.6	100.0	-	-	94.2	100.0	90.8	96.3	-	-	91.6	100.0	100.0	100.0	-	-	100.0	100.0	100.0	98.8	-	-	99.1	94.3
Mediums	2	11	0	0	-	13	0	18	1	0	-	19	0	0	0	0	-	0	0	0	1	0	-	1	33
% Mediums	2.9	7.4	0.0	-	-	5.8	0.0	9.2	3.7	-	-	8.4	0.0	0.0	0.0	-	-	0.0	0.0	0.0	1.2	-	-	0.9	5.7
Articulated Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Articulated Trucks	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	0.0	-	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	1	-	-	-	-	2	-	-	-	-	-	-	0	-	-	-	-	-	2	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-



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Count Name: Cross Avenue & Lyons
Lane/Commercial Plaza
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Turning Movement Peak Hour Data Plot (12:15 PM)



Paradigm Transportation Solutions Limited
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Count Name: Cross Avenue & Lyons
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Turning Movement Peak Hour Data (5:00 PM)

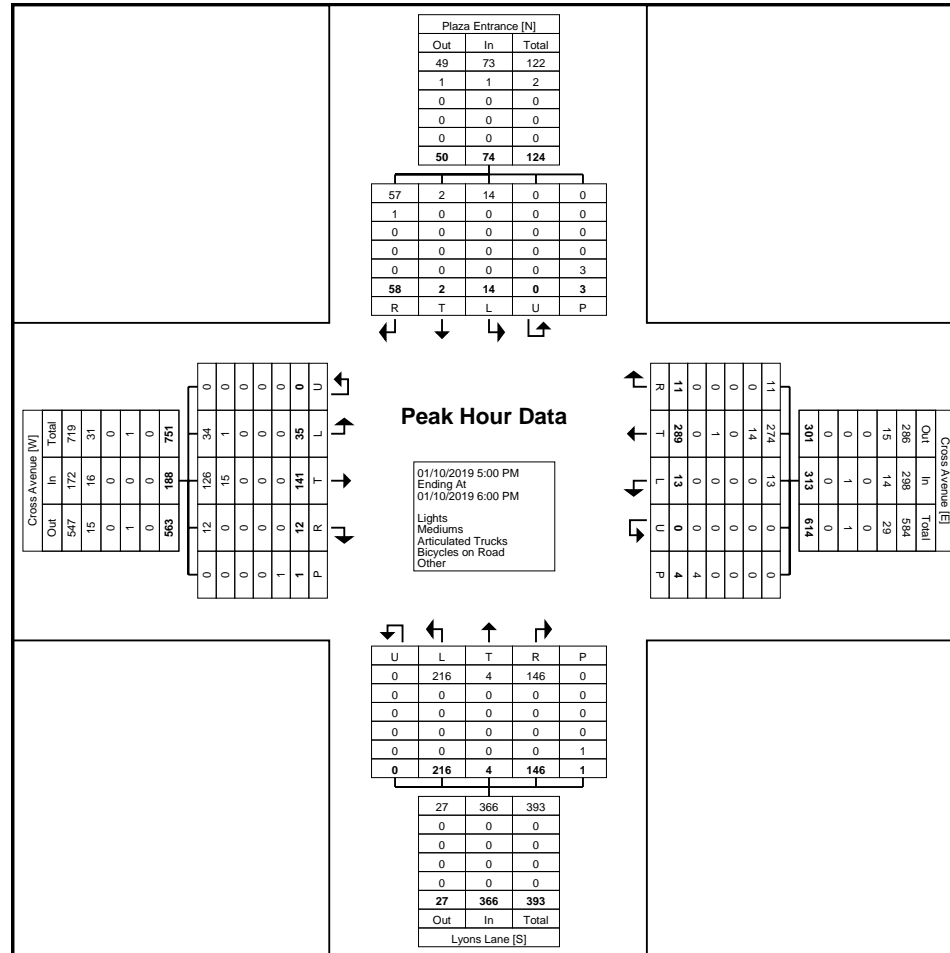
Start Time	Cross Avenue Eastbound						Cross Avenue Westbound						Lyons Lane Northbound						Plaza Entrance Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
5:00 PM	9	41	0	0	0	50	1	76	2	0	0	79	73	0	32	0	1	105	5	0	24	0	0	29	263
5:15 PM	7	24	4	0	1	35	6	73	3	0	1	82	24	0	24	0	0	48	3	0	14	0	1	17	182
5:30 PM	15	42	4	0	0	61	2	66	5	0	1	73	59	1	46	0	0	106	4	1	10	0	1	15	255
5:45 PM	4	34	4	0	0	42	4	74	1	0	2	79	60	3	44	0	0	107	2	1	10	0	1	13	241
Total	35	141	12	0	1	188	13	289	11	0	4	313	216	4	146	0	1	366	14	2	58	0	3	74	941
Approach %	18.6	75.0	6.4	0.0	-	-	4.2	92.3	3.5	0.0	-	-	59.0	1.1	39.9	0.0	-	-	18.9	2.7	78.4	0.0	-	-	-
Total %	3.7	15.0	1.3	0.0	-	20.0	1.4	30.7	1.2	0.0	-	33.3	23.0	0.4	15.5	0.0	-	38.9	1.5	0.2	6.2	0.0	-	7.9	-
PHF	0.583	0.839	0.750	0.000	-	0.770	0.542	0.951	0.550	0.000	-	0.954	0.740	0.333	0.793	0.000	-	0.855	0.700	0.500	0.604	0.000	-	0.638	0.894
Lights	34	126	12	0	-	172	13	274	11	0	-	298	216	4	146	0	-	366	14	2	57	0	-	73	909
% Lights	97.1	89.4	100.0	-	-	91.5	100.0	94.8	100.0	-	-	95.2	100.0	100.0	100.0	-	-	100.0	100.0	100.0	98.3	-	-	98.6	96.6
Mediums	1	15	0	0	-	16	0	14	0	0	-	14	0	0	0	0	-	0	0	0	1	0	-	1	31
% Mediums	2.9	10.6	0.0	-	-	8.5	0.0	4.8	0.0	-	-	4.5	0.0	0.0	0.0	-	-	0.0	0.0	0.0	1.7	-	-	1.4	3.3
Articulated Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Articulated Trucks	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Road	0	0	0	0	-	0	0	1	0	0	-	1	0	0	0	0	-	0	0	0	0	0	-	0	1
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	0.0	0.3	0.0	-	-	0.3	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.1
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	1	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	33.3	-	-
Pedestrians	-	-	-	-	1	-	-	-	-	-	4	-	-	-	-	-	1	-	-	-	-	-	2	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	66.7	-	-



Paradigm Transportation Solutions Limited
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Count Name: Cross Avenue & Lyons Lane/Commercial Plaza
Site Code:
Start Date: 01/10/2019
Page No: 9



Turning Movement Peak Hour Data Plot (5:00 PM)



Paradigm Transportation Solutions Limited
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Count Name: Cross Avenue & Lyons
Lane/Commercial Plaza
Site Code:
Start Date: 01/10/2019
Page No: 10



Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

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Count Name: Cross Avenue & Lyons Lane
Site Code:
Start Date: 01/10/2019
Page No: 1

Turning Movement Data

Start Time	Cross Avenue Eastbound					Cross Avenue Westbound					Lyons Lane Southbound					Int. Total
	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Left	Right	U-Turn	Peds	App. Total	
7:00 AM	0	60	0	0	60	19	0	0	0	19	0	1	0	2	1	80
7:15 AM	4	99	0	0	103	22	3	0	1	25	2	1	0	0	3	131
7:30 AM	2	84	0	0	86	32	4	0	0	36	3	2	0	0	5	127
7:45 AM	2	111	0	0	113	36	0	0	3	36	2	2	0	2	4	153
Hourly Total	8	354	0	0	362	109	7	0	4	116	7	6	0	4	13	491
8:00 AM	8	84	0	0	92	43	3	0	1	46	2	0	0	0	2	140
8:15 AM	7	106	0	0	113	45	2	0	1	47	1	1	0	0	2	162
8:30 AM	5	80	0	0	85	49	1	0	2	50	0	1	0	2	1	136
8:45 AM	1	71	0	0	72	38	6	0	0	44	1	1	0	0	2	118
Hourly Total	21	341	0	0	362	175	12	0	4	187	4	3	0	2	7	556
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11:00 AM	1	54	0	0	55	61	1	0	0	62	3	8	0	2	11	128
11:15 AM	3	43	0	0	46	58	5	0	2	63	1	3	0	1	4	113
11:30 AM	4	50	0	0	54	72	3	0	0	75	7	5	0	0	12	141
11:45 AM	1	42	0	0	43	68	3	0	1	71	5	2	0	0	7	121
Hourly Total	9	189	0	0	198	259	12	0	3	271	16	18	0	3	34	503
12:00 PM	3	53	0	0	56	60	2	0	0	62	10	7	0	2	17	135
12:15 PM	0	55	0	0	55	76	3	0	0	79	0	9	0	1	9	143
12:30 PM	4	59	0	0	63	75	1	0	0	76	5	3	0	1	8	147
12:45 PM	3	47	0	0	50	55	2	0	0	57	3	2	0	0	5	112
Hourly Total	10	214	0	0	224	266	8	0	0	274	18	21	0	4	39	537
1:00 PM	5	50	0	0	55	67	5	0	1	72	4	5	0	1	9	136
1:15 PM	2	49	0	0	51	79	7	0	0	86	2	1	0	2	3	140
1:30 PM	5	53	0	0	58	72	1	0	0	73	1	4	0	2	5	136
1:45 PM	4	48	0	0	52	63	4	0	2	67	5	7	0	1	12	131
Hourly Total	16	200	0	0	216	281	17	0	3	298	12	17	0	6	29	543
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3:00 PM	1	58	0	0	59	84	3	0	1	87	3	4	0	0	7	153
3:15 PM	1	53	0	0	54	100	4	0	0	104	7	6	0	1	13	171
3:30 PM	1	57	0	0	58	64	2	0	2	66	4	2	0	2	6	130
3:45 PM	2	51	0	0	53	102	4	0	0	106	5	5	0	0	10	169
Hourly Total	5	219	0	0	224	350	13	0	3	363	19	17	0	3	36	623
4:00 PM	2	44	0	0	46	122	0	0	1	122	5	7	0	2	12	180
4:15 PM	3	37	0	0	40	75	1	0	0	76	2	9	0	2	11	127
4:30 PM	1	56	0	0	57	118	2	0	1	120	5	11	0	2	16	193
4:45 PM	1	66	0	0	67	102	0	0	1	102	0	15	0	1	15	184
Hourly Total	7	203	0	0	210	417	3	0	3	420	12	42	0	7	54	684
5:00 PM	3	43	0	0	46	164	2	0	1	166	4	16	0	1	20	232

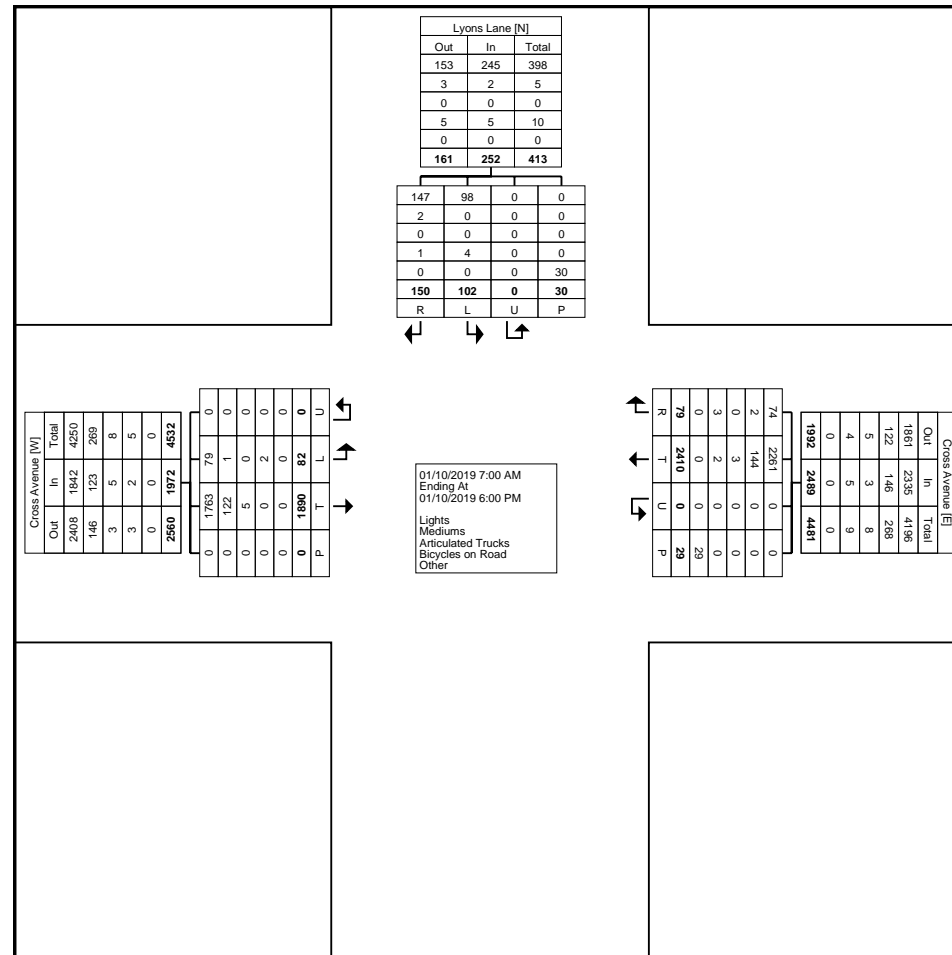
5:15 PM	0	37	0	0	37	104	3	0	4	107	1	3	0	0	4	148
5:30 PM	1	46	0	0	47	140	2	0	1	142	8	4	0	0	12	201
5:45 PM	2	44	0	0	46	145	0	0	3	145	1	3	0	0	4	195
Hourly Total	6	170	0	0	176	553	7	0	9	560	14	26	0	1	40	776
Grand Total	82	1890	0	0	1972	2410	79	0	29	2489	102	150	0	30	252	4713
Approach %	4.2	95.8	0.0	-	-	96.8	3.2	0.0	-	-	40.5	59.5	0.0	-	-	-
Total %	1.7	40.1	0.0	-	41.8	51.1	1.7	0.0	-	52.8	2.2	3.2	0.0	-	5.3	-
Lights	79	1763	0	-	1842	2261	74	0	-	2335	98	147	0	-	245	4422
% Lights	96.3	93.3	-	-	93.4	93.8	93.7	-	-	93.8	96.1	98.0	-	-	97.2	93.8
Mediums	1	122	0	-	123	144	2	0	-	146	0	2	0	-	2	271
% Mediums	1.2	6.5	-	-	6.2	6.0	2.5	-	-	5.9	0.0	1.3	-	-	0.8	5.8
Articulated Trucks	0	5	0	-	5	3	0	0	-	3	0	0	0	-	0	8
% Articulated Trucks	0.0	0.3	-	-	0.3	0.1	0.0	-	-	0.1	0.0	0.0	-	-	0.0	0.2
Bicycles on Road	2	0	0	-	2	2	3	0	-	5	4	1	0	-	5	12
% Bicycles on Road	2.4	0.0	-	-	0.1	0.1	3.8	-	-	0.2	3.9	0.7	-	-	2.0	0.3
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	3	-	-	-	-	1	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	10.3	-	-	-	-	3.3	-	-
Pedestrians	-	-	-	0	-	-	-	-	26	-	-	-	-	29	-	-
% Pedestrians	-	-	-	-	-	-	-	-	89.7	-	-	-	-	96.7	-	-



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Count Name: Cross Avenue & Lyons Lane
Site Code:
Start Date: 01/10/2019
Page No: 3



Turning Movement Data Plot



Paradigm Transportation Solutions Limited
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Count Name: Cross Avenue & Lyons Lane
Site Code:
Start Date: 01/10/2019
Page No: 4

Turning Movement Peak Hour Data (7:45 AM)

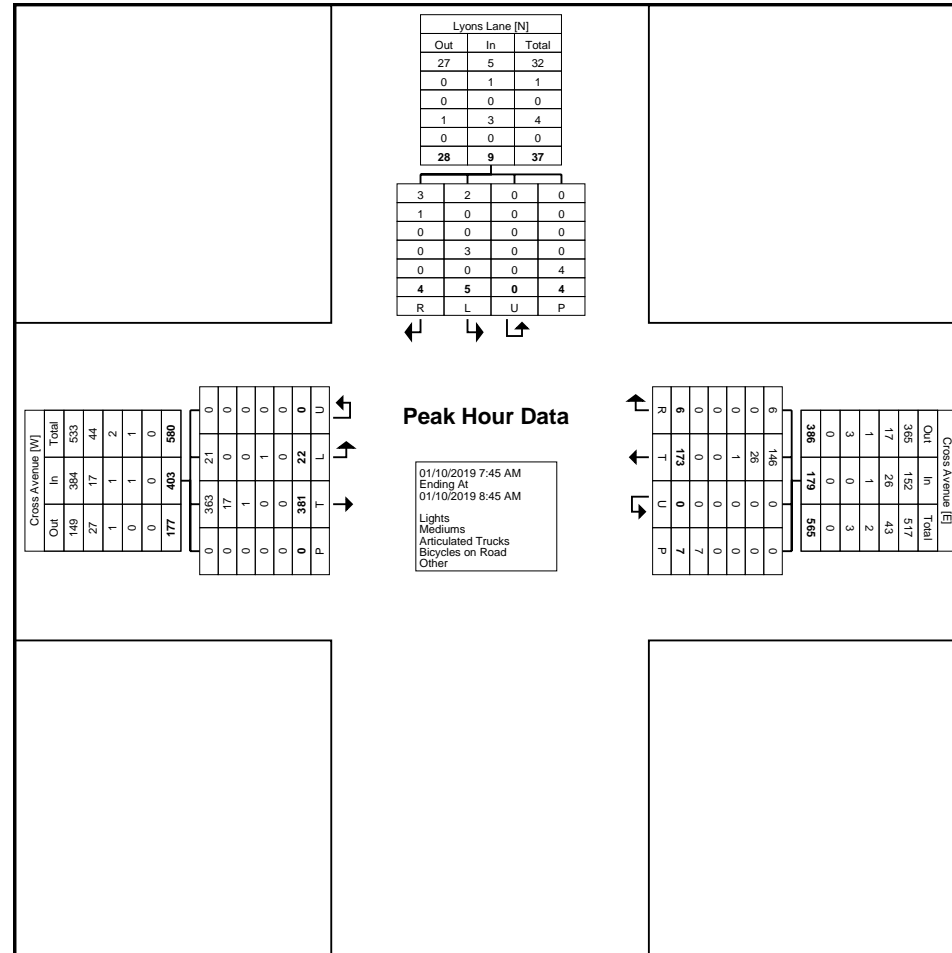
Start Time	Cross Avenue Eastbound					Cross Avenue Westbound					Lyons Lane Southbound					Int. Total
	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Left	Right	U-Turn	Peds	App. Total	
7:45 AM	2	111	0	0	113	36	0	0	3	36	2	2	0	2	4	153
8:00 AM	8	84	0	0	92	43	3	0	1	46	2	0	0	0	2	140
8:15 AM	7	106	0	0	113	45	2	0	1	47	1	1	0	0	2	162
8:30 AM	5	80	0	0	85	49	1	0	2	50	0	1	0	2	1	136
Total	22	381	0	0	403	173	6	0	7	179	5	4	0	4	9	591
Approach %	5.5	94.5	0.0	-	-	96.6	3.4	0.0	-	-	55.6	44.4	0.0	-	-	-
Total %	3.7	64.5	0.0	-	68.2	29.3	1.0	0.0	-	30.3	0.8	0.7	0.0	-	1.5	-
PHF	0.688	0.858	0.000	-	0.892	0.883	0.500	0.000	-	0.895	0.625	0.500	0.000	-	0.563	0.912
Lights	21	363	0	-	384	146	6	0	-	152	2	3	0	-	5	541
% Lights	95.5	95.3	-	-	95.3	84.4	100.0	-	-	84.9	40.0	75.0	-	-	55.6	91.5
Mediums	0	17	0	-	17	26	0	0	-	26	0	1	0	-	1	44
% Mediums	0.0	4.5	-	-	4.2	15.0	0.0	-	-	14.5	0.0	25.0	-	-	11.1	7.4
Articulated Trucks	0	1	0	-	1	1	0	0	-	1	0	0	0	-	0	2
% Articulated Trucks	0.0	0.3	-	-	0.2	0.6	0.0	-	-	0.6	0.0	0.0	-	-	0.0	0.3
Bicycles on Road	1	0	0	-	1	0	0	0	-	0	3	0	0	-	3	4
% Bicycles on Road	4.5	0.0	-	-	0.2	0.0	0.0	-	-	0.0	60.0	0.0	-	-	33.3	0.7
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	0.0	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	0	-	-	-	-	7	-	-	-	-	4	-	-
% Pedestrians	-	-	-	-	-	-	-	-	100.0	-	-	-	-	100.0	-	-



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Count Name: Cross Avenue & Lyons Lane
Site Code:
Start Date: 01/10/2019
Page No: 5



Turning Movement Peak Hour Data Plot (7:45 AM)



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Count Name: Cross Avenue & Lyons Lane
Site Code:
Start Date: 01/10/2019
Page No: 6

Turning Movement Peak Hour Data (11:45 AM)

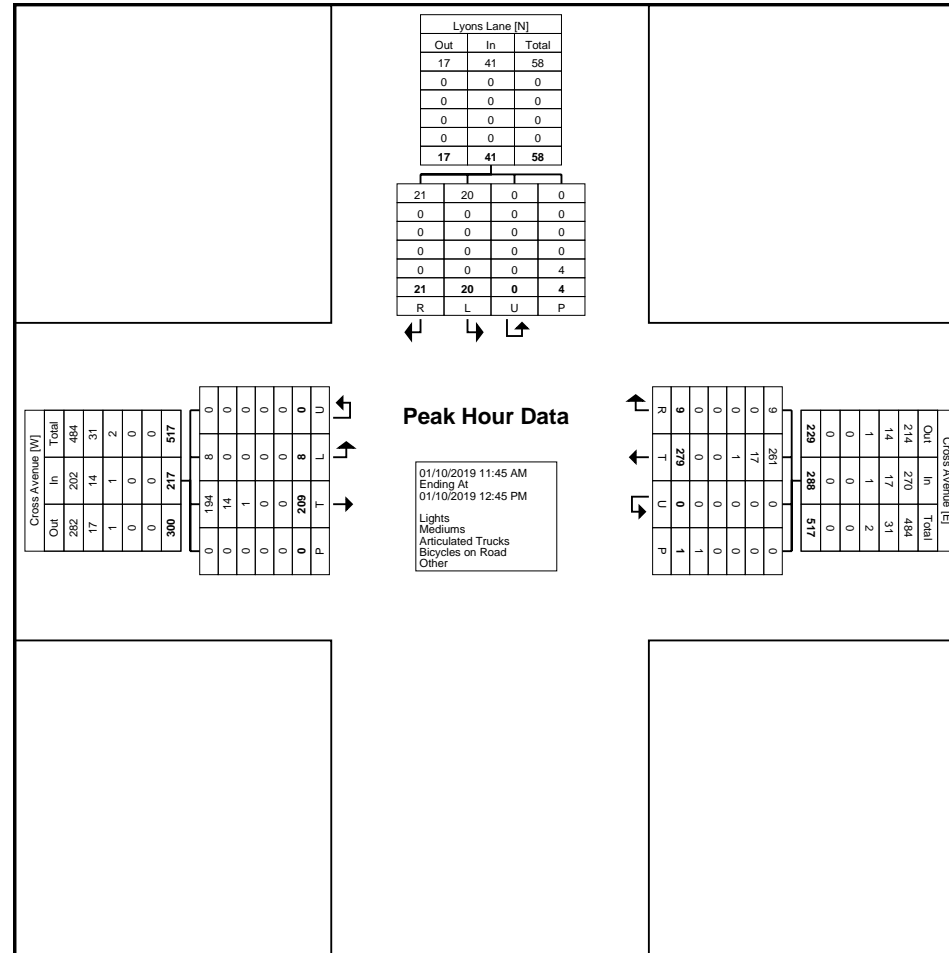
Start Time	Cross Avenue Eastbound					Cross Avenue Westbound					Lyons Lane Southbound					Int. Total
	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Left	Right	U-Turn	Peds	App. Total	
11:45 AM	1	42	0	0	43	68	3	0	1	71	5	2	0	0	7	121
12:00 PM	3	53	0	0	56	60	2	0	0	62	10	7	0	2	17	135
12:15 PM	0	55	0	0	55	76	3	0	0	79	0	9	0	1	9	143
12:30 PM	4	59	0	0	63	75	1	0	0	76	5	3	0	1	8	147
Total	8	209	0	0	217	279	9	0	1	288	20	21	0	4	41	546
Approach %	3.7	96.3	0.0	-	-	96.9	3.1	0.0	-	-	48.8	51.2	0.0	-	-	-
Total %	1.5	38.3	0.0	-	39.7	51.1	1.6	0.0	-	52.7	3.7	3.8	0.0	-	7.5	-
PHF	0.500	0.886	0.000	-	0.861	0.918	0.750	0.000	-	0.911	0.500	0.583	0.000	-	0.603	0.929
Lights	8	194	0	-	202	261	9	0	-	270	20	21	0	-	41	513
% Lights	100.0	92.8	-	-	93.1	93.5	100.0	-	-	93.8	100.0	100.0	-	-	100.0	94.0
Mediums	0	14	0	-	14	17	0	0	-	17	0	0	0	-	0	31
% Mediums	0.0	6.7	-	-	6.5	6.1	0.0	-	-	5.9	0.0	0.0	-	-	0.0	5.7
Articulated Trucks	0	1	0	-	1	1	0	0	-	1	0	0	0	-	0	2
% Articulated Trucks	0.0	0.5	-	-	0.5	0.4	0.0	-	-	0.3	0.0	0.0	-	-	0.0	0.4
Bicycles on Road	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	1	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	0.0	-	-	-	-	25.0	-	-
Pedestrians	-	-	-	0	-	-	-	-	1	-	-	-	-	3	-	-
% Pedestrians	-	-	-	-	-	-	-	-	100.0	-	-	-	-	75.0	-	-



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Count Name: Cross Avenue & Lyons Lane
Site Code:
Start Date: 01/10/2019
Page No: 7



Turning Movement Peak Hour Data Plot (11:45 AM)



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Waterloo, Ontario, Canada N2J 1N8
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Count Name: Cross Avenue & Lyons Lane
Site Code:
Start Date: 01/10/2019
Page No: 8

Turning Movement Peak Hour Data (5:00 PM)

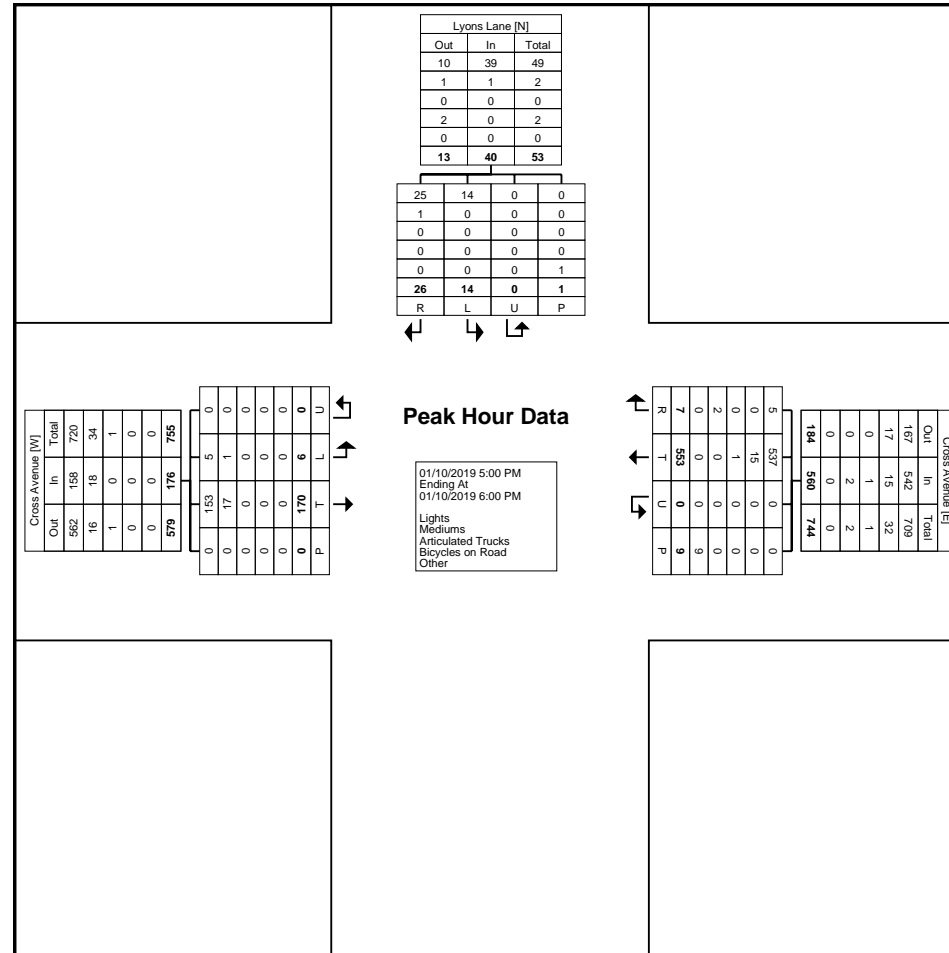
Start Time	Cross Avenue Eastbound					Cross Avenue Westbound					Lyons Lane Southbound					Int. Total
	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Left	Right	U-Turn	Peds	App. Total	
5:00 PM	3	43	0	0	46	164	2	0	1	166	4	16	0	1	20	232
5:15 PM	0	37	0	0	37	104	3	0	4	107	1	3	0	0	4	148
5:30 PM	1	46	0	0	47	140	2	0	1	142	8	4	0	0	12	201
5:45 PM	2	44	0	0	46	145	0	0	3	145	1	3	0	0	4	195
Total	6	170	0	0	176	553	7	0	9	560	14	26	0	1	40	776
Approach %	3.4	96.6	0.0	-	-	98.8	1.3	0.0	-	-	35.0	65.0	0.0	-	-	-
Total %	0.8	21.9	0.0	-	22.7	71.3	0.9	0.0	-	72.2	1.8	3.4	0.0	-	5.2	-
PHF	0.500	0.924	0.000	-	0.936	0.843	0.583	0.000	-	0.843	0.438	0.406	0.000	-	0.500	0.836
Lights	5	153	0	-	158	537	5	0	-	542	14	25	0	-	39	739
% Lights	83.3	90.0	-	-	89.8	97.1	71.4	-	-	96.8	100.0	96.2	-	-	97.5	95.2
Mediums	1	17	0	-	18	15	0	0	-	15	0	1	0	-	1	34
% Mediums	16.7	10.0	-	-	10.2	2.7	0.0	-	-	2.7	0.0	3.8	-	-	2.5	4.4
Articulated Trucks	0	0	0	-	0	1	0	0	-	1	0	0	0	-	0	1
% Articulated Trucks	0.0	0.0	-	-	0.0	0.2	0.0	-	-	0.2	0.0	0.0	-	-	0.0	0.1
Bicycles on Road	0	0	0	-	0	0	2	0	-	2	0	0	0	-	0	2
% Bicycles on Road	0.0	0.0	-	-	0.0	0.0	28.6	-	-	0.4	0.0	0.0	-	-	0.0	0.3
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	2	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	22.2	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	0	-	-	-	-	7	-	-	-	-	1	-	-
% Pedestrians	-	-	-	-	-	-	-	-	77.8	-	-	-	-	100.0	-	-



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Count Name: Cross Avenue & Lyons Lane
Site Code:
Start Date: 01/10/2019
Page No: 9



Turning Movement Peak Hour Data Plot (5:00 PM)



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Count Name: Cross Avenue & Lyons Lane
Site Code:
Start Date: 01/10/2019
Page No: 10



Paradigm Transportation Solutions Limited
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Count Name: Argus Road & South Service Road
Site Code:
Start Date: 01/10/2019
Page No: 1

Turning Movement Data

Start Time	Argus Road Eastbound						Argus Road Westbound						Northbound Approach Northbound						South Service Road Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
7:00 AM	0	1	0	0	1	1	1	102	17	0	4	120	1	0	0	0	2	1	0	0	0	0	1	0	122
7:15 AM	0	0	0	0	0	0	0	128	17	0	2	145	0	0	0	0	1	0	0	0	0	0	0	0	145
7:30 AM	1	1	1	0	0	3	0	127	25	0	1	152	0	0	0	0	1	0	1	0	0	0	0	1	156
7:45 AM	0	0	0	0	0	0	2	157	28	0	2	187	0	1	0	0	2	1	0	0	1	0	1	1	189
Hourly Total	1	2	1	0	1	4	3	514	87	0	9	604	1	1	0	0	6	2	1	0	1	0	2	2	612
8:00 AM	0	1	1	0	0	2	1	130	21	0	1	152	0	0	0	0	2	0	2	2	2	1	0	7	161
8:15 AM	0	3	0	0	1	3	1	125	39	0	1	165	1	0	0	0	1	1	1	0	0	0	0	1	170
8:30 AM	2	2	0	0	0	4	0	60	27	0	0	87	1	1	0	0	1	2	0	1	2	0	0	3	96
8:45 AM	2	2	0	0	0	4	0	85	30	0	1	115	0	1	0	0	0	1	1	2	0	0	0	3	123
Hourly Total	4	8	1	0	1	13	2	400	117	0	3	519	2	2	0	0	4	4	4	5	4	1	0	14	550
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11:00 AM	2	5	1	1	0	9	0	30	18	0	0	48	1	3	0	0	1	4	4	3	3	1	0	11	72
11:15 AM	2	1	0	0	0	3	1	33	19	0	0	53	0	2	1	0	0	3	2	2	8	0	0	12	71
11:30 AM	4	4	0	0	0	8	1	32	25	0	3	58	0	1	0	0	2	1	2	1	3	0	0	6	73
11:45 AM	1	0	0	0	0	1	0	38	20	0	1	58	1	4	0	0	0	5	2	4	2	0	0	8	72
Hourly Total	9	10	1	1	0	21	2	133	82	0	4	217	2	10	1	0	3	13	10	10	16	1	0	37	288
12:00 PM	1	4	1	0	0	6	1	22	24	1	1	48	1	3	0	0	0	4	3	3	5	0	0	11	69
12:15 PM	0	0	0	0	0	0	1	32	15	0	1	48	0	1	0	0	0	1	2	3	3	0	0	8	57
12:30 PM	0	2	0	1	0	3	2	30	20	0	2	52	0	0	1	0	0	1	2	0	5	0	0	7	63
12:45 PM	1	6	1	0	0	8	0	37	20	0	0	57	0	1	0	0	0	1	1	0	3	0	0	4	70
Hourly Total	2	12	2	1	0	17	4	121	79	1	4	205	1	5	1	0	0	7	8	6	16	0	0	30	259
1:00 PM	1	2	0	0	0	3	0	32	24	0	2	56	0	0	0	0	3	0	0	0	5	0	0	5	64
1:15 PM	1	3	1	0	0	5	0	44	10	0	0	54	0	1	0	0	0	1	3	0	4	0	0	7	67
1:30 PM	1	2	0	1	0	4	0	30	27	0	4	57	1	0	0	0	5	1	2	1	2	0	0	5	67
1:45 PM	1	3	1	0	0	5	0	38	17	0	2	55	0	2	0	0	0	2	1	2	2	0	0	5	67
Hourly Total	4	10	2	1	0	17	0	144	78	0	8	222	1	3	0	0	8	4	6	3	13	0	0	22	265
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3:00 PM	5	3	0	0	1	8	0	36	16	0	4	52	1	0	0	0	5	1	3	2	5	0	0	10	71
3:15 PM	1	2	0	0	0	3	0	31	18	0	0	49	0	1	0	0	2	1	1	1	1	0	0	3	56
3:30 PM	1	7	1	0	0	9	0	31	6	0	1	37	0	2	1	0	3	3	4	2	4	0	0	10	59
3:45 PM	1	5	0	0	0	6	1	36	12	0	1	49	0	1	0	0	1	1	2	1	5	1	0	9	65
Hourly Total	8	17	1	0	1	26	1	134	52	0	6	187	1	4	1	0	11	6	10	6	15	1	0	32	251
4:00 PM	5	1	0	1	0	7	0	44	12	0	3	56	1	3	0	0	1	4	4	3	2	0	0	9	76
4:15 PM	0	3	0	0	0	3	0	46	19	0	1	65	1	0	0	0	2	1	3	0	2	0	0	5	74
4:30 PM	3	4	0	0	0	7	0	37	9	0	1	46	0	0	0	0	1	0	1	0	4	0	0	5	58
4:45 PM	1	0	0	0	0	1	0	51	12	0	0	63	1	0	0	0	1	1	4	2	5	0	0	11	76
Hourly Total	9	8	0	1	0	18	0	178	52	0	5	230	3	3	0	0	5	6	12	5	13	0	0	30	284

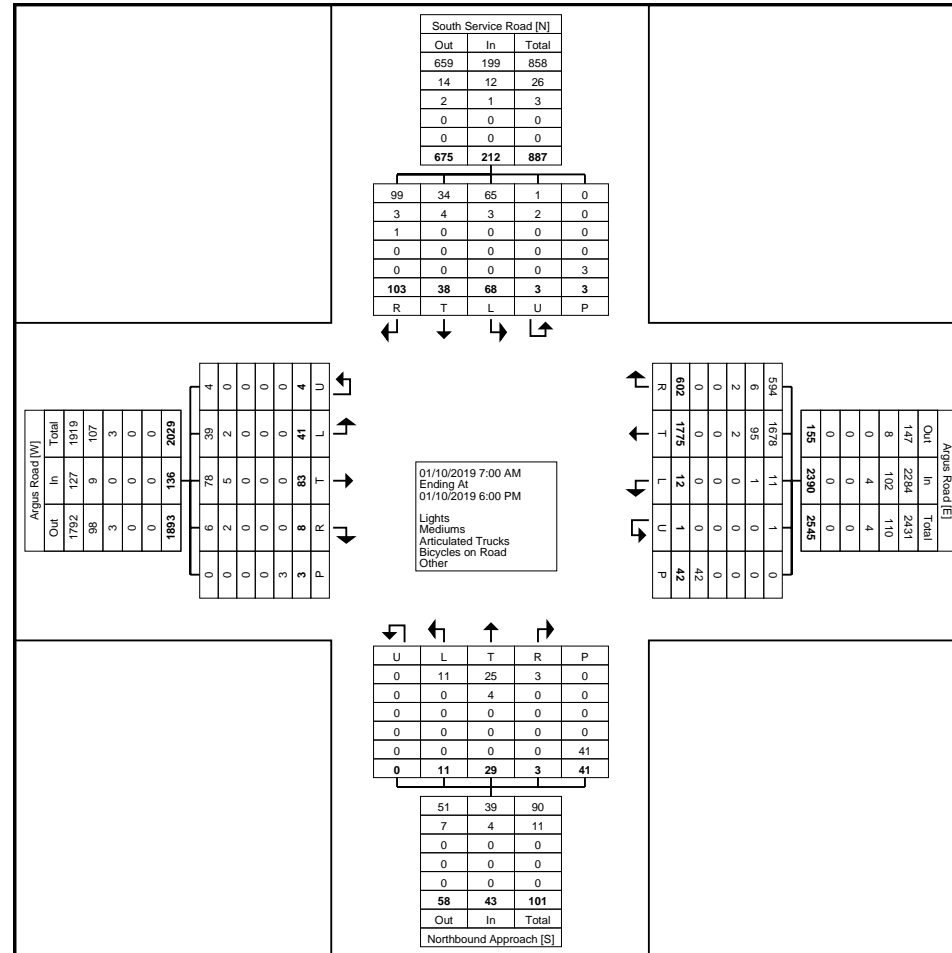
5:00 PM	2	5	0	0	0	7	0	27	16	0	0	43	0	1	0	0	0	1	10	1	13	0	1	24	75
5:15 PM	1	3	0	0	0	4	0	40	10	0	1	50	0	0	0	0	1	0	1	1	5	0	0	7	61
5:30 PM	0	4	0	0	0	4	0	36	15	0	1	51	0	0	0	0	2	0	1	1	2	0	0	4	59
5:45 PM	1	4	0	0	0	5	0	48	14	0	1	62	0	0	0	0	1	0	5	0	5	0	0	10	77
Hourly Total	4	16	0	0	0	20	0	151	55	0	3	206	0	1	0	0	4	1	17	3	25	0	1	45	272
Grand Total	41	83	8	4	3	136	12	1775	602	1	42	2390	11	29	3	0	41	43	68	38	103	3	3	212	2781
Approach %	30.1	61.0	5.9	2.9	-	-	0.5	74.3	25.2	0.0	-	-	25.6	67.4	7.0	0.0	-	-	32.1	17.9	48.6	1.4	-	-	-
Total %	1.5	3.0	0.3	0.1	-	4.9	0.4	63.8	21.6	0.0	-	85.9	0.4	1.0	0.1	0.0	-	1.5	2.4	1.4	3.7	0.1	-	7.6	-
Lights	39	78	6	4	-	127	11	1678	594	1	-	2284	11	25	3	0	-	39	65	34	99	1	-	199	2649
% Lights	95.1	94.0	75.0	100.0	-	93.4	91.7	94.5	98.7	100.0	-	95.6	100.0	86.2	100.0	-	-	90.7	95.6	89.5	96.1	33.3	-	93.9	95.3
Mediums	2	5	2	0	-	9	1	95	6	0	-	102	0	4	0	0	-	4	3	4	3	2	-	12	127
% Mediums	4.9	6.0	25.0	0.0	-	6.6	8.3	5.4	1.0	0.0	-	4.3	0.0	13.8	0.0	-	-	9.3	4.4	10.5	2.9	66.7	-	5.7	4.6
Articulated Trucks	0	0	0	0	-	0	0	2	2	0	-	4	0	0	0	0	-	0	0	0	1	0	-	1	5
% Articulated Trucks	0.0	0.0	0.0	0.0	-	0.0	0.0	0.1	0.3	0.0	-	0.2	0.0	0.0	0.0	-	-	0.0	0.0	0.0	1.0	0.0	-	0.5	0.2
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	3	-	-	-	-	42	-	-	-	-	-	41	-	-	-	-	-	-	3	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	-	100.0	-	-



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Count Name: Argus Road & South Service Road
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Turning Movement Data Plot



Paradigm Transportation Solutions Limited
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Count Name: Argus Road & South Service Road
Site Code:
Start Date: 01/10/2019
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Turning Movement Peak Hour Data (7:30 AM)

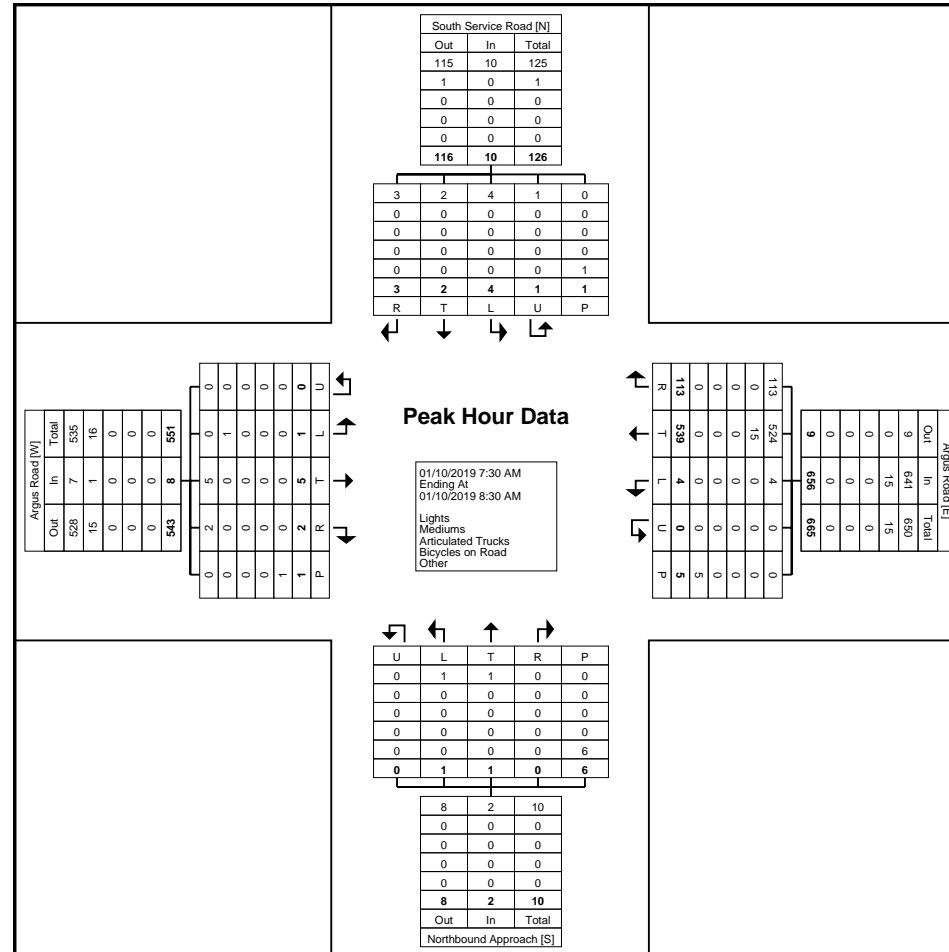
Start Time	Argus Road Eastbound						Argus Road Westbound						Northbound Approach Northbound						South Service Road Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
7:30 AM	1	1	1	0	0	3	0	127	25	0	1	152	0	0	0	0	1	0	1	0	0	0	0	1	156
7:45 AM	0	0	0	0	0	0	2	157	28	0	2	187	0	1	0	0	2	1	0	0	1	0	1	1	189
8:00 AM	0	1	1	0	0	2	1	130	21	0	1	152	0	0	0	0	2	0	2	2	2	1	0	7	161
8:15 AM	0	3	0	0	1	3	1	125	39	0	1	165	1	0	0	0	1	1	1	0	0	0	0	1	170
Total	1	5	2	0	1	8	4	539	113	0	5	656	1	1	0	0	6	2	4	2	3	1	1	10	676
Approach %	12.5	62.5	25.0	0.0	-	-	0.6	82.2	17.2	0.0	-	-	50.0	50.0	0.0	0.0	-	-	40.0	20.0	30.0	10.0	-	-	-
Total %	0.1	0.7	0.3	0.0	-	1.2	0.6	79.7	16.7	0.0	-	97.0	0.1	0.1	0.0	0.0	-	0.3	0.6	0.3	0.4	0.1	-	1.5	-
PHF	0.250	0.417	0.500	0.000	-	0.667	0.500	0.858	0.724	0.000	-	0.877	0.250	0.250	0.000	0.000	-	0.500	0.500	0.250	0.375	0.250	-	0.357	0.894
Lights	0	5	2	0	-	7	4	524	113	0	-	641	1	1	0	0	-	2	4	2	3	1	-	10	660
% Lights	0.0	100.0	100.0	-	-	87.5	100.0	97.2	100.0	-	-	97.7	100.0	100.0	-	-	-	100.0	100.0	100.0	100.0	100.0	-	100.0	97.6
Mediums	1	0	0	0	-	1	0	15	0	0	-	15	0	0	0	0	-	0	0	0	0	0	-	0	16
% Mediums	100.0	0.0	0.0	-	-	12.5	0.0	2.8	0.0	-	-	2.3	0.0	0.0	-	-	-	0.0	0.0	0.0	0.0	0.0	-	0.0	2.4
Articulated Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Articulated Trucks	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	1	-	-	-	-	-	5	-	-	-	-	-	6	-	-	-	-	-	1	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-



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Count Name: Argus Road & South Service Road
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Turning Movement Peak Hour Data Plot (7:30 AM)



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Count Name: Argus Road & South Service Road
Site Code:
Start Date: 01/10/2019
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Turning Movement Peak Hour Data (11:00 AM)

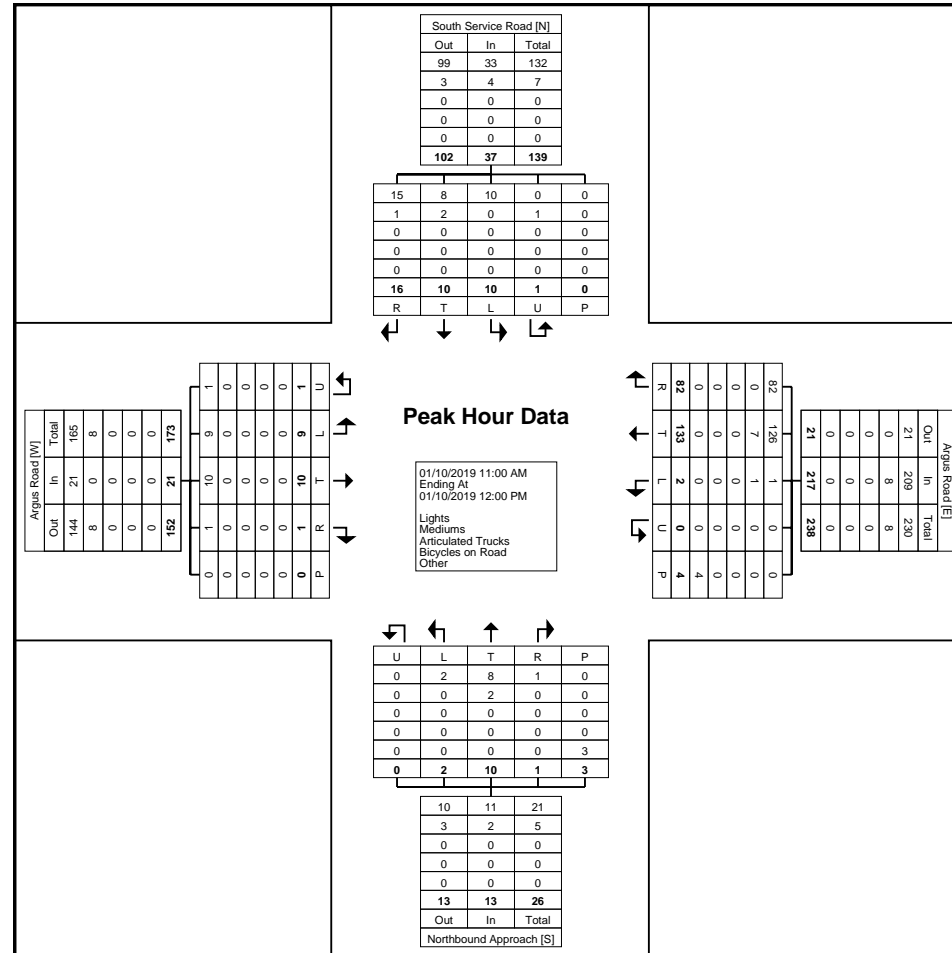
Start Time	Argus Road Eastbound						Argus Road Westbound						Northbound Approach Northbound						South Service Road Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
11:00 AM	2	5	1	1	0	9	0	30	18	0	0	48	1	3	0	0	1	4	4	3	3	1	0	11	72
11:15 AM	2	1	0	0	0	3	1	33	19	0	0	53	0	2	1	0	0	3	2	2	8	0	0	12	71
11:30 AM	4	4	0	0	0	8	1	32	25	0	3	58	0	1	0	0	2	1	2	1	3	0	0	6	73
11:45 AM	1	0	0	0	0	1	0	38	20	0	1	58	1	4	0	0	0	5	2	4	2	0	0	8	72
Total	9	10	1	1	0	21	2	133	82	0	4	217	2	10	1	0	3	13	10	10	16	1	0	37	288
Approach %	42.9	47.6	4.8	4.8	-	-	0.9	61.3	37.8	0.0	-	-	15.4	76.9	7.7	0.0	-	-	27.0	27.0	43.2	2.7	-	-	-
Total %	3.1	3.5	0.3	0.3	-	7.3	0.7	46.2	28.5	0.0	-	75.3	0.7	3.5	0.3	0.0	-	4.5	3.5	3.5	5.6	0.3	-	12.8	-
PHF	0.563	0.500	0.250	0.250	-	0.583	0.500	0.875	0.820	0.000	-	0.935	0.500	0.625	0.250	0.000	-	0.650	0.625	0.625	0.500	0.250	-	0.771	0.986
Lights	9	10	1	1	-	21	1	126	82	0	-	209	2	8	1	0	-	11	10	8	15	0	-	33	274
% Lights	100.0	100.0	100.0	100.0	-	100.0	50.0	94.7	100.0	-	-	96.3	100.0	80.0	100.0	-	-	84.6	100.0	80.0	93.8	0.0	-	89.2	95.1
Mediums	0	0	0	0	-	0	1	7	0	0	-	8	0	2	0	0	-	2	0	2	1	1	-	4	14
% Mediums	0.0	0.0	0.0	0.0	-	0.0	50.0	5.3	0.0	-	-	3.7	0.0	20.0	0.0	-	-	15.4	0.0	20.0	6.3	100.0	-	10.8	4.9
Articulated Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Articulated Trucks	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	-	0	-	-	-	-	-	4	-	-	-	-	-	3	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-



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Count Name: Argus Road & South Service Road
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Turning Movement Peak Hour Data Plot (11:00 AM)



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Count Name: Argus Road & South Service Road
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Turning Movement Peak Hour Data (4:00 PM)

Start Time	Argus Road Eastbound						Argus Road Westbound						Northbound Approach Northbound						South Service Road Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
4:00 PM	5	1	0	1	0	7	0	44	12	0	3	56	1	3	0	0	1	4	4	3	2	0	0	9	76
4:15 PM	0	3	0	0	0	3	0	46	19	0	1	65	1	0	0	0	2	1	3	0	2	0	0	5	74
4:30 PM	3	4	0	0	0	7	0	37	9	0	1	46	0	0	0	0	1	0	1	0	4	0	0	5	58
4:45 PM	1	0	0	0	0	1	0	51	12	0	0	63	1	0	0	0	1	1	4	2	5	0	0	11	76
Total	9	8	0	1	0	18	0	178	52	0	5	230	3	3	0	0	5	6	12	5	13	0	0	30	284
Approach %	50.0	44.4	0.0	5.6	-	-	0.0	77.4	22.6	0.0	-	-	50.0	50.0	0.0	0.0	-	-	40.0	16.7	43.3	0.0	-	-	-
Total %	3.2	2.8	0.0	0.4	-	6.3	0.0	62.7	18.3	0.0	-	81.0	1.1	1.1	0.0	0.0	-	2.1	4.2	1.8	4.6	0.0	-	10.6	-
PHF	0.450	0.500	0.000	0.250	-	0.643	0.000	0.873	0.684	0.000	-	0.885	0.750	0.250	0.000	0.000	-	0.375	0.750	0.417	0.650	0.000	-	0.682	0.934
Lights	9	7	0	1	-	17	0	160	52	0	-	212	3	3	0	0	-	6	12	5	13	0	-	30	265
% Lights	100.0	87.5	-	100.0	-	94.4	-	89.9	100.0	-	-	92.2	100.0	100.0	-	-	-	100.0	100.0	100.0	100.0	-	-	100.0	93.3
Mediums	0	1	0	0	-	1	0	18	0	0	-	18	0	0	0	0	-	0	0	0	0	0	-	0	19
% Mediums	0.0	12.5	-	0.0	-	5.6	-	10.1	0.0	-	-	7.8	0.0	0.0	-	-	-	0.0	0.0	0.0	0.0	-	-	0.0	6.7
Articulated Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Articulated Trucks	0.0	0.0	-	0.0	-	0.0	-	0.0	0.0	-	-	0.0	0.0	0.0	-	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	-	0.0	-	0.0	-	0.0	0.0	-	-	0.0	0.0	0.0	-	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	-	0	-	-	-	-	-	5	-	-	-	-	-	5	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-



Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 cbowness@ptsl.com

Count Name: Argus Road & South Service Road
Site Code:
Start Date: 01/10/2019
Page No: 10



Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 cbowness@ptsl.com

Count Name: South Service Road & Lyons Lane
Site Code:
Start Date: 01/10/2019
Page No: 1

Turning Movement Data

Start Time	South Service Road Westbound					Lyons Lane Northbound					Lyons Lane Southbound					Int. Total
	Left	Right	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	
7:00 AM	1	1	0	0	2	0	0	0	0	0	0	0	0	0	0	2
7:15 AM	1	0	0	0	1	0	1	0	0	1	0	1	0	0	1	3
7:30 AM	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	1
7:45 AM	2	0	0	3	2	1	0	0	0	1	0	2	0	0	2	5
Hourly Total	4	1	0	3	5	2	1	0	0	3	0	3	0	0	3	11
8:00 AM	1	0	2	2	3	1	1	0	0	2	0	1	0	0	1	6
8:15 AM	0	0	0	1	0	1	1	0	0	2	0	1	0	0	1	3
8:30 AM	0	1	0	0	1	0	1	0	1	1	0	0	0	0	0	2
8:45 AM	1	0	0	0	1	0	0	0	0	0	1	0	0	0	1	2
Hourly Total	2	1	2	3	5	2	3	0	1	5	1	2	0	0	3	13
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11:00 AM	4	2	2	2	8	0	0	0	0	0	2	0	0	0	2	10
11:15 AM	1	0	2	2	3	0	1	0	0	1	0	0	0	0	0	4
11:30 AM	2	0	0	1	2	0	0	0	0	0	0	0	0	0	0	2
11:45 AM	2	1	1	0	4	0	2	0	0	2	1	1	0	0	2	8
Hourly Total	9	3	5	5	17	0	3	0	0	3	3	1	0	0	4	24
12:00 PM	3	1	1	3	5	0	2	0	0	2	1	1	0	0	2	9
12:15 PM	3	1	1	0	5	1	0	0	0	1	1	0	0	0	1	7
12:30 PM	1	0	0	0	1	3	1	0	0	4	0	0	0	0	0	5
12:45 PM	2	2	0	0	4	1	1	0	0	2	2	2	0	0	4	10
Hourly Total	9	4	2	3	15	5	4	0	0	9	4	3	0	0	7	31
1:00 PM	2	0	0	1	2	0	3	0	0	3	0	1	0	0	1	6
1:15 PM	0	0	0	3	0	0	1	0	0	1	0	0	0	2	0	1
1:30 PM	1	0	0	1	1	1	1	0	0	2	0	0	0	0	0	3
1:45 PM	3	2	0	3	5	0	0	0	0	0	1	1	0	0	2	7
Hourly Total	6	2	0	8	8	1	5	0	0	6	1	2	0	2	3	17
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3:00 PM	1	1	0	0	2	2	0	0	0	2	0	1	0	0	1	5
3:15 PM	2	2	0	2	4	0	1	0	0	1	1	2	0	0	3	8
3:30 PM	2	0	1	3	3	0	1	0	0	1	0	1	0	0	1	5
3:45 PM	2	0	2	2	4	1	2	0	0	3	0	1	0	0	1	8
Hourly Total	7	3	3	7	13	3	4	0	0	7	1	5	0	0	6	26
4:00 PM	6	3	0	0	9	0	1	0	0	1	2	1	0	0	3	13
4:15 PM	3	0	0	0	3	0	0	0	0	0	0	0	0	0	0	3
4:30 PM	4	1	0	0	5	0	0	0	0	0	0	2	0	0	2	7
4:45 PM	2	0	0	4	2	0	0	0	0	0	0	0	0	0	0	2
Hourly Total	15	4	0	4	19	0	1	0	0	1	2	3	0	0	5	25
5:00 PM	2	1	0	0	3	1	2	0	0	3	1	1	0	0	2	8

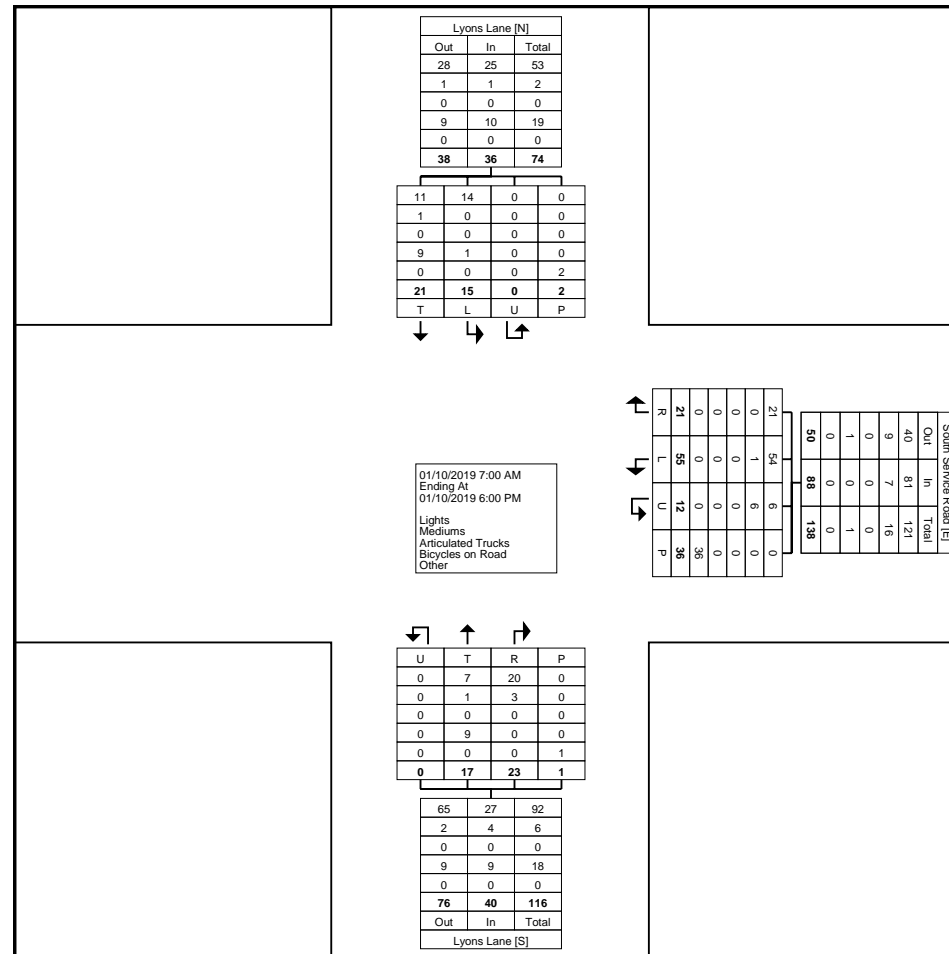
5:15 PM	1	2	0	0	3	1	0	0	0	1	2	0	0	0	2	6
5:30 PM	0	0	0	0	0	1	0	0	0	1	0	1	0	0	1	2
5:45 PM	0	0	0	3	0	1	0	0	0	1	0	0	0	0	0	1
Hourly Total	3	3	0	3	6	4	2	0	0	6	3	2	0	0	5	17
Grand Total	55	21	12	36	88	17	23	0	1	40	15	21	0	2	36	164
Approach %	62.5	23.9	13.6	-	-	42.5	57.5	0.0	-	-	41.7	58.3	0.0	-	-	-
Total %	33.5	12.8	7.3	-	53.7	10.4	14.0	0.0	-	24.4	9.1	12.8	0.0	-	22.0	-
Lights	54	21	6	-	81	7	20	0	-	27	14	11	0	-	25	133
% Lights	98.2	100.0	50.0	-	92.0	41.2	87.0	-	-	67.5	93.3	52.4	-	-	69.4	81.1
Mediums	1	0	6	-	7	1	3	0	-	4	0	1	0	-	1	12
% Mediums	1.8	0.0	50.0	-	8.0	5.9	13.0	-	-	10.0	0.0	4.8	-	-	2.8	7.3
Articulated Trucks	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Articulated Trucks	0.0	0.0	0.0	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Road	0	0	0	-	0	9	0	0	-	9	1	9	0	-	10	19
% Bicycles on Road	0.0	0.0	0.0	-	0.0	52.9	0.0	-	-	22.5	6.7	42.9	-	-	27.8	11.6
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	0.0	-	-	-	-	0.0	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	36	-	-	-	-	1	-	-	-	-	2	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	100.0	-	-	-	-	100.0	-	-



Paradigm Transportation Solutions Limited
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Count Name: South Service Road & Lyons Lane
Site Code:
Start Date: 01/10/2019
Page No: 3



Turning Movement Data Plot



Paradigm Transportation Solutions Limited
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Count Name: South Service Road & Lyons Lane
Site Code:
Start Date: 01/10/2019
Page No: 4

Turning Movement Peak Hour Data (7:45 AM)

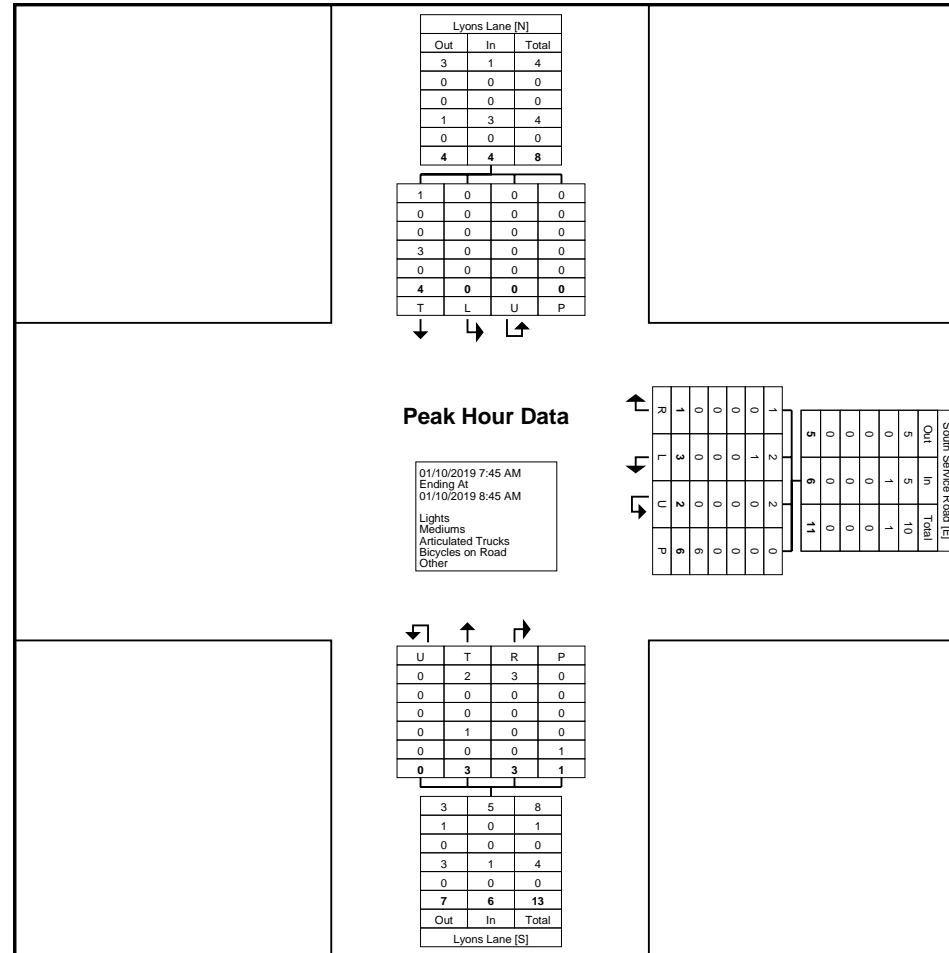
Start Time	South Service Road Westbound					Lyons Lane Northbound					Lyons Lane Southbound					Int. Total
	Left	Right	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	
7:45 AM	2	0	0	3	2	1	0	0	0	1	0	2	0	0	2	5
8:00 AM	1	0	2	2	3	1	1	0	0	2	0	1	0	0	1	6
8:15 AM	0	0	0	1	0	1	1	0	0	2	0	1	0	0	1	3
8:30 AM	0	1	0	0	1	0	1	0	1	1	0	0	0	0	0	2
Total	3	1	2	6	6	3	3	0	1	6	0	4	0	0	4	16
Approach %	50.0	16.7	33.3	-	-	50.0	50.0	0.0	-	-	0.0	100.0	0.0	-	-	-
Total %	18.8	6.3	12.5	-	37.5	18.8	18.8	0.0	-	37.5	0.0	25.0	0.0	-	25.0	-
PHF	0.375	0.250	0.250	-	0.500	0.750	0.750	0.000	-	0.750	0.000	0.500	0.000	-	0.500	0.667
Lights	2	1	2	-	5	2	3	0	-	5	0	1	0	-	1	11
% Lights	66.7	100.0	100.0	-	83.3	66.7	100.0	-	-	83.3	-	25.0	-	-	25.0	68.8
Mediums	1	0	0	-	1	0	0	0	-	0	0	0	0	-	0	1
% Mediums	33.3	0.0	0.0	-	16.7	0.0	0.0	-	-	0.0	-	0.0	-	-	0.0	6.3
Articulated Trucks	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Articulated Trucks	0.0	0.0	0.0	-	0.0	0.0	0.0	-	-	0.0	-	0.0	-	-	0.0	0.0
Bicycles on Road	0	0	0	-	0	1	0	0	-	1	0	3	0	-	3	4
% Bicycles on Road	0.0	0.0	0.0	-	0.0	33.3	0.0	-	-	16.7	-	75.0	-	-	75.0	25.0
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	0.0	-	-	-	-	0.0	-	-	-	-	-	-	-
Pedestrians	-	-	-	6	-	-	-	-	1	-	-	-	-	0	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	100.0	-	-	-	-	-	-	-



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Count Name: South Service Road & Lyons Lane
Site Code:
Start Date: 01/10/2019
Page No: 5



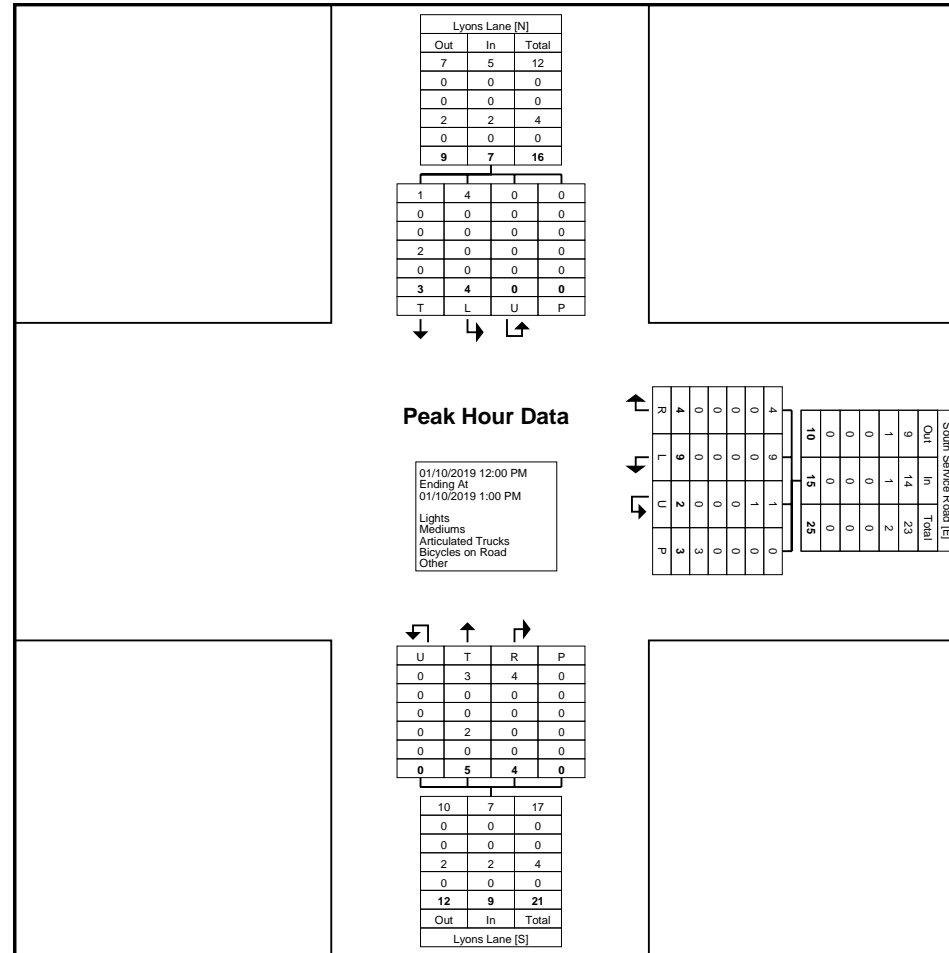
Turning Movement Peak Hour Data Plot (7:45 AM)



Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
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Count Name: South Service Road & Lyons Lane
Site Code:
Start Date: 01/10/2019
Page No: 7



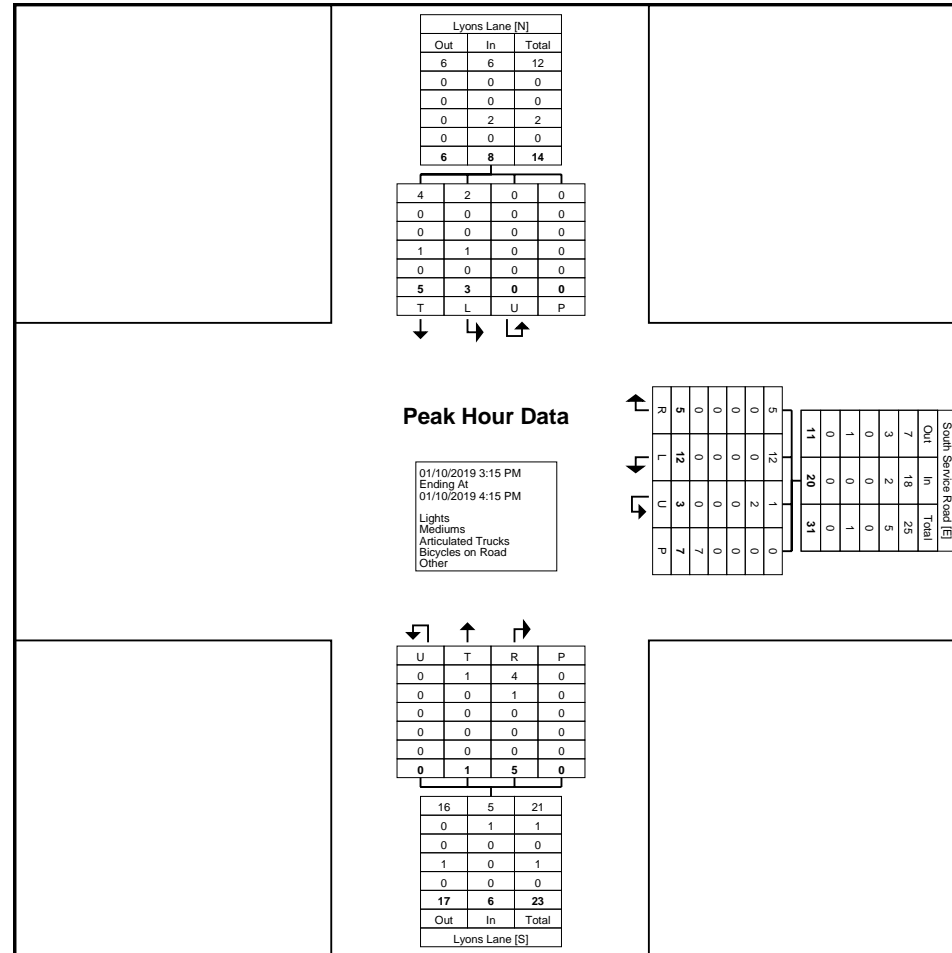
Turning Movement Peak Hour Data Plot (12:00 PM)



Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
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Count Name: South Service Road & Lyons Lane
Site Code:
Start Date: 01/10/2019
Page No: 9



Turning Movement Peak Hour Data Plot (3:15 PM)



Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 cbowness@ptsl.com

Count Name: South Service Road & Lyons Lane
Site Code:
Start Date: 01/10/2019
Page No: 10



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts.com

Count Name: Royal Windsor Drive & Canadian Road
Site Code: 210590
Start Date: 02/15/2022
Page No: 1

Turning Movement Data

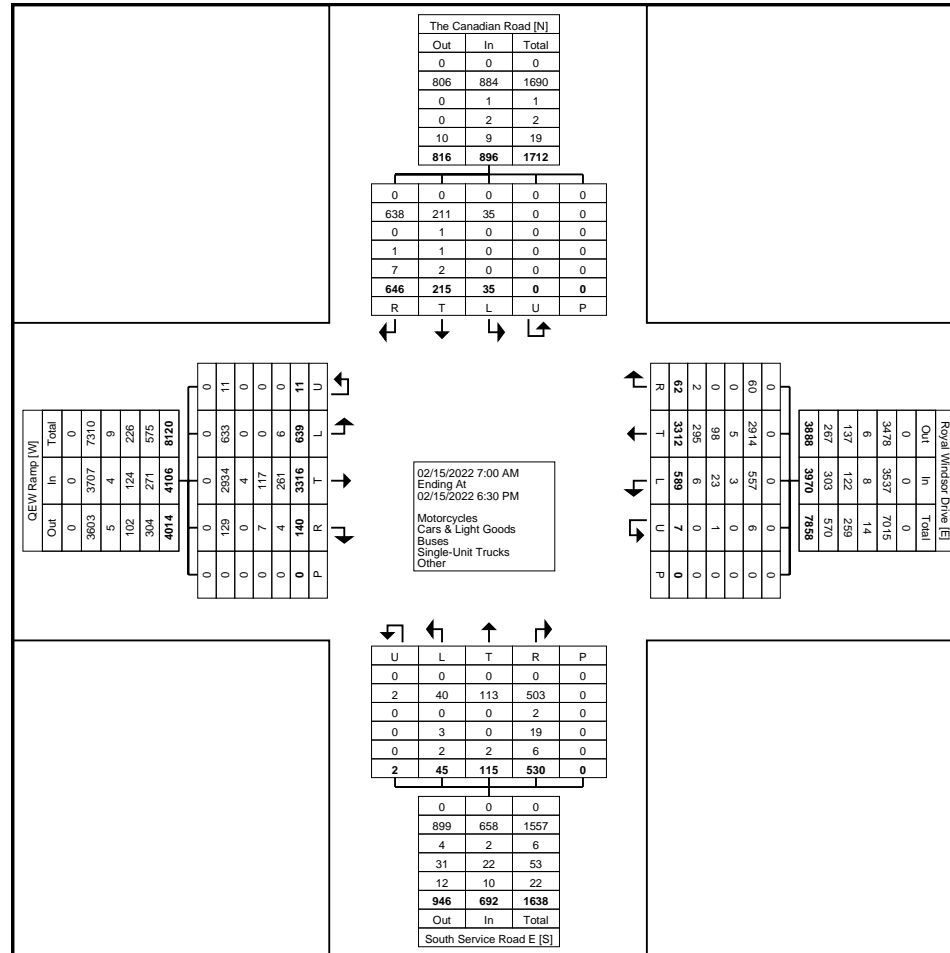
Start Time	QEW Ramp Eastbound						Royal Windsor Drive Westbound						South Service Road E Northbound						The Canadian Road Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
7:00 AM	6	86	3	0	0	95	3	54	0	0	0	57	1	2	3	0	0	6	3	1	3	0	0	7	165
7:15 AM	19	146	3	0	0	168	13	69	0	0	0	82	2	1	11	0	0	14	2	3	8	0	0	13	277
7:30 AM	17	137	3	1	0	158	8	68	2	1	0	79	1	2	6	0	0	9	0	8	9	0	0	17	263
7:45 AM	13	122	4	0	0	139	13	127	1	0	0	141	0	0	14	0	0	14	0	4	3	0	0	7	301
Hourly Total	55	491	13	1	0	560	37	318	3	1	0	359	4	5	34	0	0	43	5	16	23	0	0	44	1006
8:00 AM	10	85	5	0	0	100	18	105	2	0	0	125	1	2	7	0	0	10	1	6	8	0	0	15	250
8:15 AM	7	125	6	0	0	138	19	103	1	0	0	123	1	2	12	0	0	15	1	1	6	0	0	8	284
8:30 AM	7	128	10	0	0	145	25	118	2	1	0	146	0	3	9	0	0	12	1	5	7	0	0	13	316
8:45 AM	1	130	3	0	0	134	22	96	2	0	0	120	0	0	10	0	0	10	0	3	7	0	0	10	274
Hourly Total	25	468	24	0	0	517	84	422	7	1	0	514	2	7	38	0	0	47	3	15	28	0	0	46	1124
9:00 AM	6	100	8	0	0	114	11	64	0	0	0	75	0	2	14	0	0	16	0	4	3	0	0	7	212
9:15 AM	2	92	4	0	0	98	16	80	0	2	0	98	0	1	12	0	0	13	0	2	5	0	0	7	216
9:30 AM	1	104	2	1	0	108	9	87	0	0	0	96	0	0	6	0	0	6	1	5	6	0	0	12	222
9:45 AM	1	81	7	0	0	89	14	88	0	0	0	102	0	0	9	0	0	9	1	3	3	0	0	7	207
Hourly Total	10	377	21	1	0	409	50	319	0	2	0	371	0	3	41	0	0	44	2	14	17	0	0	33	857
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11:00 AM	4	77	11	2	0	94	9	73	6	1	0	89	4	2	7	1	0	14	2	4	8	0	0	14	211
11:15 AM	3	83	6	0	0	92	10	95	1	0	0	106	2	1	16	0	0	19	0	2	5	0	0	7	224
11:30 AM	3	78	9	2	0	92	22	91	0	0	0	113	0	0	14	0	0	14	0	2	3	0	0	5	224
11:45 AM	6	84	6	1	0	97	15	87	1	0	0	103	3	0	21	0	0	24	0	0	3	0	0	3	227
Hourly Total	16	322	32	5	0	375	56	346	8	1	0	411	9	3	58	1	0	71	2	8	19	0	0	29	886
12:00 PM	3	84	4	0	0	91	13	74	0	1	0	88	0	4	22	0	0	26	1	5	4	0	0	10	215
12:15 PM	0	75	5	0	0	80	18	73	0	0	0	91	1	3	10	0	0	14	1	2	2	0	0	5	190
12:30 PM	0	73	2	0	0	75	12	79	2	0	0	93	0	0	12	0	0	12	0	3	6	0	0	9	189
12:45 PM	0	78	4	0	0	82	12	87	3	0	0	102	2	0	8	0	0	10	0	0	5	0	0	5	199
Hourly Total	3	310	15	0	0	328	55	313	5	1	0	374	3	7	52	0	0	62	2	10	17	0	0	29	793
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3:30 PM	7	101	6	2	0	116	29	168	1	0	0	198	2	2	32	0	0	36	0	8	35	0	0	43	393
3:45 PM	11	96	3	0	0	110	22	183	0	0	0	205	2	6	25	1	0	34	0	11	75	0	0	86	435
Hourly Total	18	197	9	2	0	226	51	351	1	0	0	403	4	8	57	1	0	70	0	19	110	0	0	129	828
4:00 PM	21	97	5	0	0	123	47	169	3	0	0	219	2	5	18	0	0	25	3	31	205	0	0	239	606
4:15 PM	25	107	2	0	0	134	57	146	8	0	0	211	2	7	18	0	0	27	7	52	94	0	0	153	525
4:30 PM	86	128	2	0	0	216	30	140	3	0	0	173	3	10	23	0	0	36	1	14	45	0	0	60	485
4:45 PM	140	142	6	0	0	288	25	112	10	0	0	147	5	19	28	0	0	52	1	7	26	0	0	34	521
Hourly Total	272	474	15	0	0	761	159	567	24	0	0	750	12	41	87	0	0	140	12	104	370	0	0	486	2137



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

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Count Name: Royal Windsor Drive & Canadian Road
Site Code: 210590
Start Date: 02/15/2022
Page No: 3



Turning Movement Data Plot



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
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Count Name: Royal Windsor Drive & Canadian Road
Site Code: 210590
Start Date: 02/15/2022
Page No: 4

Turning Movement Peak Hour Data (7:45 AM)

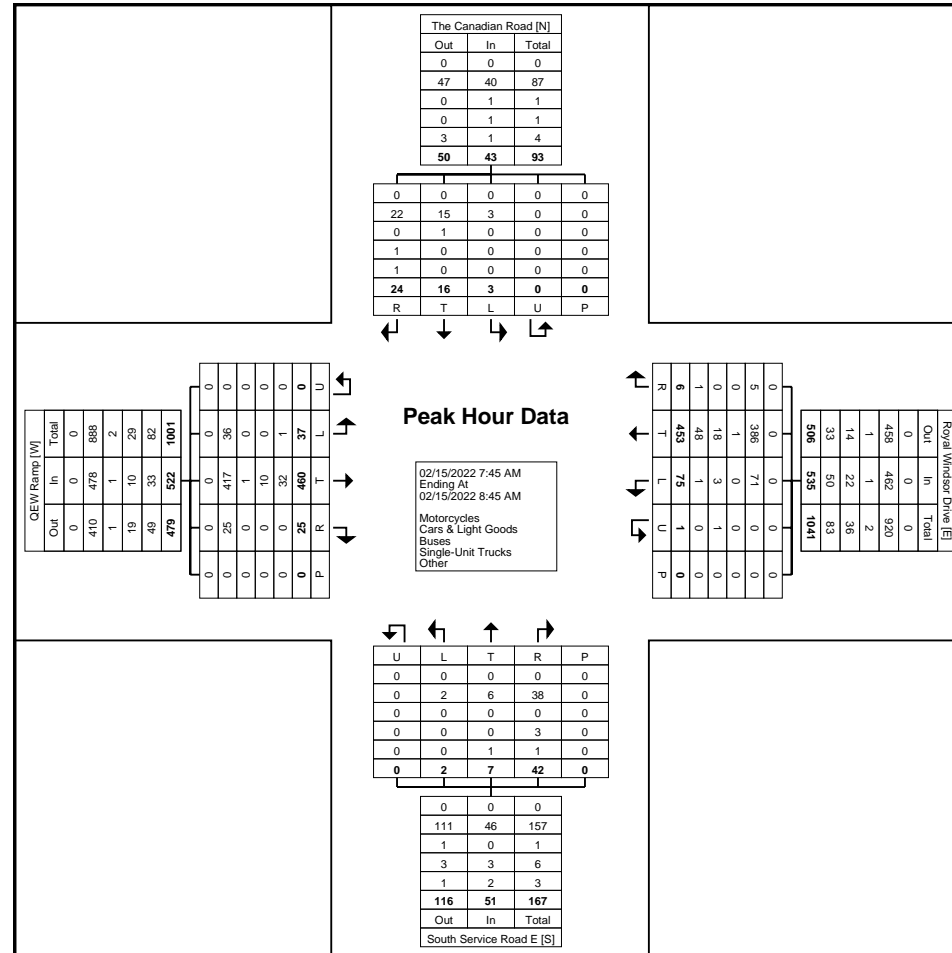
Start Time	QEW Ramp Eastbound						Royal Windsor Drive Westbound						South Service Road E Northbound						The Canadian Road Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
7:45 AM	13	122	4	0	0	139	13	127	1	0	0	141	0	0	14	0	0	14	0	4	3	0	0	7	301
8:00 AM	10	85	5	0	0	100	18	105	2	0	0	125	1	2	7	0	0	10	1	6	8	0	0	15	250
8:15 AM	7	125	6	0	0	138	19	103	1	0	0	123	1	2	12	0	0	15	1	1	6	0	0	8	284
8:30 AM	7	128	10	0	0	145	25	118	2	1	0	146	0	3	9	0	0	12	1	5	7	0	0	13	316
Total	37	460	25	0	0	522	75	453	6	1	0	535	2	7	42	0	0	51	3	16	24	0	0	43	1151
Approach %	7.1	88.1	4.8	0.0	-	-	14.0	84.7	1.1	0.2	-	-	3.9	13.7	82.4	0.0	-	-	7.0	37.2	55.8	0.0	-	-	-
Total %	3.2	40.0	2.2	0.0	-	45.4	6.5	39.4	0.5	0.1	-	46.5	0.2	0.6	3.6	0.0	-	4.4	0.3	1.4	2.1	0.0	-	3.7	-
PHF	0.712	0.898	0.625	0.000	-	0.900	0.750	0.892	0.750	0.250	-	0.916	0.500	0.583	0.750	0.000	-	0.850	0.750	0.667	0.750	0.000	-	0.717	0.911
Motorcycles	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Motorcycles	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Cars & Light Goods	36	417	25	0	-	478	71	386	5	0	-	462	2	6	38	0	-	46	3	15	22	0	-	40	1026
% Cars & Light Goods	97.3	90.7	100.0	-	-	91.6	94.7	85.2	83.3	0.0	-	86.4	100.0	85.7	90.5	-	-	90.2	100.0	93.8	91.7	-	-	93.0	89.1
Buses	0	1	0	0	-	1	0	1	0	0	-	1	0	0	0	0	-	0	0	1	0	0	-	1	3
% Buses	0.0	0.2	0.0	-	-	0.2	0.0	0.2	0.0	0.0	-	0.2	0.0	0.0	0.0	-	-	0.0	0.0	6.3	0.0	-	-	2.3	0.3
Single-Unit Trucks	0	10	0	0	-	10	3	18	0	1	-	22	0	0	3	0	-	3	0	0	1	0	-	1	36
% Single-Unit Trucks	0.0	2.2	0.0	-	-	1.9	4.0	4.0	0.0	100.0	-	4.1	0.0	0.0	7.1	-	-	5.9	0.0	0.0	4.2	-	-	2.3	3.1
Articulated Trucks	1	32	0	0	-	33	1	48	1	0	-	50	0	1	1	0	-	2	0	0	1	0	-	1	86
% Articulated Trucks	2.7	7.0	0.0	-	-	6.3	1.3	10.6	16.7	0.0	-	9.3	0.0	14.3	2.4	-	-	3.9	0.0	0.0	4.2	-	-	2.3	7.5
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Paradigm Transportation Solutions Limited
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Count Name: Royal Windsor Drive & Canadian Road
Site Code: 210590
Start Date: 02/15/2022
Page No: 5



Turning Movement Peak Hour Data Plot (7:45 AM)



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@ptsI.com

Count Name: Royal Windsor Drive & Canadian Road
Site Code: 210590
Start Date: 02/15/2022
Page No: 6

Turning Movement Peak Hour Data (11:15 AM)

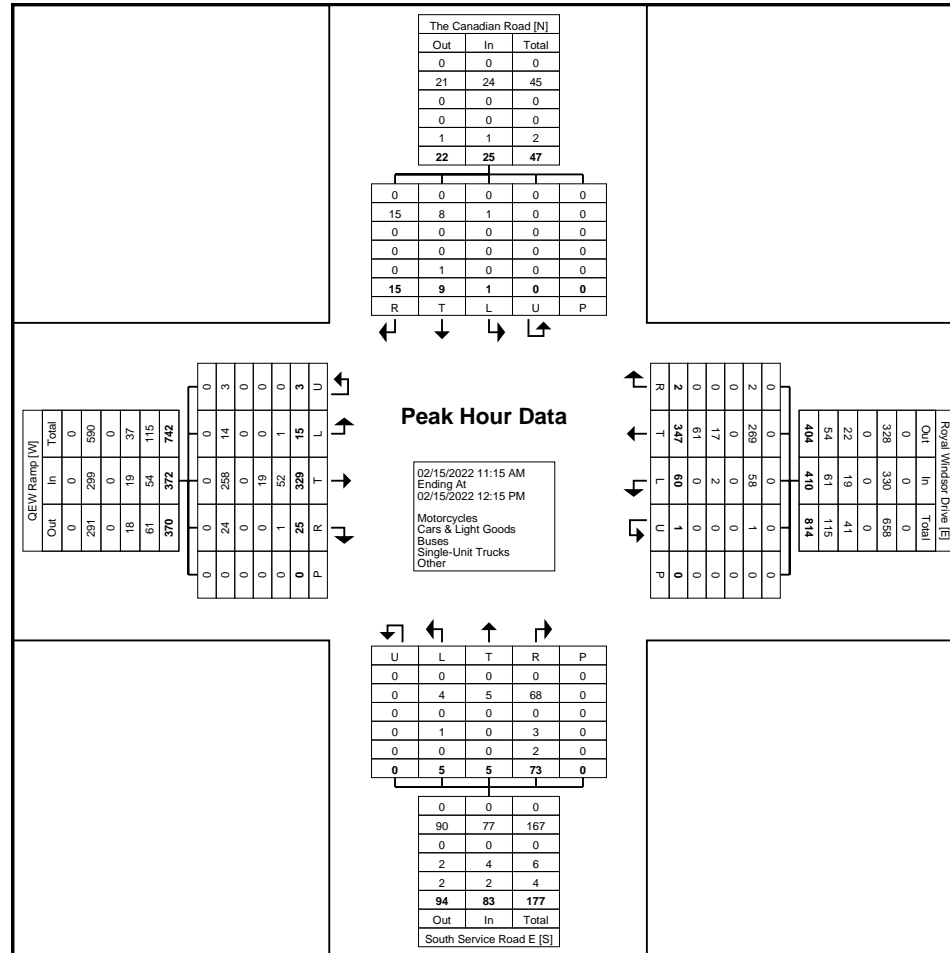
Start Time	QEW Ramp Eastbound						Royal Windsor Drive Westbound						South Service Road E Northbound						The Canadian Road Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
11:15 AM	3	83	6	0	0	92	10	95	1	0	0	106	2	1	16	0	0	19	0	2	5	0	0	7	224
11:30 AM	3	78	9	2	0	92	22	91	0	0	0	113	0	0	14	0	0	14	0	2	3	0	0	5	224
11:45 AM	6	84	6	1	0	97	15	87	1	0	0	103	3	0	21	0	0	24	0	0	3	0	0	3	227
12:00 PM	3	84	4	0	0	91	13	74	0	1	0	88	0	4	22	0	0	26	1	5	4	0	0	10	215
Total	15	329	25	3	0	372	60	347	2	1	0	410	5	5	73	0	0	83	1	9	15	0	0	25	890
Approach %	4.0	88.4	6.7	0.8	-	-	14.6	84.6	0.5	0.2	-	-	6.0	6.0	88.0	0.0	-	-	4.0	36.0	60.0	0.0	-	-	-
Total %	1.7	37.0	2.8	0.3	-	41.8	6.7	39.0	0.2	0.1	-	46.1	0.6	0.6	8.2	0.0	-	9.3	0.1	1.0	1.7	0.0	-	2.8	-
PHF	0.625	0.979	0.694	0.375	-	0.959	0.682	0.913	0.500	0.250	-	0.907	0.417	0.313	0.830	0.000	-	0.798	0.250	0.450	0.750	0.000	-	0.625	0.980
Motorcycles	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Motorcycles	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Cars & Light Goods	14	258	24	3	-	299	58	269	2	1	-	330	4	5	68	0	-	77	1	8	15	0	-	24	730
% Cars & Light Goods	93.3	78.4	96.0	100.0	-	80.4	96.7	77.5	100.0	100.0	-	80.5	80.0	100.0	93.2	-	-	92.8	100.0	88.9	100.0	-	-	96.0	82.0
Buses	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Buses	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Single-Unit Trucks	0	19	0	0	-	19	2	17	0	0	-	19	1	0	3	0	-	4	0	0	0	0	-	0	42
% Single-Unit Trucks	0.0	5.8	0.0	0.0	-	5.1	3.3	4.9	0.0	0.0	-	4.6	20.0	0.0	4.1	-	-	4.8	0.0	0.0	0.0	-	-	0.0	4.7
Articulated Trucks	1	52	1	0	-	54	0	61	0	0	-	61	0	0	2	0	-	2	0	1	0	0	-	1	118
% Articulated Trucks	6.7	15.8	4.0	0.0	-	14.5	0.0	17.6	0.0	0.0	-	14.9	0.0	0.0	2.7	-	-	2.4	0.0	11.1	0.0	-	-	4.0	13.3
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Paradigm Transportation Solutions Limited
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Count Name: Royal Windsor Drive & Canadian Road
Site Code: 210590
Start Date: 02/15/2022
Page No: 7



Turning Movement Peak Hour Data Plot (11:15 AM)



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Cambridge, Ontario, Canada N1R 8J8
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Count Name: Royal Windsor Drive & Canadian Road
Site Code: 210590
Start Date: 02/15/2022
Page No: 8

Turning Movement Peak Hour Data (4:00 PM)

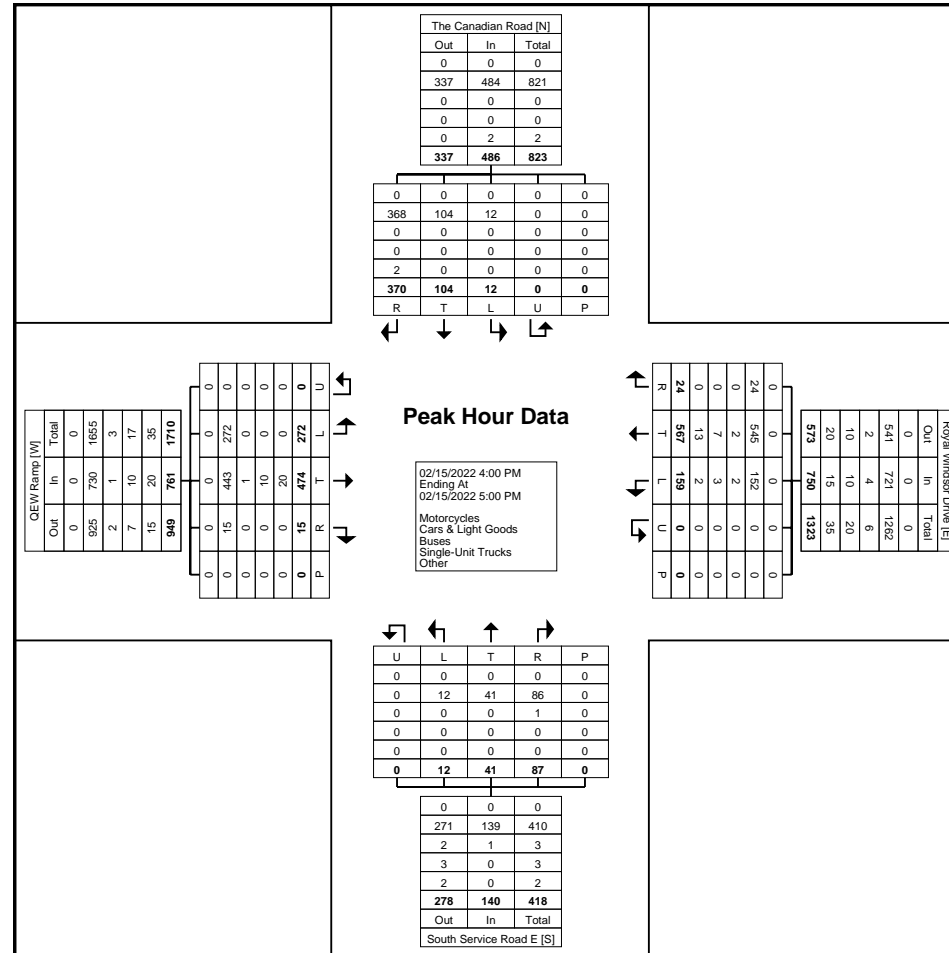
Start Time	QEW Ramp Eastbound						Royal Windsor Drive Westbound						South Service Road E Northbound						The Canadian Road Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
4:00 PM	21	97	5	0	0	123	47	169	3	0	0	219	2	5	18	0	0	25	3	31	205	0	0	239	606
4:15 PM	25	107	2	0	0	134	57	146	8	0	0	211	2	7	18	0	0	27	7	52	94	0	0	153	525
4:30 PM	86	128	2	0	0	216	30	140	3	0	0	173	3	10	23	0	0	36	1	14	45	0	0	60	485
4:45 PM	140	142	6	0	0	288	25	112	10	0	0	147	5	19	28	0	0	52	1	7	26	0	0	34	521
Total	272	474	15	0	0	761	159	567	24	0	0	750	12	41	87	0	0	140	12	104	370	0	0	486	2137
Approach %	35.7	62.3	2.0	0.0	-	-	21.2	75.6	3.2	0.0	-	-	8.6	29.3	62.1	0.0	-	-	2.5	21.4	76.1	0.0	-	-	-
Total %	12.7	22.2	0.7	0.0	-	35.6	7.4	26.5	1.1	0.0	-	35.1	0.6	1.9	4.1	0.0	-	6.6	0.6	4.9	17.3	0.0	-	22.7	-
PHF	0.486	0.835	0.625	0.000	-	0.661	0.697	0.839	0.600	0.000	-	0.856	0.600	0.539	0.777	0.000	-	0.673	0.429	0.500	0.451	0.000	-	0.508	0.882
Motorcycles	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Motorcycles	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Cars & Light Goods	272	443	15	0	-	730	152	545	24	0	-	721	12	41	86	0	-	139	12	104	368	0	-	484	2074
% Cars & Light Goods	100.0	93.5	100.0	-	-	95.9	95.6	96.1	100.0	-	-	96.1	100.0	100.0	98.9	-	-	99.3	100.0	100.0	99.5	-	-	99.6	97.1
Buses	0	1	0	0	-	1	2	2	0	0	-	4	0	0	1	0	-	1	0	0	0	0	-	0	6
% Buses	0.0	0.2	0.0	-	-	0.1	1.3	0.4	0.0	-	-	0.5	0.0	0.0	1.1	0	-	0.7	0.0	0.0	0.0	-	-	0.0	0.3
Single-Unit Trucks	0	10	0	0	-	10	3	7	0	0	-	10	0	0	0	0	-	0	0	0	0	0	-	0	20
% Single-Unit Trucks	0.0	2.1	0.0	-	-	1.3	1.9	1.2	0.0	-	-	1.3	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.9
Articulated Trucks	0	20	0	0	-	20	2	13	0	0	-	15	0	0	0	0	-	0	0	0	2	0	-	2	37
% Articulated Trucks	0.0	4.2	0.0	-	-	2.6	1.3	2.3	0.0	-	-	2.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.5	-	-	0.4	1.7
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Paradigm Transportation Solutions Limited
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Count Name: Royal Windsor Drive & Canadian Road
Site Code: 210590
Start Date: 02/15/2022
Page No: 9



Turning Movement Peak Hour Data Plot (4:00 PM)



Date: 03-May-22

Intersection: Trafalgar & QEW WB Ramp

8 Phase Basic Timing Sheet

	1	2	3	4	5	6	7	8	2 Ped	4 Ped	6 Ped	8 Ped
Phases in use		X	X	X					X	X		
Direction		SB	Prot EBL	WB		NB		EB				
Min Green		28	7	10		28		10				
Veh Ext.		4.5	3.0	3.0		4.5		3.0				
Yellow		4	3	4		4		4				
Red		3	2	3		3		3				
Walk		7		7		7		7				
Don't Walk		21		24		21		24				
Max 1		30	20	40		30		40				
Max 2		70		90		70		90				
Max 3												
Veh Recall												
Ped Recall												
Notes:												

<p>Pattern 1 Time: 6:00-7:00,9:00-10:00 Cycle Length: 120 Offset (%): 81%</p> <table border="0"> <tr><td colspan="5"> </td></tr> <tr><td>Direction</td><td></td><td></td><td></td><td></td></tr> <tr><td>Phase</td><td>1</td><td>2</td><td>3</td><td>4</td></tr> <tr><td>%</td><td>0</td><td>58</td><td>10</td><td>32</td></tr> <tr><td>Direction</td><td></td><td></td><td></td><td></td></tr> <tr><td>Phase</td><td>5</td><td>6</td><td>7</td><td>8</td></tr> <tr><td>%</td><td>0</td><td>58</td><td>0</td><td>42</td></tr> </table>						Direction					Phase	1	2	3	4	%	0	58	10	32	Direction					Phase	5	6	7	8	%	0	58	0	42	<p>Pattern 2 Time: 7:00-9:00 Cycle Length: 140 Offset (%): 91%</p> <table border="0"> <tr><td colspan="5"> </td></tr> <tr><td>Direction</td><td></td><td></td><td></td><td></td></tr> <tr><td>Phase</td><td>1</td><td>2</td><td>3</td><td>4</td></tr> <tr><td>%</td><td>0</td><td>62</td><td>9</td><td>29</td></tr> <tr><td>Direction</td><td></td><td></td><td></td><td></td></tr> <tr><td>Phase</td><td>5</td><td>6</td><td>7</td><td>8</td></tr> <tr><td>%</td><td>0</td><td>62</td><td>0</td><td>38</td></tr> </table>						Direction					Phase	1	2	3	4	%	0	62	9	29	Direction					Phase	5	6	7	8	%	0	62	0	38
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%	0	62	0	38																																																																			
<p>Pattern 3 Time: 10:00-15:15,19:00-22:00 Cycle Length: 120 Offset (%): 81%</p> <table border="0"> <tr><td colspan="5"> </td></tr> <tr><td>Direction</td><td></td><td></td><td></td><td></td></tr> <tr><td>Phase</td><td>1</td><td>2</td><td>3</td><td>4</td></tr> <tr><td>%</td><td>0</td><td>55</td><td>10</td><td>35</td></tr> <tr><td>Direction</td><td></td><td></td><td></td><td></td></tr> <tr><td>Phase</td><td>5</td><td>6</td><td>7</td><td>8</td></tr> <tr><td>%</td><td>0</td><td>55</td><td>0</td><td>45</td></tr> </table>						Direction					Phase	1	2	3	4	%	0	55	10	35	Direction					Phase	5	6	7	8	%	0	55	0	45	<p>Pattern 4 Time: 15:15-17:00 Cycle Length: 120 Offset (%): 81%</p> <table border="0"> <tr><td colspan="5"> </td></tr> <tr><td>Direction</td><td></td><td></td><td></td><td></td></tr> <tr><td>Phase</td><td>1</td><td>2</td><td>3</td><td>4</td></tr> <tr><td>%</td><td>0</td><td>55</td><td>10</td><td>35</td></tr> <tr><td>Direction</td><td></td><td></td><td></td><td></td></tr> <tr><td>Phase</td><td>5</td><td>6</td><td>7</td><td>8</td></tr> <tr><td>%</td><td>0</td><td>55</td><td>0</td><td>45</td></tr> </table>						Direction					Phase	1	2	3	4	%	0	55	10	35	Direction					Phase	5	6	7	8	%	0	55	0	45
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<p>Pattern 5 Time: 17:00-19:00 Cycle Length: 140 Offset (%): 46%</p> <table border="0"> <tr><td colspan="5"> </td></tr> <tr><td>Direction</td><td></td><td></td><td></td><td></td></tr> <tr><td>Phase</td><td>1</td><td>2</td><td>3</td><td>4</td></tr> <tr><td>%</td><td>0</td><td>57</td><td>9</td><td>34</td></tr> <tr><td>Direction</td><td></td><td></td><td></td><td></td></tr> <tr><td>Phase</td><td>5</td><td>6</td><td>7</td><td>8</td></tr> <tr><td>%</td><td>0</td><td>57</td><td>0</td><td>43</td></tr> </table>						Direction					Phase	1	2	3	4	%	0	57	9	34	Direction					Phase	5	6	7	8	%	0	57	0	43	<p>Pattern 6 Time: 22:00 Cycle Length: local Offset (%):</p> <table border="0"> <tr><td colspan="5"> </td></tr> <tr><td>Direction</td><td></td><td></td><td></td><td></td></tr> <tr><td>Phase</td><td>1</td><td>2</td><td>3</td><td>4</td></tr> <tr><td>%</td><td>0</td><td>0</td><td>0</td><td>0</td></tr> <tr><td>Direction</td><td></td><td></td><td></td><td></td></tr> <tr><td>Phase</td><td>5</td><td>6</td><td>7</td><td>8</td></tr> <tr><td>%</td><td>0</td><td>0</td><td>0</td><td>0</td></tr> </table>						Direction					Phase	1	2	3	4	%	0	0	0	0	Direction					Phase	5	6	7	8	%	0	0	0	0
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Date: 03-May-22

Intersection: Trafalgar & QEW EB Ramp

8 Phase Basic Timing Sheet

	1	2	3	4	5	6	7	8	2 Ped	4 Ped	6 Ped	8 Ped
Phases in use		X		X					X	X		
Direction		NB/SB		EB								
Min Green		29		10								
Veh Ext.				3.0								
Yellow		4		4								
Red		3		3								
Walk		7		7								
Don't Walk		22		24								
Max 1		50		40								
Max 2		70		90								
Max 3												
Veh Recall												
Ped Recall												
Notes:												

<p>Pattern 1 Time: 6:00-7:00,9:00-10:00 Cycle Length: 120 Offset (%): 97%</p> <table border="0"> <tr><td colspan="5"> </td></tr> <tr><td>Direction</td><td></td><td></td><td></td><td></td></tr> <tr><td>Phase</td><td>1</td><td>2</td><td>3</td><td>4</td></tr> <tr><td>%</td><td>0</td><td>60</td><td>0</td><td>40</td></tr> <tr><td>Direction</td><td></td><td></td><td></td><td></td></tr> <tr><td>Phase</td><td>5</td><td>6</td><td>7</td><td>8</td></tr> <tr><td>%</td><td>0</td><td>0</td><td>0</td><td>0</td></tr> </table>						Direction					Phase	1	2	3	4	%	0	60	0	40	Direction					Phase	5	6	7	8	%	0	0	0	0	<p>Pattern 2 Time: 7:00-9:00 Cycle Length: 140 Offset (%): 4%</p> <table border="0"> <tr><td colspan="5"> </td></tr> <tr><td>Direction</td><td></td><td></td><td></td><td></td></tr> <tr><td>Phase</td><td>1</td><td>2</td><td>3</td><td>4</td></tr> <tr><td>%</td><td>0</td><td>59</td><td>0</td><td>41</td></tr> <tr><td>Direction</td><td></td><td></td><td></td><td></td></tr> <tr><td>Phase</td><td>5</td><td>6</td><td>7</td><td>8</td></tr> <tr><td>%</td><td>0</td><td>0</td><td>0</td><td>0</td></tr> </table>						Direction					Phase	1	2	3	4	%	0	59	0	41	Direction					Phase	5	6	7	8	%	0	0	0	0
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<p>Pattern 3 Time: 10:00-15:15, 19:00-22:00 Cycle Length: 120 Offset (%): 97%</p> <table border="0"> <tr><td colspan="5"> </td></tr> <tr><td>Direction</td><td></td><td></td><td></td><td></td></tr> <tr><td>Phase</td><td>1</td><td>2</td><td>3</td><td>4</td></tr> <tr><td>%</td><td>0</td><td>60</td><td>0</td><td>40</td></tr> <tr><td>Direction</td><td></td><td></td><td></td><td></td></tr> <tr><td>Phase</td><td>5</td><td>6</td><td>7</td><td>8</td></tr> <tr><td>%</td><td>0</td><td>0</td><td>0</td><td>0</td></tr> </table>						Direction					Phase	1	2	3	4	%	0	60	0	40	Direction					Phase	5	6	7	8	%	0	0	0	0	<p>Pattern 4 Time: 15:15-17:00 Cycle Length: 120 Offset (%): 65%</p> <table border="0"> <tr><td colspan="5"> </td></tr> <tr><td>Direction</td><td></td><td></td><td></td><td></td></tr> <tr><td>Phase</td><td>1</td><td>2</td><td>3</td><td>4</td></tr> <tr><td>%</td><td>0</td><td>58</td><td>0</td><td>42</td></tr> <tr><td>Direction</td><td></td><td></td><td></td><td></td></tr> <tr><td>Phase</td><td>5</td><td>6</td><td>7</td><td>8</td></tr> <tr><td>%</td><td>0</td><td>0</td><td>0</td><td>0</td></tr> </table>						Direction					Phase	1	2	3	4	%	0	58	0	42	Direction					Phase	5	6	7	8	%	0	0	0	0
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<p>Pattern 5 Time: 17:00-19:00 Cycle Length: 140 Offset (%): 37%</p> <table border="0"> <tr><td colspan="5"> </td></tr> <tr><td>Direction</td><td></td><td></td><td></td><td></td></tr> <tr><td>Phase</td><td>1</td><td>2</td><td>3</td><td>4</td></tr> <tr><td>%</td><td>0</td><td>60</td><td>0</td><td>40</td></tr> <tr><td>Direction</td><td></td><td></td><td></td><td></td></tr> <tr><td>Phase</td><td>5</td><td>6</td><td>7</td><td>8</td></tr> <tr><td>%</td><td>0</td><td>0</td><td>0</td><td>0</td></tr> </table>						Direction					Phase	1	2	3	4	%	0	60	0	40	Direction					Phase	5	6	7	8	%	0	0	0	0	<p>Pattern 6 Time: 22:00 Cycle Length: local Offset (%):</p> <table border="0"> <tr><td colspan="5"> </td></tr> <tr><td>Direction</td><td></td><td></td><td></td><td></td></tr> <tr><td>Phase</td><td>1</td><td>2</td><td>3</td><td>4</td></tr> <tr><td>%</td><td>0</td><td>0</td><td>0</td><td>0</td></tr> <tr><td>Direction</td><td></td><td></td><td></td><td></td></tr> <tr><td>Phase</td><td>5</td><td>6</td><td>7</td><td>8</td></tr> <tr><td>%</td><td>0</td><td>0</td><td>0</td><td>0</td></tr> </table>						Direction					Phase	1	2	3	4	%	0	0	0	0	Direction					Phase	5	6	7	8	%	0	0	0	0
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TRAFALGAR RD & CORNWALL RD Direct port 13 - Trafalgar & Cross

Configuration Phase Sequence Page 1

Phase Ring (MM)1-1-1

Phase															
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	1	1	1	2	2	2	2	1	1	2	2	1	1	2	2

Hardware Alternate Sequence Enable: No

Phase Ring Sequence

Sequence	Ring	Phase															
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
	Barrier Mode	B		B	B	B		B		B							
1	1	1	2	3	4	9	10	13	14	0	0	0	0	0	0	0	0
1	2	5	6	8	7	11	12	15	16	0	0	0	0	0	0	0	0
2	1	1	2	3	4	9	10	13	14	0	0	0	0	0	0	0	0
2	2	5	6	8	7	11	12	15	16	0	0	0	0	0	0	0	0
3	1	1	2	3	4	9	10	13	14	0	0	0	0	0	0	0	0
3	2	5	6	8	7	11	12	15	16	0	0	0	0	0	0	0	0
4	1	1	2	3	4	9	10	13	14	0	0	0	0	0	0	0	0
4	2	5	6	8	7	11	12	15	16	0	0	0	0	0	0	0	0
5	1	1	2	3	4	9	10	13	14	0	0	0	0	0	0	0	0
5	2	5	6	8	7	11	12	15	16	0	0	0	0	0	0	0	0
6	1	1	2	3	4	9	10	13	14	0	0	0	0	0	0	0	0
6	2	5	6	8	7	11	12	15	16	0	0	0	0	0	0	0	0
7	1	1	2	3	4	9	10	13	14	0	0	0	0	0	0	0	0
7	2	5	6	8	7	11	12	15	16	0	0	0	0	0	0	0	0
8	1	1	2	3	4	9	10	13	14	0	0	0	0	0	0	0	0
8	2	5	6	8	7	11	12	15	16	0	0	0	0	0	0	0	0
9	1	1	2	3	4	9	10	13	14	0	0	0	0	0	0	0	0
9	2	5	6	8	7	11	12	15	16	0	0	0	0	0	0	0	0
10	1	1	2	3	4	9	10	13	14	0	0	0	0	0	0	0	0
10	2	5	6	8	7	11	12	15	16	0	0	0	0	0	0	0	0
11	1	1	2	3	4	9	10	13	14	0	0	0	0	0	0	0	0
11	2	5	6	8	7	11	12	15	16	0	0	0	0	0	0	0	0
12	1	1	2	3	4	9	10	13	14	0	0	0	0	0	0	0	0
12	2	5	6	8	7	11	12	15	16	0	0	0	0	0	0	0	0
13	1	1	2	3	4	9	10	13	14	0	0	0	0	0	0	0	0
13	2	5	6	8	7	11	12	15	16	0	0	0	0	0	0	0	0
14	1	1	2	3	4	9	10	13	14	0	0	0	0	0	0	0	0
14	2	5	6	8	7	11	12	15	16	0	0	0	0	0	0	0	0
15	1	1	2	3	4	9	10	13	14	0	0	0	0	0	0	0	0
15	2	5	6	8	7	11	12	15	16	0	0	0	0	0	0	0	0
16	1	1	2	3	4	9	10	13	14	0	0	0	0	0	0	0	0
16	2	5	6	8	7	11	12	15	16	0	0	0	0	0	0	0	0

**Phase
Compatibility
(MM)1-1-2**

Phase 1	Phase 2
1	5
1	6
2	5
2	6
3	8
4	7
9	11
9	12
10	11
10	12
13	15
13	16
14	15
14	16

**Phase Direction
Descriptions**

Phase	Description
1	SBLT
2	NB
3	WBLT
4	EB
5	NBLT
6	SB
7	EBLT
8	WB

**Overlap Direction
Descriptions**

Overlap	Description
---------	-------------

Administration (MM)1-7-1

Enable CRC Check: No

CRC: 0000

Request Download Program Data: No

Enable Automatic Backup to Datakey: Yes

TRAFALGAR RD & CORNWALL RD Direct port 13 - Trafalgar & Cross

Configuration Phase Sequence Page 2

In Use(MM)1-2

Exclusive Ped(MM)1-2

Backup Prevent(MM)1-1-3

Simultaneous Gap(MM)1-1-4

Disable(MM)1-1-4

Phases In Use
1
2
3
4
5
6
7
8

Phase

Phase	Timing Phase	Backup
1	2	Yes
2	3	Yes
3	4	Yes
4	5	Yes
5	6	B
6	7	Yes

Phase	Must Gap with Phase

Phase

Load Switch Assignments (MMU Channel) (MM)1-3

Phase	Overlap	Type	Dimming				Power Up			Auto		Flash Together	
			Red	Yellow	Green	Dark	Auto	Red	Yellow	Dark	Red		Yellow
1	1	V				+	Yes				Yes		
2	2	V				+	Yes				Yes		Yes
3	3	V				+	Yes				Yes		
4	4	V				+	Yes				Yes		Yes
5	5	V				-	Yes				Yes		
6	6	V				-	Yes				Yes		Yes
7	7	V				-	Yes				Yes		
8	8	V				-	Yes				Yes		Yes
9	2	P				+	Yes						
10	4	P				+	Yes						
11	6	P				-	Yes						
12	0					-	Yes						
13	1					+	Yes				Yes		
14	2	O				-	Yes				Yes		Yes
15	3	O				+	Yes				Yes		
16	4	O				-	Yes				Yes		Yes

TRAFALGAR RD & CORNWALL RD Direct port 13 - Trafalgar & Cross

Configuration Port 1 (SDLC)

SDLC Options (MM)1-4-1

Bus Interface Terminal/Facilities

BIU	Term and Facility Enable	Detector Rack Enable
1	Yes	Yes
2	Yes	Yes
3	No	No
4	No	No
5	No	No
6	No	No
7	No	No
8	No	No

Enable TS2/MMU Type Cabinet: Yes
 Enable MMU Extended Status: Yes
 Enable SDLC Stop Time: No
 Enable 3 Critical RFE's Lockup: Yes
 Diagonstics (Test Fixture) Enable: No

Secondary To Secondary Addressing

ID	Term and Facility Enable	Detector Rack Enable
1	No	No
2	No	No
3	No	No
4	No	No
5	No	No
6	No	No
7	No	No
8	No	No

Secondary To Secondary Addressing MMU: No
 Secondary To Secondary Addressing Diagonstics: No

MMU Program (MM)1-4-2

Channel Can Serve with Channel	
Channel 1	Channel 2
1	5
1	6
1	11
2	5
2	6
2	9
2	11
3	7
3	8
3	12
4	7
4	8
4	10
4	12
5	9
6	9
6	11
7	10
8	10
8	12
9	11
10	12

Color Check Enable (MM)1-4-3

Enable Color Check: Yes

Color Check Enable

--	--	--	--

MMU Channel	Green	Yellow	Red
1	Yes	Yes	No
2	Yes	Yes	Yes
3	Yes	Yes	No
4	Yes	Yes	Yes
5	Yes	Yes	No
6	Yes	Yes	Yes
7	Yes	Yes	No
8	Yes	Yes	Yes
9	Yes	No	Yes
10	Yes	No	Yes
11	Yes	No	Yes

TRAFALGAR RD & CORNWALL RD Direct port 13 - Trafalgar & Cross

Controller Timing Plan (MM)2-1

Plan 1

Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Min Green	7	27	12	10	7	27	10	10	5	5	5	5	5	5	5	5
BK Min Green	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CS Min Green	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Delay Green	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Walk	0	7	0	7	0	7	0	0	0	10	0	10	0	10	0	10
Walk 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Walk Max	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ped Clear	0	20	0	28	0	20	0	7	0	16	0	16	0	16	0	16
Ped Clear 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ped Clear Max	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ped CO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vehicle Ext	3.0	5.0	3.5	4.0	3.0	5.0	3.0	4.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Ext 2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Max 1	25	50	25	40	25	50	35	45	35	35	35	35	35	35	35	35
Max 2	40	70	70	70	40	70	70	70	40	40	40	40	40	40	40	40
Max 3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DYM Max	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DYM Stp	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Yellow	3.0	4.0	4.0	4.0	3.0	4.0	4.0	4.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Red Clear	1.0	3.0	3.0	3.0	2.0	3.0	3.0	3.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Red Max	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Red Revert	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
ACT B4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SEC/ACT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Max Int	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Time B4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cars Wt	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
STPT Duc	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Min Gap	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

TRAFALGAR RD & CORNWALL RD Direct port 13 - Trafalgar & Cross

Controller Start/Fash (MM) 2-5**Startup**

Phase	Phase Setting
2	Y
6	Y

Overlap
A
B
C
D

Flash > Mon: No
Flash Time: 0
All Red: 0
Power Start Sequence: 1

Automatic Flash

Entry Phase
2
6

Exit Phase
2
6

Overlap Exit
A
B
C
D

Flash > Mon: No
Exit Flash Interval: W
Minimum Auto Flash: 8
Minimum Recall: No
Cycle Through Phase: No

TRAFALGAR RD & CORNWALL RD Direct port 13 - Trafalgar & Cross

Controller Options**Controller Options (MM)2-6-1**

Phase	Flashing Green Phase	Guaranteed Passage	Non Act 1	Non Act 2	Dual Entry	Conditional Service	Conditional Reservice	Ped Reservice	Rest In Walk	Flashing Walk	Ped Clear Yellow	Ped Clear Red	IGRN + Veh Ext
2	No	No	Yes	No	No	No	No	No	Yes	No	No	No	No
3	No	No	No	No	Yes	No	No	No	No	No	No	No	No
4	No	No	No	Yes	Yes	No	No	No	No	No	No	No	No
6	No	No	Yes	No	No	Yes	No	No	Yes	No	No	No	No
7	No	No	No	No	Yes	No	No	No	No	No	No	No	No
8	No	No	No	Yes	Yes	No	No	No	No	No	No	No	No

Ped Clear Protect: Off

Red Revert: 2.0

Act Pre-Time (MM)2-7

Pre-Time Mode Enable: No

Free Input Enables Pre-Timed: Yes

Pre-Timed Phase

Phase Recall Options (MM)2-8

Plan	Phase	Lock Detector	Vehicle Recall	Ped Recall	Max Recall	Soft Recall	No Rest	AI Calc
1	2	No	Yes	Yes	No	No	No	No
1	6	No	Yes	Yes	No	No	No	No
2	1	Yes	No	No	No	No	No	No
2	2	Yes	No	No	No	No	No	No
2	3	Yes	No	No	No	No	No	No
2	4	Yes	No	No	No	No	No	No
2	5	Yes	No	No	No	No	No	No
2	6	Yes	No	No	No	No	No	No
2	7	Yes	No	No	No	No	No	No
2	8	Yes	No	No	No	No	No	No
2	9	Yes	No	No	No	No	No	No
2	10	Yes	No	No	No	No	No	No
2	11	Yes	No	No	No	No	No	No
2	12	Yes	No	No	No	No	No	No
2	13	Yes	No	No	No	No	No	No
2	14	Yes	No	No	No	No	No	No
2	15	Yes	No	No	No	No	No	No
2	16	Yes	No	No	No	No	No	No
3	1	Yes	No	No	No	No	No	No
3	2	Yes	No	No	No	No	No	No
3	3	Yes	No	No	No	No	No	No
3	4	Yes	No	No	No	No	No	No
3	5	Yes	No	No	No	No	No	No
3	6	Yes	No	No	No	No	No	No
3	7	Yes	No	No	No	No	No	No
3	8	Yes	No	No	No	No	No	No
3	9	Yes	No	No	No	No	No	No
3	10	Yes	No	No	No	No	No	No
3	11	Yes	No	No	No	No	No	No
3	12	Yes	No	No	No	No	No	No
3	13	Yes	No	No	No	No	No	No
3	14	Yes	No	No	No	No	No	No
3	15	Yes	No	No	No	No	No	No
3	16	Yes	No	No	No	No	No	No
4	1	Yes	No	No	No	No	No	No
4	2	Yes	No	No	No	No	No	No
4	3	Yes	No	No	No	No	No	No
4	4	Yes	No	No	No	No	No	No
4	5	Yes	No	No	No	No	No	No
4	6	Yes	No	No	No	No	No	No
4	7	Yes	No	No	No	No	No	No
4	8	Yes	No	No	No	No	No	No
4	9	Yes	No	No	No	No	No	No
4	10	Yes	No	No	No	No	No	No
4	11	Yes	No	No	No	No	No	No
4	12	Yes	No	No	No	No	No	No
4	13	Yes	No	No	No	No	No	No
4	14	Yes	No	No	No	No	No	No
4	15	Yes	No	No	No	No	No	No
4	16	Yes	No	No	No	No	No	No

TRAFALGAR RD & CORNWALL RD Direct port 13 - Trafalgar & Cross

Coordination Options**Coordination Options (MM)3-1**

Manual Pattern: Auto
 ECPI Coord: Yes
 System Source: TBC
 System Format: STD
 Splits In: Percent
 Offsets In: Percent
 Transition: Smooth
 Max Select: MAXINH
 Dwell/Add Time: 0
 Dly Coord Wz-Lz: No
 Force Off: Float
 Offset Reference: Lead
 Use Ped Time: Yes
 Ped Recall: No
 Ped Resv: No
 Local Zero Ovr: No
 Fo Add Ini Green: No
 Re-sync Count: 3
 Multisync: No

Split Demand (MM)3-5

Demand 1	Demand 2
Phase	Phase

Demand	Detector	Call Time	Cycle Count

Auto Perm Minimum Green (Seconds) (MM)3-4

Phase	Min Green
1	3

TRAFALGAR RD & CORNWALL RD Direct port 13 - Trafalgar & Cross

Coordination Pattern Data
Pattern Data (MM)3-2

Pattern	Split Pattern	TS2	Cycle	Std(COS)	Offset Value	Dwell/Add Time	Splits In	Offsets In	Actuated Coord
1	1	0-1	120	111	12	0	Percent	Percent	Yes
2	2	0-2	140	0	6	0	Percent	Percent	Yes
3	3	0-3	120	0	12	0	Percent	Percent	Yes
4	4	1-1	120	0	49	0	Percent	Percent	Yes
5	5	1-2	140	0	42	0	Percent	Percent	Yes
6	6	1-3	255	0	0	0	Percent	Percent	No
11	11	3-2	120	0	85	0	Percent	Percent	No
12	12	3-3	120	0	45	0	Percent	Percent	No
13	13	4-1	150	0	10	0	Percent	Percent	No
18	18	5-3	150	0	19	0	Percent	Percent	No
21	21	6-3	120	0	85	0	Percent	Percent	No
23	23	7-2	120	0	85	0	Percent	Percent	No
24	24	7-3	120	0	0	0	Percent	Percent	No

Pattern	Timing Plan	Actuated Walk Rest	Sequence	Phase Reservice	Action Plan	Max Select	Force Off	Vehicle Perm 1	Vehicle Perm 2	Vehicle Perm 3
1	0	Yes	0	No	0	Max Inhibit	None	0	0	0
2	0	Yes	0	No	0	Max Inhibit	Float	0	0	0
3	0	Yes	0	No	0	Max Inhibit	Float	0	0	0
4	0	Yes	0	No	0	Max Inhibit	Float	0	0	0
5	0	Yes	0	No	0	None	None	0	0	0
6	0	No	0	No	0	None	None	0	0	0
11	0	No	0	No	0	None	None	0	0	0
12	0	No	0	No	0	None	None	0	0	0
13	0	No	0	No	0	None	None	0	0	0
18	0	No	0	No	0	None	None	0	0	0
21	0	No	0	No	0	None	None	0	0	0
23	0	No	0	No	0	None	None	0	0	0
24	0	No	0	No	0	None	None	0	0	0

Pattern	Ring Split Ext 1	Ring Split Ext 2	Ring Split Ext 3	Ring Split Ext 4	Split Demand Pattern 1	Split Demand Pattern 2	XArt Pattern	Ring Displ 2	Ring Displ 3	Ring Displ 4
1	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0
21	0	0	0	0	0	0	0	0	0	0
23	0	0	0	0	0	0	0	0	0	0
24	0	0	0	0	0	0	0	0	0	0

Split Preference Phases

Pattern	Phase	Preference 1	Preference 2
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Special Functions

Pattern	Function	Output
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Split Pattern Data (MM)3-3
Coord Phases

Split Pattern	Phase	Split
1	1	10
1	2	39

Split/Modes

Split Pattern	Mode	Phase															
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	Coord	X				X											
1		X			X												

21	2	36
21	3	19
21	4	30
21	5	15
21	6	36
21	7	30
21	8	19
23	1	15
23	2	36
23	3	19
23	4	30
23	5	15
23	6	36
23	7	30
23	8	19

TRAFALGAR RD & CORNWALL RD Direct port 13 - Trafalgar & Cross

Preemptor Preempt Plan (MM)4-1

Preempt Phases

Preempt	Phase	Track Clear Veh	Dwell Veh	Dwell Ped	Cycling Veh	Cycling Ped	Exit Phase	Exit Calls	Special Function
3	2	No	Yes	No	No	No	No	No	No
3	6	No	Yes	No	No	No	No	No	No
4	2	No	Yes	No	No	No	No	No	No
4	6	No	Yes	No	No	No	No	No	No

Preempt Overlaps

Preempt	Overlap	Track Clear	Enable Trailing	Dwell Overlap	Cycling Overlap
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Preempt	Enable	Preempt Override	Interlock Enable	Detector Lock	Delay	Inhibit	Override Flash	Duration	CLR > GRN
1	No	Yes	No	Yes	0	0	No	0	No
2	No	Yes	No	Yes	0	0	No	0	No
3	Standard	Yes	No	Yes	0	0	No	15	No
4	Standard	Yes	No	Yes	0	0	No	15	No
5	No	Yes	No	Yes	0	0	No	0	No
6	No	Yes	No	Yes	0	0	No	0	No
7	No	Yes	No	Yes	0	0	No	0	No
8	No	Yes	No	Yes	0	0	No	0	No
9	No	Yes	No	Yes	0	0	No	0	No
10	No	Yes	No	Yes	0	0	No	0	No

Preempt	Term Overlap Asap	PC Through Yellow	Terminate Phase	Ped Dark	Track Clearance Re-service	Dwell Flash	Linked Pmt	Flash Exit Color	Preempt To Coord	Fault Type
1	No	No	No	No	No	Off	0	Green	No	Hard
2	No	No	No	No	No	Off	0	Green	No	Hard
3	No	Yes	No	No	No	Off	0	Green	No	Hard
4	No	No	No	No	No	Off	0	Green	No	Hard
5	No	No	No	No	No	Off	0	Green	No	Hard
6	No	No	No	No	No	Off	0	Green	No	Hard
7	No	No	No	No	No	Off	0	Green	No	Hard
8	No	No	No	No	No	Off	0	Green	No	Hard
9	No	No	No	No	No	Off	0	Green	No	Hard
10	No	No	No	No	No	Off	0	Green	No	Hard

Preempt	Exit Timing Plan	Reservice	Free During Pmt Ring 1	Free During Pmt Ring 2	Free During Pmt Ring 3	Free During Pmt Ring 4
1	0	0	No	No	No	No
2	0	0	No	No	No	No
3	0	0	No	No	No	No
4	0	0	No	No	No	No
5	0	0	No	No	No	No
6	0	0	No	No	No	No
7	0	0	No	No	No	No
8	0	0	No	No	No	No
9	0	0	No	No	No	No
10	0	0	No	No	No	No

Preempt	Entrance Walk	Entrance Ped Clear	Entrance Min Green	Entrance Yellow	Entrance Red	Track Clear Min Green	Gate Down Ext Green	Gate Down Max Green	Track Clear Yellow	Track Clear Red
1	0	255	5	4.0	1.0	0	0	0	4.0	1.0
2	0	255	5	4.0	1.0	0	0	0	4.0	1.0
3	0	7	5	4.0	2.0	0	0	0	4.0	1.0
4	0	7	5	4.0	2.0	0	0	0	4.0	1.0
5	0	255	5	4.0	1.0	0	0	0	4.0	1.0
6	0	255	5	4.0	1.0	0	0	0	4.0	1.0
7	0	255	5	4.0	1.0	0	0	0	4.0	1.0
8	0	255	5	4.0	1.0	0	0	0	4.0	1.0
9	0	255	5	4.0	1.0	0	0	0	4.0	1.0

10	0	255	5	4.0	1.0	0	0	0	4.0	1.0
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Preempt	Min Dwell Time	Extend Preempt Input Time	Max Preempt Call Time	Exit Yellow Time	Exit Red Time	Preempt Active Out	Preempt Active Dwell	Other Priority Preempt	Non-Priority Preempt	Inhibit Ext Time
1	0	0.0	0	4.0	1.0	On	No	Off	Off	0.0
2	0	0.0	0	4.0	1.0	On	No	Off	Off	0.0
3	0	0.0	0	4.0	1.0	On	No	Off	Off	0.0
4	0	0.0	0	4.0	1.0	On	No	Off	Off	0.0
5	0	0.0	0	4.0	1.0	On	No	Off	Off	0.0
6	0	0.0	0	4.0	1.0	On	No	Off	Off	0.0
7	0	0.0	0	4.0	1.0	On	No	Off	Off	0.0
8	0	0.0	0	4.0	1.0	On	No	Off	Off	0.0
9	0	0.0	0	4.0	1.0	On	No	Off	Off	0.0
10	0	0.0	0	4.0	1.0	On	No	Off	Off	0.0

TRAFALGAR RD & CORNWALL RD Direct port 13 - Trafalgar & Cross

Time Base Clock/Calendar

Clock/Calendar Options (MM)5-1

Enable Action Plan: 0
Sync Reference Time: 3:15 AM
Sync Reference: Reference Time
Day Light Savings: USDLS
Time Reset Input Set Time: 3:30:00
Standard Time From GMT: -5

TRAFALGAR RD & CORNWALL RD Direct port 13 - Trafalgar & Cross

Time Base Action Plan**Action Plan (MM)5-2**

Plan	Pattern	Veh Det Plan	Flash	Red Rest	Controller Seq	Timing Plan	Override System	Detector Log	Veh Det Diag Plan	Ped Det Diag Plan	Dimming Enable
1	1	1	No	No	0	0	Yes	None	0	0	No
2	2	0	No	No	0	0	Yes	None	0	0	No
3	3	0	No	No	0	0	Yes	None	0	0	No
4	4	0	No	No	0	0	Yes	None	0	0	No
5	5	0	No	No	0	0	Yes	None	0	0	No
6	254 - FREE	0	No	No	0	0	Yes	None	0	0	No
7	21	0	No	No	0	0	No	None	0	0	No
8	23	0	No	No	0	0	No	None	0	0	No
9	24	0	No	No	0	0	No	None	0	0	No

Action Plan Phases

Plan	Phase	Ped Rcl	Walk 2	Vex 2	Veh Rcl	Max Rcl	Max 2	Max 3	CS Inhibit	Omit

Action Plan Special Functions

Plan	Function

Action Plan Auxiliary Functions

Plan	Function

Logic Statement Control

Plan	LP	Statement Control

TRAFALGAR RD & CORNWALL RD Direct port 13 - Trafalgar & Cross

Time Base Day Plan/Schedule
Day Plan (MM)5-3

Plan	Event	Action Plan	Start Time
1	1	1	6:00 AM
1	2	2	7:00 AM
1	3	1	9:00 AM
1	4	3	10:00 AM
1	5	4	3:15 PM
1	6	5	5:00 PM
1	7	3	7:00 PM
1	8	6	10:00 PM

Schedule (MM)5-4

Schedule Number	Day Plan Number	Months	Days of Week	Days of Month
1	1	Jan, Feb, Mar, Apr, May, Jun, Jul, Aug, Sept, Oct, Nov, Dec	Sun, Mon, Tues, Wed, Thurs, Fri, Sat	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31
2	2	Jan, Feb, Mar, Apr, May, Jun, Jul, Aug, Sept, Oct, Nov, Dec	Sun, Sat	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31

TRAFALGAR RD & CORNWALL RD Direct port 13 - Trafalgar & Cross

Detectors**Detectors Page 1****Vehicle Detectors Setup (MM)6-1**

Vehicle Plan	Detector Number	Called	Type
1	3	3	S
1	4	4	S
1	7	7	S
1	8	8	S
1	9	9	S
1	10	10	S
1	11	11	S
1	12	12	S
1	15	7	S
1	16	7	S
1	17	1	S
1	18	2	S
1	21	5	S
1	22	6	S
1	25	1	S
1	26	2	S
1	29	5	S
1	30	6	S

Vehicle Detector Setup (MM)6-2 continued

Detector Number	ECPI	TS2 Detector	Detector Description
1	S-STANDARD	Yes	
2	S-STANDARD	Yes	
3	S-STANDARD	Yes	
4	S-STANDARD	Yes	
5	S-STANDARD	Yes	
6	S-STANDARD	Yes	
7	S-STANDARD	Yes	
8	S-STANDARD	Yes	
9	S-STANDARD	Yes	
10	S-STANDARD	Yes	
11	S-STANDARD	Yes	
12	S-STANDARD	Yes	
13	S-STANDARD	Yes	
14	S-STANDARD	Yes	
15	S-STANDARD	Yes	
16	S-STANDARD	Yes	
17	S-STANDARD	Yes	
18	S-STANDARD	Yes	
19	S-STANDARD	Yes	
20	S-STANDARD	Yes	
21	S-STANDARD	Yes	
22	S-STANDARD	Yes	
23	S-STANDARD	Yes	
24	S-STANDARD	Yes	
25	S-STANDARD	Yes	
26	S-STANDARD	Yes	
27	S-STANDARD	Yes	
28	S-STANDARD	Yes	
29	S-STANDARD	Yes	
30	S-STANDARD	Yes	
31	S-STANDARD	Yes	
32	S-STANDARD	Yes	
33	S-STANDARD	Yes	
34	S-STANDARD	Yes	
35	S-STANDARD	Yes	
36	S-STANDARD	Yes	
37	S-STANDARD	Yes	
38	S-STANDARD	Yes	
39	S-STANDARD	Yes	
40	S-STANDARD	Yes	
41	S-STANDARD	Yes	
42	S-STANDARD	Yes	
43	S-STANDARD	Yes	
44	S-STANDARD	Yes	
45	N-NTCIP	Yes	
46	N-NTCIP	Yes	
47	N-NTCIP	Yes	
48	N-NTCIP	Yes	
49	N-NTCIP	Yes	
50	N-NTCIP	Yes	
51	N-NTCIP	Yes	
52	N-NTCIP	Yes	
53	N-NTCIP	Yes	
54	N-NTCIP	Yes	
55	N-NTCIP	Yes	
56	N-NTCIP	Yes	
57	N-NTCIP	Yes	
58	N-NTCIP	Yes	
59	N-NTCIP	Yes	
60	N-NTCIP	Yes	
61	N-NTCIP	Yes	
62	N-NTCIP	Yes	
63	N-NTCIP	Yes	
64	N-NTCIP	Yes	

Vehicle Detector Setup (MM)6-2 continued

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Detector Number	Vehicle Plan	Assigned Phase	Switch Phase	Extend Time/Passage Time	Delay Time	Queue Limit/Disconnect Time	Added Option	Call Option	NTCIP Occupancy	NTCIP Volume	ECPI Log	Lock In	Ext Option
1	1	0	0	0.0	0.0	0	No	Yes	No	No	No	None	Passage
1	2	1	0	0.0	0.0	0	No	Yes	No	No	No	None	Passage
1	3	1	0	0.0	0.0	0	No	Yes	No	No	No	None	Passage
1	4	1	0	0.0	0.0	0	No	Yes	No	No	No	None	Passage
2	1	0	0	0.0	0.0	0	No	Yes	No	No	No	None	Passage
2	2	2	0	0.0	0.0	0	No	Yes	No	No	No	None	Passage
2	3	2	0	0.0	0.0	0	No	Yes	No	No	No	None	Passage
2	4	2	0	0.0	0.0	0	No	Yes	No	No	No	None	Passage
3	1	3	0	0.0	0.0	0	No	Yes	No	No	No	None	Passage
3	2	3	0	0.0	0.0	0	No	Yes	No	No	No	None	Passage
3	3	3	0	0.0	0.0	0	No	Yes	No	No	No	None	Passage
3	4	3	0	0.0	0.0	0	No	Yes	No	No	No	None	Passage
4	1	4	0	0.0	0.0	0	No	Yes	No	No	No	None	Passage
4	2	4	0	0.0	0.0	0	No	Yes	No	No	No	None	Passage
4	3	4	0	0.0	0.0	0	No	Yes	No	No	No	None	Passage
4	4	4	0	0.0	0.0	0	No	Yes	No	No	No	None	Passage
5	1	0	0	0.0	0.0	0	No	Yes	No	No	No	None	Passage
5	2	5	0	0.0	0.0	0	No	Yes	No	No	No	None	Passage
5	3	5	0	0.0	0.0	0	No	Yes	No	No	No	None	Passage
5	4	5	0	0.0	0.0	0	No	Yes	No	No	No	None	Passage
6	1	0	0	0.0	0.0	0	No	Yes	No	No	No	None	Passage
6	2	6	0	0.0	0.0	0	No	Yes	No	No	No	None	Passage
6	3	6	0	0.0	0.0	0	No	Yes	No	No	No	None	Passage
6	4	6	0	0.0	0.0	0	No	Yes	No	No	No	None	Passage
7	1	7	0	0.0	0.0	0	No	Yes	No	No	No	None	Passage
7	2	7	0	0.0	0.0	0	No	Yes	No	No	No	None	Passage
7	3	7	0	0.0	0.0	0	No	Yes	No	No	No	None	Passage
7	4	7	0	0.0	0.0	0	No	Yes	No	No	No	None	Passage
8	1	8	0	0.0	0.0	0	No	Yes	No	No	No	None	Passage
8	2	8	0	0.0	0.0	0	No	Yes	No	No	No	None	Passage
8	3	8	0	0.0	0.0	0	No	Yes	No	No	No	None	Passage
8	4	8	0	0.0	0.0	0	No	Yes	No	No	No	None	Passage
9	1	9	0	0.0	0.0	0	No	Yes	No	No	No	None	Passage
9	2	9	0	0.0	0.0	0	No	Yes	No	No	No	None	Passage
9	3	9	0	0.0	0.0	0	No	Yes	No	No	No	None	Passage
9	4	9	0	0.0	0.0	0	No	Yes	No	No	No	None	Passage
10	1	10	0	0.0	0.0	0	No	Yes	No	No	No	None	Passage
10	2	10	0	0.0	0.0	0	No	Yes	No	No	No	None	Passage
10	3	10	0	0.0	0.0	0	No	Yes	No	No	No	None	Passage
10	4	10	0	0.0	0.0	0	No	Yes	No	No	No	None	Passage
11	1	11	0	0.0	0.0	0	No	Yes	No	No	No	None	Passage
11	2	11	0	0.0	0.0	0	No	Yes	No	No	No	None	Passage
11	3	11	0	0.0	0.0	0	No	Yes	No	No	No	None	Passage
11	4	11	0	0.0	0.0	0	No	Yes	No	No	No	None	Passage
12	1	12	0	0.0	0.0	0	No	Yes	No	No	No	None	Passage
12	2	12	0	0.0	0.0	0	No	Yes	No	No	No	None	Passage
12	3	12	0	0.0	0.0	0	No	Yes	No	No	No	None	Passage
12	4	12	0	0.0	0.0	0	No	Yes	No	No	No	None	Passage
13	1	13	0	0.0	0.0	0	No	Yes	No	No	No	None	Passage
13	2	13	0	0.0	0.0	0	No	Yes	No	No	No	None	Passage
13	3	13	0	0.0	0.0	0	No	Yes	No	No	No	None	Passage
13	4	13	0	0.0	0.0	0	No	Yes	No	No	No	None	Passage
14	1	14	0	0.0	0.0	0	No	Yes	No	No	No	None	Passage
14	2	14	0	0.0	0.0	0	No	Yes	No	No	No	None	Passage
14	3	14	0	0.0	0.0	0	No	Yes	No	No	No	None	Passage
14	4	14	0	0.0	0.0	0	No	Yes	No	No	No	None	Passage
15	1	7	0	0.0	0.0	0	No	Yes	No	No	No	None	Passage
15	2	15	0	0.0	0.0	0	No	Yes	No	No	No	None	Passage
15	3	15	0	0.0	0.0	0	No	Yes	No	No	No	None	Passage
15	4	15	0	0.0	0.0	0	No	Yes	No	No	No	None	Passage
16	1	7	0	0.0	0.0	0	No	Yes	No	No	No	None	Passage
16	2	16	0	0.0	0.0	0	No	Yes	No	No	No	None	Passage
16	3	16	0	0.0	0.0	0	No	Yes	No	No	No	None	Passage
16	4	16	0	0.0	0.0	0	No	Yes	No	No	No	None	Passage
17	1	1	0	0.0	0.0	0	No	Yes	No	No	No	None	Passage
17	2	0	0	0.0	0.0	0	No	Yes	No	No	No	None	Passage
17	3	0	0	0.0	0.0	0	No	Yes	No	No	No	None	Passage
17	4	0	0	0.0	0.0	0	No	Yes	No	No	No	None	Passage

35	4	0	0	0.0	0.0	0	No	Yes	No	No	No	None	Passage
36	1	0	0	0.0	0.0	0	No	Yes	No	No	No	None	Passage
36	2	0	0	0.0	0.0	0	No	Yes	No	No	No	None	Passage
36	3	0	0	0.0	0.0	0	No	Yes	No	No	No	None	Passage
36	4	0	0	0.0	0.0	0	No	Yes	No	No	No	None	Passage
37	1	0	0	0.0	0.0	0	No	Yes	No	No	No	None	Passage
37	2	0	0	0.0	0.0	0	No	Yes	No	No	No	None	Passage
37	3	0	0	0.0	0.0	0	No	Yes	No	No	No	None	Passage
37	4	0	0	0.0	0.0	0	No	Yes	No	No	No	None	Passage
38	1	0	0	0.0	0.0	0	No	Yes	No	No	No	None	Passage
38	2	0	0	0.0	0.0	0	No	Yes	No	No	No	None	Passage
38	3	0	0	0.0	0.0	0	No	Yes	No	No	No	None	Passage
38	4	0	0	0.0	0.0	0	No	Yes	No	No	No	None	Passage
39	1	0	0	0.0	0.0	0	No	Yes	No	No	No	None	Passage
39	2	0	0	0.0	0.0	0	No	Yes	No	No	No	None	Passage
39	3	0	0	0.0	0.0	0	No	Yes	No	No	No	None	Passage
39	4	0	0	0.0	0.0	0	No	Yes	No	No	No	None	Passage
40	1	0	0	0.0	0.0	0	No	Yes	No	No	No	None	Passage
40	2	0	0	0.0	0.0	0	No	Yes	No	No	No	None	Passage
40	3	0	0	0.0	0.0	0	No	Yes	No	No	No	None	Passage
40	4	0	0	0.0	0.0	0	No	Yes	No	No	No	None	Passage
41	1	0	0	0.0	0.0	0	No	Yes	No	No	No	None	Passage
41	2	0	0	0.0	0.0	0	No	Yes	No	No	No	None	Passage
41	3	0	0	0.0	0.0	0	No	Yes	No	No	No	None	Passage
41	4	0	0	0.0	0.0	0	No	Yes	No	No	No	None	Passage
42	1	0	0	0.0	0.0	0	No	Yes	No	No	No	None	Passage
42	2	0	0	0.0	0.0	0	No	Yes	No	No	No	None	Passage
42	3	0	0	0.0	0.0	0	No	Yes	No	No	No	None	Passage
42	4	0	0	0.0	0.0	0	No	Yes	No	No	No	None	Passage
43	1	0	0	0.0	0.0	0	No	Yes	No	No	No	None	Passage
43	2	0	0	0.0	0.0	0	No	Yes	No	No	No	None	Passage
43	3	0	0	0.0	0.0	0	No	Yes	No	No	No	None	Passage
43	4	0	0	0.0	0.0	0	No	Yes	No	No	No	None	Passage
44	1	0	0	0.0	0.0	0	No	Yes	No	No	No	None	Passage
44	2	0	0	0.0	0.0	0	No	Yes	No	No	No	None	Passage
44	3	0	0	0.0	0.0	0	No	Yes	No	No	No	None	Passage
44	4	0	0	0.0	0.0	0	No	Yes	No	No	No	None	Passage

Ped Detector Options (MM)6-3

Phase Ped Detector (NTCIP)

Local Ped Detector	Number
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	9
10	10
11	11
12	12
13	13
14	14
15	15
16	16

Local System Detector

Local System Detector	Number
-----------------------	--------

TRAFALGAR RD & CORNWALL RD Direct port 13 - Trafalgar & Cross

Detectors

Detectors Page 2

Log - Speed Detector Setup (MM)6-5

NTCIP Log Period: 0 ECPI Log Period: TBAP Length Unit: Inch

Speed Detector	Local Detector	One/Two Detector	Vehicle Length	Trap Length	Enable Log
1	0	1	0	0	No
2	0	1	0	0	No
3	0	1	0	0	No
4	0	1	0	0	No
5	0	1	0	0	No
6	0	1	0	0	No
7	0	1	0	0	No
8	0	1	0	0	No
9	0	1	0	0	No
10	0	1	0	0	No
11	0	1	0	0	No
12	0	1	0	0	No
13	0	1	0	0	No
14	0	1	0	0	No
15	0	1	0	0	No
16	0	1	0	0	No

Vehicle Detector Diagnostics (MM)6-6

Plan	Detector	Counts	Act	Pres	Multiplier	Failed Time	Failed Call Delay
1	1	0	0	0	1	255	0
1	2	0	0	0	1	255	0
1	3	0	0	0	1	255	0
1	4	0	0	0	1	255	0
1	5	0	0	0	1	255	0
1	6	0	0	0	1	255	0
1	7	0	0	0	1	255	0
1	8	0	0	0	1	255	0
1	9	0	0	0	1	255	0
1	10	0	0	0	1	255	0
1	11	0	0	0	1	255	0
1	12	0	0	0	1	255	0
1	13	0	0	0	1	255	0
1	14	0	0	0	1	255	0
1	15	0	0	0	1	255	0
1	16	0	0	0	1	255	0
1	17	0	0	0	1	255	0
1	18	0	0	0	1	255	0
1	19	0	0	0	1	255	0
1	20	0	0	0	1	255	0
1	21	0	0	0	1	255	0
1	22	0	0	0	1	255	0
1	23	0	0	0	1	255	0
1	24	0	0	0	1	255	0
1	25	0	0	0	1	255	0
1	26	0	0	0	1	255	0
1	27	0	0	0	1	255	0
1	28	0	0	0	1	255	0
1	29	0	0	0	1	255	0
1	30	0	0	0	1	255	0
1	31	0	0	0	1	255	0
1	32	0	0	0	1	255	0

Pedestrian Detector Diagnostics (MM)6-7

Plan	Detector	Counts	Act	Pres	Multiplier
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Date: 03-May-22

Intersection: Trafalgar & Cornwall

8 Phase Basic Timing Sheet

	1	2	3	4	5	6	7	8	2 Ped	4 Ped	6 Ped	8 Ped
Phases in use	X	X	X	X	X	X	X	X	X	X	X	X
Direction	Prot SBL	NB	Prot EBL	WB	Prot NBL	SB	Prot WBL	EB				
Min Green	7	20	7	10	7	20	7	10				
Veh Ext.												
Yellow	3	4	3	4	3	4	3	4				
Red	2	3	2	3	2	3	2	3				
Walk		7		7		7		7				
Don't Walk		25		23		25		23				
Max 1	25	50	25	40	25	50	25	40				
Max 2	40	70	45	65	40	70	45	65				
Max 3												
Veh Recall												
Ped Recall												
Notes:												

<p>Pattern 1 Time: 6:00-7:00, 9:00-10:00 Cycle Length: 120 Offset (%): 37%</p> <table border="1"> <tbody> <tr> <td>Direction</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Phase</td> <td>1</td> <td>2</td> <td>3</td> <td>4</td> </tr> <tr> <td>%</td> <td>20</td> <td>33</td> <td>10</td> <td>37</td> </tr> <tr> <td>Direction</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Phase</td> <td>5</td> <td>6</td> <td>7</td> <td>8</td> </tr> <tr> <td>%</td> <td>10</td> <td>43</td> <td>16</td> <td>31</td> </tr> </tbody> </table>	Direction					Phase	1	2	3	4	%	20	33	10	37	Direction					Phase	5	6	7	8	%	10	43	16	31	<p>Pattern 2 Time: 7:00-9:00 Cycle Length: 140 Offset (%): 41%</p> <table border="1"> <tbody> <tr> <td>Direction</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Phase</td> <td>1</td> <td>2</td> <td>3</td> <td>4</td> </tr> <tr> <td>%</td> <td>27</td> <td>29</td> <td>9</td> <td>35</td> </tr> <tr> <td>Direction</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Phase</td> <td>5</td> <td>6</td> <td>7</td> <td>8</td> </tr> <tr> <td>%</td> <td>9</td> <td>47</td> <td>16</td> <td>28</td> </tr> </tbody> </table>	Direction					Phase	1	2	3	4	%	27	29	9	35	Direction					Phase	5	6	7	8	%	9	47	16	28
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%	9	47	16	28																																																									
<p>Pattern 3 Time: 10:00-15:15, 19:00-22:00 Cycle Length: 120 Offset (%): 37%</p> <table border="1"> <tbody> <tr> <td>Direction</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Phase</td> <td>1</td> <td>2</td> <td>3</td> <td>4</td> </tr> <tr> <td>%</td> <td>22</td> <td>33</td> <td>10</td> <td>35</td> </tr> <tr> <td>Direction</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Phase</td> <td>5</td> <td>6</td> <td>7</td> <td>8</td> </tr> <tr> <td>%</td> <td>10</td> <td>45</td> <td>14</td> <td>31</td> </tr> </tbody> </table>	Direction					Phase	1	2	3	4	%	22	33	10	35	Direction					Phase	5	6	7	8	%	10	45	14	31	<p>Pattern 4 Time: 15:15-17:00 Cycle Length: 120 Offset (%): 78%</p> <table border="1"> <tbody> <tr> <td>Direction</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Phase</td> <td>1</td> <td>2</td> <td>3</td> <td>4</td> </tr> <tr> <td>%</td> <td>20</td> <td>33</td> <td>10</td> <td>37</td> </tr> <tr> <td>Direction</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Phase</td> <td>5</td> <td>6</td> <td>7</td> <td>8</td> </tr> <tr> <td>%</td> <td>10</td> <td>43</td> <td>16</td> <td>31</td> </tr> </tbody> </table>	Direction					Phase	1	2	3	4	%	20	33	10	37	Direction					Phase	5	6	7	8	%	10	43	16	31
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<p>Pattern 5 Time: 17:00-19:00 Cycle Length: 140 Offset (%): 70</p> <table border="1"> <tbody> <tr> <td>Direction</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Phase</td> <td>1</td> <td>2</td> <td>3</td> <td>4</td> </tr> <tr> <td>%</td> <td>24</td> <td>30</td> <td>10</td> <td>36</td> </tr> <tr> <td>Direction</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Phase</td> <td>5</td> <td>6</td> <td>7</td> <td>8</td> </tr> <tr> <td>%</td> <td>10</td> <td>44</td> <td>18</td> <td>28</td> </tr> </tbody> </table>	Direction					Phase	1	2	3	4	%	24	30	10	36	Direction					Phase	5	6	7	8	%	10	44	18	28	<p>Pattern 6 Time: 22:00 Cycle Length: local Offset (%):</p> <table border="1"> <tbody> <tr> <td>Direction</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Phase</td> <td>1</td> <td>2</td> <td>3</td> <td>4</td> </tr> <tr> <td>%</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> </tr> <tr> <td>Direction</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Phase</td> <td>5</td> <td>6</td> <td>7</td> <td>8</td> </tr> <tr> <td>%</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> </tr> </tbody> </table>	Direction					Phase	1	2	3	4	%	0	0	0	0	Direction					Phase	5	6	7	8	%	0	0	0	0
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<p>Pattern 7 Time: Cycle Length: Offset (%):</p> <table border="1"> <tbody> <tr> <td>Direction</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Phase</td> <td>1</td> <td>2</td> <td>3</td> <td>4</td> </tr> <tr> <td>%</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Direction</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Phase</td> <td>5</td> <td>6</td> <td>7</td> <td>8</td> </tr> <tr> <td>%</td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	Direction					Phase	1	2	3	4	%					Direction					Phase	5	6	7	8	%					<p>Pattern 8 Time: 7:15 Cycle Length: 140 Offset (%): 41%</p> <table border="1"> <tbody> <tr> <td>Direction</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Phase</td> <td>1</td> <td>2</td> <td>3</td> <td>4</td> </tr> <tr> <td>%</td> <td>27</td> <td>29</td> <td>9</td> <td>35</td> </tr> <tr> <td>Direction</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Phase</td> <td>5</td> <td>6</td> <td>7</td> <td>8</td> </tr> <tr> <td>%</td> <td>9</td> <td>47</td> <td>16</td> <td>28</td> </tr> </tbody> </table>	Direction					Phase	1	2	3	4	%	27	29	9	35	Direction					Phase	5	6	7	8	%	9	47	16	28
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Trafalgar Rd @ Cornwall Rd (Master) - Cross Ave @ Argus Rd

Configuration Phase Sequence Page 1

Phase Ring (MM)1-1-1

Phase															
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	1	1	1	2	2	2	2	1	1	2	2	1	1	2	2

Hardware Alternate Sequence Enable: No

Phase Ring Sequence

Sequence	Ring	Phase															
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
	Barrier Mode	B		B		B		B		B							
1	1	1	2	3	4	9	10	13	14	0	0	0	0	0	0	0	0
1	2	5	6	7	8	11	12	15	16	0	0	0	0	0	0	0	0
2	1	2	1	3	4	10	9	13	14	0	0	0	0	0	0	0	0
2	2	5	6	7	8	11	12	15	16	0	0	0	0	0	0	0	0
3	1	1	2	4	3	9	10	14	13	0	0	0	0	0	0	0	0
3	2	5	6	7	8	11	12	15	16	0	0	0	0	0	0	0	0
4	1	2	1	4	3	10	9	14	13	0	0	0	0	0	0	0	0
4	2	5	6	7	8	11	12	15	16	0	0	0	0	0	0	0	0
5	1	1	2	3	4	9	10	13	14	0	0	0	0	0	0	0	0
5	2	6	5	7	8	12	11	15	16	0	0	0	0	0	0	0	0
6	1	2	1	3	4	10	9	13	14	0	0	0	0	0	0	0	0
6	2	6	5	7	8	12	11	15	16	0	0	0	0	0	0	0	0
7	1	1	2	4	3	9	10	14	13	0	0	0	0	0	0	0	0
7	2	6	5	7	8	12	11	15	16	0	0	0	0	0	0	0	0
8	1	2	1	4	3	10	9	14	13	0	0	0	0	0	0	0	0
8	2	6	5	7	8	12	11	15	16	0	0	0	0	0	0	0	0
9	1	1	2	3	4	9	10	13	14	0	0	0	0	0	0	0	0
9	2	5	6	8	7	11	12	16	15	0	0	0	0	0	0	0	0
10	1	2	1	3	4	10	9	13	14	0	0	0	0	0	0	0	0
10	2	5	6	8	7	11	12	16	15	0	0	0	0	0	0	0	0
11	1	1	2	4	3	9	10	14	13	0	0	0	0	0	0	0	0
11	2	5	6	8	7	11	12	16	15	0	0	0	0	0	0	0	0
12	1	2	1	4	3	10	9	14	13	0	0	0	0	0	0	0	0
12	2	5	6	8	7	11	12	16	15	0	0	0	0	0	0	0	0
13	1	1	2	3	4	9	10	13	14	0	0	0	0	0	0	0	0
13	2	6	5	8	7	12	11	16	15	0	0	0	0	0	0	0	0
14	1	2	1	3	4	10	9	13	14	0	0	0	0	0	0	0	0
14	2	6	5	8	7	12	11	16	15	0	0	0	0	0	0	0	0
15	1	1	2	4	3	9	10	14	13	0	0	0	0	0	0	0	0
15	2	6	5	8	7	12	11	16	15	0	0	0	0	0	0	0	0
16	1	2	1	4	3	10	9	14	13	0	0	0	0	0	0	0	0
16	2	6	5	8	7	12	11	16	15	0	0	0	0	0	0	0	0

**Phase
Compatibility
(MM)1-1-2**

Phase 1	Phase 2
1	5
1	6
2	5
2	6
3	7
3	8
4	7
4	8
9	11
9	12
10	11
10	12
13	15
13	16
14	15
14	16

**Phase Direction
Descriptions**

Phase	Description
1	WBLT
2	EB
4	SB
6	WB
8	NB

**Overlap Direction
Descriptions**

Overlap	Description
---------	-------------

Administration (MM)1-7-1

Enable CRC Check: No

CRC: 0000

Request Download Program Data: No

Enable Automatic Backup to Datakey: Yes

Trafalgar Rd @ Cornwall Rd (Master) - Cross Ave @ Argus Rd

Configuration Phase Sequence Page 2

In Use(MM)1-2		Exclusive Ped(MM)1-2		Backup Prevent(MM)1-1-3			Simultaneous Gap(MM)1-1-4		Disable(MM)1-1-4
Phases In Use	Phase	Phase	Timing Phase	Backup	Phase	Must Gap with Phase	Phase		
1		1	2	Yes					
2		3	4	Yes					
4		5	6	Yes					
6		7	8	Yes					
8									

Load Switch Assignments (MMU Channel) (MM)1-3

Phase	Overlap	Type	Dim				Auto		Flash Together
			R	Y	G	D	R	Y	
1	1	V				+	Yes		
2	2	V				+	Yes		Yes
3	3	V				+	Yes		
4	4	V				+	Yes		Yes
5	5	V				-	Yes		
6	6	V				-	Yes		Yes
7	7	V				-	Yes		
8	8	V				-	Yes		Yes
9	2	P				+			
10	4	P				+			
11	6	P				-			
12	8	P				-			
13	1	O				+	Yes		
14	2	O				-	Yes		Yes
15	3	O				+	Yes		
16	4	O				-	Yes		Yes

Trafalgar Rd @ Cornwall Rd (Master) - Cross Ave @ Argus Rd

Configuration Port 1 (SDLC)**SDLC Options (MM)1-4-1****Bus Interface Terminal/Facilities**

BIU	Term and Facility Enable	Detector Rack Enable
1	Yes	Yes
2	Yes	Yes
3	No	No
4	No	No
5	No	No
6	No	No
7	No	No
8	No	No

Enable TS2/MMU Type Cabinet: No
 Enable MMU Extended Status: Yes
 Enable SDLC Stop Time: No
 Enable 3 Critical RFE's Lockup: Yes
 MMU To CU SDLC External Start: Enabled
 Diagnostics (Test Fixture) Enable: No

Secondary To Secondary Addressing

ID	Term and Facility Enable	Detector Rack Enable
1	No	No
2	No	No
3	No	No
4	No	No
5	No	No
6	No	No
7	No	No
8	No	No

Secondary To Secondary Addressing MMU: No
 Secondary To Secondary Addressing Diagnostics: No

MMU Program (MM)1-4-2

Channel Can Serve with Channel	
Channel 1	Channel 2
1	5
1	6
1	11
2	5
2	6
2	9
2	11
3	7
3	8
3	12
4	7
4	8
4	10
4	12
5	9
6	9
6	11

7	10
8	10
8	12
9	11
10	12

Color Check Enable (MM)1-4-3

Enable Color Check: Yes

Color Check Enable

MMU Channel	Green	Yellow	Red
1	Yes	Yes	No
2	Yes	Yes	Yes
4	Yes	Yes	Yes
6	Yes	Yes	Yes
8	Yes	Yes	Yes
9	Yes	No	Yes
10	Yes	No	Yes
11	Yes	No	Yes
12	Yes	No	Yes

Trafalgar Rd @ Cornwall Rd (Master) - Cross Ave @ Argus Rd

**Controller Timing Plan (MM)2-1
Plan 1**

Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Min Green	8	22	5	10	5	22	5	10	5	5	5	5	5	5	5	5
BK Min Green	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CS Min Green	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Delay Green	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Walk	0	7	0	7	0	7	0	7	0	10	0	10	0	10	0	10
Walk 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Walk Max	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ped Clear	0	16	0	16	0	16	0	16	0	16	0	16	0	16	0	16
Ped Clear 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ped Clear Max	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ped CO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vehicle Ext	2.5	5.0	0.0	4.0	0.0	5.0	0.0	4.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Ext 2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Max 1	12	45	0	30	0	45	0	30	35	35	35	35	35	35	35	35
Max 2	0	0	0	0	0	0	0	0	40	40	40	40	40	40	40	40
Max 3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DYM Max	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DYM Stp	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Yellow	3.0	4.0	3.0	4.0	3.0	4.0	3.0	4.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Red Clear	1.0	2.0	1.0	2.0	1.0	2.0	1.0	2.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Red Max	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Red Revert	4.0	4.0	2.0	4.0	2.0	4.0	2.0	4.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
ACT B4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SEC/ACT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Max Int	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Time B4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cars Wt	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
STPT Duc	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Min Gap	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Trafalgar Rd @ Cornwall Rd (Master) - Cross Ave @ Argus Rd

Controller Start/Fash (MM) 2-5**Startup**

Phase	Phase Setting
2	Y
6	Y

Overlap

Flash > Mon: Yes
Flash Time: 0
All Red: 9
Power Start Sequence: 1

Automatic Flash

Entry Phase
2
6

Exit Phase
2
6

Overlap Exit
A
B
C
D

Flash > Mon: Yes
Exit Flash Interval: W
Minimum Auto Flash: 8
Minimum Recall: No
Cycle Through Phase: No

Trafalgar Rd @ Cornwall Rd (Master) - Cross Ave @ Argus Rd

Controller Options**Controller Options (MM)2-6-1**

Phase	Flashing Green Phase	Guaranteed Passage	Non Act 1	Non Act 2	Dual Entry	Conditional Service	Conditional Reservice	Ped Reservice	Rest In Walk	Flashing Walk	Ped Clear Yellow	Ped Clear Red	IGRN + Veh Ext
2	No	No	Yes	No	Yes	No	No	Yes	No	No	No	No	No
4	No	No	No	Yes	Yes	No	No	No	No	No	No	No	No
6	No	No	Yes	No	Yes	No	No	Yes	No	No	No	No	No
8	No	No	No	Yes	Yes	No	No	No	No	No	No	No	No

Ped Clear Protect: Off

Red Revert: 2.0

Act Pre-Time (MM)2-7

Pre-Time Mode Enable: No

Free Input Enables Pre-Timed: Yes

Pre-Timed Phase

Phase Recall Options (MM)2-8

Plan	Phase	Lock Detector	Vehicle Recall	Ped Recall	Max Recall	Soft Recall	No Rest	AI Calc
1	2	No	Yes	No	No	No	No	No
1	4	No	Yes	No	No	No	No	No
1	6	No	Yes	No	No	No	No	No
1	8	No	Yes	No	No	No	No	No
2	1	Yes	No	No	No	No	No	No
2	2	Yes	No	No	No	No	No	No
2	3	Yes	No	No	No	No	No	No
2	4	Yes	No	No	No	No	No	No
2	5	Yes	No	No	No	No	No	No
2	6	Yes	No	No	No	No	No	No
2	7	Yes	No	No	No	No	No	No
2	8	Yes	No	No	No	No	No	No
2	9	Yes	No	No	No	No	No	No
2	10	Yes	No	No	No	No	No	No
2	11	Yes	No	No	No	No	No	No
2	12	Yes	No	No	No	No	No	No
2	13	Yes	No	No	No	No	No	No
2	14	Yes	No	No	No	No	No	No
2	15	Yes	No	No	No	No	No	No
2	16	Yes	No	No	No	No	No	No
3	1	Yes	No	No	No	No	No	No
3	2	Yes	No	No	No	No	No	No
3	3	Yes	No	No	No	No	No	No
3	4	Yes	No	No	No	No	No	No
3	5	Yes	No	No	No	No	No	No
3	6	Yes	No	No	No	No	No	No
3	7	Yes	No	No	No	No	No	No
3	8	Yes	No	No	No	No	No	No
3	9	Yes	No	No	No	No	No	No
3	10	Yes	No	No	No	No	No	No
3	11	Yes	No	No	No	No	No	No
3	12	Yes	No	No	No	No	No	No
3	13	Yes	No	No	No	No	No	No
3	14	Yes	No	No	No	No	No	No
3	15	Yes	No	No	No	No	No	No
3	16	Yes	No	No	No	No	No	No
4	1	Yes	No	No	No	No	No	No
4	2	Yes	No	No	No	No	No	No
4	3	Yes	No	No	No	No	No	No
4	4	Yes	No	No	No	No	No	No
4	5	Yes	No	No	No	No	No	No
4	6	Yes	No	No	No	No	No	No
4	7	Yes	No	No	No	No	No	No
4	8	Yes	No	No	No	No	No	No
4	9	Yes	No	No	No	No	No	No
4	10	Yes	No	No	No	No	No	No
4	11	Yes	No	No	No	No	No	No
4	12	Yes	No	No	No	No	No	No
4	13	Yes	No	No	No	No	No	No
4	14	Yes	No	No	No	No	No	No
4	15	Yes	No	No	No	No	No	No
4	16	Yes	No	No	No	No	No	No

Trafalgar Rd @ Cornwall Rd (Master) - Cross Ave @ Argus Rd

Coordination Options**Coordination Options (MM)3-1**

Manual Pattern: Auto
 ECPI Coord: Yes
 System Source: TBC
 System Format: STD
 Splits In: Seconds
 Offsets In: Seconds
 Transition: Smooth
 Max Select: MAXINH
 Dwell/Add Time: 0
 Dly Coord Wz-Lz: No
 Force Off: Float
 Offset Reference: Lead
 Use Ped Time: Yes
 Ped Recall: No
 Ped Resv: No
 Local Zero Ovrd: No
 Fo Add Ini Green: No
 Re-sync Count: 0
 Multisync: No

Split Demand (MM)3-5**Demand 1 Demand 2**

Phase	Phase
-------	-------

Demand	Detector	Call Time	Cycle Count
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Auto Perm Minimum Green (Seconds) (MM)3-4

Phase	Min Green
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Trafalgar Rd @ Cornwall Rd (Master) - Cross Ave @ Argus Rd

Coordination Pattern Data

Pattern Data (MM)3-2

Pattern	Split Pattern	TS2	Cycle	Std(COS)	Offset Value	Splits In	Offsets In	Actuated Coord
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Pattern	Timing Plan	Actuated Walk Rest	Sequence	Phase Reservice	Action Plan	XArt Pattern	Vehicle Perm 1	Vehicle Perm 2	Vehicle Perm 3
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Pattern	Ring Split Ext 1	Ring Split Ext 2	Ring Split Ext 3	Ring Split Ext 4	Split Demand Pattern 1	Split Demand Pattern 2	Ring Displ 2	Ring Displ 3	Ring Displ 4
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Split Preference Phases

Pattern	Phase	Preference 1	Preference 2
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Special Functions

Pattern	Function	Output
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Split Pattern Data (MM)3-3

Coord Phases

Split Pattern	Phase	Split
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Split/Modes

Split Pattern	Mode	Phase															
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

Trafalgar Rd @ Cornwall Rd (Master) - Cross Ave @ Argus Rd

Preemptor Preempt Plan (MM)4-1

Preempt Phases

Preempt	Phase	Track Clear Veh	Dwell Veh	Dwell Ped	Cycling Veh	Cycling Ped	Exit Phase	Exit Calls	Special Function
3	2	No	Yes	No	No	No	Yes	No	No
3	6	No	Yes	No	No	No	Yes	No	No
5	2	No	Yes	No	No	No	Yes	No	No
5	6	No	Yes	No	No	No	Yes	No	No
6	2	No	Yes	No	No	No	Yes	No	No
6	6	No	Yes	No	No	No	Yes	No	No

Preempt Overlaps

Preempt	Overlap	Track Clear	Enable Trailing	Dwell Overlap	Cycling Overlap
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Preempt	Enable	Preempt Override	Interlock Enable	Detector Lock	Delay	Inhibit	Override Flash	Duration	CLR > GRN
1	No	Yes	No	Yes	0	0	Yes	0	No
2	No	Yes	No	Yes	0	0	Yes	0	No
3	Standard	Yes	No	Yes	0	0	Yes	10	No
4	No	Yes	No	Yes	0	0	Yes	0	No
5	No	Yes	No	Yes	0	0	Yes	10	No
6	No	Yes	No	Yes	0	0	Yes	10	No
7	No	Yes	No	Yes	0	0	Yes	0	No
8	No	Yes	No	Yes	0	0	Yes	0	No
9	No	Yes	No	Yes	0	0	Yes	0	No
10	No	Yes	No	Yes	0	0	Yes	0	No

Preempt	Term Overlap Asap	PC Through Yellow	Terminate Phase	Ped Dark	Track Clearance Re-service	Dwell Flash	Linked Pmt	Flash Exit Color	Preempt To Coord	Fault Type
1	No	No	No	No	No	Off	0	Red	No	Hard
2	No	No	No	No	No	Off	0	Green	No	Hard
3	No	Yes	No	No	No	Off	0	Green	No	Hard
4	No	No	No	No	No	Off	0	Green	No	Hard
5	No	Yes	No	No	No	Off	0	Green	No	Hard
6	No	Yes	No	No	No	Off	0	Green	No	Hard
7	No	No	No	No	No	Off	0	Green	No	Hard
8	No	No	No	No	No	Off	0	Green	No	Hard
9	No	No	No	No	No	Off	0	Green	No	Hard
10	No	No	No	No	No	Off	0	Green	No	Hard

Preempt	Exit Timing Plan	Reservice	Free During Pmt Ring 1	Free During Pmt Ring 2	Free During Pmt Ring 3	Free During Pmt Ring 4
1	0	0	No	No	No	No
2	0	0	No	No	No	No
3	0	0	No	No	No	No
4	0	0	No	No	No	No
5	0	0	No	No	No	No
6	0	0	No	No	No	No
7	0	0	No	No	No	No
8	0	0	No	No	No	No
9	0	0	No	No	No	No
10	0	0	No	No	No	No

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Preempt	Entrance Walk	Entrance Ped Clear	Entrance Min Green	Entrance Yellow	Entrance Red	Track Clear Min Green	Gate Down Ext Green	Gate Down Max Green	Track Clear Yellow	Track Clear Red
1	0	255	5	4.0	1.0	0	0	0	4.0	1.0
2	0	255	5	4.0	1.0	0	0	0	4.0	1.0
3	0	7	3	4.0	2.0	0	0	0	4.0	1.0
4	0	255	5	4.0	1.0	0	0	0	4.0	1.0
5	0	7	3	4.0	1.0	0	0	0	4.0	1.0
6	0	7	3	4.0	1.0	0	0	0	4.0	1.0
7	0	255	5	4.0	1.0	0	0	0	4.0	1.0
8	0	255	5	4.0	1.0	0	0	0	4.0	1.0
9	0	255	5	4.0	1.0	0	0	0	4.0	1.0
10	0	255	5	4.0	1.0	0	0	0	4.0	1.0

Preempt	Min Dwell Time	Extend Preempt Input Time	Max Preempt Call Time	Exit Yellow Time	Exit Red Time	Preempt Active Out	Preempt Active Dwell	Other Priority Preempt	Non-Priority Preempt
1	0	0.0	0	4.0	1.0	On	No	Off	Off
2	0	0.0	0	4.0	1.0	On	No	Off	Off
3	0	0.0	0	4.0	1.0	On	No	Off	Off
4	0	0.0	0	4.0	1.0	On	No	Off	Off
5	0	0.0	0	4.0	1.0	On	No	Off	Off
6	0	0.0	0	4.0	1.0	On	No	Off	Off
7	0	0.0	0	4.0	1.0	On	No	Off	Off
8	0	0.0	0	4.0	1.0	On	No	Off	Off
9	0	0.0	0	4.0	1.0	On	No	Off	Off
10	0	0.0	0	4.0	1.0	On	No	Off	Off

Trafalgar Rd @ Cornwall Rd (Master) - Cross Ave @ Argus Rd

Preemptor Preempt Filtering
Enable Preempt Filtering and TSP/SCP
(MM)4-2

Input	Solid	Pulsing
3	Preemption -3	Preemption -7
4	Preemption -4	Preemption -8
5	Preemption -5	Preemption -9
6	Preemption -6	Preemption -10

Trafalgar Rd @ Cornwall Rd (Master) - Cross Ave @ Argus Rd

Time Base Clock/Calendar
Clock/Calendar Options (MM)5-1

Enable Action Plan: 0
Sync Reference Time: 3:15 AM
Sync Reference: Reference Time
Day Light Savings: USDLS
Time Reset Input Set Time: 3:30:00
Standard Time From GMT: -5

Trafalgar Rd @ Cornwall Rd (Master) - Cross Ave @ Argus Rd

Time Base Action Plan**Action Plan (MM)5-2**

Plan	Pattern	Veh Det Plan	Flash	Red Rest	Controller Seq	Timing Plan	System Override	Detector Log	Veh Det Diag Plan	Ped Det Diag Plan	Dimming Enable
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Action Plan Phases

Plan	Phase	Ped Rcl	Walk 2	Vex 2	Veh Rcl	Max Rcl	Max 2	Max 3	CS Inhibit	Omit
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Action Plan Special Functions

Plan	Function
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Action Plan Auxiliary Functions

Plan	Function
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Logic Statement Control

Plan	LP	Statement Control
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Trafalgar Rd @ Cornwall Rd (Master) - Cross Ave @ Argus Rd

Time Base Day Plan/Schedule

Day Plan (MM)5-3

Plan	Event	Action Plan	Start Time
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Schedule (MM)5-4

Schedule Number	Day Plan Number	Months	Days of Week	Days of Month
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Trafalgar Rd @ Cornwall Rd (Master) - Cross Ave @ Argus Rd

Detectors

Detectors Page 1

Vehicle Detectors Setup (MM)6-1

Vehicle Plan	Detector Number	Called
1	8	4

Vehicle Detector Setup (MM)6-2 continued

Detector Number	ECPI	TS2 Detector	Detector Description
1	6	Yes	
2	6	Yes	
3	6	Yes	
4	6	Yes	
5	6	Yes	
6	6	Yes	
7	6	Yes	
8	6	Yes	
9	6	Yes	
10	6	Yes	
11	6	Yes	
12	6	Yes	
13	6	Yes	
14	6	Yes	
15	6	Yes	
16	6	Yes	
18	6	Yes	
19	6	Yes	
21	6	Yes	
22	6	Yes	
23	6	Yes	
25	6	Yes	
26	6	Yes	
27	6	Yes	
28	6	Yes	
29	6	Yes	
30	6	Yes	
31	6	Yes	
32	6	Yes	
33	6	Yes	
34	6	Yes	
35	6	Yes	
36	6	Yes	
37	6	Yes	
38	6	Yes	
39	6	Yes	
40	6	Yes	
41	6	Yes	
42	6	Yes	
43	6	Yes	
44	6	Yes	
45	6	Yes	
46	6	Yes	
47	6	Yes	
48	6	Yes	
49	6	Yes	
50	6	Yes	
51	6	Yes	
52	6	Yes	
53	6	Yes	
54	6	Yes	
55	6	Yes	
56	6	Yes	
57	6	Yes	
58	6	Yes	
59	6	Yes	
60	6	Yes	
61	6	Yes	
62	6	Yes	
63	6	Yes	

64	6	Yes	
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Vehicle Detector Setup (MM)6-2 continued

Detector Number	Vehicle Plan	Assigned Phase	Switch Phase	Extend Time	Delay Time	Queue Limit	Yellow Lock	Added Option	Call Option	Passage Option	Queue Option	NTCIP Occupancy	NTCIP Volume
2	1	2	0	0.0	0.0	0	No	No	Yes	Yes	No	No	No
4	1	4	0	0.0	4.0	0	No	No	Yes	Yes	No	No	No
5	1	5	0	0.0	0.0	0	No	No	Yes	Yes	No	No	No
6	1	6	0	0.0	0.0	0	No	No	Yes	Yes	No	No	No
7	1	4	0	0.0	0.0	0	No	No	Yes	Yes	No	No	No
9	1	9	0	0.0	0.0	0	No	No	Yes	Yes	No	No	No
10	1	10	0	0.0	0.0	0	No	No	Yes	Yes	No	No	No
11	1	11	0	0.0	0.0	0	No	No	Yes	Yes	No	No	No
12	1	12	0	0.0	0.0	0	No	No	Yes	Yes	No	No	No
13	1	13	0	0.0	0.0	0	No	No	Yes	Yes	No	No	No
14	1	14	0	0.0	0.0	0	No	No	Yes	Yes	No	No	No
15	1	15	0	0.0	0.0	0	No	No	Yes	Yes	No	No	No
16	1	16	0	0.0	0.0	0	No	No	Yes	Yes	No	No	No
17	1	1	6	0.0	0.0	0	No	No	Yes	Yes	No	No	No
24	1	8	0	0.0	0.0	0	No	No	Yes	Yes	No	No	No

Ped Detector Options (MM)6-3**Phase Ped Detector (NTCIP)**

Local Ped Detector	Number
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	9
10	10
11	11
12	12
13	13
14	14
15	15
16	16

Local System Detector

Local System Detector	Number
-----------------------	--------

Trafalgar Rd @ Cornwall Rd (Master) - Cross Ave @ Argus Rd

Detectors

Detectors Page 2

Log - Speed Detector Setup (MM)6-5

NTCIP Log Period: 0 ECPI Log Period: TBAP Length Unit: Inch

Speed Detector	Local Detector	One/Two Detector	Vehicle Length	Trap Length	Enable Log
1	0	1	0	0	No
2	0	1	0	0	No
3	0	1	0	0	No
4	0	1	0	0	No
5	0	1	0	0	No
6	0	1	0	0	No
7	0	1	0	0	No
8	0	1	0	0	No
9	0	1	0	0	No
10	0	1	0	0	No
11	0	1	0	0	No
12	0	1	0	0	No
13	0	1	0	0	No
14	0	1	0	0	No
15	0	1	0	0	No
16	0	1	0	0	No

Vehicle Detector Diagnostics (MM)6-6

Plan	Detector	Counts	Act	Pres	Multiplier	Failed Time	Failed Call Delay
1	1	0	0	0	1	255	0
1	2	0	0	0	1	255	0
1	3	0	0	0	1	255	0
1	4	0	0	0	1	255	0
1	5	0	0	0	1	255	0
1	6	0	0	0	1	255	0
1	7	0	0	0	1	255	0
1	8	0	0	0	1	255	0
1	9	0	0	0	1	255	0
1	10	0	0	0	1	255	0
1	11	0	0	0	1	255	0
1	12	0	0	0	1	255	0
1	13	0	0	0	1	255	0
1	14	0	0	0	1	255	0
1	15	0	0	0	1	255	0
1	16	0	0	0	1	255	0
1	17	0	0	0	1	255	0
1	18	0	0	0	1	255	0
1	19	0	0	0	1	255	0
1	20	0	0	0	1	255	0
1	21	0	0	0	1	255	0
1	22	0	0	0	1	255	0
1	23	0	0	0	1	255	0
1	24	0	0	0	1	255	0
1	25	0	0	0	1	255	0
1	26	0	0	0	1	255	0
1	27	0	0	0	1	255	0
1	28	0	0	0	1	255	0
1	29	0	0	0	1	255	0

1	30	0	0	0	1	255	0
1	31	0	0	0	1	255	0
1	32	0	0	0	1	255	0
1	33	0	0	0	1	255	0
1	34	0	0	0	1	255	0
1	35	0	0	0	1	255	0
1	36	0	0	0	1	255	0
1	37	0	0	0	1	255	0
1	38	0	0	0	1	255	0
1	39	0	0	0	1	255	0
1	40	0	0	0	1	255	0
1	41	0	0	0	1	255	0
1	42	0	0	0	1	255	0
1	43	0	0	0	1	255	0
1	44	0	0	0	1	255	0
1	45	0	0	0	1	255	0
1	46	0	0	0	1	255	0
1	47	0	0	0	1	255	0
1	48	0	0	0	1	255	0
1	49	0	0	0	1	255	0
1	50	0	0	0	1	255	0
1	51	0	0	0	1	255	0
1	52	0	0	0	1	255	0
1	53	0	0	0	1	255	0
1	54	0	0	0	1	255	0
1	55	0	0	0	1	255	0
1	56	0	0	0	1	255	0
1	57	0	0	0	1	255	0
1	58	0	0	0	1	255	0
1	59	0	0	0	1	255	0
1	60	0	0	0	1	255	0
1	61	0	0	0	1	255	0
1	62	0	0	0	1	255	0
1	63	0	0	0	1	255	0
1	64	0	0	0	1	255	0

Pedestrian Detector Diagnostics (MM)6-7

Plan	Detector	Counts	Act	Pres	Multiplier
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Trafalgar Rd @ Cornwall Rd (Master) - Cross Ave @ Lyons Lane

Configuration Phase Sequence Page 1

Phase Ring (MM)1-1-1

Phase															
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	1	1	1	2	2	2	2	1	1	2	2	1	1	2	2

Hardware Alternate Sequence Enable: No

Phase Ring Sequence

Sequence	Ring	Phase															
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
	Barrier Mode	B		B		B		B		B							
1	1	1	2	3	4	9	10	13	14	0	0	0	0	0	0	0	0
1	2	5	6	7	8	11	12	15	16	0	0	0	0	0	0	0	0
2	1	2	1	3	4	10	9	13	14	0	0	0	0	0	0	0	0
2	2	5	6	7	8	11	12	15	16	0	0	0	0	0	0	0	0
3	1	1	2	4	3	9	10	14	13	0	0	0	0	0	0	0	0
3	2	5	6	7	8	11	12	15	16	0	0	0	0	0	0	0	0
4	1	2	1	4	3	10	9	14	13	0	0	0	0	0	0	0	0
4	2	5	6	7	8	11	12	15	16	0	0	0	0	0	0	0	0
5	1	1	2	3	4	9	10	13	14	0	0	0	0	0	0	0	0
5	2	6	5	7	8	12	11	15	16	0	0	0	0	0	0	0	0
6	1	2	1	3	4	10	9	13	14	0	0	0	0	0	0	0	0
6	2	6	5	7	8	12	11	15	16	0	0	0	0	0	0	0	0
7	1	1	2	4	3	9	10	14	13	0	0	0	0	0	0	0	0
7	2	6	5	7	8	12	11	15	16	0	0	0	0	0	0	0	0
8	1	2	1	4	3	10	9	14	13	0	0	0	0	0	0	0	0
8	2	6	5	7	8	12	11	15	16	0	0	0	0	0	0	0	0
9	1	1	2	3	4	9	10	13	14	0	0	0	0	0	0	0	0
9	2	5	6	8	7	11	12	16	15	0	0	0	0	0	0	0	0
10	1	2	1	3	4	10	9	13	14	0	0	0	0	0	0	0	0
10	2	5	6	8	7	11	12	16	15	0	0	0	0	0	0	0	0
11	1	1	2	4	3	9	10	14	13	0	0	0	0	0	0	0	0
11	2	5	6	8	7	11	12	16	15	0	0	0	0	0	0	0	0
12	1	2	1	4	3	10	9	14	13	0	0	0	0	0	0	0	0
12	2	5	6	8	7	11	12	16	15	0	0	0	0	0	0	0	0
13	1	1	2	3	4	9	10	13	14	0	0	0	0	0	0	0	0
13	2	6	5	8	7	12	11	16	15	0	0	0	0	0	0	0	0
14	1	2	1	3	4	10	9	13	14	0	0	0	0	0	0	0	0
14	2	6	5	8	7	12	11	16	15	0	0	0	0	0	0	0	0
15	1	1	2	4	3	9	10	14	13	0	0	0	0	0	0	0	0
15	2	6	5	8	7	12	11	16	15	0	0	0	0	0	0	0	0
16	1	2	1	4	3	10	9	14	13	0	0	0	0	0	0	0	0
16	2	6	5	8	7	12	11	16	15	0	0	0	0	0	0	0	0

**Phase
Compatibility
(MM)1-1-2**

Phase 1	Phase 2
1	5
1	6
2	5
2	6
3	7
3	8
4	7
4	8
9	11
9	12
10	11
10	12
13	15
13	16
14	15
14	16

**Phase Direction
Descriptions**

Phase	Description
1	WBLT
2	EB
4	SB
6	WB
8	NB

**Overlap Direction
Descriptions**

Overlap	Description
---------	-------------

Administration (MM)1-7-1

Enable CRC Check: No

CRC: 0000

Request Download Program Data: No

Enable Automatic Backup to Datakey: Yes

Trafalgar Rd @ Cornwall Rd (Master) - Cross Ave @ Lyons Lane

Configuration Phase Sequence Page 2

In Use(MM)1-2		Exclusive Ped(MM)1-2		Backup Prevent(MM)1-1-3			Simultaneous Gap(MM)1-1-4		Disable(MM)1-1-4
Phases In Use	Phase	Phase	Timing Phase	Backup	Phase	Must Gap with Phase	Phase		
1		1	2	Yes					
2		5	6	Yes					
4									
6									
8									

Load Switch Assignments (MMU Channel) (MM)1-3

Phase	Overlap	Type	Dim				Auto		Flash Together
			R	Y	G	D	R	Y	
1	1	V				+	Yes		
2	2	V				+	Yes		Yes
3	3	V				+	Yes		
4	4	V				+	Yes		Yes
5	5	V				-	Yes		
6	6	V				-	Yes		Yes
7	7	V				-	Yes		
8	8	V				-	Yes		Yes
9	2	P				+			
10	4	P				+			
11	6	P				-			
12	8	P				-			
13	1	O				+	Yes		
14	2	O				-	Yes		Yes
15	3	O				+	Yes		
16	4	O				-	Yes		Yes

Trafalgar Rd @ Cornwall Rd (Master) - Cross Ave @ Lyons Lane

Configuration Port 1 (SDLC)**SDLC Options (MM)1-4-1****Bus Interface Terminal/Facilities**

BIU	Term and Facility Enable	Detector Rack Enable
1	Yes	Yes
2	Yes	No
3	No	No
4	No	No
5	No	No
6	No	No
7	No	No
8	No	No

Enable TS2/MMU Type Cabinet: No
 Enable MMU Extended Status: Yes
 Enable SDLC Stop Time: No
 Enable 3 Critical RFE's Lockup: Yes
 MMU To CU SDLC External Start: Enabled
 Diagnostics (Test Fixture) Enable: No

Secondary To Secondary Addressing

ID	Term and Facility Enable	Detector Rack Enable
1	No	No
2	No	No
3	No	No
4	No	No
5	No	No
6	No	No
7	No	No
8	No	No

Secondary To Secondary Addressing MMU: No
 Secondary To Secondary Addressing Diagnostics: No

MMU Program (MM)1-4-2

Channel Can Serve with Channel	
Channel 1	Channel 2
1	5
1	6
1	11
2	5
2	6
2	9
2	11
3	7
3	8
3	12
4	7
4	8
4	10
4	12
5	9
6	9
6	11

7	10
8	10
8	12
9	11
10	12

Color Check Enable (MM)1-4-3

Enable Color Check: Yes

Color Check Enable

MMU Channel	Green	Yellow	Red
1	Yes	Yes	No
2	Yes	Yes	Yes
4	Yes	Yes	Yes
6	Yes	Yes	Yes
8	Yes	Yes	Yes

Trafalgar Rd @ Cornwall Rd (Master) - Cross Ave @ Lyons Lane

**Controller Timing Plan (MM)2-1
Plan 1**

Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Min Green	8	35	5	10	5	35	5	10	5	5	5	5	5	5	5	5
BK Min Green	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CS Min Green	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Delay Green	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Walk	0	7	0	7	0	7	0	7	0	10	0	10	0	10	0	10
Walk 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Walk Max	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ped Clear	0	15	0	15	0	15	0	15	0	16	0	16	0	16	0	16
Ped Clear 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ped Clear Max	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ped CO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vehicle Ext	2.5	5.0	0.0	4.0	0.0	5.0	0.0	4.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Ext 2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Max 1	10	45	0	35	0	45	0	35	35	35	35	35	35	35	35	35
Max 2	0	0	0	0	0	0	0	0	40	40	40	40	40	40	40	40
Max 3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DYM Max	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DYM Stp	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Yellow	3.0	4.0	3.0	4.0	3.0	4.0	3.0	4.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Red Clear	1.0	2.0	1.0	2.0	1.0	2.0	1.0	2.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Red Max	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Red Revert	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
ACT B4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SEC/ACT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Max Int	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Time B4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cars Wt	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
STPT Duc	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Min Gap	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Trafalgar Rd @ Cornwall Rd (Master) - Cross Ave @ Lyons Lane

Controller Start/Fash (MM) 2-5**Startup**

Phase	Phase Setting
2	Y
6	Y

Overlap
A
B
C
D

Flash > Mon: No
Flash Time: 0
All Red: 0
Power Start Sequence: 1

Automatic Flash

Entry Phase
2
6

Exit Phase
2
6

Overlap Exit
A
B
C
D

Flash > Mon: No
Exit Flash Interval: W
Minimum Auto Flash: 8
Minimum Recall: No
Cycle Through Phase: No

Trafalgar Rd @ Cornwall Rd (Master) - Cross Ave @ Lyons Lane

Controller Options**Controller Options (MM)2-6-1**

Phase	Flashing Green Phase	Guaranteed Passage	Non Act 1	Non Act 2	Dual Entry	Conditional Service	Conditional Reservice	Ped Reservice	Rest In Walk	Flashing Walk	Ped Clear Yellow	Ped Clear Red	IGRN + Veh Ext
2	No	No	Yes	No	Yes	No	No	No	Yes	No	Yes	No	No
4	No	No	No	Yes	Yes	No	No	No	No	No	No	No	No
6	No	No	Yes	No	Yes	No	No	No	Yes	No	Yes	No	No
8	No	No	No	Yes	Yes	No	No	No	No	No	No	No	No

Ped Clear Protect: Off

Red Revert: 2.0

Act Pre-Time (MM)2-7

Pre-Time Mode Enable: No

Free Input Enables Pre-Timed: Yes

Pre-Timed Phase

Phase Recall Options (MM)2-8

Plan	Phase	Lock Detector	Vehicle Recall	Ped Recall	Max Recall	Soft Recall	No Rest	AI Calc
1	2	No	Yes	Yes	No	No	No	No
1	6	No	Yes	Yes	No	No	No	No
1	13	Yes	No	No	No	No	No	No
1	14	Yes	No	No	No	No	No	No
1	15	Yes	No	No	No	No	No	No
1	16	Yes	No	No	No	No	No	No
2	1	Yes	No	No	No	No	No	No
2	2	Yes	No	No	No	No	No	No
2	3	Yes	No	No	No	No	No	No
2	4	Yes	No	No	No	No	No	No
2	5	Yes	No	No	No	No	No	No
2	6	Yes	No	No	No	No	No	No
2	7	Yes	No	No	No	No	No	No
2	8	Yes	No	No	No	No	No	No
2	9	Yes	No	No	No	No	No	No
2	10	Yes	No	No	No	No	No	No
2	11	Yes	No	No	No	No	No	No
2	12	Yes	No	No	No	No	No	No
2	13	Yes	No	No	No	No	No	No
2	14	Yes	No	No	No	No	No	No
2	15	Yes	No	No	No	No	No	No
2	16	Yes	No	No	No	No	No	No
3	1	Yes	No	No	No	No	No	No
3	2	Yes	No	No	No	No	No	No
3	3	Yes	No	No	No	No	No	No
3	4	Yes	No	No	No	No	No	No
3	5	Yes	No	No	No	No	No	No
3	6	Yes	No	No	No	No	No	No
3	7	Yes	No	No	No	No	No	No
3	8	Yes	No	No	No	No	No	No
3	9	Yes	No	No	No	No	No	No
3	10	Yes	No	No	No	No	No	No
3	11	Yes	No	No	No	No	No	No
3	12	Yes	No	No	No	No	No	No
3	13	Yes	No	No	No	No	No	No
3	14	Yes	No	No	No	No	No	No
3	15	Yes	No	No	No	No	No	No
3	16	Yes	No	No	No	No	No	No
4	1	Yes	No	No	No	No	No	No
4	2	Yes	No	No	No	No	No	No
4	3	Yes	No	No	No	No	No	No
4	4	Yes	No	No	No	No	No	No
4	5	Yes	No	No	No	No	No	No
4	6	Yes	No	No	No	No	No	No
4	7	Yes	No	No	No	No	No	No
4	8	Yes	No	No	No	No	No	No
4	9	Yes	No	No	No	No	No	No
4	10	Yes	No	No	No	No	No	No
4	11	Yes	No	No	No	No	No	No
4	12	Yes	No	No	No	No	No	No
4	13	Yes	No	No	No	No	No	No
4	14	Yes	No	No	No	No	No	No
4	15	Yes	No	No	No	No	No	No
4	16	Yes	No	No	No	No	No	No

Trafalgar Rd @ Cornwall Rd (Master) - Cross Ave @ Lyons Lane

Coordination Options**Coordination Options (MM)3-1**

Manual Pattern: Auto
 ECPI Coord: Yes
 System Source: TBC
 System Format: STD
 Splits In: Seconds
 Offsets In: Seconds
 Transition: Smooth
 Max Select: MAXINH
 Dwell/Add Time: 0
 Dly Coord Wz-Lz: No
 Force Off: Float
 Offset Reference: Lead
 Use Ped Time: Yes
 Ped Recall: No
 Ped Resv: No
 Local Zero Ovrd: No
 Fo Add Ini Green: No
 Re-sync Count: 0
 Multisync: No

Split Demand (MM)3-5**Demand 1 Demand 2**

Phase	Phase
-------	-------

Demand	Detector	Call Time	Cycle Count
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Auto Perm Minimum Green (Seconds) (MM)3-4

Phase	Min Green
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Trafalgar Rd @ Cornwall Rd (Master) - Cross Ave @ Lyons Lane

Coordination Pattern Data

Pattern Data (MM)3-2

Pattern	Split Pattern	TS2	Cycle	Std(COS)	Offset Value	Splits In	Offsets In	Actuated Coord
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Pattern	Timing Plan	Actuated Walk Rest	Sequence	Phase Reservice	Action Plan	XArt Pattern	Vehicle Perm 1	Vehicle Perm 2	Vehicle Perm 3
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Pattern	Ring Split Ext 1	Ring Split Ext 2	Ring Split Ext 3	Ring Split Ext 4	Split Demand Pattern 1	Split Demand Pattern 2	Ring Displ 2	Ring Displ 3	Ring Displ 4
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Split Preference Phases

Pattern	Phase	Preference 1	Preference 2
---------	-------	--------------	--------------

Special Functions

Pattern	Function	Output
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Split Pattern Data (MM)3-3

Coord Phases

Split Pattern	Phase	Split
---------------	-------	-------

Split/Modes

Split Pattern	Mode	Phase															
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

Trafalgar Rd @ Cornwall Rd (Master) - Cross Ave @ Lyons Lane

Preemptor Preempt Plan (MM)4-1

Preempt Phases

Preempt	Phase	Track Clear Veh	Dwell Veh	Dwell Ped	Cycling Veh	Cycling Ped	Exit Phase	Exit Calls	Special Function
3	2	No	Yes	No	No	No	No	No	No
3	6	No	Yes	No	No	No	No	No	No

Preempt Overlaps

Preempt	Overlap	Track Clear	Enable Trailing	Dwell Overlap	Cycling Overlap
---------	---------	-------------	-----------------	---------------	-----------------

Preempt	Enable	Preempt Override	Interlock Enable	Detector Lock	Delay	Inhibit	Override Flash	Duration	CLR > GRN
1	No	Yes	No	Yes	0	0	Yes	0	No
2	No	Yes	No	Yes	0	0	Yes	0	No
3	Standard	Yes	No	Yes	0	0	Yes	10	No
4	No	Yes	No	Yes	0	0	Yes	0	No
5	No	Yes	No	Yes	0	0	Yes	0	No
6	No	Yes	No	Yes	0	0	Yes	0	No
7	No	Yes	No	Yes	0	0	Yes	0	No
8	No	Yes	No	Yes	0	0	Yes	0	No
9	No	Yes	No	Yes	0	0	Yes	0	No
10	No	Yes	No	Yes	0	0	Yes	0	No

Preempt	Term Overlap Asap	PC Through Yellow	Terminate Phase	Ped Dark	Track Clearance Re-service	Dwell Flash	Linked Pmt	Flash Exit Color	Preempt To Coord	Fault Type
1	No	No	No	No	No	Off	0	Red	No	Hard
2	No	No	No	No	No	Off	0	Green	No	Hard
3	No	Yes	No	No	No	Off	0	Green	No	Hard
4	No	No	No	No	No	Off	0	Green	No	Hard
5	No	No	No	No	No	Off	0	Green	No	Hard
6	No	No	No	No	No	Off	0	Green	No	Hard
7	No	No	No	No	No	Off	0	Green	No	Hard
8	No	No	No	No	No	Off	0	Green	No	Hard
9	No	No	No	No	No	Off	0	Green	No	Hard
10	No	No	No	No	No	Off	0	Green	No	Hard

Preempt	Exit Timing Plan	Reservice	Free During Pmt Ring 1	Free During Pmt Ring 2	Free During Pmt Ring 3	Free During Pmt Ring 4
1	0	0	No	No	No	No
2	0	0	No	No	No	No
3	0	0	No	No	No	No
4	0	0	No	No	No	No
5	0	0	No	No	No	No
6	0	0	No	No	No	No
7	0	0	No	No	No	No
8	0	0	No	No	No	No
9	0	0	No	No	No	No
10	0	0	No	No	No	No

Preempt	Entrance Walk	Entrance Ped Clear	Entrance Min Green	Entrance Yellow	Entrance Red	Track Clear Min Green	Gate Down Ext Green	Gate Down Max Green	Track Clear Yellow	Track Clear Red
1	0	255	5	4.0	1.0	0	0	0	4.0	1.0

2	0	255	5	4.0	1.0	0	0	0	4.0	1.0
3	0	7	4	3.0	2.0	0	0	0	4.0	1.0
4	0	255	5	4.0	1.0	0	0	0	4.0	1.0
5	0	255	5	4.0	1.0	0	0	0	4.0	1.0
6	0	255	5	4.0	1.0	0	0	0	4.0	1.0
7	0	255	5	4.0	1.0	0	0	0	4.0	1.0
8	0	255	5	4.0	1.0	0	0	0	4.0	1.0
9	0	255	5	4.0	1.0	0	0	0	4.0	1.0
10	0	255	5	4.0	1.0	0	0	0	4.0	1.0

Preempt	Min Dwell Time	Extend Preempt Input Time	Max Preempt Call Time	Exit Yellow Time	Exit Red Time	Preempt Active Out	Preempt Active Dwell	Other Priority Preempt	Non-Priority Preempt
1	0	0.0	0	4.0	1.0	On	No	Off	Off
2	0	0.0	0	4.0	1.0	On	No	Off	Off
3	0	0.0	0	4.0	1.0	On	No	Off	Off
4	0	0.0	0	4.0	1.0	On	No	Off	Off
5	0	0.0	0	4.0	1.0	On	No	Off	Off
6	0	0.0	0	4.0	1.0	On	No	Off	Off
7	0	0.0	0	4.0	1.0	On	No	Off	Off
8	0	0.0	0	4.0	1.0	On	No	Off	Off
9	0	0.0	0	4.0	1.0	On	No	Off	Off
10	0	0.0	0	4.0	1.0	On	No	Off	Off

Trafalgar Rd @ Cornwall Rd (Master) - Cross Ave @ Lyons Lane

Preemptor Preempt Filtering
Enable Preempt Filtering and TSP/SCP
(MM)4-2

Input	Solid	Pulsing
3	Preemption -3	Preemption -7
4	Preemption -4	Preemption -8
5	Preemption -5	Preemption -9
6	Preemption -6	Preemption -10

Trafalgar Rd @ Cornwall Rd (Master) - Cross Ave @ Lyons Lane

Time Base Clock/Calendar
Clock/Calendar Options (MM)5-1

Enable Action Plan: 0
Sync Reference Time: 3:15 AM
Sync Reference: Reference Time
Day Light Savings: USDLS
Time Reset Input Set Time: 3:30:00
Standard Time From GMT: -5

Trafalgar Rd @ Cornwall Rd (Master) - Cross Ave @ Lyons Lane

Time Base Action Plan**Action Plan (MM)5-2**

Plan	Pattern	Veh Det Plan	Flash	Red Rest	Controller Seq	Timing Plan	System Override	Detector Log	Veh Det Diag Plan	Ped Det Diag Plan	Dimming Enable
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Action Plan Phases

Plan	Phase	Ped Rcl	Walk 2	Vex 2	Veh Rcl	Max Rcl	Max 2	Max 3	CS Inhibit	Omit
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Action Plan Special Functions

Plan	Function
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Action Plan Auxiliary Functions

Plan	Function
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Logic Statement Control

Plan	LP	Statement Control
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Trafalgar Rd @ Cornwall Rd (Master) - Cross Ave @ Lyons Lane

Time Base Day Plan/Schedule

Day Plan (MM)5-3

Plan	Event	Action Plan	Start Time
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Schedule (MM)5-4

Schedule Number	Day Plan Number	Months	Days of Week	Days of Month
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Trafalgar Rd @ Cornwall Rd (Master) - Cross Ave @ Lyons Lane

Detectors

Detectors Page 1

Vehicle Detectors Setup (MM)6-1

Vehicle Plan	Detector Number	Called
1	3	4
1	4	8
1	7	8
1	8	4
1	12	8

Vehicle Detector Setup (MM)6-2 continued

Detector Number	ECPI	TS2 Detector	Detector Description
1	6	Yes	
2	6	Yes	
3	6	Yes	
4	6	Yes	
5	6	Yes	
6	6	Yes	
7	6	Yes	
8	6	Yes	
9	6	Yes	
10	6	Yes	
11	6	Yes	
12	6	Yes	
13	6	Yes	
14	6	Yes	
15	6	Yes	
16	6	Yes	
17	6	Yes	
18	6	Yes	
19	6	Yes	
20	6	Yes	
21	6	Yes	
22	6	Yes	
23	6	Yes	
24	6	Yes	
25	6	Yes	
26	6	Yes	
27	6	Yes	
28	6	Yes	
29	6	Yes	
30	6	Yes	
31	6	Yes	
32	6	Yes	
33	6	Yes	
34	6	Yes	
35	6	Yes	
36	6	Yes	
37	6	Yes	
38	6	Yes	
39	6	Yes	
40	6	Yes	
41	6	Yes	
42	6	Yes	
43	6	Yes	
44	6	Yes	
45	6	Yes	
46	6	Yes	
47	6	Yes	
48	6	Yes	
49	6	Yes	
50	6	Yes	
51	6	Yes	
52	6	Yes	
53	6	Yes	
54	6	Yes	
55	6	Yes	
56	6	Yes	
57	6	Yes	
58	6	Yes	
59	6	Yes	
60	6	Yes	

61	6	Yes	
62	6	Yes	
63	6	Yes	
64	6	Yes	

Vehicle Detector Setup (MM)6-2 continued

Detector Number	Vehicle Plan	Assigned Phase	Switch Phase	Extend Time	Delay Time	Queue Limit	Yellow Lock	Added Option	Call Option	Passage Option	Queue Option	NTCIP Occupancy	NTCIP Volume
1	1	1	0	0.0	0.0	0	No	No	Yes	Yes	No	No	No
2	1	2	0	0.0	0.0	0	No	No	Yes	Yes	No	No	No
3	1	8	0	0.0	0.0	0	No	No	Yes	Yes	No	No	No
4	1	4	0	0.0	0.0	0	No	No	Yes	Yes	No	No	No
7	1	4	0	0.0	0.0	0	No	No	Yes	Yes	No	No	No
8	1	8	0	0.0	0.0	0	No	No	Yes	Yes	No	No	No
11	1	2	0	0.0	0.0	0	No	No	Yes	Yes	No	No	No
12	1	4	0	0.0	0.0	0	No	No	Yes	Yes	No	No	No
13	1	13	0	0.0	0.0	0	No	No	Yes	Yes	No	No	No
14	1	14	0	0.0	0.0	0	No	No	Yes	Yes	No	No	No
15	1	15	0	0.0	0.0	0	No	No	Yes	Yes	No	No	No
16	1	16	0	0.0	0.0	0	No	No	Yes	Yes	No	No	No

Ped Detector Options (MM)6-3**Phase Ped Detector (NTCIP)**

Local Ped Detector	Number
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	9
10	10
11	11
12	12
13	13
14	14
15	15
16	16

Local System Detector

Local System Detector	Number
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Trafalgar Rd @ Cornwall Rd (Master) - Cross Ave @ Lyons Lane

Detectors

Detectors Page 2

Log - Speed Detector Setup (MM)6-5

NTCIP Log Period: 0 ECPI Log Period: TBAP Length Unit: Inch

Speed Detector	Local Detector	One/Two Detector	Vehicle Length	Trap Length	Enable Log
1	0	1	0	0	No
2	0	1	0	0	No
3	0	1	0	0	No
4	0	1	0	0	No
5	0	1	0	0	No
6	0	1	0	0	No
7	0	1	0	0	No
8	0	1	0	0	No
9	0	1	0	0	No
10	0	1	0	0	No
11	0	1	0	0	No
12	0	1	0	0	No
13	0	1	0	0	No
14	0	1	0	0	No
15	0	1	0	0	No
16	0	1	0	0	No

Vehicle Detector Diagnostics (MM)6-6

Plan	Detector	Counts	Act	Pres	Multiplier	Failed Time	Failed Call Delay
1	1	0	0	0	1	255	0
1	2	0	0	0	1	255	0
1	3	0	0	0	1	255	0
1	4	0	0	0	1	255	0
1	5	0	0	0	1	255	0
1	6	0	0	0	1	255	0
1	7	0	0	0	1	255	0
1	8	0	0	0	1	255	0
1	9	0	0	0	1	255	0
1	10	0	0	0	1	255	0
1	11	0	0	0	1	255	0
1	12	0	0	0	1	255	0
1	13	0	0	0	1	255	0
1	14	0	0	0	1	255	0
1	15	0	0	0	1	255	0
1	16	0	0	0	1	255	0
1	17	0	0	0	1	255	0
1	18	0	0	0	1	255	0
1	19	0	0	0	1	255	0
1	20	0	0	0	1	255	0
1	21	0	0	0	1	255	0
1	22	0	0	0	1	255	0
1	23	0	0	0	1	255	0
1	24	0	0	0	1	255	0
1	25	0	0	0	1	255	0
1	26	0	0	0	1	255	0
1	27	0	0	0	1	255	0
1	28	0	0	0	1	255	0
1	29	0	0	0	1	255	0

1	30	0	0	0	1	255	0
1	31	0	0	0	1	255	0
1	32	0	0	0	1	255	0
1	33	0	0	0	1	255	0
1	34	0	0	0	1	255	0
1	35	0	0	0	1	255	0
1	36	0	0	0	1	255	0
1	37	0	0	0	1	255	0
1	38	0	0	0	1	255	0
1	39	0	0	0	1	255	0
1	40	0	0	0	1	255	0
1	41	0	0	0	1	255	0
1	42	0	0	0	1	255	0
1	43	0	0	0	1	255	0
1	44	0	0	0	1	255	0
1	45	0	0	0	1	255	0
1	46	0	0	0	1	255	0
1	47	0	0	0	1	255	0
1	48	0	0	0	1	255	0
1	49	0	0	0	1	255	0
1	50	0	0	0	1	255	0
1	51	0	0	0	1	255	0
1	52	0	0	0	1	255	0
1	53	0	0	0	1	255	0
1	54	0	0	0	1	255	0
1	55	0	0	0	1	255	0
1	56	0	0	0	1	255	0
1	57	0	0	0	1	255	0
1	58	0	0	0	1	255	0
1	59	0	0	0	1	255	0
1	60	0	0	0	1	255	0
1	61	0	0	0	1	255	0
1	62	0	0	0	1	255	0
1	63	0	0	0	1	255	0
1	64	0	0	0	1	255	0

Pedestrian Detector Diagnostics (MM)6-7

Plan	Detector	Counts	Act	Pres	Multiplier
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Town of Oakville, ON



MOVING TRAFFIC FORWARD

MTO0307 - Dorval Dr @ QEW N Ramp - Econolite Type - ASC/3

Controller Timing Plan (MM) 2-1

Plan 1

Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Direction		NBSB		WB												
Min Green	5	20	5	10	5	5	5	5	5	5	5	5	5	5	5	5
Bk Min Green	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CS Min Green	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Delay Green	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Walk	0	7	0	5	0	5	0	5	0	10	0	10	0	10	0	10
Walk2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Walk Max	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ped Clear	0	11	0	7	0	7	0	7	0	16	0	16	0	16	0	16
Ped Clear 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ped Clear Max	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ped CO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vehicle Ext	5.0	5.0	5.0	4.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Ext 2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Max1	35	40	35	40	35	35	35	35	35	35	35	35	35	35	35	35
Max2	40	45	40	40	40	40	40	40	40	40	40	40	40	40	40	40
Max3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DYM Max	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dym Step	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Yellow	3.0	4.0	4.0	4.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Red Clear	1.0	2.0	1.0	2.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Red Max	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Red Revert	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Act B4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sec/Act	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Max Int	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Time B4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cars Wt	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
STPTDuc	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TTReduc	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Min Gap	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
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Town of Oakville, ON



MOVING TRAFFIC FORWARD

MTO0307 - Dorval Dr @ QEW N Ramp - Econolite Type - ASC/3

Coordination Pattern Data Coordinator Pattern Data (MM) 3-2

Coordinator Pattern # 1

Split Pattern	1	TS2 (Pat-Off)	0-1	Splits In	Percent
Cycle	120	Std (COS)	9	Offsets In	Percent
Offset Value	59%	Dwell/Add Time	0		
Actuated Coord	No	Timing Plan	0		
Actuated Walk Rest	Yes	Sequence	0		
Phase Reservice	No	Action Plan	0		
Max Select	None	Force Off	None		

Split Preference Phases

Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Description		NBSB		WB												
Splits (Split Pat 1)	0	62	0	38	0	0	0	0	0	0	0	0	0	0	0	0
Pref 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pref 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Ring	1	2	3	4
Ring Split Ext	0	0	0	0
Ring Displacement	-	0	0	0
Split Sum	100%	0%	0%	0%

Misc. Data			
Veh Perm 1	0	Veh Perm 2	0
Split Demand Pat 1	0	Split Demand Pat 2	0
		Veh Perm 2 Disp	0
		Crossing Arterial Pat	0

Split Pattern

Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Coord Phase		X														
Vehicle Recall																
Pedestrian Recall		X														
Recall to Max. Time																
Omit Phase									X	X	X	X	X	X	X	X
Special Function Outputs																

Coordinator Pattern # 2

Split Pattern	2	TS2 (Pat-Off)	0-2	Splits In	Percent
Cycle	120	Std (COS)	17	Offsets In	Percent
Offset Value	45%	Dwell/Add Time	0		
Actuated Coord	No	Timing Plan	0		
Actuated Walk Rest	Yes	Sequence	0		
Phase	No	Action Plan	0		
Reservice					
Max Select	None	Force Off	None		

Split Preference Phases

Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Description		NBSB		WB												
Splits (Split Pat 2)	0	62	0	38	0	0	0	0	0	0	0	0	0	0	0	0
Pref 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pref 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Ring	1	2	3	4
Ring Split Ext	0	0	0	0
Ring Displacement	-	0	0	0
Split Sum	100%	0%	0%	0%

Misc. Data
 Veh Perm 1 0 Veh Perm 2 0 Veh Perm 2 Disp 0
 Split Demand Pat 1 0 Split Demand Pat 2 0 Crossing Arterial Pat 0

Split Pattern

Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Coord Phase		X														
Vehicle Recall																
Pedestrian Recall		X														
Recall to Max. Time																
Omit Phase									X	X	X	X	X	X	X	X
Special Function Outputs																

Coordinator Pattern # 3

Split Pattern	3	TS2 (Pat-Off)	0-3	Splits In	Percent
Cycle	120	Std (COS)	25	Offsets In	Percent
Offset Value	56%	Dwell/Add Time	0		
Actuated Coord	No	Timing Plan	0		
Actuated Walk Rest	Yes	Sequence	0		
Phase	No	Action Plan	0		
Reservice					
Max Select	None	Force Off	None		

Split Preference Phases

Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Description		NBSB		WB												
Splits (Split Pat 3)	0	58	0	42	0	0	0	0	0	0	0	0	0	0	0	0
Pref 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pref 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Ring	1	2	3	4
Ring Split Ext	0	0	0	0
Ring Displacement	-	0	0	0
Split Sum	100%	0%	0%	0%

Misc. Data

Veh Perm 1 0 Veh Perm 2 0 Veh Perm 2 Disp 0
 Split Demand Pat 1 0 Split Demand Pat 2 0 Crossing Arterial Pat 0

Split Pattern

Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Coord Phase		X														
Vehicle Recall																
Pedestrian Recall		X														
Recall to Max. Time																
Omit Phase									X	X	X	X	X	X	X	X
Special Function Outputs																

Coordinator Pattern # 4

Split Pattern	4	TS2 (Pat-Off)	1-1	Splits In	Percent
Cycle	120	Std (COS)	33	Offsets In	Percent
Offset Value	45%	Dwell/Add Time	0		
Actuated Coord	No	Timing Plan	0		
Actuated Walk Rest	Yes	Sequence	0		
Phase	No	Action Plan	0		
Reservice					
Max Select	None	Force Off	None		

Split Preference Phases

Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Description		NBSB		WB												
Splits (Split Pat 4)	0	62	0	38	0	0	0	0	0	0	0	0	0	0	0	0
Pref 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pref 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Ring	1	2	3	4
Ring Split Ext	0	0	0	0
Ring Displacement	-	0	0	0
Split Sum	100%	0%	0%	0%

Misc. Data
 Veh Perm 1 0 Veh Perm 2 0 Veh Perm 2 Disp 0
 Split Demand 0 Split Demand 0 Crossing Arterial 0
 Pat 1 Pat 2 Pat

Split Pattern

Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Coord Phase		X														
Vehicle Recall																
Pedestrian Recall		X														
Recall to Max. Time																
Omit Phase									X	X	X	X	X	X	X	X
Special Function Outputs																

Town of Oakville, ON



MOVING TRAFFIC FORWARD

MTO0307 - Dorval Dr @ QEW N Ramp - Econolite Type - ASC/3

Time Base Day Plan/Schedule
Day Plan (MM) 5-3**Day Plan #1**

Event	Action Plan	Start Time
1	1	06:00
2	2	10:00
3	3	15:15
4	4	19:00
5	5	22:00

Schedule (MM) 5-4**Schedule Number - 1**

Day Plan No.: 1

Month	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
	X	X	X	X	X	X	X	X	X	X	X	X

Day (DOW)	SUN	MON	TUE	WED	THU	FRI	SAT
	X	X	X	X	X	X	X

Day (DOM)	1	2	3	4	5	6	7	8	9	10	11
	X	X	X	X	X	X	X	X	X	X	X
	12	13	14	15	16	17	18	19	20	21	22
	X	X	X	X	X	X	X	X	X	X	X
	23	24	25	26	27	28	29	30	31		
	X	X	X	X	X	X	X	X	X		

Town of Oakville, ON



MOVING TRAFFIC FORWARD

MTO0306 - Dorval Dr @ QEW S Ramp - Econolite Type - ASC/3

Controller Timing Plan (MM) 2-1

Plan 1

Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Direction		NBSB		EB												
Min Green	5	20	5	10	5	5	5	5	5	5	5	5	5	5	5	5
Bk Min Green	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CS Min Green	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Delay Green	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Walk	0	7	0	0	0	10	0	10	0	10	0	10	0	10	0	10
Walk2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Walk Max	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ped Clear	0	11	0	7	0	16	0	16	0	16	0	16	0	16	0	16
Ped Clear 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ped Clear Max	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ped CO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vehicle Ext	5.0	5.0	5.0	4.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Ext 2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Max1	35	40	35	30	35	35	35	35	35	35	35	35	35	35	35	35
Max2	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
Max3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DYM Max	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dym Step	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Yellow	3.0	4.0	3.0	4.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Red Clear	1.0	2.0	1.0	2.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Red Max	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Red Revert	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Act B4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sec/Act	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Max Int	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Time B4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cars Wt	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
STPTDuc	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TTReduc	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Min Gap	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
---------	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

Town of Oakville, ON



MOVING TRAFFIC FORWARD

MTO0306 - Dorval Dr @ QEW S Ramp - Econolite Type - ASC/3

Coordination Options**Options (MM) 3-1**

Manual Pattern	Auto	ECPI Coord	Yes
System Source	TBC	System Format	STD
Splits In	Percent	Offsets In	Percent
Transition	Smooth	Max Select	MAXINH
Dwell / Add Time	0		
Delay Coord Wk-LZ	No	Force Off	Float
Offset Reference	Lead	Use Ped Time	Yes
Ped Recall	No	Ped Reservice	No
Local Zero Override	No	FO Added Ini Green	No
Re-sync Count	0	Multisync	No

Auto Perm Minimum Green (Seconds) (MM) 3-4

Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Minimum Green	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Split Demand (MM) 3-5

Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Demand 1																
Demand 2																

Demand	1	2
Detector	0	0
Call Time (Sec)	0	0
Cycle Count	0	0

Town of Oakville, ON



MOVING TRAFFIC FORWARD

MTO0306 - Dorval Dr @ QEW S Ramp - Econolite Type - ASC/3

Coordination Pattern Data
Coordinator Pattern Data (MM) 3-2

Coordinator Pattern # 1

Split Pattern	1	TS2 (Pat-Off)	0-1	Splits In	Percent
Cycle	120	Std (COS)	0	Offsets In	Percent
Offset Value	80%	Dwell/Add Time	0		
Actuated Coord No		Timing Plan	0		
Actuated Walk Rest	Yes	Sequence	0		
Phase Reservice	No	Action Plan	0		
Max Select	None	Force Off	None		

Split Preference Phases

Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Description		NBSB		EB												
Splits (Split Pat 1)	0	62	0	38	0	0	0	0	0	0	0	0	0	0	0	0
Pref 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pref 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Ring	1	2	3	4
Ring Split Ext	0	0	0	0
Ring Displacement	-	0	0	0
Split Sum	100%	0%	0%	0%

Misc. Data					
Veh Perm 1	0	Veh Perm 2	0	Veh Perm 2 Disp	0
Split Demand Pat 1	0	Split Demand Pat 2	0	Crossing Arterial Pat	0

Split Pattern

Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Coord Phase		X														
Vehicle Recall																
Pedestrian Recall		X														
Recall to Max. Time																
Omit Phase									X	X	X	X	X	X	X	X
Special Function Outputs																

Coordinator Pattern # 2

Split Pattern	2	TS2 (Pat-Off)	0-2	Splits In	Percent
Cycle	120	Std (COS)	0	Offsets In	Percent
Offset Value	8%	Dwell/Add Time	0		
Actuated Coord	No	Timing Plan	0		
Actuated Walk Rest	Yes	Sequence	0		
Phase	No	Action Plan	0		
Reservice					
Max Select	None	Force Off	None		

Split Preference Phases

Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Description		NBSB		EB												
Splits (Split Pat 2)	0	62	0	38	0	0	0	0	0	0	0	0	0	0	0	0
Pref 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pref 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Ring	1	2	3	4
Ring Split Ext	0	0	0	0
Ring Displacement	-	0	0	0
Split Sum	100%	0%	0%	0%

Misc. Data
 Veh Perm 1 0 Veh Perm 2 0 Veh Perm 2 Disp 0
 Split Demand 0 Split Demand 0 Crossing Arterial 0
 Pat 1 Pat 2 Pat

Split Pattern

Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Coord Phase		X														
Vehicle Recall																
Pedestrian Recall		X														
Recall to Max. Time																
Omit Phase									X	X	X	X	X	X	X	X
Special Function Outputs																

Coordinator Pattern # 3

Split Pattern	3	TS2 (Pat-Off)	0-3	Splits In	Percent
Cycle	120	Std (COS)	0	Offsets In	Percent
Offset Value	68%	Dwell/Add Time	0		
Actuated Coord	No	Timing Plan	0		
Actuated Walk Rest	Yes	Sequence	0		
Phase	No	Action Plan	0		
Reservice					
Max Select	None	Force Off	None		

Split Preference Phases

Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Description		NBSB		EB												
Splits (Split Pat 3)	0	62	0	38	0	0	0	0	0	0	0	0	0	0	0	0
Pref 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pref 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Ring	1	2	3	4
Ring Split Ext	0	0	0	0
Ring Displacement	-	0	0	0
Split Sum	100%	0%	0%	0%

Misc. Data

Veh Perm 1 0 Veh Perm 2 0 Veh Perm 2 Disp 0
 Split Demand Pat 1 0 Split Demand Pat 2 0 Crossing Arterial Pat 0

Split Pattern

Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Coord Phase		X														
Vehicle Recall																
Pedestrian Recall		X														
Recall to Max. Time																
Omit Phase									X	X	X	X	X	X	X	X
Special Function Outputs																

Coordinator Pattern # 4

Split Pattern	4	TS2 (Pat-Off)	1-1	Splits In	Percent
Cycle	120	Std (COS)	0	Offsets In	Percent
Offset Value	80%	Dwell/Add Time	0		
Actuated Coord	No	Timing Plan	0		
Actuated Walk Rest	Yes	Sequence	0		
Phase	No	Action Plan	0		
Reservice					
Max Select	None	Force Off	None		

Split Preference Phases

Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Description		NBSB		EB												
Splits (Split Pat 4)	0	62	0	38	0	0	0	0	0	0	0	0	0	0	0	0
Pref 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pref 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Ring	1	2	3	4
Ring Split Ext	0	0	0	0
Ring Displacement	-	0	0	0
Split Sum	100%	0%	0%	0%

Misc. Data

Veh Perm 1	0	Veh Perm 2	0	Veh Perm 2 Disp	0
Split Demand Pat 1	0	Split Demand Pat 2	0	Crossing Arterial Pat	0

Split Pattern

Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Coord Phase		X														
Vehicle Recall																
Pedestrian Recall		X														
Recall to Max. Time																
Omit Phase									X	X	X	X	X	X	X	X
Special Function Outputs																

Town of Oakville, ON



MOVING TRAFFIC FORWARD

MTO0306 - Dorval Dr @ QEW S Ramp - Econolite Type - ASC/3

Time Base Day Plan/Schedule
Day Plan (MM) 5-3**Day Plan #1**

Event	Action Plan	Start Time
1	1	06:00
2	2	10:00
3	3	15:15
4	4	19:00
5	5	22:00

Schedule (MM) 5-4**Schedule Number - 1**

Day Plan No.: 1

Month	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
	X	X	X	X	X	X	X	X	X	X	X	X

Day (DOW)	SUN	MON	TUE	WED	THU	FRI	SAT
	X	X	X	X	X	X	X

Day (DOM)	1	2	3	4	5	6	7	8	9	10	11
	X	X	X	X	X	X	X	X	X	X	X
	12	13	14	15	16	17	18	19	20	21	22
	X	X	X	X	X	X	X	X	X	X	X
	23	24	25	26	27	28	29	30	31		
	X	X	X	X	X	X	X	X	X		

Town of Oakville, ON



MOVING TRAFFIC FORWARD

OAK0714 - Royal Windsor Dr @ South Service Rd - Econolite Type - Cobalt

Controller Timing Plan (MM) 2-1

Plan 1 - ""

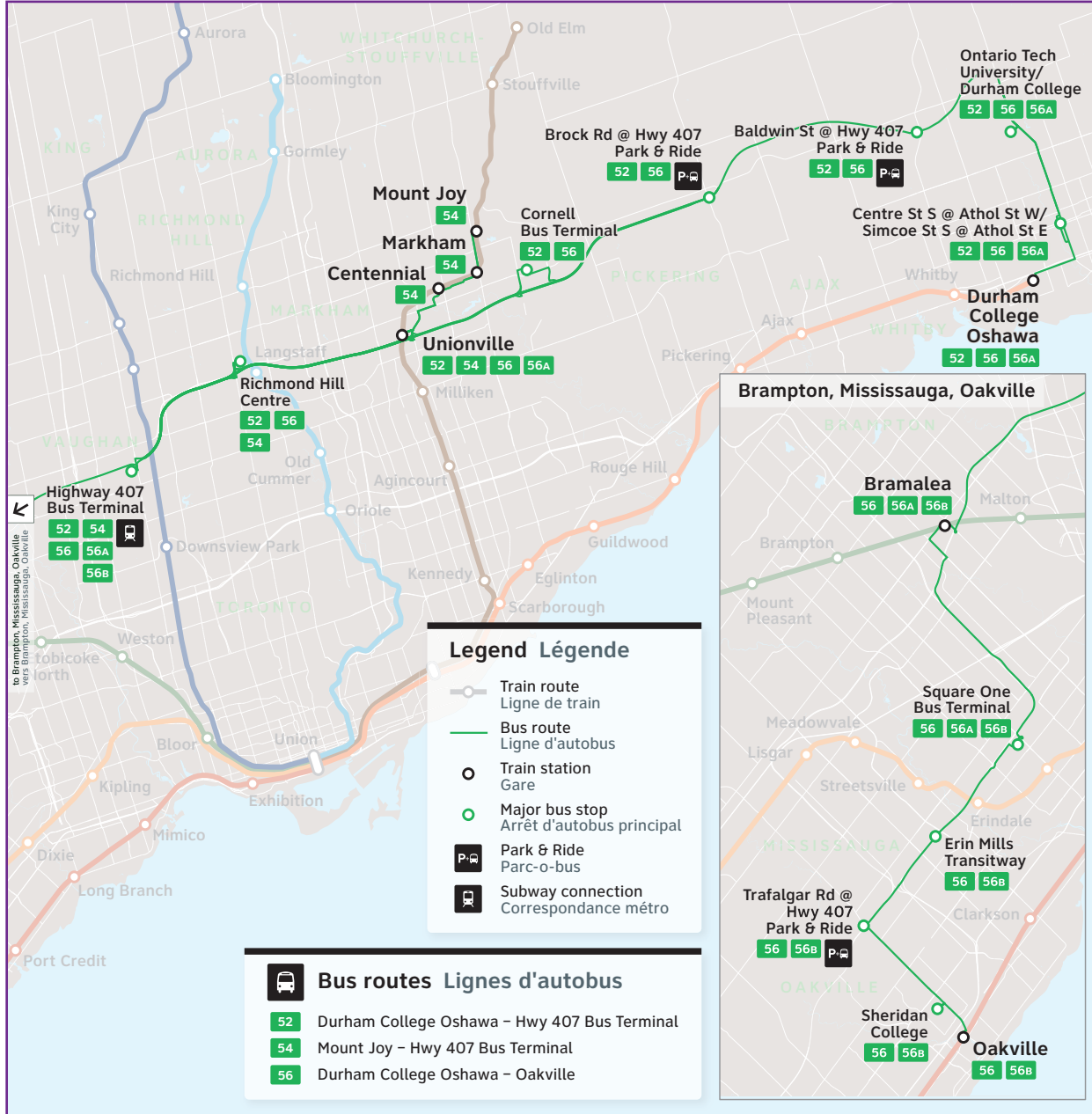
Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Direction	W-L	E-T	N	S-T	E-L	W-T	W	N-T	N	N	N	N	N	N	N	N
Min Green	8	20	0	10	8	30	0	8	5	5	5	5	5	5	5	5
Bk Min Green	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CS Min Green	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Delay Green	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Walk	0	10	0	10	0	10	0	10	0	10	0	10	0	10	0	10
Walk2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Walk Max	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ped Clear	0	10	0	20	0	10	0	10	0	16	0	16	0	16	0	16
Ped Clear 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ped Clear Max	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ped CO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vehicle Ext	3.5	4.5	0.0	3.5	3.5	6.0	0.0	3.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Ext 2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Max1	45	45	0	35	25	45	0	35	35	35	35	35	35	35	35	35
Max2	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
Max3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DYM Max	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dym Step	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Yellow	4.0	5.4	3.0	3.7	4.0	5.4	3.0	3.7	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Red Clear	2.0	3.0	0.0	4.1	2.0	3.0	0.0	4.1	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Red Max	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Red Revert	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Act B4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sec/Act	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Max Int	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Time B4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cars Wt	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
STPTDuc	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TTReduc	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Min Gap	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

52-54-56

Oshawa/Oakville

Route number
Numéro du trajet



CONTACT US

1-888-438-6646
416-869-3200
TTY: #711 or call
1-800-855-0511

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message texte.
gotransit.com/OnTheGO

Oshawa/ Oakville



GO Bus Schedule/
Horaire des autobus GO



52 54 56

- Oshawa
- Whitby
- Pickering
- Markham
- Richmond Hill
- Hwy. 407 Bus Terminal
- Brampton
- Mississauga
- Oakville

Daily / Quotidiennement

Includes GO Bus routes 52, 54, 56 / Inclut les trajets 52, 54, 56 d'autobus GO

Effective / À partir de:

2 SEPTEMBER
SEPTEMBRE 2023



How to read our schedules

Step 1

Find the station or terminal you are departing from. Stops are listed across the top in the order they are served.

Step 2

The upper left corner tells you what day the schedule is for and the direction of travel.

Step 3

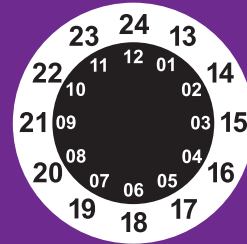
Look across the rows for available departure times.

Step 4

Not all trains or buses stop at every station. If you see → the train or bus will not stop at that station.

Schedule times shown in 24-hour clock

Midnight to noon
00 01 - 12 00
Noon to midnight
12 01 - 24 00



Legend

 Bus trips

→ Trip does not serve this location.



GO Bus service is accessible to passengers using mobility devices at this location.



Parking available.

For the latest schedule information and updates, please visit gotransit.com/schedules.

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Notes

Bicycles

1. Bicycles are not allowed in Union Station or on-board trains during morning rush hour (6:30-9:30) and evening rush hour (15:30-18:30), Monday to Friday.
2. Foldable bicycles are allowed on-board trains at all times.

Comment lire nos horaires

Étape 1

Trouvez votre gare ou terminus de départ. La liste des arrêts est donnée en haut dans l'ordre dans lequel ils sont desservis.

Étape 2

Le coin supérieur gauche vous indique le jour pour lequel l'horaire est donné et la direction de circulation.

Étape 3

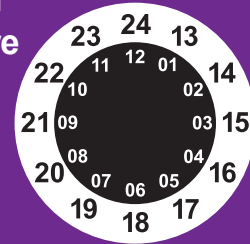
Regardez dans les rangées pour obtenir les heures de départ offertes.

Étape 4

Les trains ou les autobus ne s'arrêtent pas tous à chaque gare. Si vous voyez le symbole → le train ou l'autobus ne s'arrêtera pas à cette gare.

Indications selon un système horaire de 24 heures

De minuit à midi:
00 01 - 12 00
De midi à minuit:
12 01 - 24 00



Légende

 Horaire des autobus

→ Trajet ne sert pas cette station.



Service d'autobus GO accessible aux personnes utilisant des aides à la mobilité à cet endroit.



Stationnement disponible.

Pour consulter les horaires les plus récents et les mises à jour, veuillez visiter gotransit.com/schedules.

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Notes

Vélos

1. Les vélos ne sont pas autorisés dans la gare Union ou à bord des trains du lundi au vendredi, pendant l'heure de pointe (6:30-9:30) et pendant l'heure de pointe du soir (15:30-18:30).
2. Les vélos pliables sont permis à bord des trains en tout temps.

**Saturday and Sunday
Samedi et dimanche**

WESTBOUND / EN DIRECTION OUEST

Route Number Numéro du trajet	Zone → Trip Number Numéro du parcours	Oshawa 94		Oshawa 88		Whitby 51		Pickering 86		Markham 86		Markham 71		Richmond Hill 60		Vaughan 19	
		Dp	Oshawa 94	Oshawa 88	Oshawa 88	Whitby 51	Pickering 86	Markham 86	Markham 71	Richmond Hill 60	Vaughan 19						
52	52210	06 35	06 45	06 57	07 07	07 18	07 30	07 40	07 52	08 05							
52	52280	07 30	07 40	07 53	08 03	08 15	08 27	08 40	08 52	09 05							
52	52360	08 30	08 40	08 53	09 03	09 15	09 27	09 40	09 52	10 05							
52	52420	09 25	09 35	09 48	09 59	10 12	10 27	10 40	10 52	11 05							
52	52490	10 25	10 35	10 48	10 59	11 12	11 27	11 40	11 52	12 05							
52	52520	11 25	11 35	11 48	11 59	12 12	12 27	12 40	12 52	13 05							
52	52560	12 25	12 35	12 48	12 59	13 12	13 27	13 30	13 52	14 05							
52	52610	13 25	13 35	13 48	13 59	14 12	14 27	14 40	14 52	15 05							
52	52670	14 25	14 35	14 48	14 59	15 12	15 27	15 40	15 52	16 05							
52	52720	15 25	15 35	15 48	15 59	16 12	16 27	16 40	16 52	17 05							
52	52790	16 25	16 35	16 48	16 59	17 12	17 27	17 40	17 52	18 05							
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52	52860	19 30	19 40	19 53	20 03	20 15	20 27	20 40	20 52	21 05							
52	52880	20 35	20 45	20 57	21 07	21 18	21 30	21 40	21 52	22 05							
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**Saturday and Sunday
Samedi et dimanche**

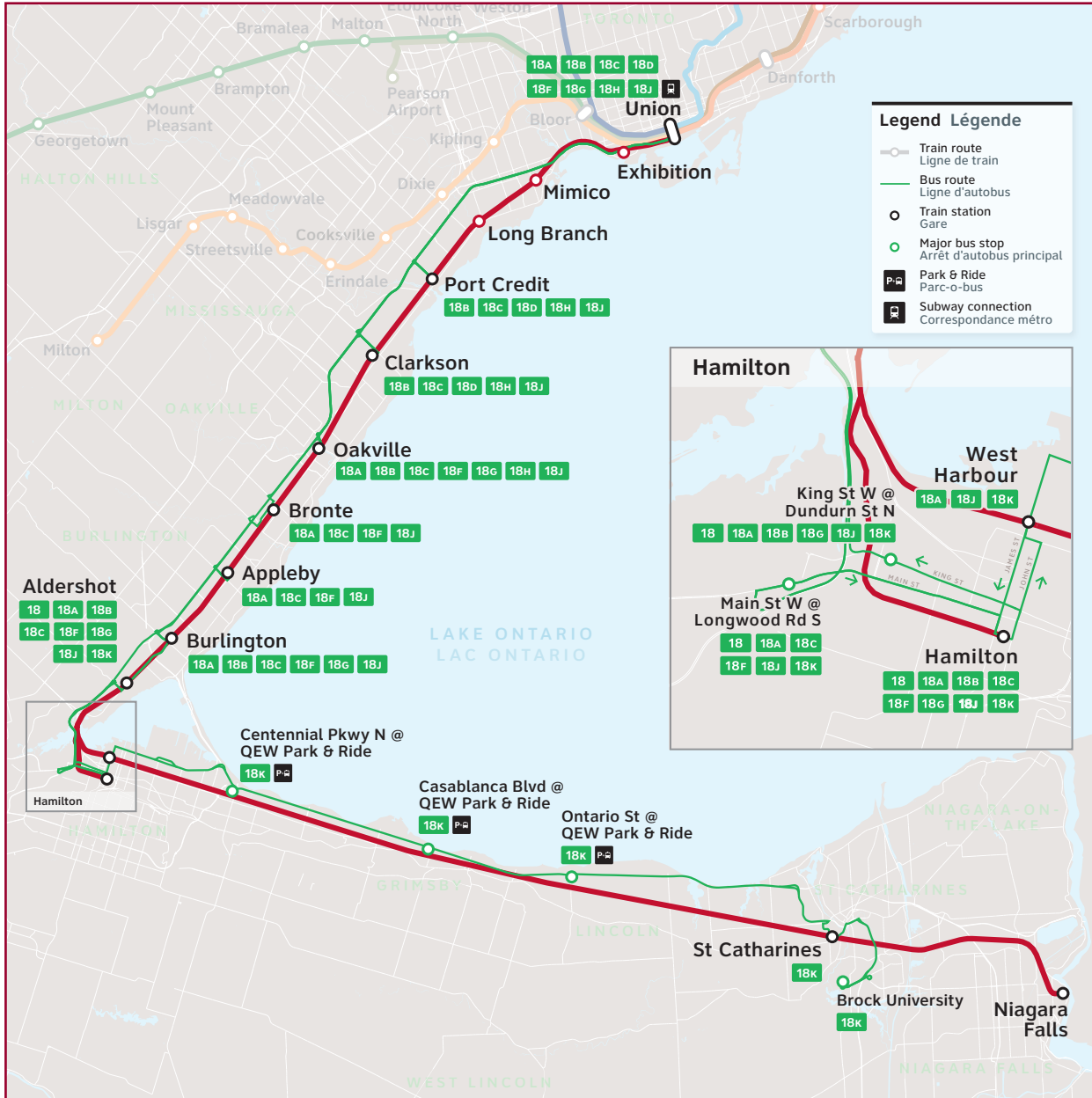
EASTBOUND / EN DIRECTION EST

Route Number Numéro du trajet	Zone → Trip Number Numéro du parcours	Vaughan 19		Richmond Hill 60		Markham 71		Markham 86		Pickering 86		Whitby 51		Oshawa 88		Oshawa 94		Oshawa 94	
		Hwy. 407 Bus Terminal	Richmond Hill Centre	Unionville GO	Cornell Bus Terminal	Brock Rd. @ Hwy. 407 P&R	Baldwin St. @ Hwy. 407	Oshawa 88	Oshawa 94	Oshawa 94									
52	52151	08 25	08 35	08 50	09 01	09 14	09 25	09 37	09 47	10 00									
52	52211	09 25	09 35	09 50	10 01	10 14	10 25	10 37	10 47	11 00									
52	52281	10 25	10 35	10 50	11 01	11 14	11 26	11 40	11 50	12 05									
52	52311	11 25	11 35	11 50	12 01	12 14	12 26	12 40	12 50	13 05									
52	52351	12 25	12 35	12 50	13 01	13 14	13 26	13 40	13 50	14 05									
52	52391	13 25	13 35	13 50	14 01	14 14	14 26	14 40	14 50	15 05									
52	52431	14 25	14 35	14 50	15 01	15 14	15 26	15 40	15 50	16 05									
52	52531	15 25	15 35	15 50	16 01	16 14	16 26	16 40	16 50	17 05									
52	52621	16 25	16 35	16 50	17 01	17 14	17 26	17 40	17 50	18 05									
52	52711	17 25	17 35	17 50	18 01	18 14	18 26	18 40	18 50	19 05									
52	52801	18 25	18 35	18 50	19 01	19 14	19 26	19 40	19 50	20 05									
52	52831	19 25	19 35	19 50	20 01	20 14	20 25	20 37	20 47	21 00									
52	52861	20 25	20 35	20 50	21 00	21 10	21 21	21 32	21 42	21 55									
52	52891	21 25	21 35	21 50	22 00	22 10	22 21	22 32	22 42	22 55									
52	52921	22 25	22 35	22 50	23 00	23 10	23 21	23 32	23 42	23 55									
52	52951	23 25	23 35	23 50	00 00	00 10	00 21	00 32	00 42	00 55									

01 - 18

Route numbers
Numéros des trajets

Lakeshore West



CONTACT US

1-888-438-6646
416-869-3200
TTY: #711 or call
1-800-855-0511

gotransit.com/schedules

@GOtransitLW

See Something?
Say Something.
24/7 Transit Safety Dispatch:
1-877-297-0642

prestocard.ca

Sign-up for email or
text alerts/ Inscrivez-
vous pour recevoir des
alertes par courriel ou
message texte.
gotransit.com/OnTheGO

Lakeshore West



GO Train and Bus Schedule/
Horaire des trains et des autobus GO



LW 18



Daily / Quotidiennement
Includes GO Bus route 18 /
Inclut le trajet 18 d'autobus GO

Effective / À partir de:
17 OCTOBER / OCTOBRE **2023**

How to read our schedules

Step 1

Find the station or terminal you are departing from. Stops are listed across the top in the order they are served.

Step 2

The upper left corner tells you what day the schedule is for and the direction of travel.

Step 3

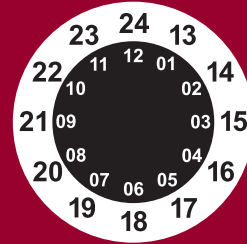
Look across the rows for available departure times.

Step 4

Not all trains or buses stop at every station. If you see → the train or bus will not stop at that station.

Schedule times shown in 24-hour clock

Midnight to noon
00 01 - 12 00
Noon to midnight
12 01 - 24 00




Legend


 Train trips

 Bus trips


→ Trip does not serve this location.

↓ Check below for connecting trips.

 GO Train service is accessible to passengers using mobility devices at this location.

 GO Bus service is accessible to passengers using mobility devices at this location.

 GO Train & GO Bus service is accessible to passengers using mobility devices at this location.

 Parking available.

For the latest schedule information and updates, please visit gotransit.com/schedules.

2

Notes

h Trip holds for connection from bus.

M-Th Trip operates Monday to Thursday only.

Fri Trip operates on Fridays only.

Sat Trip operates on Saturdays only.

Sun Trip operates on Sundays only.

Bicycles

1. Bicycles are not allowed in Union Station or on-board trains during morning rush hour (6:30-9:30) and evening rush hour (15:30-18:30), Monday to Friday.

2. Foldable bicycles are allowed on-board trains at all times.

Comment lire nos horaires

Étape 1

Trouvez votre gare ou terminus de départ. La liste des arrêts est donnée en haut dans l'ordre dans lequel ils sont desservis.

Étape 2

Le coin supérieur gauche vous indique le jour pour lequel l'horaire est donné et la direction de circulation.

Étape 3

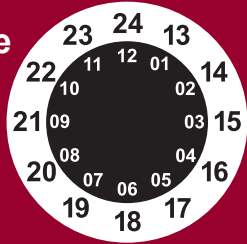
Regardez dans les rangées pour obtenir les heures de départ offertes.

Étape 4


Les trains ou les autobus ne s'arrêtent pas tous à chaque gare. Si vous voyez le symbole → le train ou l'autobus ne s'arrêtera pas à cette gare.


Indications selon un système horaire de 24 heures

De minuit à midi:
00 01 - 12 00
De midi à minuit:
12 01 - 24 00




Légende


 Horaire des trains


 Horaire des autobus

→ Trajet ne sert pas cette station.

↓ Vérifiez les trajets de correspondance cidessous.

 Service de trains GO accessible aux personnes utilisant des aides à la mobilité à cet endroit.

 Service d'autobus GO accessible aux personnes utilisant des aides à la mobilité à cet endroit.

 Les services de trains et d'autobus GO sont accessibles aux utilisateurs d'un appareil d'aide à la mobilité à cet endroit.

 Stationnement disponible.

Pour consulter les horaires les plus récents et les mises à jour, veuillez visiter gotransit.com/schedules.

3

Notes

h Attentes des trajets pour les connexions d'autobus.

M-Th Service offert du lundi au jeudi seulement.

Fri Service offert les vendredis seulement.

Sat Service offert les samedis seulement.

Sun Service offert les dimanches seulement.

Vélos

1. Les vélos ne sont pas autorisés dans la gare Union ou à bord des trains du lundi au vendredi, pendant l'heure de pointe (6:30-9:30) et pendant l'heure de pointe du soir (15:30-18:30).

2. Les vélos pliables sont permis à bord des trains en tout temps.

Monday to Friday (except holidays)
Du lundi au vendredi (sauf les jours fériés)

EASTBOUND / EN DIRECTION EST

Route Number Numéro du trajet	Zone→	Exception	Niagara Falls 84 Niagara Falls GO	Dp	St. Catharines 83 Brock University	St. Catharines 83 St. Catharines GO	Beamsville 82	Grimsby 81 Ontario St. @ QEW Casablanca Blvd. @ QEW	Centennial Pkwy. N. @ QEW Hamilton 18	Dp	Hamilton 18 West Harbour GO	Dp	Hamilton 18 Hamilton GO Centre	King St. W. @ Dundurn St. N. Burlington 17	Ar	Aldershot GO	Transfer - Correspondances Trip Number - Numéro du parcours	Burlington 17	Dp	Burlington 16 Aldershot GO	Burlington GO	Appley GO	Oakville 14 Bronte GO	Oakville 13 Oakville GO	Mississauga 12 Clarkson GO	Mississauga 10 Port Credit GO	Etobicoke 99 Long Branch GO	Etobicoke 79 Mimico GO	Toronto 2 Exhibition GO	Toronto 2 Union Station		
18G 18020																	18022														05 25	
18H 18040																																05 45
18 1704										05 10																						06 00
18 18090										05 27																						07 00
18 1854										05 48																						07 02
18 1756										06 08																						07 17
18 1856																																07 34
18 1256																																07 32
18 1858																																08 04
18 1758										07 09																						08 02
18 1860																																08 18
18 18250																																08 34
18 1960																																08 32
18 1710																																08 47
18 18340																																09 04
18 1712																																09 04
18 18400																																10 15
18 1714																																10 45
18K 18440																																11 15
18K 1716																																12 15
18K 18490																																12 45
18 1718																																13 45
18 18530																																14 15
18 1720																																14 45

Monday to Friday (except holidays)
Du lundi au vendredi (sauf les jours fériés)

EASTBOUND / EN DIRECTION EST

Route Number Numéro du trajet	Zone→	Exception	Niagara Falls 84 Niagara Falls GO	Dp	St. Catharines 83 Brock University	St. Catharines 83 St. Catharines GO	Beamsville 82	Grimsby 81 Ontario St. @ QEW Casablanca Blvd. @ QEW	Centennial Pkwy. N. @ QEW Hamilton 18	Dp	Hamilton 18 West Harbour GO	Dp	Hamilton 18 Hamilton GO Centre	King St. W. @ Dundurn St. N. Burlington 17	Ar	Aldershot GO	Transfer - Correspondances Trip Number - Numéro du parcours	Burlington 17	Dp	Burlington 16 Aldershot GO	Burlington GO	Appley GO	Oakville 14 Bronte GO	Oakville 13 Oakville GO	Mississauga 12 Clarkson GO	Mississauga 10 Port Credit GO	Etobicoke 99 Long Branch GO	Etobicoke 79 Mimico GO	Toronto 2 Exhibition GO	Toronto 2 Union Station		
18K 18570																															15 15	
18K 1972																																15 27
18 1722																																15 45
18 18610																																16 15
18K 1724																																16 45
18K 18650																																17 15
18 1726																																17 45
18 18690																																18 15
18K 1728																																18 45
18K 18730																																19 15
18K 1730																																19 45
18K 18770																																20 15
18K 1732																																20 45
18K 18830																																21 45
18 1734																																21 45
18 18860																																22 15
18K 1736																																22 45
18K 18880																																23 15
18 1988																																23 28
18 1738																																23 45
18 18920																																00 15
18J 18900		M-Th																														00 45
18 1740		Fri																														00 41

Saturday and Sunday Samedi et dimanche																				
EASTBOUND / EN DIRECTION EST																				
Route Number Numéro du trajet	Zone→	Niagara Falls 84 Dp	St. Catharines 83 Dp	Hamilton 18 Dp	Hamilton 18 Dp	Hamilton 18 Dp	King St. W. @ Dundurn St. N. Ar	Aldershot GO	Transfer - Correspondances Trip Number - Numéro du parcours	Burlington 17 Dp	Burlington 16 Dp	Burlington 15 Dp	Oakville 14	Oakville 13	Mississauga 12 Dp	Mississauga 10 Dp	Etobicoke 59 Dp	Etobicoke 79 Dp	Toronto 2 Ar	
Exception	Niagara Falls GO	St. Catharines GO	West Harbour GO	Hamilton GO Centre	King St. W. @ Dundurn St. N.	Aldershot GO	Transfer - Correspondances	Aldershot GO	Burlington GO	Appleby GO	Bronte GO	Oakville GO	Clarkson GO	Port Credit GO	Long Branch GO	Mimico GO	Exhibition GO	Union Station	Ar	
18B	18050				04 30	04 37	04 45	→		04 45	04 55	→	→	05 10	05 20	05 30	→	→	→	05 55
18A	18062				05 05	05 15	05 22	05 30	→	05 30	05 40	05 50	06 00	06 10	→	→	→	→	→	06 45
18H	18064													06 20	06 30	06 40	→	→	→	07 05
18A	18072				05 35	05 45	05 52	06 00	→	06 00	06 10	06 20	06 30	06 40	→	→	→	→	→	07 15
18H	18074													06 50	07 00	07 10	→	→	→	07 35
18A	18080				06 05	06 15	06 22	06 30	→	06 30	06 40	06 50	07 00	07 10	→	→	→	→	→	07 45
18H	18082													07 20	07 30	07 40	→	→	→	08 05
18A	18090				06 35	06 45	06 52	07 00	→	07 00	07 10	07 20	07 30	07 40	→	→	→	→	→	08 15
18H	18092													07 50	08 00	08 10	→	→	→	08 35
	1708				07 21	→	→	07 33	→	07 33	07 40	07 47	07 52	07 59	08 06	08 13	08 19	08 28	08 36	08 45
18	18200				07 38	07 45	07 53	¹⁰¹⁰	08 02	08 10	08 17	08 22	08 29	08 36	08 43	08 49	08 58	09 06	09 15	
	1710				08 21	→	→	08 33	→	08 33	08 40	08 47	08 52	08 59	09 06	09 13	09 19	09 28	09 36	09 45
18	18300				08 38	08 45	08 53	¹⁰¹²	09 02	09 10	09 17	09 22	09 29	09 36	09 43	09 49	09 58	10 06	10 15	
	1712				09 21	→	→	09 33	→	09 33	09 40	09 47	09 52	09 59	10 06	10 13	10 19	10 28	10 36	10 45
18	18360				09 36	09 43	09 53	¹⁰¹⁴	10 02	10 10	10 17	10 22	10 29	10 36	10 43	10 49	10 58	11 06	11 15	
	1714				10 21	→	→	10 33	→	10 33	10 40	10 47	10 52	10 59	11 06	11 13	11 19	11 28	11 36	11 45
18	18420				10 36	10 43	10 53	¹⁰¹⁶	11 02	11 10	11 17	11 22	11 29	11 36	11 43	11 49	11 58	12 06	12 15	
	1716				11 21	→	→	11 33	→	11 33	11 40	11 47	11 52	11 59	12 06	12 13	12 19	12 28	12 36	12 45
18	18470				11 36	11 43	11 53	¹⁰¹⁸	12 02	12 10	12 17	12 22	12 29	12 36	12 43	12 49	12 58	13 06	13 15	
	1718				12 21	→	→	12 33	→	12 33	12 40	12 47	12 52	12 59	13 06	13 13	13 19	13 28	13 36	13 45
18	18510				12 36	12 43	12 53	¹⁰²⁰	13 02	13 10	13 17	13 22	13 29	13 36	13 43	13 49	13 58	14 06	14 15	
	1970		12 04	12 30	→	→	→	13 26	→	13 26	13 34	→	→	13 47	→	13 59	→	→	14 15	14 24
	1720				13 21	→	→	13 33	→	13 33	13 41	13 47	13 52	13 59	14 06	14 13	14 19	14 28	14 36	14 45
18	18550				13 36	13 43	13 53	¹⁰²²	14 02	14 10	14 17	14 22	14 29	14 36	14 43	14 49	14 58	15 06	15 15	

Saturday and Sunday Samedi et dimanche																				
EASTBOUND / EN DIRECTION EST																				
Route Number Numéro du trajet	Zone→	Niagara Falls 84 Dp	St. Catharines 83 Dp	Hamilton 18 Dp	Hamilton 18 Dp	Hamilton 18 Dp	King St. W. @ Dundurn St. N. Ar	Aldershot GO	Transfer - Correspondances Trip Number - Numéro du parcours	Burlington 17 Dp	Burlington 16 Dp	Burlington 15 Dp	Oakville 14	Oakville 13	Mississauga 12 Dp	Mississauga 10 Dp	Etobicoke 59 Dp	Etobicoke 79 Dp	Toronto 2 Ar	
Exception	Niagara Falls GO	St. Catharines GO	West Harbour GO	Hamilton GO Centre	King St. W. @ Dundurn St. N.	Aldershot GO	Transfer - Correspondances	Aldershot GO	Burlington GO	Appleby GO	Bronte GO	Oakville GO	Clarkson GO	Port Credit GO	Long Branch GO	Mimico GO	Exhibition GO	Union Station	Ar	
	1722																			
18	18590																			
	1724																			
18	18630																			
	1726																			
18	18670																			
	1978		16 04	16 30																
	1728																			
18	18710																			
	1730																			
18	18750																			
	1732																			
18	18790																			
	1734																			
18	18820																			
	1736																			
	1986	Sun	20 20	20 46																
	1988	Sat	21 04	21 30																
	1738																			
18	18920																			
18J	18930	Sun																		
	1740	Sat																		

Appendix C

Reduced Scale Architectural Drawings



DRAWING NOT TO BE SCALED

Contractor must check and verify all dimensions on the job and report any discrepancies to the architect before proceeding with the work.
This drawing shall not be used for construction purposes unless signed by the consultant responsible. This drawing as an instrument of service is provided by and is the property of Sweeny & Co. Architects.

ISSUED

2024-03-26 ISSUED FOR ZBA



166 SOUTH SERVICE ROAD EAST

Oakville, Ontario

OWNER:
District Developments
90 Wincup Ave., Unit 1
Toronto, ON M6B 1P5
416.626.6038

ARCHITECT:
Sweeny & Co Architects Inc.
134 Peter St., Suite 1601
Toronto, ON M5V 2H2
contact: Alexa Guerra
info@sweenyandco.com
(416) 971-6252

CIVIL:
Trafalgar Engineering
67 - 881 Markham Road
Oakville, Ontario, L6K 3V6
O: (905) 339-3366

STRUCTURAL:
Johnson, Kim & Partners
3 Concorde Gate, 4th Floor
Toronto, ON M5C 3N7
416-447-7466

LANDSCAPE ARCHITECT:
Ardosa Design
69 John Street S., Suite 250
Hamilton, ON L8N 2G9
t: 905-526-8876

MECHANICAL:
MV Shore Associates
P: 416-443-1995
250 Fernand Drive, Suite 304
Toronto Ontario M3C 3G8

TRANSPORTATION:
BA Group
95 St. Clair Avenue West, Suite 1000 | Toronto
416 961 7110 x222

ELECTRICAL:
MV Shore Associates
P: 416-443-1995
250 Fernand Drive, Suite 304
Toronto Ontario M3C 3G8

TRANSPORTATION:
Paradigm Transportation Solutions Limited
54-150 Pinebush Road, Cambridge ON N1R 6J8
p: 905.381.2229 x303
w: www.pstl.com

Sweeny&Co Architects

134 PETER STREET | SUITE 1601
TORONTO, ONTARIO | M5V 2H2 | CANADA
P: 416-971-6252 | F: 416-671-6420
E: info@sweenyandco.com | www.sweenyandco.com

PRJ. NAME
166 South Service Road
South Service Road & Trafalgar

OWNER
166 South Service Inc.

DWG TITLE
Cover Page

DATE: 2024-03-26
SCALE:
DRAWN: MS
CHECKED: AG
PRJ. No.: 2128

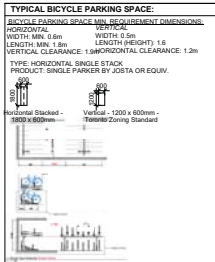
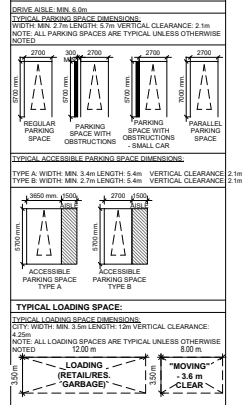
DWG No.
AZ000

ISSUED FOR REZONING, OLT

2024-03-26

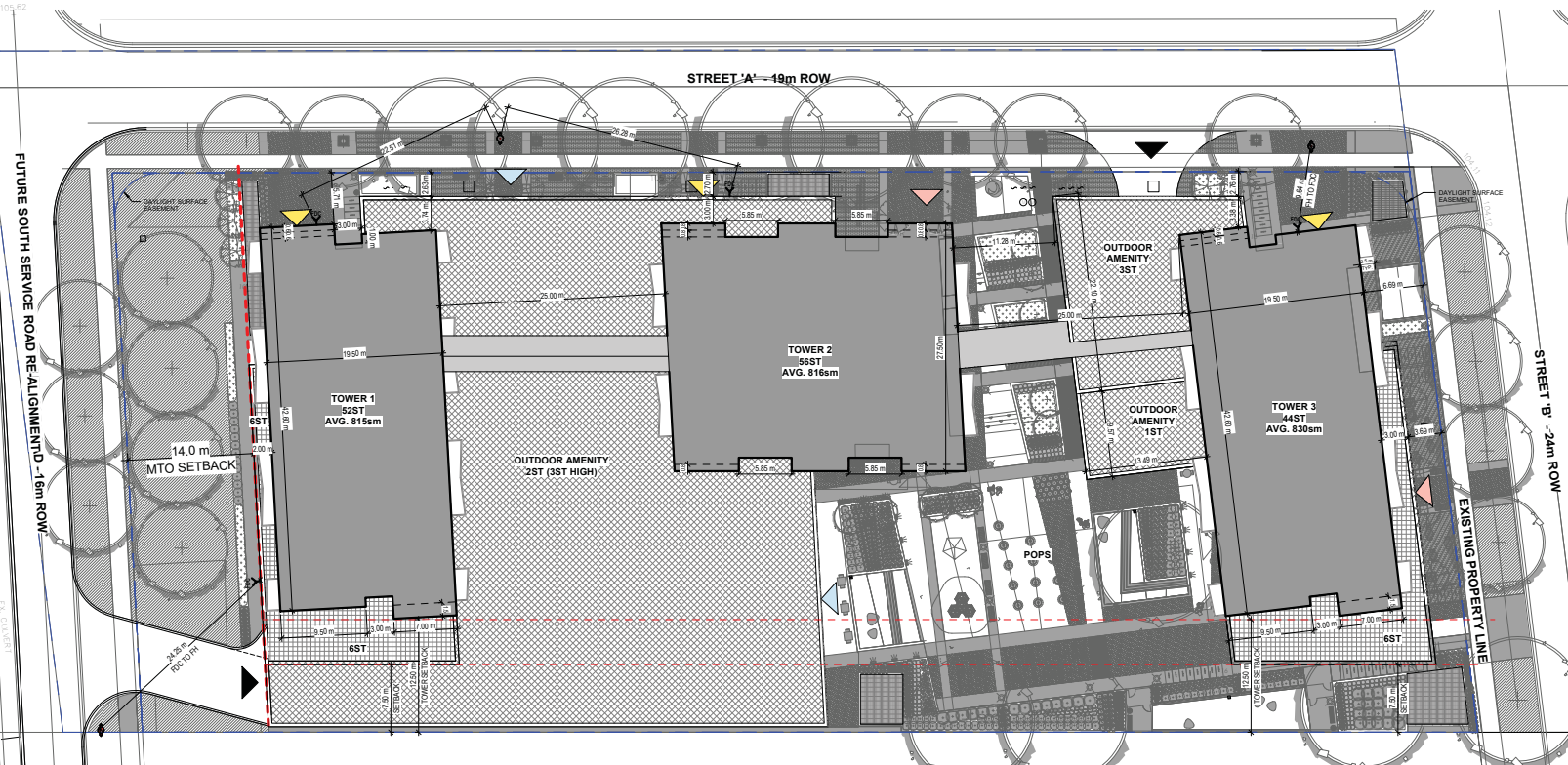
ZONING STANDARDS

ZONING STANDARDS AS PER BY-LAW 2014-014
TYPICAL PARKING SPACE:



GFA DEFINITION:
FLOOR AREA, GROSS means the total area of all of the floors in a building measured from the exterior faces of the exterior walls, but shall not include an attic, basement or mechanical penthouse."

SITE PLAN

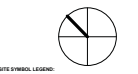


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- SITE SYMBOL LEGEND**
- ▲ EXISTENTIAL ENTRANCES (TOWNS)
 - ▲ EXISTING ENTRANCES
 - ▲ SERVICE ENTRANCE
 - ▲ AMENITY ENTRANCE
 - ▲ PRIVATE ENTRANCE
 - OUTDOOR AMENITY
 - GREEN ROOF
 - GRASSY
 - EXISTING GRASSES
 - PROPOSED GRASSES
 - PROPOSED FIRE HYDRANT
 - THE OVERHEAD CONNECTION
 - PROPERTY LINE
 - EDGING
- GARBAGE BIN**
 R RECYCLING BIN
 G GROUND BIN
 S BULKY WASTE STORAGE (BIN 100L)
 J JANITOR CLOSET
- CON** CONSTRUCTION ELEVATOR
 M MOVING ELEVATOR/LIVING ROOM
 S SERVICE ELEVATOR
 SH SHUTTLE ELEVATOR
 V VESTIBULE

**Sweeny & Co
 Architects**

134 PETER STREET | SUITE 1601
 TORONTO, ONTARIO | M5V 2H2 | CANADA
 P: 416-597-4232 | F: 416-597-6500
 E: info@sweenyandco.com | www.sweenyandco.com

PRD. NAME
 166 South Service Road
 South Service Road & Trafalgar

OWNER
 166 South Service Inc.

DWG. TITLE
 Site Plan & Zoning Information

DATE: 2024-03-26
SCALE: 1:250
DRAWN: MS
CHECKED: AG
PRD. NO.: 2128

DWG. NO.
AZ100

C:\Users\j\Documents\2024\Kevin Transit Hub_Central_New_Units\BIM\N\VI 2024-03-20 7:50:01 PM

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2024-03-26 ISSUED FOR ZBA



179 Parking Spaces
-residential (19 small cars)

**Sweeny&Co
Architects**

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TORONTO, ONTARIO | M5V 2H2 | CANADA
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PRJ. NAME
166 South Service Road
South Service Road & Trafalgar

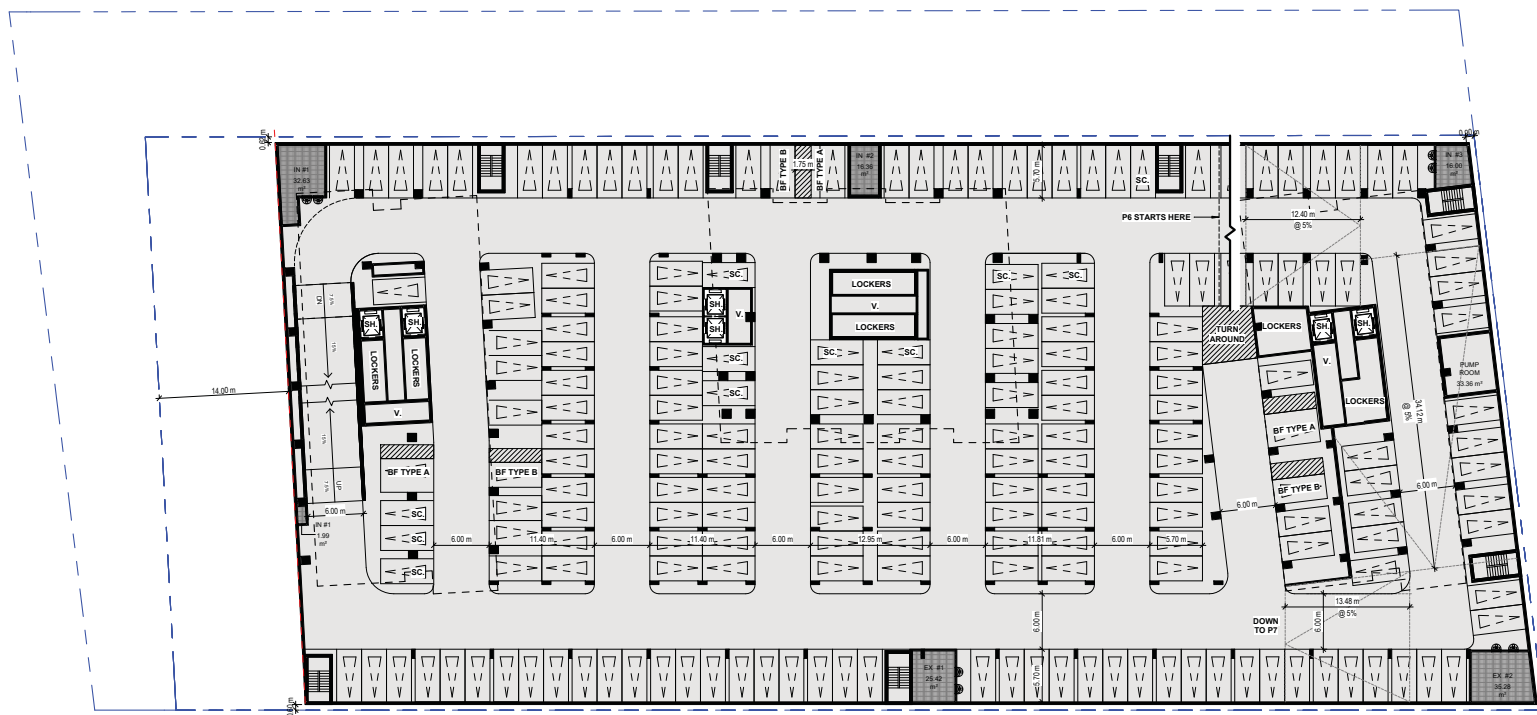
OWNER
166 South Service Inc.

DWG TITLE
Level P7

DATE: 2024-03-26
SCALE: 1: 250
DRAWN:
CHECKED: AG
PRJ. No.: 2128

DWG No.
AZ101

C:\Users\jtd\Documents\120_Coleville Transit Hub_Central_New_Supermarket_V1
2024-03-20 7:50:01 PM



199 Parking Spaces
-residential (11 small cars)

DRAWING NOT TO BE SCALED

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2024-03-26 ISSUED FOR ZBA



**Sweeny & Co
Architects**

134 PETER STREET | SUITE 1001
TORONTO, ONTARIO | M5V 2H2 | CANADA
P: 416-597-4252 | F: 416-597-5620
E: info@sweenyandco.com | www.sweenyandco.com

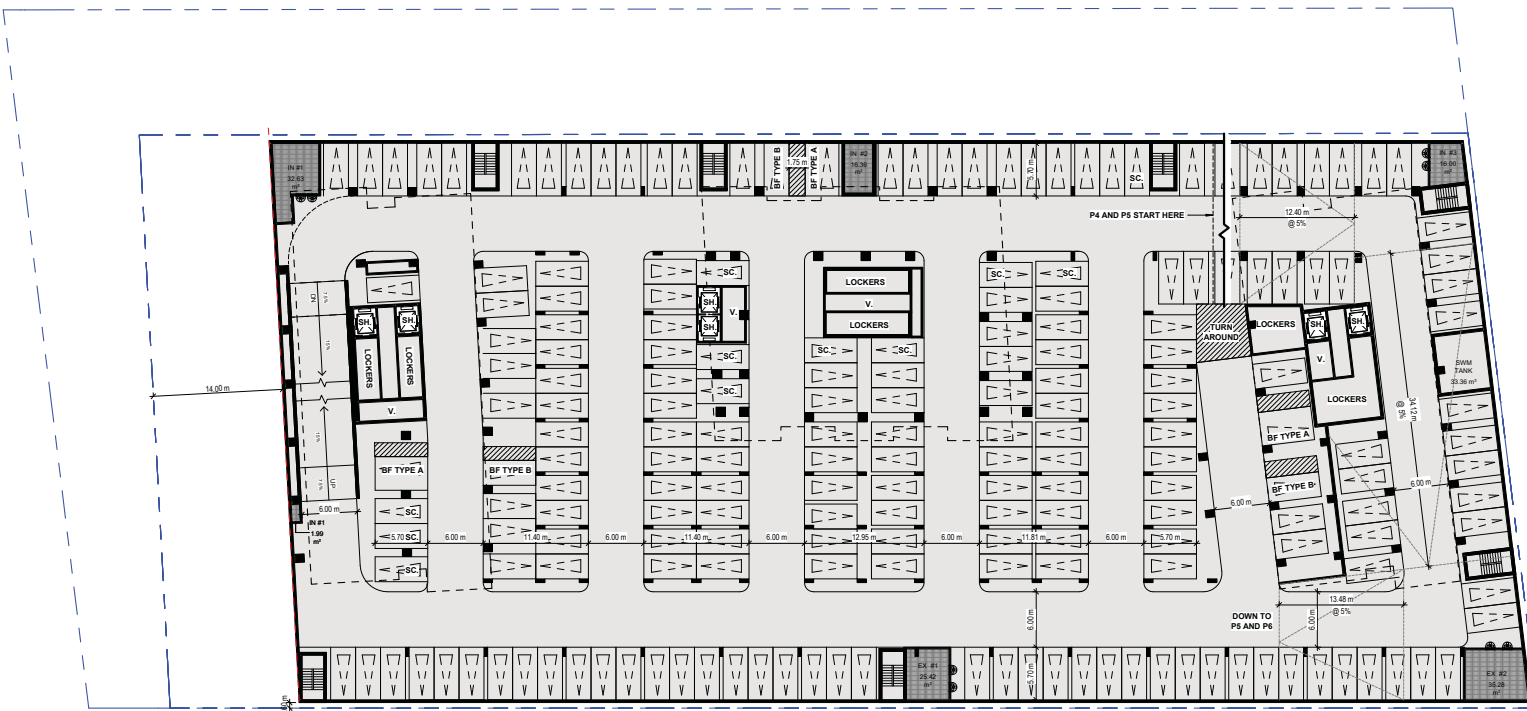
PRJ. NAME
166 South Service Road
South Service Road & Trafalgar

OWNER
166 South Service Inc.

DWG TITLE
Level P6

DATE: 2024-03-26
SCALE: 1:250
DRAWN:
CHECKED: AG
PRJ. No.: 2128
DWG No.:
AZ102

C:\Users\alr\Documents\126_Cakelin Transit Hub_Central_News_Imperial\DWG\2024-03-20 7:50:59 PM



199 Parking Spaces
-residential (11 small cars)

DRAWING NOT TO BE SCALED

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E: info@sweenyandco.com | www.sweenyandco.com

PROJ. NAME
166 South Service Road
South Service Road & Trafalgar

OWNER
166 South Service Inc.

DWG TITLE
Level P5

DATE: 2024-03-26
SCALE: 1 : 250
DRAWN: AG
CHECKED: AG
PROJ. No.: 2128

DWG No.
AZ103

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PRJ. NAME
 166 South Service Road
 South Service Road & Trafalgar

OWNER
 166 South Service Inc.

DWG TITLE
 Levels P2

DATE: 2024-03-26
SCALE: 1: 250
DRAWN:
CHECKED: AG
PRJ. No.: 2128 DWG NO.
AZ106



195 Parking Spaces
 -23 commercial
 -172 res visitor (9 small cars)

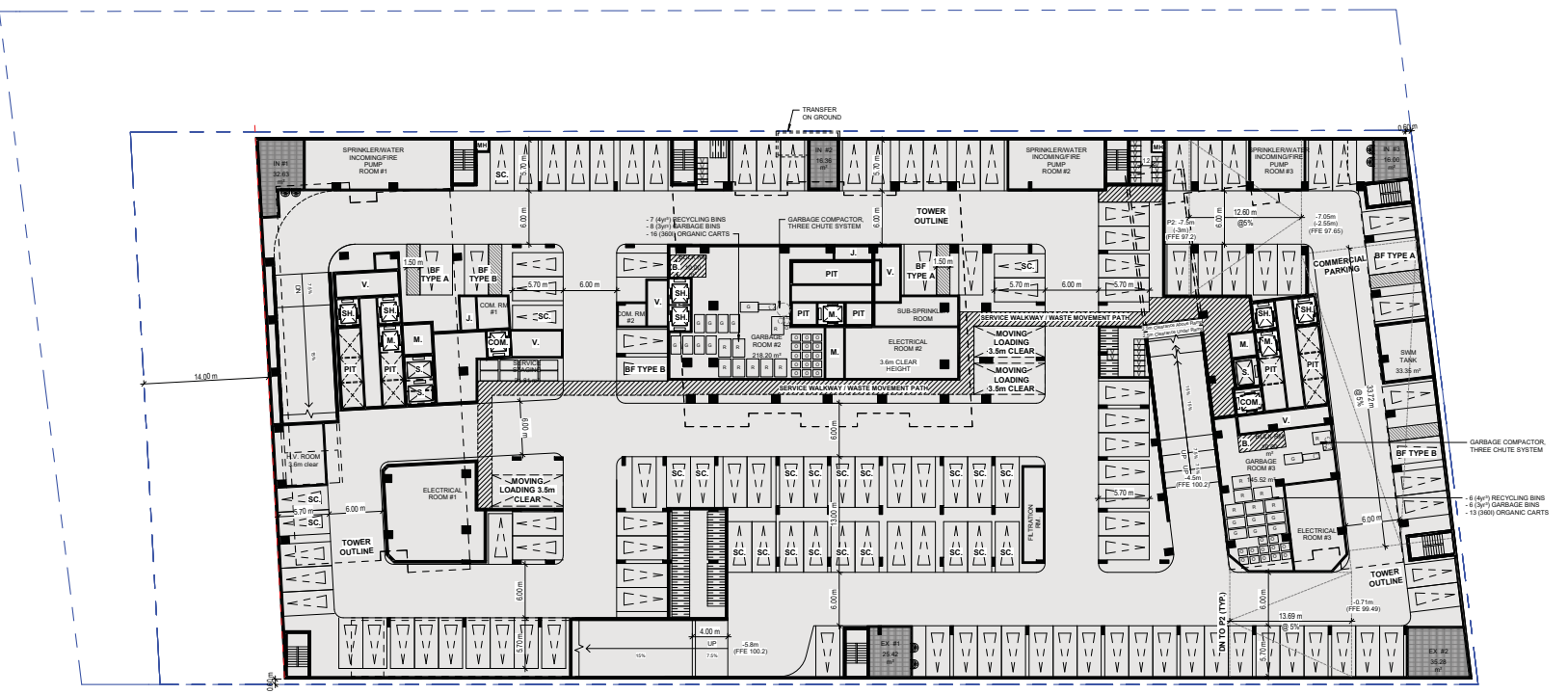
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- SITE SYMBOL LEGEND**
- INDUSTRIAL ENTRANCES (TOWNS)
 - EXISTING OFFICE ENTRANCES
 - SERVICE ENTRANCE
 - WEIGHT ENTRANCE
 - PRIVATE ENTRANCE
 - OUTDOOR ARENARY
 - GREEN ROOF
 - GRANDY
 - EXISTING GRASSES
 - PROPOSED GRASSES
 - PROPOSED FIRE HYDRANT
 - FIRE DEPARTMENT CONNECTION
 - PROPERTY LINE
 - OBVIOUS
 - G GARbage BIN
 - R RECYCLING BIN
 - O ORGANIC BIN
 - J JUNKYARD STORAGE (BIN 1000)
 - J JANITOR CLOSET
 - COM COMMERCIAL ELEVATOR
 - M MOVING ELEVATOR (MOVING ROOM)
 - S SERVICE ELEVATOR
 - SH SHUTTLE ELEVATOR
 - V VESTIBULE



124 Parking Spaces
-commercial (23 small cars) 47x2 = 94+27 = 121
BICYCLE PARKING
LONG TERM = 121

**Sweeney & Co
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PRJ. NAME
166 South Service Road
South Service Road & Trafalgar

OWNER
166 South Service Inc.

DWG TITLE
Levels P1

DATE: 2024-03-26
SCALE: As indicated
DRAWN: AG
CHECKED: AG
PRJ. NO.: 2128
DWG. NO. **AZ107**

C:\Users\jdoorema\Documents\124_Cowles Transit Hub_Central_Nov_2023\RMAA V1
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GR PLAN NOTES	
Note Number	Note Text
1	WEIGHT CAPACITY OF LOADING AREA (35,000 KG)
2	LOADING AREA HAS +/- 2% GRADE

DRAWING NOT TO BE SCALED

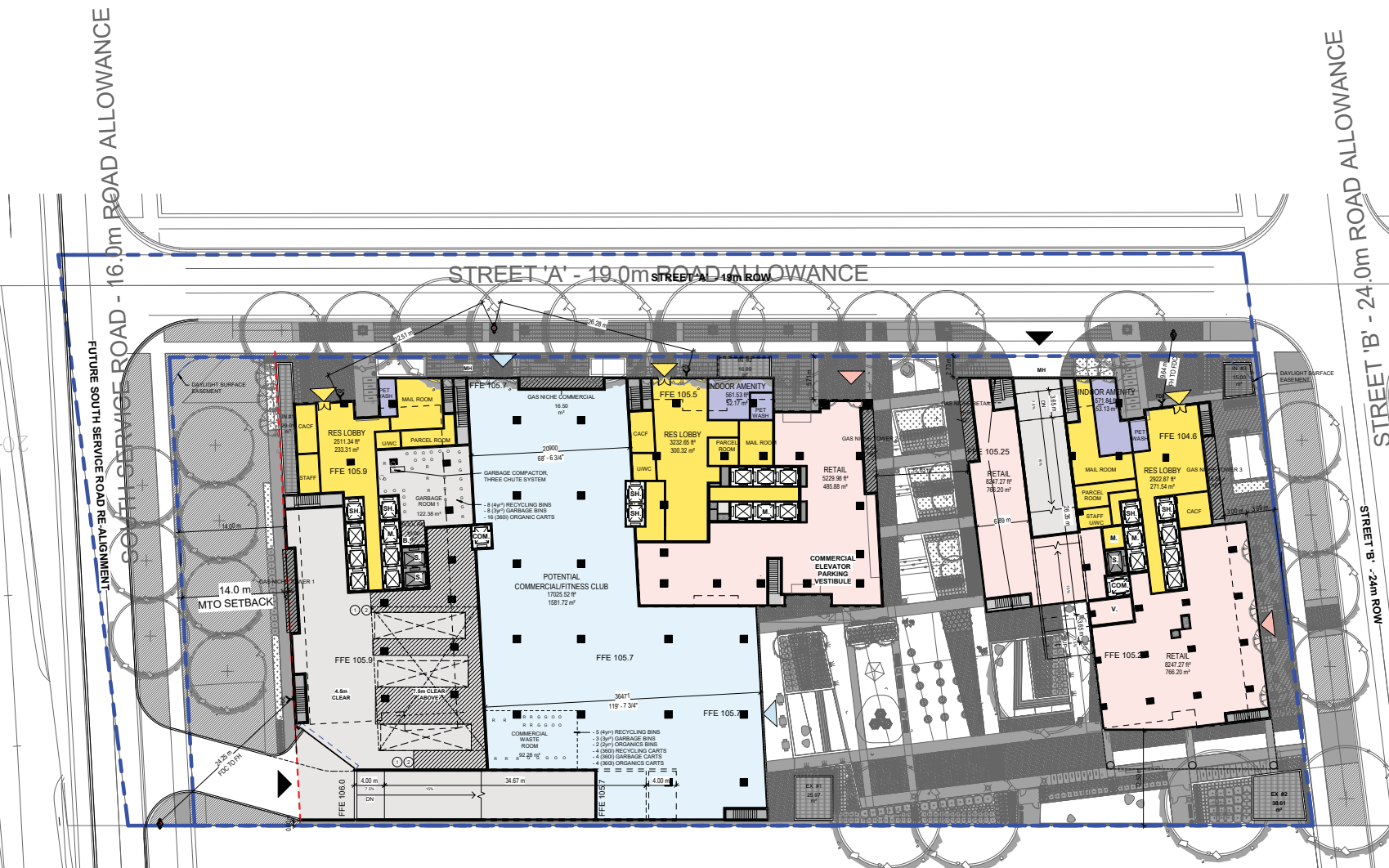
Contractor must check and verify all dimensions on the job and report any discrepancies to the architect before proceeding with the work.

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- SITE SYMBOL LEGEND**
- ▲ ACCESSIBILITY ENTRANCE (RAMP)
 - ▲ EXISTING OFFICE ENTRANCES
 - ▲ SERVICE ENTRANCE
 - ▲ SECURITY ENTRANCE
 - ▲ PRIVATE TERRACE
 - ▲ OUTDOOR AMENITY
 - ▲ GREEN ROOF
 - ▲ SANDY
 - ▲ EXISTING GRASSES
 - ▲ PROPOSED GRASSES
 - ▲ PROPOSED FIRE HYDRANT
 - ▲ FIRE DEPARTMENT CONNECTION
 - ▲ PROPERTY LINE
 - ▲ CURBS
 - G GARBAGE BIN
 - R RECYCLING BIN
 - O ORGANIC BINS
 - B BULKY WASTE STORAGE (MIN. 1500)
 - J JAWBOLT CLOSET
 - COM COMMERCIAL ELEVATOR
 - M MOVING ELEVATOR / MOVING ROOM
 - S SERVICE ELEVATOR
 - SH SHUTTLE ELEVATOR
 - V VESTIBULE



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PRJG. NAME
166 South Service Road
South Service Road & Trafalgar

OWNER
166 South Service Inc.

DWG TITLE
Level 1 - Ground Floor Plan

DATE: 2024-03-26
SCALE: 1:250
DRAWN:
CHECKED: AG
PRJG. No.: 2128
DWG. No.:
AZ108

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GR PLAN NOTES

Note Number	Note Text
1	WEIGHT CAPACITY OF LOADING AREA (35,000 KG)
2	LOADING AREA HAS +/- 2% GRADE

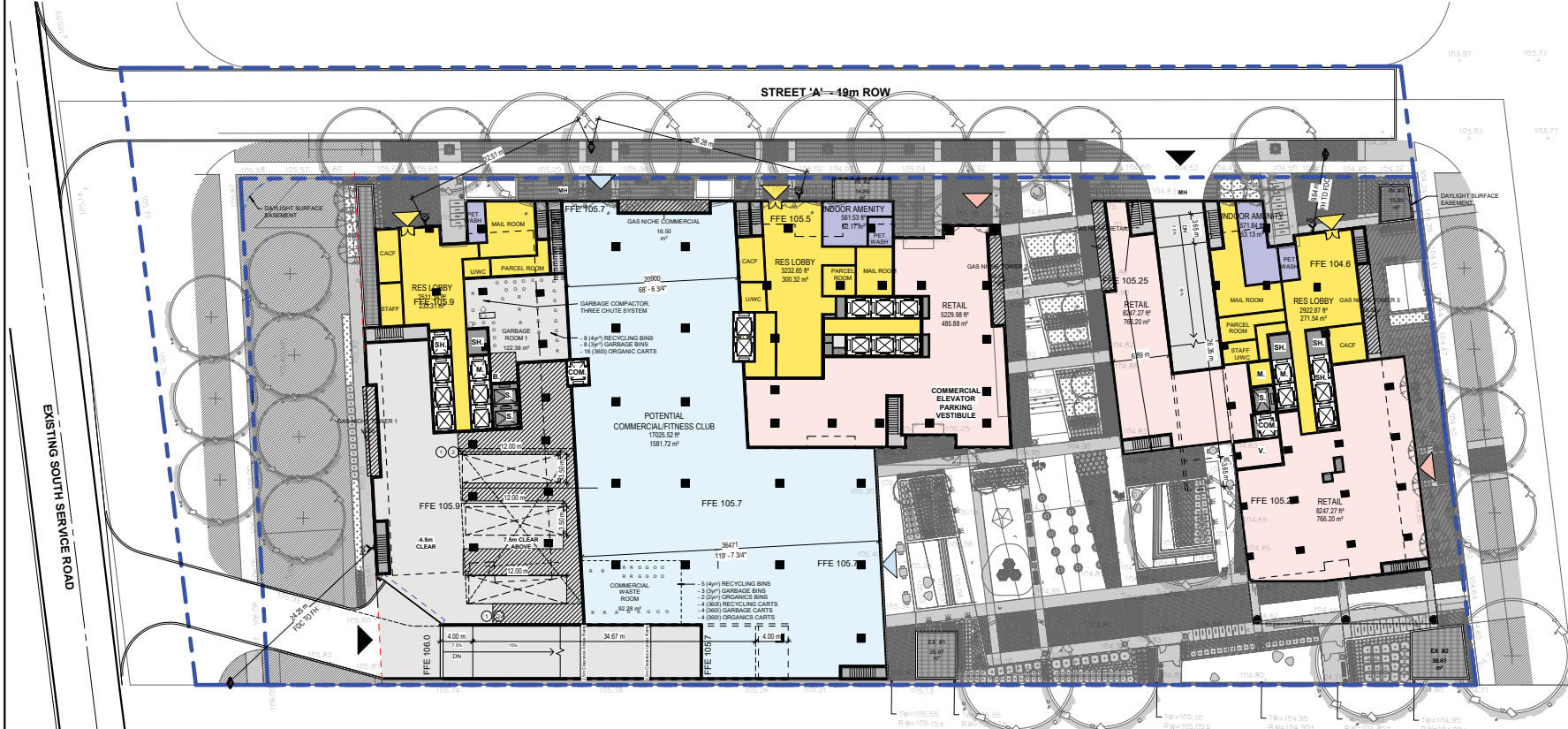
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EXISTING SOUTH SERVICE ROAD

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PRJ. NAME
166 South Service Road
South Service Road & Trafalgar

OWNER
166 South Service Inc.

DWG. TITLE
Level 1 - Ground Floor Plan
- Interim Road

DATE: 2024-03-26
SCALE: 1:250

DRAWN:
CHECKED: AG
PRJ. No.: 2128

DWG. No.
AZ109

Appendix D

Interim and Ultimate Vehicle Manoeuvring Diagrams (VMDs), BA Group,

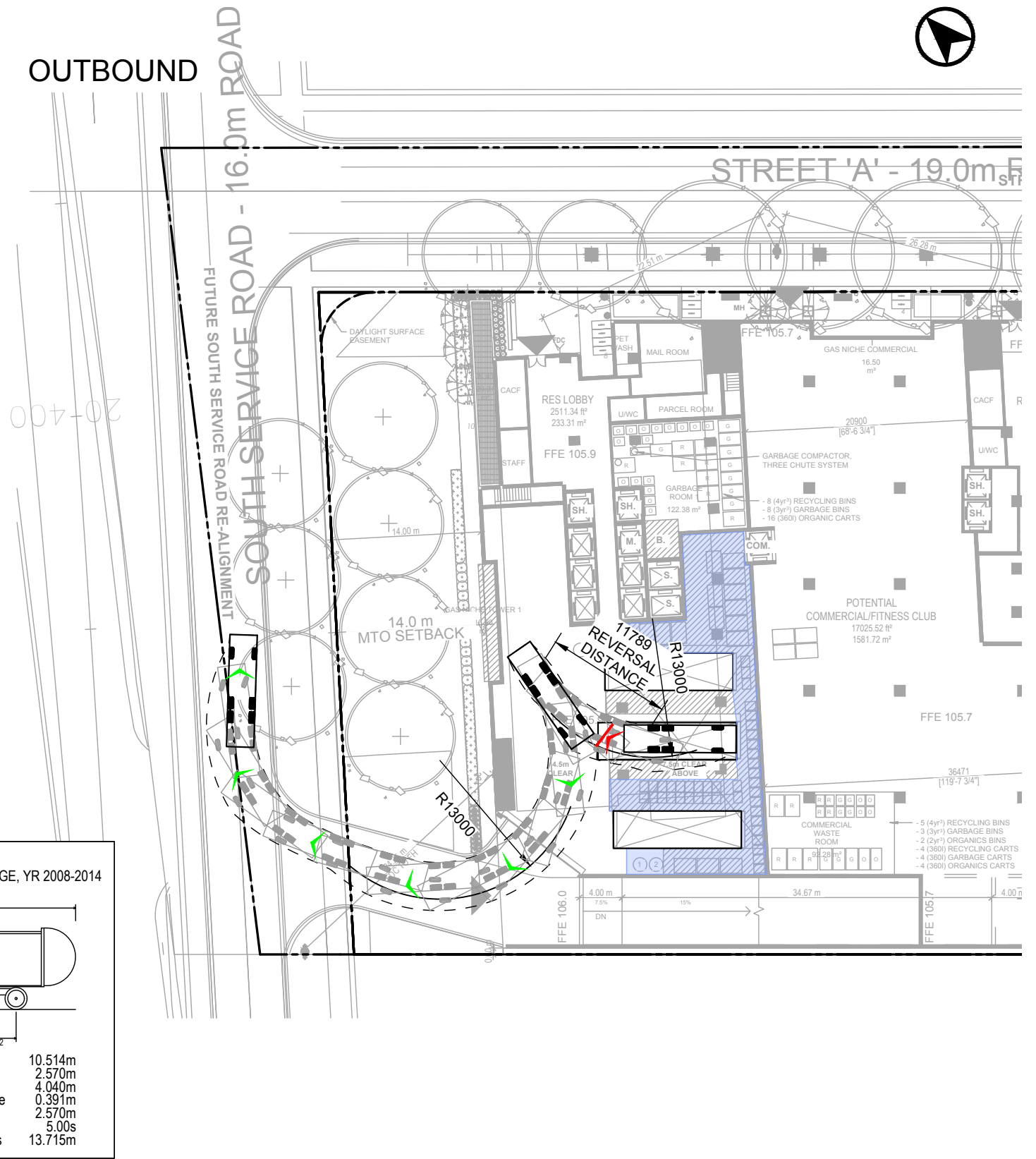
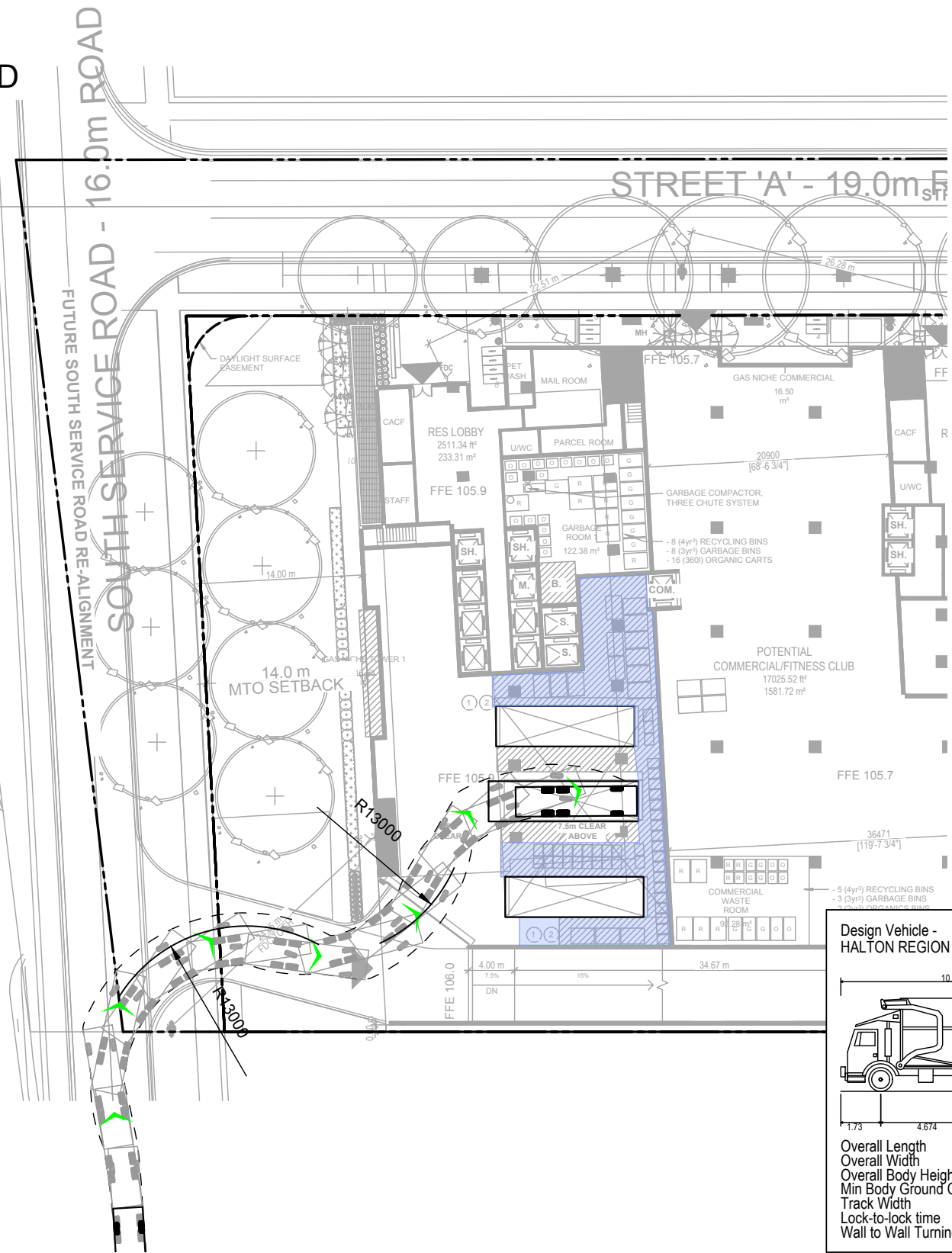


INBOUND

OUTBOUND



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Date Plotted: March 27, 2024



**Design Vehicle -
HALTON REGION GARBAGE, YR 2008-2014**

Overall Length	10.514m
Overall Width	2.570m
Overall Body Height	4.040m
Min Body Ground Clearance	0.391m
Track Width	2.570m
Lock-to-lock time	5.00s
Wall to Wall Turning Radius	13.715m



**166 SOUTH SERVICE ROAD
VEHICLE MANOEUVRING DIAGRAM
HALTON REGION GARBAGE TRUCK
ULTIMATE CONDITION**

Project: 166 SOUTH SERVICE RD
Project No. 8078-03
Date: March 27, 2024
Revised: --

Scale 1:500

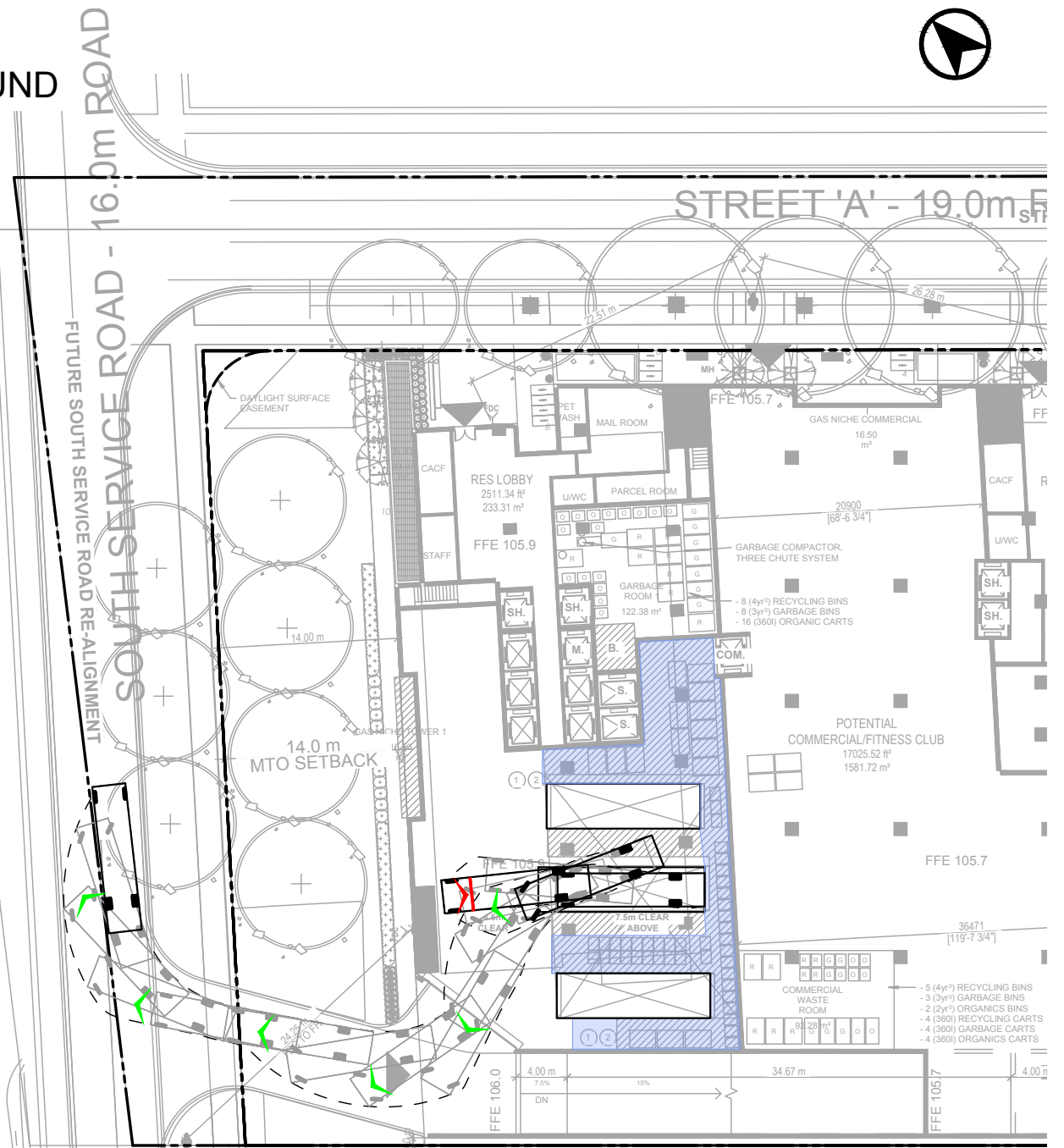
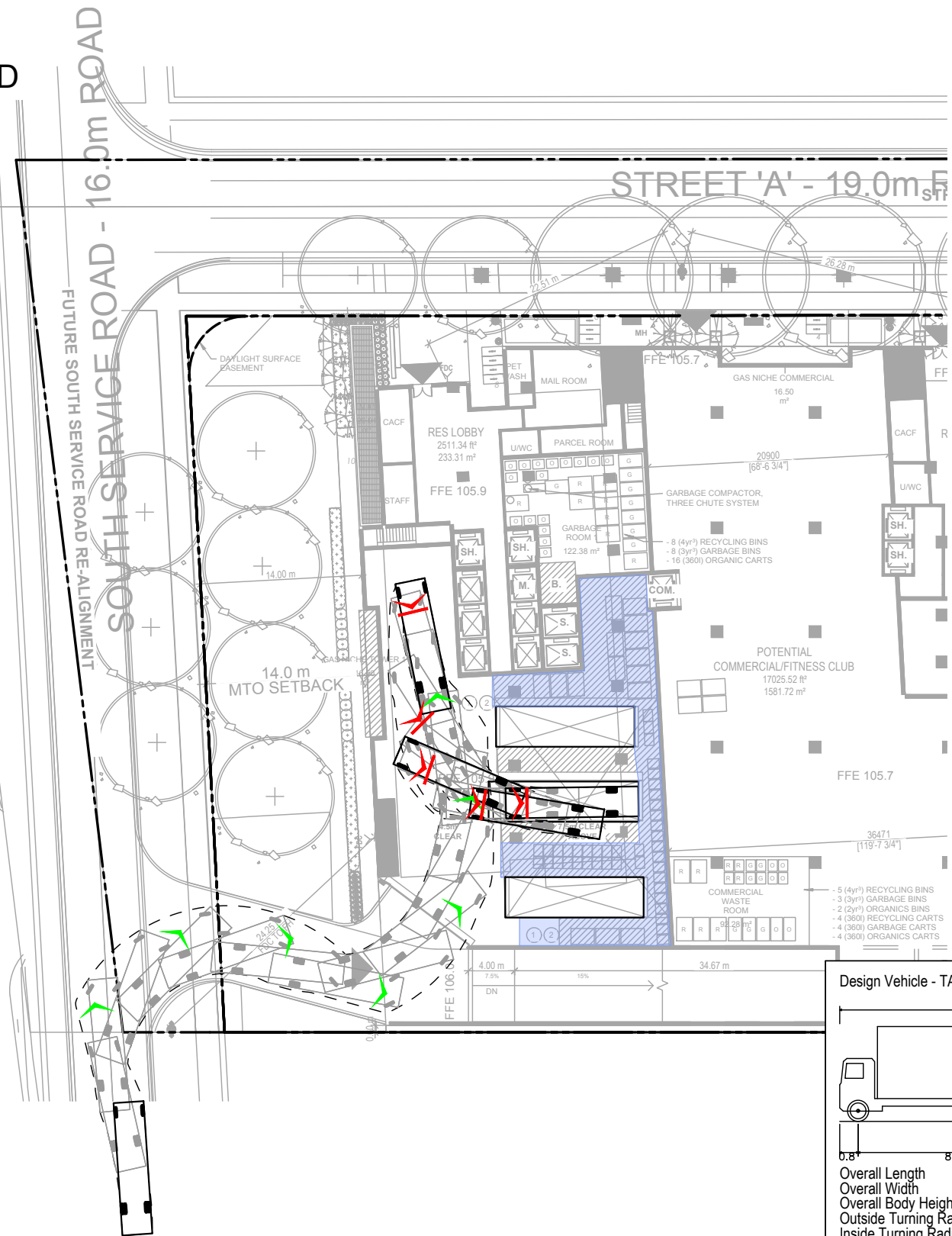
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INBOUND

OUTBOUND



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Date Plotted: March 27, 2024



Design Vehicle - TAC HSU (Heavy Single Unit)

Overall Length	11.50m
Overall Width	2.60m
Overall Body Height	4.11m
Outside Turning Radius	14.56m
Inside Turning Radius	8.69m



**166 SOUTH SERVICE ROAD
VEHICLE MANOEUVRING DIAGRAM
HEAVY SINGLE UNIT TRUCK
ULTIMATE CONDITION**

Project: 166 SOUTH SERVICE RD
Project No. 8078-03
Date: March 27, 2024
Revised: --

Scale 1:500

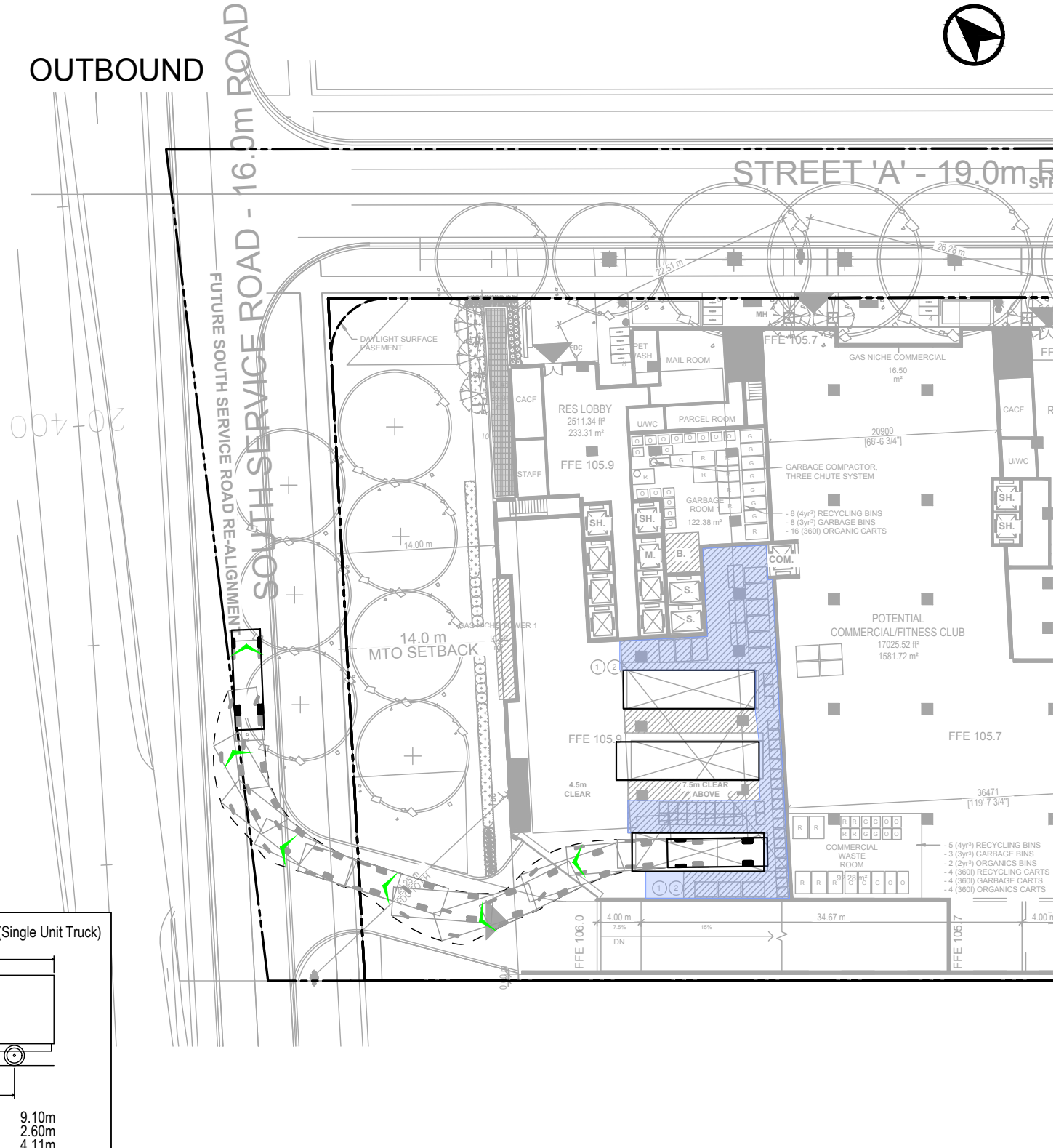
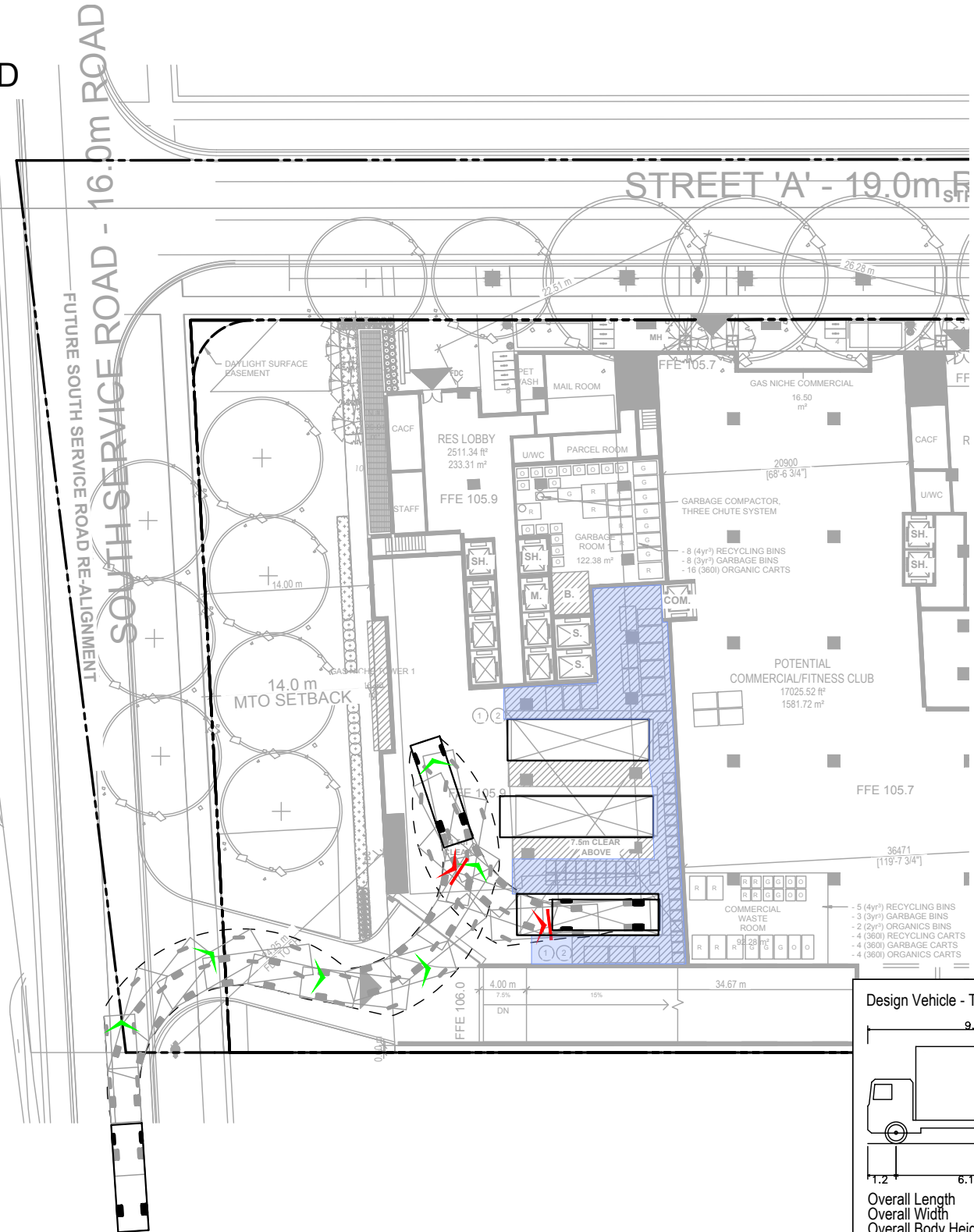
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INBOUND

OUTBOUND



File name: J:\8078-03\ba\ba\ba\ba-166 South Service Road-SPR-March21-2024.dwg Date Plotted: March 27, 2024



Design Vehicle - TAC SU (Single Unit Truck)

Overall Length	9.10m
Overall Width	2.60m
Overall Body Height	4.11m
Outside Turning Radius	13.40m
Inside Turning Radius	8.60m



**166 SOUTH SERVICE ROAD
VEHICLE MANOEUVRING DIAGRAM
SINGLE UNIT TRUCK
ULTIMATE CONDITION**

Project: 166 SOUTH SERVICE RD
Project No. 8078-03
Date: March 27, 2024
Revised: --

Scale 1:500

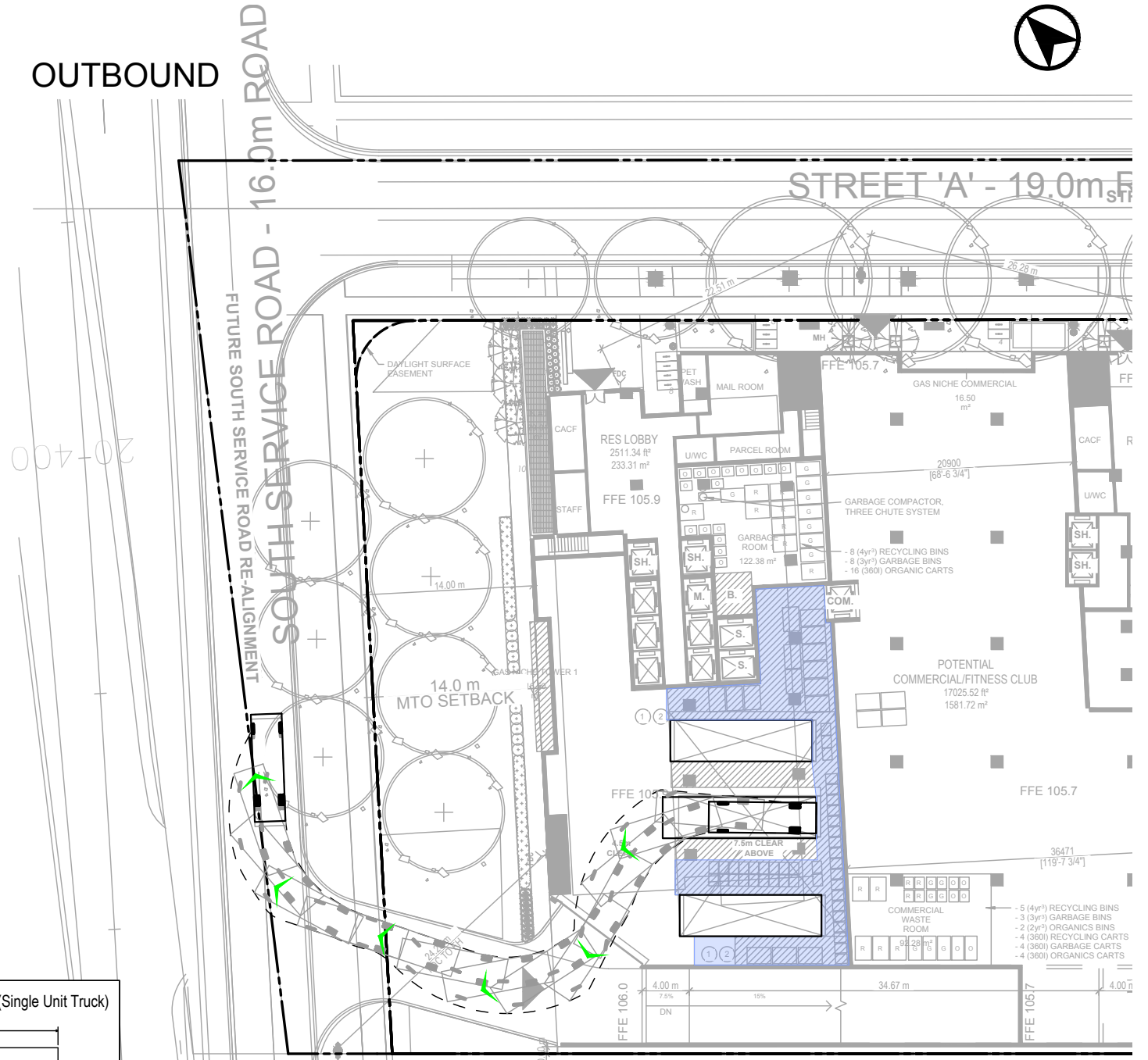
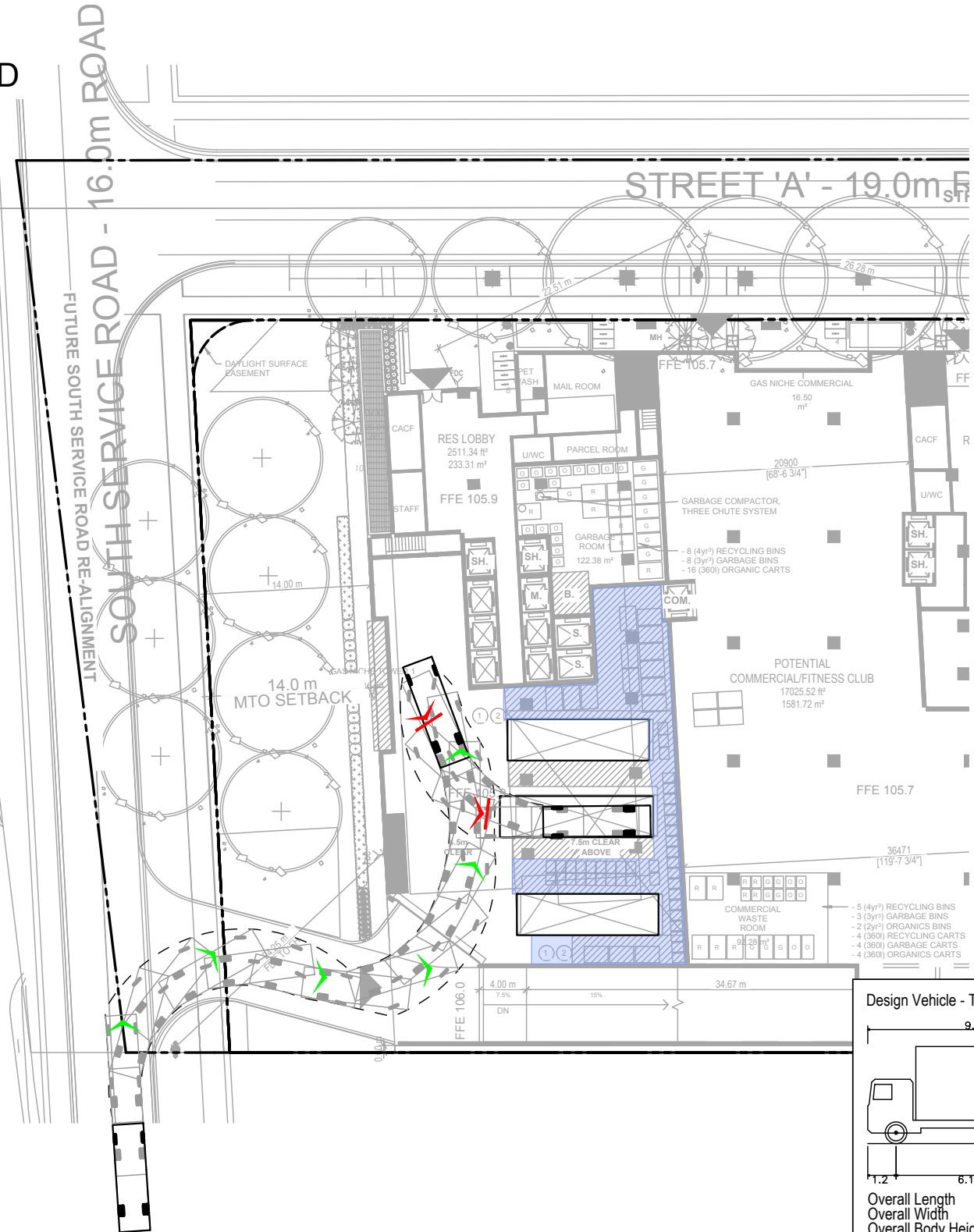
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INBOUND

OUTBOUND



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Date Plotted: March 27, 2024



Design Vehicle - TAC SU (Single Unit Truck)

Overall Length	9.10m
Overall Width	2.60m
Overall Body Height	4.11m
Outside Turning Radius	13.40m
Inside Turning Radius	8.60m



**166 SOUTH SERVICE ROAD
VEHICLE MANOEUVRING DIAGRAM
SINGLE UNIT TRUCK
ULTIMATE CONDITION**

Project: 166 SOUTH SERVICE RD
Project No. 8078-03
Date: March 27, 2024
Revised: --

Scale 1:500

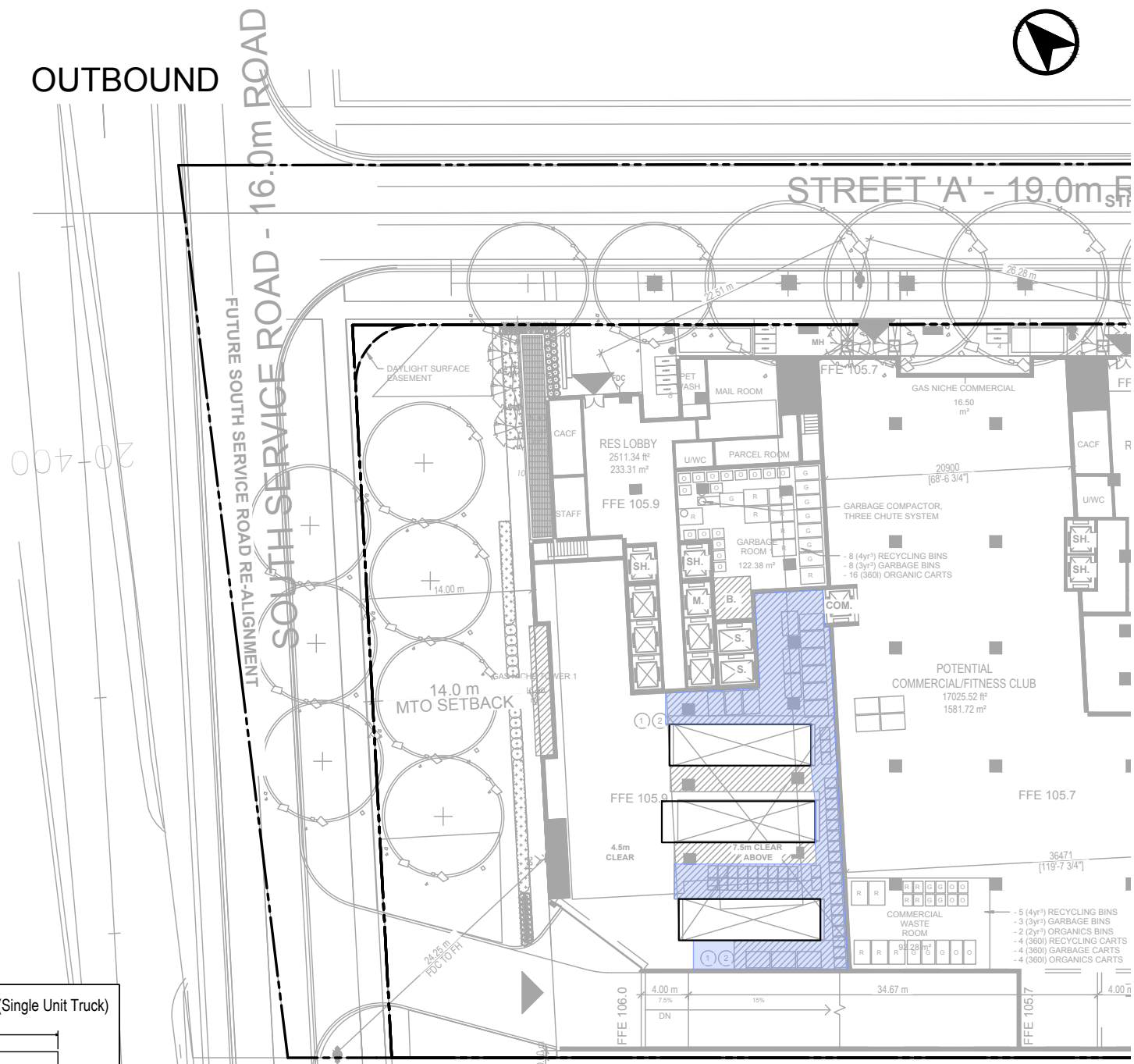
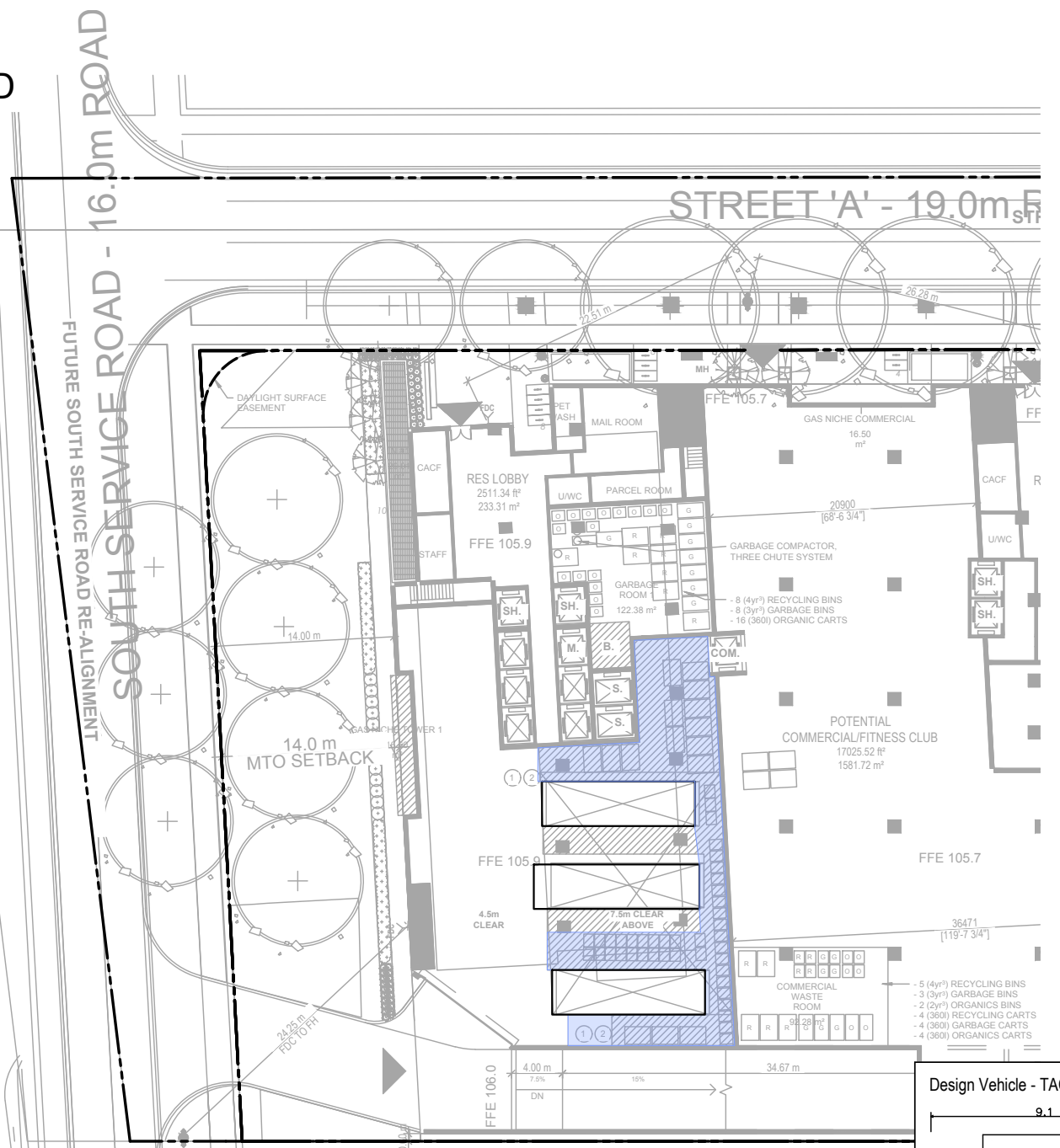
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INBOUND

OUTBOUND



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Date Plotted: March 27, 2024



Design Vehicle - TAC SU (Single Unit Truck)

Overall Length	9.10m
Overall Width	2.60m
Overall Body Height	4.11m
Outside Turning Radius	13.40m
Inside Turning Radius	8.60m



**166 SOUTH SERVICE ROAD
VEHICLE MANOEUVRING DIAGRAM
SINGLE UNIT TRUCK
ULTIMATE CONDITION**

Project: 166 SOUTH SERVICE RD
Project No. 8078-03
Date: March 27, 2024
Revised: --

Scale 1:500

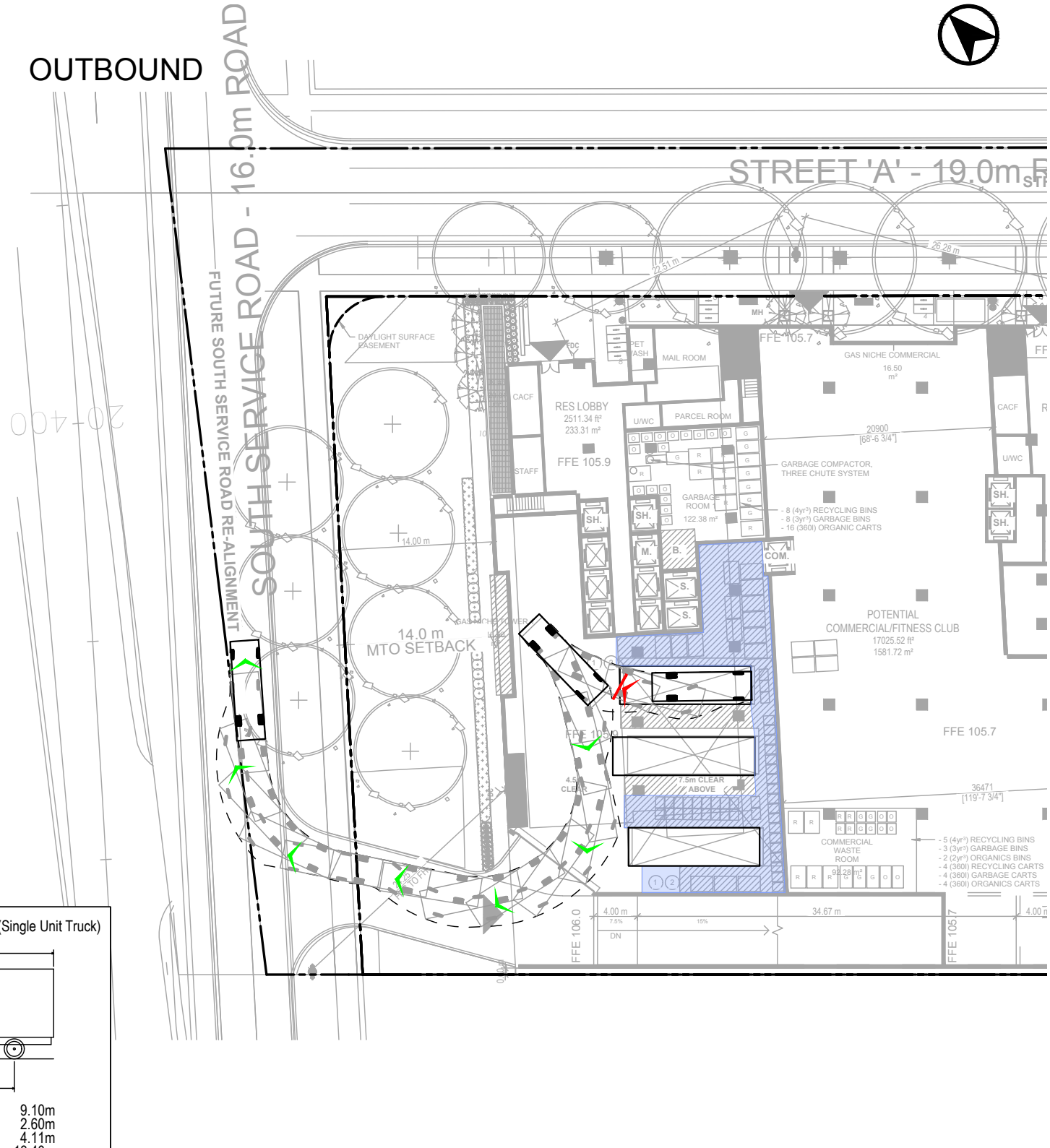
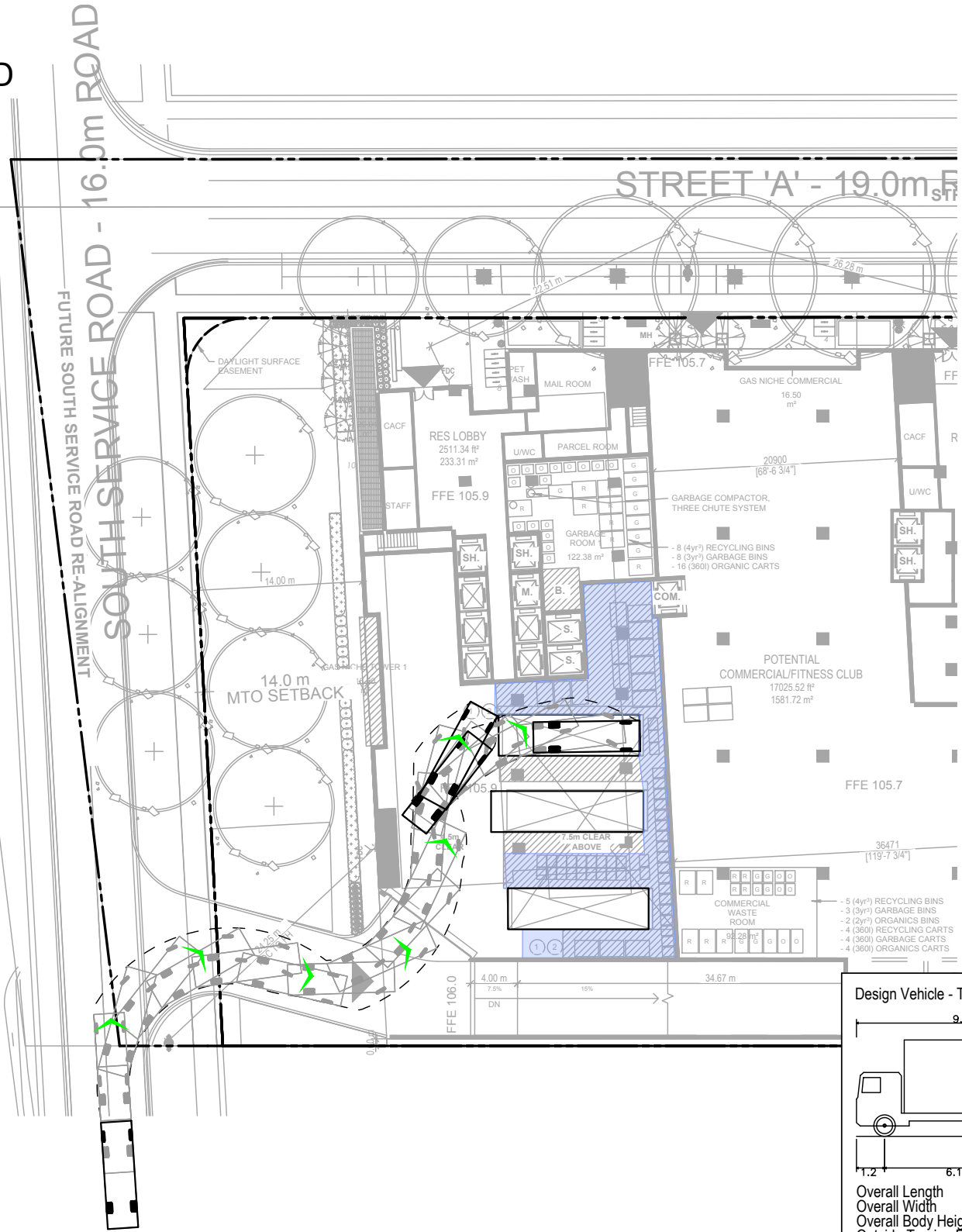
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INBOUND

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Date Plotted: March 27, 2024



Design Vehicle - TAC SU (Single Unit Truck)

Overall Length	9.10m
Overall Width	2.60m
Overall Body Height	4.11m
Outside Turning Radius	13.40m
Inside Turning Radius	8.60m



**166 SOUTH SERVICE ROAD
VEHICLE MANOEUVRING DIAGRAM
SINGLE UNIT TRUCK
ULTIMATE CONDITION**

Project: 166 SOUTH SERVICE RD
Project No. 8078-03
Date: March 27, 2024
Revised: --

Scale 1:500

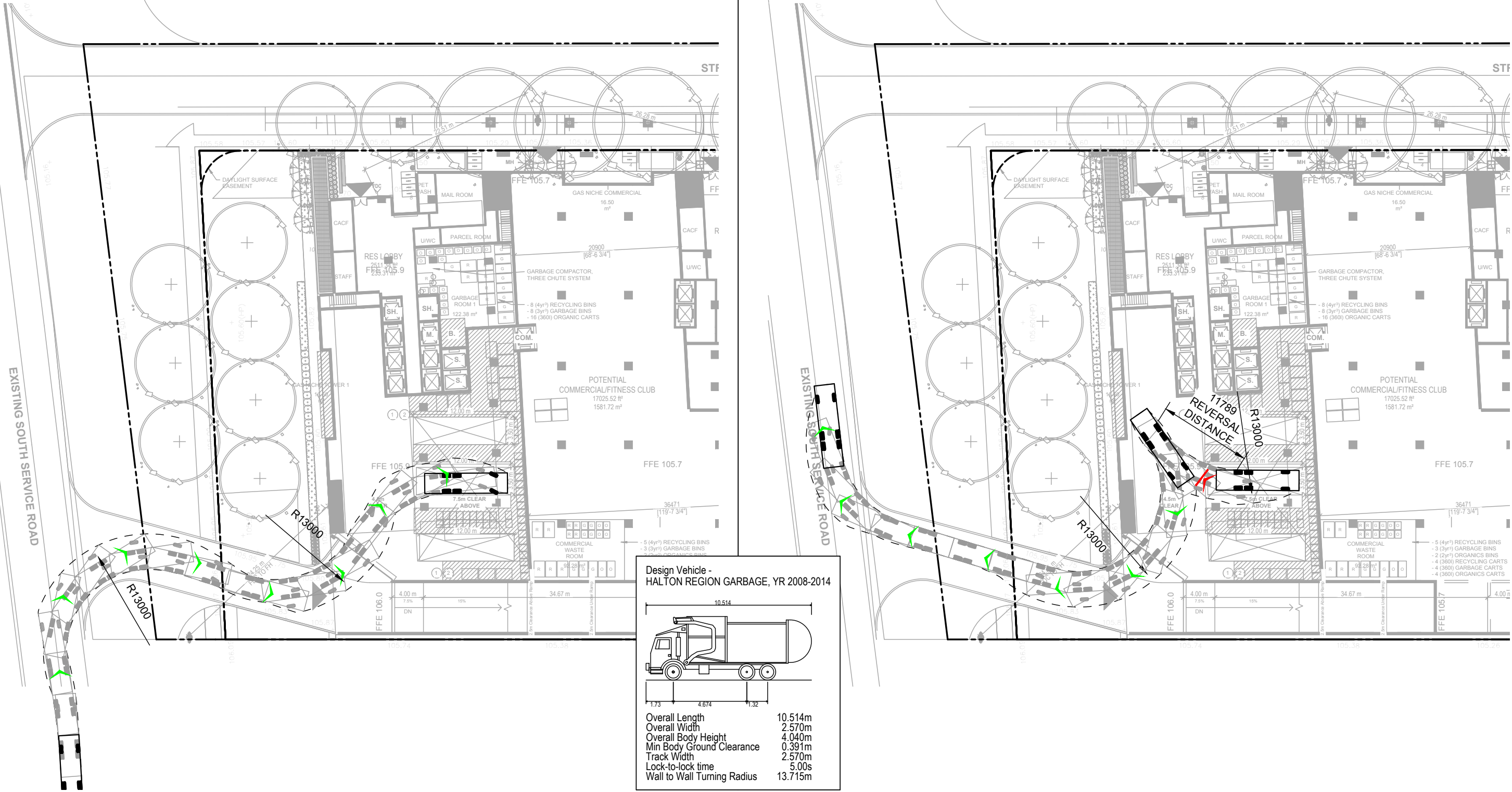
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INBOUND

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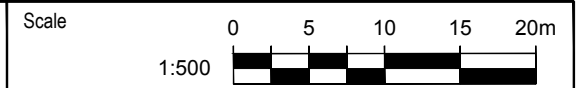
Design Vehicle - HALTON REGION GARBAGE, YR 2008-2014

Overall Length	10.514m
Overall Width	2.570m
Overall Body Height	4.040m
Min Body Ground Clearance	0.391m
Track Width	2.570m
Lock-to-lock time	5.00s
Wall to Wall Turning Radius	13.715m



**166 SOUTH SERVICE ROAD
VEHICLE MANOEUVRING DIAGRAM
HALTON REGION GARBAGE TRUCK
INTERIM CONDITION**

Project: 166 SOUTH SERVICE RD
Project No. 8078-03
Date: March 27, 2024
Revised: --



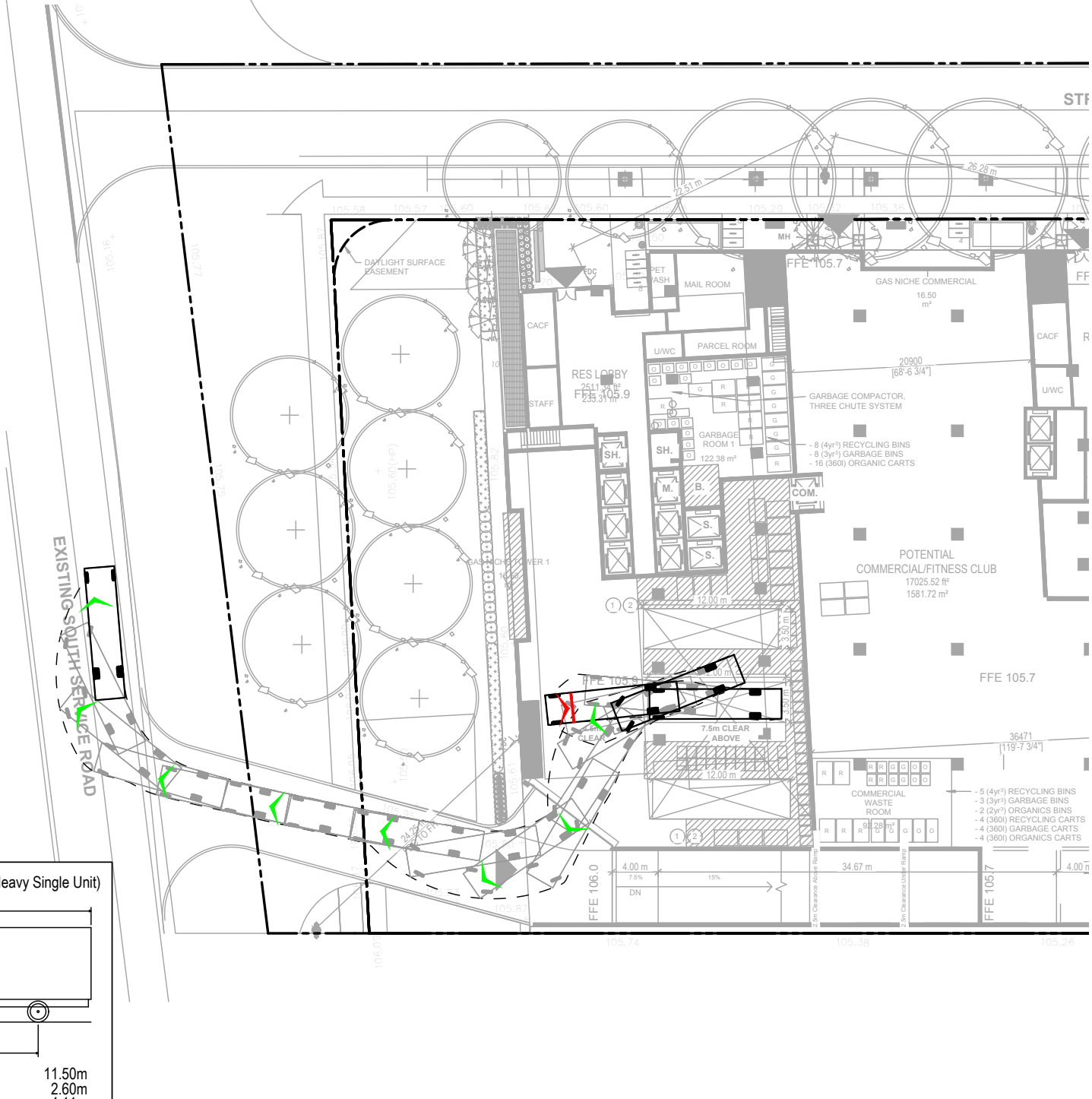
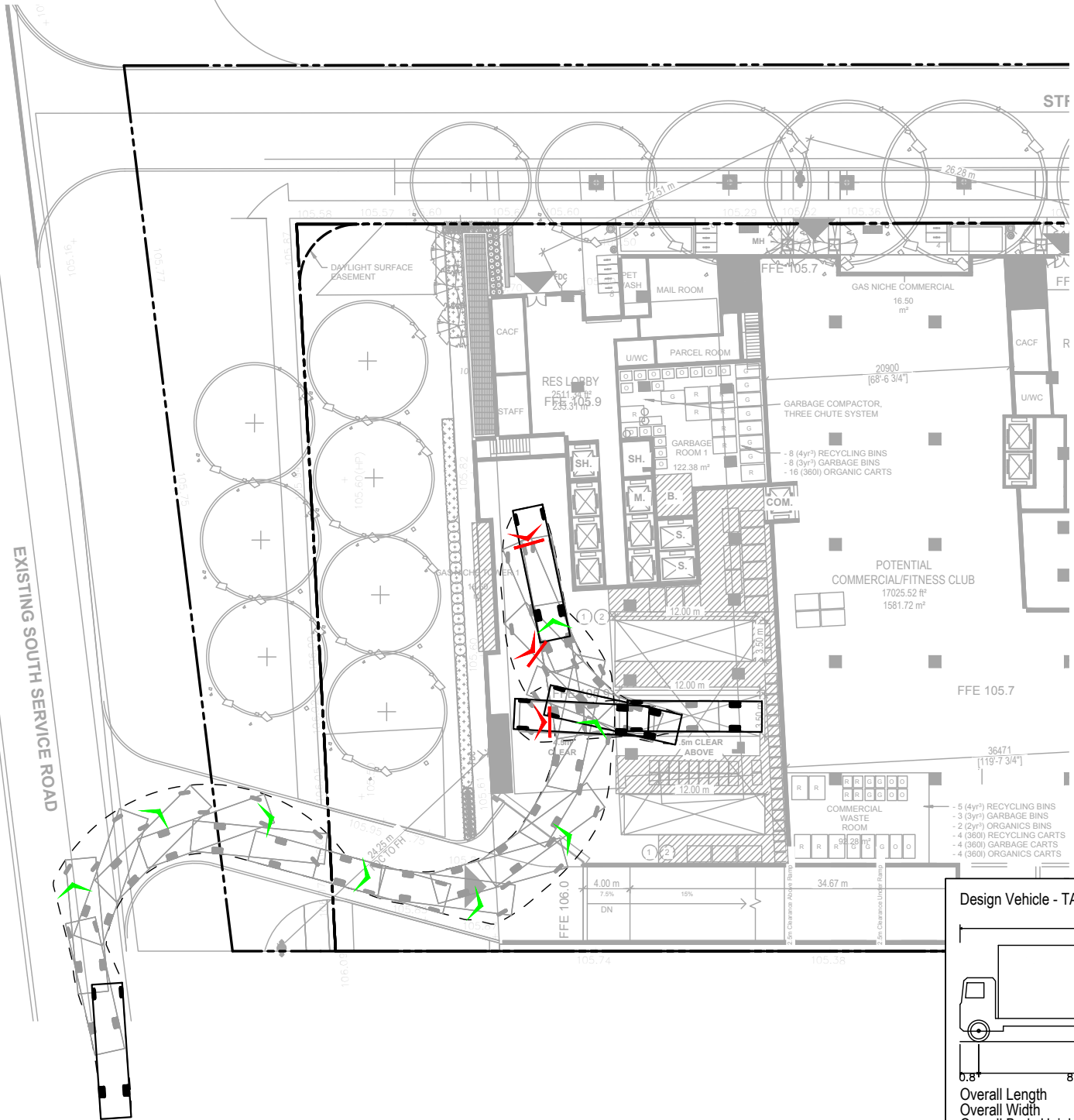
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INBOUND

OUTBOUND

File name: J:\8078-03\ba\site Plan Review\17_March 21-2024\ba-166 South Service Road-SPR-March21-2024.dwg
Date Plotted: March 27, 2024



Design Vehicle - TAC HSU (Heavy Single Unit)

Overall Length	11.50m
Overall Width	2.60m
Overall Body Height	4.11m
Outside Turning Radius	14.56m
Inside Turning Radius	8.69m



**166 SOUTH SERVICE ROAD
VEHICLE MANOEUVRING DIAGRAM
HEAVY SINGLE UNIT TRUCK
INTERIM CONDITION**

Project: 166 SOUTH SERVICE RD
Project No. 8078-03
Date: March 27, 2024
Revised: --

Scale 1:500

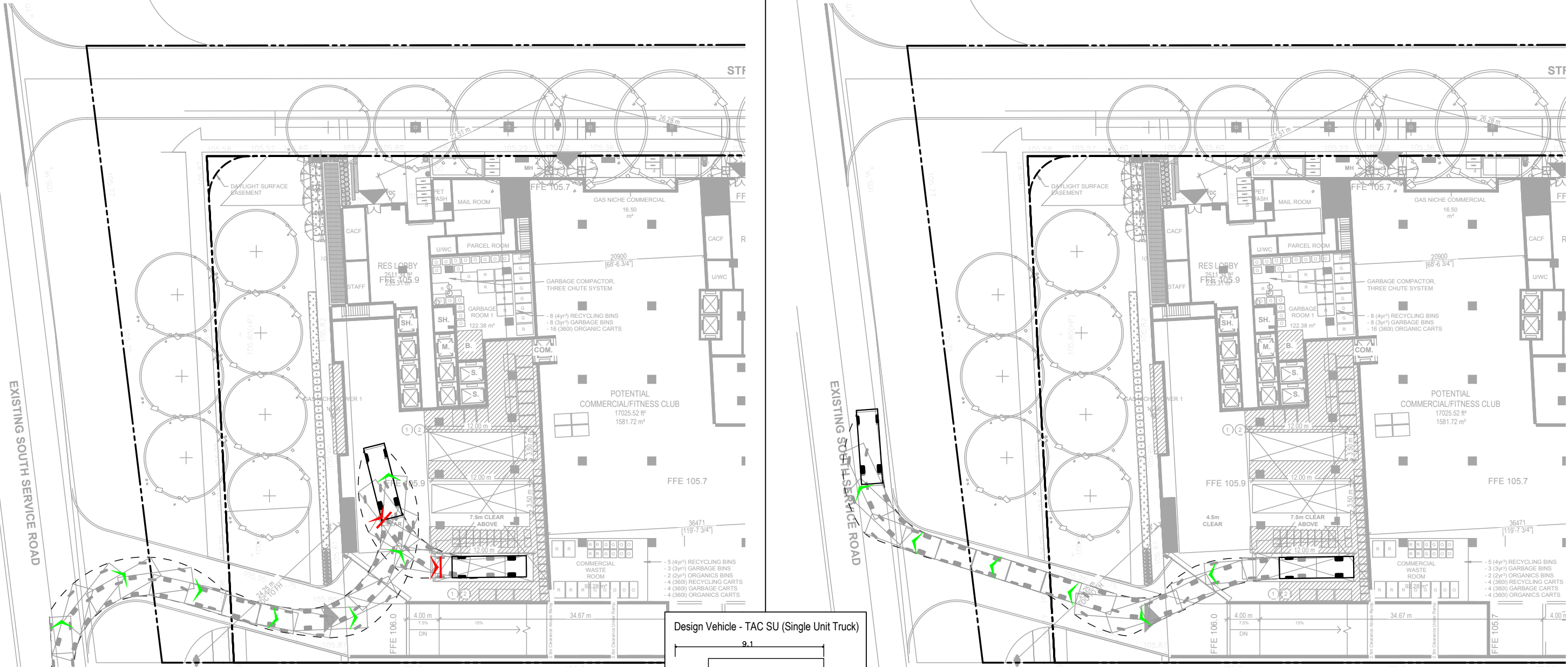
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OUTBOUND

Filename: J:\8078-03\ba\site Plan Review\17_March 21-2024\ba-166 South Service Road-SPR-March21-2024.dwg
Date Plotted: March 27, 2024



Design Vehicle - TAC SU (Single Unit Truck)

Overall Length	9.10m
Overall Width	2.60m
Overall Body Height	4.11m
Outside Turning Radius	13.40m
Inside Turning Radius	8.60m



166 SOUTH SERVICE ROAD
VEHICLE MANOEUVRING DIAGRAM
SINGLE UNIT TRUCK
INTERIM CONDITION

Project: 166 SOUTH SERVICE RD
 Project No. 8078-03
 Date: March 27, 2024
 Revised: --

Scale 1:500

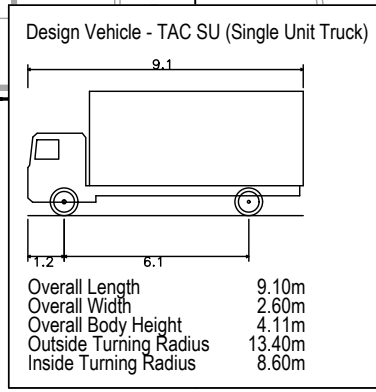
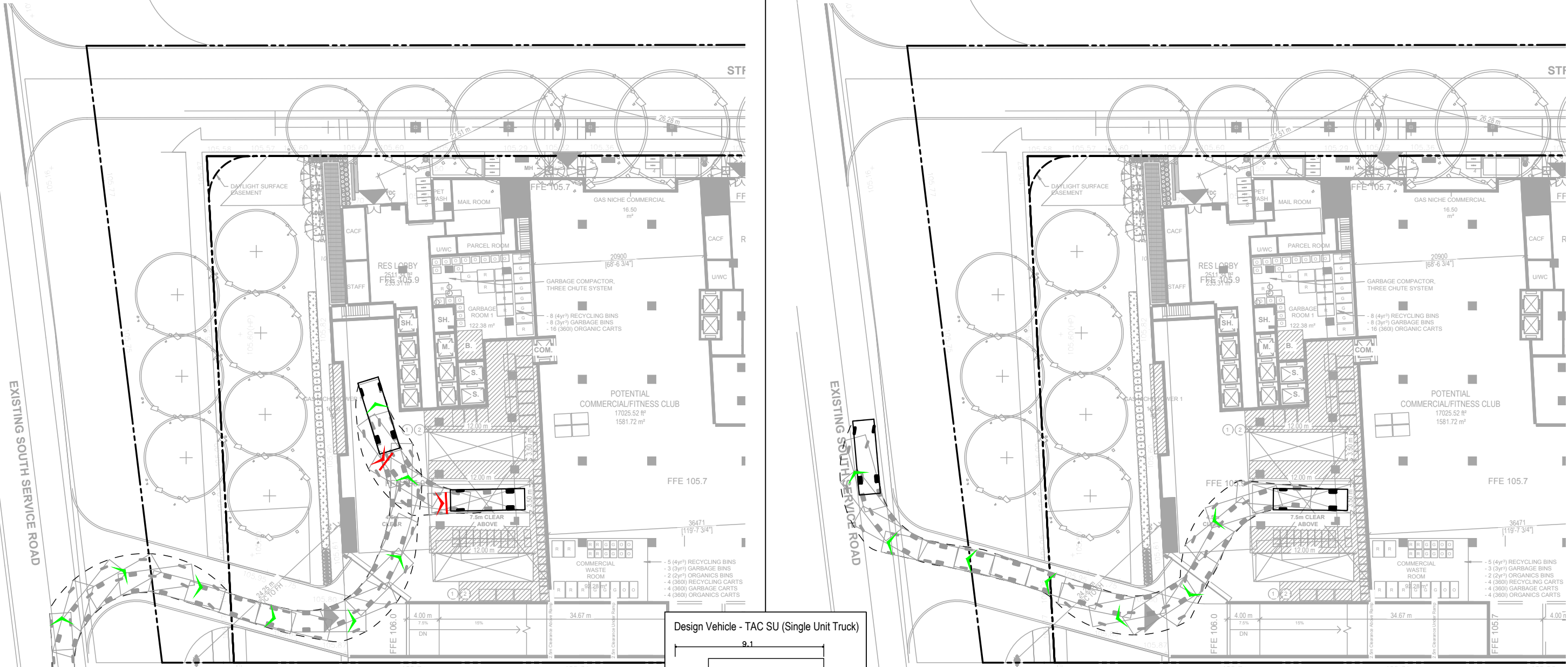
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INBOUND

OUTBOUND

File name: J:\8078-03\ba\site Plan Review\17_March 21-2024\ba-166 South Service Road-SPR-March21-2024.dwg
Date Plotted: March 27, 2024



166 SOUTH SERVICE ROAD
VEHICLE MANOEUVRING DIAGRAM
SINGLE UNIT TRUCK
INTERIM CONDITION

Project: 166 SOUTH SERVICE RD
 Project No. 8078-03
 Date: March 27, 2024
 Revised: --

Scale 1:500

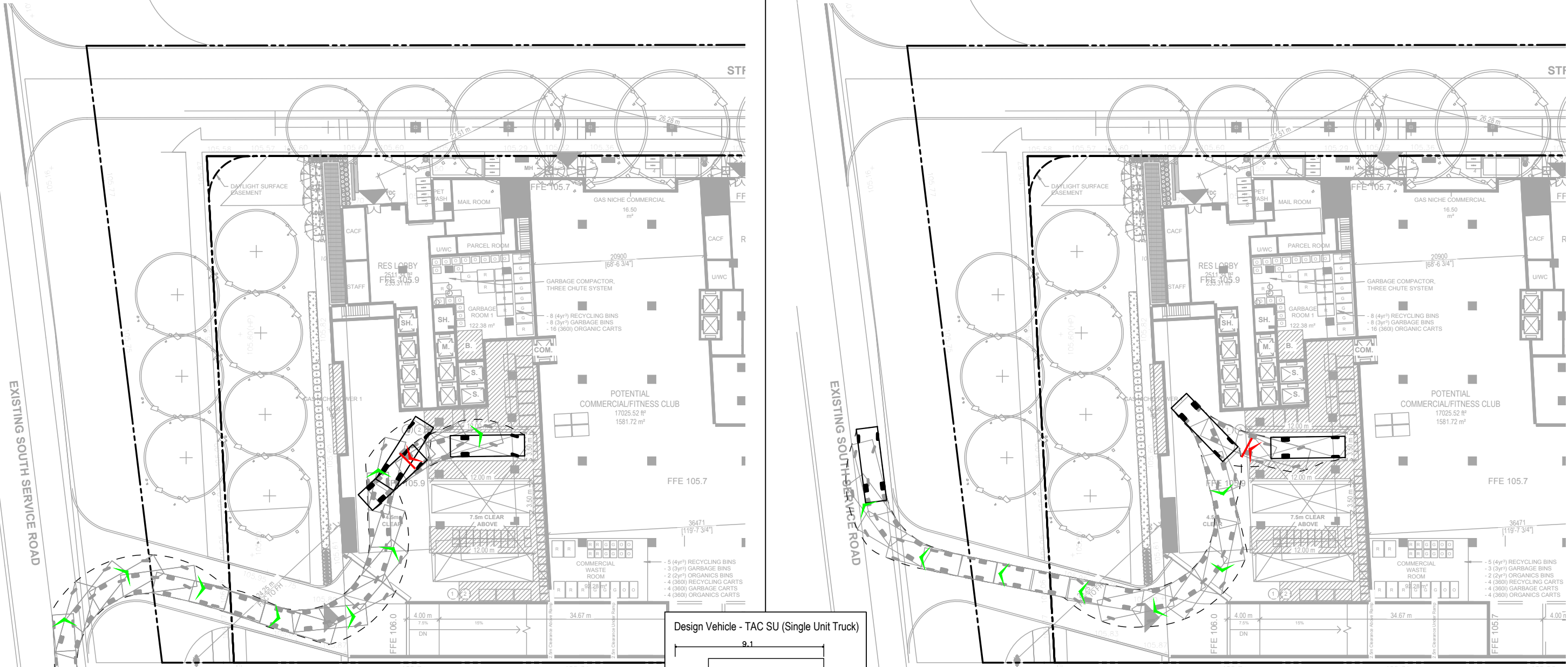
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INBOUND

OUTBOUND

Filename: J:\8078-03\ba\site Plan Review\17_March 21-2024\ba-166 South Service Road-SPR-March21-2024.dwg
Date Plotted: March 27, 2024



Design Vehicle - TAC SU (Single Unit Truck)

Overall Length	9.10m
Overall Width	2.60m
Overall Body Height	4.11m
Outside Turning Radius	13.40m
Inside Turning Radius	8.60m



166 SOUTH SERVICE ROAD
VEHICLE MANOEUVRING DIAGRAM
SINGLE UNIT TRUCK
INTERIM CONDITION

Project: 166 SOUTH SERVICE RD
 Project No. 8078-03
 Date: March 27, 2024
 Revised: --

Scale 1:500

Drawing No. **VMD-10**

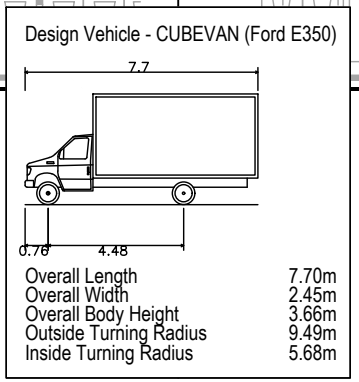
INBOUND

OUTBOUND



124 Parking Spaces
-commercial (23 small cars)
47x2 = 94+27 = 121
BICYCLE PARKING
LONG TERM = 121

124 Parking Spaces
-commercial (23 small cars)
47x2 = 94+27 = 121
BICYCLE PARKING
LONG TERM = 121



Filename: J:\8078-03\basistite Plan Review\17_March 21-2024\ba-166 South Service Road-SPR-March21-2024.dwg Date Plotted: March 27, 2024



166 SOUTH SERVICE ROAD VEHICLE MANOEUVRING DIAGRAM CUBE VAN

Project: 166 SOUTH SERVICE RD
Project No. 8078-03
Date: March 27, 2024
Revised: --

Scale 1:500

Drawing No. VMD-06

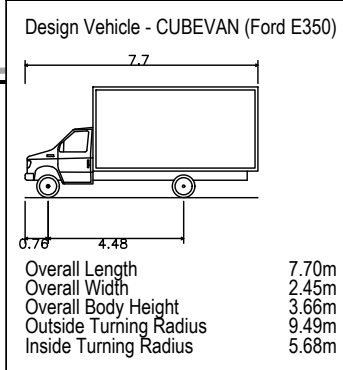
INBOUND

OUTBOUND



124 Parking Spaces
 -commercial (23 small cars)
 47x2 = 94+27 = 121
 BICYCLE PARKING
 LONG TERM = 121

124 Parking Spaces
 -commercial (23 small cars)
 47x2 = 94+27 = 121
 BICYCLE PARKING
 LONG TERM = 121



File name: J:\8078-03\ba\site Plan Review\17_March 21-2024\ba-166 South Service Road-SPR-March21-2024.dwg
 Date Plotted: March 27, 2024



166 SOUTH SERVICE ROAD VEHICLE MANOEUVRING DIAGRAM CUBE VAN

Project: 166 SOUTH SERVICE RD
 Project No. 8078-03
 Date: March 27, 2024
 Revised: --

Scale 1:500

Drawing No. **VMD-07**

INBOUND

OUTBOUND



124 Parking Spaces
-commercial (23 small cars)
47x2 = 94+27 = 121
BICYCLE PARKING
LONG TERM = 121

124 Parking Spaces
-commercial (23 small cars)
47x2 = 94+27 = 121
BICYCLE PARKING
LONG TERM = 121

Design Vehicle - CUBEVAN (Ford E350)

Overall Length	7.70m
Overall Width	2.45m
Overall Body Height	3.66m
Outside Turning Radius	9.49m
Inside Turning Radius	5.68m



166 SOUTH SERVICE ROAD VEHICLE MANOEUVRING DIAGRAM CUBE VAN

Project: 166 SOUTH SERVICE RD
Project No. 8078-03
Date: March 27, 2024
Revised: --



Drawing No. **VMD-08**

Date Plotted: March 27, 2024
File Name: J:\8078-03\ba\site\Plan Review\17_March 21-2024\ba-166 South Service Road-SPR-March 21-2024.dwg

Appendix E

ITE Internal Capture Calculations



NCHRP 8-51 Internal Trip Capture Estimation Tool			
Project Name:	210590 - 166 South Service Rd	Organization:	Paradigm Transportation Solutions Limited
Project Location:	Oakville, ON	Performed By:	
Scenario Description:		Date:	
Analysis Year:	Site Generated Traffic	Checked By:	
Analysis Period:	AM Street Peak Hour	Date:	

Table 1-A: Base Vehicle-Trip Generation Estimates (Single-Use Site Estimate)						
Land Use	Development Data (For Information Only)			Estimated Vehicle-Trips		
	ITE LUCs ¹	Quantity	Units	Total	Entering	Exiting
Office				0		
Retail	495, 822	63,011	Square Feet	96	52	44
Restaurant	-	-	-	0		
Cinema/Entertainment	-	-	-	0		
Residential	222	1,851	Dwelling Units	365	40	325
Hotel				0		
All Other Land Uses ²	-	-	-	0		
Total				461	92	369

Table 2-A: Mode Split and Vehicle Occupancy Estimates						
Land Use	Entering Trips			Exiting Trips		
	Veh. Occ.	% Transit	% Non-Motorized	Veh. Occ.	% Transit	% Non-Motorized
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						
All Other Land Uses ²						

Table 3-A: Average Land Use Interchange Distances (Feet Walking Distance)						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						

Table 4-A: Internal Person-Trip Origin-Destination Matrix*						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		0	0	0	0	0
Retail	0		0	0	1	0
Restaurant	0	0		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	0	3	0	0		0
Hotel	0	0	0	0	0	

Table 5-A: Computations Summary			
	Total	Entering	Exiting
All Person-Trips	461	92	369
Internal Capture Percentage	2%	4%	1%
External Vehicle-Trips ³	453	88	365
External Transit-Trips ⁴	0	0	0
External Non-Motorized Trips ⁴	0	0	0

Table 6-A: Internal Trip Capture Percentages by Land Use		
Land Use	Entering Trips	Exiting Trips
Office	N/A	N/A
Retail	6%	2%
Restaurant	N/A	N/A
Cinema/Entertainment	N/A	N/A
Residential	3%	1%
Hotel	N/A	N/A

¹Land Use Codes (LUCs) from *Trip Generation Informational Report*, published by the Institute of Transportation Engineers.

²Total estimate for all other land uses at mixed-use development site-not subject to internal trip capture computations in this estimator

³Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-A

⁴Person-Trips

*Indicates computation that has been rounded to the nearest whole number.

Estimation Tool Developed by the Texas Transportation Institute

Project Name:	210590 - 166 South Service Rd
Analysis Period:	AM Street Peak Hour

Land Use	Table 7-A (D): Entering Trips			Table 7-A (O): Exiting Trips		
	Veh. Occ.	Vehicle-Trips	Person-Trips*	Veh. Occ.	Vehicle-Trips	Person-Trips*
Office	1.00	0	0	1.00	0	0
Retail	1.00	52	52	1.00	44	44
Restaurant	1.00	0	0	1.00	0	0
Cinema/Entertainment	1.00	0	0	1.00	0	0
Residential	1.00	40	40	1.00	325	325
Hotel	1.00	0	0	1.00	0	0

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		0	0	0	0	0
Retail	13		6	0	6	0
Restaurant	0	0		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	7	3	65	0		0
Hotel	0	0	0	0	0	

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		17	0	0	0	0
Retail	0		0	0	1	0
Restaurant	0	4		0	2	0
Cinema/Entertainment	0	0	0		0	0
Residential	0	9	0	0		0
Hotel	0	2	0	0	0	

Destination Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles ¹	Transit ²	Non-Motorized ²
Office	0	0	0	0	0	0
Retail	3	49	52	49	0	0
Restaurant	0	0	0	0	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	1	39	40	39	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses ³	0	0	0	0	0	0

Origin Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles ¹	Transit ²	Non-Motorized ²
Office	0	0	0	0	0	0
Retail	1	43	44	43	0	0
Restaurant	0	0	0	0	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	3	322	325	322	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses ³	0	0	0	0	0	0

¹Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-A
²Person-Trips
³Total estimate for all other land uses at mixed-use development site-not subject to internal trip capture computations in this estimator
*Indicates computation that has been rounded to the nearest whole number.

NCHRP 8-51 Internal Trip Capture Estimation Tool			
Project Name:	210590 - 166 South Service Rd	Organization:	Paradigm Transportation Solutions Limited
Project Location:	Oakville, ON	Performed By:	
Scenario Description:		Date:	
Analysis Year:	Site Generated Traffic	Checked By:	
Analysis Period:	PM Street Peak Hour	Date:	

Table 1-P: Base Vehicle-Trip Generation Estimates (Single-Use Site Estimate)						
Land Use	Development Data (For Information Only)			Estimated Vehicle-Trips		
	ITE LUCs ¹	Quantity	Units	Total	Entering	Exiting
Office				0		
Retail	495, 822	63,011	Square Feet	259	141	118
Restaurant	-	-	-	0		
Cinema/Entertainment	-	-	-	0		
Residential	222	1,851	Dwelling Units	307	212	95
Hotel				0		
All Other Land Uses ²	-	-	-	0		
Total				566	353	213

Table 2-P: Mode Split and Vehicle Occupancy Estimates						
Land Use	Entering Trips			Exiting Trips		
	Veh. Occ.	% Transit	% Non-Motorized	Veh. Occ.	% Transit	% Non-Motorized
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						
All Other Land Uses ²						

Table 3-P: Average Land Use Interchange Distances (Feet Walking Distance)						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						

Table 4-P: Internal Person-Trip Origin-Destination Matrix*						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		0	0	0	0	0
Retail	0		0	0	31	0
Restaurant	0	0		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	0	14	0	0		0
Hotel	0	0	0	0	0	

Table 5-P: Computations Summary			
	Total	Entering	Exiting
All Person-Trips	566	353	213
Internal Capture Percentage	16%	13%	21%
External Vehicle-Trips ³	476	308	168
External Transit-Trips ⁴	0	0	0
External Non-Motorized Trips ⁴	0	0	0

Table 6-P: Internal Trip Capture Percentages by Land Use		
Land Use	Entering Trips	Exiting Trips
Office	N/A	N/A
Retail	10%	26%
Restaurant	N/A	N/A
Cinema/Entertainment	N/A	N/A
Residential	15%	15%
Hotel	N/A	N/A

¹Land Use Codes (LUCs) from *Trip Generation Informational Report*, published by the Institute of Transportation Engineers.

²Total estimate for all other land uses at mixed-use development site-not subject to internal trip capture computations in this estimator

³Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-P

⁴Person-Trips

*Indicates computation that has been rounded to the nearest whole number.

Estimation Tool Developed by the Texas Transportation Institute

Project Name:	210590 - 166 South Service Rd
Analysis Period:	PM Street Peak Hour

Table 7-P: Conversion of Vehicle-Trip Ends to Person-Trip Ends						
Land Use	Table 7-P (D): Entering Trips			Table 7-P (O): Exiting Trips		
	Veh. Occ.	Vehicle-Trips	Person-Trips*	Veh. Occ.	Vehicle-Trips	Person-Trips*
Office	1.00	0	0	1.00	0	0
Retail	1.00	141	141	1.00	118	118
Restaurant	1.00	0	0	1.00	0	0
Cinema/Entertainment	1.00	0	0	1.00	0	0
Residential	1.00	212	212	1.00	95	95
Hotel	1.00	0	0	1.00	0	0

Table 8-P (O): Internal Person-Trip Origin-Destination Matrix (Computed at Origin)						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		0	0	0	0	0
Retail	2		34	5	31	6
Restaurant	0	0		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	4	40	20	0		3
Hotel	0	0	0	0	0	

Table 8-P (D): Internal Person-Trip Origin-Destination Matrix (Computed at Destination)						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		11	0	0	8	0
Retail	0		0	0	98	0
Restaurant	0	71		0	34	0
Cinema/Entertainment	0	6	0		8	0
Residential	0	14	0	0		0
Hotel	0	3	0	0	0	

Table 9-P (D): Internal and External Trips Summary (Entering Trips)						
Destination Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles ¹	Transit ²	Non-Motorized ²
Office	0	0	0	0	0	0
Retail	14	127	141	127	0	0
Restaurant	0	0	0	0	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	31	181	212	181	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses ³	0	0	0	0	0	0

Table 9-P (O): Internal and External Trips Summary (Exiting Trips)						
Origin Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles ¹	Transit ²	Non-Motorized ²
Office	0	0	0	0	0	0
Retail	31	87	118	87	0	0
Restaurant	0	0	0	0	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	14	81	95	81	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses ³	0	0	0	0	0	0

¹Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-P

²Person-Trips

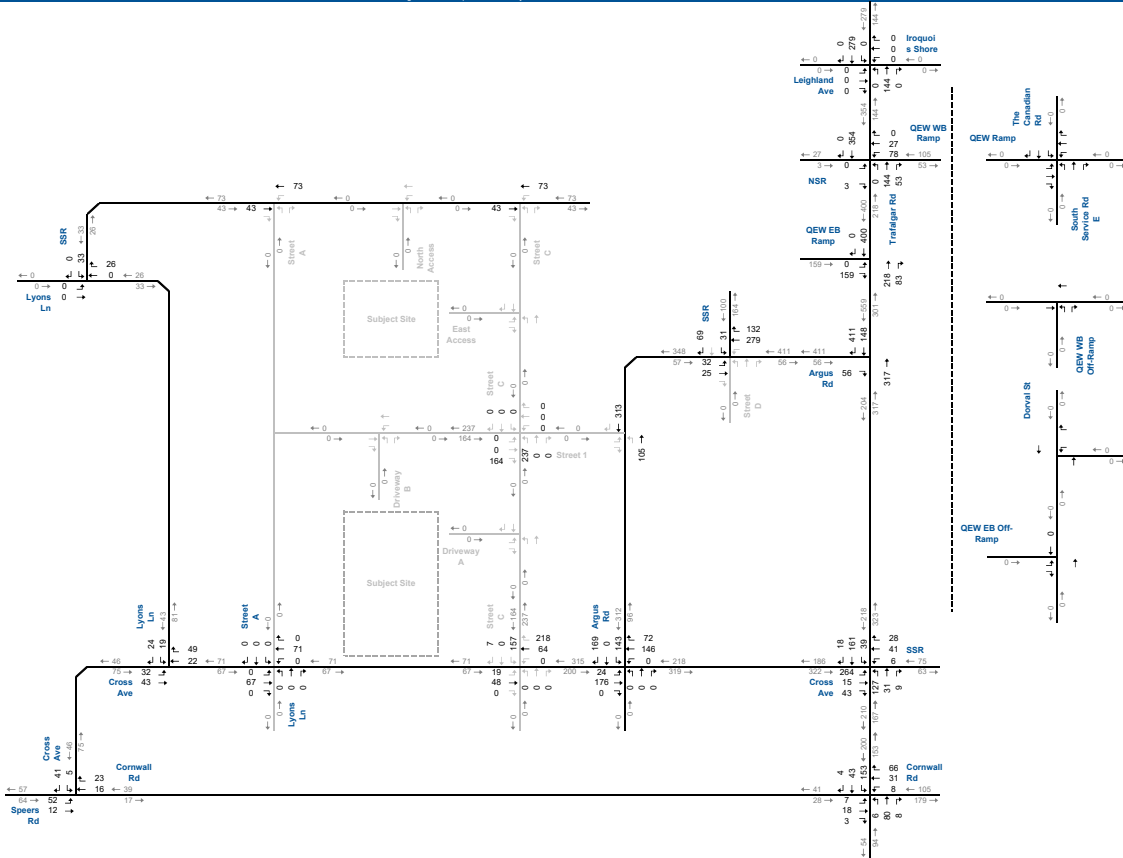
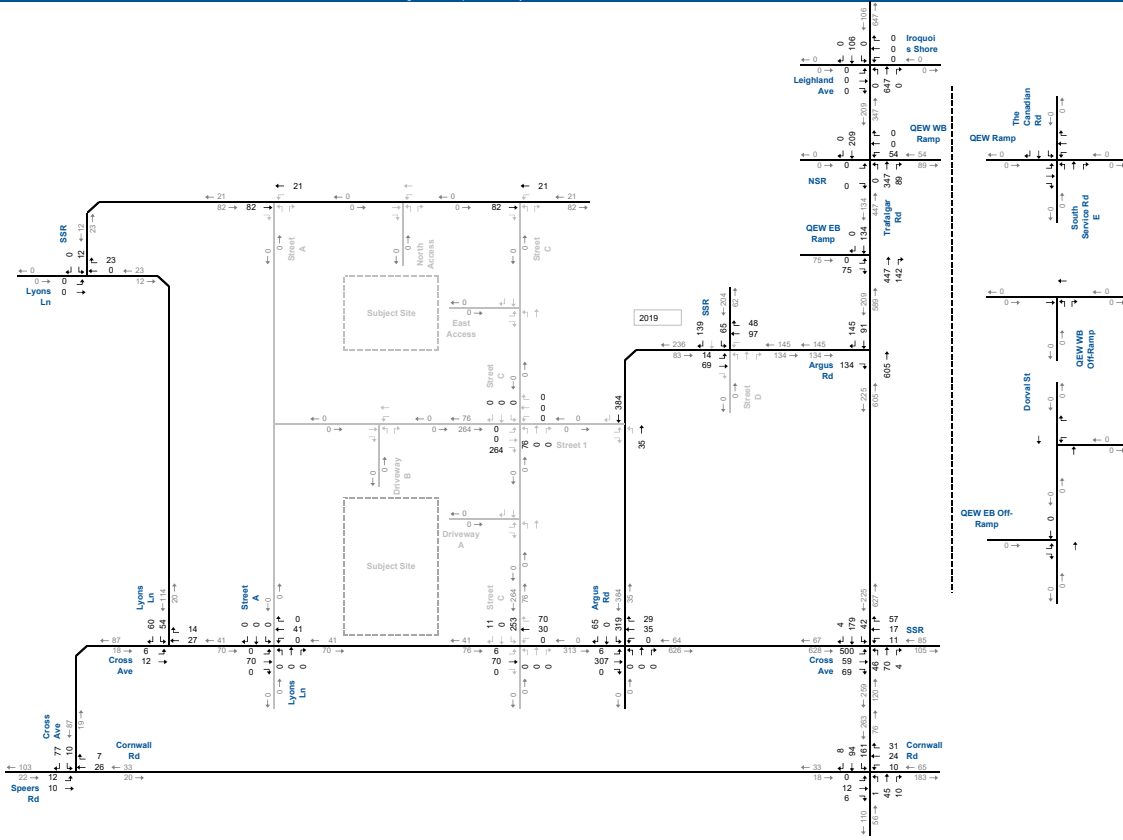
³Total estimate for all other land uses at mixed-use development site-not subject to internal trip capture computations in this estimator

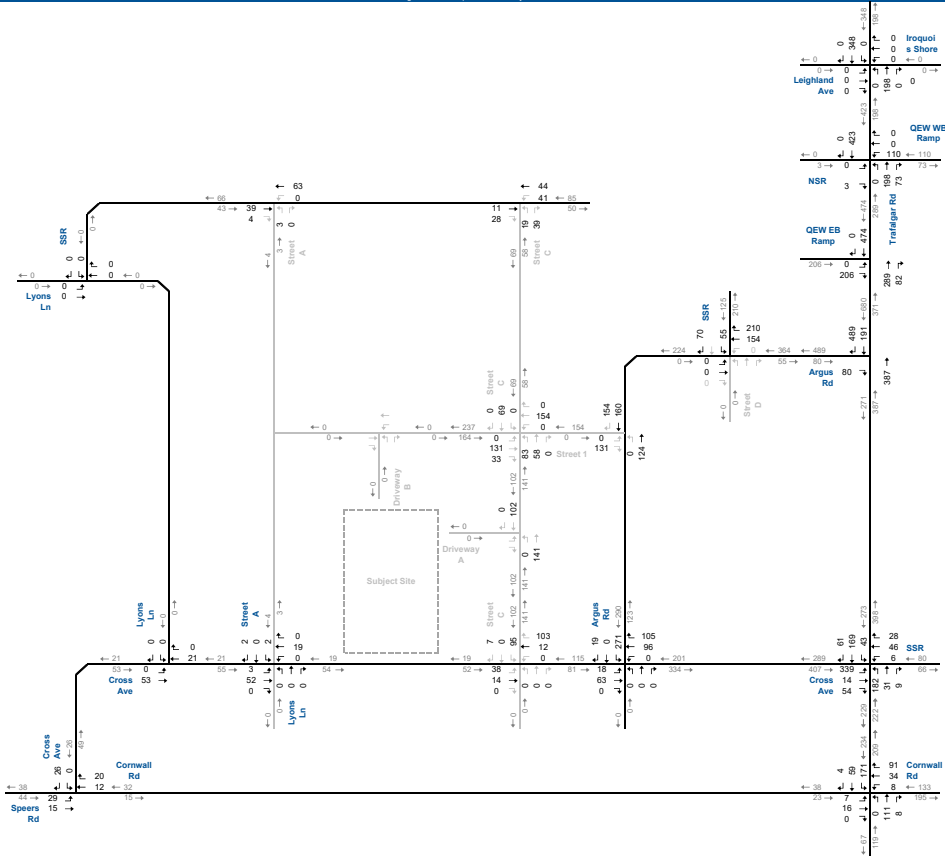
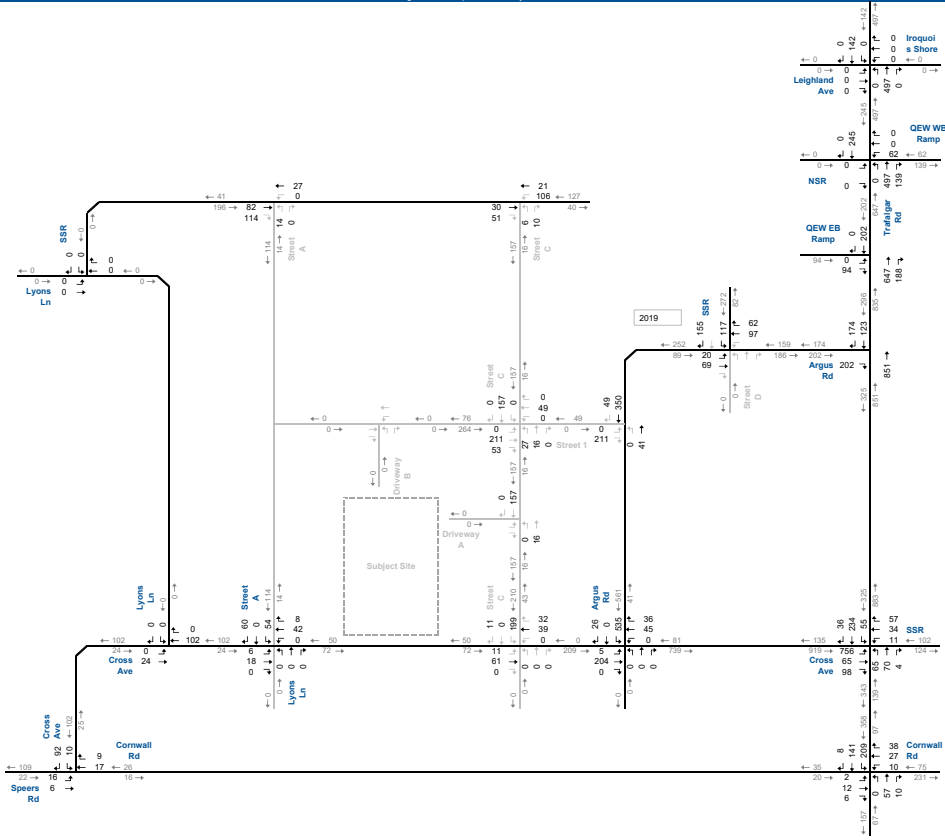
*Indicates computation that has been rounded to the nearest whole number.

Appendix F

Midtown Oakville Background Traffic







Appendix G

Synchro Analysis




Lanes, Volumes, Timings

Base Year 2023 AM.syn

1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd

04-03-2024




Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	31	96	265	549	68	158	129	834	631	147	1273	42
Future Volume (vph)	31	96	265	549	68	158	129	834	631	147	1273	42
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0		0.0	165.0		25.0	145.0		0.0	95.0		90.0
Storage Lanes	1		1	1		1	1		1	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Ped Bike Factor	0.99					0.98			0.99	1.00		
Frt			0.850			0.850			0.850			0.850
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1624	1693	1425	3060	1676	1398	1425	4446	1398	1562	4532	1398
Fit Permitted	0.709			0.448			0.116			0.272		
Satd. Flow (perm)	1200	1693	1425	1443	1676	1366	174	4446	1377	446	4532	1398
Right Turn on Red			Yes			Yes			Yes			
Satd. Flow (RTOR)			195			172			682			109
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		285.9			293.8			275.1			252.7	
Travel Time (s)		20.6			21.2			19.8			18.2	
Confl. Peds. (#/hr)	11				11			10		10		
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
Heavy Vehicles (%)	0%	1%	2%	3%	2%	4%	14%	5%	4%	4%	3%	4%
Adj. Flow (vph)	34	104	288	597	74	172	140	907	686	160	1384	46
Shared Lane Traffic (%)												
Lane Group Flow (vph)	34	104	288	597	74	172	140	907	686	160	1384	46
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)			7.2			7.2			3.6			3.6
Link Offset(m)			0.0			0.0			0.0			0.0
Crosswalk Width(m)			4.8			4.8			4.8			4.8
Two way Left Turn Lane												
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings

Base Year 2023 AM.syn

1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd

04-03-2024



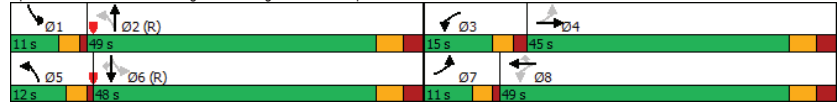
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA	Free	pm+pt	NA	Perm	pm+pt	NA	Free	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		Free	8		8	2		Free	6		6
Detector Phase	7	4		3	8	8	5	2		1	6	6
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0	10.0	6.0	15.0		6.0	15.0	15.0
Minimum Split (s)	10.0	34.0		11.0	43.0	43.0	10.0	34.0		10.0	34.0	34.0
Total Split (s)	11.0	45.0		15.0	49.0	49.0	12.0	49.0		11.0	48.0	48.0
Total Split (%)	9.2%	37.5%		12.5%	40.8%	40.8%	10.0%	40.8%		9.2%	40.0%	40.0%
Maximum Green (s)	7.0	38.0		10.0	42.0	42.0	8.0	42.0		7.0	41.0	41.0
Yellow Time (s)	3.0	4.0		3.0	4.0	4.0	3.0	4.0		3.0	4.0	4.0
All-Red Time (s)	1.0	3.0		2.0	3.0	3.0	1.0	3.0		1.0	3.0	3.0
Lost Time Adjust (s)	0.0	-3.0		0.0	-3.0	-3.0	0.0	-3.0		0.0	-3.0	-3.0
Total Lost Time (s)	4.0	4.0		5.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	4.0		3.0	4.0	4.0	3.0	5.0		3.0	5.0	5.0
Recall Mode	None	None		None	None	None	None	C-Max		None	C-Max	C-Max
Walk Time (s)				7.0	7.0		7.0			7.0		7.0
Flash Dont Walk (s)				29.0	29.0		20.0			20.0		20.0
Pedestrian Calls (#/hr)				0	0		0			0		0
Act Effct Green (s)	23.6	17.0	120.0	30.4	25.4	25.4	79.1	65.3	120.0	72.9	62.2	62.2
Actuated g/C Ratio	0.20	0.14	1.00	0.25	0.21	0.21	0.66	0.54	1.00	0.61	0.52	0.52
v/c Ratio	0.13	0.44	0.20	1.20	0.21	0.41	0.54	0.38	0.50	0.43	0.59	0.06
Control Delay	33.0	52.2	0.3	143.8	41.7	9.0	19.2	17.0	1.3	12.1	22.2	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	33.0	52.2	0.3	143.8	41.7	9.0	19.2	17.0	1.3	12.1	22.2	0.1
LOS	C	D	A	F	D	A	B	B	A	B	C	A
Approach Delay		15.6			107.3			11.0				20.5
Approach LOS		B			F			B				C
Queue Length 50th (m)	6.4	24.0	0.0	-87.5	16.0	0.0	11.7	44.8	0.0	13.4	82.0	0.0
Queue Length 95th (m)	14.1	40.2	0.0	#117.3	29.2	18.7	30.2	64.3	0.0	25.3	115.5	0.0
Internal Link Dist (m)		261.9			269.8			251.1				228.7
Turn Bay Length (m)	60.0			165.0		25.0	145.0			95.0		90.0
Base Capacity (vph)	264	578	1425	499	628	619	259	2418	1377	371	2348	776
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.13	0.18	0.20	1.20	0.12	0.28	0.54	0.38	0.50	0.43	0.59	0.06
Intersection Summary												
Area Type:	CBD											
Cycle Length:	120											
Actuated Cycle Length:	120											
Offset:	33.6 (28%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green											
Natural Cycle:	100											
Control Type:	Actuated-Coordinated											
Maximum v/c Ratio:	1.20											
Intersection Signal Delay:	32.4						Intersection LOS: C					

Lanes, Volumes, Timings
1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd

Base Year 2023 AM.syn
04-03-2024

Intersection Capacity Utilization 71.2% ICU Level of Service C
Analysis Period (min) 15
- Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd



HCM Signalized Intersection Capacity Analysis
1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd

Base Year 2023 AM.syn
04-03-2024

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement												
Lane Configurations	↖	↗	↘	↖	↗	↘	↖	↗	↘	↖	↗	↘
Traffic Volume (vph)	31	96	265	549	68	158	129	834	631	147	1273	42
Future Volume (vph)	31	96	265	549	68	158	129	834	631	147	1273	42
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	1.0	5.0	4.0	4.0	4.0	4.0	1.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.98	1.00	0.99	1.00	1.00	1.00	1.00
Flpb, ped/bikes	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1613	1693	1425	3060	1676	1366	1425	4446	1377	1561	4532	1398
Flt Permitted	0.71	1.00	1.00	0.45	1.00	1.00	0.12	1.00	1.00	0.27	1.00	1.00
Satd. Flow (perm)	1204	1693	1425	1443	1676	1366	173	4446	1377	447	4532	1398
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	34	104	288	597	74	172	140	907	686	160	1384	46
RTOR Reduction (vph)	0	0	0	0	0	136	0	0	0	0	0	23
Lane Group Flow (vph)	34	104	288	597	74	36	140	907	686	160	1384	23
Confl. Peds. (#/hr)	11					11			10	10		
Heavy Vehicles (%)	0%	1%	2%	3%	2%	4%	14%	5%	4%	4%	3%	4%
Turn Type	pm+pt	NA	Free	pm+pt	NA	Perm	pm+pt	NA	Free	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		Free	8		8	2		Free	6		6
Actuated Green, G (s)	19.8	15.6	120.0	30.6	22.4	22.4	74.5	60.6	120.0	68.3	57.5	57.5
Effective Green, g (s)	19.8	18.6	120.0	30.6	25.4	25.4	74.5	63.6	120.0	68.3	60.5	60.5
Actuated g/C Ratio	0.17	0.16	1.00	0.26	0.21	0.21	0.62	0.53	1.00	0.57	0.50	0.50
Clearance Time (s)	4.0	7.0		5.0	7.0	7.0	4.0	7.0		4.0	7.0	7.0
Vehicle Extension (s)	3.0	4.0		3.0	4.0	4.0	3.0	5.0		3.0	5.0	5.0
Lane Grp Cap (vph)	212	262	1425	502	354	289	252	2356	1377	354	2284	704
v/s Ratio Prot	0.01	0.06		c0.10	0.04		0.06	0.20		0.04	c0.31	
v/s Ratio Perm	0.02		0.20	c0.20		0.03	0.28		c0.50	0.22		0.02
v/c Ratio	0.16	0.40	0.20	1.19	0.21	0.13	0.56	0.38	0.50	0.45	0.61	0.03
Uniform Delay, d1	42.7	45.7	0.0	43.7	39.0	38.3	13.8	16.7	0.0	12.6	21.2	15.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.4	1.3	0.3	103.7	0.4	0.3	2.6	0.5	1.3	0.9	1.2	0.1
Delay (s)	43.1	47.0	0.3	147.4	39.4	38.6	16.5	17.1	1.3	13.5	22.4	15.1
Level of Service	D	D	A	F	D	D	B	B	A	B	C	B
Approach Delay (s)		15.1			115.7			10.8		21.3		
Approach LOS		B			F			B		C		
Intersection Summary												
HCM 2000 Control Delay			34.1			HCM 2000 Level of Service		C				
HCM 2000 Volume to Capacity ratio	0.78											
Actuated Cycle Length (s)			120.0			Sum of lost time (s)		17.0				
Intersection Capacity Utilization			71.2%			ICU Level of Service		C				
Analysis Period (min)	15											
c Critical Lane Group												

Lanes, Volumes, Timings

Base Year 2023 AM.syn

2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp

04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	→	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	2	0	136	370	26	204	0	1388	315	0	2082	5
Future Volume (vph)	2	0	136	370	26	204	0	1388	315	0	2082	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.5	3.3	3.6	3.5	3.6	3.6	3.6	3.6	3.6	3.5
Storage Length (m)	50.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Storage Lanes	1	1	1	1	1	1	0	1	0	1	0	0
Taper Length (m)	7.5		7.5		7.5		7.5		7.5		7.5	
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.91	1.00	1.00	0.86	0.86
Ped Bike Factor									0.98		1.00	
Frt			0.850			0.850			0.850			
Flt Protected	0.950			0.950	0.958							
Satd. Flow (prot)	1570	0	1395	1421	1450	1356	0	4446	1384	0	5711	0
Flt Permitted	0.950			0.950	0.958							
Satd. Flow (perm)	1570	0	1395	1421	1450	1356	0	4446	1353	0	5711	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			31			222			175			
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		142.1			192.6			324.8			275.1	
Travel Time (s)		10.2			13.9			23.4			19.8	
Confl. Peds. (#/hr)							8		5	5		8
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
Heavy Vehicles (%)	0%	0%	3%	5%	23%	6%	0%	5%	5%	0%	3%	0%
Adj. Flow (vph)	2	0	148	402	28	222	0	1509	342	0	2263	5
Shared Lane Traffic (%)				47%								
Lane Group Flow (vph)	2	0	148	213	217	222	0	1509	342	0	2268	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.3			3.3			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.19	1.14	1.16	1.19	1.14	1.16	1.14	1.14	1.14	1.14	1.14	1.16
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1		1	1		1			1			2
Detector Template	Left		Right	Left	Thru	Right		Thru	Right		Thru	
Leading Detector (m)	2.0		2.0	2.0	10.0	2.0		10.0	2.0		10.0	
Trailing Detector (m)	0.0		0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Detector 1 Position(m)	0.0		0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Detector 1 Size(m)	2.0		2.0	2.0	0.6	2.0		0.6	2.0		0.6	
Detector 1 Type	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Detector 1 Delay (s)	0.0		0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Detector 2 Position(m)					9.4			9.4			9.4	
Detector 2 Size(m)					0.6			0.6			0.6	
Detector 2 Type					Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

Lanes, Volumes, Timings

Base Year 2023 AM.syn

2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp

04-03-2024

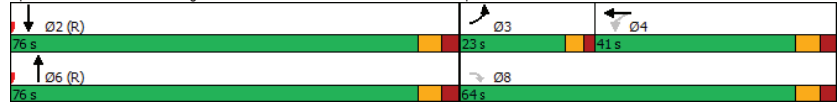
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)								0.0			0.0	0.0
Turn Type	Prot		Perm	Perm	NA	Free		NA	Free		NA	NA
Protected Phases	3				4			6			2	
Permitted Phases			8	4		Free		Free				
Detector Phase	3		8	4	4			6			2	
Switch Phase												
Minimum Initial (s)	7.0		10.0	10.0	10.0			5.0			28.0	
Minimum Split (s)	23.0		38.0	38.0	38.0			35.0			35.0	
Total Split (s)	23.0		64.0	41.0	41.0			76.0			76.0	
Total Split (%)	16.4%		45.7%	29.3%	29.3%			54.3%			54.3%	
Maximum Green (s)	18.0		57.0	34.0	34.0			69.0			69.0	
Yellow Time (s)	3.0		4.0	4.0	4.0			4.0			4.0	
All-Red Time (s)	2.0		3.0	3.0	3.0			3.0			3.0	
Lost Time Adjust (s)	-1.0		-3.0	-3.0	-3.0			-3.0			-3.0	
Total Lost Time (s)	4.0		4.0	4.0	4.0			4.0			4.0	
Lead/Lag	Lead			Lag	Lag							
Lead-Lag Optimize?	Yes			Yes	Yes							
Vehicle Extension (s)	3.0		3.0	3.0	3.0			4.5			4.5	
Recall Mode	Min		Min	Min	Min			C-Min			C-Min	
Walk Time (s)			7.0	7.0	7.0			7.0			7.0	
Flash Dont Walk (s)			24.0	24.0	24.0			21.0			21.0	
Pedestrian Calls (#/hr)			0	0	0			0			0	
Act Effct Green (s)	8.0		41.2	29.2	29.2	140.0		90.8		140.0	90.8	
Actuated g/C Ratio	0.06		0.29	0.21	0.21	1.00		0.65		1.00	0.65	
v/c Ratio	0.02		0.34	0.72	0.72	0.16		0.52		0.25	0.61	
Control Delay	63.0		31.2	64.8	64.5	0.3		10.0		0.4	16.0	
Queue Delay	0.0		0.0	0.0	0.0	0.0		0.0		0.0	0.0	
Total Delay	63.0		31.2	64.8	64.5	0.3		10.0		0.4	16.0	
LOS	E		C	E	E	A		B		A	B	
Approach Delay		31.6			42.7			8.2			16.0	
Approach LOS		C			D			A			B	
Queue Length 50th (m)	0.6		26.5	61.3	62.5	0.0		64.5		0.0	105.1	
Queue Length 95th (m)	3.7		42.4	86.1	87.0	0.0		91.6		0.0	139.2	
Internal Link Dist (m)		118.1			168.6			300.8			251.1	
Turn Bay Length (m)	50.0											
Base Capacity (vph)	213		615	377	385	1356		2884		1353	3705	
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	0.01		0.24	0.56	0.56	0.16		0.52		0.25	0.61	
Intersection Summary												
Area Type:	CBD											
Cycle Length:	140											
Actuated Cycle Length:	140											
Offset:	115.4 (82%), Referenced to phase 2:SBT and 6:NBT, Start of Green											
Natural Cycle:	100											
Control Type:	Actuated-Coordinated											
Maximum v/c Ratio:	0.72											

Lanes, Volumes, Timings
2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp

Base Year 2023 AM.syn
04-03-2024

Intersection Signal Delay: 17.1	Intersection LOS: B
Intersection Capacity Utilization 65.1%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp



HCM Signalized Intersection Capacity Analysis
2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp

Base Year 2023 AM.syn
04-03-2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	2	0	136	370	26	204	0	1388	315	0	2082	5
Future Volume (vph)	2	0	136	370	26	204	0	1388	315	0	2082	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.5	3.3	3.6	3.5	3.6	3.6	3.6	3.6	3.6	3.5
Total Lost time (s)	4.0		4.0	4.0	4.0	1.0		4.0	4.0		4.0	
Lane Util. Factor	1.00		1.00	0.95	0.95	1.00		0.91	1.00		0.86	
Frbp, ped/bikes	1.00		1.00	1.00	1.00	1.00		1.00	0.98		1.00	
Flpb, ped/bikes	1.00		1.00	1.00	1.00	1.00		1.00	1.00		1.00	
Frt	1.00		0.85	1.00	1.00	0.85		1.00	0.85		1.00	
Flt Protected	0.95		1.00	0.95	0.96	1.00		1.00	1.00		1.00	
Satd. Flow (prot)	1570		1395	1421	1450	1356		4446	1353		5709	
Flt Permitted	0.95		1.00	0.95	0.96	1.00		1.00	1.00		1.00	
Satd. Flow (perm)	1570		1395	1421	1450	1356		4446	1353		5709	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	2	0	148	402	28	222	0	1509	342	0	2263	5
RTOR Reduction (vph)	0	0	22	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	2	0	126	213	217	222	0	1509	342	0	2268	0
Confl. Peds. (#/hr)							8		5	5		8
Heavy Vehicles (%)	0%	0%	3%	5%	23%	6%	0%	5%	5%	0%	3%	0%
Turn Type	Prot		Perm	Perm	NA	Free		NA	Free		NA	
Protected Phases	3				4			6			2	
Permitted Phases			8	4		Free			Free			
Actuated Green, G (s)	7.0		38.2	26.2	26.2	140.0		87.8	140.0		87.8	
Effective Green, g (s)	8.0		41.2	29.2	29.2	140.0		90.8	140.0		90.8	
Actuated g/C Ratio	0.06		0.29	0.21	0.21	1.00		0.65	1.00		0.65	
Clearance Time (s)	5.0		7.0	7.0	7.0			7.0			7.0	
Vehicle Extension (s)	3.0		3.0	3.0	3.0			4.5			4.5	
Lane Grp Cap (vph)	89		410	296	302	1356		2883	1353		3702	
v/s Ratio Prot	0.00							0.34			c0.40	
v/s Ratio Perm			0.09	c0.15	0.15	0.16			c0.25			
v/c Ratio	0.02		0.31	0.72	0.72	0.16		0.52	0.25		0.61	
Uniform Delay, d1	62.3		38.3	51.6	51.6	0.0		13.1	0.0		14.3	
Progression Factor	1.00		1.00	1.00	1.00	1.00		0.68	1.00		1.00	
Incremental Delay, d2	0.1		0.4	8.1	7.9	0.3		0.6	0.4		0.8	
Delay (s)	62.4		38.8	59.7	59.5	0.3		9.4	0.4		15.1	
Level of Service	E		D	E	E	A		A	A		B	
Approach Delay (s)		39.1			39.4			7.8			15.1	
Approach LOS		D			D			A			B	
Intersection Summary												
HCM 2000 Control Delay			16.3		HCM 2000 Level of Service						B	
HCM 2000 Volume to Capacity ratio			0.62									
Actuated Cycle Length (s)			140.0		Sum of lost time (s)						12.0	
Intersection Capacity Utilization			65.1%		ICU Level of Service						C	
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
3: Trafalgar Rd & QEW EB-Off Ramp

Base Year 2023 AM.syn
04-03-2024

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR						
Lane Configurations												
Traffic Volume (vph)	713	581	0	1002	1369	376						
Future Volume (vph)	713	581	0	1002	1369	376						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900						
Lane Width (m)	3.3	3.5	3.6	3.6	3.6	3.6						
Lane Util. Factor	0.97	1.00	1.00	0.91	0.91	1.00						
Frt		0.850				0.850						
Flt Protected	0.950											
Satd. Flow (prot)	2958	1423	0	4404	4489	1454						
Flt Permitted	0.950											
Satd. Flow (perm)	2958	1423	0	4404	4489	1454						
Right Turn on Red		Yes				Yes						
Satd. Flow (RTOR)		7				212						
Link Speed (k/h)	50			50	50							
Link Distance (m)	199.2			51.4	324.8							
Travel Time (s)	14.3			3.7	23.4							
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92						
Heavy Vehicles (%)	3%	1%	0%	6%	4%	0%						
Adj. Flow (vph)	775	632	0	1089	1488	409						
Shared Lane Traffic (%)												
Lane Group Flow (vph)	775	632	0	1089	1488	409						
Enter Blocked Intersection	No	No	No	No	No	No						
Lane Alignment	Left	Right	Left	Left	Left	Right						
Median Width(m)	6.6			0.0	0.0							
Link Offset(m)	0.0			0.0	0.0							
Crosswalk Width(m)	4.8			4.8	4.8							
Two way Left Turn Lane												
Headway Factor	1.19	1.16	1.14	1.14	1.14	1.14						
Turning Speed (k/h)	24	14	24			14						
Number of Detectors	1	1		2	2	1						
Detector Template	Left	Right		Thru	Thru	Right						
Leading Detector (m)	2.0	2.0		10.0	10.0	2.0						
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0						
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0						
Detector 1 Size(m)	2.0	2.0		0.6	0.6	2.0						
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex						
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0						
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0						
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0						
Detector 2 Position(m)				9.4	9.4							
Detector 2 Size(m)				0.6	0.6							
Detector 2 Type				Cl+Ex	Cl+Ex							
Detector 2 Channel												
Detector 2 Extend (s)				0.0	0.0							
Turn Type	Perm	Perm		NA	NA	Free						
Protected Phases				2	2							
Permitted Phases	4	4				Free						
Detector Phase	4	4		2	2							

Lanes, Volumes, Timings
3: Trafalgar Rd & QEW EB-Off Ramp

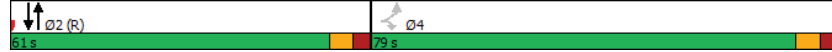
Base Year 2023 AM.syn
04-03-2024

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR						
Switch Phase												
Minimum Initial (s)	10.0	10.0		29.0	29.0							
Minimum Split (s)	38.0	38.0		36.0	36.0							
Total Split (s)	79.0	79.0		61.0	61.0							
Total Split (%)	56.4%	56.4%		43.6%	43.6%							
Maximum Green (s)	72.0	72.0		54.0	54.0							
Yellow Time (s)	4.0	4.0		4.0	4.0							
All-Red Time (s)	3.0	3.0		3.0	3.0							
Lost Time Adjust (s)	-3.0	-3.0		-3.0	-3.0							
Total Lost Time (s)	4.0	4.0		4.0	4.0							
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0							
Recall Mode	None	None		C-Max	C-Max							
Walk Time (s)	7.0	7.0		7.0	7.0							
Flash Dont Walk (s)	24.0	24.0		22.0	22.0							
Pedestrian Calls (#/hr)	0	0		0	0							
Act Effct Green (s)	70.4	70.4		61.6	61.6	140.0						
Actuated g/C Ratio	0.50	0.50		0.44	0.44	1.00						
v/c Ratio	0.52	0.88		0.56	0.75	0.28						
Control Delay	24.4	45.2		31.2	28.7	0.4						
Queue Delay	0.0	0.0		0.0	0.0	0.0						
Total Delay	24.4	45.2		31.2	28.7	0.4						
LOS	C	D		C	C	A						
Approach Delay	33.7			31.2	22.6							
Approach LOS	C			C	C							
Queue Length 50th (m)	72.6	150.9		101.7	145.5	0.0						
Queue Length 95th (m)	88.2	210.8		72.4	155.0	0.0						
Internal Link Dist (m)	175.2			27.4	300.8							
Turn Bay Length (m)												
Base Capacity (vph)	1584	765		1938	1975	1454						
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	0.49	0.83		0.56	0.75	0.28						
Intersection Summary												
Area Type:	CBD											
Cycle Length:	140											
Actuated Cycle Length:	140											
Offset:	133.6 (95%), Referenced to phase 2:NBSB and 6.; Start of Green											
Natural Cycle:	75											
Control Type:	Actuated-Coordinated											
Maximum v/c Ratio:	0.88											
Intersection Signal Delay:	28.3						Intersection LOS: C					
Intersection Capacity Utilization	76.0%						ICU Level of Service D					
Analysis Period (min)	15											

Lanes, Volumes, Timings
3: Trafalgar Rd & QEW EB-Off Ramp

Base Year 2023 AM.syn
04-03-2024

Splits and Phases: 3: Trafalgar Rd & QEW EB-Off Ramp



HCM Signalized Intersection Capacity Analysis
3: Trafalgar Rd & QEW EB-Off Ramp

Base Year 2023 AM.syn
04-03-2024

	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔↔	↔		↕↕	↕↕	↕
Traffic Volume (vph)	713	581	0	1002	1369	376
Future Volume (vph)	713	581	0	1002	1369	376
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.5	3.6	3.6	3.6	3.6
Total Lost time (s)	4.0	4.0		4.0	4.0	1.0
Lane Util. Factor	0.97	1.00		0.91	0.91	1.00
Fr _t	1.00	0.85		1.00	1.00	0.85
Fit Protected	0.95	1.00		1.00	1.00	1.00
Satd. Flow (prot)	2958	1423		4404	4489	1454
Fit Permitted	0.95	1.00		1.00	1.00	1.00
Satd. Flow (perm)	2958	1423		4404	4489	1454
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	775	632	0	1089	1488	409
RTOR Reduction (vph)	0	3	0	0	0	0
Lane Group Flow (vph)	775	629	0	1089	1488	409
Heavy Vehicles (%)	3%	1%	0%	6%	4%	0%
Turn Type	Perm	Perm		NA	NA	Free
Protected Phases				2	2	
Permitted Phases	4	4				Free
Actuated Green, G (s)	67.4	67.4		58.6	58.6	140.0
Effective Green, g (s)	70.4	70.4		61.6	61.6	140.0
Actuated g/C Ratio	0.50	0.50		0.44	0.44	1.00
Clearance Time (s)	7.0	7.0		7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	1487	715		1937	1975	1454
v/s Ratio Prot				0.25	c0.33	
v/s Ratio Perm	0.26	c0.44				0.28
v/c Ratio	0.52	0.88		0.56	0.75	0.28
Uniform Delay, d1	23.4	31.0		29.2	32.8	0.0
Progression Factor	1.00	1.00		0.99	0.78	1.00
Incremental Delay, d2	0.3	11.9		1.1	2.2	0.4
Delay (s)	23.8	42.9		30.1	27.8	0.4
Level of Service	C	D		C	C	A
Approach Delay (s)	32.4			30.1	21.9	
Approach LOS	C			C	C	
Intersection Summary						
HCM 2000 Control Delay			27.3		HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.84			
Actuated Cycle Length (s)			140.0		Sum of lost time (s)	11.0
Intersection Capacity Utilization			76.0%		ICU Level of Service	D
Analysis Period (min)			15			
c Critical Lane Group						

Lanes, Volumes, Timings
4: Trafalgar Rd & Argus Rd

Base Year 2023 AM.syn
04-03-2024

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	23	0	1552	1632	318
Future Volume (vph)	0	23	0	1552	1632	318
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.6	3.5	3.6	3.6	3.6	3.6
Lane Util. Factor	1.00	1.00	1.00	0.91	0.91	0.91
Ped Bike Factor						
Frt		0.865			0.976	
Fit Protected						
Satd. Flow (prot)	0	1367	0	4363	4395	0
Fit Permitted						
Satd. Flow (perm)	0	1367	0	4363	4395	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	145.7			270.2	51.4	
Travel Time (s)	10.5			19.5	3.7	
Confl. Peds. (#/hr)						11
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	7%	0%	7%	4%	2%
Adj. Flow (vph)	0	25	0	1687	1774	346
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	25	0	1687	2120	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			3.3	3.3	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.14	1.16	1.14	1.14	1.14	1.14
Turning Speed (k/h)	24	14	24			14
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	CBD					
Control Type:	Unsignalized					
Intersection Capacity Utilization	53.1%		ICU Level of Service A			
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
4: Trafalgar Rd & Argus Rd

Base Year 2023 AM.syn
04-03-2024

Movement	EBL	EBR	NBL	NBT	SBT	SBR	
Lane Configurations							
Traffic Volume (veh/h)	0	23	0	1552	1632	318	
Future Volume (Veh/h)	0	23	0	1552	1632	318	
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	25	0	1687	1774	346	
Pedestrians	11						
Lane Width (m)	3.5						
Walking Speed (m/s)	1.2						
Percent Blockage	1						
Right turn flare (veh)							
Median type			None	None			
Median storage (veh)							
Upstream signal (m)				270	52		
pX, platoon unblocked	0.79	0.73	0.73				
vC, conflicting volume	2520	775	2131				
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol	939	0	1239				
tC, single (s)	6.8	7.0	4.1				
tC, 2 stage (s)							
tF (s)	3.5	3.4	2.2				
p0 queue free %	100	97	100				
cM capacity (veh/h)	208	769	410				
Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	25	562	562	562	710	710	701
Volume Left	0	0	0	0	0	0	0
Volume Right	25	0	0	0	0	0	346
eSH	769	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.03	0.33	0.33	0.33	0.42	0.42	0.41
Queue Length 95th (m)	0.8	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (s)	9.8	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	A						
Approach Delay (s)	9.8	0.0			0.0		
Approach LOS	A						
Intersection Summary							
Average Delay				0.1			
Intersection Capacity Utilization	53.1%		ICU Level of Service		A		
Analysis Period (min)	15						

Lanes, Volumes, Timings

Base Year 2023 AM.syn

5: Trafalgar Rd & Cross Ave/South Service Rd

04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	253	27	74	35	30	87	75	976	22	151	1223	206
Future Volume (vph)	253	27	74	35	30	87	75	976	22	151	1223	206
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.6	3.3	3.6	3.5	3.3	3.6	3.6	3.3	3.6	3.6
Storage Length (m)	130.0	0.0	25.0	0.0	50.0	0.0	25.0	0.0	25.0	0.0	0.0	0.0
Storage Lanes	1	0	1	1	1	1	1	0	1	0	1	0
Taper Length (m)	7.5		7.5		7.5		7.5		7.5		7.5	
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.91	0.91
Ped Bike Factor	1.00	0.98		0.99		0.99		1.00		0.99		0.99
Frt	0.890					0.850		0.997			0.978	
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2795	1357	0	1525	1583	1382	1428	4500	0	1525	4404	0
Fit Permitted	0.950			0.687			0.111			0.190		
Satd. Flow (perm)	2789	1357	0	1094	1583	1362	167	4500	0	305	4404	0
Right Turn on Red			Yes			Yes		Yes			Yes	
Satd. Flow (RTOR)		80				179		3			28	
Link Speed (k/h)	50			50			50			50		
Link Distance (m)	151.2			330.4			150.2			270.2		
Travel Time (s)	10.9			23.8			10.8			19.5		
Confl. Peds. (#/hr)	1		4	4		1	10		52	52		10
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
Heavy Vehicles (%)	9%	6%	12%	3%	8%	4%	10%	3%	0%	3%	3%	4%
Adj. Flow (vph)	275	29	80	38	33	95	82	1061	24	164	1329	224
Shared Lane Traffic (%)												
Lane Group Flow (vph)	275	109	0	38	33	95	82	1085	0	164	1553	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)	6.6			6.6			3.3			3.3		
Link Offset(m)	0.0			0.0			0.0			0.0		
Crosswalk Width(m)	4.8			4.8			4.8			4.8		
Two way Left Turn Lane												
Headway Factor	1.19	1.14	1.14	1.19	1.14	1.16	1.19	1.14	1.14	1.19	1.14	1.14
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2	1	1		1	2		2
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

Lanes, Volumes, Timings

Base Year 2023 AM.syn

5: Trafalgar Rd & Cross Ave/South Service Rd

04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases				8		8	2			6		
Detector Phases	7	4		3	8	8	5	2		1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		12.0	10.0	10.0	7.0	27.0		7.0	27.0	
Minimum Split (s)	17.0	25.0		17.0	25.0	25.0	11.5	34.0		11.5	34.0	
Total Split (s)	40.0	48.0		17.0	25.0	25.0	15.0	54.0		21.0	60.0	
Total Split (%)	28.6%	34.3%		12.1%	17.9%	17.9%	10.7%	38.6%		15.0%	42.9%	
Maximum Green (s)	33.0	41.0		13.0	18.0	18.0	11.0	47.0		17.0	53.0	
Yellow Time (s)	4.0	4.0		3.0	4.0	4.0	3.0	4.0		3.0	4.0	
All-Red Time (s)	3.0	3.0		1.0	3.0	3.0	1.0	3.0		1.0	3.0	
Lost Time Adjust (s)	-3.0	-3.0		0.0	-3.0	-3.0	0.0	-3.0		0.0	-3.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	4.0		3.5	4.0	4.0	3.0	5.0		3.0	5.0	
Recall Mode	Min	Min		Min	Min	Min	Min	C-Max		Min	C-Max	
Walk Time (s)		7.0			7.0	7.0		7.0			7.0	
Flash Dont Walk (s)		11.0			11.0	11.0		11.0			11.0	
Pedestrian Calls (#/hr)		0			0	0		0			0	
Act Effct Green (s)	22.1	23.7		25.6	13.6	13.6	84.2	75.0		91.3	79.2	
Actuated g/C Ratio	0.16	0.17		0.18	0.10	0.10	0.60	0.54		0.65	0.57	
v/c Ratio	0.62	0.37		0.16	0.22	0.32	0.45	0.45		0.52	0.62	
Control Delay	61.1	19.5		37.6	61.6	2.9	26.0	28.4		22.0	24.4	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	61.1	19.5		37.6	61.6	2.9	26.0	28.4		22.0	24.4	
LOS	E	B		D	E	A	C	C		C	C	
Approach Delay		49.3			22.5			28.2			24.1	
Approach LOS		D			C			C			C	
Queue Length 50th (m)	39.1	7.3		8.2	9.1	0.0	13.6	70.9		22.4	97.2	
Queue Length 95th (m)	52.3	24.0		16.3	20.2	0.0	m25.2	96.5		m37.2	129.1	
Internal Link Dist (m)		127.2			306.4			126.2			246.2	
Turn Bay Length (m)	130.0			25.0			50.0			25.0		
Base Capacity (vph)	718	481		248	237	356	206	2413		354	2502	
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	
Reduced v/c Ratio	0.38	0.23		0.15	0.14	0.27	0.40	0.45		0.46	0.62	

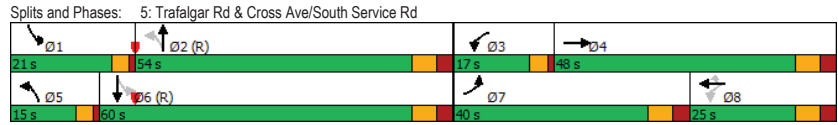
Intersection Summary

Area Type:	CBD
Cycle Length:	140
Actuated Cycle Length:	140
Offset:	128 (91%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle:	90
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.62

Lanes, Volumes, Timings
5: Trafalgar Rd & Cross Ave/South Service Rd

Base Year 2023 AM.syn
04-03-2024

Intersection Signal Delay: 28.3	Intersection LOS: C
Intersection Capacity Utilization 62.1%	ICU Level of Service B
Analysis Period (min) 15	
m Volume for 95th percentile queue is metered by upstream signal.	



HCM Signalized Intersection Capacity Analysis
5: Trafalgar Rd & Cross Ave/South Service Rd

Base Year 2023 AM.syn
04-03-2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔	↔		↔	↔	↔	↔↔↔	↔	↔	↔	↔↔	↔
Traffic Volume (vph)	253	27	74	35	30	87	75	976	22	151	1223	206
Future Volume (vph)	253	27	74	35	30	87	75	976	22	151	1223	206
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.3	3.6	3.5	3.3	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	1.00		1.00	1.00	1.00	1.00	0.91		1.00	0.91	
Frpb, ped/bikes	1.00	0.98		1.00	1.00	0.99	1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		0.99	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.89		1.00	1.00	0.85	1.00	1.00		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	2795	1357		1516	1583	1362	1428	4498		1525	4406	
Flt Permitted	0.95	1.00		0.69	1.00	1.00	0.11	1.00		0.19	1.00	
Satd. Flow (perm)	2795	1357		1096	1583	1362	166	4498		306	4406	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	275	29	80	38	33	95	82	1061	24	164	1329	224
RTOR Reduction (vph)	0	66	0	0	0	86	0	1	0	0	12	0
Lane Group Flow (vph)	275	43	0	38	33	9	82	1084	0	164	1541	0
Confl. Peds. (#/hr)	1		4	4		1	10		52	52		10
Heavy Vehicles (%)	9%	6%	12%	3%	8%	4%	10%	3%	0%	3%	3%	4%
Turn Type	Prot	NA		pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases				8		8	2			6		
Actuated Green, G (s)	19.1	20.7		22.6	10.6	10.6	81.2	72.1		89.3	76.2	
Effective Green, g (s)	22.1	23.7		22.6	13.6	13.6	81.2	75.1		89.3	79.2	
Actuated g/C Ratio	0.16	0.17		0.16	0.10	0.10	0.58	0.54		0.64	0.57	
Clearance Time (s)	7.0	7.0		4.0	7.0	7.0	4.0	7.0		4.0	7.0	
Vehicle Extension (s)	3.0	4.0		3.5	4.0	4.0	3.0	5.0		3.0	5.0	
Lane Grp Cap (vph)	441	229		212	153	132	178	2412		310	2492	
v/s Ratio Prot	c0.10	c0.03		0.02	0.02		0.03	0.24		c0.05	c0.35	
v/s Ratio Perm				0.01		0.01	0.24			0.29		
v/c Ratio	0.62	0.19		0.18	0.22	0.07	0.46	0.45		0.53	0.62	
Uniform Delay, d1	55.1	49.9		50.5	58.3	57.5	15.3	19.8		12.3	20.3	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.78	1.31		1.81	1.12	
Incremental Delay, d2	2.7	0.5		0.5	1.0	0.3	1.5	0.5		1.0	0.7	
Delay (s)	57.8	50.4		51.0	59.2	57.8	28.8	26.5		23.3	23.4	
Level of Service	E	D		D	E	E	C	C		C	C	
Approach Delay (s)		55.7			56.5			26.6			23.4	
Approach LOS		E			E			C			C	
Intersection Summary												
HCM 2000 Control Delay			29.7									C
HCM 2000 Volume to Capacity ratio			0.58									
Actuated Cycle Length (s)			140.0				Sum of lost time (s)			16.0		
Intersection Capacity Utilization			62.1%				ICU Level of Service					B
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
6: Trafalgar Rd & Cornwall Rd

Base Year 2023 AM.syn
04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	263	400	66	51	449	406	88	405	56	516	604	212
Future Volume (vph)	263	400	66	51	449	406	88	405	56	516	604	212
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.5
Storage Length (m)	80.0	0.0	80.0	0.0	25.0	0.0	80.0	0.0	80.0	0.0	0.0	0.0
Storage Lanes	2	0	1	1	1	1	0	1	1	1	1	1
Taper Length (m)	7.5		7.5		7.5		7.5		7.5		7.5	
Lane Util. Factor	0.97	0.95	0.95	1.00	0.95	1.00	1.00	*0.80	0.95	0.97	*0.80	1.00
Ped Bike Factor	0.98	0.99		0.99		0.98	1.00	1.00		0.98		0.98
Frt		0.979				0.850		0.982				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2987	3055	0	1481	3154	1411	1540	2652	0	2929	1341	1356
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2934	3055	0	1469	3154	1384	1532	2652	0	2872	1341	1324
Right Turn on Red			Yes			Yes		Yes			Yes	
Satd. Flow (RTOR)		15				441		9				169
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		285.8			142.3			311.4			130.3	
Travel Time (s)		20.6			10.2			22.4			9.4	
Confl. Peds. (#/hr)	25		7	7		25	9		18	18		9
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
Heavy Vehicles (%)	2%	4%	1%	6%	3%	3%	2%	1%	0%	4%	2%	6%
Adj. Flow (vph)	286	435	72	55	488	441	96	440	61	561	657	230
Shared Lane Traffic (%)												
Lane Group Flow (vph)	286	507	0	55	488	441	96	501	0	561	657	230
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		6.6			6.6			6.6			6.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.19	1.14	1.14	1.19	1.14	1.14	1.19	1.14	1.14	1.19	1.14	1.16
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2	1	1	2		1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0		2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6		2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

Lanes, Volumes, Timings
6: Trafalgar Rd & Cornwall Rd

Base Year 2023 AM.syn
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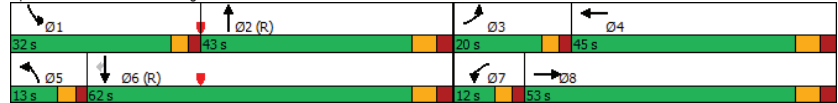
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA	Free	Prot	NA		Prot	NA	Perm
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases					Free							6
Detector Phases	3	8		7	4		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	7.0	10.0		7.0	10.0		7.0	20.0		7.0	20.0	20.0
Minimum Split (s)	12.0	37.0		12.0	37.0		12.0	39.0		12.0	39.0	39.0
Total Split (s)	20.0	53.0		12.0	45.0		13.0	43.0		32.0	62.0	62.0
Total Split (%)	14.3%	37.9%		8.6%	32.1%		9.3%	30.7%		22.9%	44.3%	44.3%
Maximum Green (s)	15.0	46.0		7.0	38.0		8.0	36.0		27.0	55.0	55.0
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	4.0
All-Red Time (s)	2.0	3.0		2.0	3.0		2.0	3.0		2.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-3.0		-1.0	-3.0		-1.0	-3.0		-1.0	-3.0	-3.0
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	0.2	0.2		0.2	0.2		0.2	0.2		0.2	0.2	0.2
Recall Mode	Max	Max		Max	Max		None	C-Max		Max	C-Max	C-Max
Walk Time (s)		7.0			7.0			7.0			7.0	7.0
Flash Dont Walk (s)		23.0			23.0			25.0			25.0	25.0
Pedestrian Calls (#/hr)		0			0			0			0	0
Act Effct Green (s)	16.0	49.0		8.0	41.0		9.0	39.0		28.0	58.0	58.0
Actuated g/C Ratio	0.11	0.35		0.06	0.29		1.00	0.06	0.28	0.20	0.41	0.41
v/c Ratio	0.84	0.47		0.65	0.53		0.32	0.97	0.67	0.96	1.18	0.36
Control Delay	82.0	36.0		98.2	43.9		0.6	146.6	49.3	86.1	130.4	7.1
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	82.0	36.0		98.2	43.9		0.6	146.6	49.3	86.1	130.4	7.1
LOS	F	D		F	D		A	F	D	F	F	A
Approach Delay		52.6			27.5			64.9			93.6	
Approach LOS		D			C			E			F	
Queue Length 50th (m)	42.7	58.5		16.0	62.7		0.0	28.5	80.0	65.2	~282.8	10.6
Queue Length 95th (m)	#66.4	76.2		#37.9	81.4		0.0	#66.8	104.9	#117.9	#387.6	15.1
Internal Link Dist (m)		261.8			118.3			287.4			106.3	
Turn Bay Length (m)	80.0			80.0			25.0			80.0		
Base Capacity (vph)	341	1079		84	923		1384	99	745	585	555	647
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.84	0.47		0.65	0.53		0.32	0.97	0.67	0.96	1.18	0.36
Intersection Summary												
Area Type:	CBD											
Cycle Length:	140											
Actuated Cycle Length:	140											
Offset:	0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green, Master Intersection											
Natural Cycle:	130											
Control Type:	Actuated-Coordinated											
Maximum v/c Ratio:	1.18											

Lanes, Volumes, Timings
6: Trafalgar Rd & Cornwall Rd

Base Year 2023 AM.syn
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Intersection Signal Delay: 63.6	Intersection LOS: E
Intersection Capacity Utilization 89.7%	ICU Level of Service E
Analysis Period (min) 15	
* User Entered Value	
~ Volume exceeds capacity, queue is theoretically infinite. Queue shown is maximum after two cycles.	
# 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.	

Splits and Phases: 6: Trafalgar Rd & Cornwall Rd



HCM Signalized Intersection Capacity Analysis
6: Trafalgar Rd & Cornwall Rd

Base Year 2023 AM.syn
04-03-2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔	↕↕		↔↔	↕↕	↔↔	↔↔	↕↕		↔↔	↕↕	↔↔
Traffic Volume (vph)	263	400	66	51	449	406	88	405	56	516	604	212
Future Volume (vph)	263	400	66	51	449	406	88	405	56	516	604	212
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.5
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.97	0.95		1.00	0.95	1.00	1.00	*0.80		0.97	*0.80	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.98	1.00	1.00		1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	2987	3054		1481	3154	1384	1540	2651		2929	1341	1324
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	2987	3054		1481	3154	1384	1540	2651		2929	1341	1324
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	286	435	72	55	488	441	96	440	61	561	657	230
RTOR Reduction (vph)	0	10	0	0	0	0	0	6	0	0	0	99
Lane Group Flow (vph)	286	497	0	55	488	441	96	495	0	561	657	131
Confl. Peds. (#/hr)	25		7	7		25	9		18	18		9
Heavy Vehicles (%)	2%	4%	1%	6%	3%	2%	2%	1%	0%	4%	2%	6%
Turn Type	Prot	NA		Prot	NA	Free	Prot	NA		Prot	NA	Perm
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases						Free						6
Actuated Green, G (s)	15.0	46.0		7.0	38.0	140.0	8.0	36.0		27.0	55.0	55.0
Effective Green, g (s)	16.0	49.0		8.0	41.0	140.0	9.0	39.0		28.0	58.0	58.0
Actuated g/C Ratio	0.11	0.35		0.06	0.29	1.00	0.06	0.28		0.20	0.41	0.41
Clearance Time (s)	5.0	7.0		5.0	7.0		5.0	7.0		5.0	7.0	7.0
Vehicle Extension (s)	0.2	0.2		0.2	0.2		0.2	0.2		0.2	0.2	0.2
Lane Grp Cap (vph)	341	1068		84	923	1384	99	738		585	555	548
v/s Ratio Prot	c0.10	0.16		0.04	c0.15		0.06	0.19		c0.19	c0.49	
v/s Ratio Perm						0.32						0.10
v/c Ratio	0.84	0.47		0.65	0.53	0.32	0.97	0.67		0.96	1.18	0.24
Uniform Delay, d1	60.7	35.3		64.6	41.4	0.0	65.4	44.8		55.4	41.0	26.7
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.12	0.86	0.73
Incremental Delay, d2	21.2	1.5		33.4	2.2	0.6	79.3	4.8		24.9	97.2	0.8
Delay (s)	82.0	36.8		98.1	43.6	0.6	144.6	49.6		86.8	132.6	20.2
Level of Service	F	D		F	D	A	F	D		F	F	C
Approach Delay (s)	53.1			27.4			64.9			97.0		
Approach LOS	D			C			E			F		
Intersection Summary												
HCM 2000 Control Delay	64.9			HCM 2000 Level of Service		E						
HCM 2000 Volume to Capacity ratio	0.92											
Actuated Cycle Length (s)	140.0		Sum of lost time (s)		16.0							
Intersection Capacity Utilization	89.7%		ICU Level of Service		E							
Analysis Period (min)	15											
c Critical Lane Group												

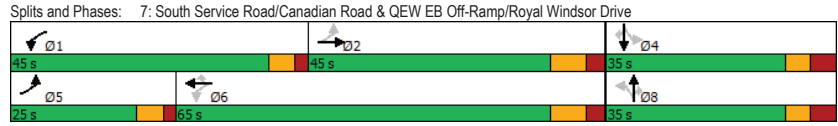
Lanes, Volumes, Timings
 7: South Service Road/Canadian Road & QEW EB Off-Ramp/Royal Windsor Drive Base Year 2023 AM.syn
 04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	38	469	26	77	462	6	2	7	43	3	16	24
Future Volume (vph)	38	469	26	77	462	6	2	7	43	3	16	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	150.0	0.0	155.0		70.0	15.0		0.0	0.0			30.0
Storage Lanes	2	0	1		1	1		1	1			1
Taper Length (m)	7.5		7.5		7.5			7.5				7.5
Lane Util. Factor	0.97	0.95	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.992				0.850			0.850			0.850
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3400	3300	0	1719	3139	1380	1805	1667	1468	1805	1792	1495
Fit Permitted	0.468			0.425			0.746			0.752		
Satd. Flow (perm)	1675	3300	0	769	3139	1380	1417	1667	1468	1429	1792	1495
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5				94			152			152
Link Speed (k/h)	80			80			60					40
Link Distance (m)	324.5			247.2			158.7					215.5
Travel Time (s)	14.6			11.1			9.5					19.4
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
Heavy Vehicles (%)	3%	9%	0%	5%	15%	17%	0%	14%	10%	0%	6%	8%
Adj. Flow (vph)	41	510	28	84	502	7	2	8	47	3	17	26
Shared Lane Traffic (%)												
Lane Group Flow (vph)	41	538	0	84	502	7	2	8	47	3	17	26
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Right	Left	Left	Right	Right
Median Width(m)	7.2			7.2			3.6					3.6
Link Offset(m)	0.0			0.0			0.0					0.0
Crosswalk Width(m)	4.8			4.8			4.8					4.8
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	CI+Ex	CI+Ex		CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4				9.4
Detector 2 Size(m)		0.6			0.6			0.6				0.6
Detector 2 Type		CI+Ex			CI+Ex			CI+Ex				CI+Ex
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8				4

Lanes, Volumes, Timings
 7: South Service Road/Canadian Road & QEW EB Off-Ramp/Royal Windsor Drive Base Year 2023 AM.syn
 04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	2			6		6	8	8	8	4		4
Detector Phase	5	2		1	6	6	8	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	8.0	20.0		8.0	30.0	30.0	8.0	8.0	8.0	10.0	10.0	10.0
Minimum Split (s)	14.0	34.0		14.0	38.4	38.4	28.8	28.8	28.8	35.0	35.0	35.0
Total Split (s)	25.0	45.0		45.0	65.0	65.0	35.0	35.0	35.0	35.0	35.0	35.0
Total Split (%)	20.0%	36.0%		36.0%	52.0%	52.0%	28.0%	28.0%	28.0%	28.0%	28.0%	28.0%
Maximum Green (s)	19.0	36.6		39.0	56.6	56.6	27.2	27.2	27.2	27.2	27.2	27.2
Yellow Time (s)	4.0	5.4		4.0	5.4	5.4	3.7	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	2.0	3.0		2.0	3.0	3.0	4.1	4.1	4.1	4.1	4.1	4.1
Lost Time Adjust (s)	-2.0	-4.4		-2.0	-4.4	-4.4	-3.8	-3.8	-3.8	-3.8	-3.8	-3.8
Total Lost Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lead	Lag		Lead	Lag	Lag						
Lead-Lag Optimize?												
Vehicle Extension (s)	3.5	4.5		3.5	6.0	6.0	3.5	3.5	3.5	3.5	3.5	3.5
Recall Mode	None	Max		None	Max	Max	None	None	None	None	None	None
Walk Time (s)	10.0			10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Flash Dont Walk (s)		10.0			10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Pedestrian Calls (#/hr)		0			0	0	0	0	0	0	0	0
Act Effct Green (s)	70.2	62.9		71.2	67.8	67.8	13.2	13.2	13.2	14.2	14.2	14.2
Actuated g/C Ratio	0.81	0.72		0.82	0.78	0.78	0.15	0.15	0.15	0.16	0.16	0.16
v/c Ratio	0.03	0.23		0.11	0.21	0.01	0.01	0.03	0.13	0.01	0.06	0.07
Control Delay	2.4	6.4		2.7	6.0	0.0	36.0	36.3	0.8	36.0	36.6	0.4
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	2.4	6.4		2.7	6.0	0.0	36.0	36.3	0.8	36.0	36.6	0.4
LOS	A	A		A	A	A	D	D	A	D	D	A
Approach Delay		6.1			5.4			7.0				16.1
Approach LOS		A			A			A				B
Queue Length 50th (m)	0.7	22.1		3.1	20.8	0.0	0.3	1.4	0.0	0.5	2.9	0.0
Queue Length 95th (m)	1.7	30.3		6.1	28.7	0.0	2.4	5.6	0.0	3.1	9.2	0.0
Internal Link Dist (m)		300.5			223.2			134.7			191.5	
Turn Bay Length (m)	150.0			155.0		70.0	15.0					30.0
Base Capacity (vph)	1838	2386		1106	2442	1094	517	608	632	521	653	642
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.02	0.23		0.08	0.21	0.01	0.00	0.01	0.07	0.01	0.03	0.04
Intersection Summary												
Area Type:	Other											
Cycle Length:	125											
Actuated Cycle Length:	87.1											
Natural Cycle:	90											
Control Type:	Semi Act-Uncoord											
Maximum v/c Ratio:	0.23											
Intersection Signal Delay:	6.2											
Intersection Capacity Utilization:	50.0%											
ICU Level of Service A												
Analysis Period (min)	15											

Lanes, Volumes, Timings Base Year 2023 AM.syn
04-03-2024
7: South Service Road/Canadian Road & QEW EB Off-Ramp/Royal Windsor Drive



HCM Signalized Intersection Capacity Analysis Base Year 2023 AM.syn
04-03-2024
7: South Service Road/Canadian Road & QEW EB Off-Ramp/Royal Windsor Drive

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	38	469	26	77	462	6	2	7	43	3	16	24
Future Volume (vph)	38	469	26	77	462	6	2	7	43	3	16	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	0.95		1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Fit Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3400	3300		1719	3139	1380	1805	1667	1468	1805	1792	1495
Fit Permitted	0.47	1.00		0.42	1.00	1.00	0.75	1.00	1.00	0.75	1.00	1.00
Satd. Flow (perm)	1674	3300		769	3139	1380	1418	1667	1468	1430	1792	1495
Peak-hour factor, PHF	0.92	0.92		0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	41	510		28	84	502	7	8	47	3	17	26
RTOR Reduction (vph)	0	2		0	0	2	0	0	42	0	0	23
Lane Group Flow (vph)	41	536		84	502	5	2	8	5	3	17	3
Heavy Vehicles (%)	3%	9%		0%	5%	15%	17%	0%	14%	10%	0%	6%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6		6	8		8	4		4
Actuated Green, G (s)	63.4	59.1		67.8	61.3	61.3	5.4	5.4	5.4	5.4	5.4	5.4
Effective Green, g (s)	67.4	63.5		71.8	65.7	65.7	9.2	9.2	9.2	9.2	9.2	9.2
Actuated g/C Ratio	0.72	0.68		0.77	0.70	0.70	0.10	0.10	0.10	0.10	0.10	0.10
Clearance Time (s)	6.0	8.4		6.0	8.4	8.4	7.8	7.8	7.8	7.8	7.8	7.8
Vehicle Extension (s)	3.5	4.5		3.5	6.0	6.0	3.5	3.5	3.5	3.5	3.5	3.5
Lane Grp Cap (vph)	1327	2248		679	2212	972	139	164	144	141	176	147
v/s Ratio Prot	0.00	c0.16		c0.01	0.16			0.00			c0.01	
v/s Ratio Perm	0.02			0.08		0.00	0.00		0.00	0.00		0.00
v/c Ratio	0.03	0.24		0.12	0.23	0.01	0.01	0.05	0.03	0.02	0.10	0.02
Uniform Delay, d1	3.6	5.7		2.7	4.8	4.1	37.9	38.0	38.0	37.9	38.2	37.9
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.0	0.3		0.1	0.2	0.0	0.0	0.1	0.1	0.1	0.3	0.1
Delay (s)	3.6	5.9		2.8	5.1	4.1	38.0	38.2	38.1	38.0	38.5	38.0
Level of Service	A	A		A	A	A	D	D	D	D	D	D
Approach Delay (s)		5.7			4.7			38.1			38.2	
Approach LOS		A			A			D			D	
Intersection Summary												
HCM 2000 Control Delay		7.9										
HCM 2000 Volume to Capacity ratio		0.21										
Actuated Cycle Length (s)		93.2						12.0				
Intersection Capacity Utilization		50.0%										
ICU Level of Service								A				
Analysis Period (min)		15										
c Critical Lane Group												

Lanes, Volumes, Timings
8: QEW WB Off-Ramp & Kerr Street

Base Year 2023 AM.syn
04-03-2024

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔↔			↔↔	↔↔	↔↔
Traffic Volume (vph)	402	0	0	244	214	238
Future Volume (vph)	402	0	0	244	214	238
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)		0.0	0.0		0.0	140.0
Storage Lanes		0	0		1	1
Taper Length (m)			7.5		7.5	
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00
Frt						0.850
Flt Protected					0.950	
Satd. Flow (prot)	3539	0	0	3539	1770	1583
Flt Permitted					0.950	
Satd. Flow (perm)	3539	0	0	3539	1770	1583
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)						259
Link Speed (k/h)	60			60	40	
Link Distance (m)	128.8			184.7	258.8	
Travel Time (s)	7.7			11.1	23.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	437	0	0	265	233	259
Shared Lane Traffic (%)						
Lane Group Flow (vph)	437	0	0	265	233	259
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)		15	25		25	15
Turn Type	NA			NA	Prot	Perm
Protected Phases	4			8	2	
Permitted Phases						2
Minimum Split (s)				22.5	22.5	22.5
Total Split (s)				22.5	22.5	22.5
Total Split (%)	50.0%			50.0%	50.0%	50.0%
Maximum Green (s)	18.0			18.0	18.0	18.0
Yellow Time (s)	3.5			3.5	3.5	3.5
All-Red Time (s)	1.0			1.0	1.0	1.0
Lost Time Adjust (s)	0.0			0.0	0.0	0.0
Total Lost Time (s)	4.5			4.5	4.5	4.5
Lead/Lag						
Lead-Lag Optimize?						
Walk Time (s)	7.0			7.0	7.0	7.0
Flash Dont Walk (s)	11.0			11.0	11.0	11.0
Pedestrian Calls (#/hr)	0			0	0	0
Act Effct Green (s)	18.0			18.0	18.0	18.0
Actuated g/C Ratio	0.40			0.40	0.40	0.40
v/c Ratio	0.31			0.19	0.33	0.33

Lanes, Volumes, Timings
8: QEW WB Off-Ramp & Kerr Street

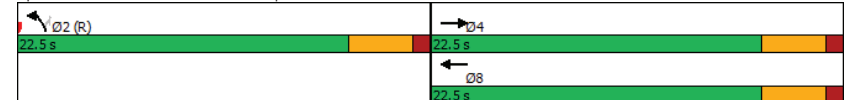
Base Year 2023 AM.syn
04-03-2024

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Control Delay	10.0			9.2	11.0	3.0
Queue Delay	0.0			0.0	0.0	0.0
Total Delay	10.0			9.2	11.0	3.0
LOS	B			A	B	A
Approach Delay	10.0			9.2	6.8	
Approach LOS	B			A	A	
Queue Length 50th (m)	12.3			7.0	12.5	0.0
Queue Length 95th (m)	20.3			12.7	25.0	9.9
Internal Link Dist (m)	104.8			160.7	234.8	
Turn Bay Length (m)						140.0
Base Capacity (vph)	1415			1415	708	788
Starvation Cap Reductn	0			0	0	0
Spillback Cap Reductn	0			0	0	0
Storage Cap Reductn	0			0	0	0
Reduced v/c Ratio	0.31			0.19	0.33	0.33

Intersection Summary

Area Type: Other
 Cycle Length: 45
 Actuated Cycle Length: 45
 Offset: 0 (0%), Referenced to phase 2:NBL and 6:, Start of Green
 Natural Cycle: 45
 Control Type: Pretimed
 Maximum v/c Ratio: 0.33
 Intersection Signal Delay: 8.5
 Intersection Capacity Utilization 33.3%
 Analysis Period (min) 15
 Intersection LOS: A
 ICU Level of Service A

Splits and Phases: 8: QEW WB Off-Ramp & Kerr Street



HCM Signalized Intersection Capacity Analysis
8: QEW WB Off-Ramp & Kerr Street

Base Year 2023 AM.syn
04-03-2024

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔↔			↔↔	↔↔	↔↔
Traffic Volume (vph)	402	0	0	244	214	238
Future Volume (vph)	402	0	0	244	214	238
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5			4.5	4.5	4.5
Lane Util. Factor	0.95			0.95	1.00	1.00
Fr _t	1.00			1.00	1.00	0.85
Fl _t Protected	1.00			1.00	0.95	1.00
Satd. Flow (prot)	3539			3539	1770	1583
Fl _t Permitted	1.00			1.00	0.95	1.00
Satd. Flow (perm)	3539			3539	1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	437	0	0	265	233	259
RTOR Reduction (vph)	0	0	0	0	0	155
Lane Group Flow (vph)	437	0	0	265	233	104
Turn Type	NA			NA	Prot	Perm
Protected Phases	4			8	2	
Permitted Phases						2
Actuated Green, G (s)	18.0			18.0	18.0	18.0
Effective Green, g (s)	18.0			18.0	18.0	18.0
Actuated g/C Ratio	0.40			0.40	0.40	0.40
Clearance Time (s)	4.5			4.5	4.5	4.5
Lane Grp Cap (vph)	1415			1415	708	633
v/s Ratio Prot	c0.12			0.07	c0.13	
v/s Ratio Perm						0.07
v/c Ratio	0.31			0.19	0.33	0.16
Uniform Delay, d1	9.2			8.8	9.3	8.7
Progression Factor	1.00			1.00	1.00	1.00
Incremental Delay, d2	0.6			0.3	1.2	0.6
Delay (s)	9.8			9.0	10.6	9.2
Level of Service	A			A	B	A
Approach Delay (s)	9.8			9.0	9.9	
Approach LOS	A			A	A	
Intersection Summary						
HCM 2000 Control Delay			9.7		HCM 2000 Level of Service A	
HCM 2000 Volume to Capacity ratio			0.32			
Actuated Cycle Length (s)			45.0		Sum of lost time (s) 9.0	
Intersection Capacity Utilization			33.3%		ICU Level of Service A	
Analysis Period (min)			15			
c Critical Lane Group						

Lanes, Volumes, Timings
9: Dorval Drive & QEW WB Off-Ramp

Base Year 2023 AM.syn
04-03-2024

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔↔	↔	↔↔			↔↔
Traffic Volume (vph)	752	350	431	0	0	1200
Future Volume (vph)	752	350	431	0	0	1200
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	190.0		0.0	0.0	
Storage Lanes	2	1		0	0	
Taper Length (m)	7.5				7.5	
Lane Util. Factor	0.97	0.91	0.95	1.00	1.00	0.95
Fr _t	0.993	0.850				
Fl _t Protected	0.954					
Satd. Flow (prot)	3423	1441	3539	0	0	3539
Fl _t Permitted	0.954					
Satd. Flow (perm)	3423	1441	3539	0	0	3539
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)	4	342				
Link Speed (k/h)	40		60			60
Link Distance (m)	325.1		310.2			266.9
Travel Time (s)	29.3		18.6			16.0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	817	380	468	0	0	1304
Shared Lane Traffic (%)		10%				
Lane Group Flow (vph)	855	342	468	0	0	1304
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	7.2		0.0		0.0	
Link Offset(m)	0.0		0.0		0.0	
Crosswalk Width(m)	4.8		4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15		15	25	
Number of Detectors	1	1	2			2
Detector Template	Left	Right	Thru			Thru
Leading Detector (m)	2.0	2.0	10.0			10.0
Trailing Detector (m)	0.0	0.0	0.0			0.0
Detector 1 Position(m)	0.0	0.0	0.0			0.0
Detector 1 Size(m)	2.0	2.0	0.6			0.6
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0			0.0
Detector 1 Queue (s)	0.0	0.0	0.0			0.0
Detector 1 Delay (s)	0.0	0.0	0.0			0.0
Detector 2 Position(m)			9.4			9.4
Detector 2 Size(m)			0.6			0.6
Detector 2 Type			Cl+Ex			Cl+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type		Prot	Perm	NA		NA
Protected Phases		8		2		6
Permitted Phases						8

Lanes, Volumes, Timings
9: Dorval Drive & QEW WB Off-Ramp

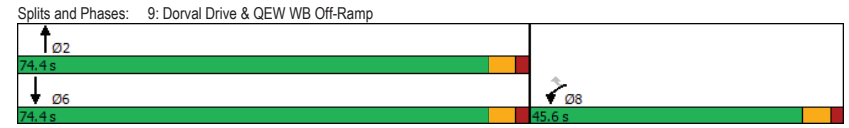
Base Year 2023 AM.syn
04-03-2024

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Detector Phase	8	8	2			6
Switch Phase						
Minimum Initial (s)	10.0	10.0	20.0			20.0
Minimum Split (s)	24.0	24.0	26.0			26.0
Total Split (s)	45.6	45.6	74.4			74.4
Total Split (%)	38.0%	38.0%	62.0%			62.0%
Maximum Green (s)	39.6	39.6	68.4			68.4
Yellow Time (s)	4.0	4.0	4.0			4.0
All-Red Time (s)	2.0	2.0	2.0			2.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0			-2.0
Total Lost Time (s)	4.0	4.0	4.0			4.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	4.5	4.5	5.0			5.0
Recall Mode	None	None	Max			Max
Walk Time (s)	5.0	5.0	7.0			7.0
Flash Dont Walk (s)	7.0	7.0	11.0			11.0
Pedestrian Calls (#/hr)	0	0	0			0
Act Effct Green (s)	38.3	38.3	70.5			70.5
Actuated g/C Ratio	0.33	0.33	0.60			0.60
v/c Ratio	0.76	0.49	0.22			0.61
Control Delay	39.9	5.5	11.3			16.6
Queue Delay	0.0	0.0	0.0			0.0
Total Delay	39.9	5.5	11.3			16.6
LOS	D	A	B			B
Approach Delay	30.1		11.3			16.6
Approach LOS	C		B			B
Queue Length 50th (m)	94.0	0.0	27.4			105.0
Queue Length 95th (m)	117.6	22.7	36.6			127.6
Internal Link Dist (m)	301.1		286.2			242.9
Turn Bay Length (m)		190.0				
Base Capacity (vph)	1224	733	2137			2137
Starvation Cap Reductn	0	0	0			0
Spillback Cap Reductn	0	0	0			0
Storage Cap Reductn	0	0	0			0
Reduced v/c Ratio	0.70	0.47	0.22			0.61

Intersection Summary	
Area Type:	Other
Cycle Length:	120
Actuated Cycle Length:	116.8
Natural Cycle:	50
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.76
Intersection Signal Delay:	21.2
Intersection Capacity Utilization:	65.0%
Analysis Period (min):	15
Intersection LOS:	C
ICU Level of Service:	C

Lanes, Volumes, Timings
9: Dorval Drive & QEW WB Off-Ramp

Base Year 2023 AM.syn
04-03-2024



HCM Signalized Intersection Capacity Analysis
9: Dorval Drive & QEWB Off-Ramp

Base Year 2023 AM.syn
04-03-2024

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔↔	↔	↕↕			↕↕
Traffic Volume (vph)	752	350	431	0	0	1200
Future Volume (vph)	752	350	431	0	0	1200
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0			4.0
Lane Util. Factor	0.97	0.91	0.95			0.95
Fr't	0.99	0.85	1.00			1.00
Fit Protected	0.95	1.00	1.00			1.00
Satd. Flow (prot)	3426	1441	3539			3539
Fit Permitted	0.95	1.00	1.00			1.00
Satd. Flow (perm)	3426	1441	3539			3539
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	817	380	468	0	0	1304
RTOR Reduction (vph)	3	230	0	0	0	0
Lane Group Flow (vph)	852	112	468	0	0	1304
Turn Type	Prot	Perm	NA			NA
Protected Phases	8		2			6
Permitted Phases	8					
Actuated Green, G (s)	36.2	36.2	68.5			68.5
Effective Green, g (s)	38.2	38.2	70.5			70.5
Actuated g/C Ratio	0.33	0.33	0.60			0.60
Clearance Time (s)	6.0	6.0	6.0			6.0
Vehicle Extension (s)	4.5	4.5	5.0			5.0
Lane Grp Cap (vph)	1121	471	2137			2137
v/s Ratio Prot	c0.25		0.13			c0.37
v/s Ratio Perm		0.08				
v/c Ratio	0.76	0.24	0.22			0.61
Uniform Delay, d1	35.2	28.6	10.5			14.5
Progression Factor	1.00	1.00	1.00			1.00
Incremental Delay, d2	3.5	0.5	0.2			1.3
Delay (s)	38.6	29.1	10.8			15.8
Level of Service	D	C	B			B
Approach Delay (s)	35.9		10.8			15.8
Approach LOS	D		B			B

Intersection Summary			
HCM 2000 Control Delay	23.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	116.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	65.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
10: Dorval Drive & QEWE Off-Ramp

Base Year 2023 AM.syn
04-03-2024

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔↔	↔		↕↕	↕↕	
Traffic Volume (vph)	110	438	0	606	1297	0
Future Volume (vph)	110	438	0	606	1297	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	175.0	0.0	0.0			0.0
Storage Lanes	1	1	0			0
Taper Length (m)	7.5		7.5			
Lane Util. Factor	0.97	0.91	1.00	0.95	0.95	1.00
Fr't	0.900	0.850				
Fit Protected	0.984					
Satd. Flow (prot)	3200	1441	0	3539	3539	0
Fit Permitted	0.984					
Satd. Flow (perm)	3200	1441	0	3539	3539	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	43	43				
Link Speed (k/h)	40			60	60	
Link Distance (m)	275.5			164.3	310.2	
Travel Time (s)	24.8			9.9	18.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	120	476	0	659	1410	0
Shared Lane Traffic (%)	50%					
Lane Group Flow (vph)	358	238	0	659	1410	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	7.2			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Number of Detectors	1	1		2	2	
Detector Template	Left	Right		Thru	Thru	
Leading Detector (m)	2.0	2.0		10.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	2.0		0.6	0.6	
Detector 1 Type	CI+Ex	CI+Ex		CI+Ex	CI+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	
Detector 2 Position(m)				9.4	9.4	
Detector 2 Size(m)				0.6	0.6	
Detector 2 Type				CI+Ex	CI+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Prot	Perm		NA	NA	
Protected Phases	4			2	6	
Permitted Phases	4					

Lanes, Volumes, Timings
10: Dorval Drive & QEW EB Off-Ramp

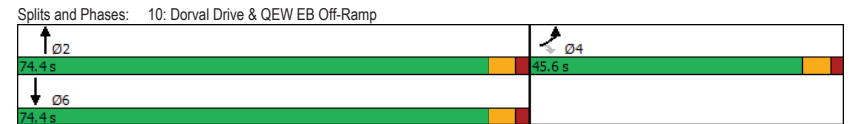
Base Year 2023 AM.syn
04-03-2024

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Detector Phase	4	4		2	6	
Switch Phase						
Minimum Initial (s)	10.0	10.0		20.0	20.0	
Minimum Split (s)	24.0	24.0		26.0	26.0	
Total Split (s)	45.6	45.6		74.4	74.4	
Total Split (%)	38.0%	38.0%		62.0%	62.0%	
Maximum Green (s)	39.6	39.6		68.4	68.4	
Yellow Time (s)	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	4.0	4.0		5.0	5.0	
Recall Mode	None	None		Max	Max	
Walk Time (s)	0.0	0.0		7.0	7.0	
Flash Dont Walk (s)	7.0	7.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0	
Act Effct Green (s)	22.7	22.7		70.7	70.7	
Actuated g/C Ratio	0.22	0.22		0.70	0.70	
v/c Ratio	0.48	0.67		0.27	0.57	
Control Delay	31.5	38.5		6.8	9.9	
Queue Delay	0.0	0.0		0.0	0.0	
Total Delay	31.5	38.5		6.8	9.9	
LOS	C	D		A	A	
Approach Delay	34.3			6.8	9.9	
Approach LOS	C			A	A	
Queue Length 50th (m)	29.0	40.5		23.6	68.3	
Queue Length 95th (m)	42.5	69.1		43.4	118.9	
Internal Link Dist (m)	251.5			140.3	286.2	
Turn Bay Length (m)	175.0					
Base Capacity (vph)	1342	618		2466	2466	
Starvation Cap Reductn	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	
Storage Cap Reductn	0	0		0	0	
Reduced v/c Ratio	0.27	0.39		0.27	0.57	

Intersection Summary
 Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 101.5
 Natural Cycle: 55
 Control Type: Semi Act-Uncoord
 Maximum v/c Ratio: 0.67
 Intersection Signal Delay: 14.6
 Intersection Capacity Utilization 65.0%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service C

Lanes, Volumes, Timings
10: Dorval Drive & QEW EB Off-Ramp

Base Year 2023 AM.syn
04-03-2024



HCM Signalized Intersection Capacity Analysis
10: Dorval Drive & QEW EB Off-Ramp

Base Year 2023 AM.syn
04-03-2024

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	110	438	0	606	1297	0
Future Volume (vph)	110	438	0	606	1297	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	0.91		0.95	0.95	
Frt	0.90	0.85		1.00	1.00	
Flt Protected	0.98	1.00		1.00	1.00	
Satd. Flow (prot)	3200	1441		3539	3539	
Flt Permitted	0.98	1.00		1.00	1.00	
Satd. Flow (perm)	3200	1441		3539	3539	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	120	476	0	659	1410	0
RTOR Reduction (vph)	33	33	0	0	0	0
Lane Group Flow (vph)	325	205	0	659	1410	0
Turn Type	Prot	Perm		NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4				
Actuated Green, G (s)	20.7	20.7		68.7	68.7	
Effective Green, g (s)	22.7	22.7		70.7	70.7	
Actuated g/C Ratio	0.22	0.22		0.70	0.70	
Clearance Time (s)	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	4.0	4.0		5.0	5.0	
Lane Grp Cap (vph)	716	322		2467	2467	
v/s Ratio Prot	0.10			0.19	c0.40	
v/s Ratio Perm		c0.14				
v/c Ratio	0.45	0.64		0.27	0.57	
Uniform Delay, d1	34.0	35.6		5.7	7.7	
Progression Factor	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.6	4.6		0.3	1.0	
Delay (s)	34.6	40.2		6.0	8.7	
Level of Service	C	D		A	A	
Approach Delay (s)	36.8			6.0	8.7	
Approach LOS	D			A	A	

Intersection Summary			
HCM 2000 Control Delay	14.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	101.4	Sum of lost time (s)	8.0
Intersection Capacity Utilization	65.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
11: Argus Rd & South Service Rd

Base Year 2023 AM.syn
04-03-2024

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	1	5	582	122	4	3
Future Volume (vph)	1	5	582	122	4	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt			0.977		0.942	
Flt Protected		0.992			0.972	
Satd. Flow (prot)	0	1454	1630	0	1566	0
Flt Permitted		0.992			0.972	
Satd. Flow (perm)	0	1454	1630	0	1566	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		177.7	145.7		103.5	
Travel Time (s)		12.8	10.5		7.5	
Confl. Peds. (#/hr)	1			1	5	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	100%	0%	3%	0%	0%	0%
Adj. Flow (vph)	1	5	633	133	4	3
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	6	766	0	7	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (k/h)	24		14		24	14
Sign Control		Free	Free		Stop	

Intersection Summary	
Area Type:	CBD
Control Type:	Unsignalized
Intersection Capacity Utilization 52.6%	ICU Level of Service A
Analysis Period (min) 15	

HCM Unsignalized Intersection Capacity Analysis
11: Argus Rd & South Service Rd

Base Year 2023 AM.syn
04-03-2024

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	↕
Traffic Volume (veh/h)	1	5	582	122	4	3
Future Volume (Veh/h)	1	5	582	122	4	3
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
Hourly flow rate (vph)	1	5	633	133	4	3
Pedestrians		1	5		1	
Lane Width (m)		3.6	3.6		3.6	
Walking Speed (m/s)		1.2	1.2		1.2	
Percent Blockage		0	0		0	
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)		358				
pX, platoon unblocked						
vC, conflicting volume	767				712	702
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	767				712	702
tC, single (s)	5.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	3.1				3.5	3.3
p0 queue free %	100				99	99
cM capacity (veh/h)	535				399	441
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	6	766	7			
Volume Left	1	0	4			
Volume Right	0	133	3			
eSH	535	1700	416			
Volume to Capacity	0.00	0.45	0.02			
Queue Length 95th (m)	0.0	0.0	0.4			
Control Delay (s)	2.0	0.0	13.8			
Lane LOS	A		B			
Approach Delay (s)	2.0	0.0	13.8			
Approach LOS			B			
Intersection Summary						
Average Delay			0.1			
Intersection Capacity Utilization		52.6%		ICU Level of Service		A
Analysis Period (min)		15				

Lanes, Volumes, Timings
12: Lyons Lane & South Service Road

Base Year 2023 AM.syn
04-03-2024

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	↕
Traffic Volume (vph)	0	4	3	3	3	1
Future Volume (vph)	0	4	3	3	3	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt			0.932		0.966	
Fit Protected					0.964	
Satd. Flow (prot)	0	1710	1594	0	1276	0
Fit Permitted					0.964	
Satd. Flow (perm)	0	1710	1594	0	1276	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		60.5	89.6		37.6	
Travel Time (s)		4.4	6.5		2.7	
Confl. Peds. (#/hr)	6			6	1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	0%	33%	0%
Adj. Flow (vph)	0	4	3	3	3	1
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	4	6	0	4	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (k/h)	24			14	24	14
Sign Control		Free	Free		Stop	
Intersection Summary						
Area Type:	CBD					
Control Type:	Unsignalized					
Intersection Capacity Utilization 15.1%				ICU Level of Service A		
Analysis Period (min) 15						

HCM Unsignalized Intersection Capacity Analysis
12: Lyons Lane & South Service Road

Base Year 2023 AM.syn
04-03-2024

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	↕
Traffic Volume (veh/h)	0	4	3	3	3	1
Future Volume (Veh/h)	0	4	3	3	3	1
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)	0	4	3	3	3	1
Pedestrians			1		6	
Lane Width (m)			3.6		3.6	
Walking Speed (m/s)			1.2		1.2	
Percent Blockage			0		1	
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	12				16	10
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	12				16	10
tC, single (s)	4.1				6.7	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.8	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	1612				923	1071
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	4	6	4			
Volume Left	0	0	3			
Volume Right	0	3	1			
eSH	1612	1700	956			
Volume to Capacity	0.00	0.00	0.00			
Queue Length 95th (m)	0.0	0.0	0.1			
Control Delay (s)	0.0	0.0	8.8			
Lane LOS			A			
Approach Delay (s)	0.0	0.0	8.8			
Approach LOS			A			
Intersection Summary						
Average Delay			2.5			
Intersection Capacity Utilization			15.1%		ICU Level of Service	A
Analysis Period (min)			15			

Lanes, Volumes, Timings
13: GO Bus Terminal/Argus Rd & Cross Ave

Base Year 2023 AM.syn
04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↕	↕		↕	↕		↕	↕		↕	↕	↕
Traffic Volume (vph)	31	383	14	40	595	24	21	0	49	57	16	500
Future Volume (vph)	31	383	14	40	595	24	21	0	49	57	16	500
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6
Storage Length (m)	20.0		0.0	20.0		0.0	0.0		0.0	15.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00	1.00		1.00	1.00			0.96		0.98		0.99
Frt		0.995			0.994			0.850				0.855
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1570	3092	0	818	3190	0	805	734	0	1570	1401	0
Fit Permitted	0.396			0.376			0.165			0.722		
Satd. Flow (perm)	654	3092	0	323	3190	0	140	734	0	1167	1401	0
Right Turn on Red			Yes			Yes		Yes				Yes
Satd. Flow (RTOR)		5			8			404			267	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		162.8			72.9			81.9			113.6	
Travel Time (s)		11.7			5.2			5.9			8.2	
Confl. Peds. (#/hr)	1		3	3		1	3		20	20		3
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
Heavy Vehicles (%)	0%	1%	100%	92%	1%	5%	95%	0%	91%	0%	93%	0%
Adj. Flow (vph)	34	416	15	43	647	26	23	0	53	62	17	543
Shared Lane Traffic (%)												
Lane Group Flow (vph)	34	431	0	43	673	0	23	53	0	62	560	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.3			3.3			3.3			3.3	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.19	1.14	1.14	1.19	1.14	1.14	1.19	1.14	1.14	1.19	1.14	1.14
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

Lanes, Volumes, Timings
13: GO Bus Terminal/Argus Rd & Cross Ave

Base Year 2023 AM.syn
04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases		2		6				8			4	
Detector Phase	2	2		1	6			8	8		4	4
Switch Phase												
Minimum Initial (s)	22.0	22.0		8.0	22.0			10.0	10.0		10.0	10.0
Minimum Split (s)	45.0	45.0		12.5	29.0			29.0	29.0		29.0	29.0
Total Split (s)	45.5	45.5		12.5	58.0			32.0	32.0		32.0	32.0
Total Split (%)	50.6%	50.6%		13.9%	64.4%			35.6%	35.6%		35.6%	35.6%
Maximum Green (s)	39.5	39.5		8.5	52.0			26.0	26.0		26.0	26.0
Yellow Time (s)	4.0	4.0		3.0	4.0			4.0	4.0		4.0	4.0
All-Red Time (s)	2.0	2.0		1.0	2.0			2.0	2.0		2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0		0.0	-2.0			-2.0	-2.0		-2.0	-2.0
Total Lost Time (s)	4.0	4.0		4.0	4.0			4.0	4.0		4.0	4.0
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Vehicle Extension (s)	5.0	5.0		2.5	5.0			4.0	4.0		4.0	4.0
Recall Mode	Min	Min		Min	Min			Min	Min		Min	Min
Walk Time (s)	7.0	7.0		7.0	7.0			7.0	7.0		7.0	7.0
Flash Dont Walk (s)	16.0	16.0		16.0	16.0			16.0	16.0		16.0	16.0
Pedestrian Calls (#/hr)	0	0		0	0			0	0		0	0
Act Effct Green (s)	24.1	24.1		36.3	36.3			25.1	25.1		25.1	25.1
Actuated g/C Ratio	0.35	0.35		0.52	0.52			0.36	0.36		0.36	0.36
v/c Ratio	0.15	0.40		0.19	0.40			0.46	0.10		0.15	0.83
Control Delay	19.2	19.1		11.6	11.4			50.8	0.4		15.6	22.5
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0		0.0	0.0
Total Delay	19.2	19.1		11.6	11.4			50.8	0.4		15.6	22.5
LOS	B	B		B	B			D	A		B	C
Approach Delay		19.1			11.4				15.6			21.8
Approach LOS		B			B				B			C
Queue Length 50th (m)	3.4	24.3		3.0	29.5			2.3	0.0		5.5	35.3
Queue Length 95th (m)	10.1	37.0		8.2	42.0			#13.4	0.0		13.4	#95.6
Internal Link Dist (m)		138.8			48.9				57.9			89.6
Turn Bay Length (m)	20.0			20.0							15.0	
Base Capacity (vph)	392	1857		229	2493			56	537		472	726
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	0.09	0.23		0.19	0.27			0.41	0.10		0.13	0.77

Intersection Summary

Area Type: CBD
 Cycle Length: 90
 Actuated Cycle Length: 69.4
 Natural Cycle: 90
 Control Type: Semi Act-Uncoord
 Maximum v/c Ratio: 0.83
 Intersection Signal Delay: 16.9
 Intersection LOS: B

Lanes, Volumes, Timings
13: GO Bus Terminal/Argus Rd & Cross Ave

Base Year 2023 AM.syn
04-03-2024

Intersection Capacity Utilization 79.2%
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 13: GO Bus Terminal/Argus Rd & Cross Ave



HCM Signalized Intersection Capacity Analysis
13: GO Bus Terminal/Argus Rd & Cross Ave

Base Year 2023 AM.syn
04-03-2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	31	383	14	40	595	24	21	0	49	57	16	500
Future Volume (vph)	31	383	14	40	595	24	21	0	49	57	16	500
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.3	3.6	3.3	3.6
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frbp, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.97		1.00	0.99	
Fipb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		0.98	1.00	
Frt	1.00	0.99		1.00	0.99		1.00	0.85		1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1569	3092		817	3191		805	738		1544	1401	
Flt Permitted	0.40	1.00		0.38	1.00		0.16	1.00		0.72	1.00	
Satd. Flow (perm)	654	3092		324	3191		139	738		1174	1401	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	34	416	15	43	647	26	23	0	53	62	17	543
RTOR Reduction (vph)	0	3	0	0	4	0	0	34	0	0	170	0
Lane Group Flow (vph)	34	428	0	43	669	0	23	19	0	62	390	0
Confl. Peds. (#/hr)	1		3	3		1	3		20	20		3
Heavy Vehicles (%)	0%	1%	100%	92%	1%	5%	95%	0%	91%	0%	93%	0%
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6		8	8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	22.2	22.2		34.3	34.3		23.1	23.1		23.1	23.1	
Effective Green, g (s)	24.2	24.2		34.3	36.3		25.1	25.1		25.1	25.1	
Actuated g/C Ratio	0.35	0.35		0.49	0.52		0.36	0.36		0.36	0.36	
Clearance Time (s)	6.0	6.0		4.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	5.0	5.0		2.5	5.0		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	228	1078		217	1669		50	266		424	506	
v/s Ratio Prot		0.14		0.02	c0.21			0.03			c0.28	
v/s Ratio Perm	0.05			0.07			0.16			0.05		
v/c Ratio	0.15	0.40		0.20	0.40		0.46	0.07		0.15	0.77	
Uniform Delay, d1	15.5	17.1		9.7	10.0		17.0	14.5		14.9	19.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.6	0.5		0.3	0.3		8.9	0.2		0.2	7.4	
Delay (s)	16.2	17.6		10.0	10.3		25.8	14.7		15.1	27.0	
Level of Service	B	B		B	B		C	B		B	C	
Approach Delay (s)		17.5			10.3			18.1			25.8	
Approach LOS		B			B			B			C	

Intersection Summary			
HCM 2000 Control Delay	17.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	69.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	79.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
14: Lyons Lane/Street A & Cross Ave

Base Year 2023 AM.syn
04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	57	172	197	219	117	5	17	3	13	16	24	41
Future Volume (vph)	57	172	197	219	117	5	17	3	13	16	24	41
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6
Storage Length (m)	0.0	0.0	25.0		0.0	20.0	0.0	0.0		0.0	0.0	0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	0.99		1.00	1.00		1.00	0.99		1.00	0.99	
Frt		0.920			0.994			0.876			0.905	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1540	2810	0	1570	2727	0	1570	1479	0	1468	1504	0
Flt Permitted	0.668			0.457			0.711			0.746		
Satd. Flow (perm)	1073	2810	0	755	2727	0	1171	1479	0	1148	1504	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		214			5			14			45	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		40.1			211.2			69.1			70.9	
Travel Time (s)		2.9			15.2			5.0			5.1	
Confl. Peds. (#/hr)	5		1	1		5	3		3	3		3
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
Heavy Vehicles (%)	2%	11%	0%	0%	19%	0%	0%	0%	0%	7%	0%	3%
Adj. Flow (vph)	62	187	214	238	127	5	18	3	14	17	26	45
Shared Lane Traffic (%)												
Lane Group Flow (vph)	62	401	0	238	132	0	18	17	0	17	71	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.3			3.3			3.3			3.3	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.19	1.14	1.14	1.19	1.14	1.14	1.19	1.14	1.14	1.19	1.14	1.14
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

Lanes, Volumes, Timings
14: Lyons Lane/Street A & Cross Ave

Base Year 2023 AM.syn
04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	2	2		1	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	35.0	35.0		8.0	35.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	41.0	41.0		12.5	41.0		28.0	28.0		28.0	28.0	
Total Split (s)	41.0	41.0		21.0	62.0		28.0	28.0		28.0	28.0	
Total Split (%)	45.6%	45.6%		23.3%	68.9%		31.1%	31.1%		31.1%	31.1%	
Maximum Green (s)	35.0	35.0		17.0	56.0		22.0	22.0		22.0	22.0	
Yellow Time (s)	4.0	4.0		3.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		1.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0		0.0	-2.0		-2.0	-2.0		-2.0	-2.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Vehicle Extension (s)	5.0	5.0		2.5	5.0		4.0	4.0		4.0	4.0	
Recall Mode	Min	Min		Min	Min		Min	Min		Min	Min	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	15.0	15.0		15.0	15.0		15.0	15.0		15.0	15.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	37.0	37.0		50.1	50.1		12.2	12.2		12.2	12.2	
Actuated g/C Ratio	0.53	0.53		0.71	0.71		0.17	0.17		0.17	0.17	
v/c Ratio	0.11	0.25		0.37	0.07		0.09	0.06		0.09	0.24	
Control Delay	9.5	4.7		5.2	3.1		26.2	15.2		26.2	15.2	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	9.5	4.7		5.2	3.1		26.2	15.2		26.2	15.2	
LOS	A	A		A	A		C	B		C	B	
Approach Delay		5.3			4.4			20.9			17.4	
Approach LOS		A			A			C			B	
Queue Length 50th (m)	3.9	6.2		8.8	2.2		2.1	0.4		2.0	3.0	
Queue Length 95th (m)	10.7	14.5		16.5	4.5		7.7	5.5		7.4	13.8	
Internal Link Dist (m)		16.1			187.2			45.1			46.9	
Turn Bay Length (m)				25.0			20.0					
Base Capacity (vph)	565	1581		734	2252		400	514		392	543	
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	0.11	0.25		0.32	0.06		0.04	0.03		0.04	0.13	

Intersection Summary

Area Type: CBD
 Cycle Length: 90
 Actuated Cycle Length: 70.3
 Natural Cycle: 85
 Control Type: Semi Act-Uncoord
 Maximum v/c Ratio: 0.37
 Intersection Signal Delay: 6.7
 Intersection LOS: A

Lanes, Volumes, Timings
14: Lyons Lane/Street A & Cross Ave

Base Year 2023 AM.syn
04-03-2024

Intersection Capacity Utilization 77.6% ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 14: Lyons Lane/Street A & Cross Ave



HCM Signalized Intersection Capacity Analysis
14: Lyons Lane/Street A & Cross Ave

Base Year 2023 AM.syn
04-03-2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	57	172	197	219	117	5	17	3	13	16	24	41
Future Volume (vph)	57	172	197	219	117	5	17	3	13	16	24	41
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	0.99	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Fr	1.00	0.92		1.00	0.99		1.00	0.88		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)	1529	2810		1570	2728		1566	1480		1463	1504	
Flt Permitted	0.67	1.00		0.46	1.00		0.71	1.00		0.75	1.00	
Satd. Flow (perm)	1076	2810		756	2728		1172	1480		1150	1504	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	62	187	214	238	127	5	18	3	14	17	26	45
RTOR Reduction (vph)	0	101	0	0	1	0	0	12	0	0	37	0
Lane Group Flow (vph)	62	300	0	238	131	0	18	5	0	17	34	0
Confl. Peds. (#/hr)	5		1	1		5	3		3	3		3
Heavy Vehicles (%)	2%	11%	0%	0%	19%	0%	0%	0%	0%	7%	0%	3%
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	35.0	35.0		48.1	48.1		10.2	10.2		10.2	10.2	
Effective Green, g (s)	37.0	37.0		48.1	50.1		12.2	12.2		12.2	12.2	
Actuated g/C Ratio	0.53	0.53		0.68	0.71		0.17	0.17		0.17	0.17	
Clearance Time (s)	6.0	6.0		4.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	5.0	5.0		2.5	5.0		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	566	1478		622	1944		203	256		199	261	
v/s Ratio Prot		0.11		c0.05	0.05			0.00			c0.02	
v/s Ratio Perm	0.06			c0.21			0.02			0.01		
v/c Ratio	0.11	0.20		0.38	0.07		0.09	0.02		0.09	0.13	
Uniform Delay, d1	8.4	8.8		4.3	3.0		24.4	24.1		24.4	24.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	0.1		0.3	0.0		0.3	0.0		0.3	0.3	
Delay (s)	8.5	9.0		4.6	3.1		24.6	24.1		24.6	24.9	
Level of Service	A	A		A	A		C	C		C	C	
Approach Delay (s)		8.9			4.1			24.4			24.8	
Approach LOS		A			A			C			C	

Intersection Summary			
HCM 2000 Control Delay	9.1	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.34		
Actuated Cycle Length (s)	70.3	Sum of lost time (s)	12.0
Intersection Capacity Utilization	77.6%	ICU Level of Service	D
Analysis Period (min)	15		

Lanes, Volumes, Timings
15: Cross Ave & Lyons Lane

Base Year 2023 AM.syn
04-03-2024

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↕	↕	↕	↕	↕
Traffic Volume (vph)	24	411	187	6	5	4
Future Volume (vph)	24	411	187	6	5	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	5.0			0.0	0.0	0.0
Storage Lanes	1			0	1	0
Taper Length (m)	7.5				7.5	
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	1.00
Ped Bike Factor						
Fr			0.995		0.940	
Flt Protected	0.950				0.973	
Satd. Flow (prot)	1624	3094	2800	0	1408	0
Flt Permitted	0.950				0.973	
Satd. Flow (perm)	1624	3094	2800	0	1408	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		281.3	40.1		41.7	
Travel Time (s)		20.3	2.9		3.0	
Confl. Peds. (#/hr)	4			4	7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	5%	16%	0%	0%	25%
Adj. Flow (vph)	26	447	203	7	5	4
Shared Lane Traffic (%)						
Lane Group Flow (vph)	26	447	210	0	9	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.6	3.6		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (k/h)	25			15	25	15
Sign Control		Free	Free		Stop	

Intersection Summary	
Area Type:	CBD
Control Type:	Unsignalized
Intersection Capacity Utilization 23.6%	ICU Level of Service A
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis
15: Cross Ave & Lyons Lane

Base Year 2023 AM.syn
04-03-2024

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↕↕	↕↕		↕	↕↕
Traffic Volume (veh/h)	24	411	187	6	5	4
Future Volume (Veh/h)	24	411	187	6	5	4
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)	26	447	203	7	5	4
Pedestrians			7		4	
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)			40			
pX, platoon unblocked						
vC, conflicting volume	214				493	109
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	214				493	109
tC, single (s)	4.1				6.8	7.4
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.5
p0 queue free %	98				99	100
cM capacity (veh/h)	1364				496	852
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	26	224	224	135	75	9
Volume Left	26	0	0	0	0	5
Volume Right	0	0	0	0	7	4
sSH	1364	1700	1700	1700	1700	609
Volume to Capacity	0.02	0.13	0.13	0.08	0.04	0.01
Queue Length 95th (m)	0.5	0.0	0.0	0.0	0.0	0.4
Control Delay (s)	7.7	0.0	0.0	0.0	0.0	11.0
Lane LOS	A					B
Approach Delay (s)	0.4			0.0		11.0
Approach LOS						B
Intersection Summary						
Average Delay			0.4			
Intersection Capacity Utilization			23.6%		ICU Level of Service	A
Analysis Period (min)			15			

Lanes, Volumes, Timings
16: Speers Road/Cornwall Road & Cross Avenue

Base Year 2023 AM.syn
04-03-2024

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↕↕	↕↕		↕	↕↕
Traffic Volume (vph)	191	600	556	21	5	229
Future Volume (vph)	191	600	556	21	5	229
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	75.0			0.0	55.0	0.0
Storage Lanes	1			0	1	2
Taper Length (m)	7.5				7.5	
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	0.88
Frt			0.994			0.850
Fit Protected	0.950				0.950	
Satd. Flow (prot)	1770	3539	3518	0	1770	2787
Fit Permitted	0.349				0.950	
Satd. Flow (perm)	650	3539	3518	0	1770	2787
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)			4			249
Link Speed (k/h)		50	50		50	
Link Distance (m)		228.9	275.4		183.9	
Travel Time (s)		16.5	19.8		13.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	208	652	604	23	5	249
Shared Lane Traffic (%)						
Lane Group Flow (vph)	208	652	627	0	5	249
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.6	3.6		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25			15	25	15
Number of Detectors	1	2	2		1	1
Detector Template	Left	Thru	Thru		Left	Right
Leading Detector (m)	2.0	10.0	10.0		2.0	2.0
Trailing Detector (m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Size(m)	2.0	0.6	0.6		2.0	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0		0.0	0.0
Detector 2 Position(m)		9.4	9.4			
Detector 2 Size(m)		0.6	0.6			
Detector 2 Type		Cl+Ex	Cl+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type	pm+pt	NA	NA		pm+pt	Perm
Protected Phases	5	2	6		7	
Permitted Phases	2				4	4

Lanes, Volumes, Timings
16: Speers Road/Cornwall Road & Cross Avenue

Base Year 2023 AM.syn
04-03-2024



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Detector Phase	5	2	6		7	4
Switch Phase						
Minimum Initial (s)	6.0	25.0	25.0		6.0	6.0
Minimum Split (s)	12.0	35.0	35.0		29.0	29.0
Total Split (s)	26.0	61.0	35.0		29.0	29.0
Total Split (%)	28.9%	67.8%	38.9%		32.2%	32.2%
Maximum Green (s)	20.0	55.0	29.0		23.0	23.0
Yellow Time (s)	4.0	4.0	4.0		4.0	4.0
All-Red Time (s)	2.0	2.0	2.0		2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0		6.0	6.0
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?			Yes			
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	None	Max	Max		None	None
Walk Time (s)		18.0	18.0		12.0	12.0
Flash Dont Walk (s)		7.0	7.0		7.0	7.0
Pedestrian Calls (#/hr)		0	0		0	0
Act Effct Green (s)	55.0	55.0	41.0		6.8	6.8
Actuated g/C Ratio	0.75	0.75	0.56		0.09	0.09
v/c Ratio	0.34	0.25	0.32		0.03	0.52
Control Delay	4.5	3.3	9.8		30.6	8.9
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	4.5	3.3	9.8		30.6	8.9
LOS	A	A	A		C	A
Approach Delay		3.6	9.8		9.3	
Approach LOS		A	A		A	
Queue Length 50th (m)	6.3	11.2	22.8		0.7	0.0
Queue Length 95th (m)	13.9	19.6	38.8		3.7	11.0
Internal Link Dist (m)		204.9	251.4		159.9	
Turn Bay Length (m)	75.0				55.0	
Base Capacity (vph)	788	2638	1955		551	1040
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	0.26	0.25	0.32		0.01	0.24

Intersection Summary

Area Type:	Other
Cycle Length:	90
Actuated Cycle Length:	73.8
Natural Cycle:	80
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.52
Intersection Signal Delay:	6.6
Intersection Capacity Utilization:	51.4%
Intersection LOS:	A
ICU Level of Service:	A
Analysis Period (min):	15

Lanes, Volumes, Timings
16: Speers Road/Cornwall Road & Cross Avenue

Base Year 2023 AM.syn
04-03-2024

Splits and Phases: 16: Speers Road/Cornwall Road & Cross Avenue



HCM Signalized Intersection Capacity Analysis
16: Speers Road/Cornwall Road & Cross Avenue

Base Year 2023 AM.syn
04-03-2024

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↕	↕		↕	↕
Traffic Volume (vph)	191	600	556	21	5	229
Future Volume (vph)	191	600	556	21	5	229
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0		6.0	6.0
Lane Util. Factor	1.00	0.95	0.95		1.00	0.88
Fr	1.00	1.00	0.99		1.00	0.85
Fit Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	3539	3520		1770	2787
Fit Permitted	0.35	1.00	1.00		0.95	1.00
Satd. Flow (perm)	650	3539	3520		1770	2787
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	208	652	604	23	5	249
RTOR Reduction (vph)	0	0	2	0	0	226
Lane Group Flow (vph)	208	652	625	0	5	23
Turn Type	pm+pt	NA	NA		pm+pt	Perm
Protected Phases	5	2	6		7	
Permitted Phases	2				4	4
Actuated Green, G (s)	55.0	55.0	41.0		6.8	6.8
Effective Green, g (s)	55.0	55.0	41.0		6.8	6.8
Actuated g/C Ratio	0.75	0.75	0.56		0.09	0.09
Clearance Time (s)	6.0	6.0	6.0		6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	605	2637	1955		163	256
v/s Ratio Prot	c0.04	0.18	0.18		0.00	
v/s Ratio Perm	c0.22				c0.01	
v/c Ratio	0.34	0.25	0.32		0.03	0.09
Uniform Delay, d1	3.2	2.9	8.9		30.5	30.7
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.3	0.2	0.4		0.1	0.2
Delay (s)	3.6	3.2	9.3		30.6	30.8
Level of Service	A	A	A		C	C
Approach Delay (s)		3.3	9.3		30.8	
Approach LOS		A	A		C	

Intersection Summary			
HCM 2000 Control Delay	9.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.34		
Actuated Cycle Length (s)	73.8	Sum of lost time (s)	18.0
Intersection Capacity Utilization	51.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
23: GO Station West Access/Street C & Cross Ave

Base Year 2023 AM.syn
04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Volume (vph)	0	210	87	729	359	0	39	0	205	0	0	0
Future Volume (vph)	0	210	87	729	359	0	39	0	205	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.0	0.0	0.0
Storage Lanes	0	0	0	0	0	0	1	0	1	0	0	0
Taper Length (m)	7.5			7.5			7.5		7.5		7.5	
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Fr		0.956						0.850				
Fit Protected					0.968		0.950					
Satd. Flow (prot)	0	3383	0	0	3426	0	1770	1583	0	1863	1863	0
Fit Permitted					0.653		0.757					
Satd. Flow (perm)	0	3383	0	0	2311	0	1410	1583	0	1863	1863	0
Right Turn on Red			Yes			Yes		Yes				Yes
Satd. Flow (RTOR)		95					505					
Link Speed (k/h)		50			50		50					50
Link Distance (m)		211.2			162.8		81.1					134.3
Travel Time (s)		15.2			11.7		5.8					9.7
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
Adj. Flow (vph)	0	228	95	792	390	0	42	0	223	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	323	0	0	1182	0	42	223	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.3			3.3		3.6		3.6			3.6
Link Offset(m)		0.0			0.0		0.0		0.0			0.0
Crosswalk Width(m)		4.8			4.8		4.8		4.8			4.8
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25	15	25	15	25	15	25	15	25	15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type		NA			NA			NA			NA	
Protected Phases		4			8			2			2	
Permitted Phases		4			8			2			2	

Lanes, Volumes, Timings
23: GO Station West Access/Street C & Cross Ave

Base Year 2023 AM.syn
04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	24.0	24.0		24.0	24.0		24.0	24.0		24.0	24.0	
Total Split (s)	25.0	25.0		25.0	25.0		25.0	25.0		25.0	25.0	
Total Split (%)	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%		50.0%	50.0%	
Maximum Green (s)	19.0	19.0		19.0	19.0		19.0	19.0		19.0	19.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		6.0			6.0			6.0			6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		19.0			19.0			19.0			19.0	
Actuated g/C Ratio		0.38			0.38			0.38			0.38	
v/c Ratio		0.24			2.02dl			0.08			0.24	
Control Delay		7.9			183.7			10.5			0.6	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		7.9			183.7			10.5			0.6	
LOS		A			F			B			A	
Approach Delay		7.9			183.7			2.2				
Approach LOS		A			F			A				
Queue Length 50th (m)		7.1			~80.0			2.4			0.0	
Queue Length 95th (m)		14.1			#113.8			7.2			0.0	
Internal Link Dist (m)		187.2			138.8			57.1			110.3	
Turn Bay Length (m)												
Base Capacity (vph)		1344			878			535			914	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.24			1.35			0.08			0.24	

Intersection Summary

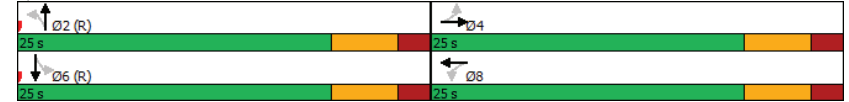
Area Type: Other
 Cycle Length: 50
 Actuated Cycle Length: 50
 Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
 Natural Cycle: 70
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.35
 Intersection Signal Delay: 124.5 Intersection LOS: F
 Intersection Capacity Utilization 76.7% ICU Level of Service D
 Analysis Period (min) 15
 ~ Volume exceeds capacity, queue is theoretically infinite.

Lanes, Volumes, Timings
23: GO Station West Access/Street C & Cross Ave

Base Year 2023 AM.syn
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Queue shown is maximum after two cycles.
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 dl Defacto Left Lane. Record with 1 though lane as a left lane.

Splits and Phases: 23: GO Station West Access/Street C & Cross Ave



HCM Signalized Intersection Capacity Analysis
23: GO Station West Access/Street C & Cross Ave

Base Year 2023 AM.syn
04-03-2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔			↔			↔		
Traffic Volume (vph)	0	210	87	729	359	0	39	0	205	0	0	0
Future Volume (vph)	0	210	87	729	359	0	39	0	205	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0			6.0		6.0			6.0		
Lane Util. Factor		0.95			0.95		1.00		1.00			
Frnt		0.96			1.00		1.00		0.85			
Flt Protected		1.00			0.97		0.95		1.00			
Satd. Flow (prot)		3383			3424		1770		1583			
Flt Permitted		1.00			0.65		0.76		1.00			
Satd. Flow (perm)		3383			2313		1410		1583			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	228	95	792	390	0	42	0	223	0	0	0
RTOR Reduction (vph)	0	59	0	0	0	0	0	138	0	0	0	0
Lane Group Flow (vph)	0	264	0	0	1182	0	42	85	0	0	0	0
Turn Type	NA			Perm		NA		Perm		NA		Perm
Protected Phases		4			8		2		2		6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		19.0			19.0		19.0		19.0			
Effective Green, g (s)		19.0			19.0		19.0		19.0			
Actuated g/C Ratio		0.38			0.38		0.38		0.38			
Clearance Time (s)		6.0			6.0		6.0		6.0			
Vehicle Extension (s)		3.0			3.0		3.0		3.0			
Lane Grp Cap (vph)		1285			878		535		601			
v/s Ratio Prot		0.08							c0.05			
v/s Ratio Perm					c0.51		0.03					
v/c Ratio		0.21			2.02dl		0.08		0.14			
Uniform Delay, d1		10.4			15.5		9.9		10.2			
Progression Factor		1.00			1.00		1.00		1.00			
Incremental Delay, d2		0.1			163.4		0.3		0.5			
Delay (s)		10.5			178.9		10.2		10.6			
Level of Service		B			F		B		B			
Approach Delay (s)		10.5			178.9				10.6			0.0
Approach LOS		B			F				B			A

Intersection Summary			
HCM 2000 Control Delay	123.0	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	50.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	76.7%	ICU Level of Service	D
Analysis Period (min)	15		
dl Defacto Left Lane. Recode with 1 though lane as a left lane.			
c Critical Lane Group			

Lanes, Volumes, Timings
1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd

Base Year 2023 PM.syn
04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔			↔			↔		
Traffic Volume (vph)	118	99	273	778	190	157	357	1563	584	119	955	98
Future Volume (vph)	118	99	273	778	190	157	357	1563	584	119	955	98
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0		0.0	165.0		25.0	145.0		0.0	95.0		90.0
Storage Lanes	1		1	1		1	1		1	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Ped Bike Factor	0.97					0.95			0.98	1.00		
Frnt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1624	1710	1425	3120	1710	1425	1608	4577	1425	1608	4532	1425
Flt Permitted	0.628			0.426			0.126			0.108		
Satd. Flow (perm)	1046	1710	1425	1399	1710	1360	213	4577	1402	183	4532	1425
Right Turn on Red			Yes			Yes			Yes		Yes	
Satd. Flow (RTOR)			255			151			337		191	
Link Speed (k/h)		50			50		50			50		
Link Distance (m)		347.0			285.9		280.4			353.6		
Travel Time (s)		25.0			20.6		20.2			25.5		
Confl. Peds. (#/hr)	34					34			14	14		
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
Heavy Vehicles (%)	0%	0%	2%	1%	0%	2%	1%	2%	2%	1%	3%	2%
Adj. Flow (vph)	128	108	297	846	207	171	388	1699	635	129	1038	107
Shared Lane Traffic (%)												
Lane Group Flow (vph)	128	108	297	846	207	171	388	1699	635	129	1038	107
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		7.2			7.2			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings

Base Year 2023 PM.syn

1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd

04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA	Free	pm+pt	NA	Perm	pm+pt	NA	Free	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		Free	8		8	2		Free	6		6
Detector Phase	7	4		3	8	8	5	2		1	6	6
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0	10.0	6.0	15.0		6.0	15.0	15.0
Minimum Split (s)	11.0	25.0		11.0	43.0	43.0	11.0	34.0		10.0	34.0	34.0
Total Split (s)	11.0	28.0		26.0	43.0	43.0	22.0	56.0		10.0	44.0	44.0
Total Split (%)	9.2%	23.3%		21.7%	35.8%	35.8%	18.3%	46.7%		8.3%	36.7%	36.7%
Maximum Green (s)	7.0	21.0		21.0	36.0	36.0	18.0	49.0		6.0	37.0	37.0
Yellow Time (s)	3.0	4.0		3.0	4.0	4.0	3.0	4.0		3.0	4.0	4.0
All-Red Time (s)	1.0	3.0		2.0	3.0	3.0	1.0	3.0		1.0	3.0	3.0
Lost Time Adjust (s)	0.0	-3.0		0.0	-3.0	-3.0	0.0	-3.0		0.0	-3.0	-3.0
Total Lost Time (s)	4.0	4.0		5.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	5.0		3.0	5.0	5.0	3.0	5.0		3.0	5.0	5.0
Recall Mode	None	None		None	None	None	None	C-Max		None	C-Max	C-Max
Walk Time (s)				7.0	7.0		7.0			7.0	7.0	
Flash Dont Walk (s)				29.0	29.0		20.0			20.0	20.0	
Pedestrian Calls (#/hr)				0	0		0			0	0	
Act Effct Green (s)	24.8	17.8	120.0	42.8	32.8	32.8	68.2	53.9	120.0	50.3	40.0	40.0
Actuated g/C Ratio	0.21	0.15	1.00	0.36	0.27	0.27	0.57	0.45	1.00	0.42	0.33	0.33
v/c Ratio	0.51	0.43	0.21	1.06	0.44	0.36	0.97	0.83	0.45	0.65	0.69	0.18
Control Delay	36.9	50.9	0.3	82.5	38.8	9.0	68.0	33.6	1.1	38.6	37.4	0.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	36.9	50.9	0.3	82.5	38.8	9.0	68.0	33.6	1.1	38.6	37.4	0.6
LOS	D	D	A	F	D	A	E	C	A	D	D	A
Approach Delay		19.4			64.9			30.9			34.5	
Approach LOS		B			E			C			C	
Queue Length 50th (m)	21.7	24.7	0.0	~103.0	42.6	3.7	74.5	136.4	0.0	14.3	81.0	0.0
Queue Length 95th (m)	34.5	41.4	0.0	#137.5	62.5	20.4	#156.0	158.5	0.0	#50.1	97.8	0.0
Internal Link Dist (m)		323.0			261.9			256.4			329.6	
Turn Bay Length (m)	60.0			165.0		25.0	145.0			95.0		90.0
Base Capacity (vph)	249	342	1425	799	555	543	402	2057	1402	198	1510	602
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.51	0.32	0.21	1.06	0.37	0.31	0.97	0.83	0.45	0.65	0.69	0.18

Intersection Summary

Area Type:	CBD
Cycle Length:	120
Actuated Cycle Length:	120
Offset:	105.6 (88%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle:	110
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	1.06
Intersection Signal Delay:	37.9
Intersection LOS:	D

Lanes, Volumes, Timings

Base Year 2023 PM.syn

1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd

04-03-2024

Intersection Capacity Utilization	89.6%	ICU Level of Service E
Analysis Period (min)	15	
- Volume exceeds capacity, queue is theoretically infinite.		
Queue shown is maximum after two cycles.		
# 95th percentile volume exceeds capacity, queue may be longer.		
Queue shown is maximum after two cycles.		

Splits and Phases: 1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd



HCM Signalized Intersection Capacity Analysis
1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd

Base Year 2023 PM.syn
04-03-2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	118	99	273	778	190	157	357	1563	584	119	955	98
Future Volume (vph)	118	99	273	778	190	157	357	1563	584	119	955	98
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	1.0	5.0	4.0	4.0	4.0	4.0	1.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.98	1.00	1.00	1.00
Flpb, ped/bikes	0.98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1599	1710	1425	3120	1710	1360	1608	4577	1402	1608	4532	1425
Flt Permitted	0.63	1.00	1.00	0.43	1.00	1.00	0.13	1.00	1.00	0.11	1.00	1.00
Satd. Flow (perm)	1057	1710	1425	1400	1710	1360	213	4577	1402	183	4532	1425
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	128	108	297	846	207	171	388	1699	635	129	1038	107
RTOR Reduction (vph)	0	0	0	0	0	110	0	0	0	0	0	71
Lane Group Flow (vph)	128	108	297	846	207	61	388	1699	635	129	1038	36
Confl. Peds. (#/hr)	34			34			14			14		
Heavy Vehicles (%)	0%	0%	2%	1%	0%	2%	1%	2%	2%	1%	3%	2%
Turn Type	pm+pt	NA	Free	pm+pt	NA	Perm	pm+pt	NA	Free	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		Free	8		8	2		Free	6		6
Actuated Green, G (s)	21.8	14.8	120.0	40.8	29.8	29.8	65.2	50.9	120.0	47.3	37.0	37.0
Effective Green, g (s)	21.8	17.8	120.0	40.8	32.8	32.8	65.2	53.9	120.0	47.3	40.0	40.0
Actuated g/C Ratio	0.18	0.15	1.00	0.34	0.27	0.27	0.54	0.45	1.00	0.39	0.33	0.33
Clearance Time (s)	4.0	7.0		5.0	7.0	7.0	4.0	7.0		4.0	7.0	7.0
Vehicle Extension (s)	3.0	5.0		3.0	5.0	5.0	3.0	5.0		3.0	5.0	5.0
Lane Grp Cap (vph)	223	253	1425	777	467	371	397	2055	1402	194	1510	475
v/s Ratio Prot	0.03	0.06		c0.19	0.12		c0.20	0.37		0.06	0.23	
v/s Ratio Perm	0.07		0.21	c0.18		0.05	c0.33		0.45	0.20		0.03
v/c Ratio	0.57	0.43	0.21	1.09	0.44	0.17	0.98	0.83	0.45	0.66	0.69	0.08
Uniform Delay, d1	43.7	46.5	0.0	36.9	36.1	33.2	33.2	29.0	0.0	25.9	34.6	27.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.5	2.4	0.3	59.2	1.4	0.4	38.8	4.0	1.1	8.3	2.6	0.3
Delay (s)	47.3	48.9	0.3	96.0	37.5	33.6	72.0	32.9	1.1	34.2	37.2	27.7
Level of Service	D	D	A	F	D	C	E	C	A	C	D	C
Approach Delay (s)	21.4			77.4			31.1			36.1		
Approach LOS	C			E			C			D		

Intersection Summary			
HCM 2000 Control Delay	41.1	HCM 2000 Level of Service	
HCM 2000 Volume to Capacity ratio	1.02		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	
Intersection Capacity Utilization	89.6%	ICU Level of Service	
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp

Base Year 2023 PM.syn
04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	21	0	246	418	98	303	0	2180	435	0	1997	9
Future Volume (vph)	21	0	246	418	98	303	0	2180	435	0	1997	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.5	3.3	3.6	3.5	3.6	3.6	3.6	3.6	3.6	3.5
Storage Length (m)	50.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Storage Lanes	1		1	1		1	0		1	0		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.91	1.00	1.00	0.86	0.86
Ped Bike Factor	1.00					0.99			0.97		1.00	
Frt			0.850			0.850			0.850		0.999	
Flt Protected	0.950			0.950	0.970							
Satd. Flow (prot)	1570	0	1437	1463	1551	1409	0	4577	1439	0	4781	0
Flt Permitted	0.950			0.950	0.970							
Satd. Flow (perm)	1567	0	1437	1463	1551	1391	0	4577	1400	0	4781	0
Right Turn on Red			Yes			Yes		Yes		Yes		Yes
Satd. Flow (RTOR)			31			328		154				1
Link Speed (k/h)		50			50		50			50		50
Link Distance (m)		142.1			192.6		324.8			280.4		
Travel Time (s)		10.2			13.9		23.4			20.2		
Confl. Peds. (#/hr)	2					2	14		14	14		14
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
Heavy Vehicles (%)	0%	0%	0%	2%	1%	2%	0%	2%	1%	0%	23%	0%
Adj. Flow (vph)	23	0	267	454	107	329	0	2370	473	0	2171	10
Shared Lane Traffic (%)				39%								
Lane Group Flow (vph)	23	0	267	277	284	329	0	2370	473	0	2181	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.3			3.3			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.19	1.14	1.16	1.19	1.14	1.16	1.14	1.14	1.14	1.14	1.14	1.16
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1		1	1		2	1		2	1		2
Detector Template	Left		Right	Left	Thru	Right		Thru	Right		Thru	
Leading Detector (m)	2.0		2.0	2.0	10.0	2.0		10.0	2.0		10.0	
Trailing Detector (m)	0.0		0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Detector 1 Position(m)	0.0		0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Detector 1 Size(m)	2.0		2.0	2.0	0.6	2.0		0.6	2.0		0.6	
Detector 1 Type	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Detector 1 Delay (s)	0.0		0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Detector 2 Position(m)					9.4			9.4			9.4	
Detector 2 Size(m)					0.6			0.6			0.6	
Detector 2 Type					Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

Lanes, Volumes, Timings

Base Year 2023 PM.syn

2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp

04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)					0.0			0.0			0.0	
Turn Type	Prot		Perm	Perm	NA	Free		NA	Free		NA	
Protected Phases	3			4	4			6			2	
Permitted Phases						Free			Free			
Detector Phase	3		8	4	4			6			2	
Switch Phase												
Minimum Initial (s)	7.0		10.0	10.0	10.0			5.0			28.0	
Minimum Split (s)	23.0		38.0	38.0	38.0			35.0			35.0	
Total Split (s)	23.0		61.0	38.0	38.0			79.0			79.0	
Total Split (%)	16.4%		43.6%	27.1%	27.1%			56.4%			56.4%	
Maximum Green (s)	18.0		54.0	31.0	31.0			72.0			72.0	
Yellow Time (s)	3.0		4.0	4.0	4.0			4.0			4.0	
All-Red Time (s)	2.0		3.0	3.0	3.0			3.0			3.0	
Lost Time Adjust (s)	-1.0		-3.0	-3.0	-3.0			-3.0			-3.0	
Total Lost Time (s)	4.0		4.0	4.0	4.0			4.0			4.0	
Lead/Lag	Lead			Lag	Lag							
Lead-Lag Optimize?	Yes			Yes	Yes							
Vehicle Extension (s)	3.0		3.0	3.0	3.0			4.5			4.5	
Recall Mode	Min		Min	Min	Min			C-Min			C-Min	
Walk Time (s)	7.0		7.0	7.0	7.0			7.0			7.0	
Flash Dont Walk (s)			24.0	24.0	24.0			21.0			21.0	
Pedestrian Calls (#/hr)			0	0	0			0			0	
Act Effct Green (s)	9.1		47.5	34.4	34.4	140.0		84.5	140.0		84.5	
Actuated g/C Ratio	0.06		0.34	0.25	0.25	1.00		0.60	1.00		0.60	
v/c Ratio	0.23		0.53	0.77	0.75	0.24		0.86	0.34		0.76	
Control Delay	67.1		35.5	63.3	60.6	0.4		21.5	0.4		23.6	
Queue Delay	0.0		0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Total Delay	67.1		35.5	63.3	60.6	0.4		21.5	0.4		23.6	
LOS	E		D	E	E	A		C	A		C	
Approach Delay		38.0						18.0			23.6	
Approach LOS		D						B			C	
Queue Length 50th (m)	6.5		55.1	79.0	80.5	0.0		136.6	0.0		128.5	
Queue Length 95th (m)	16.1		75.5	108.4	109.7	0.0		#252.5	0.0		170.9	
Internal Link Dist (m)		118.1			168.6			300.8			256.4	
Turn Bay Length (m)	50.0											
Base Capacity (vph)	213		603	383	406	1391		2763	1400		2887	
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	0.11		0.44	0.72	0.70	0.24		0.86	0.34		0.76	

Intersection Summary

Area Type: CBD
 Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 115.4 (82%), Referenced to phase 2:SBT and 6:NBT, Start of Green
 Natural Cycle: 130
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.86

Lanes, Volumes, Timings

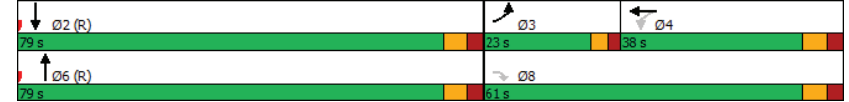
Base Year 2023 PM.syn

2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp

04-03-2024

Intersection Signal Delay: 23.9
 Intersection LOS: C
 Intersection Capacity Utilization 76.1%
 ICU Level of Service D
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp



HCM Signalized Intersection Capacity Analysis
2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp

Base Year 2023 PM.syn
04-03-2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	21	0	246	418	98	303	0	2180	435	0	1997	9
Future Volume (vph)	21	0	246	418	98	303	0	2180	435	0	1997	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.5	3.3	3.6	3.5	3.6	3.6	3.6	3.6	3.6	3.5
Total Lost time (s)	4.0		4.0	4.0	4.0	1.0		4.0	4.0		4.0	
Lane Util. Factor	1.00		1.00	0.95	0.95	1.00		0.91	1.00		0.86	
Frpb, ped/bikes	1.00		1.00	1.00	1.00	0.99		1.00	0.97		1.00	
Flpb, ped/bikes	1.00		1.00	1.00	1.00	1.00		1.00	1.00		1.00	
Frt	1.00		0.85	1.00	1.00	0.85		1.00	0.85		1.00	
Flt Protected	0.95		1.00	0.95	0.97	1.00		1.00	1.00		1.00	
Satd. Flow (prot)	1570		1437	1463	1550	1391		4577	1400		4782	
Flt Permitted	0.95		1.00	0.95	0.97	1.00		1.00	1.00		1.00	
Satd. Flow (perm)	1570		1437	1463	1550	1391		4577	1400		4782	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	23	0	267	454	107	329	0	2370	473	0	2171	10
RTOR Reduction (vph)	0	0	20	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	23	0	247	277	284	329	0	2370	473	0	2181	0
Confl. Peds. (#/hr)	2					2	14		14	14		14
Heavy Vehicles (%)	0%	0%	0%	2%	1%	2%	0%	2%	1%	0%	23%	0%
Turn Type	Prot		Perm	Perm	NA	Free		NA	Free		NA	
Protected Phases	3				4			6			2	
Permitted Phases			8	4		Free			Free			
Actuated Green, G (s)	8.1		44.5	31.4	31.4	140.0		81.5	140.0		81.5	
Effective Green, g (s)	9.1		47.5	34.4	34.4	140.0		84.5	140.0		84.5	
Actuated g/C Ratio	0.06		0.34	0.25	0.25	1.00		0.60	1.00		0.60	
Clearance Time (s)	5.0		7.0	7.0	7.0			7.0			7.0	
Vehicle Extension (s)	3.0		3.0	3.0	3.0			4.5			4.5	
Lane Grp Cap (vph)	102		487	359	380	1391		2762	1400		2886	
v/s Ratio Prot	0.01							c0.52			0.46	
v/s Ratio Perm			c0.17	c0.19	0.18	0.24			0.34			
v/c Ratio	0.23		0.51	0.77	0.75	0.24		0.86	0.34		0.76	
Uniform Delay, d1	62.1		36.9	49.1	48.8	0.0		22.8	0.0		20.2	
Progression Factor	1.00		1.00	1.00	1.00	1.00		0.77	1.00		1.00	
Incremental Delay, d2	1.1		0.8	9.9	7.8	0.4		2.6	0.4		1.9	
Delay (s)	63.2		37.7	59.0	56.6	0.4		20.1	0.4		22.1	
Level of Service	E		D	E	E	A		C	A		C	
Approach Delay (s)		39.7			36.6			16.8			22.1	
Approach LOS		D			D			B			C	

Intersection Summary			
HCM 2000 Control Delay	22.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	76.1%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
3: Trafalgar Rd & QEW EB-Off Ramp

Base Year 2023 PM.syn
04-03-2024

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	854	307	0	1746	1479	279
Future Volume (vph)	854	307	0	1746	1479	279
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.5	3.6	3.6	3.6	3.6
Lane Util. Factor	0.97	1.00	1.00	0.91	0.91	1.00
Ped Bike Factor		0.99				
Frt		0.850				0.850
Flt Protected	0.950					
Satd. Flow (prot)	3046	1423	0	4577	4577	1454
Flt Permitted	0.950					
Satd. Flow (perm)	3046	1402	0	4577	4577	1454
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		14				146
Link Speed (k/h)	50			50	50	
Link Distance (m)	199.2			51.4	324.8	
Travel Time (s)	14.3			3.7	23.4	
Confl. Peds. (#/hr)		2				
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	1%	0%	2%	2%	0%
Adj. Flow (vph)	928	334	0	1898	1608	303
Shared Lane Traffic (%)						
Lane Group Flow (vph)	928	334	0	1898	1608	303
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	6.6			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.19	1.16	1.14	1.14	1.14	1.14
Turning Speed (k/h)	24	14	24			14
Number of Detectors	1	1		2	2	1
Detector Template	Left	Right		Thru	Thru	Right
Leading Detector (m)	2.0	2.0		10.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	2.0	2.0		0.6	0.6	2.0
Detector 1 Type	CI+Ex	CI+Ex		CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)				9.4	9.4	
Detector 2 Size(m)				0.6	0.6	
Detector 2 Type				CI+Ex	CI+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Perm	Perm		NA	NA	Free
Protected Phases				2	2	

Lanes, Volumes, Timings
3: Trafalgar Rd & QEW EB-Off Ramp

Base Year 2023 PM.syn
04-03-2024



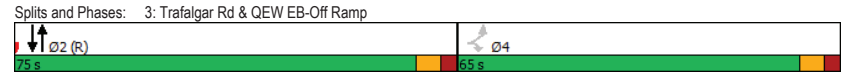
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Permitted Phases	4	4				Free
Detector Phase	4	4		2	2	
Switch Phase						
Minimum Initial (s)	10.0	10.0		29.0	29.0	
Minimum Split (s)	38.0	38.0		36.0	36.0	
Total Split (s)	65.0	65.0		75.0	75.0	
Total Split (%)	46.4%	46.4%		53.6%	53.6%	
Maximum Green (s)	58.0	58.0		68.0	68.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	
All-Red Time (s)	3.0	3.0		3.0	3.0	
Lost Time Adjust (s)	-3.0	-3.0		-3.0	-3.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Recall Mode	None	None		C-Max	C-Max	
Walk Time (s)	7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	24.0	24.0		22.0	22.0	
Pedestrian Calls (#/hr)	0	0		0	0	
Act Effct Green (s)	53.1	53.1		78.9	78.9	140.0
Actuated g/C Ratio	0.38	0.38		0.56	0.56	1.00
v/c Ratio	0.80	0.62		0.74	0.62	0.21
Control Delay	44.4	38.4		19.1	14.2	0.2
Queue Delay	0.0	0.0		0.0	0.0	0.0
Total Delay	44.4	38.4		19.1	14.2	0.2
LOS	D	D		B	B	A
Approach Delay	42.8			19.1	12.0	
Approach LOS	D			B	B	
Queue Length 50th (m)	123.2	75.0		110.6	80.2	0.0
Queue Length 95th (m)	136.8	99.5		111.7	90.5	m0.0
Internal Link Dist (m)	175.2			27.4	300.8	
Turn Bay Length (m)						
Base Capacity (vph)	1327	618		2580	2580	1454
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	0.70	0.54		0.74	0.62	0.21

Intersection Summary
 Area Type: CBD
 Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 133.6 (95%), Referenced to phase 2:NBSB and 6:, Start of Green
 Natural Cycle: 75
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.80
 Intersection Signal Delay: 22.3 Intersection LOS: C
 Intersection Capacity Utilization 71.2% ICU Level of Service C
 Analysis Period (min) 15

Lanes, Volumes, Timings
3: Trafalgar Rd & QEW EB-Off Ramp

Base Year 2023 PM.syn
04-03-2024

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



HCM Signalized Intersection Capacity Analysis
3: Trafalgar Rd & QEW EB-Off Ramp

Base Year 2023 PM.syn
04-03-2024

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↖ ↗	↗		↖ ↖	↖ ↖	↗
Traffic Volume (vph)	854	307	0	1746	1479	279
Future Volume (vph)	854	307	0	1746	1479	279
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.5	3.6	3.6	3.6	3.6
Total Lost time (s)	4.0	4.0		4.0	4.0	1.0
Lane Util. Factor	0.97	1.00		0.91	0.91	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.85		1.00	1.00	0.85
Flt Protected	0.95	1.00		1.00	1.00	1.00
Satd. Flow (prot)	3046	1402		4577	4577	1454
Flt Permitted	0.95	1.00		1.00	1.00	1.00
Satd. Flow (perm)	3046	1402		4577	4577	1454
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	928	334	0	1898	1608	303
RTOR Reduction (vph)	0	9	0	0	0	0
Lane Group Flow (vph)	928	325	0	1898	1608	303
Confl. Peds. (#/hr)		2				
Heavy Vehicles (%)	0%	1%	0%	2%	2%	0%
Turn Type	Perm	Perm		NA	NA	Free
Protected Phases				2	2	
Permitted Phases	4	4				Free
Actuated Green, G (s)	50.1	50.1		75.9	75.9	140.0
Effective Green, g (s)	53.1	53.1		78.9	78.9	140.0
Actuated g/C Ratio	0.38	0.38		0.56	0.56	1.00
Clearance Time (s)	7.0	7.0		7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	1155	531		2579	2579	1454
v/s Ratio Prot				c0.41	0.35	
v/s Ratio Perm	c0.30	0.23				0.21
v/c Ratio	0.80	0.61		0.74	0.62	0.21
Uniform Delay, d1	38.8	35.1		22.8	20.6	0.0
Progression Factor	1.00	1.00		0.73	0.62	1.00
Incremental Delay, d2	4.1	2.1		1.5	0.8	0.2
Delay (s)	42.9	37.2		18.2	13.6	0.2
Level of Service	D	D		B	B	A
Approach Delay (s)	41.4			18.2	11.5	
Approach LOS	D			B	B	

Intersection Summary			
HCM 2000 Control Delay	21.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	71.2%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
4: Trafalgar Rd & Argus Rd

Base Year 2023 PM.syn
04-03-2024

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗		↖ ↖	↖ ↖	
Traffic Volume (vph)	0	44	0	2347	1503	283
Future Volume (vph)	0	44	0	2347	1503	283
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.6	3.5	3.6	3.6	3.6	3.6
Lane Util. Factor	1.00	1.00	1.00	0.91	0.91	0.91
Ped Bike Factor						
Frt		0.865			0.976	
Flt Protected						
Satd. Flow (prot)	0	1354	0	4577	4460	0
Flt Permitted						
Satd. Flow (perm)	0	1354	0	4577	4460	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	145.7			270.2	51.4	
Travel Time (s)	10.5			19.5	3.7	
Confl. Peds. (#/hr)						24
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	8%	0%	2%	2%	3%
Adj. Flow (vph)	0	48	0	2551	1634	308
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	48	0	2551	1942	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			3.3	3.3	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.14	1.16	1.14	1.14	1.14	1.14
Turning Speed (k/h)	24	14	24			14
Sign Control	Stop			Free	Free	

Intersection Summary	
Area Type:	CBD
Control Type:	Unsignalized
Intersection Capacity Utilization	53.7%
ICU Level of Service	A
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis
4: Trafalgar Rd & Argus Rd

Base Year 2023 PM.syn
04-03-2024

Movement	EBL	EBR	NBL	NBT	SBT	SBR	
Lane Configurations		↗		↖↖	↗↗		
Traffic Volume (veh/h)	0	44	0	2347	1503	283	
Future Volume (Veh/h)	0	44	0	2347	1503	283	
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	48	0	2551	1634	308	
Pedestrians	24						
Lane Width (m)	3.5						
Walking Speed (m/s)	1.2						
Percent Blockage	2						
Right turn flare (veh)							
Median type			None	None			
Median storage (veh)							
Upstream signal (m)			270	52			
pX, platoon unblocked	0.87	0.77	0.77				
vC, conflicting volume	2662	723	1966				
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol	584	0	1195				
tC, single (s)	6.8	7.1	4.1				
tC, 2 stage (s)							
tF (s)	3.5	3.4	2.2				
p0 queue free %	100	94	100				
cM capacity (veh/h)	382	801	445				
Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	48	850	850	850	654	654	635
Volume Left	0	0	0	0	0	0	0
Volume Right	48	0	0	0	0	0	308
sSH	801	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.06	0.50	0.50	0.50	0.38	0.38	0.37
Queue Length 95th (m)	1.5	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (s)	9.8	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	A						
Approach Delay (s)	9.8	0.0			0.0		
Approach LOS	A						
Intersection Summary							
Average Delay			0.1				
Intersection Capacity Utilization			53.7%		ICU Level of Service		A
Analysis Period (min)			15				

Lanes, Volumes, Timings
5: Trafalgar Rd & Cross Ave/South Service Rd

Base Year 2023 PM.syn
04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖↖	↖	↗	↖	↖	↗	↖↖	↖↖	↗	↖↖	↖↖	↖↖
Traffic Volume (vph)	540	35	105	65	54	163	90	1309	32	69	1137	210
Future Volume (vph)	540	35	105	65	54	163	90	1309	32	69	1137	210
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.6	3.3	3.6	3.5	3.3	3.6	3.6	3.3	3.6	3.6
Storage Length (m)	130.0		0.0	25.0		0.0	50.0		0.0	25.0		0.0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.91	0.91
Ped Bike Factor		0.97		0.97				0.99			0.99	
Ft		0.887				0.850		0.996			0.977	
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2958	1346	0	1540	1644	1423	1496	4573	0	1570	4465	0
Fit Permitted	0.950			0.660			0.075			0.087		
Satd. Flow (perm)	2958	1346	0	1039	1644	1423	118	4573	0	144	4465	0
Right Turn on Red			Yes			Yes		Yes		Yes		Yes
Satd. Flow (RTOR)		114				148		3			27	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		151.2			330.4			150.2			270.2	
Travel Time (s)		10.9			23.8			10.8			19.5	
Confl. Peds. (#/hr)			15	15			18		70	70		18
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
Heavy Vehicles (%)	3%	8%	9%	2%	4%	1%	5%	1%	0%	0%	1%	3%
Adj. Flow (vph)	587	38	114	71	59	177	98	1423	35	75	1236	228
Shared Lane Traffic (%)												
Lane Group Flow (vph)	587	152	0	71	59	177	98	1458	0	75	1464	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		6.6			6.6			3.3			3.3	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.19	1.14	1.14	1.19	1.14	1.16	1.19	1.14	1.14	1.19	1.14	1.14
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2	1	1	2		1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

Lanes, Volumes, Timings

Base Year 2023 PM.syn

5: Trafalgar Rd & Cross Ave/South Service Rd

04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Perm	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	7	4			8		5	2		1	6	
Permitted Phases				8		8	2			6		
Detector Phase	7	4		8	8	8	5	2		1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	7.0	27.0		7.0	27.0	
Minimum Split (s)	17.0	25.0		25.0	25.0	25.0	11.5	34.0		11.5	34.0	
Total Split (s)	43.0	75.0		32.0	32.0	32.0	18.0	53.0		12.0	47.0	
Total Split (%)	30.7%	53.6%		22.9%	22.9%	22.9%	12.9%	37.9%		8.6%	33.6%	
Maximum Green (s)	36.0	68.0		25.0	25.0	25.0	14.0	46.0		8.0	40.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	3.0	4.0		3.0	4.0	
All-Red Time (s)	3.0	3.0		3.0	3.0	3.0	1.0	3.0		1.0	3.0	
Lost Time Adjust (s)	-3.0	-3.0		0.0	-3.0	-3.0	0.0	-3.0		0.0	-3.0	
Total Lost Time (s)	4.0	4.0		7.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lead/Lag	Lead			Lag	Lag	Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes			Yes	Yes	Yes	Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	4.0		4.0	4.0	4.0	3.0	5.0		3.0	5.0	
Recall Mode	Min	Min		Min	Min	Min	C-Max			Min	C-Max	
Walk Time (s)		7.0		7.0	7.0	7.0	7.0			7.0		
Flash Dont Walk (s)		11.0		11.0	11.0	11.0	11.0			11.0		
Pedestrian Calls (#/hr)		0		0	0	0	0			0		
Act Effct Green (s)	35.0	58.1		16.1	19.1	19.1	71.5	61.2		68.0	59.3	
Actuated g/C Ratio	0.25	0.42		0.12	0.14	0.14	0.51	0.44		0.49	0.42	
v/c Ratio	0.79	0.24		0.60	0.26	0.55	0.60	0.73		0.47	0.77	
Control Delay	57.4	7.4		78.0	55.4	18.9	46.5	52.6		41.4	40.7	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	57.4	7.4		78.0	55.4	18.9	46.5	52.6		41.4	40.7	
LOS	E	A		E	E	B	D	D		D	D	
Approach Delay		47.2			39.6			52.2			40.8	
Approach LOS		D			D			D			D	
Queue Length 50th (m)	82.2	6.6		20.0	15.7	7.6	24.2	137.2		12.8	101.9	
Queue Length 95th (m)	101.6	18.4		35.7	28.6	30.2	m31.0	m153.9		m29.9	#193.7	
Internal Link Dist (m)		127.2			306.4			126.2			246.2	
Turn Bay Length (m)	130.0			25.0			50.0			25.0		
Base Capacity (vph)	824	738		185	328	403	203	1999		162	1905	
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	
Reduced v/c Ratio	0.71	0.21		0.38	0.18	0.44	0.48	0.73		0.46	0.77	

Intersection Summary

Area Type: CBD
 Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 128 (91%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.79

Lanes, Volumes, Timings

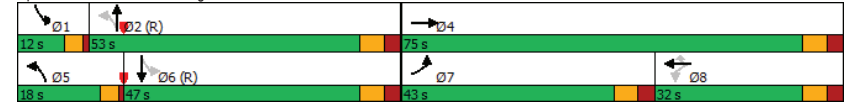
Base Year 2023 PM.syn

5: Trafalgar Rd & Cross Ave/South Service Rd

04-03-2024

Intersection Signal Delay: 46.1
 Intersection Capacity Utilization 74.5%
 Intersection LOS: D
 ICU Level of Service D
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: Trafalgar Rd & Cross Ave/South Service Rd



HCM Signalized Intersection Capacity Analysis
5: Trafalgar Rd & Cross Ave/South Service Rd

Base Year 2023 PM.syn
04-03-2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	540	35	105	65	54	163	90	1309	32	69	1137	210
Future Volume (vph)	540	35	105	65	54	163	90	1309	32	69	1137	210
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.6	3.3	3.6	3.5	3.3	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)	4.0	4.0		7.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	1.00		1.00	1.00	1.00	1.00	0.91		1.00	0.91	
Frbp, ped/bikes	1.00	0.97		1.00	1.00	1.00	1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		0.97	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.89		1.00	1.00	0.85	1.00	1.00		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	2958	1347		1496	1644	1423	1496	4575		1570	4463	
Flt Permitted	0.95	1.00		0.66	1.00	1.00	0.08	1.00		0.09	1.00	
Satd. Flow (perm)	2958	1347		1040	1644	1423	119	4575		144	4463	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	587	38	114	71	59	177	98	1423	35	75	1236	228
RTOR Reduction (vph)	0	67	0	0	0	128	0	2	0	0	16	0
Lane Group Flow (vph)	587	85	0	71	59	49	98	1456	0	75	1448	0
Confl. Peds. (#/hr)			15	15			18		70	70		18
Heavy Vehicles (%)	3%	8%	9%	2%	4%	1%	5%	1%	0%	0%	1%	3%
Turn Type	Prot	NA		Perm	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		8		8	5	2		1	6	
Permitted Phases				8		8	2			6		
Actuated Green, G (s)	32.0	55.1		16.1	16.1	16.1	68.8	58.2		65.0	56.3	
Effective Green, g (s)	35.0	58.1		16.1	19.1	19.1	68.8	61.2		65.0	59.3	
Actuated g/C Ratio	0.25	0.42		0.12	0.14	0.14	0.49	0.44		0.46	0.42	
Clearance Time (s)	7.0	7.0		7.0	7.0	7.0	4.0	7.0		4.0	7.0	
Vehicle Extension (s)	3.0	4.0		4.0	4.0	4.0	3.0	5.0		3.0	5.0	
Lane Grp Cap (vph)	739	559		119	224	194	162	1999		155	1890	
v/s Ratio Prot	c0.20	0.06		0.04			c0.05	0.32		0.03	c0.32	
v/s Ratio Perm				c0.07			0.03	0.25		0.19		
v/c Ratio	0.79	0.15		0.60	0.26	0.25	0.60	0.73		0.48	0.77	
Uniform Delay, d1	49.1	25.6		58.9	54.1	54.1	25.2	32.5		24.7	34.4	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.57	1.50		1.57	1.08	
Incremental Delay, d2	5.9	0.2		9.1	0.9	0.9	3.8	1.5		1.9	2.5	
Delay (s)	55.0	25.7		67.9	55.0	55.0	43.5	50.2		40.8	39.6	
Level of Service	E	C		E	E	E	D	D		D	D	
Approach Delay (s)		49.0			58.0			49.8			39.7	
Approach LOS		D			E			D			D	

Intersection Summary			
HCM 2000 Control Delay	46.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	74.5%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
6: Trafalgar Rd & Cornwall Rd

Base Year 2023 PM.syn
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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	429	423	42	79	651	356	56	645	71	441	547	319
Future Volume (vph)	429	423	42	79	651	356	56	645	71	441	547	319
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.5
Storage Length (m)	80.0		0.0	80.0		0.0	25.0		0.0	80.0		0.0
Storage Lanes	2		0	1		1	1		0	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	0.97	0.95	0.95	1.00	0.95	1.00	1.00	*0.80	0.95	0.97	*0.80	1.00
Ped Bike Factor	0.99	1.00		0.98		0.98	0.99	1.00		0.99		0.97
Frt		0.986				0.850		0.985				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3016	3101	0	1570	3217	1439	1540	2688	0	2987	1368	1409
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2983	3101	0	1545	3217	1413	1525	2688	0	2965	1368	1361
Right Turn on Red			Yes			Yes		Yes		Yes		Yes
Satd. Flow (RTOR)		8				293		7				292
Link Speed (k/h)		50			50			50				50
Link Distance (m)		285.8			142.3			311.4				130.3
Travel Time (s)		20.6			10.2			22.4				9.4
Confl. Peds. (#/hr)	21		14	14		21	17		10	10		17
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
Heavy Vehicles (%)	1%	3%	1%	0%	1%	1%	2%	0%	0%	2%	0%	2%
Adj. Flow (vph)	466	460	46	86	708	387	61	701	77	479	595	347
Shared Lane Traffic (%)												
Lane Group Flow (vph)	466	506	0	86	708	387	61	778	0	479	595	347
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		6.6			6.6			6.6				6.6
Link Offset(m)		0.0			0.0			0.0				0.0
Crosswalk Width(m)		4.8			4.8			4.8				4.8
Two way Left Turn Lane												
Headway Factor	1.19	1.14	1.14	1.19	1.14	1.14	1.19	1.14	1.14	1.19	1.14	1.16
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2	1	1	2		1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0		2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6		2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4				9.4
Detector 2 Size(m)		0.6			0.6			0.6				0.6
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex				Cl+Ex
Detector 2 Channel												

Lanes, Volumes, Timings
6: Trafalgar Rd & Cornwall Rd

Base Year 2023 PM.syn
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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA	Free	Prot	NA		Prot	NA	Perm
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases					Free							6
Detector Phase	3	8		7	4		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	7.0	10.0		7.0	10.0		7.0	20.0		7.0	20.0	20.0
Minimum Split (s)	12.0	37.0		12.0	37.0		12.0	39.0		12.0	39.0	39.0
Total Split (s)	26.0	45.0		18.0	37.0		12.0	48.0		29.0	65.0	65.0
Total Split (%)	18.6%	32.1%		12.9%	26.4%		8.6%	34.3%		20.7%	46.4%	46.4%
Maximum Green (s)	21.0	38.0		13.0	30.0		7.0	41.0		24.0	58.0	58.0
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	4.0
All-Red Time (s)	2.0	3.0		2.0	3.0		2.0	3.0		2.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-3.0		-1.0	-3.0		-1.0	-3.0		-1.0	-3.0	-3.0
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	0.2	0.2		0.2	0.2		0.2	0.2		0.2	0.2	0.2
Recall Mode	Max	Max		Max	Max		None	C-Max		Max	C-Max	C-Max
Walk Time (s)		7.0			7.0			7.0			7.0	7.0
Flash Dont Walk (s)		23.0			23.0			25.0			25.0	25.0
Pedestrian Calls (#/hr)		0			0			0			0	0
Act Effct Green (s)	22.0	41.0		14.0	33.0	140.0	8.0	44.0		25.0	63.4	63.4
Actuated g/C Ratio	0.16	0.29		0.10	0.24	1.00	0.06	0.31		0.18	0.45	0.45
v/c Ratio	0.99	0.55		0.55	0.93	0.27	0.69	0.92		0.90	0.96	0.45
Control Delay	96.2	43.8		73.9	72.5	0.5	101.4	62.3		92.5	45.0	2.4
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	96.2	43.8		73.9	72.5	0.5	101.4	62.3		92.5	45.0	2.4
LOS	F	D		E	E	A	F	E		F	D	A
Approach Delay		68.9			49.0			65.1			50.6	
Approach LOS		E			D			E			D	
Queue Length 50th (m)	70.7	64.6		24.3	107.2	0.0	17.8	135.6		70.7	180.5	1.8
Queue Length 95th (m)	#107.2	84.0		43.3	#145.7	0.0	#41.7	#182.7		#105.7	#305.7	m9.7
Internal Link Dist (m)		261.8			118.3			287.4			106.3	
Turn Bay Length (m)	80.0			80.0			25.0			80.0		
Base Capacity (vph)	473	913		157	758	1413	88	849		533	619	775
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	0
Reduced v/c Ratio	0.99	0.55		0.55	0.93	0.27	0.69	0.92		0.90	0.96	0.45

Intersection Summary

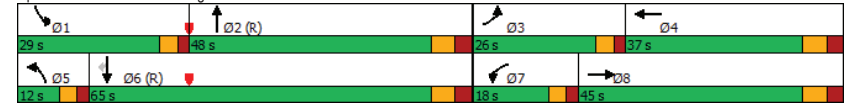
Area Type: CBD
 Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green, Master Intersection
 Natural Cycle: 130
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.99

Lanes, Volumes, Timings
6: Trafalgar Rd & Cornwall Rd

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04-03-2024

Intersection Signal Delay: 57.0
 Intersection Capacity Utilization 92.6%
 Intersection LOS: E
 ICU Level of Service F
 Analysis Period (min) 15
 * User Entered Value
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 6: Trafalgar Rd & Cornwall Rd



HCM Signalized Intersection Capacity Analysis
 6: Trafalgar Rd & Cornwall Rd

Base Year 2023 PM.syn
 04-03-2024

	←	→	↖	↗	↙	↘	↕	↖	↗	↙	↘	↕	
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	↖ ↗	↖ ↗		↖ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗		↖ ↗	↖ ↗	↖ ↗	
Traffic Volume (vph)	429	423	42	79	651	356	56	645	71	441	547	319	
Future Volume (vph)	429	423	42	79	651	356	56	645	71	441	547	319	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.5	
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	
Lane Util. Factor	0.97	0.95		1.00	0.95	1.00	1.00	*0.80		0.97	*0.80	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.98	1.00	1.00		1.00	1.00	0.97	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	
Fr	1.00	0.99		1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	
Satd. Flow (prot)	3016	3102		1570	3217	1413	1540	2689		2987	1368	1361	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	
Satd. Flow (perm)	3016	3102		1570	3217	1413	1540	2689		2987	1368	1361	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	466	460	46	86	708	387	61	701	77	479	595	347	
RTOR Reduction (vph)	0	6	0	0	0	0	0	5	0	0	0	162	
Lane Group Flow (vph)	466	500	0	86	708	387	61	773	0	479	595	185	
Confl. Peds. (#/hr)	21		14	14		21	17		10	10		17	
Heavy Vehicles (%)	1%	3%	1%	0%	1%	1%	2%	0%	0%	2%	0%	2%	
Turn Type	Prot	NA		Prot	NA	Free	Prot	NA		Prot	NA	Perm	
Protected Phases	3	8		7	4		5	2		1	6		
Permitted Phases					Free							6	
Actuated Green, G (s)	21.0	38.0		13.0	30.0	140.0	5.6	41.0		24.0	59.4	59.4	
Effective Green, g (s)	22.0	41.0		14.0	33.0	140.0	6.6	44.0		25.0	62.4	62.4	
Actuated g/C Ratio	0.16	0.29		0.10	0.24	1.00	0.05	0.31		0.18	0.45	0.45	
Clearance Time (s)	5.0	7.0		5.0	7.0		5.0	7.0		5.0	7.0	7.0	
Vehicle Extension (s)	0.2	0.2		0.2	0.2		0.2	0.2		0.2	0.2	0.2	
Lane Grp Cap (vph)	473	908		157	758	1413	72	845		533	609	606	
v/s Ratio Prot	c0.15	0.16		0.05	c0.22		0.04	0.29		c0.16	c0.43		
v/s Ratio Perm					0.27							0.14	
v/c Ratio	0.99	0.55		0.55	0.93	0.27	0.85	0.92		0.90	0.98	0.31	
Uniform Delay, d1	58.8	41.7		60.0	52.4	0.0	66.2	46.2		56.3	38.1	24.9	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.38	0.55	0.23	
Incremental Delay, d2	37.9	2.4		13.1	20.1	0.5	54.9	16.1		15.6	25.4	0.9	
Delay (s)	96.7	44.1		73.0	72.5	0.5	121.1	62.3		93.3	46.3	6.5	
Level of Service	F	D		E	E	A	F	E		F	D	A	
Approach Delay (s)	69.3			48.9			66.6			52.5			
Approach LOS	E			D			E			D			
Intersection Summary													
HCM 2000 Control Delay		57.9		HCM 2000 Level of Service				E					
HCM 2000 Volume to Capacity ratio		0.97											
Actuated Cycle Length (s)		140.0		Sum of lost time (s)				16.0					
Intersection Capacity Utilization		92.6%		ICU Level of Service				F					
Analysis Period (min)		15											
c Critical Lane Group													

Lanes, Volumes, Timings
 7: South Service Road/Canadian Road & QEW EB Off-Ramp/Royal Windsor Drive

Base Year 2023 PM.syn
 04-03-2024

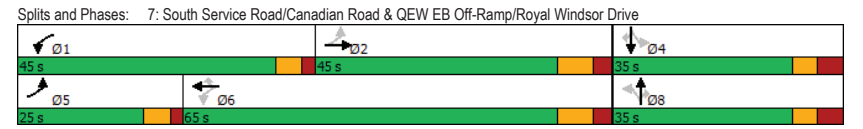
	←	→	↖	↗	↙	↘	↕	↖	↗	↙	↘	↕
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖ ↗	↖ ↗		↖ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗		↖ ↗	↖ ↗	↖ ↗
Traffic Volume (vph)	277	483	15	162	578	24	12	42	89	12	106	377
Future Volume (vph)	277	483	15	162	578	24	12	42	89	12	106	377
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	150.0		0.0	155.0		70.0	15.0		0.0	0.0		30.0
Storage Lanes	2		0	1		1	1		1	1		1
Taper Length (m)	7.5			7.5		7.5			7.5			7.5
Lane Util. Factor	0.97	0.95	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr		0.996				0.850		0.850				0.850
Flt Protected	0.950			0.950		0.950		0.950		0.950		0.950
Satd. Flow (prot)	3502	3398	0	1752	3505	1615	1805	1900	1615	1805	1900	1599
Flt Permitted	0.370			0.432		0.609		0.727				0.727
Satd. Flow (perm)	1364	3398	0	797	3505	1615	1157	1900	1615	1381	1900	1599
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3				94			152			410
Link Speed (k/h)		80			80		60					40
Link Distance (m)		324.5			247.2		158.7					215.5
Travel Time (s)		14.6			11.1		9.5					19.4
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
Heavy Vehicles (%)	0%	6%	0%	3%	3%	0%	0%	0%	0%	0%	0%	1%
Adj. Flow (vph)	301	525	16	176	628	26	13	46	97	13	115	410
Shared Lane Traffic (%)												
Lane Group Flow (vph)	301	541	0	176	628	26	13	46	97	13	115	410
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Right	Left	Right	Left	Right
Median Width(m)		7.2			7.2		3.6		3.6			3.6
Link Offset(m)		0.0			0.0		0.0		0.0			0.0
Crosswalk Width(m)		4.8			4.8		4.8		4.8			4.8
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	CI+Ex	CI+Ex		CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4		9.4		9.4			9.4
Detector 2 Size(m)		0.6			0.6		0.6		0.6			0.6
Detector 2 Type		CI+Ex			CI+Ex		CI+Ex		CI+Ex			CI+Ex
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0		0.0		0.0			0.0
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6		8		4			4

Lanes, Volumes, Timings Base Year 2023 PM.syn
 7: South Service Road/Canadian Road & QEW EB Off-Ramp/Royal Windsor Drive 04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	2			6		6	8		8	4		4
Detector Phase	5	2		1	6	6	8	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	8.0	20.0		8.0	30.0	30.0	8.0	8.0	8.0	10.0	10.0	10.0
Minimum Split (s)	14.0	29.4		14.0	38.4	38.4	28.8	28.8	28.8	28.8	28.8	28.8
Total Split (s)	25.0	45.0		45.0	65.0	65.0	35.0	35.0	35.0	35.0	35.0	35.0
Total Split (%)	20.0%	36.0%		36.0%	52.0%	52.0%	28.0%	28.0%	28.0%	28.0%	28.0%	28.0%
Maximum Green (s)	19.0	36.6		39.0	56.6	56.6	27.2	27.2	27.2	27.2	27.2	27.2
Yellow Time (s)	4.0	5.4		4.0	5.4	5.4	3.7	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	2.0	3.0		2.0	3.0	3.0	4.1	4.1	4.1	4.1	4.1	4.1
Lost Time Adjust (s)	-2.0	-4.4		-2.0	-4.4	-4.4	-3.8	-3.8	-3.8	-3.8	-3.8	-3.8
Total Lost Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lead	Lag		Lead	Lag	Lag						
Lead-Lag Optimize?												
Vehicle Extension (s)	3.5	4.5		3.5	6.0	6.0	3.5	3.5	3.5	3.5	3.5	3.5
Recall Mode	None	Max		None	Max	Max	None	None	None	None	None	None
Walk Time (s)		10.0			10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Flash Dont Walk (s)		10.0			10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Pedestrian Calls (#/hr)		0			0	0	0	0	0	0	0	0
Act Effct Green (s)	74.6	62.3		72.4	61.1	61.1	17.0	17.0	17.0	17.0	17.0	17.0
Actuated g/C Ratio	0.73	0.61		0.71	0.60	0.60	0.17	0.17	0.17	0.17	0.17	0.17
v/c Ratio	0.24	0.26		0.26	0.30	0.03	0.07	0.15	0.25	0.06	0.37	0.68
Control Delay	4.2	10.3		5.0	11.3	0.0	36.8	37.6	2.7	36.3	41.5	9.9
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	4.2	10.3		5.0	11.3	0.0	36.8	37.6	2.7	36.3	41.5	9.9
LOS	A	B		A	B	A	D	D	A	D	D	A
Approach Delay		8.1			9.6			15.9				17.3
Approach LOS		A			A			B				B
Queue Length 50th (m)	6.6	24.2		7.6	30.2	0.0	2.3	8.3	0.0	2.3	21.5	0.0
Queue Length 95th (m)	14.1	43.5		18.5	52.5	0.0	8.0	18.9	3.3	7.9	39.4	27.4
Internal Link Dist (m)		300.5			223.2			134.7			191.5	
Turn Bay Length (m)	150.0			155.0		70.0	15.0					30.0
Base Capacity (vph)	1470	2065		985	2090	1001	350	576	595	418	576	770
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.20	0.26		0.18	0.30	0.03	0.04	0.08	0.16	0.03	0.20	0.53

Intersection Summary	
Area Type:	Other
Cycle Length:	125
Actuated Cycle Length:	102.5
Natural Cycle:	85
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.68
Intersection Signal Delay:	11.3
Intersection Capacity Utilization:	65.0%
Analysis Period (min):	15
Intersection LOS:	B
ICU Level of Service:	C

Lanes, Volumes, Timings Base Year 2023 PM.syn
 7: South Service Road/Canadian Road & QEW EB Off-Ramp/Royal Windsor Drive 04-03-2024



HCM Signalized Intersection Capacity Analysis Base Year 2023 PM.syn
 7: South Service Road/Canadian Road & QEW EB Off-Ramp/Royal Windsor Drive 04-03-2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↕	↔	↕	↕	↔	↕	↔
Traffic Volume (vph)	277	483	15	162	578	24	12	42	89	12	106	377
Future Volume (vph)	277	483	15	162	578	24	12	42	89	12	106	377
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	0.95		1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr	1.00	1.00		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3502	3396		1752	3505	1615	1805	1900	1615	1805	1900	1599
Flt Permitted	0.37	1.00		0.43	1.00	1.00	0.61	1.00	1.00	0.73	1.00	1.00
Satd. Flow (perm)	1362	3396		796	3505	1615	1158	1900	1615	1381	1900	1599
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	301	525	16	176	628	26	13	46	97	13	115	410
RTOR Reduction (vph)	0	1	0	0	0	10	0	0	81	0	0	342
Lane Group Flow (vph)	301	540	0	176	628	16	13	46	16	13	115	68
Heavy Vehicles (%)	0%	6%	0%	3%	3%	0%	0%	0%	0%	0%	0%	1%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8				4
Permitted Phases	2			6		6	8		8	4		4
Actuated Green, G (s)	68.2	57.9		66.0	56.8	56.8	13.2	13.2	13.2	13.2	13.2	13.2
Effective Green, g (s)	72.2	62.3		70.0	61.2	61.2	17.0	17.0	17.0	17.0	17.0	17.0
Actuated g/C Ratio	0.70	0.61		0.68	0.60	0.60	0.17	0.17	0.17	0.17	0.17	0.17
Clearance Time (s)	6.0	8.4		6.0	8.4	8.4	7.8	7.8	7.8	7.8	7.8	7.8
Vehicle Extension (s)	3.5	4.5		3.5	6.0	6.0	3.5	3.5	3.5	3.5	3.5	3.5
Lane Grp Cap (vph)	1216	2064		648	2092	964	192	315	267	229	315	265
v/s Ratio Prot	c0.03	0.16		0.03	c0.18			0.02				c0.06
v/s Ratio Perm	0.14			0.16		0.01	0.01		0.01	0.01		0.04
v/c Ratio	0.25	0.26		0.27	0.30	0.02	0.07	0.15	0.06	0.06	0.37	0.26
Uniform Delay, d1	5.1	9.4		5.8	10.1	8.4	36.1	36.5	36.0	36.0	38.0	37.2
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	0.3		0.3	0.4	0.0	0.2	0.3	0.1	0.1	0.9	0.6
Delay (s)	5.3	9.7		6.0	10.5	8.4	36.2	36.8	36.1	36.1	38.8	37.9
Level of Service	A	A		A	B	A	D	D	D	D	D	D
Approach Delay (s)		8.1			9.5			36.3				38.0
Approach LOS		A			A			D				D

Intersection Summary	
HCM 2000 Control Delay	17.3 HCM 2000 Level of Service B
HCM 2000 Volume to Capacity ratio	0.31
Actuated Cycle Length (s)	102.5 Sum of lost time (s) 12.0
Intersection Capacity Utilization	65.0% ICU Level of Service C
Analysis Period (min)	15
c Critical Lane Group	

Lanes, Volumes, Timings Base Year 2023 PM.syn
 8: QEW WB Off-Ramp & Kerr Street 04-03-2024

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔	↔	↔	↕	↕	↕
Traffic Volume (vph)	374	0	0	614	103	233
Future Volume (vph)	374	0	0	614	103	233
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)		0.0	0.0		0.0	140.0
Storage Lanes		0	0		1	1
Taper Length (m)			7.5		7.5	
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00
Fr						0.850
Flt Protected					0.950	
Satd. Flow (prot)	3574	0	0	3574	1805	1599
Flt Permitted					0.950	
Satd. Flow (perm)	3574	0	0	3574	1805	1599
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)						253
Link Speed (k/h)	60			60	40	
Link Distance (m)	130.3			194.2	262.1	
Travel Time (s)	7.8			11.7	23.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	0%	0%	1%	0%	1%
Adj. Flow (vph)	407	0	0	667	112	253
Shared Lane Traffic (%)						
Lane Group Flow (vph)	407	0	0	667	112	253
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)		15	25		25	15
Turn Type	NA			NA	Prot	Perm
Protected Phases	4			8	2	
Permitted Phases						2
Minimum Split (s)	22.5			22.5	22.5	22.5
Total Split (s)	22.5			22.5	22.5	22.5
Total Split (%)	50.0%			50.0%	50.0%	50.0%
Maximum Green (s)	18.0			18.0	18.0	18.0
Yellow Time (s)	3.5			3.5	3.5	3.5
All-Red Time (s)	1.0			1.0	1.0	1.0
Lost Time Adjust (s)	0.0			0.0	0.0	0.0
Total Lost Time (s)	4.5			4.5	4.5	4.5
Lead/Lag						
Lead-Lag Optimize?						
Walk Time (s)	7.0			7.0	7.0	7.0
Flash Dont Walk (s)	11.0			11.0	11.0	11.0
Pedestrian Calls (#/hr)	0			0	0	0
Act Effct Green (s)	18.0			18.0	18.0	18.0
Actuated g/C Ratio	0.40			0.40	0.40	0.40

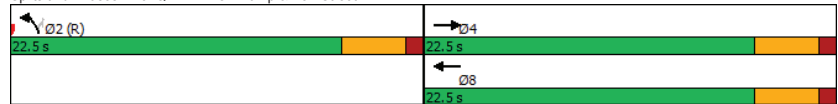
Lanes, Volumes, Timings
8: QEWSB Off-Ramp & Kerr Street

Base Year 2023 PM.syn
04-03-2024

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
v/c Ratio	0.28			0.47	0.16	0.32
Control Delay	9.8			11.3	9.4	2.9
Queue Delay	0.0			0.0	0.0	0.0
Total Delay	9.8			11.3	9.4	2.9
LOS	A			B	A	A
Approach Delay	9.8			11.3	4.9	
Approach LOS	A			B	A	
Queue Length 50th (m)	11.3			20.1	5.6	0.0
Queue Length 95th (m)	18.9			31.4	13.0	9.8
Internal Link Dist (m)	106.3			170.2	238.1	
Turn Bay Length (m)						140.0
Base Capacity (vph)	1429			1429	722	791
Starvation Cap Reductn	0			0	0	0
Spillback Cap Reductn	0			0	0	0
Storage Cap Reductn	0			0	0	0
Reduced v/c Ratio	0.28			0.47	0.16	0.32

Intersection Summary
 Area Type: Other
 Cycle Length: 45
 Actuated Cycle Length: 45
 Offset: 0 (0%), Referenced to phase 2:NBL and 6:, Start of Green
 Natural Cycle: 45
 Control Type: Pretimed
 Maximum v/c Ratio: 0.47
 Intersection Signal Delay: 9.3
 Intersection Capacity Utilization 32.3%
 Analysis Period (min) 15
 Intersection LOS: A
 ICU Level of Service A

Splits and Phases: 8: QEWSB Off-Ramp & Kerr Street



HCM Signalized Intersection Capacity Analysis
8: QEWSB Off-Ramp & Kerr Street

Base Year 2023 PM.syn
04-03-2024

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↑	↑
Traffic Volume (vph)	374	0	0	614	103	233
Future Volume (vph)	374	0	0	614	103	233
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5			4.5	4.5	4.5
Lane Util. Factor	0.95			0.95	1.00	1.00
Frts	1.00			1.00	1.00	0.85
Fit Protected	1.00			1.00	0.95	1.00
Satd. Flow (prot)	3574			3574	1805	1599
Fit Permitted	1.00			1.00	0.95	1.00
Satd. Flow (perm)	3574			3574	1805	1599
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	407	0	0	667	112	253
RTOR Reduction (vph)	0	0	0	0	0	152
Lane Group Flow (vph)	407	0	0	667	112	101
Heavy Vehicles (%)	1%	0%	0%	1%	0%	1%
Turn Type	NA			NA	Prot	Perm
Protected Phases	4			8		2
Permitted Phases						2
Actuated Green, G (s)	18.0			18.0	18.0	18.0
Effective Green, g (s)	18.0			18.0	18.0	18.0
Actuated g/C Ratio	0.40			0.40	0.40	0.40
Clearance Time (s)	4.5			4.5	4.5	4.5
Lane Grp Cap (vph)	1429			1429	722	639
v/s Ratio Prot	0.11			c0.19	0.06	
v/s Ratio Perm						c0.06
v/c Ratio	0.28			0.47	0.16	0.16
Uniform Delay, d1	9.1			10.0	8.6	8.6
Progression Factor	1.00			1.00	1.00	1.00
Incremental Delay, d2	0.5			1.1	0.5	0.5
Delay (s)	9.6			11.1	9.1	9.2
Level of Service	A			B	A	A
Approach Delay (s)	9.6			11.1	9.2	
Approach LOS	A			B	A	

Intersection Summary
 HCM 2000 Control Delay 10.2
 HCM 2000 Volume to Capacity ratio 0.31
 Actuated Cycle Length (s) 45.0
 Intersection Capacity Utilization 32.3%
 Analysis Period (min) 15
 HCM 2000 Level of Service B
 Sum of lost time (s) 9.0
 ICU Level of Service A

c Critical Lane Group

Lanes, Volumes, Timings
9: Dorval Drive & QEW WB Off-Ramp

Base Year 2023 PM.syn
04-03-2024

	↙	↖	↑	↗	↘	↓
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔↔	↔	↔↔			↔↔
Traffic Volume (vph)	631	555	887	0	0	942
Future Volume (vph)	631	555	887	0	0	942
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	190.0		0.0	0.0	
Storage Lanes	2	1		0	0	
Taper Length (m)	7.5			7.5		
Lane Util. Factor	0.97	0.91	0.95	1.00	1.00	0.95
Frt	0.966	0.850				
Flt Protected	0.963					
Satd. Flow (prot)	3344	1455	3574	0	0	3539
Flt Permitted	0.963					
Satd. Flow (perm)	3344	1455	3574	0	0	3539
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)	38	105				
Link Speed (k/h)	40		60			60
Link Distance (m)	325.1		310.2			266.9
Travel Time (s)	29.3		18.6			16.0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	1%	1%	0%	0%	2%
Adj. Flow (vph)	686	603	964	0	0	1024
Shared Lane Traffic (%)		33%				
Lane Group Flow (vph)	885	404	964	0	0	1024
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	7.2		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15		15	25	
Number of Detectors	1	1	2			2
Detector Template	Left	Right	Thru			Thru
Leading Detector (m)	2.0	2.0	10.0			10.0
Trailing Detector (m)	0.0	0.0	0.0			0.0
Detector 1 Position(m)	0.0	0.0	0.0			0.0
Detector 1 Size(m)	2.0	2.0	0.6			0.6
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex			CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0			0.0
Detector 1 Queue (s)	0.0	0.0	0.0			0.0
Detector 1 Delay (s)	0.0	0.0	0.0			0.0
Detector 2 Position(m)			9.4			9.4
Detector 2 Size(m)			0.6			0.6
Detector 2 Type			CI+Ex			CI+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type	Prot	Perm	NA			NA
Protected Phases	8		2			6

Lanes, Volumes, Timings
9: Dorval Drive & QEW WB Off-Ramp

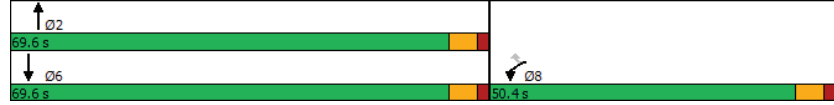
Base Year 2023 PM.syn
04-03-2024

	↙	↖	↑	↗	↘	↓
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Permitted Phases		8				
Detector Phase	8	8	2			6
Switch Phase						
Minimum Initial (s)	10.0	10.0	20.0			20.0
Minimum Split (s)	24.0	24.0	26.0			26.0
Total Split (s)	50.4	50.4	69.6			69.6
Total Split (%)	42.0%	42.0%	58.0%			58.0%
Maximum Green (s)	44.4	44.4	63.6			63.6
Yellow Time (s)	4.0	4.0	4.0			4.0
All-Red Time (s)	2.0	2.0	2.0			2.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0			-2.0
Total Lost Time (s)	4.0	4.0	4.0			4.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	4.5	4.5	5.0			5.0
Recall Mode	None	None	Max			Max
Walk Time (s)	5.0	5.0	7.0			7.0
Flash Dont Walk (s)	7.0	7.0	11.0			11.0
Pedestrian Calls (#/hr)	0	0	0			0
Act Effct Green (s)	40.3	40.3	65.8			65.8
Actuated g/C Ratio	0.35	0.35	0.58			0.58
v/c Ratio	0.73	0.69	0.47			0.50
Control Delay	34.6	29.7	15.7			16.2
Queue Delay	0.0	0.0	0.0			0.0
Total Delay	34.6	29.7	15.7			16.2
LOS	C	C	B			B
Approach Delay	33.1		15.7			16.2
Approach LOS	C		B			B
Queue Length 50th (m)	88.9	66.2	67.8			74.0
Queue Length 95th (m)	111.9	106.8	92.4			100.3
Internal Link Dist (m)	301.1		286.2			242.9
Turn Bay Length (m)		190.0				
Base Capacity (vph)	1386	655	2060			2040
Starvation Cap Reductn	0	0	0			0
Spillback Cap Reductn	0	0	0			0
Storage Cap Reductn	0	0	0			0
Reduced v/c Ratio	0.64	0.62	0.47			0.50
Intersection Summary						
Area Type:	Other					
Cycle Length:	120					
Actuated Cycle Length:	114.1					
Natural Cycle:	50					
Control Type:	Semi Act-Uncoord					
Maximum v/c Ratio:	0.73					
Intersection Signal Delay:	22.7			Intersection LOS: C		
Intersection Capacity Utilization	56.5%			ICU Level of Service B		
Analysis Period (min)	15					

Lanes, Volumes, Timings
9: Dorval Drive & QEW WB Off-Ramp

Base Year 2023 PM.syn
04-03-2024

Splits and Phases: 9: Dorval Drive & QEW WB Off-Ramp



HCM Signalized Intersection Capacity Analysis
9: Dorval Drive & QEW WB Off-Ramp

Base Year 2023 PM.syn
04-03-2024

	←	↖	↑	↗	↓	
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔↔	↔	↑↑			↑↑
Traffic Volume (vph)	631	555	887	0	0	942
Future Volume (vph)	631	555	887	0	0	942
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0			4.0
Lane Util. Factor	0.97	0.91	0.95			0.95
Frt	0.97	0.85	1.00			1.00
Fit Protected	0.96	1.00	1.00			1.00
Satd. Flow (prot)	3344	1455	3574			3539
Fit Permitted	0.96	1.00	1.00			1.00
Satd. Flow (perm)	3344	1455	3574			3539
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	686	603	964	0	0	1024
RTOR Reduction (vph)	25	68	0	0	0	0
Lane Group Flow (vph)	860	336	964	0	0	1024
Heavy Vehicles (%)	3%	1%	1%	0%	0%	2%
Turn Type	Prot	Perm	NA			NA
Protected Phases	8		2			6
Permitted Phases		8				
Actuated Green, G (s)	38.3	38.3	63.8			63.8
Effective Green, g (s)	40.3	40.3	65.8			65.8
Actuated g/C Ratio	0.35	0.35	0.58			0.58
Clearance Time (s)	6.0	6.0	6.0			6.0
Vehicle Extension (s)	4.5	4.5	5.0			5.0
Lane Grp Cap (vph)	1181	513	2061			2040
v/s Ratio Prot	c0.26		0.27			c0.29
v/s Ratio Perm		0.23				
v/c Ratio	0.73	0.66	0.47			0.50
Uniform Delay, d1	32.1	31.1	14.0			14.4
Progression Factor	1.00	1.00	1.00			1.00
Incremental Delay, d2	2.6	3.6	0.8			0.9
Delay (s)	34.7	34.7	14.8			15.3
Level of Service	C	C	B			B
Approach Delay (s)	34.7		14.8			15.3
Approach LOS	C		B			B
Intersection Summary						
HCM 2000 Control Delay			22.8		HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.59			
Actuated Cycle Length (s)			114.1		Sum of lost time (s)	8.0
Intersection Capacity Utilization			56.5%		ICU Level of Service	B
Analysis Period (min)			15			
c Critical Lane Group						

Lanes, Volumes, Timings
10: Dorval Drive & QEW EB Off-Ramp

Base Year 2023 PM.syn
04-03-2024

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	245	291	0	1064	1007	0
Future Volume (vph)	245	291	0	1064	1007	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	175.0	0.0	0.0			0.0
Storage Lanes	1	1	0			0
Taper Length (m)	7.5		7.5			
Lane Util. Factor	0.97	0.91	1.00	0.95	0.95	1.00
Fr't	0.950	0.850				
Flt Protected	0.968					
Satd. Flow (prot)	3302	1441	0	3539	3505	0
Flt Permitted	0.968					
Satd. Flow (perm)	3302	1441	0	3539	3505	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	84	91				
Link Speed (k/h)	40			60	60	
Link Distance (m)	275.5			164.3	310.2	
Travel Time (s)	24.8			9.9	18.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	2%	0%	2%	3%	0%
Adj. Flow (vph)	266	316	0	1157	1095	0
Shared Lane Traffic (%)		42%				
Lane Group Flow (vph)	399	183	0	1157	1095	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	7.2			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Number of Detectors	1	1		2	2	
Detector Template	Left	Right		Thru	Thru	
Leading Detector (m)	2.0	2.0		10.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	2.0		0.6	0.6	
Detector 1 Type	CI+Ex	CI+Ex		CI+Ex	CI+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	
Detector 2 Position(m)				9.4	9.4	
Detector 2 Size(m)				0.6	0.6	
Detector 2 Type				CI+Ex	CI+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Prot	Perm		NA	NA	
Protected Phases	4			2	6	

Lanes, Volumes, Timings
10: Dorval Drive & QEW EB Off-Ramp

Base Year 2023 PM.syn
04-03-2024

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Permitted Phases		4				
Detector Phase	4	4		2	6	
Switch Phase						
Minimum Initial (s)	10.0	10.0		20.0	20.0	
Minimum Split (s)	24.0	24.0		26.0	26.0	
Total Split (s)	45.6	45.6		74.4	74.4	
Total Split (%)	38.0%	38.0%		62.0%	62.0%	
Maximum Green (s)	39.6	39.6		68.4	68.4	
Yellow Time (s)	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	4.0	4.0		5.0	5.0	
Recall Mode	None	None		Max	Max	
Walk Time (s)	0.0	0.0		7.0	7.0	
Flash Dont Walk (s)	7.0	7.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0	
Act Effct Green (s)	18.0	18.0		70.5	70.5	
Actuated g/C Ratio	0.19	0.19		0.73	0.73	
v/c Ratio	0.58	0.53		0.45	0.43	
Control Delay	31.4	23.8		6.3	6.1	
Queue Delay	0.0	0.0		0.0	0.0	
Total Delay	31.4	23.8		6.3	6.1	
LOS	C	C		A	A	
Approach Delay	29.0			6.3	6.1	
Approach LOS	C			A	A	
Queue Length 50th (m)	29.0	17.3		39.0	36.1	
Queue Length 95th (m)	43.9	40.7		65.8	61.2	
Internal Link Dist (m)	251.5			140.3	286.2	
Turn Bay Length (m)	175.0					
Base Capacity (vph)	1472	673		2584	2559	
Starvation Cap Reductn	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	
Storage Cap Reductn	0	0		0	0	
Reduced v/c Ratio	0.27	0.27		0.45	0.43	
Intersection Summary						
Area Type:	Other					
Cycle Length:	120					
Actuated Cycle Length:	96.5					
Natural Cycle:	50					
Control Type:	Semi Act-Uncoord					
Maximum v/c Ratio:	0.58					
Intersection Signal Delay:	10.9			Intersection LOS: B		
Intersection Capacity Utilization:	56.5%			ICU Level of Service B		
Analysis Period (min)	15					

Lanes, Volumes, Timings
10: Dorval Drive & QEW EB Off-Ramp

Base Year 2023 PM.syn
04-03-2024

Splits and Phases: 10: Dorval Drive & QEW EB Off-Ramp

↑ Ø2	Ø4
74.4 s	45.6 s
↓ Ø6	
74.4 s	

HCM Signalized Intersection Capacity Analysis
10: Dorval Drive & QEW EB Off-Ramp

Base Year 2023 PM.syn
04-03-2024

	↖ ↗		↙ ↘		↑ ↓	
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↖↗	↗		↖↖	↖↖	
Traffic Volume (vph)	245	291	0	1064	1007	0
Future Volume (vph)	245	291	0	1064	1007	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	0.91		0.95	0.95	
Fr _t	0.95	0.85		1.00	1.00	
Fit Protected	0.97	1.00		1.00	1.00	
Satd. Flow (prot)	3301	1441		3539	3505	
Fit Permitted	0.97	1.00		1.00	1.00	
Satd. Flow (perm)	3301	1441		3539	3505	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	266	316	0	1157	1095	0
RTOR Reduction (vph)	68	74	0	0	0	0
Lane Group Flow (vph)	331	109	0	1157	1095	0
Heavy Vehicles (%)	3%	2%	0%	2%	3%	0%
Turn Type	Prot	Perm		NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4				
Actuated Green, G (s)	16.0	16.0		68.5	68.5	
Effective Green, g (s)	18.0	18.0		70.5	70.5	
Actuated g/C Ratio	0.19	0.19		0.73	0.73	
Clearance Time (s)	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	4.0	4.0		5.0	5.0	
Lane Grp Cap (vph)	615	268		2585	2560	
v/s Ratio Prot	c0.10			c0.33	0.31	
v/s Ratio Perm		0.08				
v/c Ratio	0.54	0.41		0.45	0.43	
Uniform Delay, d ₁	35.5	34.5		5.2	5.1	
Progression Factor	1.00	1.00		1.00	1.00	
Incremental Delay, d ₂	1.2	1.4		0.6	0.5	
Delay (s)	36.6	35.9		5.8	5.6	
Level of Service	D	D		A	A	
Approach Delay (s)	36.4			5.8	5.6	
Approach LOS	D			A	A	
Intersection Summary						
HCM 2000 Control Delay			12.0	HCM 2000 Level of Service		B
HCM 2000 Volume to Capacity ratio			0.47			
Actuated Cycle Length (s)			96.5	Sum of lost time (s)		8.0
Intersection Capacity Utilization			56.5%	ICU Level of Service		B
Analysis Period (min)			15			
c Critical Lane Group						

Lanes, Volumes, Timings
11: Argus Rd & South Service Rd

Base Year 2023 PM.syn
04-03-2024

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Volume (vph)	10	9	284	83	13	14
Future Volume (vph)	10	9	284	83	13	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt			0.970		0.930	
Flt Protected		0.974			0.976	
Satd. Flow (prot)	0	1568	1539	0	1552	0
Flt Permitted		0.974			0.976	
Satd. Flow (perm)	0	1568	1539	0	1552	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		177.7	145.7		103.5	
Travel Time (s)		12.8	10.5		7.5	
Confl. Peds. (#/hr)					5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	13%	10%	0%	0%	0%
Adj. Flow (vph)	11	10	309	90	14	15
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	21	399	0	29	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (k/h)	24			14	24	14
Sign Control		Free	Free		Stop	

Intersection Summary						
Area Type:	CBD					
Control Type:	Unsignalized					
Intersection Capacity Utilization	32.2%		ICU Level of Service A			
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
11: Argus Rd & South Service Rd

Base Year 2023 PM.syn
04-03-2024

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Volume (veh/h)	10	9	284	83	13	14
Future Volume (Veh/h)	10	9	284	83	13	14
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)	11	10	309	90	14	15
Pedestrians			5			
Lane Width (m)			3.6			
Walking Speed (m/s)			1.2			
Percent Blockage			0			
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)		358				
pX, platoon unblocked						
vC, conflicting volume	399				391	354
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	399				391	354
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				98	98
cM capacity (veh/h)	1171				609	694

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	21	399	29
Volume Left	11	0	14
Volume Right	0	90	15
eSH	1171	1700	650
Volume to Capacity	0.01	0.23	0.04
Queue Length 95th (m)	0.2	0.0	1.1
Control Delay (s)	4.3	0.0	10.8
Lane LOS	A		B
Approach Delay (s)	4.3	0.0	10.8
Approach LOS			B

Intersection Summary			
Average Delay		0.9	
Intersection Capacity Utilization	32.2%	ICU Level of Service	A
Analysis Period (min)	15		

Lanes, Volumes, Timings
12: Lyons Lane & South Service Road

Base Year 2023 PM.syn
04-03-2024

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Volume (vph)	3	5	1	5	13	5
Future Volume (vph)	3	5	1	5	13	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt			0.887		0.964	
Flt Protected		0.982			0.964	
Satd. Flow (prot)	0	1679	1282	0	1589	0
Flt Permitted		0.982			0.964	
Satd. Flow (perm)	0	1679	1282	0	1589	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		60.5	89.6		37.6	
Travel Time (s)		4.4	6.5		2.7	
Confl. Peds. (#/hr)	7			7		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	22%	0%	0%
Adj. Flow (vph)	3	5	1	5	14	5
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	8	6	0	19	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (k/h)	24			14	24	14
Sign Control		Free	Free		Stop	

Intersection Summary						
Area Type:	CBD					
Control Type:	Unsignalized					
Intersection Capacity Utilization	15.4%		ICU Level of Service A			
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
12: Lyons Lane & South Service Road

Base Year 2023 PM.syn
04-03-2024

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Volume (veh/h)	3	5	1	5	13	5
Future Volume (Veh/h)	3	5	1	5	13	5
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)	3	5	1	5	14	5
Pedestrians					7	
Lane Width (m)					3.6	
Walking Speed (m/s)					1.2	
Percent Blockage					1	
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	13				22	10
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	13				22	10
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				99	100
cM capacity (veh/h)	1609				993	1070

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	8	6	19
Volume Left	3	0	14
Volume Right	0	5	5
eSH	1609	1700	1012
Volume to Capacity	0.00	0.00	0.02
Queue Length 95th (m)	0.0	0.0	0.5
Control Delay (s)	2.7	0.0	8.6
Lane LOS	A		A
Approach Delay (s)	2.7	0.0	8.6
Approach LOS			A

Intersection Summary			
Average Delay		5.6	
Intersection Capacity Utilization	15.4%	ICU Level of Service	A
Analysis Period (min)	15		

Lanes, Volumes, Timings
13: GO Bus Terminal/Argus Rd & Cross Ave
Base Year 2023 PM.syn
04-03-2024

	↖	→	↘	↙	←	↖	↙	↘	↙	↘	↙	↘
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↖↗	↘	↖	↖↗	↘	↖	↖	↘	↖	↖	↘
Traffic Volume (vph)	14	850	16	37	353	42	15	2	46	145	19	131
Future Volume (vph)	14	850	16	37	353	42	15	2	46	145	19	131
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6
Storage Length (m)	20.0	0.0	20.0	0.0	0.0	0.0	0.0	15.0	0.0	0.0	0.0	0.0
Storage Lanes	1	0	1	0	1	0	1	0	1	0	1	0
Taper Length (m)	7.5		7.5		7.5		7.5		7.5		7.5	
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	1.00		1.00	1.00	0.99	0.97		0.98	0.98		
Frt		0.997			0.984		0.856			0.869		
Flt Protected	0.950		0.950		0.950		0.950		0.950		0.950	
Satd. Flow (prot)	1570	3180	0	797	3184	0	785	707	0	1570	1287	0
Flt Permitted	0.502			0.177			0.607			0.723		
Satd. Flow (perm)	822	3180	0	148	3184	0	496	707	0	1169	1287	0
Right Turn on Red			Yes		Yes		Yes		Yes		Yes	
Satd. Flow (RTOR)		3		26			50			142		
Link Speed (k/h)		50		50			50			50		
Link Distance (m)		164.3		72.9			81.9			115.7		
Travel Time (s)		11.8		5.2			5.9			8.3		
Confl. Peds. (#/hr)	9		4	4		9	12		20	20		12
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
Heavy Vehicles (%)	0%	0%	100%	97%	0%	0%	100%	100%	100%	0%	100%	0%
Adj. Flow (vph)	15	924	17	40	384	46	16	2	50	158	21	142
Shared Lane Traffic (%)												
Lane Group Flow (vph)	15	941	0	40	430	0	16	52	0	158	163	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.3			3.3			3.3			3.3	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.19	1.14	1.14	1.19	1.14	1.14	1.19	1.14	1.14	1.19	1.14	1.14
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

Lanes, Volumes, Timings
13: GO Bus Terminal/Argus Rd & Cross Ave
Base Year 2023 PM.syn
04-03-2024

	↖	→	↘	↙	←	↖	↙	↘	↙	↘	↙	↘
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases		2		6			8			4		
Detector Phases	2	2		1	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	22.0	22.0		8.0	22.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	45.0	45.0		12.5	29.0		29.0	29.0		29.0	29.0	
Total Split (s)	46.5	46.5		12.5	59.0		31.0	31.0		31.0	31.0	
Total Split (%)	51.7%	51.7%		13.9%	65.6%		34.4%	34.4%		34.4%	34.4%	
Maximum Green (s)	40.5	40.5		8.5	53.0		25.0	25.0		25.0	25.0	
Yellow Time (s)	4.0	4.0		3.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		1.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0		0.0	-2.0		-2.0	-2.0		-2.0	-2.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Vehicle Extension (s)	5.0	5.0		2.5	5.0		4.0	4.0		4.0	4.0	
Recall Mode	Min	Min		Min	Min		Min	Min		Min	Min	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	16.0	16.0		16.0	16.0		16.0	16.0		16.0	16.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	32.9	32.9		45.3	45.3		18.3	18.3		18.3	18.3	
Actuated g/C Ratio	0.46	0.46		0.63	0.63		0.25	0.25		0.25	0.25	
v/c Ratio	0.04	0.65		0.24	0.21		0.13	0.24		0.53	0.38	
Control Delay	12.4	17.8		9.8	6.1		25.2	10.6		31.5	8.9	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	12.4	17.8		9.8	6.1		25.2	10.6		31.5	8.9	
LOS	B	B		A	A		C	B		C	A	
Approach Delay		17.7			6.4			14.0			20.0	
Approach LOS		B			A			B			C	
Queue Length 50th (m)	1.1	49.6		1.9	10.7		1.7	0.2		19.0	2.2	
Queue Length 95th (m)	4.9	85.3		7.0	22.8		7.4	8.9		42.4	17.5	
Internal Link Dist (m)		140.3			48.9			57.9			91.7	
Turn Bay Length (m)	20.0			20.0						15.0		
Base Capacity (vph)	500	1935		172	2512		191	304		451	584	
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	0.03	0.49		0.23	0.17		0.08	0.17		0.35	0.28	

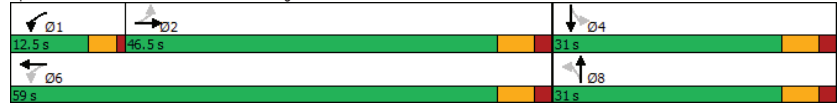
Intersection Summary	
Area Type:	CBD
Cycle Length:	90
Actuated Cycle Length:	71.9
Natural Cycle:	90
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.65
Intersection Signal Delay:	15.0
Intersection LOS:	B

Lanes, Volumes, Timings
13: GO Bus Terminal/Argus Rd & Cross Ave

Base Year 2023 PM.syn
04-03-2024

Intersection Capacity Utilization 57.6% ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 13: GO Bus Terminal/Argus Rd & Cross Ave



HCM Signalized Intersection Capacity Analysis
13: GO Bus Terminal/Argus Rd & Cross Ave

Base Year 2023 PM.syn
04-03-2024

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement												
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	14	850	16	37	353	42	15	2	46	145	19	131
Future Volume (vph)	14	850	16	37	353	42	15	2	46	145	19	131
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frbp, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.97		1.00	0.98	
Flpb, ped/bikes	0.99	1.00		1.00	1.00		0.99	1.00		0.98	1.00	
Frt	1.00	1.00		1.00	0.98		1.00	0.86		1.00	0.87	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1558	3181		797	3185		778	710		1543	1291	
Flt Permitted	0.50	1.00		0.18	1.00		0.61	1.00		0.72	1.00	
Satd. Flow (perm)	823	3181		148	3185		497	710		1175	1291	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	15	924	17	40	384	46	16	2	50	158	21	142
RTOR Reduction (vph)	0	2	0	0	10	0	0	37	0	0	106	0
Lane Group Flow (vph)	15	939	0	40	420	0	16	15	0	158	57	0
Confl. Peds. (#/hr)	9		4	4		9	12		20	20		12
Heavy Vehicles (%)	0%	0%	100%	97%	0%	0%	100%	100%	100%	0%	100%	0%
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	31.0	31.0		43.3	43.3		16.3	16.3		16.3	16.3	
Effective Green, g (s)	33.0	33.0		43.3	45.3		18.3	18.3		18.3	18.3	
Actuated g/C Ratio	0.46	0.46		0.60	0.63		0.26	0.26		0.26	0.26	
Clearance Time (s)	6.0	6.0		4.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	5.0	5.0		2.5	5.0		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	379	1466		164	2015		127	181		300	329	
v/s Ratio Prot		c0.30		c0.03	0.13			0.02			0.04	
v/s Ratio Perm	0.02			0.12			0.03			c0.13		
v/c Ratio	0.04	0.64		0.24	0.21		0.13	0.08		0.53	0.17	
Uniform Delay, d1	10.6	14.8		7.7	5.6		20.5	20.3		22.9	20.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	1.3		0.6	0.1		0.6	0.3		2.2	0.3	
Delay (s)	10.7	16.1		8.2	5.7		21.1	20.5		25.1	21.1	
Level of Service	B	B		A	A		C	C		C	C	
Approach Delay (s)		16.0			5.9			20.7			23.1	
Approach LOS		B			A			C			C	
Intersection Summary												
HCM 2000 Control Delay				14.8			HCM 2000 Level of Service				B	
HCM 2000 Volume to Capacity ratio				0.55								
Actuated Cycle Length (s)				71.6			Sum of lost time (s)				12.0	
Intersection Capacity Utilization				57.6%			ICU Level of Service				B	
Analysis Period (min)				15								
c Critical Lane Group												

Lanes, Volumes, Timings
14: Lyons Lane/Street A & Cross Ave

Base Year 2023 PM.syn
04-03-2024

	↖	→	↘	↙	←	↖	↙	↑	↘	↙	↓	↘
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↖		↖	↖		↖	↖		↖	↖	
Traffic Volume (vph)	38	152	13	14	312	12	233	4	158	15	2	63
Future Volume (vph)	38	152	13	14	312	12	233	4	158	15	2	63
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6
Storage Length (m)	0.0	0.0	25.0		0.0	20.0		0.0	0.0			0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00	1.00		1.00	1.00		1.00	0.98		1.00	0.99	
Frt		0.988			0.994			0.853			0.854	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1525	2909	0	1570	3078	0	1570	1435	0	1570	1414	0
Flt Permitted	0.541			0.574			0.711			0.588		
Satd. Flow (perm)	865	2909	0	947	3078	0	1174	1435	0	968	1414	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		12			7			172				68
Link Speed (k/h)		50			50			50				50
Link Distance (m)		40.1			209.8			69.1				70.9
Travel Time (s)		2.9			15.1			5.0				5.1
Confl. Peds. (#/hr)	3		1	1		3	1		4	4		1
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
Heavy Vehicles (%)	3%	11%	0%	0%	5%	0%	0%	0%	0%	0%	0%	2%
Adj. Flow (vph)	41	165	14	15	339	13	253	4	172	16	2	68
Shared Lane Traffic (%)												
Lane Group Flow (vph)	41	179	0	15	352	0	253	176	0	16	70	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.3			3.3			3.3			3.3	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.19	1.14	1.14	1.19	1.14	1.14	1.19	1.14	1.14	1.19	1.14	1.14
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

Lanes, Volumes, Timings
14: Lyons Lane/Street A & Cross Ave

Base Year 2023 PM.syn
04-03-2024

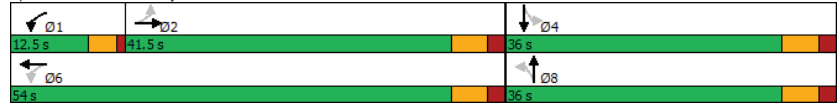
	↖	→	↘	↙	←	↖	↙	↑	↘	↙	↓	↘
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6		8		8		4	
Permitted Phases		2		6			8		8		4	
Detector Phases	2	2		1	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	35.0	35.0		8.0	35.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	41.0	41.0		12.5	41.0		28.0	28.0		28.0	28.0	
Total Split (s)	41.5	41.5		12.5	54.0		36.0	36.0		36.0	36.0	
Total Split (%)	46.1%	46.1%		13.9%	60.0%		40.0%	40.0%		40.0%	40.0%	
Maximum Green (s)	35.5	35.5		8.5	48.0		30.0	30.0		30.0	30.0	
Yellow Time (s)	4.0	4.0		3.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		1.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0		0.0	-2.0		-2.0	-2.0		-2.0	-2.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Vehicle Extension (s)	5.0	5.0		2.5	5.0		4.0	4.0		4.0	4.0	
Recall Mode	Min	Min		Min	Min		Min	Min		Min	Min	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	15.0	15.0		15.0	15.0		15.0	15.0		15.0	15.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	37.2	37.2		49.2	49.2		24.5	24.5		24.5	24.5	
Actuated g/C Ratio	0.45	0.45		0.60	0.60		0.30	0.30		0.30	0.30	
v/c Ratio	0.10	0.13		0.02	0.19		0.72	0.32		0.06	0.15	
Control Delay	15.8	13.7		8.6	8.4		37.7	5.3		19.7	6.3	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	15.8	13.7		8.6	8.4		37.7	5.3		19.7	6.3	
LOS	B	B		A	A		D	A		B	A	
Approach Delay		14.1			8.4			24.4			8.8	
Approach LOS		B			A			C			A	
Queue Length 50th (m)	3.8	8.1		0.9	12.4		36.6	0.5		1.9	0.3	
Queue Length 95th (m)	11.2	16.3		3.9	23.0		63.0	13.8		6.2	8.9	
Internal Link Dist (m)		16.1			185.8			45.1			46.9	
Turn Bay Length (m)				25.0			20.0					
Base Capacity (vph)	398	1346		635	1893		461	668		380	597	
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	0.13		0.02	0.19		0.55	0.26		0.04	0.12	
Intersection Summary												
Area Type:	CBD											
Cycle Length:	90											
Actuated Cycle Length:	81.8											
Natural Cycle:	85											
Control Type:	Semi Act-Uncoordinated											
Maximum v/c Ratio:	0.72											
Intersection Signal Delay:	15.8						Intersection LOS: B					

Lanes, Volumes, Timings
14: Lyons Lane/Street A & Cross Ave

Base Year 2023 PM.syn
04-03-2024

Intersection Capacity Utilization 62.8% ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 14: Lyons Lane/Street A & Cross Ave



HCM Signalized Intersection Capacity Analysis
14: Lyons Lane/Street A & Cross Ave

Base Year 2023 PM.syn
04-03-2024

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	←	↑	↘	←	↑	↘	←	↑	↘	←	↑	↘
Lane Configurations	↘	↑	↘	↘	↑	↘	↘	↑	↘	↘	↑	↘
Traffic Volume (vph)	38	152	13	14	312	12	233	4	158	15	2	63
Future Volume (vph)	38	152	13	14	312	12	233	4	158	15	2	63
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frbp, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.98		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	0.99		1.00	0.85		1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1519	2910		1569	3080		1569	1436		1565	1415	
Flt Permitted	0.54	1.00		0.57	1.00		0.71	1.00		0.59	1.00	
Satd. Flow (perm)	865	2910		948	3080		1175	1436		969	1415	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	41	165	14	15	339	13	253	4	172	16	2	68
RTOR Reduction (vph)	0	7	0	0	3	0	0	120	0	0	48	0
Lane Group Flow (vph)	41	172	0	15	349	0	253	56	0	16	22	0
Confl. Peds. (#/hr)	3		1	1		3	1		4	4		1
Heavy Vehicles (%)	3%	11%	0%	0%	5%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	4
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	35.3	35.3		47.3	47.3		22.5	22.5		22.5	22.5	
Effective Green, g (s)	37.3	37.3		47.3	49.3		24.5	24.5		24.5	24.5	
Actuated g/C Ratio	0.46	0.46		0.58	0.60		0.30	0.30		0.30	0.30	
Clearance Time (s)	6.0	6.0		4.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	5.0	5.0		2.5	5.0		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	394	1326		608	1856		351	430		290	423	
v/s Ratio Prot		0.06		0.00	c0.11			0.04			0.02	
v/s Ratio Perm	0.05			0.01			c0.22			0.02		
v/c Ratio	0.10	0.13		0.02	0.19		0.72	0.13		0.06	0.05	
Uniform Delay, d1	12.7	12.9		7.4	7.3		25.6	20.9		20.4	20.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	0.1		0.0	0.1		7.6	0.2		0.1	0.1	
Delay (s)	13.0	13.0		7.5	7.4		33.2	21.1		20.5	20.5	
Level of Service	B	B		A	A		C	C		C	C	
Approach Delay (s)		13.0			7.4			28.2			20.5	
Approach LOS		B			A			C			C	
Intersection Summary												
HCM 2000 Control Delay				17.6			HCM 2000 Level of Service				B	
HCM 2000 Volume to Capacity ratio				0.39								
Actuated Cycle Length (s)				81.8			Sum of lost time (s)			12.0		
Intersection Capacity Utilization				62.8%			ICU Level of Service			B		
Analysis Period (min)				15								
c Critical Lane Group												

Lanes, Volumes, Timings
15: Cross Ave & Lyons Lane

Base Year 2023 PM.syn
04-03-2024

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↕↕	↕↕		↕↕	
Traffic Volume (vph)	6	184	597	8	15	28
Future Volume (vph)	6	184	597	8	15	28
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	5.0			0.0	0.0	0.0
Storage Lanes	1			0	1	0
Taper Length (m)	7.5				7.5	
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	1.00
Ped Bike Factor						
Frt			0.998		0.912	
Flt Protected	0.950				0.983	
Satd. Flow (prot)	1388	2954	3149	0	1494	0
Flt Permitted	0.950				0.983	
Satd. Flow (perm)	1388	2954	3149	0	1494	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		281.3	40.1		41.7	
Travel Time (s)		20.3	2.9		3.0	
Confl. Peds. (#/hr)	1			1	9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	17%	10%	3%	0%	0%	4%
Adj. Flow (vph)	7	200	649	9	16	30
Shared Lane Traffic (%)						
Lane Group Flow (vph)	7	200	658	0	46	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.6	3.6		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (k/h)	25			15	25	15
Sign Control		Free	Free		Stop	

Intersection Summary	
Area Type:	CBD
Control Type:	Unsignalized
Intersection Capacity Utilization	28.6%
ICU Level of Service A	
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis
15: Cross Ave & Lyons Lane

Base Year 2023 PM.syn
04-03-2024

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↕↕	↕↕		↕↕	
Traffic Volume (veh/h)	6	184	597	8	15	28
Future Volume (Veh/h)	6	184	597	8	15	28
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)	7	200	649	9	16	30
Pedestrians			9		1	
Lane Width (m)		3.6	3.6		3.6	
Walking Speed (m/s)		1.2	1.2		1.2	
Percent Blockage			1		0	
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)			40			
pX, platoon unblocked	0.96				0.96	0.96
vC, conflicting volume	659				778	330
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	559				682	216
tC, single (s)	4.4				6.8	7.0
tC, 2 stage (s)						
tF (s)	2.4				3.5	3.3
p0 queue free %	99				96	96
cM capacity (veh/h)	873				366	750
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	7	100	100	433	225	46
Volume Left	7	0	0	0	0	16
Volume Right	0	0	0	0	9	30
eSH	873	1700	1700	1700	1700	549
Volume to Capacity	0.01	0.06	0.06	0.25	0.13	0.08
Queue Length 95th (m)	0.2	0.0	0.0	0.0	0.0	2.2
Control Delay (s)	9.2	0.0	0.0	0.0	0.0	12.2
Lane LOS	A					B
Approach Delay (s)	0.3			0.0		12.2
Approach LOS						B

Intersection Summary	
Average Delay	0.7
Intersection Capacity Utilization	28.6%
ICU Level of Service A	
Analysis Period (min)	15

Lanes, Volumes, Timings
16: Speers Road/Cornwall Road & Cross Avenue

Base Year 2023 PM.syn
04-03-2024

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↕↕	↕↕		↕	↕↕
Traffic Volume (vph)	236	686	754	17	8	398
Future Volume (vph)	236	686	754	17	8	398
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	75.0			0.0	55.0	0.0
Storage Lanes	1			0	1	2
Taper Length (m)	7.5				7.5	
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	0.88
Frt			0.997			0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1770	3539	3529	0	1770	2787
Flt Permitted	0.257				0.950	
Satd. Flow (perm)	479	3539	3529	0	1770	2787
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)			3			433
Link Speed (k/h)	50	50			50	
Link Distance (m)	189.7	274.5			184.2	
Travel Time (s)	13.7	19.8			13.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	257	746	820	18	9	433
Shared Lane Traffic (%)						
Lane Group Flow (vph)	257	746	838	0	9	433
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.6	3.6		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25			15	25	15
Number of Detectors	1	2	2		1	1
Detector Template	Left	Thru	Thru		Left	Right
Leading Detector (m)	2.0	10.0	10.0		2.0	2.0
Trailing Detector (m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Size(m)	2.0	0.6	0.6		2.0	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0		0.0	0.0
Detector 2 Position(m)		9.4	9.4			
Detector 2 Size(m)		0.6	0.6			
Detector 2 Type		Cl+Ex	Cl+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type	pm+pt	NA	NA		pm+pt	Perm
Protected Phases	5	2	6		7	
Permitted Phases	2				4	4

Lanes, Volumes, Timings
16: Speers Road/Cornwall Road & Cross Avenue

Base Year 2023 PM.syn
04-03-2024

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Detector Phase	5	2	6		7	4
Switch Phase						
Minimum Initial (s)	6.0	5.0	5.0		5.0	5.0
Minimum Split (s)	12.0	33.5	33.5		27.5	27.5
Total Split (s)	22.0	62.0	40.0		28.0	28.0
Total Split (%)	24.4%	68.9%	44.4%		31.1%	31.1%
Maximum Green (s)	16.0	56.0	34.0		22.0	22.0
Yellow Time (s)	4.0	4.0	4.0		4.0	4.0
All-Red Time (s)	2.0	2.0	2.0		2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0		6.0	6.0
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?	Yes		Yes			
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	None	Max	Max		None	None
Walk Time (s)		18.0	18.0		12.0	12.0
Flash Dont Walk (s)		7.0	7.0		7.0	7.0
Pedestrian Calls (#/hr)		0	0		0	0
Act Effct Green (s)	56.1	56.1	41.0		7.0	7.0
Actuated g/C Ratio	0.75	0.75	0.55		0.09	0.09
v/c Ratio	0.50	0.28	0.44		0.05	0.66
Control Delay	6.6	3.6	11.8		31.0	9.0
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	6.6	3.6	11.8		31.0	9.0
LOS	A	A	B		C	A
Approach Delay		4.3	11.8		9.4	
Approach LOS		A	B		A	
Queue Length 50th (m)	7.9	13.0	33.7		1.3	0.0
Queue Length 95th (m)	19.0	25.5	62.4		5.4	13.7
Internal Link Dist (m)		165.7	250.5		160.2	
Turn Bay Length (m)	75.0				55.0	
Base Capacity (vph)	632	2642	1925		519	1123
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	0.41	0.28	0.44		0.02	0.39

Intersection Summary

Area Type:	Other
Cycle Length:	90
Actuated Cycle Length:	75.1
Natural Cycle:	75
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.66
Intersection Signal Delay:	8.1
Intersection Capacity Utilization:	53.6%
Intersection LOS:	A
ICU Level of Service:	A
Analysis Period (min):	15

Lanes, Volumes, Timings
16: Speers Road/Cornwall Road & Cross Avenue

Base Year 2023 PM.syn
04-03-2024

Splits and Phases: 16: Speers Road/Cornwall Road & Cross Avenue



HCM Signalized Intersection Capacity Analysis
16: Speers Road/Cornwall Road & Cross Avenue

Base Year 2023 PM.syn
04-03-2024

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↕	↕	↔	↔	↕
Traffic Volume (vph)	236	686	754	17	8	398
Future Volume (vph)	236	686	754	17	8	398
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0		6.0	6.0
Lane Util. Factor	1.00	0.95	0.95		1.00	0.88
Frt	1.00	1.00	1.00		1.00	0.85
Fit Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	3539	3528		1770	2787
Fit Permitted	0.26	1.00	1.00		0.95	1.00
Satd. Flow (perm)	479	3539	3528		1770	2787
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	257	746	820	18	9	433
RTOR Reduction (vph)	0	0	1	0	0	393
Lane Group Flow (vph)	257	746	837	0	9	40
Turn Type	pm+pt	NA	NA		pm+pt	Perm
Protected Phases	5	2	6		7	
Permitted Phases	2				4	4
Actuated Green, G (s)	56.0	56.0	40.9		7.0	7.0
Effective Green, g (s)	56.0	56.0	40.9		7.0	7.0
Actuated g/C Ratio	0.75	0.75	0.55		0.09	0.09
Clearance Time (s)	6.0	6.0	6.0		6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	514	2642	1923		165	260
v/s Ratio Prot	c0.06	0.21	0.24		0.01	
v/s Ratio Perm	c0.31					c0.01
v/c Ratio	0.50	0.28	0.44		0.05	0.16
Uniform Delay, d1	4.2	3.0	10.2		31.0	31.3
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.8	0.3	0.7		0.1	0.3
Delay (s)	5.0	3.3	10.9		31.1	31.6
Level of Service	A	A	B		C	C
Approach Delay (s)		3.7	10.9		31.6	
Approach LOS		A	B		C	
Intersection Summary						
HCM 2000 Control Delay		11.7		HCM 2000 Level of Service		B
HCM 2000 Volume to Capacity ratio		0.49				
Actuated Cycle Length (s)		75.0		Sum of lost time (s)		18.0
Intersection Capacity Utilization		53.6%		ICU Level of Service		A
Analysis Period (min)		15				
c Critical Lane Group						

Lanes, Volumes, Timings
23: GO Station West Access/Street C & Cross Ave

Base Year 2023 PM.syn
04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔			↔			↔	↔		↔	↔	
Traffic Volume (vph)	0	443	44	242	257	0	75	0	372	0	0	0
Future Volume (vph)	0	443	44	242	257	0	75	0	372	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.0	0.0	0.0	0.0
Storage Lanes	0	0	0	0	0	1	0	1	0	1	0	0
Taper Length (m)	7.5			7.5			7.5		7.5			7.5
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.986						0.850					
Flt Protected					0.976		0.950					
Satd. Flow (prot)	0	3490	0	0	3454	0	1770	1583	0	1863	1863	0
Flt Permitted					0.639		0.757					
Satd. Flow (perm)	0	3490	0	0	2262	0	1410	1583	0	1863	1863	0
Right Turn on Red			Yes				Yes				Yes	
Satd. Flow (RTOR)	25						203					
Link Speed (k/h)	50				50				50			
Link Distance (m)	209.8				164.3				55.1		132.8	
Travel Time (s)	15.1				11.8				4.0		9.6	
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
Adj. Flow (vph)	0	482	48	263	279	0	82	0	404	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	530	0	0	542	0	82	404	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)	3.3				3.3				3.6		3.6	
Link Offset(m)	0.0				0.0				0.0		0.0	
Crosswalk Width(m)	4.8				4.8				4.8		4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15		25		15		25		15	
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)	9.4				9.4				9.4		9.4	
Detector 2 Size(m)	0.6				0.6				0.6		0.6	
Detector 2 Type	Cl+Ex				Cl+Ex				Cl+Ex		Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)	0.0				0.0				0.0		0.0	
Turn Type	NA		Perm		NA		Perm		NA		Perm	
Protected Phases	4				8				2		6	
Permitted Phases	4				8				2		6	

Lanes, Volumes, Timings
23: GO Station West Access/Street C & Cross Ave

Base Year 2023 PM.syn
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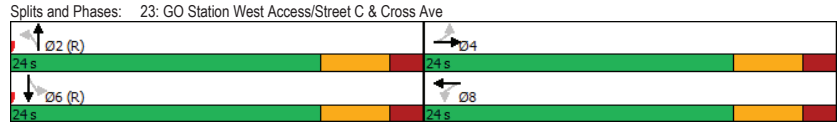
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	24.0	24.0		24.0	24.0		24.0	24.0		24.0	24.0	
Total Split (s)	24.0	24.0		24.0	24.0		24.0	24.0		24.0	24.0	
Total Split (%)	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%		50.0%	50.0%	
Maximum Green (s)	18.0	18.0		18.0	18.0		18.0	18.0		18.0	18.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0				0.0		0.0		0.0		0.0	
Total Lost Time (s)	6.0				6.0		6.0		6.0		6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	15.6				15.6		20.4		20.4			
Actuated g/C Ratio	0.32				0.32		0.42		0.42			
v/c Ratio	0.46				0.95dl		0.14		0.51			
Control Delay	13.1				20.6		10.4		8.3			
Queue Delay	0.0				0.0		0.0		0.0			
Total Delay	13.1				20.6		10.4		8.3			
LOS	B				C		B		A			
Approach Delay	13.1				20.6		8.7					
Approach LOS	B				C		A					
Queue Length 50th (m)	17.6				21.2		4.3		11.5			
Queue Length 95th (m)	26.7				33.8		11.7		32.4			
Internal Link Dist (m)	185.8				140.3		31.1				108.8	
Turn Bay Length (m)												
Base Capacity (vph)	1324				848		597		788			
Starvation Cap Reductn	0				0		0		0			
Spillback Cap Reductn	0				0		0		0			
Storage Cap Reductn	0				0		0		0			
Reduced v/c Ratio	0.40				0.64		0.14		0.51			

Intersection Summary

Area Type: Other
 Cycle Length: 48
 Actuated Cycle Length: 48
 Offset: 0 (0%), Referenced to phase 2:NBL and 6:SBTL, Start of Green
 Natural Cycle: 50
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.74
 Intersection Signal Delay: 14.3
 Intersection Capacity Utilization 65.8%
 Intersection LOS: B
 ICU Level of Service C
 Analysis Period (min) 15
 dl Defacto Left Lane. Recode with 1 though lane as a left lane.

Lanes, Volumes, Timings
23: GO Station West Access/Street C & Cross Ave

Base Year 2023 PM.syn
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HCM Signalized Intersection Capacity Analysis
23: GO Station West Access/Street C & Cross Ave

Base Year 2023 PM.syn
04-03-2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔		↔	↔		↔	↔	
Traffic Volume (vph)	0	443	44	242	257	0	75	0	372	0	0	0
Future Volume (vph)	0	443	44	242	257	0	75	0	372	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0			6.0		6.0	6.0				
Lane Util. Factor		0.95			0.95		1.00	1.00				
Frt		0.99			1.00		1.00	0.85				
Fit Protected		1.00			0.98		0.95	1.00				
Satd. Flow (prot)		3491			3455		1770	1583				
Fit Permitted		1.00			0.64		0.76	1.00				
Satd. Flow (perm)		3491			2262		1410	1583				
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	482	48	263	279	0	82	0	404	0	0	0
RTOR Reduction (vph)	0	17	0	0	0	0	0	117	0	0	0	0
Lane Group Flow (vph)	0	513	0	0	542	0	82	287	0	0	0	0
Turn Type		NA		Perm	NA		Perm	NA		Perm		
Protected Phases		4			8			2				6
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		15.6			15.6		20.4	20.4				
Effective Green, g (s)		15.6			15.6		20.4	20.4				
Actuated g/C Ratio		0.32			0.32		0.42	0.42				
Clearance Time (s)		6.0			6.0		6.0	6.0				
Vehicle Extension (s)		3.0			3.0		3.0	3.0				
Lane Grp Cap (vph)		1134			735		599	672				
v/s Ratio Prot		0.15						c0.18				
v/s Ratio Perm					c0.24		0.06					
v/c Ratio		0.45			0.95dl		0.14	0.43				
Uniform Delay, d1		12.8			14.4		8.4	9.7				
Progression Factor		1.00			1.00		1.00	1.00				
Incremental Delay, d2		0.3			3.9		0.5	2.0				
Delay (s)		13.1			18.3		8.9	11.7				
Level of Service		B			B		A	B				
Approach Delay (s)		13.1			18.3		11.2					0.0
Approach LOS		B			B		B					A
Intersection Summary												
HCM 2000 Control Delay				14.3			HCM 2000 Level of Service					B
HCM 2000 Volume to Capacity ratio				0.56								
Actuated Cycle Length (s)				48.0			Sum of lost time (s)					12.0
Intersection Capacity Utilization				65.8%			ICU Level of Service					C
Analysis Period (min)				15								
dl Defacto Left Lane. Recode with 1 though lane as a left lane.												
c Critical Lane Group												

Lanes, Volumes, Timings

BG 2028 AM.syn

1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd

04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR		
Lane Configurations														
Traffic Volume (vph)	34	106	293	606	76	174	142	921	696	162	1405	46		
Future Volume (vph)	34	106	293	606	76	174	142	921	696	162	1405	46		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900		
Storage Length (m)	60.0			165.0			25.0			145.0			90.0	
Storage Lanes	1			1			1			1			1	
Taper Length (m)	7.5			7.5			7.5			7.5				
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00		
Ped Bike Factor	0.99						0.98			0.99			1.00	
Frt	0.850			0.850			0.850			0.850				
Fit Protected	0.950			0.950			0.950			0.950				
Satd. Flow (prot)	1624	1693	1425	3060	1676	1398	1425	4446	1398	1562	4532	1398		
Fit Permitted	0.703			0.429			0.083			0.219				
Satd. Flow (perm)	1190	1693	1425	1382	1676	1366	124	4446	1377	359	4532	1398		
Right Turn on Red	Yes			Yes			Yes			Yes				
Satd. Flow (RTOR)	50			50			50			50				
Link Speed (k/h)	285.9			293.8			275.1			252.7				
Link Distance (m)	20.6			21.2			19.8			18.2				
Travel Time (s)	11			11			10			10				
Confl. Peds. (#/hr)	0.92			0.92			0.92			0.92				
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		
Heavy Vehicles (%)	0%	1%	2%	3%	2%	4%	14%	5%	4%	4%	3%	4%		
Adj. Flow (vph)	37	115	318	659	83	189	154	1001	757	176	1527	50		
Shared Lane Traffic (%)														
Lane Group Flow (vph)	37	115	318	659	83	189	154	1001	757	176	1527	50		
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No		
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right		
Median Width(m)	7.2			7.2			3.6			3.6				
Link Offset(m)	0.0			0.0			0.0			0.0				
Crosswalk Width(m)	4.8			4.8			4.8			4.8				
Two way Left Turn Lane														
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14		
Turning Speed (k/h)	25			15			25			15			25	
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1		
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right		
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0		
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0		
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		
Detector 1 Channel														
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Detector 2 Position(m)	9.4			9.4			9.4			9.4				
Detector 2 Size(m)	0.6			0.6			0.6			0.6				
Detector 2 Type	Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex				
Detector 2 Channel														
Detector 2 Extend (s)	0.0			0.0			0.0			0.0				

Lanes, Volumes, Timings

BG 2028 AM.syn

1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd

04-03-2024

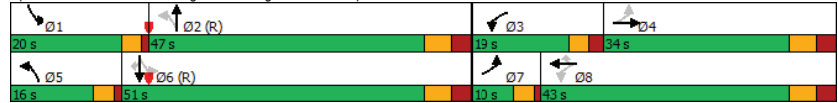
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR		
Turn Type	pm+pt	NA	Free	pm+pt	NA	Perm	pm+pt	NA	Free	pm+pt	NA	Perm		
Protected Phases	7	4		3	8		5	2		1	6			
Permitted Phases	4		Free	8		8	2		Free	6		6		
Detector Phase	7	4		3	8	8	5	2		1	6	6		
Switch Phase														
Minimum Initial (s)	6.0	10.0		6.0	10.0	10.0	6.0	15.0		6.0	15.0	15.0		
Minimum Split (s)	10.0	34.0		11.0	43.0	43.0	10.0	34.0		10.0	34.0	34.0		
Total Split (s)	10.0	34.0		19.0	43.0	43.0	16.0	47.0		20.0	51.0	51.0		
Total Split (%)	8.3%	28.3%		15.8%	35.8%	35.8%	13.3%	39.2%		16.7%	42.5%	42.5%		
Maximum Green (s)	6.0	27.0		14.0	36.0	36.0	12.0	40.0		16.0	44.0	44.0		
Yellow Time (s)	3.0	4.0		3.0	4.0	4.0	3.0	4.0		3.0	4.0	4.0		
All-Red Time (s)	1.0	3.0		2.0	3.0	3.0	1.0	3.0		1.0	3.0	3.0		
Lost Time Adjust (s)	0.0	-3.0		0.0	-3.0	-3.0	0.0	-3.0		0.0	-3.0	-3.0		
Total Lost Time (s)	4.0	4.0		5.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0		
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag		
Lead-Lag Optimize?														
Vehicle Extension (s)	3.0	4.0		3.0	4.0	4.0	3.0	5.0		3.0	5.0	5.0		
Recall Mode	None	None		None	None	None	None	C-Max		None	C-Max	C-Max		
Walk Time (s)				7.0			7.0			7.0				
Flash Dont Walk (s)				29.0			29.0			20.0				
Pedestrian Calls (#/hr)				0			0			0				
Act Effct Green (s)	23.6	17.6	120.0	35.6	30.6	30.6	72.7	59.3	120.0	70.2	58.1	58.1		
Actuated g/C Ratio	0.20	0.15	1.00	0.30	0.26	0.26	0.61	0.49	1.00	0.58	0.48	0.48		
v/c Ratio	0.15	0.47	0.22	1.09	0.19	0.39	0.70	0.46	0.55	0.53	0.70	0.07		
Control Delay	30.3	52.4	0.4	100.5	37.0	7.5	39.2	21.8	1.6	16.4	27.6	0.2		
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Total Delay	30.3	52.4	0.4	100.5	37.0	7.5	39.2	21.8	1.6	16.4	27.6	0.2		
LOS	C	D	A	F	D	A	D	C	A	B	C	A		
Approach Delay	15.4			76.0			15.2			25.7				
Approach LOS	B			E			B			C				
Queue Length 50th (m)	6.5	26.5	0.0	-84.6	17.0	0.0	20.3	56.4	0.0	16.9	103.1	0.0		
Queue Length 95th (m)	14.1	43.7	0.0	#115.0	30.0	18.3	44.4	83.6	0.0	31.1	147.2	0.0		
Internal Link Dist (m)	261.9			269.8			251.1			228.7				
Turn Bay Length (m)	60.0			165.0			145.0			95.0			90.0	
Base Capacity (vph)	255	423	1425	605	544	571	231	2197	1377	384	2192	756		
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0		
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0		
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0		
Reduced v/c Ratio	0.15	0.27	0.22	1.09	0.15	0.33	0.67	0.46	0.55	0.46	0.70	0.07		
Intersection Summary														
Area Type:	CBD													
Cycle Length:	120													
Actuated Cycle Length:	120													
Offset:	33.6 (28%), Referenced to phase 2:NBT and 6:SBTL, Start of Green													
Natural Cycle:	100													
Control Type:	Actuated-Coordinated													
Maximum v/c Ratio:	1.09													
Intersection Signal Delay:	30.0							Intersection LOS: C						

Lanes, Volumes, Timings
1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd

BG 2028 AM.syn
04-03-2024

Intersection Capacity Utilization 76.0% ICU Level of Service D
Analysis Period (min) 15
- Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd



HCM Signalized Intersection Capacity Analysis
1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd

BG 2028 AM.syn
04-03-2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↗	↘	↔	↗	↘	↔	↗	↘	↔	↗	↘
Traffic Volume (vph)	34	106	293	606	76	174	142	921	696	162	1405	46
Future Volume (vph)	34	106	293	606	76	174	142	921	696	162	1405	46
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	1.0	5.0	4.0	4.0	4.0	4.0	1.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.98	1.00	1.00	0.99	1.00	1.00	1.00
Flpb, ped/bikes	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1614	1693	1425	3060	1676	1366	1425	4446	1377	1561	4532	1398
Flt Permitted	0.70	1.00	1.00	0.43	1.00	1.00	0.08	1.00	1.00	0.22	1.00	1.00
Satd. Flow (perm)	1194	1693	1425	1382	1676	1366	124	4446	1377	361	4532	1398
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	37	115	318	659	83	189	154	1001	757	176	1527	50
RTOR Reduction (vph)	0	0	0	0	0	141	0	0	0	0	0	27
Lane Group Flow (vph)	37	115	318	659	83	48	154	1001	757	176	1527	24
Confl. Peds. (#/hr)	11				11				10	10		
Heavy Vehicles (%)	0%	1%	2%	3%	2%	4%	14%	5%	4%	4%	3%	4%
Turn Type	pm+pt	NA	Free	pm+pt	NA	Perm	pm+pt	NA	Free	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		Free	8		8	2		Free	6		6
Actuated Green, G (s)	19.8	16.2	120.0	35.2	27.6	27.6	68.1	54.7	120.0	65.5	53.4	53.4
Effective Green, g (s)	19.8	19.2	120.0	35.2	30.6	30.6	68.1	57.7	120.0	65.5	56.4	56.4
Actuated g/C Ratio	0.17	0.16	1.00	0.29	0.26	0.26	0.57	0.48	1.00	0.55	0.47	0.47
Clearance Time (s)	4.0	7.0		5.0	7.0	7.0	4.0	7.0		4.0	7.0	7.0
Vehicle Extension (s)	3.0	4.0		3.0	4.0	4.0	3.0	5.0		3.0	5.0	5.0
Lane Grp Cap (vph)	209	270	1425	601	427	348	215	2137	1377	318	2130	657
v/s Ratio Prot	0.01	0.07		c0.13	0.05		c0.08	0.23		0.06	c0.34	
v/s Ratio Perm	0.02		0.22	c0.19		0.04	0.33		c0.55	0.25		0.02
v/c Ratio	0.18	0.43	0.22	1.10	0.19	0.14	0.72	0.47	0.55	0.55	0.72	0.04
Uniform Delay, d1	42.8	45.4	0.0	40.5	35.0	34.5	25.0	20.9	0.0	14.7	25.4	17.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.4	1.5	0.4	65.9	0.3	0.2	10.8	0.7	1.6	2.1	2.1	0.1
Delay (s)	43.2	46.9	0.4	106.4	35.3	34.8	35.8	21.6	1.6	16.8	27.5	17.2
Level of Service	D	D	A	F	D	C	D	C	A	B	C	B
Approach Delay (s)		15.1			85.5			14.8			26.2	
Approach LOS		B			F			B			C	
Intersection Summary												
HCM 2000 Control Delay			31.8	HCM 2000 Level of Service				C				
HCM 2000 Volume to Capacity ratio			0.85									
Actuated Cycle Length (s)			120.0	Sum of lost time (s)				17.0				
Intersection Capacity Utilization			76.0%	ICU Level of Service				D				
Analysis Period (min)			15									
c	Critical Lane Group											

Lanes, Volumes, Timings

BG 2028 AM.syn

2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp

04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	2	0	150	409	28	225	0	1533	348	0	2298	6
Future Volume (vph)	2	0	150	409	28	225	0	1533	348	0	2298	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.5	3.3	3.6	3.5	3.6	3.6	3.6	3.6	3.6	3.5
Storage Length (m)	50.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Storage Lanes	1		1	1		1	0		1	0		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.91	1.00	1.00	0.86	0.86
Ped Bike Factor									0.98			1.00
Frt			0.850			0.850			0.850			
Flt Protected	0.950			0.950	0.958							
Satd. Flow (prot)	1570	0	1395	1421	1451	1356	0	4446	1384	0	5711	0
Flt Permitted	0.950			0.950	0.958							
Satd. Flow (perm)	1570	0	1395	1421	1451	1356	0	4446	1353	0	5711	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			31			245			175			1
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		142.1			192.6			324.8			275.1	
Travel Time (s)		10.2			13.9			23.4			19.8	
Confl. Peds. (#/hr)							8		5	5		8
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
Heavy Vehicles (%)	0%	0%	3%	5%	23%	6%	0%	5%	5%	0%	3%	0%
Adj. Flow (vph)	2	0	163	445	30	245	0	1666	378	0	2498	7
Shared Lane Traffic (%)				47%								
Lane Group Flow (vph)	2	0	163	236	239	245	0	1666	378	0	2505	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.3			3.3			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.19	1.14	1.16	1.19	1.14	1.16	1.14	1.14	1.14	1.14	1.14	1.16
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1		1	1		1			1			2
Detector Template	Left		Right	Left	Thru	Right		Thru	Right		Thru	
Leading Detector (m)	2.0		2.0	2.0	10.0	2.0		10.0	2.0		10.0	
Trailing Detector (m)	0.0		0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Detector 1 Position(m)	0.0		0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Detector 1 Size(m)	2.0		2.0	2.0	0.6	2.0		0.6	2.0		0.6	
Detector 1 Type	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Detector 1 Delay (s)	0.0		0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Detector 2 Position(m)					9.4			9.4			9.4	
Detector 2 Size(m)					0.6			0.6			0.6	
Detector 2 Type					Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

Lanes, Volumes, Timings

BG 2028 AM.syn

2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp

04-03-2024

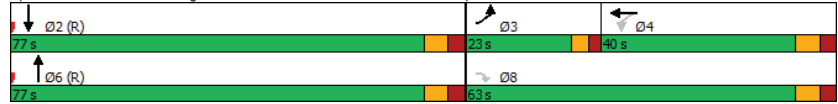
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)								0.0			0.0	0.0
Turn Type	Prot		Perm	Perm	NA	Free		NA	Free		NA	NA
Protected Phases	3				4			6			2	
Permitted Phases			8	4		Free		Free				
Detector Phase	3		8	4	4			6			2	
Switch Phase												
Minimum Initial (s)	7.0		10.0	10.0	10.0			5.0			28.0	
Minimum Split (s)	23.0		38.0	38.0	38.0			35.0			35.0	
Total Split (s)	23.0		63.0	40.0	40.0			77.0			77.0	
Total Split (%)	16.4%		45.0%	28.6%	28.6%			55.0%			55.0%	
Maximum Green (s)	18.0		56.0	33.0	33.0			70.0			70.0	
Yellow Time (s)	3.0		4.0	4.0	4.0			4.0			4.0	
All-Red Time (s)	2.0		3.0	3.0	3.0			3.0			3.0	
Lost Time Adjust (s)	-1.0		-3.0	-3.0	-3.0			-3.0			-3.0	
Total Lost Time (s)	4.0		4.0	4.0	4.0			4.0			4.0	
Lead/Lag	Lead			Lag	Lag							
Lead-Lag Optimize?	Yes			Yes	Yes							
Vehicle Extension (s)	3.0		3.0	3.0	3.0			4.5			4.5	
Recall Mode	Min		Min	Min	Min			C-Min			C-Min	
Walk Time (s)			7.0	7.0	7.0			7.0			7.0	
Flash Dont Walk (s)			24.0	24.0	24.0			21.0			21.0	
Pedestrian Calls (#/hr)			0	0	0			0			0	
Act Effct Green (s)	8.0		43.4	31.4	31.4	140.0		88.6		140.0	88.6	
Actuated g/C Ratio	0.06		0.31	0.22	0.22	1.00		0.63		1.00	0.63	
v/c Ratio	0.02		0.36	0.74	0.74	0.18		0.59		0.28	0.69	
Control Delay	63.0		30.9	64.0	63.4	0.3		13.3		0.4	19.0	
Queue Delay	0.0		0.0	0.0	0.0	0.0		0.0		0.0	0.0	
Total Delay	63.0		30.9	64.0	63.4	0.3		13.3		0.4	19.0	
LOS	E		C	E	E	A		B		A	B	
Approach Delay		31.3						42.1			10.9	19.0
Approach LOS		C						D			B	B
Queue Length 50th (m)	0.6		29.6	67.8	68.7	0.0		77.3		0.0	130.8	
Queue Length 95th (m)	3.7		45.4	92.6	93.1	0.0		111.0		0.0	173.5	
Internal Link Dist (m)		118.1						168.6			300.8	251.1
Turn Bay Length (m)	50.0											
Base Capacity (vph)	213		605	375	383	1356		2814		1353	3615	
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	0.01		0.27	0.63	0.62	0.18		0.59		0.28	0.69	

Lanes, Volumes, Timings
2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp

BG 2028 AM.syn
04-03-2024

Intersection Signal Delay: 19.4	Intersection LOS: B
Intersection Capacity Utilization 70.8%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp



HCM Signalized Intersection Capacity Analysis
2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp

BG 2028 AM.syn
04-03-2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↘		↗	↘	↗	↗		↕	↗		↕	↘
Traffic Volume (vph)	2	0	150	409	28	225	0	1533	348	0	2298	6
Future Volume (vph)	2	0	150	409	28	225	0	1533	348	0	2298	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.5	3.3	3.6	3.5	3.6	3.6	3.6	3.6	3.6	3.5
Total Lost time (s)	4.0		4.0	4.0	4.0	1.0		4.0	4.0		4.0	
Lane Util. Factor	1.00		1.00	0.95	0.95	1.00		0.91	1.00		0.86	
Frbp, ped/bikes	1.00		1.00	1.00	1.00	1.00		1.00	0.98		1.00	
Fipb, ped/bikes	1.00		1.00	1.00	1.00	1.00		1.00	1.00		1.00	
Frt	1.00		0.85	1.00	1.00	0.85		1.00	0.85		1.00	
Flt Protected	0.95		1.00	0.95	0.96	1.00		1.00	1.00		1.00	
Satd. Flow (prot)	1570		1395	1421	1451	1356		4446	1353		5709	
Flt Permitted	0.95		1.00	0.95	0.96	1.00		1.00	1.00		1.00	
Satd. Flow (perm)	1570		1395	1421	1451	1356		4446	1353		5709	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	2	0	163	445	30	245	0	1666	378	0	2498	7
RTOR Reduction (vph)	0	0	21	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	2	0	142	236	239	245	0	1666	378	0	2505	0
Confl. Peds. (#/hr)							8		5	5		8
Heavy Vehicles (%)	0%	0%	3%	5%	23%	6%	0%	5%	5%	0%	3%	0%
Turn Type	Prot		Perm	Perm	NA	Free		NA	Free		NA	
Protected Phases	3				4			6				2
Permitted Phases			8	4		Free			Free			
Actuated Green, G (s)	7.0		40.4	28.4	28.4	140.0		85.6	140.0		85.6	
Effective Green, g (s)	8.0		43.4	31.4	31.4	140.0		88.6	140.0		88.6	
Actuated g/C Ratio	0.06		0.31	0.22	0.22	1.00		0.63	1.00		0.63	
Clearance Time (s)	5.0		7.0	7.0	7.0			7.0			7.0	
Vehicle Extension (s)	3.0		3.0	3.0	3.0			4.5			4.5	
Lane Grp Cap (vph)	89		432	318	325	1356		2813	1353		3612	
v/s Ratio Prot	0.00							0.37			c0.44	
v/s Ratio Perm			0.10	c0.17	0.16	0.18			c0.28			
v/c Ratio	0.02		0.33	0.74	0.74	0.18		0.59	0.28		0.69	
Uniform Delay, d1	62.3		37.1	50.5	50.4	0.0		15.1	0.0		16.8	
Progression Factor	1.00		1.00	1.00	1.00	1.00		0.78	1.00		1.00	
Incremental Delay, d2	0.1		0.4	9.0	8.4	0.3		0.7	0.4		1.1	
Delay (s)	62.4		37.5	59.5	58.8	0.3		12.5	0.4		17.9	
Level of Service	E		D	E	E	A		B	A		B	
Approach Delay (s)		37.8			39.1			10.2			17.9	
Approach LOS		D			D			B			B	
Intersection Summary												
HCM 2000 Control Delay			18.4								B	
HCM 2000 Volume to Capacity ratio			0.69									
Actuated Cycle Length (s)			140.0			Sum of lost time (s)		12.0				
Intersection Capacity Utilization			70.8%			ICU Level of Service					C	
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
3: Trafalgar Rd & QEW EB-Off Ramp

BG 2028 AM.syn
04-03-2024

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔↔	↔		↑↑↑	↑↑↑	↔
Traffic Volume (vph)	787	642	0	1106	1511	416
Future Volume (vph)	787	642	0	1106	1511	416
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.5	3.6	3.6	3.6	3.6
Lane Util. Factor	0.97	1.00	1.00	0.91	0.91	1.00
Frt		0.850				0.850
Flt Protected	0.950					
Satd. Flow (prot)	2958	1423	0	4404	4489	1454
Flt Permitted	0.950					
Satd. Flow (perm)	2958	1423	0	4404	4489	1454
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		4				213
Link Speed (k/h)	50			50	50	
Link Distance (m)	199.2			51.4	324.8	
Travel Time (s)	14.3			3.7	23.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	1%	0%	6%	4%	0%
Adj. Flow (vph)	855	698	0	1202	1642	452
Shared Lane Traffic (%)						
Lane Group Flow (vph)	855	698	0	1202	1642	452
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	6.6			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.19	1.16	1.14	1.14	1.14	1.14
Turning Speed (k/h)	24	14	24			14
Number of Detectors	1	1		2	2	1
Detector Template	Left	Right		Thru	Thru	Right
Leading Detector (m)	2.0	2.0		10.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	2.0	2.0		0.6	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)				9.4	9.4	
Detector 2 Size(m)				0.6	0.6	
Detector 2 Type				Cl+Ex	Cl+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Perm	Perm		NA	NA	Free
Protected Phases				2	2	
Permitted Phases	4	4				Free
Detector Phase	4	4		2	2	

Lanes, Volumes, Timings
3: Trafalgar Rd & QEW EB-Off Ramp

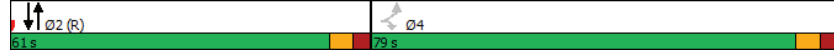
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Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Switch Phase						
Minimum Initial (s)	10.0	10.0		29.0	29.0	
Minimum Split (s)	38.0	38.0		36.0	36.0	
Total Split (s)	79.0	79.0		61.0	61.0	
Total Split (%)	56.4%	56.4%		43.6%	43.6%	
Maximum Green (s)	72.0	72.0		54.0	54.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	
All-Red Time (s)	3.0	3.0		3.0	3.0	
Lost Time Adjust (s)	-3.0	-3.0		-3.0	-3.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Recall Mode	None	None		C-Max	C-Max	
Walk Time (s)	7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	24.0	24.0		22.0	22.0	
Pedestrian Calls (#/hr)	0	0		0	0	
Act Effct Green (s)	73.5	73.5		58.5	58.5	140.0
Actuated g/C Ratio	0.52	0.52		0.42	0.42	1.00
v/c Ratio	0.55	0.93		0.65	0.88	0.31
Control Delay	23.7	51.2		35.2	33.0	0.4
Queue Delay	0.0	0.0		0.0	0.0	0.0
Total Delay	23.7	51.2		35.2	33.0	0.4
LOS	C	D		D	C	A
Approach Delay	36.1			35.2	26.0	
Approach LOS	D			D	C	
Queue Length 50th (m)	81.3	178.5		115.4	169.1	0.0
Queue Length 95th (m)	100.4	#268.4		83.5	153.8	0.0
Internal Link Dist (m)	175.2			27.4	300.8	
Turn Bay Length (m)						
Base Capacity (vph)	1584	764		1841	1876	1454
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	0.54	0.91		0.65	0.88	0.31
Intersection Summary						
Area Type:	CBD					
Cycle Length:	140					
Actuated Cycle Length:	140					
Offset:	133.6 (95%), Referenced to phase 2:NBSB and 6.; Start of Green					
Natural Cycle:	75					
Control Type:	Actuated-Coordinated					
Maximum v/c Ratio:	0.93					
Intersection Signal Delay:	31.5			Intersection LOS: C		
Intersection Capacity Utilization	83.3%			ICU Level of Service E		
Analysis Period (min)	15					
#	95th percentile volume exceeds capacity, queue may be longer.					
	Queue shown is maximum after two cycles.					

Lanes, Volumes, Timings
3: Trafalgar Rd & QEW EB-Off Ramp

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Splits and Phases: 3: Trafalgar Rd & QEW EB-Off Ramp



HCM Signalized Intersection Capacity Analysis
3: Trafalgar Rd & QEW EB-Off Ramp

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	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↕↕	↕		↕↕↕	↕↕↕	↕
Traffic Volume (vph)	787	642	0	1106	1511	416
Future Volume (vph)	787	642	0	1106	1511	416
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.5	3.6	3.6	3.6	3.6
Total Lost time (s)	4.0	4.0		4.0	4.0	1.0
Lane Util. Factor	0.97	1.00		0.91	0.91	1.00
Fr _t	1.00	0.85		1.00	1.00	0.85
Fl _t Protected	0.95	1.00		1.00	1.00	1.00
Satd. Flow (prot)	2958	1423		4404	4489	1454
Fl _t Permitted	0.95	1.00		1.00	1.00	1.00
Satd. Flow (perm)	2958	1423		4404	4489	1454
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	855	698	0	1202	1642	452
RTOR Reduction (vph)	0	2	0	0	0	0
Lane Group Flow (vph)	855	696	0	1202	1642	452
Heavy Vehicles (%)	3%	1%	0%	6%	4%	0%
Turn Type	Perm	Perm		NA	NA	Free
Protected Phases				2	2	
Permitted Phases	4	4				Free
Actuated Green, G (s)	70.5	70.5		55.5	55.5	140.0
Effective Green, g (s)	73.5	73.5		58.5	58.5	140.0
Actuated g/C Ratio	0.52	0.52		0.42	0.42	1.00
Clearance Time (s)	7.0	7.0		7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	1552	747		1840	1875	1454
v/s Ratio Prot				0.27	c0.37	
v/s Ratio Perm	0.29	c0.49				0.31
v/c Ratio	0.55	0.93		0.65	0.88	0.31
Uniform Delay, d ₁	22.2	30.9		32.6	37.4	0.0
Progression Factor	1.00	1.00		1.01	0.74	1.00
Incremental Delay, d ₂	0.4	18.3		1.7	4.6	0.4
Delay (s)	22.6	49.2		34.6	32.4	0.4
Level of Service	C	D		C	C	A
Approach Delay (s)	34.6			34.6	25.5	
Approach LOS	C			C	C	
Intersection Summary						
HCM 2000 Control Delay			30.7		HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.93			
Actuated Cycle Length (s)			140.0		Sum of lost time (s)	11.0
Intersection Capacity Utilization			83.3%		ICU Level of Service	E
Analysis Period (min)			15			
c Critical Lane Group						

Lanes, Volumes, Timings
4: Trafalgar Rd & Argus Rd

BG 2028 AM.syn
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Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	26	0	1714	1802	352
Future Volume (vph)	0	26	0	1714	1802	352
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.6	3.5	3.6	3.6	3.6	3.6
Lane Util. Factor	1.00	1.00	1.00	0.91	0.91	0.91
Ped Bike Factor						
Frt		0.865			0.975	
Fit Protected						
Satd. Flow (prot)	0	1367	0	4363	4390	0
Fit Permitted						
Satd. Flow (perm)	0	1367	0	4363	4390	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	145.7			270.2	51.4	
Travel Time (s)	10.5			19.5	3.7	
Confl. Peds. (#/hr)						11
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	7%	0%	7%	4%	2%
Adj. Flow (vph)	0	28	0	1863	1959	383
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	28	0	1863	2342	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			3.3	3.3	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.14	1.16	1.14	1.14	1.14	1.14
Turning Speed (k/h)	24	14	24			14
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	CBD					
Control Type:	Unsignalized					
Intersection Capacity Utilization	57.6%			ICU Level of Service B		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
4: Trafalgar Rd & Argus Rd

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Movement	EBL	EBR	NBL	NBT	SBT	SBR	
Lane Configurations							
Traffic Volume (veh/h)	0	26	0	1714	1802	352	
Future Volume (Veh/h)	0	26	0	1714	1802	352	
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	28	0	1863	1959	383	
Pedestrians	11						
Lane Width (m)	3.5						
Walking Speed (m/s)	1.2						
Percent Blockage	1						
Right turn flare (veh)							
Median type				None	None		
Median storage (veh)							
Upstream signal (m)				270	52		
pX, platoon unblocked	0.74	0.67	0.67				
vC, conflicting volume	2782	856	2353				
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol	848	0	1285				
tC, single (s)	6.8	7.0	4.1				
tC, 2 stage (s)							
tF (s)	3.5	3.4	2.2				
p0 queue free %	100	96	100				
cM capacity (veh/h)	224	707	362				
Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	28	621	621	621	784	784	775
Volume Left	0	0	0	0	0	0	0
Volume Right	28	0	0	0	0	0	383
eSH	707	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.04	0.37	0.37	0.37	0.46	0.46	0.46
Queue Length 95th (m)	1.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (s)	10.3	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	B						
Approach Delay (s)	10.3	0.0			0.0		
Approach LOS	B						
Intersection Summary							
Average Delay				0.1			
Intersection Capacity Utilization	57.6%			ICU Level of Service		B	
Analysis Period (min)	15						

Lanes, Volumes, Timings

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5: Trafalgar Rd & Cross Ave/South Service Rd

04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	279	29	82	38	33	96	83	1078	25	167	1350	227	
Future Volume (vph)	279	29	82	38	33	96	83	1078	25	167	1350	227	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (m)	3.3	3.6	3.6	3.3	3.6	3.5	3.3	3.6	3.6	3.3	3.6	3.6	
Storage Length (m)	130.0	0.0	25.0	0.0	50.0	0.0	25.0	0.0	25.0	0.0	0.0	0.0	
Storage Lanes	1	0	1	1	1	1	1	0	1	1	0	0	
Taper Length (m)	7.5		7.5		7.5		7.5		7.5		7.5		
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.91	0.91	
Ped Bike Factor	1.00	0.98		0.99		0.99		1.00		0.99		0.99	
Frt	0.890					0.850		0.997		0.978			
Fit Protected	0.950			0.950		0.950		0.950		0.950			
Satd. Flow (prot)	2795	1357	0	1525	1583	1382	1428	4499	0	1525	4404	0	
Fit Permitted	0.950			0.679		0.085		0.160		0.160			
Satd. Flow (perm)	2789	1357	0	1081	1583	1362	128	4499	0	257	4404	0	
Right Turn on Red			Yes			Yes		Yes		Yes		Yes	
Satd. Flow (RTOR)		89				179		3		31			
Link Speed (k/h)	50			50		50		50		50		50	
Link Distance (m)	151.2			330.4		150.2		270.2		270.2		19.5	
Travel Time (s)	10.9			23.8		10.8		19.5		19.5		19.5	
Confl. Peds. (#/hr)	1		4	4		1	10	52	52	10		10	
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	
Heavy Vehicles (%)	9%	6%	12%	3%	8%	4%	10%	3%	0%	3%	3%	4%	
Adj. Flow (vph)	303	32	89	41	36	104	90	1172	27	182	1467	247	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	303	121	0	41	36	104	90	1199	0	182	1714	0	
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No	
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right	
Median Width(m)	6.6			6.6		3.3		3.3		3.3		3.3	
Link Offset(m)	0.0			0.0		0.0		0.0		0.0		0.0	
Crosswalk Width(m)	4.8			4.8		4.8		4.8		4.8		4.8	
Two way Left Turn Lane													
Headway Factor	1.19	1.14	1.14	1.19	1.14	1.16	1.19	1.14	1.14	1.19	1.14	1.14	
Turning Speed (k/h)	24		14	24		14	24	14	24	24		14	
Number of Detectors	1	2		1	2	1	1	2		1	2		
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru		
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0		2.0	10.0		
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0		
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0		
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6		2.0	0.6		
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		
Detector 1 Channel													
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0		
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0		
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0		
Detector 2 Position(m)		9.4			9.4			9.4			9.4		
Detector 2 Size(m)		0.6			0.6			0.6			0.6		
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex		
Detector 2 Channel													

Lanes, Volumes, Timings

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5: Trafalgar Rd & Cross Ave/South Service Rd

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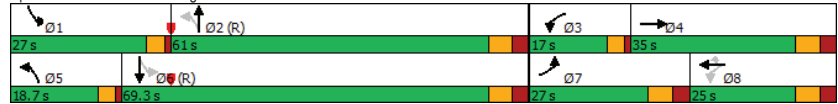
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Detector 2 Extend (s)		0.0			0.0			0.0			0.0		
Turn Type	Prot	NA		pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA		
Protected Phases	7	4		3	8		5	2		1	6		
Permitted Phases				8		8	2			6			
Detector Phases	7	4		3	8		5	2		1	6		
Switch Phase													
Minimum Initial (s)	10.0	10.0		12.0	10.0	10.0	7.0	27.0		7.0	27.0		
Minimum Split (s)	17.0	25.0		17.0	25.0	25.0	11.5	34.0		11.5	34.0		
Total Split (s)	27.0	35.0		17.0	25.0	25.0	18.7	61.0		27.0	69.3		
Total Split (%)	19.3%	25.0%		12.1%	17.9%	17.9%	13.4%	43.6%		19.3%	49.5%		
Maximum Green (s)	20.0	28.0		13.0	18.0	18.0	14.7	54.0		23.0	62.3		
Yellow Time (s)	4.0	4.0		3.0	4.0	4.0	3.0	4.0		3.0	4.0		
All-Red Time (s)	3.0	3.0		1.0	3.0	3.0	1.0	3.0		1.0	3.0		
Lost Time Adjust (s)	-3.0	-3.0		0.0	-3.0	-3.0	0.0	-3.0		0.0	-3.0		
Total Lost Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0		
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag		Lead	Lag		
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes		Yes	Yes		
Vehicle Extension (s)	3.0	4.0		3.5	4.0	4.0	3.0	5.0		3.0	5.0		
Recall Mode	Min	Min		Min	Min	Min	C-Max	C-Max		Min	C-Max		
Walk Time (s)		7.0			7.0	7.0		7.0			7.0		
Flash Dont Walk (s)		11.0			11.0	11.0		11.0			11.0		
Pedestrian Calls (#/hr)		0			0	0		0			0		
Act Effct Green (s)	21.6	23.3		25.8	13.8	13.8	84.4	74.5		91.9	78.8		
Actuated g/C Ratio	0.15	0.17		0.18	0.10	0.10	0.60	0.53		0.66	0.56		
v/c Ratio	0.70	0.40		0.17	0.23	0.35	0.54	0.50		0.61	0.69		
Control Delay	65.5	20.4		38.7	61.8	3.3	30.8	25.8		25.1	23.6		
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0		
Total Delay	65.5	20.4		38.7	61.8	3.3	30.8	25.8		25.1	23.6		
LOS	E	C		D	E	A	C	C		C	C		
Approach Delay		52.6			22.9			26.2			23.8		
Approach LOS		D			C			C			C		
Queue Length 50th (m)	43.2	8.0		8.8	9.9	0.0	15.7	69.8		27.8	103.5		
Queue Length 95th (m)	59.8	27.2		18.2	21.2	0.0	m26.0	m90.6		m34.6	130.0		
Internal Link Dist (m)		127.2			306.4			126.2			246.2		
Turn Bay Length (m)	130.0			25.0			50.0			25.0			
Base Capacity (vph)	459	369		247	237	356	218	2395		378	2492		
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0		
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0		
Storage Cap Reductn	0	0		0	0	0	0	0		0	0		
Reduced v/c Ratio	0.66	0.33		0.17	0.15	0.29	0.41	0.50		0.48	0.69		
Intersection Summary													
Area Type:	CBD												
Cycle Length:	140												
Actuated Cycle Length:	140												
Offset:	128 (91%), Referenced to phase 2:NBT and 6:SBTL, Start of Green												
Natural Cycle:	90												
Control Type:	Actuated-Coordinated												
Maximum v/c Ratio:	0.70												

Lanes, Volumes, Timings
5: Trafalgar Rd & Cross Ave/South Service Rd

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Intersection Signal Delay: 27.8	Intersection LOS: C
Intersection Capacity Utilization 66.1%	ICU Level of Service C
Analysis Period (min) 15	
m Volume for 95th percentile queue is metered by upstream signal.	

Splits and Phases: 5: Trafalgar Rd & Cross Ave/South Service Rd



HCM Signalized Intersection Capacity Analysis
5: Trafalgar Rd & Cross Ave/South Service Rd

BG 2028 AM.syn
04-03-2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔	↔		↔	↔	↔	↔↔↔	↔↔↔		↔↔↔	↔↔	↔
Traffic Volume (vph)	279	29	82	38	33	96	83	1078	25	167	1350	227
Future Volume (vph)	279	29	82	38	33	96	83	1078	25	167	1350	227
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.3	3.6	3.5	3.3	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	1.00		1.00	1.00	1.00	1.00	0.91		1.00	0.91	
Frpb, ped/bikes	1.00	0.98		1.00	1.00	0.99	1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		0.99	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.89		1.00	1.00	0.85	1.00	1.00		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	2795	1356		1517	1583	1362	1428	4498		1525	4406	
Flt Permitted	0.95	1.00		0.68	1.00	1.00	0.08	1.00		0.16	1.00	
Satd. Flow (perm)	2795	1356		1084	1583	1362	127	4498		257	4406	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	303	32	89	41	36	104	90	1172	27	182	1467	247
RTOR Reduction (vph)	0	74	0	0	0	94	0	1	0	0	14	0
Lane Group Flow (vph)	303	47	0	41	36	10	90	1198	0	182	1700	0
Confl. Peds. (#/hr)	1		4	4		1	10		52	52		10
Heavy Vehicles (%)	9%	6%	12%	3%	8%	4%	10%	3%	0%	3%	3%	4%
Turn Type	Prot	NA		pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases				8		8	2			6		
Actuated Green, G (s)	18.6	20.4		22.8	10.8	10.8	81.3	71.4		89.6	75.7	
Effective Green, g (s)	21.6	23.4		22.8	13.8	13.8	81.3	74.4		89.6	78.7	
Actuated g/C Ratio	0.15	0.17		0.16	0.10	0.10	0.58	0.53		0.64	0.56	
Clearance Time (s)	7.0	7.0		4.0	7.0	7.0	4.0	7.0		4.0	7.0	
Vehicle Extension (s)	3.0	4.0		3.5	4.0	4.0	3.0	5.0		3.0	5.0	
Lane Grp Cap (vph)	431	226		213	156	134	165	2390		293	2476	
v/s Ratio Prot	c0.11	c0.03		0.02	0.02		0.04	0.27		c0.06	c0.39	
v/s Ratio Perm				0.01		0.01	0.28			0.33		
v/c Ratio	0.70	0.21		0.19	0.23	0.08	0.55	0.50		0.62	0.69	
Uniform Delay, d1	56.2	50.3		50.4	58.2	57.3	17.1	20.9		13.6	21.9	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.38	1.14		2.02	1.02	
Incremental Delay, d2	5.1	0.6		0.5	1.0	0.3	2.7	0.6		1.9	0.7	
Delay (s)	61.3	50.9		50.9	59.2	57.6	26.5	24.5		29.2	23.0	
Level of Service	E	D		D	E	E	C	C		C	C	
Approach Delay (s)		58.3			56.4			24.7			23.6	
Approach LOS		E			E			C			C	
Intersection Summary												
HCM 2000 Control Delay			29.4				HCM 2000 Level of Service				C	
HCM 2000 Volume to Capacity ratio			0.65									
Actuated Cycle Length (s)			140.0			Sum of lost time (s)				16.0		
Intersection Capacity Utilization			66.1%			ICU Level of Service				C		
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
6: Trafalgar Rd & Cornwall Rd

BG 2028 AM.syn
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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	290	441	73	56	495	448	97	447	62	570	666	234
Future Volume (vph)	290	441	73	56	495	448	97	447	62	570	666	234
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.5
Storage Length (m)	80.0	0.0	80.0	0.0	25.0	0.0	80.0	0.0	80.0	0.0	0.0	0.0
Storage Lanes	2	0	1	1	1	1	1	0	1	1	1	1
Taper Length (m)	7.5		7.5		7.5		7.5		7.5		7.5	
Lane Util. Factor	0.97	0.95	0.95	1.00	0.95	1.00	1.00	*0.80	0.95	0.97	*0.80	1.00
Ped Bike Factor	0.98	0.99		0.99		0.98	1.00	1.00	0.98	0.98		0.98
Frt		0.979				0.850		0.982				0.850
Flt Protected	0.950			0.950		0.950		0.950		0.950		0.950
Satd. Flow (prot)	2987	3055	0	1481	3154	1411	1540	2652	0	2929	1341	1356
Flt Permitted	0.950			0.950		0.950		0.950		0.950		0.950
Satd. Flow (perm)	2937	3055	0	1470	3154	1384	1533	2652	0	2876	1341	1324
Right Turn on Red			Yes			Yes		Yes		Yes		Yes
Satd. Flow (RTOR)		12				487		9				198
Link Speed (k/h)		50			50			50				50
Link Distance (m)		285.8			142.3			311.4				130.3
Travel Time (s)		20.6			10.2			22.4				9.4
Confl. Peds. (#/hr)	25		7	7		25	9		18	18		9
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
Heavy Vehicles (%)	2%	4%	1%	6%	3%	3%	2%	1%	0%	4%	2%	6%
Adj. Flow (vph)	315	479	79	61	538	487	105	486	67	620	724	254
Shared Lane Traffic (%)												
Lane Group Flow (vph)	315	558	0	61	538	487	105	553	0	620	724	254
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		6.6			6.6			6.6				6.6
Link Offset(m)		0.0			0.0			0.0				0.0
Crosswalk Width(m)		4.8			4.8			4.8				4.8
Two way Left Turn Lane												
Headway Factor	1.19	1.14	1.14	1.19	1.14	1.14	1.19	1.14	1.14	1.19	1.14	1.16
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2	1	1	2		1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0		2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6		2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4				9.4
Detector 2 Size(m)		0.6			0.6			0.6				0.6
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex				Cl+Ex
Detector 2 Channel												

Lanes, Volumes, Timings
6: Trafalgar Rd & Cornwall Rd

BG 2028 AM.syn
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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0				0.0
Turn Type	Prot	NA		Prot	NA	Free	Prot	NA		Prot	NA	Perm
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases					Free							6
Detector Phases	3	8		7	4		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	7.0	10.0		7.0	10.0		7.0	20.0		7.0	20.0	20.0
Minimum Split (s)	12.0	37.0		12.0	37.0		12.0	39.0		12.0	39.0	39.0
Total Split (s)	17.0	38.0		16.0	37.0		12.0	48.0		38.0	74.0	74.0
Total Split (%)	12.1%	27.1%		11.4%	26.4%		8.6%	34.3%		27.1%	52.9%	52.9%
Maximum Green (s)	12.0	31.0		11.0	30.0		7.0	41.0		33.0	67.0	67.0
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	4.0
All-Red Time (s)	2.0	3.0		2.0	3.0		2.0	3.0		2.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-3.0		-1.0	-3.0		-1.0	-3.0		-1.0	-3.0	-3.0
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	0.2	0.2		0.2	0.2		0.2	0.2		0.2	0.2	0.2
Recall Mode	Max	Max		Max	Max		None	C-Max		Max	C-Max	C-Max
Walk Time (s)		7.0			7.0			7.0			7.0	7.0
Flash Dont Walk (s)		23.0			23.0			25.0			25.0	25.0
Pedestrian Calls (#/hr)		0			0			0			0	0
Act Effct Green (s)	13.0	34.0		12.0	33.0	140.0	8.0	44.0		34.0	70.0	70.0
Actuated g/C Ratio	0.09	0.24		0.09	0.24	1.00	0.06	0.31		0.24	0.50	0.50
v/c Ratio	1.14	0.74		0.48	0.72	0.35	1.19	0.66		0.87	1.08	0.33
Control Delay	151.3	54.9		74.6	55.8	0.7	210.6	45.3		78.6	83.7	5.9
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	151.3	54.9		74.6	55.8	0.7	210.6	45.3		78.6	83.7	5.9
LOS	F	D		E	E	A	F	D		E	F	A
Approach Delay		89.7			32.2			71.7				69.3
Approach LOS		F			C			E				E
Queue Length 50th (m)	-54.9	78.0		17.2	76.6	0.0	-36.9	85.8		82.0	-288.6	10.8
Queue Length 95th (m)	#86.7	100.4		33.2	98.2	0.0	#76.8	111.3		#122.8	#389.2	16.6
Internal Link Dist (m)		261.8			118.3			287.4				106.3
Turn Bay Length (m)	80.0			80.0		25.0				80.0		
Base Capacity (vph)	277	751		126	743	1384	88	839		711	670	761
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	0
Reduced v/c Ratio	1.14	0.74		0.48	0.72	0.35	1.19	0.66		0.87	1.08	0.33

Lanes, Volumes, Timings
6: Trafalgar Rd & Cornwall Rd

BG 2028 AM.syn
04-03-2024

Intersection Signal Delay: 64.3	Intersection LOS: E
Intersection Capacity Utilization 92.4%	ICU Level of Service F
Analysis Period (min) 15	
* User Entered Value	
~ Volume exceeds capacity, queue is theoretically infinite. Queue shown is maximum after two cycles.	
# 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.	

Splits and Phases: 6: Trafalgar Rd & Cornwall Rd



HCM Signalized Intersection Capacity Analysis
6: Trafalgar Rd & Cornwall Rd

BG 2028 AM.syn
04-03-2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕		↔	↕	↔	↔	↕		↔	↕	↔
Traffic Volume (vph)	290	441	73	56	495	448	97	447	62	570	666	234
Future Volume (vph)	290	441	73	56	495	448	97	447	62	570	666	234
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.5
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.97	0.95		1.00	0.95	1.00	1.00	*0.80		0.97	*0.80	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.98	1.00	1.00		1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	2987	3055		1481	3154	1384	1540	2652		2929	1341	1324
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	2987	3055		1481	3154	1384	1540	2652		2929	1341	1324
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	315	479	79	61	538	487	105	486	67	620	724	254
RTOR Reduction (vph)	0	9	0	0	0	0	0	6	0	0	0	99
Lane Group Flow (vph)	315	549	0	61	538	487	105	547	0	620	724	155
Confl. Peds. (#/hr)	25		7	7		25	9		18	18		9
Heavy Vehicles (%)	2%	4%	1%	6%	3%	2%	2%	1%	0%	4%	2%	6%
Turn Type	Prot	NA		Prot	NA	Free	Prot	NA		Prot	NA	Perm
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases						Free						6
Actuated Green, G (s)	12.0	31.0		11.0	30.0	140.0	7.0	41.0		33.0	67.0	67.0
Effective Green, g (s)	13.0	34.0		12.0	33.0	140.0	8.0	44.0		34.0	70.0	70.0
Actuated g/C Ratio	0.09	0.24		0.09	0.24	1.00	0.06	0.31		0.24	0.50	0.50
Clearance Time (s)	5.0	7.0		5.0	7.0		5.0	7.0		5.0	7.0	7.0
Vehicle Extension (s)	0.2	0.2		0.2	0.2		0.2	0.2		0.2	0.2	0.2
Lane Grp Cap (vph)	277	741		126	743	1384	88	833		711	670	662
v/s Ratio Prot	c0.11	c0.18		0.04	0.17		c0.07	0.21		0.21	c0.54	
v/s Ratio Perm						c0.35						0.12
v/c Ratio	1.14	0.74		0.48	0.72	0.35	1.19	0.66		0.87	1.08	0.23
Uniform Delay, d1	63.5	48.9		61.0	49.3	0.0	66.0	41.5		50.9	35.0	19.8
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.33	0.83	0.99
Incremental Delay, d2	96.3	6.6		12.7	6.1	0.7	156.9	4.0		10.9	54.3	0.6
Delay (s)	159.8	55.5		73.8	55.4	0.7	222.9	45.5		78.7	83.4	20.2
Level of Service	F	E		E	E	A	F	D		E	F	C
Approach Delay (s)	93.1			31.9			73.8			71.5		
Approach LOS	F			C			E			E		
Intersection Summary												
HCM 2000 Control Delay	66.1			HCM 2000 Level of Service		E						
HCM 2000 Volume to Capacity ratio	1.01											
Actuated Cycle Length (s)	140.0			Sum of lost time (s)		16.0						
Intersection Capacity Utilization	92.4%			ICU Level of Service		F						
Analysis Period (min)	15											
c Critical Lane Group												

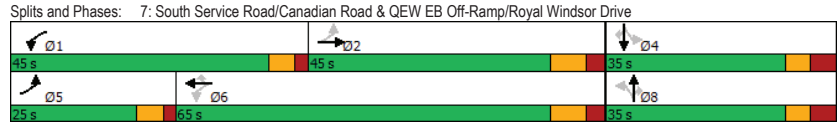
Lanes, Volumes, Timings
 7: South Service Road/Canadian Road & QEW EB Off-Ramp/Royal Windsor Drive 04-03-2024

	↖	→	↗	↖	←	↖	↖	↖	↖	↖	↖	↖
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖↗	↖↗		↖↗	↖↗	↖↗	↖↗	↖↗	↖↗	↖↗	↖↗	↖↗
Traffic Volume (vph)	42	518	28	84	510	7	2	8	47	3	18	27
Future Volume (vph)	42	518	28	84	510	7	2	8	47	3	18	27
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	150.0		0.0	155.0		70.0	15.0		0.0	0.0		30.0
Storage Lanes	2		0	1		1	1		1	1		1
Taper Length (m)	7.5			7.5		7.5			7.5			7.5
Lane Util. Factor	0.97	0.95	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.992				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3400	3299	0	1719	3139	1380	1805	1667	1468	1805	1792	1495
Flt Permitted	0.445			0.397			0.744			0.752		
Satd. Flow (perm)	1592	3299	0	718	3139	1380	1414	1667	1468	1429	1792	1495
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5				94			152			152
Link Speed (k/h)	80			80			60					40
Link Distance (m)	324.5			247.2			158.7					215.5
Travel Time (s)	14.6			11.1			9.5					19.4
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
Heavy Vehicles (%)	3%	9%	0%	5%	15%	17%	0%	14%	10%	0%	6%	8%
Adj. Flow (vph)	46	563	30	91	554	8	2	9	51	3	20	29
Shared Lane Traffic (%)												
Lane Group Flow (vph)	46	593	0	91	554	8	2	9	51	3	20	29
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Right	Left	Left	Right	Right
Median Width(m)	7.2			7.2			3.6					3.6
Link Offset(m)	0.0			0.0			0.0					0.0
Crosswalk Width(m)	4.8			4.8			4.8					4.8
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	CI+Ex	CI+Ex		CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4				9.4
Detector 2 Size(m)		0.6			0.6			0.6				0.6
Detector 2 Type		CI+Ex			CI+Ex			CI+Ex				CI+Ex
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8				4

Lanes, Volumes, Timings
 7: South Service Road/Canadian Road & QEW EB Off-Ramp/Royal Windsor Drive 04-03-2024

	↖	→	↗	↖	←	↖	↖	↖	↖	↖	↖	↖
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	2			6		6	8		8	4		4
Detector Phase	5	2		1	6	6	8	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	8.0	20.0		8.0	30.0	30.0	8.0	8.0	8.0	10.0	10.0	10.0
Minimum Split (s)	14.0	34.0		14.0	38.4	38.4	28.8	28.8	28.8	35.0	35.0	35.0
Total Split (s)	25.0	45.0		45.0	65.0	65.0	35.0	35.0	35.0	35.0	35.0	35.0
Total Split (%)	20.0%	36.0%		36.0%	52.0%	52.0%	28.0%	28.0%	28.0%	28.0%	28.0%	28.0%
Maximum Green (s)	19.0	36.6		39.0	56.6	56.6	27.2	27.2	27.2	27.2	27.2	27.2
Yellow Time (s)	4.0	5.4		4.0	5.4	5.4	3.7	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	2.0	3.0		2.0	3.0	3.0	4.1	4.1	4.1	4.1	4.1	4.1
Lost Time Adjust (s)	-2.0	-4.4		-2.0	-4.4	-4.4	-3.8	-3.8	-3.8	-3.8	-3.8	-3.8
Total Lost Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lead	Lag		Lead	Lag	Lag						
Lead-Lag Optimize?												
Vehicle Extension (s)	3.5	4.5		3.5	6.0	6.0	3.5	3.5	3.5	3.5	3.5	3.5
Recall Mode	None	Max		None	Max	Max	None	None	None	None	None	None
Walk Time (s)		10.0			10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Flash Dont Walk (s)		10.0			10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Pedestrian Calls (#/hr)		0			0	0	0	0	0	0	0	0
Act Effct Green (s)	69.5	62.6		70.5	65.7	65.7	13.4	13.4	13.4	13.9	13.9	13.9
Actuated g/C Ratio	0.77	0.69		0.78	0.73	0.73	0.15	0.15	0.15	0.15	0.15	0.15
v/c Ratio	0.03	0.26		0.14	0.24	0.01	0.01	0.04	0.15	0.01	0.07	0.08
Control Delay	2.7	7.6		3.2	6.7	0.0	36.0	36.4	0.9	36.0	36.6	0.4
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	2.7	7.6		3.2	6.7	0.0	36.0	36.4	0.9	36.0	36.6	0.4
LOS	A	A		A	A	A	D	D	A	D	D	A
Approach Delay		7.3			6.1			7.2				16.4
Approach LOS		A			A			A				B
Queue Length 50th (m)	0.8	24.9		3.4	23.4	0.0	0.3	1.6	0.0	0.5	3.5	0.0
Queue Length 95th (m)	1.9	33.8		6.6	32.0	0.0	2.4	6.1	0.0	3.1	10.4	0.0
Internal Link Dist (m)		300.5			223.2			134.7			191.5	
Turn Bay Length (m)	150.0			155.0		70.0	15.0					30.0
Base Capacity (vph)	1699	2282		1032	2277	1027	486	574	605	492	617	614
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.26		0.09	0.24	0.01	0.00	0.02	0.08	0.01	0.03	0.05
Intersection Summary												
Area Type:	Other											
Cycle Length:	125											
Actuated Cycle Length:	90.6											
Natural Cycle:	90											
Control Type:	Semi Act-Uncoord											
Maximum v/c Ratio:	0.26											
Intersection Signal Delay:	7.1											
Intersection Capacity Utilization:	50.0%											
ICU Level of Service:	A											
Analysis Period (min)	15											

Lanes, Volumes, Timings BG 2028 AM.syn
04-03-2024
7: South Service Road/Canadian Road & QEW EB Off-Ramp/Royal Windsor Drive



HCM Signalized Intersection Capacity Analysis BG 2028 AM.syn
04-03-2024
7: South Service Road/Canadian Road & QEW EB Off-Ramp/Royal Windsor Drive

	←	→	↙	↘	↖	↗	↖	↗	↘	↙	↖	↗
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖ ↗	↖ ↗		↖ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗
Traffic Volume (vph)	42	518	28	84	510	7	2	8	47	3	18	27
Future Volume (vph)	42	518	28	84	510	7	2	8	47	3	18	27
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	0.95		1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Fit Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3400	3301		1719	3139	1380	1805	1667	1468	1805	1792	1495
Fit Permitted	0.44	1.00		0.40	1.00	1.00	0.74	1.00	1.00	0.75	1.00	1.00
Satd. Flow (perm)	1591	3301		719	3139	1380	1414	1667	1468	1428	1792	1495
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	46	563	30	91	554	8	2	9	51	3	20	29
RTOR Reduction (vph)	0	2	0	0	0	3	0	0	45	0	0	25
Lane Group Flow (vph)	46	591	0	91	554	5	2	9	6	3	20	4
Heavy Vehicles (%)	3%	9%	0%	5%	15%	17%	0%	14%	10%	0%	6%	8%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8				4
Permitted Phases	2			6		6	8		8	4		4
Actuated Green, G (s)	63.1	58.6		66.7	60.4	60.4	7.8	7.8	7.8	7.8	7.8	7.8
Effective Green, g (s)	67.1	63.0		70.7	64.8	64.8	11.6	11.6	11.6	11.6	11.6	11.6
Actuated g/C Ratio	0.71	0.66		0.74	0.68	0.68	0.12	0.12	0.12	0.12	0.12	0.12
Clearance Time (s)	6.0	8.4		6.0	8.4	8.4	7.8	7.8	7.8	7.8	7.8	7.8
Vehicle Extension (s)	3.5	4.5		3.5	6.0	6.0	3.5	3.5	3.5	3.5	3.5	3.5
Lane Grp Cap (vph)	1248	2191		623	2143	942	172	203	179	174	219	182
v/s Ratio Prot	0.00	c0.18		c0.01	0.18			0.01			c0.01	
v/s Ratio Perm	0.02			0.10		0.00	0.00		0.00	0.00		0.00
v/c Ratio	0.04	0.27		0.15	0.26	0.01	0.01	0.04	0.03	0.02	0.09	0.02
Uniform Delay, d1	4.1	6.5		3.4	5.8	4.8	36.6	36.8	36.7	36.6	37.0	36.6
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.0	0.3		0.1	0.3	0.0	0.0	0.1	0.1	0.0	0.2	0.1
Delay (s)	4.1	6.8		3.5	6.1	4.8	36.6	36.9	36.8	36.7	37.2	36.7
Level of Service	A	A		A	A	A	D	D	D	D	D	D
Approach Delay (s)		6.6			5.7			36.8			36.9	
Approach LOS		A			A			D			D	
Intersection Summary												
HCM 2000 Control Delay			8.7	HCM 2000 Level of Service				A				
HCM 2000 Volume to Capacity ratio			0.23									
Actuated Cycle Length (s)			94.9	Sum of lost time (s)				12.0				
Intersection Capacity Utilization			50.0%	ICU Level of Service				A				
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
8: QEW WB Off-Ramp & Kerr Street

BG 2028 AM.syn
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Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↔	↔
Traffic Volume (vph)	444	0	0	269	236	263
Future Volume (vph)	444	0	0	269	236	263
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)		0.0	0.0		0.0	140.0
Storage Lanes		0	0		1	1
Taper Length (m)			7.5		7.5	
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00
Fr						0.850
Flt Protected					0.950	
Satd. Flow (prot)	3539	0	0	3539	1770	1583
Flt Permitted					0.950	
Satd. Flow (perm)	3539	0	0	3539	1770	1583
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)						225
Link Speed (k/h)	60			60	40	
Link Distance (m)	128.8			184.7	258.8	
Travel Time (s)	7.7			11.1	23.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	483	0	0	292	257	286
Shared Lane Traffic (%)						
Lane Group Flow (vph)	483	0	0	292	257	286
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)		15	25		25	15
Turn Type	NA			NA	Prot	Perm
Protected Phases	4			8	2	
Permitted Phases						2
Minimum Split (s)	22.5			22.5	22.5	22.5
Total Split (s)	22.5			22.5	22.5	22.5
Total Split (%)	50.0%			50.0%	50.0%	50.0%
Maximum Green (s)	18.0			18.0	18.0	18.0
Yellow Time (s)	3.5			3.5	3.5	3.5
All-Red Time (s)	1.0			1.0	1.0	1.0
Lost Time Adjust (s)	0.0			0.0	0.0	0.0
Total Lost Time (s)	4.5			4.5	4.5	4.5
Lead/Lag						
Lead-Lag Optimize?						
Walk Time (s)	7.0			7.0	7.0	7.0
Flash Dont Walk (s)	11.0			11.0	11.0	11.0
Pedestrian Calls (#/hr)	0			0	0	0
Act Effct Green (s)	18.0			18.0	18.0	18.0
Actuated g/C Ratio	0.40			0.40	0.40	0.40
v/c Ratio	0.34			0.21	0.36	0.37

Lanes, Volumes, Timings
8: QEW WB Off-Ramp & Kerr Street

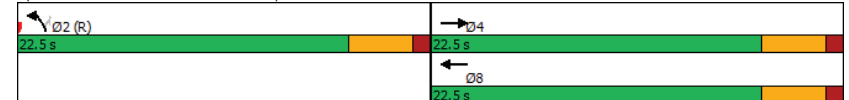
BG 2028 AM.syn
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Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Control Delay	10.2			9.3	11.4	4.4
Queue Delay	0.0			0.0	0.0	0.0
Total Delay	10.2			9.3	11.4	4.4
LOS	B			A	B	A
Approach Delay	10.2			9.3	7.7	
Approach LOS	B			A	A	
Queue Length 50th (m)	13.7			7.8	14.0	3.0
Queue Length 95th (m)	22.4			14.0	27.7	14.4
Internal Link Dist (m)	104.8			160.7	234.8	
Turn Bay Length (m)						140.0
Base Capacity (vph)	1415			1415	708	768
Starvation Cap Reductn	0			0	0	0
Spillback Cap Reductn	0			0	0	0
Storage Cap Reductn	0			0	0	0
Reduced v/c Ratio	0.34			0.21	0.36	0.37

Intersection Summary

Area Type: Other
 Cycle Length: 45
 Actuated Cycle Length: 45
 Offset: 0 (0%), Referenced to phase 2:NBL and 6:, Start of Green
 Natural Cycle: 45
 Control Type: Pretimed
 Maximum v/c Ratio: 0.37
 Intersection Signal Delay: 9.0
 Intersection Capacity Utilization 36.1%
 Analysis Period (min) 15
 Intersection LOS: A
 ICU Level of Service A

Splits and Phases: 8: QEW WB Off-Ramp & Kerr Street



HCM Signalized Intersection Capacity Analysis
8: QEW WB Off-Ramp & Kerr Street

BG 2028 AM.syn
04-03-2024

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↑↓	↑
Traffic Volume (vph)	444	0	0	269	236	263
Future Volume (vph)	444	0	0	269	236	263
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5			4.5	4.5	4.5
Lane Util. Factor	0.95			0.95	1.00	1.00
Fr _t	1.00			1.00	1.00	0.85
Fl _t Protected	1.00			1.00	0.95	1.00
Satd. Flow (prot)	3539			3539	1770	1583
Fl _t Permitted	1.00			1.00	0.95	1.00
Satd. Flow (perm)	3539			3539	1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	483	0	0	292	257	286
RTOR Reduction (vph)	0	0	0	0	0	135
Lane Group Flow (vph)	483	0	0	292	257	151
Turn Type	NA			NA	Prot	Perm
Protected Phases	4			8	2	
Permitted Phases						2
Actuated Green, G (s)	18.0			18.0	18.0	18.0
Effective Green, g (s)	18.0			18.0	18.0	18.0
Actuated g/C Ratio	0.40			0.40	0.40	0.40
Clearance Time (s)	4.5			4.5	4.5	4.5
Lane Grp Cap (vph)	1415			1415	708	633
v/s Ratio Prot	c0.14			0.08	c0.15	
v/s Ratio Perm						0.10
v/c Ratio	0.34			0.21	0.36	0.24
Uniform Delay, d1	9.4			8.8	9.5	9.0
Progression Factor	1.00			1.00	1.00	1.00
Incremental Delay, d2	0.7			0.3	1.4	0.9
Delay (s)	10.0			9.2	10.9	9.8
Level of Service	B			A	B	A
Approach Delay (s)	10.0			9.2	10.4	
Approach LOS	B			A	B	
Intersection Summary						
HCM 2000 Control Delay			10.0		HCM 2000 Level of Service A	
HCM 2000 Volume to Capacity ratio			0.35			
Actuated Cycle Length (s)			45.0		Sum of lost time (s) 9.0	
Intersection Capacity Utilization			36.1%		ICU Level of Service A	
Analysis Period (min)			15			
c Critical Lane Group						

Lanes, Volumes, Timings
9: Dorval Drive & QEW WB Off-Ramp

BG 2028 AM.syn
04-03-2024

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↑↓	↑	↑↑			↑↑
Traffic Volume (vph)	830	386	475	0	0	1325
Future Volume (vph)	830	386	475	0	0	1325
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	190.0		0.0	0.0	
Storage Lanes	2	1		0	0	
Taper Length (m)	7.5				7.5	
Lane Util. Factor	0.97	0.91	0.95	1.00	1.00	0.95
Fr _t	0.993	0.850				
Fl _t Protected	0.954					
Satd. Flow (prot)	3423	1441	3539	0	0	3539
Fl _t Permitted	0.954					
Satd. Flow (perm)	3423	1441	3539	0	0	3539
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)	4	349				
Link Speed (k/h)	40		60			60
Link Distance (m)	325.1		310.2			266.9
Travel Time (s)	29.3		18.6			16.0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	902	420	516	0	0	1440
Shared Lane Traffic (%)		10%				
Lane Group Flow (vph)	944	378	516	0	0	1440
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	7.2		0.0		0.0	
Link Offset(m)	0.0		0.0		0.0	
Crosswalk Width(m)	4.8		4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15		15	25	
Number of Detectors	1	1	2			2
Detector Template	Left	Right	Thru			Thru
Leading Detector (m)	2.0	2.0	10.0			10.0
Trailing Detector (m)	0.0	0.0	0.0			0.0
Detector 1 Position(m)	0.0	0.0	0.0			0.0
Detector 1 Size(m)	2.0	2.0	0.6			0.6
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0			0.0
Detector 1 Queue (s)	0.0	0.0	0.0			0.0
Detector 1 Delay (s)	0.0	0.0	0.0			0.0
Detector 2 Position(m)			9.4			9.4
Detector 2 Size(m)			0.6			0.6
Detector 2 Type			Cl+Ex			Cl+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type		Prot	Perm	NA		NA
Protected Phases		8		2		6
Permitted Phases						8

Lanes, Volumes, Timings
9: Dorval Drive & QEW WB Off-Ramp

BG 2028 AM.syn
04-03-2024



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Detector Phase	8	8	2			6
Switch Phase						
Minimum Initial (s)	10.0	10.0	20.0			20.0
Minimum Split (s)	24.0	24.0	26.0			26.0
Total Split (s)	45.6	45.6	74.4			74.4
Total Split (%)	38.0%	38.0%	62.0%			62.0%
Maximum Green (s)	39.6	39.6	68.4			68.4
Yellow Time (s)	4.0	4.0	4.0			4.0
All-Red Time (s)	2.0	2.0	2.0			2.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0			-2.0
Total Lost Time (s)	4.0	4.0	4.0			4.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	4.5	4.5	5.0			5.0
Recall Mode	None	None	Max			Max
Walk Time (s)	5.0	5.0	7.0			7.0
Flash Dont Walk (s)	7.0	7.0	11.0			11.0
Pedestrian Calls (#/hr)	0	0	0			0
Act Effct Green (s)	40.0	40.0	70.4			70.4
Actuated g/C Ratio	0.34	0.34	0.59			0.59
v/c Ratio	0.81	0.53	0.25			0.68
Control Delay	42.3	7.1	12.0			18.9
Queue Delay	0.0	0.0	0.0			0.0
Total Delay	42.3	7.1	12.0			18.9
LOS	D	A	B			B
Approach Delay	32.2		12.0			18.9
Approach LOS	C		B			B
Queue Length 50th (m)	107.7	5.2	30.7			123.8
Queue Length 95th (m)	133.7	32.5	40.5			149.7
Internal Link Dist (m)	301.1		286.2			242.9
Turn Bay Length (m)		190.0				
Base Capacity (vph)	1205	732	2103			2103
Starvation Cap Reductn	0	0	0			0
Spillback Cap Reductn	0	0	0			0
Storage Cap Reductn	0	0	0			0
Reduced v/c Ratio	0.78	0.52	0.25			0.68

Intersection Summary

Area Type:	Other
Cycle Length:	120
Actuated Cycle Length:	118.5
Natural Cycle:	60
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.81
Intersection Signal Delay:	23.2
Intersection Capacity Utilization:	71.0%
Intersection LOS:	C
ICU Level of Service:	C
Analysis Period (min):	15

Lanes, Volumes, Timings
9: Dorval Drive & QEW WB Off-Ramp

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Splits and Phases: 9: Dorval Drive & QEW WB Off-Ramp



HCM Signalized Intersection Capacity Analysis
9: Dorval Drive & QEWB Off-Ramp

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Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔↔	↔	↕↕			↕↕
Traffic Volume (vph)	830	386	475	0	0	1325
Future Volume (vph)	830	386	475	0	0	1325
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0			4.0
Lane Util. Factor	0.97	0.91	0.95			0.95
Fr	0.99	0.85	1.00			1.00
Fit Protected	0.95	1.00	1.00			1.00
Satd. Flow (prot)	3426	1441	3539			3539
Fit Permitted	0.95	1.00	1.00			1.00
Satd. Flow (perm)	3426	1441	3539			3539
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	902	420	516	0	0	1440
RTOR Reduction (vph)	3	231	0	0	0	0
Lane Group Flow (vph)	941	147	516	0	0	1440
Turn Type	Prot	Perm	NA			NA
Protected Phases	8		2			6
Permitted Phases		8				
Actuated Green, G (s)	38.0	38.0	68.4			68.4
Effective Green, g (s)	40.0	40.0	70.4			70.4
Actuated g/C Ratio	0.34	0.34	0.59			0.59
Clearance Time (s)	6.0	6.0	6.0			6.0
Vehicle Extension (s)	4.5	4.5	5.0			5.0
Lane Grp Cap (vph)	1157	486	2104			2104
v/s Ratio Prot	c0.27		0.15			c0.41
v/s Ratio Perm		0.10				
v/c Ratio	0.81	0.30	0.25			0.68
Uniform Delay, d1	35.8	28.9	11.4			16.4
Progression Factor	1.00	1.00	1.00			1.00
Incremental Delay, d2	5.0	0.6	0.3			1.8
Delay (s)	40.7	29.5	11.7			18.2
Level of Service	D	C	B			B
Approach Delay (s)	37.5		11.7			18.2
Approach LOS	D		B			B

Intersection Summary				
HCM 2000 Control Delay		25.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio		0.73		
Actuated Cycle Length (s)		118.4	Sum of lost time (s)	8.0
Intersection Capacity Utilization		71.0%	ICU Level of Service	C
Analysis Period (min)		15		

c Critical Lane Group

Lanes, Volumes, Timings
10: Dorval Drive & QEWB Off-Ramp

BG 2028 AM.syn
04-03-2024

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔↔	↔		↕↕	↕↕	
Traffic Volume (vph)	122	484	0	669	1432	0
Future Volume (vph)	122	484	0	669	1432	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	175.0	0.0	0.0			0.0
Storage Lanes	1	1	0			0
Taper Length (m)	7.5		7.5			
Lane Util. Factor	0.97	0.91	1.00	0.95	0.95	1.00
Fr	0.900	0.850				
Fit Protected	0.983					
Satd. Flow (prot)	3197	1441	0	3539	3539	0
Fit Permitted	0.983					
Satd. Flow (perm)	3197	1441	0	3539	3539	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	30	30				
Link Speed (k/h)	40			60	60	
Link Distance (m)	275.5			164.3	310.2	
Travel Time (s)	24.8			9.9	18.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	133	526	0	727	1557	0
Shared Lane Traffic (%)		50%				
Lane Group Flow (vph)	396	263	0	727	1557	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	7.2			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Number of Detectors	1	1		2	2	
Detector Template	Left	Right		Thru	Thru	
Leading Detector (m)	2.0	2.0		10.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	2.0		0.6	0.6	
Detector 1 Type	CI+Ex	CI+Ex		CI+Ex	CI+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	
Detector 2 Position(m)				9.4	9.4	
Detector 2 Size(m)				0.6	0.6	
Detector 2 Type				CI+Ex	CI+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Prot	Perm		NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4				

Lanes, Volumes, Timings
10: Dorval Drive & QEW EB Off-Ramp

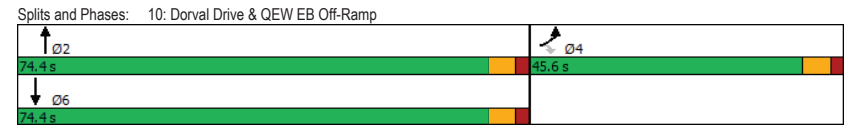
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Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Detector Phase	4	4		2	6	
Switch Phase						
Minimum Initial (s)	10.0	10.0		20.0	20.0	
Minimum Split (s)	24.0	24.0		26.0	26.0	
Total Split (s)	45.6	45.6		74.4	74.4	
Total Split (%)	38.0%	38.0%		62.0%	62.0%	
Maximum Green (s)	39.6	39.6		68.4	68.4	
Yellow Time (s)	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	4.0	4.0		5.0	5.0	
Recall Mode	None	None		Max	Max	
Walk Time (s)	0.0	0.0		7.0	7.0	
Flash Dont Walk (s)	7.0	7.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0	
Act Effct Green (s)	25.7	25.7		70.8	70.8	
Actuated g/C Ratio	0.25	0.25		0.68	0.68	
v/c Ratio	0.49	0.70		0.30	0.65	
Control Delay	32.6	41.5		8.1	12.6	
Queue Delay	0.0	0.0		0.0	0.0	
Total Delay	32.6	41.5		8.1	12.6	
LOS	C	D		A	B	
Approach Delay	36.2			8.1	12.6	
Approach LOS	D			A	B	
Queue Length 50th (m)	34.4	49.8		29.7	90.5	
Queue Length 95th (m)	48.2	80.6		53.8	156.0	
Internal Link Dist (m)	251.5			140.3	286.2	
Turn Bay Length (m)	175.0					
Base Capacity (vph)	1297	594		2396	2396	
Starvation Cap Reductn	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	
Storage Cap Reductn	0	0		0	0	
Reduced v/c Ratio	0.31	0.44		0.30	0.65	

Intersection Summary	
Area Type:	Other
Cycle Length:	120
Actuated Cycle Length:	104.5
Natural Cycle:	60
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.70
Intersection Signal Delay:	16.8
Intersection Capacity Utilization:	71.0%
Analysis Period (min):	15
Intersection LOS:	B
ICU Level of Service:	C

Lanes, Volumes, Timings
10: Dorval Drive & QEW EB Off-Ramp

BG 2028 AM.syn
04-03-2024



HCM Signalized Intersection Capacity Analysis
10: Dorval Drive & QEW EB Off-Ramp

BG 2028 AM.syn
04-03-2024

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔	↔		↕	↕	
Traffic Volume (vph)	122	484	0	669	1432	0
Future Volume (vph)	122	484	0	669	1432	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	0.91		0.95	0.95	
Frt	0.90	0.85		1.00	1.00	
Flt Protected	0.98	1.00		1.00	1.00	
Satd. Flow (prot)	3200	1441		3539	3539	
Flt Permitted	0.98	1.00		1.00	1.00	
Satd. Flow (perm)	3200	1441		3539	3539	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	133	526	0	727	1557	0
RTOR Reduction (vph)	23	23	0	0	0	0
Lane Group Flow (vph)	373	240	0	727	1557	0
Turn Type	Prot	Perm		NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4				
Actuated Green, G (s)	23.7	23.7		68.7	68.7	
Effective Green, g (s)	25.7	25.7		70.7	70.7	
Actuated g/C Ratio	0.25	0.25		0.68	0.68	
Clearance Time (s)	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	4.0	4.0		5.0	5.0	
Lane Grp Cap (vph)	787	354		2396	2396	
v/s Ratio Prot	0.12			0.21	c0.44	
v/s Ratio Perm		c0.17				
v/c Ratio	0.47	0.68		0.30	0.65	
Uniform Delay, d1	33.6	35.6		6.8	9.7	
Progression Factor	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.6	5.6		0.3	1.4	
Delay (s)	34.2	41.2		7.2	11.1	
Level of Service	C	D		A	B	
Approach Delay (s)	37.0			7.2	11.1	
Approach LOS	D			A	B	

Intersection Summary			
HCM 2000 Control Delay	15.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	104.4	Sum of lost time (s)	8.0
Intersection Capacity Utilization	71.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
11: Argus Rd & South Service Rd

BG 2028 AM.syn
04-03-2024

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Volume (vph)	1	6	643	135	5	4
Future Volume (vph)	1	6	643	135	5	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt			0.977		0.940	
Flt Protected		0.994			0.973	
Satd. Flow (prot)	0	1511	1630	0	1564	0
Flt Permitted		0.994			0.973	
Satd. Flow (perm)	0	1511	1630	0	1564	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		177.7	145.7		103.5	
Travel Time (s)		12.8	10.5		7.5	
Confl. Peds. (#/hr)	1			1	5	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	100%	0%	3%	0%	0%	0%
Adj. Flow (vph)	1	7	699	147	5	4
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	8	846	0	9	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (k/h)	24		14		24	14
Sign Control		Free	Free		Stop	
Intersection Summary						
Area Type:	CBD					
Control Type:	Unsignalized					
Intersection Capacity Utilization 57.1%				ICU Level of Service B		
Analysis Period (min) 15						

HCM Unsignalized Intersection Capacity Analysis
11: Argus Rd & South Service Rd

BG 2028 AM.syn
04-03-2024

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	↕
Traffic Volume (veh/h)	1	6	643	135	5	4
Future Volume (Veh/h)	1	6	643	135	5	4
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
Hourly flow rate (vph)	1	7	699	147	5	4
Pedestrians		1	5		1	
Lane Width (m)		3.6	3.6		3.6	
Walking Speed (m/s)		1.2	1.2		1.2	
Percent Blockage		0	0		0	
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)		358				
pX, platoon unblocked						
vC, conflicting volume	847				788	774
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	847				788	774
tC, single (s)	5.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	3.1				3.5	3.3
p0 queue free %	100				99	99
cM capacity (veh/h)	492				360	401
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	8	846	9			
Volume Left	1	0	5			
Volume Right	0	147	4			
cSH	492	1700	377			
Volume to Capacity	0.00	0.50	0.02			
Queue Length 95th (m)	0.0	0.0	0.6			
Control Delay (s)	1.6	0.0	14.8			
Lane LOS	A		B			
Approach Delay (s)	1.6	0.0	14.8			
Approach LOS			B			
Intersection Summary						
Average Delay			0.2			
Intersection Capacity Utilization		57.1%		ICU Level of Service		B
Analysis Period (min)		15				

Lanes, Volumes, Timings
12: Lyons Lane & South Service Road

BG 2028 AM.syn
04-03-2024

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	↕
Traffic Volume (vph)	0	5	4	4	4	1
Future Volume (vph)	0	5	4	4	4	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt			0.932		0.973	
Fit Protected					0.962	
Satd. Flow (prot)	0	1710	1594	0	1266	0
Fit Permitted					0.962	
Satd. Flow (perm)	0	1710	1594	0	1266	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		60.5	89.6		37.6	
Travel Time (s)		4.4	6.5		2.7	
Confl. Peds. (#/hr)	6			6	1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	0%	33%	0%
Adj. Flow (vph)	0	5	4	4	4	1
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	5	8	0	5	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (k/h)	24			14	24	14
Sign Control		Free	Free		Stop	
Intersection Summary						
Area Type:	CBD					
Control Type:	Unsignalized					
Intersection Capacity Utilization 15.1%				ICU Level of Service A		
Analysis Period (min) 15						

HCM Unsignalized Intersection Capacity Analysis
12: Lyons Lane & South Service Road

BG 2028 AM.syn
04-03-2024

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Volume (veh/h)	0	5	4	4	4	1
Future Volume (Veh/h)	0	5	4	4	4	1
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)	0	5	4	4	4	1
Pedestrians			1		6	
Lane Width (m)			3.6		3.6	
Walking Speed (m/s)			1.2		1.2	
Percent Blockage			0		1	
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	14				18	12
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	14				18	12
tC, single (s)	4.1				6.7	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.8	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	1609				920	1069
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	5	8	5			
Volume Left	0	0	4			
Volume Right	0	4	1			
cSH	1609	1700	946			
Volume to Capacity	0.00	0.00	0.01			
Queue Length 95th (m)	0.0	0.0	0.1			
Control Delay (s)	0.0	0.0	8.8			
Lane LOS			A			
Approach Delay (s)	0.0	0.0	8.8			
Approach LOS			A			
Intersection Summary						
Average Delay			2.5			
Intersection Capacity Utilization			15.1%		ICU Level of Service	A
Analysis Period (min)			15			

Lanes, Volumes, Timings
13: GO Bus Terminal/Argus Rd & Cross Ave

BG 2028 AM.syn
04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↕	↕		↕	↕		↕	↕		↕	↕	
Traffic Volume (vph)	35	423	16	44	657	26	23	0	54	63	18	552
Future Volume (vph)	35	423	16	44	657	26	23	0	54	63	18	552
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6
Storage Length (m)	20.0		0.0	20.0		0.0	0.0		0.0	15.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00	1.00		1.00	1.00			0.96		0.98		0.99
Frt		0.995			0.994			0.850				0.855
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1570	3090	0	818	3190	0	805	734	0	1570	1398	0
Fit Permitted	0.370			0.338			0.143			0.719		
Satd. Flow (perm)	611	3090	0	290	3190	0	121	734	0	1163	1398	0
Right Turn on Red			Yes			Yes		Yes				Yes
Satd. Flow (RTOR)		5			8			371			230	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		162.8			72.9			81.9			113.6	
Travel Time (s)		11.7			5.2			5.9			8.2	
Confl. Peds. (#/hr)	1		3	3		1	3		20	20		3
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
Heavy Vehicles (%)	0%	1%	100%	92%	1%	5%	95%	0%	91%	0%	93%	0%
Adj. Flow (vph)	38	460	17	48	714	28	25	0	59	68	20	600
Shared Lane Traffic (%)												
Lane Group Flow (vph)	38	477	0	48	742	0	25	59	0	68	620	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.3			3.3			3.3			3.3	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.19	1.14	1.14	1.19	1.14	1.14	1.19	1.14	1.14	1.19	1.14	1.14
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

Lanes, Volumes, Timings
13: GO Bus Terminal/Argus Rd & Cross Ave

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases		2		6				8			4	
Detector Phase	2	2		1	6			8	8		4	4
Switch Phase												
Minimum Initial (s)	22.0	22.0		8.0	22.0			10.0	10.0		10.0	10.0
Minimum Split (s)	45.0	45.0		12.5	29.0			29.0	29.0		29.0	29.0
Total Split (s)	45.5	45.5		12.5	58.0			32.0	32.0		32.0	32.0
Total Split (%)	50.6%	50.6%		13.9%	64.4%			35.6%	35.6%		35.6%	35.6%
Maximum Green (s)	39.5	39.5		8.5	52.0			26.0	26.0		26.0	26.0
Yellow Time (s)	4.0	4.0		3.0	4.0			4.0	4.0		4.0	4.0
All-Red Time (s)	2.0	2.0		1.0	2.0			2.0	2.0		2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0		0.0	-2.0			-2.0	-2.0		-2.0	-2.0
Total Lost Time (s)	4.0	4.0		4.0	4.0			4.0	4.0		4.0	4.0
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Vehicle Extension (s)	5.0	5.0		2.5	5.0			4.0	4.0		4.0	4.0
Recall Mode	Min	Min		Min	Min			Min	Min		Min	Min
Walk Time (s)	7.0	7.0		7.0	7.0			7.0	7.0		7.0	7.0
Flash Dont Walk (s)	16.0	16.0		16.0	16.0			16.0	16.0		16.0	16.0
Pedestrian Calls (#/hr)	0	0		0	0			0	0		0	0
Act Effct Green (s)	24.5	24.5		36.7	36.7			28.0	28.0		28.0	28.0
Actuated g/C Ratio	0.34	0.34		0.50	0.50			0.39	0.39		0.39	0.39
v/c Ratio	0.19	0.46		0.23	0.46			0.54	0.12		0.15	0.91
Control Delay	19.9	20.4		12.4	12.6			65.7	0.5		16.1	34.3
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0		0.0	0.0
Total Delay	19.9	20.4		12.4	12.6			65.7	0.5		16.1	34.3
LOS	B	C		B	B			E	A		B	C
Approach Delay		20.3			12.6				19.9			32.5
Approach LOS		C			B				B			C
Queue Length 50th (m)	3.8	27.3		3.4	33.4			2.7	0.0		6.1	53.8
Queue Length 95th (m)	10.9	40.7		8.8	46.7			#16.3	0.0		15.3	#129.4
Internal Link Dist (m)		138.8			48.9				57.9			89.6
Turn Bay Length (m)	20.0			20.0							15.0	
Base Capacity (vph)	349	1766		208	2372			46	511		448	680
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	0.11	0.27		0.23	0.31			0.54	0.12		0.15	0.91

Intersection Summary

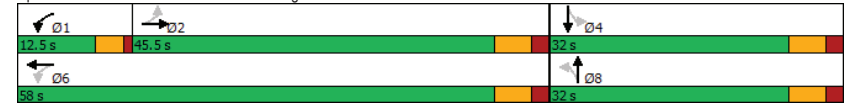
Area Type: CBD
 Cycle Length: 90
 Actuated Cycle Length: 72.7
 Natural Cycle: 90
 Control Type: Semi Act-Uncoord
 Maximum v/c Ratio: 0.91
 Intersection Signal Delay: 21.4 Intersection LOS: C

Lanes, Volumes, Timings
13: GO Bus Terminal/Argus Rd & Cross Ave

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Intersection Capacity Utilization 86.6% ICU Level of Service E
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 13: GO Bus Terminal/Argus Rd & Cross Ave



HCM Signalized Intersection Capacity Analysis
13: GO Bus Terminal/Argus Rd & Cross Ave

BG 2028 AM.syn
04-03-2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	35	423	16	44	657	26	23	0	54	63	18	552
Future Volume (vph)	35	423	16	44	657	26	23	0	54	63	18	552
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.3	3.6	3.3	3.6
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.97		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		0.98	1.00	
Frt	1.00	0.99		1.00	0.99		1.00	0.85		1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1569	3089		817	3191		805	738		1543	1399	
Flt Permitted	0.37	1.00		0.34	1.00		0.14	1.00		0.72	1.00	
Satd. Flow (perm)	611	3089		291	3191		121	738		1167	1399	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	38	460	17	48	714	28	25	0	59	68	20	600
RTOR Reduction (vph)	0	3	0	0	4	0	0	36	0	0	141	0
Lane Group Flow (vph)	38	474	0	48	738	0	25	23	0	68	479	0
Confl. Peds. (#/hr)	1		3	3		1	3		20	20		3
Heavy Vehicles (%)	0%	1%	100%	92%	1%	5%	95%	0%	91%	0%	93%	0%
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6		8	8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	22.5	22.5		34.7	34.7		26.0	26.0		26.0	26.0	
Effective Green, g (s)	24.5	24.5		34.7	36.7		28.0	28.0		28.0	28.0	
Actuated g/C Ratio	0.34	0.34		0.48	0.50		0.39	0.39		0.39	0.39	
Clearance Time (s)	6.0	6.0		4.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	5.0	5.0		2.5	5.0		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	205	1040		198	1610		46	284		449	538	
v/s Ratio Prot		0.15		0.03	c0.23			0.03			c0.34	
v/s Ratio Perm	0.06			0.09			0.21			0.06		
v/c Ratio	0.19	0.46		0.24	0.46		0.54	0.08		0.15	0.89	
Uniform Delay, d1	17.0	18.9		11.0	11.6		17.4	14.2		14.6	20.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.9	0.7		0.5	0.4		15.4	0.2		0.2	16.8	
Delay (s)	18.0	19.5		11.5	12.0		32.8	14.3		14.8	37.7	
Level of Service	B	B		B	B		C	B		B	D	
Approach Delay (s)		19.4			12.0			19.8			35.4	
Approach LOS		B			B			B			D	

Intersection Summary			
HCM 2000 Control Delay	21.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	72.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	86.6%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
14: Lyons Lane/Street A & Cross Ave

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	63	190	217	242	129	6	19	4	14	18	26	45
Future Volume (vph)	63	190	217	242	129	6	19	4	14	18	26	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6
Storage Length (m)	0.0	0.0	25.0		0.0	20.0	0.0	0.0		0.0	0.0	0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	0.99		1.00	1.00		1.00	0.99		1.00	0.99	
Frt		0.920			0.993			0.882			0.905	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1540	2810	0	1570	2728	0	1570	1490	0	1468	1503	0
Flt Permitted	0.659			0.432			0.707			0.745		
Satd. Flow (perm)	1059	2810	0	713	2728	0	1165	1490	0	1147	1503	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		236			7			15			49	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		40.1			211.2			69.1			70.9	
Travel Time (s)		2.9			15.2			5.0			5.1	
Confl. Peds. (#/hr)	5		1	1		5	3		3	3		3
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
Heavy Vehicles (%)	2%	11%	0%	0%	19%	0%	0%	0%	0%	7%	0%	3%
Adj. Flow (vph)	68	207	236	263	140	7	21	4	15	20	28	49
Shared Lane Traffic (%)												
Lane Group Flow (vph)	68	443	0	263	147	0	21	19	0	20	77	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.3			3.3			3.3			3.3	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.19	1.14	1.14	1.19	1.14	1.14	1.19	1.14	1.14	1.19	1.14	1.14
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

Lanes, Volumes, Timings
14: Lyons Lane/Street A & Cross Ave

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases		2		6			8			4		
Detector Phase	2	2		1	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	35.0	35.0		8.0	35.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	41.0	41.0		12.5	41.0		28.0	28.0		28.0	28.0	
Total Split (s)	41.0	41.0		21.0	62.0		28.0	28.0		28.0	28.0	
Total Split (%)	45.6%	45.6%		23.3%	68.9%		31.1%	31.1%		31.1%	31.1%	
Maximum Green (s)	35.0	35.0		17.0	56.0		22.0	22.0		22.0	22.0	
Yellow Time (s)	4.0	4.0		3.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		1.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0		0.0	-2.0		-2.0	-2.0		-2.0	-2.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Vehicle Extension (s)	5.0	5.0		2.5	5.0		4.0	4.0		4.0	4.0	
Recall Mode	Min	Min		Min	Min		Min	Min		Min	Min	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	15.0	15.0		15.0	15.0		15.0	15.0		15.0	15.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	37.0	37.0		50.4	50.4		12.3	12.3		12.3	12.3	
Actuated g/C Ratio	0.52	0.52		0.71	0.71		0.17	0.17		0.17	0.17	
v/c Ratio	0.12	0.28		0.42	0.08		0.10	0.07		0.10	0.26	
Control Delay	10.0	4.9		5.8	3.1		26.7	15.4		26.7	15.3	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	10.0	4.9		5.8	3.1		26.7	15.4		26.7	15.3	
LOS	A	A		A	A		C	B		C	B	
Approach Delay		5.6			4.8			21.4			17.6	
Approach LOS		A			A			C			B	
Queue Length 50th (m)	4.4	7.0		9.8	2.4		2.5	0.5		2.4	3.3	
Queue Length 95th (m)	12.0	16.3		18.8	5.0		8.6	6.0		8.3	14.6	
Internal Link Dist (m)		16.1			187.2			45.1			46.9	
Turn Bay Length (m)				25.0			20.0					
Base Capacity (vph)	554	1583		714	2239		395	515		389	542	
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	0.28		0.37	0.07		0.05	0.04		0.05	0.14	

Intersection Summary

Area Type: CBD
 Cycle Length: 90
 Actuated Cycle Length: 70.7
 Natural Cycle: 85
 Control Type: Semi Act-Uncoord
 Maximum v/c Ratio: 0.42
 Intersection Signal Delay: 7.0
 Intersection LOS: A

Lanes, Volumes, Timings
14: Lyons Lane/Street A & Cross Ave

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Intersection Capacity Utilization 77.6%
 Analysis Period (min) 15
 ICU Level of Service D

Splits and Phases: 14: Lyons Lane/Street A & Cross Ave



HCM Signalized Intersection Capacity Analysis
14: Lyons Lane/Street A & Cross Ave

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	63	190	217	242	129	6	19	4	14	18	26	45
Future Volume (vph)	63	190	217	242	129	6	19	4	14	18	26	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.3	3.6	3.6	3.6
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	0.99	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Fr	1.00	0.92		1.00	0.99		1.00	0.88		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)	1529	2811		1570	2728		1566	1490		1463	1503	
Flt Permitted	0.66	1.00		0.43	1.00		0.71	1.00		0.75	1.00	
Satd. Flow (perm)	1061	2811		713	2728		1165	1490		1148	1503	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	68	207	236	263	140	7	21	4	15	20	28	49
RTOR Reduction (vph)	0	112	0	0	2	0	0	12	0	0	40	0
Lane Group Flow (vph)	68	331	0	263	145	0	21	7	0	20	37	0
Confl. Peds. (#/hr)	5		1	1		5	3		3	3		3
Heavy Vehicles (%)	2%	11%	0%	0%	19%	0%	0%	0%	0%	7%	0%	3%
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	35.0	35.0		48.4	48.4		10.3	10.3		10.3	10.3	
Effective Green, g (s)	37.0	37.0		48.4	50.4		12.3	12.3		12.3	12.3	
Actuated g/C Ratio	0.52	0.52		0.68	0.71		0.17	0.17		0.17	0.17	
Clearance Time (s)	6.0	6.0		4.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	5.0	5.0		2.5	5.0		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	555	1471		602	1944		202	259		199	261	
v/s Ratio Prot		0.12		c0.06	0.05			0.00			c0.02	
v/s Ratio Perm	0.06			c0.24			0.02			0.02		
v/c Ratio	0.12	0.22		0.44	0.07		0.10	0.03		0.10	0.14	
Uniform Delay, d1	8.6	9.1		4.5	3.1		24.6	24.2		24.5	24.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	0.2		0.4	0.0		0.3	0.1		0.3	0.3	
Delay (s)	8.8	9.3		4.9	3.1		24.9	24.3		24.9	25.1	
Level of Service	A	A		A	A		C	C		C	C	
Approach Delay (s)		9.2			4.2			24.6			25.0	
Approach LOS		A			A			C			C	

Intersection Summary			
HCM 2000 Control Delay	9.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.38		
Actuated Cycle Length (s)	70.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	77.6%	ICU Level of Service	D
Analysis Period (min)	15		

Lanes, Volumes, Timings
15: Cross Ave & Lyons Lane

BG 2028 AM.syn
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Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↕	↕	↕	↕	↕
Traffic Volume (vph)	26	454	206	7	6	5
Future Volume (vph)	26	454	206	7	6	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	5.0			0.0	0.0	0.0
Storage Lanes	1			0	1	0
Taper Length (m)	7.5				7.5	
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	1.00
Ped Bike Factor			0.995		0.944	
Flt Protected	0.950				0.972	
Satd. Flow (prot)	1624	3094	2800	0	1421	0
Flt Permitted	0.950				0.972	
Satd. Flow (perm)	1624	3094	2800	0	1421	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		281.3	40.1		41.7	
Travel Time (s)		20.3	2.9		3.0	
Confl. Peds. (#/hr)	4			4	7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	5%	16%	0%	0%	25%
Adj. Flow (vph)	28	493	224	8	7	5
Shared Lane Traffic (%)						
Lane Group Flow (vph)	28	493	232	0	12	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.6	3.6		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (k/h)	25			15	25	15
Sign Control		Free	Free		Stop	

Intersection Summary	
Area Type:	CBD
Control Type:	Unsignalized
Intersection Capacity Utilization	24.1%
Analysis Period (min)	15
ICU Level of Service	A

HCM Unsignalized Intersection Capacity Analysis
15: Cross Ave & Lyons Lane

BG 2028 AM.syn
04-03-2024

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↕↕	↕↔		↕↔	↕↕
Traffic Volume (veh/h)	26	454	206	7	6	5
Future Volume (Veh/h)	26	454	206	7	6	5
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)	28	493	224	8	7	5
Pedestrians			7		4	
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)			40			
pX, platoon unblocked						
vC, conflicting volume	236				542	120
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	236				542	120
tC, single (s)	4.1				6.8	7.4
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.5
p0 queue free %	98				98	99
cM capacity (veh/h)	1339				461	837
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	28	246	246	149	83	12
Volume Left	28	0	0	0	0	7
Volume Right	0	0	0	0	8	5
sSH	1339	1700	1700	1700	1700	568
Volume to Capacity	0.02	0.14	0.14	0.09	0.05	0.02
Queue Length 95th (m)	0.5	0.0	0.0	0.0	0.0	0.5
Control Delay (s)	7.7	0.0	0.0	0.0	0.0	11.5
Lane LOS	A					B
Approach Delay (s)	0.4			0.0		11.5
Approach LOS						B
Intersection Summary						
Average Delay			0.5			
Intersection Capacity Utilization			24.1%		ICU Level of Service	A
Analysis Period (min)			15			

Lanes, Volumes, Timings
16: Speers Road/Cornwall Road & Cross Avenue

BG 2028 AM.syn
04-03-2024

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↕↕	↕↔		↕↔	↕↕
Traffic Volume (vph)	211	662	614	23	6	253
Future Volume (vph)	211	662	614	23	6	253
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	75.0			0.0	55.0	0.0
Storage Lanes	1			0	1	2
Taper Length (m)	7.5				7.5	
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	0.88
Frt			0.995			0.850
Fit Protected	0.950				0.950	
Satd. Flow (prot)	1770	3539	3522	0	1770	2787
Fit Permitted	0.318				0.950	
Satd. Flow (perm)	592	3539	3522	0	1770	2787
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)			4			275
Link Speed (k/h)		50	50		50	
Link Distance (m)		228.9	275.4		183.9	
Travel Time (s)		16.5	19.8		13.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	229	720	667	25	7	275
Shared Lane Traffic (%)						
Lane Group Flow (vph)	229	720	692	0	7	275
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.6	3.6		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25			15	25	15
Number of Detectors	1	2	2		1	1
Detector Template	Left	Thru	Thru		Left	Right
Leading Detector (m)	2.0	10.0	10.0		2.0	2.0
Trailing Detector (m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Size(m)	2.0	0.6	0.6		2.0	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0		0.0	0.0
Detector 2 Position(m)		9.4	9.4			
Detector 2 Size(m)		0.6	0.6			
Detector 2 Type		Cl+Ex	Cl+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type	pm+pt	NA	NA		pm+pt	Perm
Protected Phases	5	2	6		7	
Permitted Phases	2				4	4

Lanes, Volumes, Timings
16: Speers Road/Cornwall Road & Cross Avenue

BG 2028 AM.syn
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Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Detector Phase	5	2	6		7	4
Switch Phase						
Minimum Initial (s)	6.0	25.0	25.0		6.0	6.0
Minimum Split (s)	12.0	35.0	35.0		29.0	29.0
Total Split (s)	26.0	61.0	35.0		29.0	29.0
Total Split (%)	28.9%	67.8%	38.9%		32.2%	32.2%
Maximum Green (s)	20.0	55.0	29.0		23.0	23.0
Yellow Time (s)	4.0	4.0	4.0		4.0	4.0
All-Red Time (s)	2.0	2.0	2.0		2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0		6.0	6.0
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?			Yes			
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	None	Max	Max		None	None
Walk Time (s)		18.0	18.0		12.0	12.0
Flash Dont Walk (s)		7.0	7.0		7.0	7.0
Pedestrian Calls (#/hr)		0	0		0	0
Act Effct Green (s)	55.0	55.0	40.6		6.9	6.9
Actuated g/C Ratio	0.74	0.74	0.55		0.09	0.09
v/c Ratio	0.40	0.27	0.36		0.04	0.54
Control Delay	5.1	3.4	10.3		30.7	8.8
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	5.1	3.4	10.3		30.7	8.8
LOS	A	A	B		C	A
Approach Delay		3.8	10.3		9.3	
Approach LOS		A	B		A	
Queue Length 50th (m)	7.0	12.6	26.2		1.0	0.0
Queue Length 95th (m)	15.5	22.4	44.6		4.6	11.4
Internal Link Dist (m)		204.9	251.4		159.9	
Turn Bay Length (m)	75.0				55.0	
Base Capacity (vph)	759	2635	1939		551	1057
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	0.30	0.27	0.36		0.01	0.26

Intersection Summary

Area Type:	Other
Cycle Length:	90
Actuated Cycle Length:	73.9
Natural Cycle:	80
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.54
Intersection Signal Delay:	7.0
Intersection Capacity Utilization:	52.5%
Analysis Period (min):	15
Intersection LOS:	A
ICU Level of Service:	A

Lanes, Volumes, Timings
16: Speers Road/Cornwall Road & Cross Avenue

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Splits and Phases: 16: Speers Road/Cornwall Road & Cross Avenue



HCM Signalized Intersection Capacity Analysis
16: Speers Road/Cornwall Road & Cross Avenue

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Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↕↕	↕↕		↔	↕↕
Traffic Volume (vph)	211	662	614	23	6	253
Future Volume (vph)	211	662	614	23	6	253
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0		6.0	6.0
Lane Util. Factor	1.00	0.95	0.95		1.00	0.88
Fr	1.00	1.00	0.99		1.00	0.85
Fit Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	3539	3520		1770	2787
Fit Permitted	0.32	1.00	1.00		0.95	1.00
Satd. Flow (perm)	593	3539	3520		1770	2787
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	229	720	667	25	7	275
RTOR Reduction (vph)	0	0	2	0	0	249
Lane Group Flow (vph)	229	720	690	0	7	26
Turn Type	pm+pt	NA	NA		pm+pt	Perm
Protected Phases	5	2	6		7	
Permitted Phases	2				4	4
Actuated Green, G (s)	55.0	55.0	40.6		6.9	6.9
Effective Green, g (s)	55.0	55.0	40.6		6.9	6.9
Actuated g/C Ratio	0.74	0.74	0.55		0.09	0.09
Clearance Time (s)	6.0	6.0	6.0		6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	575	2633	1933		165	260
v/s Ratio Prot	c0.05	0.20	0.20		0.00	
v/s Ratio Perm	c0.25				c0.01	
v/c Ratio	0.40	0.27	0.36		0.04	0.10
Uniform Delay, d1	3.5	3.0	9.3		30.5	30.7
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.5	0.3	0.5		0.1	0.2
Delay (s)	3.9	3.3	9.8		30.6	30.8
Level of Service	A	A	A		C	C
Approach Delay (s)		3.4	9.8		30.8	
Approach LOS		A	A		C	

Intersection Summary			
HCM 2000 Control Delay	9.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	73.9	Sum of lost time (s)	18.0
Intersection Capacity Utilization	52.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
23: GO Station West Access/Street C & Cross Ave

BG 2028 AM.syn
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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕			↕↕		↕	↕		↕	↕	
Traffic Volume (vph)	0	232	96	804	396	0	43	0	227	0	0	0
Future Volume (vph)	0	232	96	804	396	0	43	0	227	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.0	0.0	0.0
Storage Lanes	0	0	0	0	0	0	1	0	1	0	0	0
Taper Length (m)	7.5			7.5			7.5		7.5			7.5
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Fr		0.956						0.850				
Fit Protected					0.968		0.950					
Satd. Flow (prot)	0	3383	0	0	3426	0	1770	1583	0	1863	1863	0
Fit Permitted					0.643		0.757					
Satd. Flow (perm)	0	3383	0	0	2276	0	1410	1583	0	1863	1863	0
Right Turn on Red			Yes			Yes		Yes				Yes
Satd. Flow (RTOR)		104					465					
Link Speed (k/h)		50			50		50					50
Link Distance (m)		211.2			162.8		81.1					134.3
Travel Time (s)		15.2			11.7		5.8					9.7
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
Adj. Flow (vph)	0	252	104	874	430	0	47	0	247	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	356	0	0	1304	0	47	247	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.3			3.3				3.6			3.6
Link Offset(m)		0.0			0.0				0.0			0.0
Crosswalk Width(m)		4.8			4.8				4.8			4.8
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25	15	25	15	25	15	25	15	25	15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type		NA			NA			NA			NA	
Protected Phases		4			8			2			2	
Permitted Phases		4			8			2			2	

Lanes, Volumes, Timings
23: GO Station West Access/Street C & Cross Ave

BG 2028 AM.syn
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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	24.0	24.0		24.0	24.0		24.0	24.0		24.0	24.0	
Total Split (s)	25.0	25.0		25.0	25.0		25.0	25.0		25.0	25.0	
Total Split (%)	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%		50.0%	50.0%	
Maximum Green (s)	19.0	19.0		19.0	19.0		19.0	19.0		19.0	19.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		6.0			6.0			6.0			6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		19.0			19.0			19.0			19.0	
Actuated g/C Ratio		0.38			0.38			0.38			0.38	
v/c Ratio		0.26			2.29dl			0.09			0.28	
Control Delay		8.0			255.4			10.6			0.8	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		8.0			255.4			10.6			0.8	
LOS		A			F			B			A	
Approach Delay		8.0			255.4			2.3				
Approach LOS		A			F			A				
Queue Length 50th (m)		8.0			~93.8			2.7			0.0	
Queue Length 95th (m)		15.2			#128.6			7.9			0.0	
Internal Link Dist (m)		187.2			138.8			57.1			110.3	
Turn Bay Length (m)												
Base Capacity (vph)		1350			864			535			889	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.26			1.51			0.09			0.28	

Intersection Summary

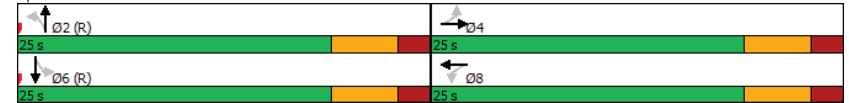
Area Type: Other
 Cycle Length: 50
 Actuated Cycle Length: 50
 Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
 Natural Cycle: 80
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.51
 Intersection Signal Delay: 172.3 Intersection LOS: F
 Intersection Capacity Utilization 83.1% ICU Level of Service E
 Analysis Period (min) 15
 ~ Volume exceeds capacity, queue is theoretically infinite.

Lanes, Volumes, Timings
23: GO Station West Access/Street C & Cross Ave

BG 2028 AM.syn
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Queue shown is maximum after two cycles.
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 dl Defacto Left Lane. Record with 1 though lane as a left lane.

Splits and Phases: 23: GO Station West Access/Street C & Cross Ave



HCM Signalized Intersection Capacity Analysis
23: GO Station West Access/Street C & Cross Ave

BG 2028 AM.syn
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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	0	232	96	804	396	0	43	0	227	0	0	0
Future Volume (vph)	0	232	96	804	396	0	43	0	227	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0		6.0		6.0		6.0		6.0		6.0
Lane Util. Factor		0.95		0.95		1.00		1.00		1.00		1.00
Fr't		0.96		1.00		1.00		0.85		1.00		1.00
Flt Protected		1.00		0.97		0.95		1.00		1.00		1.00
Satd. Flow (prot)		3384		3424		1770		1583		1583		1583
Flt Permitted		1.00		0.64		0.76		1.00		1.00		1.00
Satd. Flow (perm)		3384		2277		1410		1583		1583		1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	252	104	874	430	0	47	0	247	0	0	0
RTOR Reduction (vph)	0	64	0	0	0	0	0	153	0	0	0	0
Lane Group Flow (vph)	0	292	0	0	1304	0	47	94	0	0	0	0
Turn Type	NA		Perm	NA		Perm	NA		Perm			
Protected Phases		4		8		8		2		6		6
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		19.0			19.0		19.0		19.0			
Effective Green, g (s)		19.0			19.0		19.0		19.0			
Actuated g/C Ratio		0.38			0.38		0.38		0.38			
Clearance Time (s)		6.0			6.0		6.0		6.0			
Vehicle Extension (s)		3.0			3.0		3.0		3.0			
Lane Grp Cap (vph)		1285			865		535		601			
v/s Ratio Prot		0.09							c0.06			
v/s Ratio Perm					c0.57		0.03					
v/c Ratio		0.23			2.29d1		0.09		0.16			
Uniform Delay, d1		10.5			15.5		9.9		10.2			
Progression Factor		1.00			1.00		1.00		1.00			
Incremental Delay, d2		0.1			234.4		0.3		0.6			
Delay (s)		10.6			249.9		10.3		10.8			
Level of Service		B			F		B		B			
Approach Delay (s)		10.6			249.9		10.7		10.7			0.0
Approach LOS		B			F		B		B			A

Intersection Summary			
HCM 2000 Control Delay	170.3	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	50.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	83.1%	ICU Level of Service	E
Analysis Period (min)	15		
dl Defacto Left Lane. Recode with 1 though lane as a left lane.			
c Critical Lane Group			

Lanes, Volumes, Timings
1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd

BG 2028 PM.syn
04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	130	110	302	859	210	173	395	1725	645	132	1055	108
Future Volume (vph)	130	110	302	859	210	173	395	1725	645	132	1055	108
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0	0.0	165.0		25.0	145.0		0.0	95.0		90.0	
Storage Lanes	1		1	1	1	1		1	1		1	1
Taper Length (m)	7.5		7.5		7.5		7.5		7.5		7.5	
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Ped Bike Factor	0.98				0.95				0.98		1.00	
Fr't			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950		0.950			0.950
Satd. Flow (prot)	1624	1710	1425	3120	1710	1425	1608	4577	1425	1608	4532	1425
Flt Permitted	0.616			0.401			0.123		0.141			0.141
Satd. Flow (perm)	1027	1710	1425	1317	1710	1360	208	4577	1402	238	4532	1425
Right Turn on Red			Yes			Yes		Yes		Yes		Yes
Satd. Flow (RTOR)			323			151		337				191
Link Speed (k/h)		50			50			50				50
Link Distance (m)		347.0			285.9			280.4				353.6
Travel Time (s)		25.0			20.6			20.2				25.5
Confl. Peds. (#/hr)	34				34			14		14		
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
Heavy Vehicles (%)	0%	0%	2%	1%	0%	2%	1%	2%	2%	1%	3%	2%
Adj. Flow (vph)	141	120	328	934	228	188	429	1875	701	143	1147	117
Shared Lane Traffic (%)												
Lane Group Flow (vph)	141	120	328	934	228	188	429	1875	701	143	1147	117
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		7.2			7.2			3.6				3.6
Link Offset(m)		0.0			0.0			0.0				0.0
Crosswalk Width(m)		4.8			4.8			4.8				4.8
Two way Left Turn Lane												
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4				9.4
Detector 2 Size(m)		0.6			0.6			0.6				0.6
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex				Cl+Ex
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0

Lanes, Volumes, Timings

BG 2028 PM.syn

1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd

04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA	Free	pm+pt	NA	Perm	pm+pt	NA	Free	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		Free	8		8	2		Free	6		6
Detector Phase	7	4		3	8	8	5	2		1	6	6
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0	10.0	6.0	15.0		6.0	15.0	15.0
Minimum Split (s)	11.0	25.0		11.0	43.0	43.0	11.0	34.0		10.0	34.0	34.0
Total Split (s)	11.0	26.0		28.0	43.0	43.0	31.0	56.0		10.0	35.0	35.0
Total Split (%)	9.2%	21.7%		23.3%	35.8%	35.8%	25.8%	46.7%		8.3%	29.2%	29.2%
Maximum Green (s)	7.0	19.0		23.0	36.0	36.0	27.0	49.0		6.0	28.0	28.0
Yellow Time (s)	3.0	4.0		3.0	4.0	4.0	3.0	4.0		3.0	4.0	4.0
All-Red Time (s)	1.0	3.0		2.0	3.0	3.0	1.0	3.0		1.0	3.0	3.0
Lost Time Adjust (s)	0.0	-3.0		0.0	-3.0	-3.0	0.0	-3.0		0.0	-3.0	-3.0
Total Lost Time (s)	4.0	4.0		5.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	5.0		3.0	5.0	5.0	3.0	5.0		3.0	5.0	5.0
Recall Mode	None	None		None	None	None	None	C-Max		None	C-Max	C-Max
Walk Time (s)				7.0	7.0		7.0			7.0	7.0	
Flash Dont Walk (s)				29.0	29.0		20.0			20.0	20.0	
Pedestrian Calls (#/hr)				0	0		0			0	0	
Act Effct Green (s)	25.2	18.2	120.0	45.2	35.2	35.2	65.8	52.1	120.0	41.1	31.4	31.4
Actuated g/C Ratio	0.21	0.15	1.00	0.38	0.29	0.29	0.55	0.43	1.00	0.34	0.26	0.26
v/c Ratio	0.56	0.46	0.23	1.11	0.46	0.37	0.92	0.94	0.50	0.74	0.97	0.23
Control Delay	38.2	51.8	0.4	98.2	37.3	10.1	57.6	43.5	1.3	50.5	63.3	1.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	38.2	51.8	0.4	98.2	37.3	10.1	57.6	43.5	1.3	50.5	63.3	1.1
LOS	D	D	A	F	D	B	E	D	A	D	E	A
Approach Delay		19.9			75.7			35.7			56.9	
Approach LOS		B			E			D			E	
Queue Length 50th (m)	23.1	27.4	0.0	~102.3	45.9	6.6	86.5	160.3	0.0	18.3	103.7	0.0
Queue Length 95th (m)	36.8	45.5	0.0	#132.6	67.7	24.8	#161.8	#197.8	0.0	#62.2	#136.3	0.4
Internal Link Dist (m)		323.0			261.9			256.4			329.6	
Turn Bay Length (m)	60.0			165.0		25.0	145.0			95.0		90.0
Base Capacity (vph)	250	313	1425	841	555	543	468	1988	1402	192	1187	514
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.56	0.38	0.23	1.11	0.41	0.35	0.92	0.94	0.50	0.74	0.97	0.23

Intersection Summary

Area Type:	CBD
Cycle Length:	120
Actuated Cycle Length:	120
Offset:	105.6 (88%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle:	110
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	1.11
Intersection Signal Delay:	47.4
Intersection LOS:	D

Lanes, Volumes, Timings

BG 2028 PM.syn

1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd

04-03-2024

Intersection Capacity Utilization	96.7%	ICU Level of Service F
Analysis Period (min)	15	
- Volume exceeds capacity, queue is theoretically infinite.		
Queue shown is maximum after two cycles.		
# 95th percentile volume exceeds capacity, queue may be longer.		
Queue shown is maximum after two cycles.		

Splits and Phases: 1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd



HCM Signalized Intersection Capacity Analysis
1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd

BG 2028 PM.syn
04-03-2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	130	110	302	859	210	173	395	1725	645	132	1055	108
Future Volume (vph)	130	110	302	859	210	173	395	1725	645	132	1055	108
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	1.0	5.0	4.0	4.0	4.0	4.0	1.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.98	1.00	1.00	1.00
Flpb, ped/bikes	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1601	1710	1425	3120	1710	1360	1608	4577	1402	1608	4532	1425
Flt Permitted	0.62	1.00	1.00	0.40	1.00	1.00	0.12	1.00	1.00	0.14	1.00	1.00
Satd. Flow (perm)	1038	1710	1425	1319	1710	1360	209	4577	1402	238	4532	1425
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	141	120	328	934	228	188	429	1875	701	143	1147	117
RTOR Reduction (vph)	0	0	0	0	0	107	0	0	0	0	0	86
Lane Group Flow (vph)	141	120	328	934	228	81	429	1875	701	143	1147	31
Confl. Peds. (#/hr)	34				34				14	14		
Heavy Vehicles (%)	0%	0%	2%	1%	0%	2%	1%	2%	2%	1%	3%	2%
Turn Type	pm+pt	NA	Free	pm+pt	NA	Perm	pm+pt	NA	Free	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		Free	8		8	2		Free	6		6
Actuated Green, G (s)	22.2	15.2	120.0	43.2	32.2	32.2	62.8	49.1	120.0	38.1	28.4	28.4
Effective Green, g (s)	22.2	18.2	120.0	43.2	35.2	35.2	62.8	52.1	120.0	38.1	31.4	31.4
Actuated g/C Ratio	0.18	0.15	1.00	0.36	0.29	0.29	0.52	0.43	1.00	0.32	0.26	0.26
Clearance Time (s)	4.0	7.0		5.0	7.0	7.0	4.0	7.0		4.0	7.0	7.0
Vehicle Extension (s)	3.0	5.0		3.0	5.0	5.0	3.0	5.0		3.0	5.0	5.0
Lane Grp Cap (vph)	224	259	1425	820	501	398	463	1987	1402	186	1185	372
v/s Ratio Prot	0.04	0.07		c0.22	0.13		c0.23	c0.41		0.06	0.25	
v/s Ratio Perm	0.08		0.23	c0.19		0.06	0.25		0.50	0.18		0.02
v/c Ratio	0.63	0.46	0.23	1.14	0.46	0.20	0.93	0.94	0.50	0.77	0.97	0.08
Uniform Delay, d1	43.9	46.4	0.0	35.3	34.6	31.9	33.8	32.5	0.0	32.3	43.8	33.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	5.4	2.7	0.4	77.1	1.4	0.5	24.5	10.7	1.3	17.2	19.5	0.4
Delay (s)	49.3	49.2	0.4	112.4	36.0	32.4	58.4	43.2	1.3	49.5	63.3	33.9
Level of Service	D	D	A	F	D	C	E	D	A	D	E	C
Approach Delay (s)		22.0			88.4			35.6			59.5	
Approach LOS		C			F			D			E	
Intersection Summary												
HCM 2000 Control Delay		50.8										
HCM 2000 Volume to Capacity ratio		1.05										
Actuated Cycle Length (s)		120.0						Sum of lost time (s)	17.0			
Intersection Capacity Utilization		96.7%						ICU Level of Service	F			
Analysis Period (min)		15										
c Critical Lane Group												

Lanes, Volumes, Timings
2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp

BG 2028 PM.syn
04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	24	0	271	462	108	334	0	2406	480	0	2205	10
Future Volume (vph)	24	0	271	462	108	334	0	2406	480	0	2205	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.5	3.3	3.6	3.5	3.6	3.6	3.6	3.6	3.6	3.5
Storage Length (m)	50.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Storage Lanes	1		1	1		1	0		1	0		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.91	1.00	0.86	1.00	0.86
Ped Bike Factor	1.00					0.99			0.97		1.00	
Frt			0.850			0.850			0.850		0.999	
Flt Protected	0.950			0.950	0.970							
Satd. Flow (prot)	1570	0	1437	1463	1551	1409	0	4577	1439	0	4781	0
Flt Permitted	0.950			0.950	0.970							
Satd. Flow (perm)	1568	0	1437	1463	1551	1391	0	4577	1400	0	4781	0
Right Turn on Red			Yes			Yes			Yes		Yes	Yes
Satd. Flow (RTOR)			31			328			154		1	
Link Speed (k/h)		50			50		50			50		
Link Distance (m)		142.1			192.6		324.8			280.4		
Travel Time (s)		10.2			13.9		23.4			20.2		
Confl. Peds. (#/hr)	2					2	14		14	14		14
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
Heavy Vehicles (%)	0%	0%	0%	2%	1%	2%	0%	2%	1%	0%	23%	0%
Adj. Flow (vph)	26	0	295	502	117	363	0	2615	522	0	2397	11
Shared Lane Traffic (%)				39%								
Lane Group Flow (vph)	26	0	295	306	313	363	0	2615	522	0	2408	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.3			3.3			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.19	1.14	1.16	1.19	1.14	1.16	1.14	1.14	1.14	1.14	1.14	1.16
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1		1	1		2	1		2	1		2
Detector Template	Left		Right	Left	Thru	Right		Thru	Right		Thru	
Leading Detector (m)	2.0		2.0	2.0	10.0	2.0		10.0	2.0		10.0	
Trailing Detector (m)	0.0		0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Detector 1 Position(m)	0.0		0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Detector 1 Size(m)	2.0		2.0	2.0	0.6	2.0		0.6	2.0		0.6	
Detector 1 Type	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Detector 1 Delay (s)	0.0		0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Detector 2 Position(m)					9.4			9.4			9.4	
Detector 2 Size(m)					0.6			0.6			0.6	
Detector 2 Type					Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

Lanes, Volumes, Timings

BG 2028 PM.syn

2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp

04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)					0.0			0.0			0.0	
Turn Type	Prot		Perm	Perm	NA	Free		NA	Free		NA	
Protected Phases	3			4	4			6			2	
Permitted Phases			8	4		Free		Free				
Detector Phase	3		8	4	4			6			2	
Switch Phase												
Minimum Initial (s)	7.0		10.0	10.0	10.0			5.0			28.0	
Minimum Split (s)	23.0		38.0	38.0	38.0			35.0			35.0	
Total Split (s)	23.0		61.0	38.0	38.0			79.0			79.0	
Total Split (%)	16.4%		43.6%	27.1%	27.1%			56.4%			56.4%	
Maximum Green (s)	18.0		54.0	31.0	31.0			72.0			72.0	
Yellow Time (s)	3.0		4.0	4.0	4.0			4.0			4.0	
All-Red Time (s)	2.0		3.0	3.0	3.0			3.0			3.0	
Lost Time Adjust (s)	-1.0		-3.0	-3.0	-3.0			-3.0			-3.0	
Total Lost Time (s)	4.0		4.0	4.0	4.0			4.0			4.0	
Lead/Lag	Lead			Lag	Lag							
Lead-Lag Optimize?	Yes			Yes	Yes							
Vehicle Extension (s)	3.0		3.0	3.0	3.0			4.5			4.5	
Recall Mode	Min		Min	Min	Min			C-Min			C-Min	
Walk Time (s)	7.0		7.0	7.0	7.0			7.0			7.0	
Flash Dont Walk (s)			24.0	24.0	24.0			21.0			21.0	
Pedestrian Calls (#/hr)			0	0	0			0			0	
Act Effct Green (s)	9.2		50.6	37.3	37.3	140.0		81.4	140.0		81.4	
Actuated g/C Ratio	0.07		0.36	0.27	0.27	1.00		0.58	1.00		0.58	
v/c Ratio	0.25		0.55	0.79	0.76	0.26		0.98	0.37		0.87	
Control Delay	67.6		34.8	62.1	59.1	0.5		35.6	0.4		30.0	
Queue Delay	0.0		0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Total Delay	67.6		34.8	62.1	59.1	0.5		35.6	0.4		30.0	
LOS	E		C	E	E	A		D	A		C	
Approach Delay		37.5			38.4			29.8			30.0	
Approach LOS		D			D			C			C	
Queue Length 50th (m)	7.4		60.4	86.1	87.2	0.0		183.6	0.0		167.7	
Queue Length 95th (m)	17.6		84.9	122.2	122.7	0.0		#333.2	m0.0		205.7	
Internal Link Dist (m)		118.1			168.6			300.8			256.4	
Turn Bay Length (m)	50.0											
Base Capacity (vph)	213		603	401	425	1391		2662	1400		2781	
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		0.49	0.76	0.74	0.26		0.98	0.37		0.87	

Intersection Summary

Area Type: CBD
 Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 115.4 (82%), Referenced to phase 2:SBT and 6:NBT, Start of Green
 Natural Cycle: 140
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.98

Lanes, Volumes, Timings

BG 2028 PM.syn

2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp

04-03-2024

Intersection Signal Delay: 31.4
 Intersection Capacity Utilization 82.5%
 Intersection LOS: C
 ICU Level of Service E
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp



HCM Signalized Intersection Capacity Analysis
 2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp

BG 2028 PM.syn
 04-03-2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	24	0	271	462	108	334	0	2406	480	0	2205	10
Future Volume (vph)	24	0	271	462	108	334	0	2406	480	0	2205	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.5	3.3	3.6	3.5	3.6	3.6	3.6	3.6	3.6	3.5
Total Lost time (s)	4.0		4.0	4.0	4.0	1.0		4.0	4.0		4.0	
Lane Util. Factor	1.00		1.00	0.95	0.95	1.00		0.91	1.00		0.86	
Frpb, ped/bikes	1.00		1.00	1.00	1.00	0.99		1.00	0.97		1.00	
Flpb, ped/bikes	1.00		1.00	1.00	1.00	1.00		1.00	1.00		1.00	
Frt	1.00		0.85	1.00	1.00	0.85		1.00	0.85		1.00	
Flt Protected	0.95		1.00	0.95	0.97	1.00		1.00	1.00		1.00	
Satd. Flow (prot)	1570		1437	1463	1550	1391		4577	1400		4782	
Flt Permitted	0.95		1.00	0.95	0.97	1.00		1.00	1.00		1.00	
Satd. Flow (perm)	1570		1437	1463	1550	1391		4577	1400		4782	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	26	0	295	502	117	363	0	2615	522	0	2397	11
RTOR Reduction (vph)	0	0	20	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	26	0	275	306	313	363	0	2615	522	0	2408	0
Confl. Peds. (#/hr)	2					2	14		14	14		14
Heavy Vehicles (%)	0%	0%	0%	2%	1%	2%	0%	2%	1%	0%	23%	0%
Turn Type	Prot		Perm	Perm	NA	Free		NA	Free		NA	
Protected Phases	3				4			6			2	
Permitted Phases			8	4		Free			Free			
Actuated Green, G (s)	8.2		47.6	34.4	34.4	140.0		78.4	140.0		78.4	
Effective Green, g (s)	9.2		50.6	37.4	37.4	140.0		81.4	140.0		81.4	
Actuated g/C Ratio	0.07		0.36	0.27	0.27	1.00		0.58	1.00		0.58	
Clearance Time (s)	5.0		7.0	7.0	7.0			7.0			7.0	
Vehicle Extension (s)	3.0		3.0	3.0	3.0			4.5			4.5	
Lane Grp Cap (vph)	103		519	390	414	1391		2661	1400		2780	
v/s Ratio Prot	0.02							c0.57			0.50	
v/s Ratio Perm			c0.19	c0.21	0.20	0.26			0.37			
v/c Ratio	0.25		0.53	0.78	0.76	0.26		0.98	0.37		0.87	
Uniform Delay, d1	62.1		35.3	47.6	47.1	0.0		28.6	0.0		24.7	
Progression Factor	1.00		1.00	1.00	1.00	1.00		0.89	1.00		1.00	
Incremental Delay, d2	1.3		1.0	9.9	7.7	0.5		9.5	0.4		3.9	
Delay (s)	63.4		36.4	57.5	54.8	0.5		34.9	0.4		28.6	
Level of Service	E		D	E	D	A		C	A		C	
Approach Delay (s)	38.5			35.6			29.1			28.6		
Approach LOS	D			D			C			C		

Intersection Summary			
HCM 2000 Control Delay	30.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	82.5%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
 3: Trafalgar Rd & QEW EB-Off Ramp

BG 2028 PM.syn
 04-03-2024

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	943	339	0	1928	1633	309
Future Volume (vph)	943	339	0	1928	1633	309
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.5	3.6	3.6	3.6	3.6
Lane Util. Factor	0.97	1.00	1.00	0.91	0.91	1.00
Ped Bike Factor	0.99					
Frt	0.850			0.850		
Flt Protected	0.950					
Satd. Flow (prot)	3046	1423	0	4577	4577	1454
Flt Permitted	0.950					
Satd. Flow (perm)	3046	1402	0	4577	4577	1454
Right Turn on Red	Yes					Yes
Satd. Flow (RTOR)	9					146
Link Speed (k/h)	50		50		50	
Link Distance (m)	199.2		51.4		324.8	
Travel Time (s)	14.3		3.7		23.4	
Confl. Peds. (#/hr)	2					
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	1%	0%	2%	2%	0%
Adj. Flow (vph)	1025	368	0	2096	1775	336
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1025	368	0	2096	1775	336
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	6.6		0.0		0.0	
Link Offset(m)	0.0		0.0		0.0	
Crosswalk Width(m)	4.8		4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.19	1.16	1.14	1.14	1.14	1.14
Turning Speed (k/h)	24	14	24			14
Number of Detectors	1	1		2	2	1
Detector Template	Left	Right		Thru	Thru	Right
Leading Detector (m)	2.0	2.0		10.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	2.0	2.0		0.6	0.6	2.0
Detector 1 Type	CI+Ex	CI+Ex		CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)				9.4	9.4	
Detector 2 Size(m)				0.6	0.6	
Detector 2 Type				CI+Ex	CI+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Perm	Perm		NA	NA	Free
Protected Phases	2		2		2	

Lanes, Volumes, Timings
3: Trafalgar Rd & QEW EB-Off Ramp

BG 2028 PM.syn
04-03-2024



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Permitted Phases	4	4				Free
Detector Phase	4	4		2	2	
Switch Phase						
Minimum Initial (s)	10.0	10.0		29.0	29.0	
Minimum Split (s)	38.0	38.0		36.0	36.0	
Total Split (s)	65.0	65.0		75.0	75.0	
Total Split (%)	46.4%	46.4%		53.6%	53.6%	
Maximum Green (s)	58.0	58.0		68.0	68.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	
All-Red Time (s)	3.0	3.0		3.0	3.0	
Lost Time Adjust (s)	-3.0	-3.0		-3.0	-3.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Recall Mode	None	None		C-Max	C-Max	
Walk Time (s)	7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	24.0	24.0		22.0	22.0	
Pedestrian Calls (#/hr)	0	0		0	0	
Act Effct Green (s)	56.2	56.2		75.8	75.8	140.0
Actuated g/C Ratio	0.40	0.40		0.54	0.54	1.00
v/c Ratio	0.84	0.65		0.85	0.72	0.23
Control Delay	44.6	38.4		23.7	17.0	0.2
Queue Delay	0.0	0.0		0.0	0.0	0.0
Total Delay	44.6	38.4		23.7	17.0	0.2
LOS	D	D		C	B	A
Approach Delay	42.9			23.7	14.3	
Approach LOS	D			C	B	
Queue Length 50th (m)	135.1	82.4		164.6	96.1	0.0
Queue Length 95th (m)	157.2	114.3		198.9	120.0	m0.0
Internal Link Dist (m)	175.2			27.4	300.8	
Turn Bay Length (m)						
Base Capacity (vph)	1327	615		2477	2477	1454
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	0.77	0.60		0.85	0.72	0.23

Intersection Summary

Area Type: CBD
 Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 133.6 (95%), Referenced to phase 2:NBSB and 6:, Start of Green
 Natural Cycle: 80
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.85
 Intersection Signal Delay: 24.9
 Intersection Capacity Utilization 77.9%
 Analysis Period (min) 15
 Intersection LOS: C
 ICU Level of Service D

Lanes, Volumes, Timings
3: Trafalgar Rd & QEW EB-Off Ramp

BG 2028 PM.syn
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m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Trafalgar Rd & QEW EB-Off Ramp



HCM Signalized Intersection Capacity Analysis
3: Trafalgar Rd & QEW EB-Off Ramp

BG 2028 PM.syn
04-03-2024

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↖ ↗	↗		↖ ↗	↖ ↗	↗
Traffic Volume (vph)	943	339	0	1928	1633	309
Future Volume (vph)	943	339	0	1928	1633	309
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.5	3.6	3.6	3.6	3.6
Total Lost time (s)	4.0	4.0		4.0	4.0	1.0
Lane Util. Factor	0.97	1.00		0.91	0.91	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.85		1.00	1.00	0.85
Flt Protected	0.95	1.00		1.00	1.00	1.00
Satd. Flow (prot)	3046	1402		4577	4577	1454
Flt Permitted	0.95	1.00		1.00	1.00	1.00
Satd. Flow (perm)	3046	1402		4577	4577	1454
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1025	368	0	2096	1775	336
RTOR Reduction (vph)	0	5	0	0	0	0
Lane Group Flow (vph)	1025	363	0	2096	1775	336
Confl. Peds. (#/hr)		2				
Heavy Vehicles (%)	0%	1%	0%	2%	2%	0%
Turn Type	Perm	Perm		NA	NA	Free
Protected Phases				2	2	
Permitted Phases	4	4				Free
Actuated Green, G (s)	53.2	53.2		72.8	72.8	140.0
Effective Green, g (s)	56.2	56.2		75.8	75.8	140.0
Actuated g/C Ratio	0.40	0.40		0.54	0.54	1.00
Clearance Time (s)	7.0	7.0		7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	1222	562		2478	2478	1454
v/s Ratio Prot				0.46	0.39	
v/s Ratio Perm	0.34	0.26				0.23
v/c Ratio	0.84	0.65		0.85	0.72	0.23
Uniform Delay, d1	37.8	33.8		27.2	24.0	0.0
Progression Factor	1.00	1.00		0.73	0.64	1.00
Incremental Delay, d2	5.2	2.5		2.8	1.0	0.2
Delay (s)	43.0	36.4		22.7	16.3	0.2
Level of Service	D	D		C	B	A
Approach Delay (s)	41.3			22.7	13.8	
Approach LOS	D			C	B	

Intersection Summary			
HCM 2000 Control Delay	23.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	77.9%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
4: Trafalgar Rd & Argus Rd

BG 2028 PM.syn
04-03-2024

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗		↖ ↗	↖ ↗	↗
Traffic Volume (vph)	0	49	0	2591	1659	312
Future Volume (vph)	0	49	0	2591	1659	312
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.6	3.5	3.6	3.6	3.6	3.6
Lane Util. Factor	1.00	1.00	1.00	0.91	0.91	0.91
Ped Bike Factor						
Frt		0.865			0.976	
Flt Protected						
Satd. Flow (prot)	0	1354	0	4577	4460	0
Flt Permitted						
Satd. Flow (perm)	0	1354	0	4577	4460	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	145.7			270.2	51.4	
Travel Time (s)	10.5			19.5	3.7	
Confl. Peds. (#/hr)						24
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	8%	0%	2%	2%	3%
Adj. Flow (vph)	0	53	0	2816	1803	339
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	53	0	2816	2142	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			3.3	3.3	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.14	1.16	1.14	1.14	1.14	1.14
Turning Speed (k/h)	24	14	24			14
Sign Control	Stop			Free	Free	

Intersection Summary	
Area Type:	CBD
Control Type:	Unsignalized
Intersection Capacity Utilization	59.0%
ICU Level of Service	B
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis
4: Trafalgar Rd & Argus Rd

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Movement	EBL	EBR	NBL	NBT	SBT	SBR	
Lane Configurations		↗		↖↖	↗↗		
Traffic Volume (veh/h)	0	49	0	2591	1659	312	
Future Volume (Veh/h)	0	49	0	2591	1659	312	
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	53	0	2816	1803	339	
Pedestrians	24						
Lane Width (m)	3.5						
Walking Speed (m/s)	1.2						
Percent Blockage	2						
Right turn flare (veh)							
Median type				None	None		
Median storage (veh)							
Upstream signal (m)				270	52		
pX, platoon unblocked	0.84	0.71	0.71				
vC, conflicting volume	2935	794	2166				
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol	345	0	1221				
tC, single (s)	6.8	7.1	4.1				
tC, 2 stage (s)							
tF (s)	3.5	3.4	2.2				
p0 queue free %	100	93	100				
cM capacity (veh/h)	523	744	403				
Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	53	939	939	939	721	721	700
Volume Left	0	0	0	0	0	0	0
Volume Right	53	0	0	0	0	0	339
sSH	744	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.07	0.55	0.55	0.55	0.42	0.42	0.41
Queue Length 95th (m)	1.8	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (s)	10.2	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	B						
Approach Delay (s)	10.2	0.0			0.0		
Approach LOS	B						
Intersection Summary							
Average Delay			0.1				
Intersection Capacity Utilization			59.0%		ICU Level of Service		B
Analysis Period (min)			15				

Lanes, Volumes, Timings
5: Trafalgar Rd & Cross Ave/South Service Rd

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖↖	↖	↗	↖	↖	↗	↖↖	↖↖	↗	↖↖	↖↖	↖↖
Traffic Volume (vph)	596	38	116	72	60	180	99	1445	35	77	1255	232
Future Volume (vph)	596	38	116	72	60	180	99	1445	35	77	1255	232
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.6	3.3	3.6	3.5	3.3	3.6	3.6	3.3	3.6	3.6
Storage Length (m)	130.0		0.0	25.0		0.0	50.0		0.0	25.0		0.0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.91	0.91
Ped Bike Factor		0.97		0.97				0.99			0.99	
Ft		0.887				0.850		0.996			0.977	
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2958	1346	0	1540	1644	1423	1496	4573	0	1570	4465	0
Fit Permitted	0.950			0.651			0.072			0.075		
Satd. Flow (perm)	2958	1346	0	1026	1644	1423	113	4573	0	124	4465	0
Right Turn on Red			Yes			Yes		Yes		Yes		Yes
Satd. Flow (RTOR)		126				148		3			28	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		151.2			330.4			150.2			270.2	
Travel Time (s)		10.9			23.8			10.8			19.5	
Confl. Peds. (#/hr)			15	15			18		70	70		18
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
Heavy Vehicles (%)	3%	8%	9%	2%	4%	1%	5%	1%	0%	0%	1%	3%
Adj. Flow (vph)	648	41	126	78	65	196	108	1571	38	84	1364	252
Shared Lane Traffic (%)												
Lane Group Flow (vph)	648	167	0	78	65	196	108	1609	0	84	1616	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		6.6			6.6			3.3			3.3	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.19	1.14	1.14	1.19	1.14	1.16	1.19	1.14	1.14	1.19	1.14	1.14
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2	1	1	2		1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

Lanes, Volumes, Timings
5: Trafalgar Rd & Cross Ave/South Service Rd

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Perm	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	7	4			8		5	2		1	6	
Permitted Phases				8		8	2			6		
Detector Phase	7	4		8	8	8	5	2		1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	7.0	27.0		7.0	27.0	
Minimum Split (s)	17.0	25.0		25.0	25.0	25.0	11.5	34.0		11.5	34.0	
Total Split (s)	43.0	75.0		32.0	32.0	32.0	18.0	53.0		12.0	47.0	
Total Split (%)	30.7%	53.6%		22.9%	22.9%	22.9%	12.9%	37.9%		8.6%	33.6%	
Maximum Green (s)	36.0	68.0		25.0	25.0	25.0	14.0	46.0		8.0	40.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	3.0	4.0		3.0	4.0	
All-Red Time (s)	3.0	3.0		3.0	3.0	3.0	1.0	3.0		1.0	3.0	
Lost Time Adjust (s)	-3.0	-3.0		0.0	-3.0	-3.0	0.0	-3.0		0.0	-3.0	
Total Lost Time (s)	4.0	4.0		7.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lead/Lag	Lead			Lag	Lag	Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes			Yes	Yes	Yes	Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	4.0		4.0	4.0	4.0	3.0	5.0		3.0	5.0	
Recall Mode	Min	Min		Min	Min	Min	C-Max			Min	C-Max	
Walk Time (s)		7.0		7.0	7.0	7.0	7.0			7.0		
Flash Dont Walk (s)		11.0		11.0	11.0	11.0	11.0			11.0		
Pedestrian Calls (#/hr)		0		0	0	0	0			0		
Act Effct Green (s)	36.6	60.7		17.1	20.1	20.1	69.0	58.6		65.2	56.5	
Actuated g/C Ratio	0.26	0.43		0.12	0.14	0.14	0.49	0.42		0.47	0.40	
v/c Ratio	0.84	0.25		0.62	0.28	0.59	0.67	0.84		0.57	0.89	
Control Delay	59.4	6.9		78.5	54.5	22.5	50.0	56.9		50.2	51.2	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	59.4	6.9		78.5	54.5	22.5	50.0	56.9		50.2	51.2	
LOS	E	A		E	D	C	D	E		D	D	
Approach Delay		48.6			41.5			56.5			51.2	
Approach LOS		D			D			E			D	
Queue Length 50th (m)	90.7	6.7		22.0	17.2	12.6	27.5	156.5		17.6	132.9	
Queue Length 95th (m)	114.0	18.9		38.3	30.2	36.9	m31.9	m157.8		m29.6	#229.2	
Internal Link Dist (m)		127.2			306.4			126.2			246.2	
Turn Bay Length (m)	130.0			25.0			50.0			25.0		
Base Capacity (vph)	824	744		183	328	403	195	1914		149	1817	
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	
Reduced v/c Ratio	0.79	0.22		0.43	0.20	0.49	0.55	0.84		0.56	0.89	

Intersection Summary

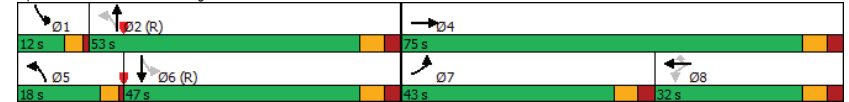
Area Type: CBD
 Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 128 (91%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
 Natural Cycle: 100
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.89

Lanes, Volumes, Timings
5: Trafalgar Rd & Cross Ave/South Service Rd

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Intersection Signal Delay: 52.0
 Intersection Capacity Utilization 79.6%
 Intersection LOS: D
 ICU Level of Service D
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: Trafalgar Rd & Cross Ave/South Service Rd



HCM Signalized Intersection Capacity Analysis
5: Trafalgar Rd & Cross Ave/South Service Rd

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	596	38	116	72	60	180	99	1445	35	77	1255	232
Future Volume (vph)	596	38	116	72	60	180	99	1445	35	77	1255	232
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.3	3.6	3.5	3.3	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)	4.0	4.0		7.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	1.00		1.00	1.00	1.00	1.00	0.91		1.00	0.91	
Frpb, ped/bikes	1.00	0.97		1.00	1.00	1.00	1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		0.97	1.00	1.00	1.00	1.00		1.00	1.00	
Fr	1.00	0.89		1.00	1.00	0.85	1.00	1.00		1.00	0.98	
Fl	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	2958	1346		1497	1644	1423	1496	4576		1570	4463	
Fl Permitted	0.95	1.00		0.65	1.00	1.00	0.07	1.00		0.07	1.00	
Satd. Flow (perm)	2958	1346		1026	1644	1423	113	4576		124	4463	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	648	41	126	78	65	196	108	1571	38	84	1364	252
RTOR Reduction (vph)	0	71	0	0	0	127	0	2	0	0	17	0
Lane Group Flow (vph)	648	96	0	78	65	69	108	1607	0	84	1599	0
Confl. Peds. (#/hr)			15	15			18		70	70		18
Heavy Vehicles (%)	3%	8%	9%	2%	4%	1%	5%	1%	0%	0%	1%	3%
Turn Type	Prot	NA		Perm	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		8		5	2		1		6	
Permitted Phases			8		8		2		6			
Actuated Green, G (s)	33.6	57.7		17.1	17.1	17.1	66.4	55.6	62.2		53.5	
Effective Green, g (s)	36.6	60.7		17.1	20.1	20.1	66.4	58.6	62.2		56.5	
Actuated g/C Ratio	0.26	0.43		0.12	0.14	0.14	0.47	0.42	0.44		0.40	
Clearance Time (s)	7.0	7.0		7.0	7.0	7.0	4.0	7.0	4.0		7.0	
Vehicle Extension (s)	3.0	4.0		4.0	4.0	4.0	3.0	5.0	3.0		5.0	
Lane Grp Cap (vph)	773	583		125	236	204	160	1915	144		1801	
v/s Ratio Prot	c0.22	0.07		0.04		c0.05	0.35		0.04		c0.36	
v/s Ratio Perm			c0.08		0.05		0.27		0.22			
v/c Ratio	0.84	0.16		0.62	0.28	0.34	0.68	0.84	0.58		0.89	
Uniform Delay, d1	48.9	24.2		58.4	53.5	54.0	28.4	36.5	28.2		38.8	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.46	1.47	1.61		1.20	
Incremental Delay, d2	7.9	0.2		10.5	0.9	1.4	5.4	2.3	4.3		5.2	
Delay (s)	56.8	24.4		68.9	54.3	55.3	46.8	56.0	49.7		51.7	
Level of Service	E	C		E	D	E	D	E	D		D	
Approach Delay (s)		50.2			58.3			55.4			51.6	
Approach LOS		D			E			E			D	

Intersection Summary			
HCM 2000 Control Delay	53.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	79.6%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
6: Trafalgar Rd & Cornwall Rd

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	474	467	46	87	718	393	62	712	79	487	603	352
Future Volume (vph)	474	467	46	87	718	393	62	712	79	487	603	352
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.5
Storage Length (m)	80.0		0.0	80.0		0.0	25.0		0.0	80.0		0.0
Storage Lanes	2		0	1		1	1		0	1		1
Taper Length (m)	7.5			7.5		7.5			7.5			7.5
Lane Util. Factor	0.97	0.95	0.95	1.00	0.95	1.00	1.00	*0.80	0.95	0.97	*0.80	1.00
Ped Bike Factor	0.99	1.00		0.98		0.98	0.99	1.00		0.99		0.97
Fr		0.987				0.850		0.985				0.850
Fl	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3016	3104	0	1570	3217	1439	1540	2688	0	2987	1368	1409
Fl Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2986	3104	0	1547	3217	1413	1526	2688	0	2967	1368	1361
Right Turn on Red			Yes			Yes		Yes		Yes		Yes
Satd. Flow (RTOR)		7				294		7				293
Link Speed (k/h)		50			50			50				50
Link Distance (m)		285.8			142.3			311.4				130.3
Travel Time (s)		20.6			10.2			22.4				9.4
Confl. Peds. (#/hr)	21		14	14		21	17		10	10		17
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
Heavy Vehicles (%)	1%	3%	1%	0%	1%	1%	2%	0%	0%	2%	0%	2%
Adj. Flow (vph)	515	508	50	95	780	427	67	774	86	529	655	383
Shared Lane Traffic (%)												
Lane Group Flow (vph)	515	558	0	95	780	427	67	860	0	529	655	383
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		6.6			6.6			6.6				6.6
Link Offset(m)		0.0			0.0			0.0				0.0
Crosswalk Width(m)		4.8			4.8			4.8				4.8
Two way Left Turn Lane												
Headway Factor	1.19	1.14	1.14	1.19	1.14	1.14	1.19	1.14	1.14	1.19	1.14	1.16
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2	1	1	2		1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0		2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6		2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4				9.4
Detector 2 Size(m)		0.6			0.6			0.6				0.6
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex				Cl+Ex
Detector 2 Channel												

Lanes, Volumes, Timings
6: Trafalgar Rd & Cornwall Rd

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA	Free	Prot	NA		Prot	NA	Perm
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases					Free							6
Detector Phase	3	8		7	4		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	7.0	10.0		7.0	10.0		7.0	20.0		7.0	20.0	20.0
Minimum Split (s)	12.0	37.0		12.0	37.0		12.0	39.0		12.0	39.0	39.0
Total Split (s)	26.0	43.0		20.0	37.0		12.0	48.0		29.0	65.0	65.0
Total Split (%)	18.6%	30.7%		14.3%	26.4%		8.6%	34.3%		20.7%	46.4%	46.4%
Maximum Green (s)	21.0	36.0		15.0	30.0		7.0	41.0		24.0	58.0	58.0
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	4.0
All-Red Time (s)	2.0	3.0		2.0	3.0		2.0	3.0		2.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-3.0		-1.0	-3.0		-1.0	-3.0		-1.0	-3.0	-3.0
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	0.2	0.2		0.2	0.2		0.2	0.2		0.2	0.2	0.2
Recall Mode	Max	Max		Max	Max		None	C-Max		Max	C-Max	C-Max
Walk Time (s)		7.0			7.0			7.0			7.0	7.0
Flash Dont Walk (s)		23.0			23.0			25.0			25.0	25.0
Pedestrian Calls (#/hr)		0			0			0			0	0
Act Effct Green (s)	22.0	39.0		16.0	33.0	140.0	8.0	44.0		25.0	61.0	61.0
Actuated g/C Ratio	0.16	0.28		0.11	0.24	1.00	0.06	0.31		0.18	0.44	0.44
v/c Ratio	1.09	0.64		0.53	1.03	0.30	0.76	1.01		0.99	1.10	0.51
Control Delay	121.5	47.8		70.1	92.1	0.5	110.6	81.0		106.3	82.7	3.7
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	121.5	47.8		70.1	92.1	0.5	110.6	81.0		106.3	82.7	3.7
LOS	F	D		E	F	A	F	F		F	F	A
Approach Delay		83.1			60.5			83.1				71.4
Approach LOS		F			E			F				E
Queue Length 50th (m)	-86.6	74.5		26.5	-127.5	0.0	19.6	-159.8		84.5	-264.6	1.8
Queue Length 95th (m)	#123.7	95.6		46.0	#169.5	0.0	#47.2	#215.3		m#107.6	m#323.5	m8.3
Internal Link Dist (m)		261.8			118.3			287.4				106.3
Turn Bay Length (m)	80.0			80.0			25.0			80.0		
Base Capacity (vph)	473	869		179	758	1413	88	849		533	596	758
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	0
Reduced v/c Ratio	1.09	0.64		0.53	1.03	0.30	0.76	1.01		0.99	1.10	0.51

Intersection Summary

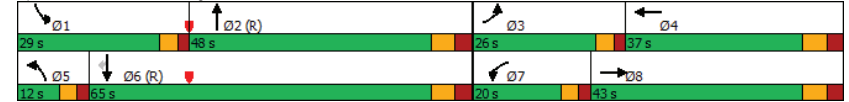
Area Type: CBD
 Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green, Master Intersection
 Natural Cycle: 140
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.10

Lanes, Volumes, Timings
6: Trafalgar Rd & Cornwall Rd

BG 2028 PM.syn
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Intersection Signal Delay: 73.3	Intersection LOS: E
Intersection Capacity Utilization 95.5%	ICU Level of Service F
Analysis Period (min) 15	
* User Entered Value	
~ Volume exceeds capacity, queue is theoretically infinite. Queue shown is maximum after two cycles.	
# 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.	
m Volume for 95th percentile queue is metered by upstream signal.	

Splits and Phases: 6: Trafalgar Rd & Cornwall Rd



HCM Signalized Intersection Capacity Analysis
6: Trafalgar Rd & Cornwall Rd

BG 2028 PM.syn
04-03-2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	
Traffic Volume (vph)	474	467	46	87	718	393	62	712	79	487	603	352	
Future Volume (vph)	474	467	46	87	718	393	62	712	79	487	603	352	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.5	
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	
Lane Util. Factor	0.97	0.95		1.00	0.95	1.00	1.00	*0.80		0.97	*0.80	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.98	1.00	1.00		1.00	1.00	0.97	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	
Fr	1.00	0.99		1.00	1.00	0.85	1.00	0.98		1.00	1.00	0.85	
Fit Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	
Satd. Flow (prot)	3016	3103		1570	3217	1413	1540	2688		2987	1368	1361	
Fit Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	
Satd. Flow (perm)	3016	3103		1570	3217	1413	1540	2688		2987	1368	1361	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	515	508	50	95	780	427	67	774	86	529	655	383	
RTOR Reduction (vph)	0	5	0	0	0	0	0	5	0	0	0	165	
Lane Group Flow (vph)	515	553	0	95	780	427	67	855	0	529	655	218	
Confl. Peds. (#/hr)	21		14	14		21	17		10	10		17	
Heavy Vehicles (%)	1%	3%	1%	0%	1%	1%	2%	0%	0%	2%	0%	2%	
Turn Type	Prot	NA		Prot	NA	Free	Prot	NA		Prot	NA	Perm	
Protected Phases	3	8		7	4		5	2		1	6		
Permitted Phases						Free						6	
Actuated Green, G (s)	21.0	36.0		15.0	30.0	140.0	7.0	41.0		24.0	58.0	58.0	
Effective Green, g (s)	22.0	39.0		16.0	33.0	140.0	8.0	44.0		25.0	61.0	61.0	
Actuated g/C Ratio	0.16	0.28		0.11	0.24	1.00	0.06	0.31		0.18	0.44	0.44	
Clearance Time (s)	5.0	7.0		5.0	7.0		5.0	7.0		5.0	7.0	7.0	
Vehicle Extension (s)	0.2	0.2		0.2	0.2		0.2	0.2		0.2	0.2	0.2	
Lane Grp Cap (vph)	473	864		179	758	1413	88	844		533	596	593	
v/s Ratio Prot	c0.17	0.18		0.06	c0.24		0.04	0.32		c0.18	c0.48		
v/s Ratio Perm					0.30							0.16	
v/c Ratio	1.09	0.64		0.53	1.03	0.30	0.76	1.01		0.99	1.10	0.37	
Uniform Delay, d1	59.0	44.3		58.5	53.5	0.0	65.1	48.0		57.4	39.5	26.5	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.42	0.56	0.35	
Incremental Delay, d2	67.6	3.6		10.8	40.3	0.6	28.8	34.3		27.3	58.7	1.0	
Delay (s)	126.6	48.0		69.3	93.8	0.6	93.9	82.3		109.0	80.8	10.3	
Level of Service	F	D		E	F	A	F	F		F	F	B	
Approach Delay (s)	85.7			61.4				83.1			73.1		
Approach LOS	F			E				F			E		

Intersection Summary			
HCM 2000 Control Delay	74.7	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.08		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	95.5%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
7: South Service Road/Canadian Road & QEW EB Off-Ramp/Royal Windsor Drive

BG 2028 PM.syn
04-03-2024

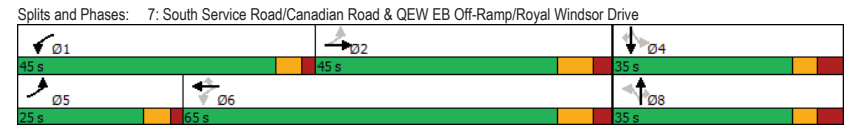
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	306	534	17	179	638	27	14	46	98	14	117	417
Future Volume (vph)	306	534	17	179	638	27	14	46	98	14	117	417
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	150.0	0.0	155.0		70.0	15.0		0.0	0.0			30.0
Storage Lanes	2	0	1		1	1		1	1			1
Taper Length (m)	7.5		7.5		7.5			7.5				7.5
Lane Util. Factor	0.97	0.95	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr		0.995				0.850		0.850				0.850
Fit Protected	0.950			0.950			0.950		0.950			0.950
Satd. Flow (prot)	3502	3394	0	1752	3505	1615	1805	1900	1615	1805	1900	1599
Fit Permitted	0.335			0.400			0.581		0.724			
Satd. Flow (perm)	1235	3394	0	738	3505	1615	1104	1900	1615	1376	1900	1599
Right Turn on Red			Yes			Yes		Yes		Yes		Yes
Satd. Flow (RTOR)		3				94		152				421
Link Speed (k/h)	80			80			60			40		
Link Distance (m)	324.5			247.2			158.7			215.5		
Travel Time (s)	14.6			11.1			9.5			19.4		
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
Heavy Vehicles (%)	0%	6%	0%	3%	3%	0%	0%	0%	0%	0%	0%	1%
Adj. Flow (vph)	333	580	18	195	693	29	15	50	107	15	127	453
Shared Lane Traffic (%)												
Lane Group Flow (vph)	333	598	0	195	693	29	15	50	107	15	127	453
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Right	Left	Right	Left	Right
Median Width(m)	7.2			7.2			3.6			3.6		
Link Offset(m)	0.0			0.0			0.0			0.0		
Crosswalk Width(m)	4.8			4.8			4.8			4.8		
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	CI+Ex	CI+Ex		CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)	9.4			9.4			9.4			9.4		
Detector 2 Size(m)	0.6			0.6			0.6			0.6		
Detector 2 Type	CI+Ex			CI+Ex			CI+Ex			CI+Ex		
Detector 2 Channel												
Detector 2 Extend (s)	0.0			0.0			0.0			0.0		
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6		8				4	

Lanes, Volumes, Timings
 7: South Service Road/Canadian Road & QEW EB Off-Ramp/Royal Windsor Drive 04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	2			6		6	8		8	4		4
Detector Phase	5	2		1	6	6	8	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	8.0	20.0		8.0	30.0	30.0	8.0	8.0	8.0	10.0	10.0	10.0
Minimum Split (s)	14.0	29.4		14.0	38.4	38.4	28.8	28.8	28.8	28.8	28.8	28.8
Total Split (s)	25.0	45.0		45.0	65.0	65.0	35.0	35.0	35.0	35.0	35.0	35.0
Total Split (%)	20.0%	36.0%		36.0%	52.0%	52.0%	28.0%	28.0%	28.0%	28.0%	28.0%	28.0%
Maximum Green (s)	19.0	36.6		39.0	56.6	56.6	27.2	27.2	27.2	27.2	27.2	27.2
Yellow Time (s)	4.0	5.4		4.0	5.4	5.4	3.7	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	2.0	3.0		2.0	3.0	3.0	4.1	4.1	4.1	4.1	4.1	4.1
Lost Time Adjust (s)	-2.0	-4.4		-2.0	-4.4	-4.4	-3.8	-3.8	-3.8	-3.8	-3.8	-3.8
Total Lost Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lead	Lag		Lead	Lag	Lag						
Lead-Lag Optimize?												
Vehicle Extension (s)	3.5	4.5		3.5	6.0	6.0	3.5	3.5	3.5	3.5	3.5	3.5
Recall Mode	None	Max		None	Max	Max	None	None	None	None	None	None
Walk Time (s)		10.0			10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Flash Dont Walk (s)		10.0			10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Pedestrian Calls (#/hr)		0			0	0	0	0	0	0	0	0
Act Effct Green (s)	75.6	62.6		73.0	61.2	61.2	18.4	18.4	18.4	18.4	18.4	18.4
Actuated g/C Ratio	0.72	0.60		0.70	0.58	0.58	0.18	0.18	0.18	0.18	0.18	0.18
v/c Ratio	0.28	0.29		0.31	0.34	0.03	0.08	0.15	0.26	0.06	0.38	0.72
Control Delay	4.8	11.6		5.9	12.7	0.1	36.6	37.4	3.4	36.1	41.5	12.5
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	4.8	11.6		5.9	12.7	0.1	36.6	37.4	3.4	36.1	41.5	12.5
LOS	A	B		A	B	A	D	D	A	D	D	B
Approach Delay		9.2			10.9			16.2			19.3	
Approach LOS		A			B			B			B	
Queue Length 50th (m)	8.1	29.1		9.4	36.5	0.0	2.7	9.1	0.0	2.7	24.2	5.8
Queue Length 95th (m)	17.8	54.6		23.4	65.4	0.0	8.7	20.2	5.5	8.6	43.1	38.1
Internal Link Dist (m)		300.5			223.2			134.7			191.5	
Turn Bay Length (m)	150.0			155.0		70.0	15.0					30.0
Base Capacity (vph)	1380	2028		950	2050	983	328	564	586	409	564	771
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.24	0.29		0.21	0.34	0.03	0.05	0.09	0.18	0.04	0.23	0.59

Intersection Summary	
Area Type:	Other
Cycle Length:	125
Actuated Cycle Length:	104.7
Natural Cycle:	85
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.72
Intersection Signal Delay:	12.5
Intersection LOS:	B
Intersection Capacity Utilization:	67.5%
ICU Level of Service:	C
Analysis Period (min):	15

Lanes, Volumes, Timings
 7: South Service Road/Canadian Road & QEW EB Off-Ramp/Royal Windsor Drive 04-03-2024



HCM Signalized Intersection Capacity Analysis
 7: South Service Road/Canadian Road & QEW EB Off-Ramp/Royal Windsor Drive 04-03-2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	306	534	17	179	638	27	14	46	98	14	117	417
Future Volume (vph)	306	534	17	179	638	27	14	46	98	14	117	417
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	0.95		1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr	1.00	1.00		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3502	3396		1752	3505	1615	1805	1900	1615	1805	1900	1599
Flt Permitted	0.33	1.00		0.40	1.00	1.00	0.58	1.00	1.00	0.72	1.00	1.00
Satd. Flow (perm)	1233	3396		738	3505	1615	1105	1900	1615	1376	1900	1599
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	333	580	18	195	693	29	15	50	107	15	127	453
RTOR Reduction (vph)	0	1	0	0	0	12	0	0	88	0	0	347
Lane Group Flow (vph)	333	597	0	195	693	17	15	50	19	15	127	106
Heavy Vehicles (%)	0%	6%	0%	3%	3%	0%	0%	0%	0%	0%	0%	1%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6		6	8		8	4		4
Actuated Green, G (s)	69.2	58.2		66.6	56.9	56.9	14.5	14.5	14.5	14.5	14.5	14.5
Effective Green, g (s)	73.2	62.6		70.6	61.3	61.3	18.3	18.3	18.3	18.3	18.3	18.3
Actuated g/C Ratio	0.70	0.60		0.67	0.59	0.59	0.17	0.17	0.17	0.17	0.17	0.17
Clearance Time (s)	6.0	8.4		6.0	8.4	8.4	7.8	7.8	7.8	7.8	7.8	7.8
Vehicle Extension (s)	3.5	4.5		3.5	6.0	6.0	3.5	3.5	3.5	3.5	3.5	3.5
Lane Grp Cap (vph)	1144	2032		611	2054	946	193	332	282	240	332	279
v/s Ratio Prot	c0.04	0.18		0.04	c0.20			0.03			c0.07	
v/s Ratio Perm	0.17			0.18		0.01	0.01		0.01	0.01		0.07
v/c Ratio	0.29	0.29		0.32	0.34	0.02	0.08	0.15	0.07	0.06	0.38	0.38
Uniform Delay, d1	5.6	10.2		6.3	11.2	9.1	36.1	36.6	36.0	36.0	38.2	38.1
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.2	0.4		0.4	0.4	0.0	0.2	0.2	0.1	0.1	0.9	1.0
Delay (s)	5.8	10.6		6.7	11.6	9.1	36.3	36.8	36.1	36.1	39.0	39.1
Level of Service	A	B		A	B	A	D	D	D	D	D	D
Approach Delay (s)		8.9			10.5			36.3			39.0	
Approach LOS		A			B			D			D	

Intersection Summary	
HCM 2000 Control Delay	18.1 HCM 2000 Level of Service B
HCM 2000 Volume to Capacity ratio	0.34
Actuated Cycle Length (s)	104.6 Sum of lost time (s) 12.0
Intersection Capacity Utilization	67.5% ICU Level of Service C
Analysis Period (min)	15
c Critical Lane Group	

Lanes, Volumes, Timings
 8: QEW WB Off-Ramp & Kerr Street 04-03-2024

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	413	0	0	678	113	257
Future Volume (vph)	413	0	0	678	113	257
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)		0.0	0.0		0.0	140.0
Storage Lanes		0	0		1	1
Taper Length (m)			7.5		7.5	
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00
Fr						0.850
Flt Protected					0.950	
Satd. Flow (prot)	3574	0	0	3574	1805	1599
Flt Permitted					0.950	
Satd. Flow (perm)	3574	0	0	3574	1805	1599
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)						253
Link Speed (k/h)	60			60	40	
Link Distance (m)	130.3			194.2	262.1	
Travel Time (s)	7.8			11.7	23.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	0%	0%	1%	0%	1%
Adj. Flow (vph)	449	0	0	737	123	279
Shared Lane Traffic (%)						
Lane Group Flow (vph)	449	0	0	737	123	279
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)		15	25		25	15
Turn Type	NA			NA	Prot	Perm
Protected Phases	4			8	2	
Permitted Phases						2
Minimum Split (s)	22.5			22.5	22.5	22.5
Total Split (s)	22.5			22.5	22.5	22.5
Total Split (%)	50.0%			50.0%	50.0%	50.0%
Maximum Green (s)	18.0			18.0	18.0	18.0
Yellow Time (s)	3.5			3.5	3.5	3.5
All-Red Time (s)	1.0			1.0	1.0	1.0
Lost Time Adjust (s)	0.0			0.0	0.0	0.0
Total Lost Time (s)	4.5			4.5	4.5	4.5
Lead/Lag						
Lead-Lag Optimize?						
Walk Time (s)	7.0			7.0	7.0	7.0
Flash Dont Walk (s)	11.0			11.0	11.0	11.0
Pedestrian Calls (#/hr)	0			0	0	0
Act Effct Green (s)	18.0			18.0	18.0	18.0
Actuated g/C Ratio	0.40			0.40	0.40	0.40

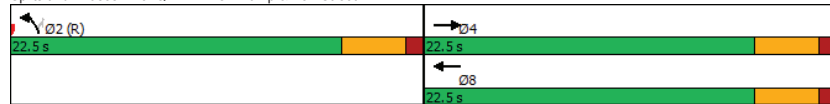
Lanes, Volumes, Timings
8: QEW WB Off-Ramp & Kerr Street

BG 2028 PM.syn
04-03-2024

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
v/c Ratio	0.31			0.52	0.17	0.35
Control Delay	10.0			11.8	9.5	3.6
Queue Delay	0.0			0.0	0.0	0.0
Total Delay	10.0			11.8	9.5	3.6
LOS	B			B	A	A
Approach Delay	10.0			11.8	5.4	
Approach LOS	B			B	A	
Queue Length 50th (m)	12.6			22.8	6.2	1.2
Queue Length 95th (m)	20.8			35.2	14.0	11.9
Internal Link Dist (m)	106.3			170.2	238.1	
Turn Bay Length (m)					140.0	
Base Capacity (vph)	1429			1429	722	791
Starvation Cap Reductn	0			0	0	0
Spillback Cap Reductn	0			0	0	0
Storage Cap Reductn	0			0	0	0
Reduced v/c Ratio	0.31			0.52	0.17	0.35

Intersection Summary	
Area Type:	Other
Cycle Length:	45
Actuated Cycle Length:	45
Offset:	0 (0%), Referenced to phase 2:NBL and 6:, Start of Green
Natural Cycle:	45
Control Type:	Pretimed
Maximum v/c Ratio:	0.52
Intersection Signal Delay:	9.7
Intersection Capacity Utilization:	34.8%
Analysis Period (min):	15
Intersection LOS:	A
ICU Level of Service A	

Splits and Phases: 8: QEW WB Off-Ramp & Kerr Street



HCM Signalized Intersection Capacity Analysis
8: QEW WB Off-Ramp & Kerr Street

BG 2028 PM.syn
04-03-2024

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↕↕			↕↕	↕	↕
Traffic Volume (vph)	413	0	0	678	113	257
Future Volume (vph)	413	0	0	678	113	257
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5			4.5	4.5	4.5
Lane Util. Factor	0.95			0.95	1.00	1.00
Fr't	1.00			1.00	1.00	0.85
Fit Protected	1.00			1.00	0.95	1.00
Sat'd. Flow (prot)	3574			3574	1805	1599
Fit Permitted	1.00			1.00	0.95	1.00
Sat'd. Flow (perm)	3574			3574	1805	1599
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	449	0	0	737	123	279
RTOR Reduction (vph)	0	0	0	0	0	152
Lane Group Flow (vph)	449	0	0	737	123	127
Heavy Vehicles (%)	1%	0%	0%	1%	0%	1%
Turn Type	NA			NA	Prot	Perm
Protected Phases	4			8		2
Permitted Phases						2
Actuated Green, G (s)	18.0			18.0	18.0	18.0
Effective Green, g (s)	18.0			18.0	18.0	18.0
Actuated g/C Ratio	0.40			0.40	0.40	0.40
Clearance Time (s)	4.5			4.5	4.5	4.5
Lane Grp Cap (vph)	1429			1429	722	639
v/s Ratio Prot	0.13			c0.21	0.07	
v/s Ratio Perm						c0.08
v/c Ratio	0.31			0.52	0.17	0.20
Uniform Delay, d1	9.3			10.2	8.7	8.8
Progression Factor	1.00			1.00	1.00	1.00
Incremental Delay, d2	0.6			1.3	0.5	0.7
Delay (s)	9.8			11.5	9.2	9.5
Level of Service	A			B	A	A
Approach Delay (s)	9.8			11.5	9.4	
Approach LOS	A			B	A	

Intersection Summary			
HCM 2000 Control Delay	10.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.36		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	34.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
9: Dorval Drive & QEW WB Off-Ramp

BG 2028 PM.syn
04-03-2024

	↙	↖	↑	↗	↘	↓
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔↔	↔	↕			↕
Traffic Volume (vph)	697	613	979	0	0	1040
Future Volume (vph)	697	613	979	0	0	1040
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	190.0		0.0	0.0	
Storage Lanes	2	1		0	0	
Taper Length (m)	7.5			7.5		
Lane Util. Factor	0.97	0.91	0.95	1.00	1.00	0.95
Frt	0.966	0.850				
Flt Protected	0.963					
Satd. Flow (prot)	3344	1455	3574	0	0	3539
Flt Permitted	0.963					
Satd. Flow (perm)	3344	1455	3574	0	0	3539
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)	38	82				
Link Speed (k/h)	40		60			60
Link Distance (m)	325.1		310.2			266.9
Travel Time (s)	29.3		18.6			16.0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	1%	1%	0%	0%	2%
Adj. Flow (vph)	758	666	1064	0	0	1130
Shared Lane Traffic (%)		33%				
Lane Group Flow (vph)	978	446	1064	0	0	1130
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	7.2		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15		15	25	
Number of Detectors	1	1	2			2
Detector Template	Left	Right	Thru			Thru
Leading Detector (m)	2.0	2.0	10.0			10.0
Trailing Detector (m)	0.0	0.0	0.0			0.0
Detector 1 Position(m)	0.0	0.0	0.0			0.0
Detector 1 Size(m)	2.0	2.0	0.6			0.6
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex			CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0			0.0
Detector 1 Queue (s)	0.0	0.0	0.0			0.0
Detector 1 Delay (s)	0.0	0.0	0.0			0.0
Detector 2 Position(m)			9.4			9.4
Detector 2 Size(m)			0.6			0.6
Detector 2 Type			CI+Ex			CI+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type	Prot	Perm	NA			NA
Protected Phases	8		2			6

Lanes, Volumes, Timings
9: Dorval Drive & QEW WB Off-Ramp

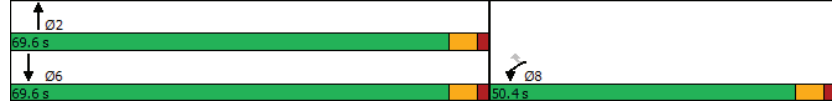
BG 2028 PM.syn
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	↙	↖	↑	↗	↘	↓
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Permitted Phases		8				
Detector Phase	8	8	2			6
Switch Phase						
Minimum Initial (s)	10.0	10.0	20.0			20.0
Minimum Split (s)	24.0	24.0	26.0			26.0
Total Split (s)	50.4	50.4	69.6			69.6
Total Split (%)	42.0%	42.0%	58.0%			58.0%
Maximum Green (s)	44.4	44.4	63.6			63.6
Yellow Time (s)	4.0	4.0	4.0			4.0
All-Red Time (s)	2.0	2.0	2.0			2.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0			-2.0
Total Lost Time (s)	4.0	4.0	4.0			4.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	4.5	4.5	5.0			5.0
Recall Mode	None	None	Max			Max
Walk Time (s)	5.0	5.0	7.0			7.0
Flash Dont Walk (s)	7.0	7.0	11.0			11.0
Pedestrian Calls (#/hr)	0	0	0			0
Act Effct Green (s)	43.1	43.1	65.7			65.7
Actuated g/C Ratio	0.37	0.37	0.56			0.56
v/c Ratio	0.78	0.76	0.53			0.57
Control Delay	36.2	35.3	17.6			18.3
Queue Delay	0.0	0.0	0.0			0.0
Total Delay	36.2	35.3	17.6			18.3
LOS	D	D	B			B
Approach Delay	35.9		17.6			18.3
Approach LOS	D		B			B
Queue Length 50th (m)	102.6	84.9	85.7			94.0
Queue Length 95th (m)	128.0	131.4	105.1			115.0
Internal Link Dist (m)	301.1		286.2			242.9
Turn Bay Length (m)		190.0				
Base Capacity (vph)	1353	628	2010			1991
Starvation Cap Reductn	0	0	0			0
Spillback Cap Reductn	0	0	0			0
Storage Cap Reductn	0	0	0			0
Reduced v/c Ratio	0.72	0.71	0.53			0.57
Intersection Summary						
Area Type:	Other					
Cycle Length:	120					
Actuated Cycle Length:	116.8					
Natural Cycle:	50					
Control Type:	Semi Act-Uncoord					
Maximum v/c Ratio:	0.78					
Intersection Signal Delay:	25.0			Intersection LOS: C		
Intersection Capacity Utilization:	61.7%			ICU Level of Service B		
Analysis Period (min)	15					

Lanes, Volumes, Timings
9: Dorval Drive & QEW WB Off-Ramp

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Splits and Phases: 9: Dorval Drive & QEW WB Off-Ramp



HCM Signalized Intersection Capacity Analysis
9: Dorval Drive & QEW WB Off-Ramp

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	←	↖	↑	↗	↓	
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔↔	↔	↕			↕
Traffic Volume (vph)	697	613	979	0	0	1040
Future Volume (vph)	697	613	979	0	0	1040
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0			4.0
Lane Util. Factor	0.97	0.91	0.95			0.95
Frt	0.97	0.85	1.00			1.00
Fit Protected	0.96	1.00	1.00			1.00
Satd. Flow (prot)	3343	1455	3574			3539
Fit Permitted	0.96	1.00	1.00			1.00
Satd. Flow (perm)	3343	1455	3574			3539
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	758	666	1064	0	0	1130
RTOR Reduction (vph)	24	52	0	0	0	0
Lane Group Flow (vph)	954	394	1064	0	0	1130
Heavy Vehicles (%)	3%	1%	1%	0%	0%	2%
Turn Type	Prot	Perm	NA			NA
Protected Phases	8		2			6
Permitted Phases		8				
Actuated Green, G (s)	41.1	41.1	63.7			63.7
Effective Green, g (s)	43.1	43.1	65.7			65.7
Actuated g/C Ratio	0.37	0.37	0.56			0.56
Clearance Time (s)	6.0	6.0	6.0			6.0
Vehicle Extension (s)	4.5	4.5	5.0			5.0
Lane Grp Cap (vph)	1233	536	2010			1990
v/s Ratio Prot	c0.29		0.30			c0.32
v/s Ratio Perm		0.27				
v/c Ratio	0.77	0.74	0.53			0.57
Uniform Delay, d1	32.5	31.9	15.9			16.4
Progression Factor	1.00	1.00	1.00			1.00
Incremental Delay, d2	3.5	5.9	1.0			1.2
Delay (s)	36.0	37.8	16.9			17.6
Level of Service	D	D	B			B
Approach Delay (s)	36.6		16.9			17.6
Approach LOS	D		B			B
Intersection Summary						
HCM 2000 Control Delay			24.9		HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.65			
Actuated Cycle Length (s)			116.8		Sum of lost time (s)	8.0
Intersection Capacity Utilization			61.7%		ICU Level of Service	B
Analysis Period (min)			15			
c Critical Lane Group						

Lanes, Volumes, Timings
10: Dorval Drive & QEW EB Off-Ramp

BG 2028 PM.syn
04-03-2024

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔↔	↔		↑↑	↑↑	
Traffic Volume (vph)	271	322	0	1175	1112	0
Future Volume (vph)	271	322	0	1175	1112	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	175.0	0.0	0.0			0.0
Storage Lanes	1	1	0			0
Taper Length (m)	7.5		7.5			
Lane Util. Factor	0.97	0.91	1.00	0.95	0.95	1.00
Fr't	0.950	0.850				
Flt Protected	0.968					
Satd. Flow (prot)	3302	1441	0	3539	3505	0
Flt Permitted	0.968					
Satd. Flow (perm)	3302	1441	0	3539	3505	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	70	70				
Link Speed (k/h)	40			60	60	
Link Distance (m)	275.5			164.3	310.2	
Travel Time (s)	24.8			9.9	18.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	2%	0%	2%	3%	0%
Adj. Flow (vph)	295	350	0	1277	1209	0
Shared Lane Traffic (%)		42%				
Lane Group Flow (vph)	442	203	0	1277	1209	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	7.2			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Number of Detectors	1	1		2	2	
Detector Template	Left	Right		Thru	Thru	
Leading Detector (m)	2.0	2.0		10.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	2.0		0.6	0.6	
Detector 1 Type	CI+Ex	CI+Ex		CI+Ex	CI+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	
Detector 2 Position(m)				9.4	9.4	
Detector 2 Size(m)				0.6	0.6	
Detector 2 Type				CI+Ex	CI+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Prot	Perm		NA	NA	
Protected Phases	4			2	6	

Lanes, Volumes, Timings
10: Dorval Drive & QEW EB Off-Ramp

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Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Permitted Phases		4				
Detector Phase	4	4		2	6	
Switch Phase						
Minimum Initial (s)	10.0	10.0		20.0	20.0	
Minimum Split (s)	24.0	24.0		26.0	26.0	
Total Split (s)	45.6	45.6		74.4	74.4	
Total Split (%)	38.0%	38.0%		62.0%	62.0%	
Maximum Green (s)	39.6	39.6		68.4	68.4	
Yellow Time (s)	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	4.0	4.0		5.0	5.0	
Recall Mode	None	None		Max	Max	
Walk Time (s)	0.0	0.0		7.0	7.0	
Flash Dont Walk (s)	7.0	7.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0	
Act Effct Green (s)	20.2	20.2		70.5	70.5	
Actuated g/C Ratio	0.20	0.20		0.71	0.71	
v/c Ratio	0.60	0.58		0.51	0.48	
Control Delay	33.2	29.6		7.7	7.4	
Queue Delay	0.0	0.0		0.0	0.0	
Total Delay	33.2	29.6		7.7	7.4	
LOS	C	C		A	A	
Approach Delay	32.1			7.7	7.4	
Approach LOS	C			A	A	
Queue Length 50th (m)	35.0	26.1		52.0	48.0	
Queue Length 95th (m)	50.6	51.7		85.3	79.2	
Internal Link Dist (m)	251.5			140.3	286.2	
Turn Bay Length (m)	175.0					
Base Capacity (vph)	1434	648		2527	2503	
Starvation Cap Reductn	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	
Storage Cap Reductn	0	0		0	0	
Reduced v/c Ratio	0.31	0.31		0.51	0.48	
Intersection Summary						
Area Type:	Other					
Cycle Length:	120					
Actuated Cycle Length:	98.7					
Natural Cycle:	50					
Control Type:	Semi Act-Uncoord					
Maximum v/c Ratio:	0.60					
Intersection Signal Delay:	12.6			Intersection LOS: B		
Intersection Capacity Utilization:	61.7%			ICU Level of Service B		
Analysis Period (min)	15					

Lanes, Volumes, Timings
10: Dorval Drive & QEW EB Off-Ramp

BG 2028 PM.syn
04-03-2024

Splits and Phases: 10: Dorval Drive & QEW EB Off-Ramp



HCM Signalized Intersection Capacity Analysis
10: Dorval Drive & QEW EB Off-Ramp

BG 2028 PM.syn
04-03-2024

	EBL	EBR	NBL	NBT	SBT	SBR
Movement						
Lane Configurations	↔↔	↔		↕↕	↕↕	
Traffic Volume (vph)	271	322	0	1175	1112	0
Future Volume (vph)	271	322	0	1175	1112	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	0.91		0.95	0.95	
Fr _t	0.95	0.85		1.00	1.00	
Fit Protected	0.97	1.00		1.00	1.00	
Satd. Flow (prot)	3301	1441		3539	3505	
Fit Permitted	0.97	1.00		1.00	1.00	
Satd. Flow (perm)	3301	1441		3539	3505	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	295	350	0	1277	1209	0
RTOR Reduction (vph)	56	56	0	0	0	0
Lane Group Flow (vph)	386	147	0	1277	1209	0
Heavy Vehicles (%)	3%	2%	0%	2%	3%	0%
Turn Type	Prot	Perm		NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4				
Actuated Green, G (s)	18.2	18.2		68.5	68.5	
Effective Green, g (s)	20.2	20.2		70.5	70.5	
Actuated g/C Ratio	0.20	0.20		0.71	0.71	
Clearance Time (s)	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	4.0	4.0		5.0	5.0	
Lane Grp Cap (vph)	675	294		2527	2503	
v/s Ratio Prot	c0.12			c0.36	0.34	
v/s Ratio Perm		0.10				
v/c Ratio	0.57	0.50		0.51	0.48	
Uniform Delay, d ₁	35.4	34.8		6.3	6.2	
Progression Factor	1.00	1.00		1.00	1.00	
Incremental Delay, d ₂	1.4	1.8		0.7	0.7	
Delay (s)	36.8	36.6		7.0	6.8	
Level of Service	D	D		A	A	
Approach Delay (s)	36.7			7.0	6.8	
Approach LOS	D			A	A	
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)			98.7		Sum of lost time (s)	8.0
Intersection Capacity Utilization			61.7%		ICU Level of Service	B
Analysis Period (min)			15			
c Critical Lane Group						

Lanes, Volumes, Timings
11: Argus Rd & South Service Rd

BG 2028 PM.syn
04-03-2024

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Volume (vph)	11	10	314	92	14	16
Future Volume (vph)	11	10	314	92	14	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt			0.969		0.928	
Flt Protected		0.975			0.977	
Satd. Flow (prot)	0	1570	1538	0	1550	0
Flt Permitted		0.975			0.977	
Satd. Flow (perm)	0	1570	1538	0	1550	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		177.7	145.7		103.5	
Travel Time (s)		12.8	10.5		7.5	
Confl. Peds. (#/hr)					5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	13%	10%	0%	0%	0%
Adj. Flow (vph)	12	11	341	100	15	17
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	23	441	0	32	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (k/h)	24			14	24	14
Sign Control		Free	Free		Stop	

Intersection Summary						
Area Type:	CBD					
Control Type:	Unsignalized					
Intersection Capacity Utilization	34.6%		ICU Level of Service A			
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
11: Argus Rd & South Service Rd

BG 2028 PM.syn
04-03-2024

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Volume (veh/h)	11	10	314	92	14	16
Future Volume (Veh/h)	11	10	314	92	14	16
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)	12	11	341	100	15	17
Pedestrians			5			
Lane Width (m)			3.6			
Walking Speed (m/s)			1.2			
Percent Blockage			0			
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)		358				
pX, platoon unblocked						
vC, conflicting volume	441				431	391
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	441				431	391
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				97	97
cM capacity (veh/h)	1130				577	662

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	23	441	32
Volume Left	12	0	15
Volume Right	0	100	17
eSH	1130	1700	619
Volume to Capacity	0.01	0.26	0.05
Queue Length 95th (m)	0.3	0.0	1.3
Control Delay (s)	4.3	0.0	11.1
Lane LOS	A		B
Approach Delay (s)	4.3	0.0	11.1
Approach LOS			B

Intersection Summary			
Average Delay		0.9	
Intersection Capacity Utilization	34.6%	ICU Level of Service	A
Analysis Period (min)	15		

Lanes, Volumes, Timings
12: Lyons Lane & South Service Road

BG 2028 PM.syn
04-03-2024

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Volume (vph)	4	6	1	6	14	6
Future Volume (vph)	4	6	1	6	14	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt			0.882		0.957	
Flt Protected		0.982			0.967	
Satd. Flow (prot)	0	1679	1265	0	1582	0
Flt Permitted		0.982			0.967	
Satd. Flow (perm)	0	1679	1265	0	1582	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		60.5	89.6		37.6	
Travel Time (s)		4.4	6.5		2.7	
Confl. Peds. (#/hr)	7			7		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	22%	0%	0%
Adj. Flow (vph)	4	7	1	7	15	7
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	11	8	0	22	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (k/h)	24			14	24	14
Sign Control		Free	Free		Stop	

Intersection Summary						
Area Type:	CBD					
Control Type:	Unsignalized					
Intersection Capacity Utilization	15.4%		ICU Level of Service A			
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
12: Lyons Lane & South Service Road

BG 2028 PM.syn
04-03-2024

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Volume (veh/h)	4	6	1	6	14	6
Future Volume (Veh/h)	4	6	1	6	14	6
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)	4	7	1	7	15	7
Pedestrians					7	
Lane Width (m)					3.6	
Walking Speed (m/s)					1.2	
Percent Blockage					1	
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	15				26	12
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	15				26	12
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)	1607				986	1069

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	11	8	22
Volume Left	4	0	15
Volume Right	0	7	7
eSH	1607	1700	1011
Volume to Capacity	0.00	0.00	0.02
Queue Length 95th (m)	0.1	0.0	0.5
Control Delay (s)	2.6	0.0	8.6
Lane LOS	A		A
Approach Delay (s)	2.6	0.0	8.6
Approach LOS			A

Intersection Summary			
Average Delay		5.3	
Intersection Capacity Utilization	15.4%	ICU Level of Service	A
Analysis Period (min)	15		

Lanes, Volumes, Timings
13: GO Bus Terminal/Argus Rd & Cross Ave

BG 2028 PM.syn
04-03-2024

	↖	→	↗	↙	←	↖	↗	↙	↘	↖	↗	↙	↘
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	↖	↕	↗	↖	↕	↗	↖	↕	↗	↖	↕	↗	
Traffic Volume (vph)	16	938	18	41	390	47	17	2	51	160	21	144	
Future Volume (vph)	16	938	18	41	390	47	17	2	51	160	21	144	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (m)	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	
Storage Length (m)	20.0	0.0	20.0	0.0	0.0	0.0	0.0	15.0	0.0	0.0	0.0	0.0	
Storage Lanes	1	0	1	0	1	0	1	0	1	0	1	0	
Taper Length (m)	7.5	0.0	7.5	0.0	7.5	0.0	7.5	0.0	7.5	0.0	7.5	0.0	
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	
Ped Bike Factor	0.99	1.00	0.99	1.00	1.00	0.99	0.97	0.98	0.98	0.98	0.98	0.98	
Frt	0.997	0.997	0.984	0.984	0.855	0.855	0.869	0.869	0.869	0.869	0.869	0.869	
Flt Protected	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	
Satd. Flow (prot)	1570	3176	0	797	3184	0	785	706	0	1570	1288	0	
Flt Permitted	0.480	0.480	0.148	0.148	0.571	0.571	0.720	0.720	0.720	0.720	0.720	0.720	
Satd. Flow (perm)	786	3176	0	124	3184	0	467	706	0	1164	1288	0	
Right Turn on Red		Yes		Yes		Yes		Yes		Yes		Yes	
Satd. Flow (RTOR)		3		26		55		157		157		157	
Link Speed (k/h)		50		50		50		50		50		50	
Link Distance (m)		164.3		72.9		81.9		115.7		115.7		115.7	
Travel Time (s)		11.8		5.2		5.9		8.3		8.3		8.3	
Confl. Peds. (#/hr)	9	4	4	9	12	20	20	12	9	4	4	9	
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	
Heavy Vehicles (%)	0%	0%	100%	97%	0%	0%	100%	100%	100%	0%	100%	0%	
Adj. Flow (vph)	17	1020	20	45	424	51	18	2	55	174	23	157	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	17	1040	0	45	475	0	18	57	0	174	180	0	
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No	
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right	
Median Width(m)		3.3		3.3		3.3		3.3		3.3		3.3	
Link Offset(m)		0.0		0.0		0.0		0.0		0.0		0.0	
Crosswalk Width(m)		4.8		4.8		4.8		4.8		4.8		4.8	
Two way Left Turn Lane													
Headway Factor	1.19	1.14	1.14	1.19	1.14	1.14	1.19	1.14	1.14	1.19	1.14	1.14	
Turning Speed (k/h)	24	14	24	14	24	14	24	14	24	14	24	14	
Number of Detectors	1	2	1	2	1	2	1	2	1	2	1	2	
Detector Template	Left	Thru	Left	Thru	Left	Thru	Left	Thru	Left	Thru	Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	10.0	2.0	10.0	2.0	10.0	2.0	10.0	2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	0.6	2.0	0.6	2.0	0.6	2.0	0.6	2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel													
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		9.4		9.4		9.4		9.4		9.4		9.4	
Detector 2 Size(m)		0.6		0.6		0.6		0.6		0.6		0.6	
Detector 2 Type		Cl+Ex		Cl+Ex		Cl+Ex		Cl+Ex		Cl+Ex		Cl+Ex	
Detector 2 Channel													

Lanes, Volumes, Timings
13: GO Bus Terminal/Argus Rd & Cross Ave

BG 2028 PM.syn
04-03-2024

	↖	→	↗	↙	←	↖	↗	↙	↘	↖	↗	↙	↘
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Detector 2 Extend (s)		0.0			0.0			0.0			0.0		0.0
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA		Perm
Protected Phases		2		1	6			8			4		4
Permitted Phases		2		6				8			4		4
Detector Phases		2		1	6			8			4		4
Switch Phase													
Minimum Initial (s)	22.0	22.0		8.0	22.0		10.0	10.0		10.0	10.0		10.0
Minimum Split (s)	45.0	45.0		12.5	29.0		29.0	29.0		29.0	29.0		29.0
Total Split (s)	46.5	46.5		12.5	59.0		31.0	31.0		31.0	31.0		31.0
Total Split (%)	51.7%	51.7%		13.9%	65.6%		34.4%	34.4%		34.4%	34.4%		34.4%
Maximum Green (s)	40.5	40.5		8.5	53.0		25.0	25.0		25.0	25.0		25.0
Yellow Time (s)	4.0	4.0		3.0	4.0		4.0	4.0		4.0	4.0		4.0
All-Red Time (s)	2.0	2.0		1.0	2.0		2.0	2.0		2.0	2.0		2.0
Lost Time Adjust (s)	-2.0	-2.0		0.0	-2.0		-2.0	-2.0		-2.0	-2.0		-2.0
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0		4.0
Lead/Lag	Lag	Lag		Lead									
Lead-Lag Optimize?	Yes	Yes		Yes									
Vehicle Extension (s)	5.0	5.0		2.5	5.0		4.0	4.0		4.0	4.0		4.0
Recall Mode	Min	Min		Min	Min		Min	Min		Min	Min		Min
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0		7.0
Flash Dont Walk (s)	16.0	16.0		16.0	16.0		16.0	16.0		16.0	16.0		16.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0		0
Act Effct Green (s)	35.4	35.4		47.9	47.9		19.4	19.4		19.4	19.4		19.4
Actuated g/C Ratio	0.47	0.47		0.63	0.63		0.26	0.26		0.26	0.26		0.26
v/c Ratio	0.05	0.70		0.30	0.23		0.15	0.26		0.58	0.40		0.40
Control Delay	12.6	19.1		11.5	6.4		26.7	10.6		34.4	9.0		9.0
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Total Delay	12.6	19.2		11.5	6.4		26.7	10.6		34.4	9.0		9.0
LOS	B	B		B	A		C	B		C	A		A
Approach Delay		19.0			6.9			14.5			21.5		
Approach LOS		B			A			B			C		
Queue Length 50th (m)	1.3	61.1		2.3	13.4		2.1	0.2		23.3	2.7		2.7
Queue Length 95th (m)	5.4	98.2		7.7	25.4		8.1	9.4		46.7	18.7		18.7
Internal Link Dist (m)		140.3			48.9			57.9			91.7		
Turn Bay Length (m)	20.0			20.0						15.0			
Base Capacity (vph)	455	1840		156	2392		171	294		428	573		573
Starvation Cap Reductn	0	27		0	0		0	0		0	0		0
Spillback Cap Reductn	0	0		0	0		0	0		0	0		0
Storage Cap Reductn	0	0		0	0		0	0		0	0		0
Reduced v/c Ratio	0.04	0.57		0.29	0.20		0.11	0.19		0.41	0.31		0.31
Intersection Summary													
Area Type:	CBD												
Cycle Length:	90												
Actuated Cycle Length:	75.5												
Natural Cycle:	90												
Control Type:	Semi Act-Uncoord												
Maximum v/c Ratio:	0.70												
Intersection Signal Delay:	16.1						Intersection LOS: B						

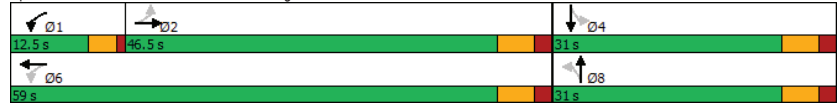
Lanes, Volumes, Timings
13: GO Bus Terminal/Argus Rd & Cross Ave

BG 2028 PM.syn
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Intersection Capacity Utilization 61.9%
Analysis Period (min) 15

ICU Level of Service B

Splits and Phases: 13: GO Bus Terminal/Argus Rd & Cross Ave



HCM Signalized Intersection Capacity Analysis
13: GO Bus Terminal/Argus Rd & Cross Ave

BG 2028 PM.syn
04-03-2024

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	←	→	↘	←	→	↘	←	→	↘	←	→	↘
Lane Configurations	↘	↘		↘	↘		↘	↘		↘	↘	↘
Traffic Volume (vph)	16	938	18	41	390	47	17	2	51	160	21	144
Future Volume (vph)	16	938	18	41	390	47	17	2	51	160	21	144
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frbp, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.97		1.00	0.98	
Flpb, ped/bikes	0.99	1.00		1.00	1.00		0.99	1.00		0.98	1.00	
Frt	1.00	1.00		1.00	0.98		1.00	0.86		1.00	0.87	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1558	3177		797	3185		778	709		1542	1291	
Flt Permitted	0.48	1.00		0.15	1.00		0.57	1.00		0.72	1.00	
Satd. Flow (perm)	788	3177		124	3185		468	709		1168	1291	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	17	1020	20	45	424	51	18	2	55	174	23	157
RTOR Reduction (vph)	0	2	0	0	9	0	0	41	0	0	116	0
Lane Group Flow (vph)	17	1038	0	45	466	0	18	16	0	174	64	0
Confl. Peds. (#/hr)	9		4	4		9	12		20	20		12
Heavy Vehicles (%)	0%	0%	100%	97%	0%	0%	100%	100%	100%	0%	100%	0%
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	33.5	33.5		45.8	45.8		17.4	17.4		17.4	17.4	
Effective Green, g (s)	35.5	35.5		45.8	47.8		19.4	19.4		19.4	19.4	
Actuated g/C Ratio	0.47	0.47		0.61	0.64		0.26	0.26		0.26	0.26	
Clearance Time (s)	6.0	6.0		4.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	5.0	5.0		2.5	5.0		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	371	1499		149	2024		120	182		301	333	
v/s Ratio Prot		c0.33		c0.03	0.15			0.02			0.05	
v/s Ratio Perm	0.02			0.15			0.04			c0.15		
v/c Ratio	0.05	0.69		0.30	0.23		0.15	0.09		0.58	0.19	
Uniform Delay, d1	10.7	15.6		8.6	5.8		21.5	21.2		24.3	21.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	1.8		0.8	0.1		0.8	0.3		3.2	0.4	
Delay (s)	10.8	17.4		9.4	6.0		22.3	21.5		27.5	22.2	
Level of Service	B	B		A	A		C	C		C	C	
Approach Delay (s)		17.3			6.3			21.7			24.8	
Approach LOS		B			A			C			C	
Intersection Summary												
HCM 2000 Control Delay			15.9				HCM 2000 Level of Service				B	
HCM 2000 Volume to Capacity ratio			0.61									
Actuated Cycle Length (s)			75.2			Sum of lost time (s)				12.0		
Intersection Capacity Utilization			61.9%			ICU Level of Service				B		
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
14: Lyons Lane/Street A & Cross Ave

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	↖	→	↗	↙	←	↖	↗	↙	↘	↖	↗	↙	↘
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	↖	↖↗		↖	↖↗		↖	↖		↖	↖		
Traffic Volume (vph)	42	168	14	16	345	13	258	5	174	17	2	69	
Future Volume (vph)	42	168	14	16	345	13	258	5	174	17	2	69	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (m)	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	
Storage Length (m)	0.0	0.0	25.0		0.0	20.0		0.0	0.0			0.0	
Storage Lanes	1		0	1		0	1		0	1		0	
Taper Length (m)	7.5			7.5		7.5			7.5				
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	
Ped Bike Factor	1.00	1.00		1.00	1.00		1.00	0.98		1.00	0.99		
Frt		0.989			0.995			0.854			0.854		
Flt Protected	0.950			0.950			0.950			0.950			
Satd. Flow (prot)	1525	2912	0	1570	3081	0	1570	1436	0	1570	1414	0	
Flt Permitted	0.522			0.563			0.707			0.565			
Satd. Flow (perm)	835	2912	0	929	3081	0	1167	1436	0	931	1414	0	
Right Turn on Red			Yes			Yes			Yes				Yes
Satd. Flow (RTOR)		12			7			189				75	
Link Speed (k/h)		50			50			50				50	
Link Distance (m)		40.1			209.8			69.1				70.9	
Travel Time (s)		2.9			15.1			5.0				5.1	
Confl. Peds. (#/hr)	3		1	1		3	1		4	4			1
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	
Heavy Vehicles (%)	3%	11%	0%	0%	5%	0%	0%	0%	0%	0%	0%	2%	
Adj. Flow (vph)	46	183	15	17	375	14	280	5	189	18	2	75	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	46	198	0	17	389	0	280	194	0	18	77	0	
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No	
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right	
Median Width(m)		3.3			3.3			3.3			3.3		
Link Offset(m)		0.0			0.0			0.0			0.0		
Crosswalk Width(m)		4.8			4.8			4.8			4.8		
Two way Left Turn Lane													
Headway Factor	1.19	1.14	1.14	1.19	1.14	1.14	1.19	1.14	1.14	1.19	1.14	1.14	
Turning Speed (k/h)	24		14	24		14	24		14	24		14	
Number of Detectors	1	2		1	2		1	2		1	2		
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru		
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0		
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0		
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0		
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6		
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		
Detector 1 Channel													
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0		
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0		
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0		
Detector 2 Position(m)		9.4			9.4			9.4			9.4		
Detector 2 Size(m)		0.6			0.6			0.6			0.6		
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex		
Detector 2 Channel													

Lanes, Volumes, Timings
14: Lyons Lane/Street A & Cross Ave

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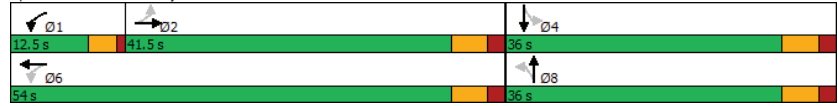
	↖	→	↗	↙	←	↖	↗	↙	↘	↖	↗	↙	↘
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Detector 2 Extend (s)		0.0			0.0			0.0				0.0	
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA		NA
Protected Phases		2		1	6			8			4		4
Permitted Phases		2		6				8			4		
Detector Phases	2	2		1	6		8	8			4		4
Switch Phase													
Minimum Initial (s)	35.0	35.0		8.0	35.0		10.0	10.0			10.0		10.0
Minimum Split (s)	41.0	41.0		12.5	41.0		28.0	28.0			28.0		28.0
Total Split (s)	41.5	41.5		12.5	54.0		36.0	36.0			36.0		36.0
Total Split (%)	46.1%	46.1%		13.9%	60.0%		40.0%	40.0%			40.0%		40.0%
Maximum Green (s)	35.5	35.5		8.5	48.0		30.0	30.0			30.0		30.0
Yellow Time (s)	4.0	4.0		3.0	4.0		4.0	4.0			4.0		4.0
All-Red Time (s)	2.0	2.0		1.0	2.0		2.0	2.0			2.0		2.0
Lost Time Adjust (s)	-2.0	-2.0		0.0	-2.0		-2.0	-2.0			-2.0		-2.0
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0		4.0
Lead/Lag	Lag	Lag		Lead									
Lead-Lag Optimize?	Yes	Yes		Yes									
Vehicle Extension (s)	5.0	5.0		2.5	5.0		4.0	4.0			4.0		4.0
Recall Mode	Min	Min		Min	Min		Min	Min			Min		Min
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0			7.0		7.0
Flash Dont Walk (s)	15.0	15.0			15.0		15.0	15.0			15.0		15.0
Pedestrian Calls (#/hr)	0	0			0		0	0			0		0
Act Effct Green (s)	37.2	37.2		49.2	49.2		26.2	26.2			26.2		26.2
Actuated g/C Ratio	0.45	0.45		0.59	0.59		0.31	0.31			0.31		0.31
v/c Ratio	0.12	0.15		0.03	0.21		0.77	0.33			0.06		0.16
Control Delay	16.7	14.4		9.0	9.1		40.4	5.2			19.6		6.1
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0			0.0		0.0
Total Delay	16.7	14.4		9.0	9.1		40.4	5.2			19.6		6.1
LOS	B	B		A	A		D	A			B		A
Approach Delay		14.9			9.1			26.0					8.7
Approach LOS		B			A			C					A
Queue Length 50th (m)	4.5	9.7		1.1	15.2		41.7	0.6			2.1		0.3
Queue Length 95th (m)	12.3	17.9		4.2	25.4		71.7	14.5			6.8		9.2
Internal Link Dist (m)		16.1			185.8			45.1					46.9
Turn Bay Length (m)				25.0			20.0						
Base Capacity (vph)	376	1321		613	1857		449	669			358		590
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	0.15		0.03	0.21		0.62	0.29			0.05		0.13
Intersection Summary													
Area Type:	CBD												
Cycle Length:	90												
Actuated Cycle Length:	83.4												
Natural Cycle:	85												
Control Type:	Semi Act-Uncoord												
Maximum v/c Ratio:	0.77												
Intersection Signal Delay:	16.8						Intersection LOS: B						

Lanes, Volumes, Timings
14: Lyons Lane/Street A & Cross Ave

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Intersection Capacity Utilization 68.0% ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 14: Lyons Lane/Street A & Cross Ave



HCM Signalized Intersection Capacity Analysis
14: Lyons Lane/Street A & Cross Ave

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	42	168	14	16	345	13	258	5	174	17	2	69
Future Volume (vph)	42	168	14	16	345	13	258	5	174	17	2	69
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frbp, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.98		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	0.99		1.00	0.85		1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1520	2911		1569	3080		1569	1437		1565	1414	
Flt Permitted	0.52	1.00		0.56	1.00		0.71	1.00		0.57	1.00	
Satd. Flow (perm)	835	2911		931	3080		1167	1437		931	1414	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	46	183	15	17	375	14	280	5	189	18	2	75
RTOR Reduction (vph)	0	7	0	0	3	0	0	130	0	0	51	0
Lane Group Flow (vph)	46	191	0	17	386	0	280	64	0	18	26	0
Confl. Peds. (#/hr)	3		1	1		3	1		4	4		1
Heavy Vehicles (%)	3%	11%	0%	0%	5%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	35.2	35.2		47.2	47.2		24.2	24.2		24.2	24.2	
Effective Green, g (s)	37.2	37.2		47.2	49.2		26.2	26.2		26.2	26.2	
Actuated g/C Ratio	0.45	0.45		0.57	0.59		0.31	0.31		0.31	0.31	
Clearance Time (s)	6.0	6.0		4.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	5.0	5.0		2.5	5.0		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	372	1298		588	1816		366	451		292	444	
v/s Ratio Prot		0.07		0.00	c0.13			0.04			0.02	
v/s Ratio Perm	0.06			0.01			c0.24			0.02		
v/c Ratio	0.12	0.15		0.03	0.21		0.77	0.14		0.06	0.06	
Uniform Delay, d1	13.5	13.7		8.0	8.0		25.8	20.5		20.0	20.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.3	0.1		0.0	0.1		9.7	0.2		0.1	0.1	
Delay (s)	13.9	13.8		8.1	8.1		35.6	20.7		20.1	20.1	
Level of Service	B	B		A	A		D	C		C	C	
Approach Delay (s)		13.8			8.1			29.5			20.1	
Approach LOS		B			A			C			C	
Intersection Summary												
HCM 2000 Control Delay			18.5				HCM 2000 Level of Service				B	
HCM 2000 Volume to Capacity ratio			0.43									
Actuated Cycle Length (s)			83.4			Sum of lost time (s)				12.0		
Intersection Capacity Utilization			68.0%			ICU Level of Service				C		
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
15: Cross Ave & Lyons Lane

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04-03-2024

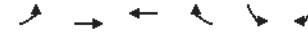


Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↕↕	↕↔		↕↔	
Traffic Volume (vph)	7	203	659	8	17	31
Future Volume (vph)	7	203	659	8	17	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	5.0			0.0	0.0	0.0
Storage Lanes	1			0	1	0
Taper Length (m)	7.5				7.5	
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	1.00
Ped Bike Factor						
Frt			0.998		0.912	
Flt Protected	0.950				0.983	
Satd. Flow (prot)	1388	2954	3149	0	1494	0
Flt Permitted	0.950				0.983	
Satd. Flow (perm)	1388	2954	3149	0	1494	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		281.3	40.1		41.7	
Travel Time (s)		20.3	2.9		3.0	
Confl. Peds. (#/hr)	1			1	9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	17%	10%	3%	0%	0%	4%
Adj. Flow (vph)	8	221	716	9	18	34
Shared Lane Traffic (%)						
Lane Group Flow (vph)	8	221	725	0	52	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.6	3.6		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (k/h)	25			15	25	15
Sign Control		Free	Free		Stop	

Intersection Summary	
Area Type:	CBD
Control Type:	Unsignalized
Intersection Capacity Utilization	30.5%
ICU Level of Service A	
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis
15: Cross Ave & Lyons Lane

BG 2028 PM.syn
04-03-2024



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↕↕	↕↔		↕↔	
Traffic Volume (veh/h)	7	203	659	8	17	31
Future Volume (Veh/h)	7	203	659	8	17	31
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)	8	221	716	9	18	34
Pedestrians			9		1	
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)			40			
pX, platoon unblocked	0.95				0.95	0.95
vC, conflicting volume	726				857	364
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCU, unblocked vol	608				745	226
tC, single (s)	4.4				6.8	7.0
tC, 2 stage (s)						
tF (s)	2.4				3.5	3.3
p0 queue free %	99				95	95
cM capacity (veh/h)	827				330	732

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	8	110	110	477	248	52
Volume Left	8	0	0	0	0	18
Volume Right	0	0	0	0	9	34
eSH	827	1700	1700	1700	1700	515
Volume to Capacity	0.01	0.07	0.07	0.28	0.15	0.10
Queue Length 95th (m)	0.2	0.0	0.0	0.0	0.0	2.7
Control Delay (s)	9.4	0.0	0.0	0.0	0.0	12.8
Lane LOS	A					B
Approach Delay (s)	0.3			0.0		12.8
Approach LOS						B

Intersection Summary	
Average Delay	0.7
Intersection Capacity Utilization	30.5%
ICU Level of Service A	
Analysis Period (min)	15

Lanes, Volumes, Timings
16: Speers Road/Cornwall Road & Cross Avenue

BG 2028 PM.syn
04-03-2024

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↕↕	↕↕		↕	↕↕
Traffic Volume (vph)	261	758	832	18	9	440
Future Volume (vph)	261	758	832	18	9	440
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	75.0			0.0	55.0	0.0
Storage Lanes	1			0	1	2
Taper Length (m)	7.5				7.5	
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	0.88
Frt			0.997			0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1770	3539	3529	0	1770	2787
Flt Permitted	0.220				0.950	
Satd. Flow (perm)	410	3539	3529	0	1770	2787
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)			3			478
Link Speed (k/h)		50	50		50	
Link Distance (m)		189.7	274.5		184.2	
Travel Time (s)		13.7	19.8		13.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	284	824	904	20	10	478
Shared Lane Traffic (%)						
Lane Group Flow (vph)	284	824	924	0	10	478
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.6	3.6		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25			15	25	15
Number of Detectors	1	2	2		1	1
Detector Template	Left	Thru	Thru		Left	Right
Leading Detector (m)	2.0	10.0	10.0		2.0	2.0
Trailing Detector (m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Size(m)	2.0	0.6	0.6		2.0	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0		0.0	0.0
Detector 2 Position(m)		9.4	9.4			
Detector 2 Size(m)		0.6	0.6			
Detector 2 Type		Cl+Ex	Cl+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type	pm+pt	NA	NA		pm+pt	Perm
Protected Phases	5	2	6		7	
Permitted Phases	2				4	4

Lanes, Volumes, Timings
16: Speers Road/Cornwall Road & Cross Avenue

BG 2028 PM.syn
04-03-2024

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Detector Phase	5	2	6		7	4
Switch Phase						
Minimum Initial (s)	6.0	5.0	5.0		5.0	5.0
Minimum Split (s)	12.0	33.5	33.5		27.5	27.5
Total Split (s)	22.0	62.0	40.0		28.0	28.0
Total Split (%)	24.4%	68.9%	44.4%		31.1%	31.1%
Maximum Green (s)	16.0	56.0	34.0		22.0	22.0
Yellow Time (s)	4.0	4.0	4.0		4.0	4.0
All-Red Time (s)	2.0	2.0	2.0		2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0		6.0	6.0
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?	Yes		Yes			
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	None	Max	Max		None	None
Walk Time (s)		18.0	18.0		12.0	12.0
Flash Dont Walk (s)		7.0	7.0		7.0	7.0
Pedestrian Calls (#/hr)		0	0		0	0
Act Effct Green (s)	56.1	56.1	39.7		7.1	7.1
Actuated g/C Ratio	0.75	0.75	0.53		0.09	0.09
v/c Ratio	0.58	0.31	0.50		0.06	0.69
Control Delay	8.5	3.7	13.5		31.0	9.0
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	8.5	3.7	13.5		31.0	9.0
LOS	A	A	B		C	A
Approach Delay		5.0	13.5		9.5	
Approach LOS		A	B		A	
Queue Length 50th (m)	8.9	14.8	39.0		1.4	0.0
Queue Length 95th (m)	23.1	29.4	76.7		5.8	14.2
Internal Link Dist (m)		165.7	250.5		160.2	
Turn Bay Length (m)	75.0				55.0	
Base Capacity (vph)	595	2638	1865		518	1154
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	0.48	0.31	0.50		0.02	0.41

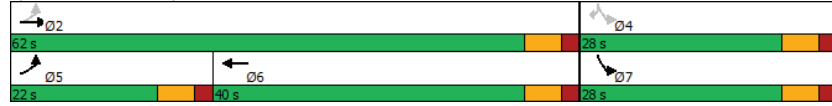
Intersection Summary

Area Type:	Other
Cycle Length:	90
Actuated Cycle Length:	75.2
Natural Cycle:	75
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.69
Intersection Signal Delay:	9.0
Intersection Capacity Utilization:	57.2%
Intersection LOS:	A
ICU Level of Service:	B
Analysis Period (min):	15

Lanes, Volumes, Timings
16: Speers Road/Cornwall Road & Cross Avenue

BG 2028 PM.syn
04-03-2024

Splits and Phases: 16: Speers Road/Cornwall Road & Cross Avenue



HCM Signalized Intersection Capacity Analysis
16: Speers Road/Cornwall Road & Cross Avenue

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04-03-2024

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↕	↕	↕	↔	↔
Traffic Volume (vph)	261	758	832	18	9	440
Future Volume (vph)	261	758	832	18	9	440
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0		6.0	6.0
Lane Util. Factor	1.00	0.95	0.95		1.00	0.88
Frt	1.00	1.00	1.00		1.00	0.85
Fit Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	3539	3528		1770	2787
Fit Permitted	0.22	1.00	1.00		0.95	1.00
Satd. Flow (perm)	411	3539	3528		1770	2787
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	284	824	904	20	10	478
RTOR Reduction (vph)	0	0	1	0	0	433
Lane Group Flow (vph)	284	824	923	0	10	45
Turn Type	pm+pt	NA	NA		pm+pt	Perm
Protected Phases	5	2	6		7	
Permitted Phases	2				4	4
Actuated Green, G (s)	56.0	56.0	39.7		7.1	7.1
Effective Green, g (s)	56.0	56.0	39.7		7.1	7.1
Actuated g/C Ratio	0.75	0.75	0.53		0.09	0.09
Clearance Time (s)	6.0	6.0	6.0		6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	492	2638	1865		167	263
v/s Ratio Prot	c0.08	0.23	0.26		0.01	
v/s Ratio Perm	c0.35					c0.02
v/c Ratio	0.58	0.31	0.49		0.06	0.17
Uniform Delay, d1	5.1	3.2	11.3		31.0	31.3
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	1.6	0.3	0.9		0.2	0.3
Delay (s)	6.8	3.5	12.2		31.1	31.6
Level of Service	A	A	B		C	C
Approach Delay (s)		4.3	12.2		31.6	
Approach LOS		A	B		C	
Intersection Summary						
HCM 2000 Control Delay		12.5		HCM 2000 Level of Service		B
HCM 2000 Volume to Capacity ratio		0.56				
Actuated Cycle Length (s)		75.1		Sum of lost time (s)		18.0
Intersection Capacity Utilization		57.2%		ICU Level of Service		B
Analysis Period (min)		15				

c Critical Lane Group

Lanes, Volumes, Timings
23: GO Station West Access/Street C & Cross Ave

BG 2028 PM.syn
04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔			↔			↔	↔		↔	↔	
Traffic Volume (vph)	0	489	49	267	284	0	83	0	411	0	0	0
Future Volume (vph)	0	489	49	267	284	0	83	0	411	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.0	0.0	0.0
Storage Lanes	0	0	0	0	0	0	1	0	1	0	0	0
Taper Length (m)	7.5			7.5			7.5		7.5			7.5
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Fr	0.986						0.850					
Flt Protected					0.976		0.950					
Satd. Flow (prot)	0	3490	0	0	3454	0	1770	1583	0	1863	1863	0
Flt Permitted					0.618		0.757					
Satd. Flow (perm)	0	3490	0	0	2187	0	1410	1583	0	1863	1863	0
Right Turn on Red			Yes				Yes				Yes	
Satd. Flow (RTOR)	25						169					
Link Speed (k/h)	50				50				50			
Link Distance (m)	209.8				164.3				55.1		132.8	
Travel Time (s)	15.1				11.8				4.0		9.6	
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
Adj. Flow (vph)	0	532	53	290	309	0	90	0	447	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	585	0	0	599	0	90	447	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)	3.3				3.3				3.6		3.6	
Link Offset(m)	0.0				0.0				0.0		0.0	
Crosswalk Width(m)	4.8				4.8				4.8		4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15		25		15		25		15	
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)	9.4				9.4				9.4		9.4	
Detector 2 Size(m)	0.6				0.6				0.6		0.6	
Detector 2 Type	Cl+Ex				Cl+Ex				Cl+Ex		Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)	0.0				0.0				0.0		0.0	
Turn Type	NA		Perm		NA		Perm		NA		Perm	
Protected Phases	4				8				2		6	
Permitted Phases	4				8				2		6	

Lanes, Volumes, Timings
23: GO Station West Access/Street C & Cross Ave

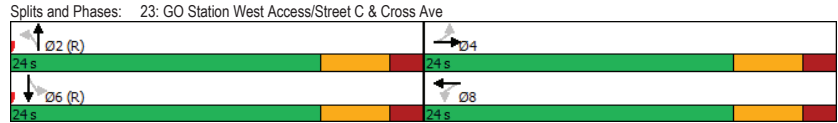
BG 2028 PM.syn
04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	24.0	24.0		24.0	24.0		24.0	24.0		24.0	24.0	
Total Split (s)	24.0	24.0		24.0	24.0		24.0	24.0		24.0	24.0	
Total Split (%)	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%		50.0%	50.0%	
Maximum Green (s)	18.0	18.0		18.0	18.0		18.0	18.0		18.0	18.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0				0.0		0.0		0.0		0.0	
Total Lost Time (s)	6.0				6.0		6.0		6.0		6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	16.5				16.5		19.5		19.5			
Actuated g/C Ratio	0.34				0.34		0.41		0.41			
v/c Ratio	0.48				1.08dl		0.16		0.60			
Control Delay	13.0				23.5		10.9		11.4			
Queue Delay	0.0				0.0		0.0		0.0			
Total Delay	13.0				23.5		10.9		11.4			
LOS	B				C		B		B			
Approach Delay	13.0				23.5		11.3					
Approach LOS	B				C		B					
Queue Length 50th (m)	18.6				23.2		5.1		18.0			
Queue Length 95th (m)	29.8				#41.8		12.7		43.0			
Internal Link Dist (m)	185.8				140.3		31.1				108.8	
Turn Bay Length (m)												
Base Capacity (vph)	1324				820		572		743			
Starvation Cap Reductn	0				0		0		0			
Spillback Cap Reductn	0				0		0		0			
Storage Cap Reductn	0				0		0		0			
Reduced v/c Ratio	0.44				0.73		0.16		0.60			
Intersection Summary												
Area Type:	Other											
Cycle Length:	48											
Actuated Cycle Length:	48											
Offset:	0 (0%), Referenced to phase 2:NBL and 6:SBTL, Start of Green											
Natural Cycle:	55											
Control Type:	Actuated-Coordinated											
Maximum v/c Ratio:	0.80											
Intersection Signal Delay:	16.1						Intersection LOS: B					
Intersection Capacity Utilization:	71.1%						ICU Level of Service C					
Analysis Period (min)	15											
# 95th percentile volume exceeds capacity, queue may be longer.												

Lanes, Volumes, Timings
 23: GO Station West Access/Street C & Cross Ave

BG 2028 PM.syn
 04-03-2024

Queue shown is maximum after two cycles.
 dl Defacto Left Lane. Recode with 1 though lane as a left lane.



HCM Signalized Intersection Capacity Analysis
 23: GO Station West Access/Street C & Cross Ave

BG 2028 PM.syn
 04-03-2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔		↔	↔		↔	↔	
Traffic Volume (vph)	0	489	49	267	284	0	83	0	411	0	0	0
Future Volume (vph)	0	489	49	267	284	0	83	0	411	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0			6.0		6.0	6.0				
Lane Util. Factor		0.95			0.95		1.00	1.00				
Frt		0.99			1.00		1.00	0.85				
Fit Protected		1.00			0.98		0.95	1.00				
Satd. Flow (prot)		3491			3456		1770	1583				
Fit Permitted		1.00			0.62		0.76	1.00				
Satd. Flow (perm)		3491			2188		1410	1583				
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	532	53	290	309	0	90	0	447	0	0	0
RTOR Reduction (vph)	0	16	0	0	0	0	0	100	0	0	0	0
Lane Group Flow (vph)	0	569	0	0	599	0	90	347	0	0	0	0
Turn Type		NA		Perm	NA		Perm	NA		Perm		
Protected Phases		4			8			2				6
Permitted Phases	4						2			6		
Actuated Green, G (s)		16.5			16.5		19.5	19.5				
Effective Green, g (s)		16.5			16.5		19.5	19.5				
Actuated g/C Ratio		0.34			0.34		0.41	0.41				
Clearance Time (s)		6.0			6.0		6.0	6.0				
Vehicle Extension (s)		3.0			3.0		3.0	3.0				
Lane Grp Cap (vph)		1200			752		572	643				
v/s Ratio Prot		0.16						c0.22				
v/s Ratio Perm					c0.27		0.06					
v/c Ratio		0.47			1.08dl		0.16	0.54				
Uniform Delay, d1		12.3			14.2		9.0	10.8				
Progression Factor		1.00			1.00		1.00	1.00				
Incremental Delay, d2		0.3			5.9		0.6	3.2				
Delay (s)		12.6			20.1		9.6	14.1				
Level of Service		B			C		A	B				
Approach Delay (s)		12.6			20.1			13.3				0.0
Approach LOS		B			C			B				A

Intersection Summary

HCM 2000 Control Delay	15.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	48.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	71.1%	ICU Level of Service	C
Analysis Period (min)	15		

dl Defacto Left Lane. Recode with 1 though lane as a left lane.
 c Critical Lane Group

Lanes, Volumes, Timings

BG 2033 AM.syn

1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd

04-03-2024

	↖	→	↗	↖	←	↖	↗	↖	↗	↖	↗	↖
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗	↖	↖	↖	↖	↖	↖	↖	↖	↖	↖
Traffic Volume (vph)	38	117	323	669	83	192	157	1614	768	179	1640	51
Future Volume (vph)	38	117	323	669	83	192	157	1614	768	179	1640	51
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0		0.0	165.0		25.0	145.0		0.0	95.0		90.0
Storage Lanes	1		1	1		1	1		1	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Ped Bike Factor	0.99					0.98			0.99			
Frt			0.850			0.850			0.850			0.850
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1624	1693	1425	3060	1676	1398	1425	4446	1398	1562	4532	1398
Fit Permitted	0.699			0.398			0.082			0.082		
Satd. Flow (perm)	1184	1693	1425	1282	1676	1366	123	4446	1377	135	4532	1398
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			218			209			429			155
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		285.9			293.8			275.1			252.7	
Travel Time (s)		20.6			21.2			19.8			18.2	
Confl. Peds. (#/hr)	11					11			10	10		
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
Heavy Vehicles (%)	0%	1%	2%	3%	2%	4%	14%	5%	4%	4%	3%	4%
Adj. Flow (vph)	41	127	351	727	90	209	171	1754	835	195	1783	55
Shared Lane Traffic (%)												
Lane Group Flow (vph)	41	127	351	727	90	209	171	1754	835	195	1783	55
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		7.2			7.2			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings

BG 2033 AM.syn

1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd

04-03-2024

	↖	→	↗	↖	←	↖	↗	↖	↗	↖	↗	↖
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA	Free	pm+pt	NA	Perm	pm+pt	NA	Free	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		Free	8		8	2		Free	6		6
Detector Phase	7	4		3	8	8	5	2		1	6	6
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0	10.0	6.0	15.0		6.0	15.0	15.0
Minimum Split (s)	10.0	34.0		11.0	43.0	43.0	10.0	34.0		10.0	34.0	34.0
Total Split (s)	10.0	34.0		19.0	43.0	43.0	13.0	53.0		14.0	54.0	54.0
Total Split (%)	8.3%	28.3%		15.8%	35.8%	35.8%	10.8%	44.2%		11.7%	45.0%	45.0%
Maximum Green (s)	6.0	27.0		14.0	36.0	36.0	9.0	46.0		10.0	47.0	47.0
Yellow Time (s)	3.0	4.0		3.0	4.0	4.0	3.0	4.0		3.0	4.0	4.0
All-Red Time (s)	1.0	3.0		2.0	3.0	3.0	1.0	3.0		1.0	3.0	3.0
Lost Time Adjust (s)	0.0	-3.0		0.0	-3.0	-3.0	0.0	-3.0		0.0	-3.0	-3.0
Total Lost Time (s)	4.0	4.0		5.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	4.0		3.0	4.0	4.0	3.0	5.0		3.0	5.0	5.0
Recall Mode	None	None		None	None	None	None	C-Max		None	C-Max	C-Max
Walk Time (s)					7.0	7.0		7.0			7.0	7.0
Flash Dont Walk (s)					29.0	29.0		20.0			20.0	20.0
Pedestrian Calls (#/hr)					0	0		0			0	0
Act Effct Green (s)	24.3	18.3	120.0	36.3	29.3	29.3	70.5	52.3	120.0	70.9	52.5	52.5
Actuated g/C Ratio	0.20	0.15	1.00	0.30	0.24	0.24	0.59	0.44	1.00	0.59	0.44	0.44
v/c Ratio	0.16	0.49	0.25	1.22	0.22	0.43	0.63	0.91	0.61	0.65	0.90	0.08
Control Delay	29.8	52.5	0.4	149.1	37.7	7.5	37.1	40.0	2.0	36.5	39.1	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.8	52.5	0.4	149.1	37.7	7.5	37.1	40.0	2.0	36.5	39.1	0.2
LOS	C	D	A	F	D	A	D	D	A	D	D	A
Approach Delay		15.5			110.5			28.3			37.8	
Approach LOS		B			F			C			D	
Queue Length 50th (m)	7.2	29.2	0.0	~107.2	18.4	0.0	25.1	147.4	0.0	29.1	148.6	0.0
Queue Length 95th (m)	14.9	47.1	0.0	#140.9	31.5	18.7	#61.2	#190.8	0.0	#65.0	#189.4	0.0
Internal Link Dist (m)		261.9			269.8			251.1			228.7	
Turn Bay Length (m)	60.0			165.0		25.0	145.0			95.0		90.0
Base Capacity (vph)	261	423	1425	594	544	585	270	1937	1377	298	1982	698
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.16	0.30	0.25	1.22	0.17	0.36	0.63	0.91	0.61	0.65	0.90	0.08
Intersection Summary												
Area Type:	CBD											
Cycle Length:	120											
Actuated Cycle Length:	120											
Offset:	33.6 (28%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green											
Natural Cycle:	110											
Control Type:	Actuated-Coordinated											
Maximum v/c Ratio:	1.22											
Intersection Signal Delay:	43.6						Intersection LOS: D					

Lanes, Volumes, Timings
1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd

BG 2033 AM.syn
04-03-2024

Intersection Capacity Utilization 84.2% ICU Level of Service E
Analysis Period (min) 15
- Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd



HCM Signalized Intersection Capacity Analysis
1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd

BG 2033 AM.syn
04-03-2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↑	↗	↖	↑	↗	↖	↖	↗	↖	↗	↖
Traffic Volume (vph)	38	117	323	669	83	192	157	1614	768	179	1640	51
Future Volume (vph)	38	117	323	669	83	192	157	1614	768	179	1640	51
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	1.0	5.0	4.0	4.0	4.0	4.0	1.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.98	1.00	1.00	0.99	1.00	1.00	1.00
Flpb, ped/bikes	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1614	1693	1425	3060	1676	1366	1425	4446	1377	1562	4532	1398
Flt Permitted	0.70	1.00	1.00	0.40	1.00	1.00	0.08	1.00	1.00	0.08	1.00	1.00
Satd. Flow (perm)	1187	1693	1425	1283	1676	1366	124	4446	1377	135	4532	1398
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	41	127	351	727	90	209	171	1754	835	195	1783	55
RTOR Reduction (vph)	0	0	0	0	0	158	0	0	0	0	0	31
Lane Group Flow (vph)	41	127	351	727	90	51	171	1754	835	195	1783	24
Confl. Peds. (#/hr)	11				11				10	10		
Heavy Vehicles (%)	0%	1%	2%	3%	2%	4%	14%	5%	4%	4%	3%	4%
Turn Type	pm+pt	NA	Free	pm+pt	NA	Perm	pm+pt	NA	Free	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		Free	8		8	2		Free	6		6
Actuated Green, G (s)	20.9	16.1	120.0	35.1	26.3	26.3	66.7	48.5	120.0	67.1	48.7	48.7
Effective Green, g (s)	20.9	19.1	120.0	35.1	29.3	29.3	66.7	51.5	120.0	67.1	51.7	51.7
Actuated g/C Ratio	0.17	0.16	1.00	0.29	0.24	0.24	0.56	0.43	1.00	0.56	0.43	0.43
Clearance Time (s)	4.0	7.0		5.0	7.0	7.0	4.0	7.0		4.0	7.0	7.0
Vehicle Extension (s)	3.0	4.0		3.0	4.0	4.0	3.0	5.0		3.0	5.0	5.0
Lane Grp Cap (vph)	223	269	1425	582	409	333	266	1908	1377	294	1952	602
v/s Ratio Prot	0.01	0.08		c0.15	0.05		0.10	c0.39		0.10	0.39	
v/s Ratio Perm	0.02		0.25	c0.22		0.04	0.26		c0.61	0.27		0.02
v/c Ratio	0.18	0.47	0.25	1.25	0.22	0.15	0.64	0.92	0.61	0.66	0.91	0.04
Uniform Delay, d1	42.0	45.9	0.0	40.4	36.2	35.6	28.1	32.3	0.0	28.8	32.0	19.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.4	1.8	0.4	125.9	0.4	0.3	5.2	8.7	2.0	5.5	8.1	0.1
Delay (s)	42.4	47.6	0.4	166.3	36.6	35.9	33.3	41.0	2.0	34.4	40.1	19.9
Level of Service	D	D	A	F	D	D	C	D	A	C	D	B
Approach Delay (s)		15.3			128.3			28.7			39.0	
Approach LOS		B			F			C			D	

Intersection Summary			
HCM 2000 Control Delay	47.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	84.2%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings

BG 2033 AM.syn

2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp

04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	→	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	2	0	165	486	31	248	0	1989	462	0	2729	6
Future Volume (vph)	2	0	165	486	31	248	0	1989	462	0	2729	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.5	3.3	3.6	3.5	3.6	3.6	3.6	3.6	3.6	3.5
Storage Length (m)	50.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Storage Lanes	1		1	1		1	0		1	0		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.91	1.00	1.00	0.86	0.86
Ped Bike Factor									0.98		1.00	
Frt			0.850			0.850			0.850			
Flt Protected	0.950			0.950	0.958							
Satd. Flow (prot)	1570	0	1395	1421	1452	1356	0	4446	1384	0	5711	0
Flt Permitted	0.950			0.950	0.958							
Satd. Flow (perm)	1570	0	1395	1421	1452	1356	0	4446	1353	0	5711	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			86			270			179			
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		142.1			192.6			324.8			275.1	
Travel Time (s)		10.2			13.9			23.4			19.8	
Confl. Peds. (#/hr)							8		5	5		8
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
Heavy Vehicles (%)	0%	0%	3%	5%	23%	6%	0%	5%	5%	0%	3%	0%
Adj. Flow (vph)	2	0	179	528	34	270	0	2162	502	0	2966	7
Shared Lane Traffic (%)				47%								
Lane Group Flow (vph)	2	0	179	280	282	270	0	2162	502	0	2973	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.3			3.3			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.19	1.14	1.16	1.19	1.14	1.16	1.14	1.14	1.14	1.14	1.14	1.16
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1		1	1		1			1			2
Detector Template	Left		Right	Left	Thru	Right		Thru	Right		Thru	
Leading Detector (m)	2.0		2.0	2.0	10.0	2.0		10.0	2.0		10.0	
Trailing Detector (m)	0.0		0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Detector 1 Position(m)	0.0		0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Detector 1 Size(m)	2.0		2.0	2.0	0.6	2.0		0.6	2.0		0.6	
Detector 1 Type	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Detector 1 Delay (s)	0.0		0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Detector 2 Position(m)					9.4			9.4			9.4	
Detector 2 Size(m)					0.6			0.6			0.6	
Detector 2 Type					Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

Lanes, Volumes, Timings

BG 2033 AM.syn

2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp

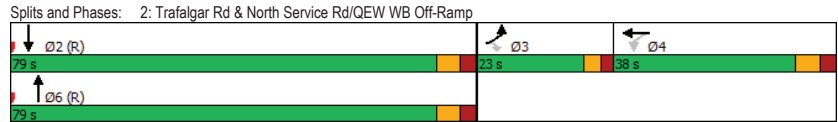
04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)								0.0			0.0	0.0
Turn Type	Prot		Perm	Perm	NA	Free		NA	Free		NA	NA
Protected Phases	3				4			4			6	2
Permitted Phases						Free			Free			
Detector Phase	3		3	4	4				6			2
Switch Phase												
Minimum Initial (s)	7.0		7.0	10.0	10.0				5.0			28.0
Minimum Split (s)	23.0		23.0	38.0	38.0				35.0			35.0
Total Split (s)	23.0		23.0	38.0	38.0				79.0			79.0
Total Split (%)	16.4%		16.4%	27.1%	27.1%				56.4%			56.4%
Maximum Green (s)	18.0		18.0	31.0	31.0				72.0			72.0
Yellow Time (s)	3.0		3.0	4.0	4.0				4.0			4.0
All-Red Time (s)	2.0		2.0	3.0	3.0				3.0			3.0
Lost Time Adjust (s)	-1.0		-3.0	-3.0	-3.0				-3.0			-3.0
Total Lost Time (s)	4.0		2.0	4.0	4.0				4.0			4.0
Lead/Lag	Lead		Lead	Lag	Lag							
Lead-Lag Optimize?	Yes		Yes	Yes	Yes							
Vehicle Extension (s)	3.0		3.0	3.0	3.0				4.5			4.5
Recall Mode	Min		Min	Min	Min				C-Min			C-Min
Walk Time (s)				7.0	7.0				7.0			7.0
Flash Dont Walk (s)				24.0	24.0				21.0			21.0
Pedestrian Calls (#/hr)				0	0				0			0
Act Effct Green (s)	14.9		16.9	32.6	32.6	140.0			80.5		140.0	80.5
Actuated g/C Ratio	0.11		0.12	0.23	0.23	1.00			0.58		1.00	0.58
v/c Ratio	0.01		0.73	0.85	0.84	0.20			0.85		0.37	0.91
Control Delay	53.0		47.7	74.1	72.3	0.3			29.0		0.4	32.4
Queue Delay	0.0		0.0	0.0	0.0	0.0			0.0		0.0	0.0
Total Delay	53.0		47.7	74.1	72.3	0.3			29.0		0.4	32.4
LOS	D		D	E	E	A			C		A	C
Approach Delay		47.8			49.6				23.6			32.4
Approach LOS		D			D				C			C
Queue Length 50th (m)	0.5		26.2	79.6	79.8	0.0			148.3		0.0	234.9
Queue Length 95th (m)	3.4		53.0	#130.7	#129.6	0.0			165.4		m0.0	#260.5
Internal Link Dist (m)		118.1			168.6				300.8			251.1
Turn Bay Length (m)	50.0											
Base Capacity (vph)	213		282	350	357	1356			2556		1353	3283
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	0.01		0.63	0.80	0.79	0.20			0.85		0.37	0.91
Intersection Summary												
Area Type:	CBD											
Cycle Length:	140											
Actuated Cycle Length:	140											
Offset:	115.4 (82%), Referenced to phase 2:SBT and 6:NBT, Start of Green											
Natural Cycle:	130											
Control Type:	Actuated-Coordinated											
Maximum v/c Ratio:	0.91											

Lanes, Volumes, Timings
2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp

BG 2033 AM.syn
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Intersection Signal Delay: 31.4 Intersection LOS: C
Intersection Capacity Utilization 81.3% ICU Level of Service D
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.



HCM Signalized Intersection Capacity Analysis
2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp

BG 2033 AM.syn
04-03-2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	2	0	165	486	31	248	0	1989	462	0	2729	6
Future Volume (vph)	2	0	165	486	31	248	0	1989	462	0	2729	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.5	3.3	3.6	3.5	3.6	3.6	3.6	3.6	3.6	3.5
Total Lost time (s)	4.0		2.0	4.0	4.0	1.0		4.0	4.0		4.0	
Lane Util. Factor	1.00		1.00	0.95	0.95	1.00		0.91	1.00		0.86	
Frpb, ped/bikes	1.00		1.00	1.00	1.00	1.00		1.00	0.98		1.00	
Flpb, ped/bikes	1.00		1.00	1.00	1.00	1.00		1.00	1.00		1.00	
Flt	1.00		0.85	1.00	1.00	0.85		1.00	0.85		1.00	
Flt Protected	0.95		1.00	0.95	0.96	1.00		1.00	1.00		1.00	
Satd. Flow (prot)	1570		1395	1421	1452	1356		4446	1353		5709	
Flt Permitted	0.95		1.00	0.95	0.96	1.00		1.00	1.00		1.00	
Satd. Flow (perm)	1570		1395	1421	1452	1356		4446	1353		5709	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	2	0	179	528	34	270	0	2162	502	0	2966	7
RTOR Reduction (vph)	0	0	76	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	2	0	103	280	282	270	0	2162	502	0	2973	0
Confl. Peds. (#/hr)							8		5	5		8
Heavy Vehicles (%)	0%	0%	3%	5%	23%	6%	0%	5%	5%	0%	3%	0%
Turn Type	Prot		Perm	Perm	NA	Free		NA	Free		NA	
Protected Phases	3				4			6			2	
Permitted Phases			3	4		Free			Free			
Actuated Green, G (s)	13.9		13.9	29.6	29.6	140.0		77.5	140.0		77.5	
Effective Green, g (s)	14.9		16.9	32.6	32.6	140.0		80.5	140.0		80.5	
Actuated g/C Ratio	0.11		0.12	0.23	0.23	1.00		0.58	1.00		0.58	
Clearance Time (s)	5.0		5.0	7.0	7.0			7.0			7.0	
Vehicle Extension (s)	3.0		3.0	3.0	3.0			4.5			4.5	
Lane Grp Cap (vph)	167		168	330	338	1356		2556	1353		3282	
v/s Ratio Prot	0.00							0.49			c0.52	
v/s Ratio Perm			c0.07	c0.20	0.19	0.20			0.37			
v/c Ratio	0.01		0.62	0.85	0.83	0.20		0.85	0.37		0.91	
Uniform Delay, d1	56.0		58.5	51.3	51.1	0.0		24.6	0.0		26.4	
Progression Factor	1.00		1.00	1.00	1.00	1.00		1.03	1.00		1.00	
Incremental Delay, d2	0.0		6.5	18.0	16.1	0.3		2.0	0.4		4.7	
Delay (s)	56.0		65.0	69.3	67.2	0.3		27.3	0.4		31.1	
Level of Service	E		E	E	E	A		C	A		C	
Approach Delay (s)		64.9			46.2			22.2			31.1	
Approach LOS		E			D			C			C	
Intersection Summary												
HCM 2000 Control Delay			30.4					HCM 2000 Level of Service			C	
HCM 2000 Volume to Capacity ratio			0.86									
Actuated Cycle Length (s)			140.0					Sum of lost time (s)			12.0	
Intersection Capacity Utilization			81.3%					ICU Level of Service			D	
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
3: Trafalgar Rd & QEW EB-Off Ramp

BG 2033 AM.syn
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Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔↔	↔		↑↑↑	↑↑↑	↔
Traffic Volume (vph)	868	767	0	1607	1766	458
Future Volume (vph)	868	767	0	1607	1766	458
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.5	3.6	3.6	3.6	3.6
Lane Util. Factor	0.97	1.00	1.00	0.91	0.91	1.00
Frt		0.850				0.850
Flt Protected	0.950					
Satd. Flow (prot)	2958	1423	0	4404	4489	1454
Flt Permitted	0.950					
Satd. Flow (perm)	2958	1423	0	4404	4489	1454
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		2				200
Link Speed (k/h)	50			50	50	
Link Distance (m)	199.2			51.4	324.8	
Travel Time (s)	14.3			3.7	23.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	1%	0%	6%	4%	0%
Adj. Flow (vph)	943	834	0	1747	1920	498
Shared Lane Traffic (%)						
Lane Group Flow (vph)	943	834	0	1747	1920	498
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	6.6			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.19	1.16	1.14	1.14	1.14	1.14
Turning Speed (k/h)	24	14	24			14
Number of Detectors	1	1		2	2	1
Detector Template	Left	Right		Thru	Thru	Right
Leading Detector (m)	2.0	2.0		10.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	2.0	2.0		0.6	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)				9.4	9.4	
Detector 2 Size(m)				0.6	0.6	
Detector 2 Type				Cl+Ex	Cl+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Perm	Perm		NA	NA	Free
Protected Phases				2	2	
Permitted Phases	4	4				Free
Detector Phase	4	4		2	2	

Lanes, Volumes, Timings
3: Trafalgar Rd & QEW EB-Off Ramp

BG 2033 AM.syn
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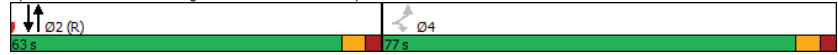
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Switch Phase						
Minimum Initial (s)	10.0	10.0		29.0	29.0	
Minimum Split (s)	38.0	38.0		36.0	36.0	
Total Split (s)	77.0	77.0		63.0	63.0	
Total Split (%)	55.0%	55.0%		45.0%	45.0%	
Maximum Green (s)	70.0	70.0		56.0	56.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	
All-Red Time (s)	3.0	3.0		3.0	3.0	
Lost Time Adjust (s)	-3.0	-3.0		-3.0	-3.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Recall Mode	None	None		C-Max	C-Max	
Walk Time (s)	7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	24.0	24.0		22.0	22.0	
Pedestrian Calls (#/hr)	0	0		0	0	
Act Effct Green (s)	73.0	73.0		59.0	59.0	140.0
Actuated g/C Ratio	0.52	0.52		0.42	0.42	1.00
v/c Ratio	0.61	1.12		0.94	1.02	0.34
Control Delay	25.7	104.9		42.8	48.0	0.3
Queue Delay	0.0	0.0		0.0	0.0	0.0
Total Delay	25.7	104.9		42.8	48.0	0.3
LOS	C	F		D	D	A
Approach Delay	62.9			42.8	38.2	
Approach LOS	E			D	D	
Queue Length 50th (m)	96.7	~280.2		144.9	~191.0	0.0
Queue Length 95th (m)	118.7	#362.4		m138.8	#243.4	m0.0
Internal Link Dist (m)	175.2			27.4	300.8	
Turn Bay Length (m)						
Base Capacity (vph)	1542	742		1855	1891	1454
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	0.61	1.12		0.94	1.02	0.34
Intersection Summary						
Area Type:	CBD					
Cycle Length:	140					
Actuated Cycle Length:	140					
Offset:	133.6 (95%), Referenced to phase 2.NBSB and 6.; Start of Green					
Natural Cycle:	75					
Control Type:	Actuated-Coordinated					
Maximum v/c Ratio:	1.12					
Intersection Signal Delay:	46.9					
Intersection Capacity Utilization:	97.3%					
ICU Level of Service F						
Analysis Period (min)	15					
~ Volume exceeds capacity, queue is theoretically infinite.						
Queue shown is maximum after two cycles.						

Lanes, Volumes, Timings
3: Trafalgar Rd & QEW EB-Off Ramp

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- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Trafalgar Rd & QEW EB-Off Ramp



HCM Signalized Intersection Capacity Analysis
3: Trafalgar Rd & QEW EB-Off Ramp

BG 2033 AM.syn
04-03-2024



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔↔	↔		↕↕	↕↕	↔
Traffic Volume (vph)	868	767	0	1607	1766	458
Future Volume (vph)	868	767	0	1607	1766	458
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.5	3.6	3.6	3.6	3.6
Total Lost time (s)	4.0	4.0		4.0	4.0	1.0
Lane Util. Factor	0.97	1.00		0.91	0.91	1.00
Frt	1.00	0.85		1.00	1.00	0.85
Flt Protected	0.95	1.00		1.00	1.00	1.00
Satd. Flow (prot)	2958	1423		4404	4489	1454
Flt Permitted	0.95	1.00		1.00	1.00	1.00
Satd. Flow (perm)	2958	1423		4404	4489	1454
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	943	834	0	1747	1920	498
RTOR Reduction (vph)	0	1	0	0	0	0
Lane Group Flow (vph)	943	833	0	1747	1920	498
Heavy Vehicles (%)	3%	1%	0%	6%	4%	0%
Turn Type	Perm	Perm		NA	NA	Free
Protected Phases				2	2	
Permitted Phases	4	4				Free
Actuated Green, G (s)	70.0	70.0		56.0	56.0	140.0
Effective Green, g (s)	73.0	73.0		59.0	59.0	140.0
Actuated g/C Ratio	0.52	0.52		0.42	0.42	1.00
Clearance Time (s)	7.0	7.0		7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	1542	741		1855	1891	1454
v/s Ratio Prot				0.40	c0.43	
v/s Ratio Perm	0.32	c0.59				0.34
v/c Ratio	0.61	1.12		0.94	1.02	0.34
Uniform Delay, d1	23.5	33.5		38.9	40.5	0.0
Progression Factor	1.00	1.00		0.93	0.73	1.00
Incremental Delay, d2	0.7	72.8		6.4	17.9	0.3
Delay (s)	24.3	106.3		42.6	47.6	0.3
Level of Service	C	F		D	D	A
Approach Delay (s)	62.8			42.6	37.9	
Approach LOS	E			D	D	

Intersection Summary			
HCM 2000 Control Delay	46.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.10		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	97.3%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
4: Trafalgar Rd & Argus Rd

BG 2033 AM.syn
04-03-2024

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	162	0	2404	2028	533
Future Volume (vph)	0	162	0	2404	2028	533
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.6	3.5	3.6	3.6	3.6	3.6
Lane Util. Factor	1.00	1.00	1.00	0.91	0.91	0.91
Ped Bike Factor						
Frt		0.865			0.969	
Fit Protected						
Satd. Flow (prot)	0	1367	0	4363	4367	0
Fit Permitted						
Satd. Flow (perm)	0	1367	0	4363	4367	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	145.7			270.2	51.4	
Travel Time (s)	10.5			19.5	3.7	
Confl. Peds. (#/hr)						11
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	7%	0%	7%	4%	2%
Adj. Flow (vph)	0	176	0	2613	2204	579
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	176	0	2613	2783	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			3.3	3.3	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.14	1.16	1.14	1.14	1.14	1.14
Turning Speed (k/h)	24	14	24			14
Sign Control	Stop			Free	Free	

Intersection Summary	
Area Type:	CBD
Control Type:	Unsignalized
Intersection Capacity Utilization	74.8%
ICU Level of Service	D
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis
4: Trafalgar Rd & Argus Rd

BG 2033 AM.syn
04-03-2024

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	162	0	2404	2028	533
Future Volume (Veh/h)	0	162	0	2404	2028	533
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	176	0	2613	2204	579
Pedestrians	11					
Lane Width (m)	3.5					
Walking Speed (m/s)	1.2					
Percent Blockage	1					
Right turn flare (veh)						
Median type			None	None		
Median storage (veh)						
Upstream signal (m)				270	52	
pX, platoon unblocked	0.71	0.59	0.59			
vC, conflicting volume	3376	1035	2794			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	523	0	1587			
tC, single (s)	6.8	7.0	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.4	2.2			
p0 queue free %	100	72	100			
cM capacity (veh/h)	345	620	243			

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	176	871	871	871	882	882	1020
Volume Left	0	0	0	0	0	0	0
Volume Right	176	0	0	0	0	0	579
eSH	620	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.28	0.51	0.51	0.51	0.52	0.52	0.60
Queue Length 95th (m)	9.3	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (s)	13.1	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	B						
Approach Delay (s)	13.1	0.0			0.0		
Approach LOS	B						

Intersection Summary	
Average Delay	0.4
Intersection Capacity Utilization	74.8%
ICU Level of Service	D
Analysis Period (min)	15

Lanes, Volumes, Timings

BG 2033 AM.syn

5: Trafalgar Rd & Cross Ave/South Service Rd

04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	808	90	160	42	50	106	138	1224	27	211	1633	255
Future Volume (vph)	808	90	160	42	50	106	138	1224	27	211	1633	255
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.6	3.3	3.6	3.5	3.3	3.6	3.6	3.3	3.6	3.6
Storage Length (m)	130.0	0.0	25.0	0.0	50.0	0.0	25.0	0.0	25.0	0.0	0.0	0.0
Storage Lanes	1	0	1	1	1	1	1	0	1	1	0	0
Taper Length (m)	7.5		7.5		7.5		7.5		7.5		7.5	
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.91	0.91
Ped Bike Factor	1.00	0.99		0.99		0.99		1.00		1.00		1.00
Frt	0.904					0.850		0.997		0.980		
Fit Protected	0.950			0.950		0.950		0.950		0.950		
Satd. Flow (prot)	2795	1388	0	1525	1583	1382	1428	4500	0	1525	4415	0
Fit Permitted	0.950			0.592		0.850		0.997		0.980		
Satd. Flow (perm)	2789	1388	0	944	1583	1362	125	4500	0	122	4415	0
Right Turn on Red			Yes			Yes		Yes			Yes	
Satd. Flow (RTOR)		67				179		2			25	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		151.2			330.4			150.2			270.2	
Travel Time (s)		10.9			23.8			10.8			19.5	
Confl. Peds. (#/hr)	1		4	4		1	10		52	52		10
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
Heavy Vehicles (%)	9%	6%	12%	3%	8%	4%	10%	3%	0%	3%	3%	4%
Adj. Flow (vph)	878	98	174	46	54	115	150	1330	29	229	1775	277
Shared Lane Traffic (%)												
Lane Group Flow (vph)	878	272	0	46	54	115	150	1359	0	229	2052	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		6.6			6.6			3.3			3.3	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.19	1.14	1.14	1.19	1.14	1.16	1.19	1.14	1.14	1.19	1.14	1.14
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2	1	1		1	2		2
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

Lanes, Volumes, Timings

BG 2033 AM.syn

5: Trafalgar Rd & Cross Ave/South Service Rd

04-03-2024

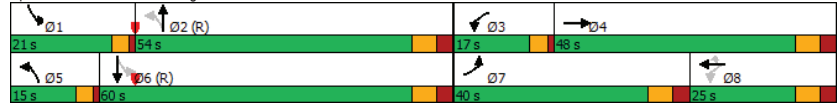
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases				8		8	2			6		
Detector Phases	7	4		3	8	8	5	2		1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		12.0	10.0	10.0	7.0	27.0		7.0	27.0	
Minimum Split (s)	17.0	25.0		17.0	25.0	25.0	11.5	34.0		11.5	34.0	
Total Split (s)	40.0	48.0		17.0	25.0	25.0	15.0	54.0		21.0	60.0	
Total Split (%)	28.6%	34.3%		12.1%	17.9%	17.9%	10.7%	38.6%		15.0%	42.9%	
Maximum Green (s)	33.0	41.0		13.0	18.0	18.0	11.0	47.0		17.0	53.0	
Yellow Time (s)	4.0	4.0		3.0	4.0	4.0	3.0	4.0		3.0	4.0	
All-Red Time (s)	3.0	3.0		1.0	3.0	3.0	1.0	3.0		1.0	3.0	
Lost Time Adjust (s)	-3.0	-3.0		0.0	-3.0	-3.0	0.0	-3.0		0.0	-3.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	4.0		3.5	4.0	4.0	3.0	5.0		3.0	5.0	
Recall Mode	Min	Min		Min	Min	Min	Min	C-Max		Min	C-Max	
Walk Time (s)		7.0			7.0	7.0		7.0			7.0	
Flash Dont Walk (s)		11.0			11.0	11.0		11.0			11.0	
Pedestrian Calls (#/hr)		0			0	0		0			0	
Act Effct Green (s)	36.0	38.8		26.8	14.8	14.8	67.0	51.3		77.2	57.5	
Actuated g/C Ratio	0.26	0.28		0.19	0.11	0.11	0.48	0.37		0.55	0.41	
v/c Ratio	1.22	0.63		0.20	0.32	0.38	0.73	0.82		0.80	1.12	
Control Delay	156.2	39.8		31.2	62.7	4.1	51.2	52.2		47.7	99.5	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	156.2	39.8		31.2	62.7	4.1	51.2	52.2		47.7	99.5	
LOS	F	D		C	E	A	D	D		D	F	
Approach Delay		128.6			24.6			52.1			94.3	
Approach LOS		F			C			D			F	
Queue Length 50th (m)	~161.6	53.3		8.4	14.9	0.0	34.6	113.6		52.1	~252.8	
Queue Length 95th (m)	#203.7	82.7		16.7	28.6	1.3	m42.7	m120.0		m53.1	m#237.1	
Internal Link Dist (m)		127.2			306.4			126.2			246.2	
Turn Bay Length (m)	130.0			25.0			50.0			25.0		
Base Capacity (vph)	718	482		241	237	356	205	1649		286	1828	
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	
Reduced v/c Ratio	1.22	0.56		0.19	0.23	0.32	0.73	0.82		0.80	1.12	
Intersection Summary												
Area Type:	CBD											
Cycle Length:	140											
Actuated Cycle Length:	140											
Offset:	128 (91%), Referenced to phase 2:NBT and 6:SBTL, Start of Green											
Natural Cycle:	150											
Control Type:	Actuated-Coordinated											
Maximum v/c Ratio:	1.22											

Lanes, Volumes, Timings
5: Trafalgar Rd & Cross Ave/South Service Rd

BG 2033 AM.syn
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Intersection Signal Delay: 86.7 Intersection LOS: F
Intersection Capacity Utilization 97.5% ICU Level of Service F
Analysis Period (min) 15
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: Trafalgar Rd & Cross Ave/South Service Rd



HCM Signalized Intersection Capacity Analysis
5: Trafalgar Rd & Cross Ave/South Service Rd

BG 2033 AM.syn
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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔		↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	808	90	160	42	50	106	138	1224	27	211	1633	255
Future Volume (vph)	808	90	160	42	50	106	138	1224	27	211	1633	255
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.3	3.6	3.5	3.3	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	1.00		1.00	1.00	1.00	1.00	0.91		1.00	0.91	
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.99	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	1.00	
Frt	1.00	0.90		1.00	1.00	0.85	1.00	1.00		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	2795	1388		1519	1583	1362	1428	4500		1525	4414	
Flt Permitted	0.95	1.00		0.59	1.00	1.00	0.08	1.00		0.08	1.00	
Satd. Flow (perm)	2795	1388		947	1583	1362	124	4500		123	4414	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	878	98	174	46	54	115	150	1330	29	229	1775	277
RTOR Reduction (vph)	0	48	0	0	0	103	0	1	0	0	15	0
Lane Group Flow (vph)	878	224	0	46	54	12	150	1358	0	229	2037	0
Confl. Peds. (#/hr)	1		4	4		1	10		52	52		10
Heavy Vehicles (%)	9%	6%	12%	3%	8%	4%	10%	3%	0%	3%	3%	4%
Turn Type	Prot	NA		pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases				8		8	2			6		
Actuated Green, G (s)	33.0	35.8		23.8	11.8	11.8	64.0	48.3		74.2	54.5	
Effective Green, g (s)	36.0	38.8		23.8	14.8	14.8	64.0	51.3		74.2	57.5	
Actuated g/C Ratio	0.26	0.28		0.17	0.11	0.11	0.46	0.37		0.53	0.41	
Clearance Time (s)	7.0	7.0		4.0	7.0	7.0	4.0	7.0		4.0	7.0	
Vehicle Extension (s)	3.0	4.0		3.5	4.0	4.0	3.0	5.0		3.0	5.0	
Lane Grp Cap (vph)	718	384		210	167	143	202	1648		284	1812	
v/s Ratio Prot	c0.31	c0.16		0.02	0.03		0.08	0.30		c0.13	c0.46	
v/s Ratio Perm				0.02		0.01	0.25			0.30		
v/c Ratio	1.22	0.58		0.22	0.32	0.09	0.74	0.82		0.81	1.12	
Uniform Delay, d1	52.0	43.6		49.7	58.0	56.5	35.8	40.2		39.9	41.2	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.20	1.21		1.14	1.12	
Incremental Delay, d2	112.5	2.7		0.6	1.5	0.4	8.0	2.7		5.2	58.6	
Delay (s)	164.5	46.3		50.4	59.5	56.8	50.9	51.6		50.6	104.6	
Level of Service	F	D		D	E	E	D	D		D	F	
Approach Delay (s)		136.6			56.1			51.5			99.2	
Approach LOS		F			E			D			F	
Intersection Summary												
HCM 2000 Control Delay			91.8									F
HCM 2000 Volume to Capacity ratio			1.07									
Actuated Cycle Length (s)			140.0			Sum of lost time (s)		16.0				
Intersection Capacity Utilization			97.5%			ICU Level of Service		F				
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
6: Trafalgar Rd & Cornwall Rd

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	320	495	87	67	562	519	108	538	73	752	828	258
Future Volume (vph)	320	495	87	67	562	519	108	538	73	752	828	258
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.5
Storage Length (m)	80.0	0.0	80.0	0.0	25.0	0.0	80.0	0.0	80.0	0.0	0.0	0.0
Storage Lanes	2	0	1	1	1	1	0	1	0	1	1	1
Taper Length (m)	7.5		7.5		7.5		7.5		7.5		7.5	
Lane Util. Factor	0.97	0.95	0.95	1.00	0.95	1.00	1.00	*0.80	0.95	0.97	*0.80	1.00
Ped Bike Factor	0.99	0.99		0.99		0.98	1.00	1.00		0.98		0.98
Frt		0.977				0.850		0.982				0.850
Flt Protected	0.950		0.950		0.950		0.950		0.950		0.950	
Satd. Flow (prot)	2987	3049	0	1481	3154	1411	1540	2652	0	2929	1341	1356
Flt Permitted	0.950		0.950		0.950		0.950		0.950		0.950	
Satd. Flow (perm)	2942	3049	0	1471	3154	1384	1534	2652	0	2883	1341	1324
Right Turn on Red			Yes			Yes		Yes		Yes		Yes
Satd. Flow (RTOR)		14				495		8				179
Link Speed (k/h)		50			50			50				50
Link Distance (m)		285.8			142.3			311.4				130.3
Travel Time (s)		20.6			10.2			22.4				9.4
Confl. Peds. (#/hr)	25		7	7		25	9		18	18		9
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
Heavy Vehicles (%)	2%	4%	1%	6%	3%	3%	2%	1%	0%	4%	2%	6%
Adj. Flow (vph)	348	538	95	73	611	564	117	585	79	817	900	280
Shared Lane Traffic (%)												
Lane Group Flow (vph)	348	633	0	73	611	564	117	664	0	817	900	280
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		6.6			6.6			6.6			6.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.19	1.14	1.14	1.19	1.14	1.14	1.19	1.14	1.14	1.19	1.14	1.16
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2	1	1	2		1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0		2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6		2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

Lanes, Volumes, Timings
6: Trafalgar Rd & Cornwall Rd

BG 2033 AM.syn
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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA	Free	Prot	NA		Prot	NA	Perm
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases					Free							6
Detector Phases	3	8		7	4		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	7.0	10.0		7.0	10.0		7.0	20.0		7.0	20.0	20.0
Minimum Split (s)	12.0	37.0		12.0	37.0		12.0	39.0		12.0	39.0	39.0
Total Split (s)	16.0	39.0		14.0	37.0		12.0	43.0		44.0	75.0	75.0
Total Split (%)	11.4%	27.9%		10.0%	26.4%		8.6%	30.7%		31.4%	53.6%	53.6%
Maximum Green (s)	11.0	32.0		9.0	30.0		7.0	36.0		39.0	68.0	68.0
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	4.0
All-Red Time (s)	2.0	3.0		2.0	3.0		2.0	3.0		2.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-3.0		-1.0	-3.0		-1.0	-3.0		-1.0	-3.0	-3.0
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	0.2	0.2		0.2	0.2		0.2	0.2		0.2	0.2	0.2
Recall Mode	Max	Max		Max	Max		None	C-Max		Max	C-Max	C-Max
Walk Time (s)		7.0			7.0			7.0			7.0	7.0
Flash Dont Walk (s)		23.0			23.0			25.0			25.0	25.0
Pedestrian Calls (#/hr)		0			0			0			0	0
Act Effct Green (s)	12.0	35.0		10.0	33.0	140.0	8.0	39.0		40.0	71.0	71.0
Actuated g/C Ratio	0.09	0.25		0.07	0.24	1.00	0.06	0.28		0.29	0.51	0.51
v/c Ratio	1.36	0.82		0.70	0.82	0.41	1.33	0.89		0.98	1.32	0.37
Control Delay	231.1	58.3		95.4	61.1	0.9	255.4	63.4		83.5	176.2	9.5
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	231.1	58.3		95.4	61.1	0.9	255.4	63.4		83.5	176.2	9.5
LOS	F	E		F	E	A	F	E		F	F	A
Approach Delay		119.6			35.9			92.2			114.9	
Approach LOS		F			D			F			F	
Queue Length 50th (m)	-68.5	90.3		21.2	89.5	0.0	-44.2	115.4		130.8	-413.6	19.0
Queue Length 95th (m)	#101.5	114.6		#46.6	113.2	0.0	#85.9	#157.3		m120.6m#359.6	m17.2	
Internal Link Dist (m)		261.8			118.3			287.4			106.3	
Turn Bay Length (m)	80.0			80.0		25.0		80.0			80.0	
Base Capacity (vph)	256	772		105	743	1384	88	744		836	680	759
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	0
Reduced v/c Ratio	1.36	0.82		0.70	0.82	0.41	1.33	0.89		0.98	1.32	0.37

Intersection Summary

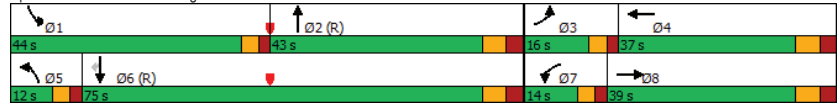
Area Type:	CBD
Cycle Length:	140
Actuated Cycle Length:	140
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green, Master Intersection	
Natural Cycle:	150
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	1.36

Lanes, Volumes, Timings
6: Trafalgar Rd & Cornwall Rd

BG 2033 AM.syn
04-03-2024

Intersection Signal Delay: 92.6	Intersection LOS: F
Intersection Capacity Utilization 103.5%	ICU Level of Service G
Analysis Period (min) 15	
* User Entered Value	
~ Volume exceeds capacity, queue is theoretically infinite. Queue shown is maximum after two cycles.	
# 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.	
m Volume for 95th percentile queue is metered by upstream signal.	

Splits and Phases: 6: Trafalgar Rd & Cornwall Rd



HCM Signalized Intersection Capacity Analysis
6: Trafalgar Rd & Cornwall Rd

BG 2033 AM.syn
04-03-2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↕	↔	↕	↔	↔	↕	↕
Traffic Volume (vph)	320	495	87	67	562	519	108	538	73	752	828	258
Future Volume (vph)	320	495	87	67	562	519	108	538	73	752	828	258
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.5
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.97	0.95		1.00	0.95	1.00	1.00	*0.80		0.97	*0.80	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.98	1.00	1.00		1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	2987	3050		1481	3154	1384	1540	2653		2929	1341	1324
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	2987	3050		1481	3154	1384	1540	2653		2929	1341	1324
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	348	538	95	73	611	564	117	585	79	817	900	280
RTOR Reduction (vph)	0	11	0	0	0	0	0	6	0	0	0	88
Lane Group Flow (vph)	348	623	0	73	611	564	117	658	0	817	900	192
Confl. Peds. (#/hr)	25		7	7		25	9		18	18		9
Heavy Vehicles (%)	2%	4%	1%	6%	3%	3%	2%	1%	0%	4%	2%	6%
Turn Type	Prot	NA		Prot	NA	Free	Prot	NA		Prot	NA	Perm
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases						Free						6
Actuated Green, G (s)	11.0	32.0		9.0	30.0	140.0	7.0	36.0		39.0	68.0	68.0
Effective Green, g (s)	12.0	35.0		10.0	33.0	140.0	8.0	39.0		40.0	71.0	71.0
Actuated g/C Ratio	0.09	0.25		0.07	0.24	1.00	0.06	0.28		0.29	0.51	0.51
Clearance Time (s)	5.0	7.0		5.0	7.0		5.0	7.0		5.0	7.0	7.0
Vehicle Extension (s)	0.2	0.2		0.2	0.2		0.2	0.2		0.2	0.2	0.2
Lane Grp Cap (vph)	256	762		105	743	1384	88	739		836	680	671
v/s Ratio Prot	c0.12	c0.20		0.05	0.19		c0.08	0.25		0.28	c0.67	
v/s Ratio Perm						c0.41						0.14
v/c Ratio	1.36	0.82		0.70	0.82	0.41	1.33	0.89		0.98	1.32	0.29
Uniform Delay, d1	64.0	49.5		63.5	50.7	0.0	66.0	48.5		49.5	34.5	19.9
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.62	0.94	1.30
Incremental Delay, d2	185.0	9.5		31.8	10.0	0.9	207.3	15.2		5.4	146.6	0.1
Delay (s)	249.0	58.9		95.3	60.7	0.9	273.3	63.6		85.9	179.0	26.0
Level of Service	F	E		F	E	A	F	E		F	F	C
Approach Delay (s)	126.3			35.7			95.0			119.4		
Approach LOS	F			D			F			F		
Intersection Summary												
HCM 2000 Control Delay	96.1			HCM 2000 Level of Service		F						
HCM 2000 Volume to Capacity ratio	1.21											
Actuated Cycle Length (s)	140.0			Sum of lost time (s)		16.0						
Intersection Capacity Utilization	103.5%			ICU Level of Service		G						
Analysis Period (min)	15											
c Critical Lane Group												

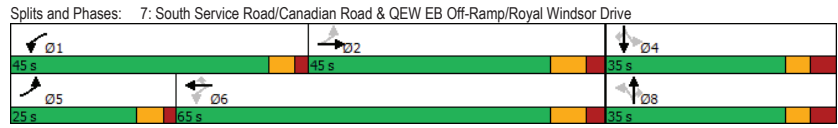
Lanes, Volumes, Timings
 7: South Service Road/Canadian Road & QEW EB Off-Ramp/Royal Windsor Drive 04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	46	571	31	93	563	7	2	9	52	4	20	30
Future Volume (vph)	46	571	31	93	563	7	2	9	52	4	20	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	150.0	0.0	155.0		70.0	15.0			0.0	0.0		30.0
Storage Lanes	2	0	1		1	1			1	1		1
Taper Length (m)	7.5		7.5		7.5				7.5			7.5
Lane Util. Factor	0.97	0.95	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr		0.992				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3400	3300	0	1719	3139	1380	1805	1667	1468	1805	1792	1495
Flt Permitted	0.401			0.380			0.743			0.751		
Satd. Flow (perm)	1435	3300	0	688	3139	1380	1412	1667	1468	1427	1792	1495
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5				94			152			152
Link Speed (k/h)	80			80			60					40
Link Distance (m)	324.5			247.2			158.7					215.5
Travel Time (s)	14.6			11.1			9.5					19.4
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
Heavy Vehicles (%)	3%	9%	0%	5%	15%	17%	0%	14%	10%	0%	6%	8%
Adj. Flow (vph)	50	621	34	101	612	8	2	10	57	4	22	33
Shared Lane Traffic (%)												
Lane Group Flow (vph)	50	655	0	101	612	8	2	10	57	4	22	33
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Right	Left	Left	Right	Right
Median Width(m)	7.2			7.2			3.6					3.6
Link Offset(m)	0.0			0.0			0.0					0.0
Crosswalk Width(m)	4.8			4.8			4.8					4.8
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	CI+Ex	CI+Ex		CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4				9.4
Detector 2 Size(m)		0.6			0.6			0.6				0.6
Detector 2 Type		CI+Ex			CI+Ex			CI+Ex				CI+Ex
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8				4

Lanes, Volumes, Timings
 7: South Service Road/Canadian Road & QEW EB Off-Ramp/Royal Windsor Drive 04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	2			6		6	8		8	4		4
Detector Phase	5	2		1	6	6	8	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	8.0	20.0		8.0	30.0	30.0	8.0	8.0	8.0	10.0	10.0	10.0
Minimum Split (s)	14.0	34.0		14.0	38.4	38.4	28.8	28.8	28.8	35.0	35.0	35.0
Total Split (s)	25.0	45.0		45.0	65.0	65.0	35.0	35.0	35.0	35.0	35.0	35.0
Total Split (%)	20.0%	36.0%		36.0%	52.0%	52.0%	28.0%	28.0%	28.0%	28.0%	28.0%	28.0%
Maximum Green (s)	19.0	36.6		39.0	56.6	56.6	27.2	27.2	27.2	27.2	27.2	27.2
Yellow Time (s)	4.0	5.4		4.0	5.4	5.4	3.7	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	2.0	3.0		2.0	3.0	3.0	4.1	4.1	4.1	4.1	4.1	4.1
Lost Time Adjust (s)	-2.0	-4.4		-2.0	-4.4	-4.4	-3.8	-3.8	-3.8	-3.8	-3.8	-3.8
Total Lost Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lead	Lag		Lead	Lag	Lag						
Lead-Lag Optimize?												
Vehicle Extension (s)	3.5	4.5		3.5	6.0	6.0	3.5	3.5	3.5	3.5	3.5	3.5
Recall Mode	None	Max		None	Max	Max	None	None	None	None	None	None
Walk Time (s)	10.0			10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Flash Dont Walk (s)		10.0			10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Pedestrian Calls (#/hr)		0			0	0	0	0	0	0	0	0
Act Effct Green (s)	72.5	65.7		72.6	65.8	65.8	13.4	13.4	13.4	13.9	13.9	13.9
Actuated g/C Ratio	0.78	0.70		0.78	0.70	0.70	0.14	0.14	0.14	0.15	0.15	0.15
v/c Ratio	0.04	0.28		0.16	0.28	0.01	0.01	0.04	0.17	0.02	0.08	0.09
Control Delay	2.7	7.6		3.2	7.6	0.0	36.0	36.4	1.1	36.0	37.0	0.5
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	2.7	7.6		3.2	7.6	0.0	36.0	36.4	1.1	36.0	37.0	0.5
LOS	A	A		A	A	A	D	D	A	D	D	A
Approach Delay		7.3			6.9			7.2				16.6
Approach LOS		A			A			A				B
Queue Length 50th (m)	0.9	28.2		3.8	26.5	0.0	0.3	1.7	0.0	0.7	3.8	0.0
Queue Length 95th (m)	2.0	38.2		7.1	35.8	0.0	2.4	6.7	0.0	3.8	11.0	0.0
Internal Link Dist (m)		300.5			223.2			134.7				191.5
Turn Bay Length (m)	150.0			155.0		70.0	15.0					30.0
Base Capacity (vph)	1606	2323		1011	2210	999	471	555	591	475	597	600
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.28		0.10	0.28	0.01	0.00	0.02	0.10	0.01	0.04	0.06
Intersection Summary												
Area Type:	Other											
Cycle Length:	125											
Actuated Cycle Length:	93.4											
Natural Cycle:	90											
Control Type:	Semi Act-Uncoord											
Maximum v/c Ratio:	0.28											
Intersection Signal Delay:	7.5											
Intersection Capacity Utilization:	50.0%						Intersection LOS: A					
Analysis Period (min):	15											
ICU Level of Service:	A											

Lanes, Volumes, Timings BG 2033 AM.syn
04-03-2024
7: South Service Road/Canadian Road & QEW EB Off-Ramp/Royal Windsor Drive



HCM Signalized Intersection Capacity Analysis BG 2033 AM.syn
04-03-2024
7: South Service Road/Canadian Road & QEW EB Off-Ramp/Royal Windsor Drive

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	↖	→	↘	↖	→	↘	↖	→	↘	↖	→	↘
Lane Configurations	↖↗	↖↗	↖↗	↖↗	↖↗	↖↗	↖↗	↖↗	↖↗	↖↗	↖↗	↖↗
Traffic Volume (vph)	46	571	31	93	563	7	2	9	52	4	20	30
Future Volume (vph)	46	571	31	93	563	7	2	9	52	4	20	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	0.95		1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Fit Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3400	3300		1719	3139	1380	1805	1667	1468	1805	1792	1495
Fit Permitted	0.40	1.00		0.38	1.00	1.00	0.74	1.00	1.00	0.75	1.00	1.00
Satd. Flow (perm)	1434	3300		688	3139	1380	1412	1667	1468	1427	1792	1495
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	50	621	34	101	612	8	2	10	57	4	22	33
RTOR Reduction (vph)	0	2	0	0	0	3	0	0	50	0	0	29
Lane Group Flow (vph)	50	653	0	101	612	5	2	10	7	4	22	4
Heavy Vehicles (%)	3%	9%	0%	5%	15%	17%	0%	14%	10%	0%	6%	8%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6		6	8		8	4		4
Actuated Green, G (s)	66.6	60.4		66.6	60.4	60.4	7.7	7.7	7.7	7.7	7.7	7.7
Effective Green, g (s)	70.6	64.8		70.6	64.8	64.8	11.5	11.5	11.5	11.5	11.5	11.5
Actuated g/C Ratio	0.73	0.67		0.73	0.67	0.67	0.12	0.12	0.12	0.12	0.12	0.12
Clearance Time (s)	6.0	8.4		6.0	8.4	8.4	7.8	7.8	7.8	7.8	7.8	7.8
Vehicle Extension (s)	3.5	4.5		3.5	6.0	6.0	3.5	3.5	3.5	3.5	3.5	3.5
Lane Grp Cap (vph)	1216	2215		590	2107	926	168	198	174	170	213	178
v/s Ratio Prot	0.00	c0.20		c0.01	0.19			0.01			c0.01	
v/s Ratio Perm	0.03			0.11		0.00	0.00		0.00	0.00		0.00
v/c Ratio	0.04	0.29		0.17	0.29	0.01	0.01	0.05	0.04	0.02	0.10	0.02
Uniform Delay, d1	3.6	6.5		3.8	6.5	5.2	37.5	37.7	37.6	37.5	37.9	37.5
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.0	0.3		0.2	0.3	0.0	0.0	0.1	0.1	0.1	0.3	0.1
Delay (s)	3.6	6.8		3.9	6.8	5.2	37.5	37.8	37.7	37.6	38.2	37.6
Level of Service	A	A		A	A	A	D	D	D	D	D	D
Approach Delay (s)		6.6			6.4			37.7				37.8
Approach LOS		A			A			D				D
Intersection Summary												
HCM 2000 Control Delay			9.1	HCM 2000 Level of Service				A				
HCM 2000 Volume to Capacity ratio			0.26									
Actuated Cycle Length (s)			96.5	Sum of lost time (s)				12.0				
Intersection Capacity Utilization			50.0%	ICU Level of Service				A				
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
8: QEW WB Off-Ramp & Kerr Street

BG 2033 AM.syn
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Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔↔			↔↔	↔↔	↔↔
Traffic Volume (vph)	489	0	0	297	261	290
Future Volume (vph)	489	0	0	297	261	290
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)		0.0	0.0		0.0	140.0
Storage Lanes		0	0		1	1
Taper Length (m)			7.5		7.5	
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00
Frt						0.850
Flt Protected					0.950	
Satd. Flow (prot)	3539	0	0	3539	1770	1583
Flt Permitted					0.950	
Satd. Flow (perm)	3539	0	0	3539	1770	1583
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)						191
Link Speed (k/h)	60			60	40	
Link Distance (m)	128.8			184.7	258.8	
Travel Time (s)	7.7			11.1	23.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	532	0	0	323	284	315
Shared Lane Traffic (%)						
Lane Group Flow (vph)	532	0	0	323	284	315
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)		15	25		25	15
Turn Type	NA			NA	Prot	Perm
Protected Phases	4			8	2	
Permitted Phases						2
Minimum Split (s)	22.5			22.5	22.5	22.5
Total Split (s)	22.5			22.5	22.5	22.5
Total Split (%)	50.0%			50.0%	50.0%	50.0%
Maximum Green (s)	18.0			18.0	18.0	18.0
Yellow Time (s)	3.5			3.5	3.5	3.5
All-Red Time (s)	1.0			1.0	1.0	1.0
Lost Time Adjust (s)	0.0			0.0	0.0	0.0
Total Lost Time (s)	4.5			4.5	4.5	4.5
Lead/Lag						
Lead-Lag Optimize?						
Walk Time (s)	7.0			7.0	7.0	7.0
Flash Dont Walk (s)	11.0			11.0	11.0	11.0
Pedestrian Calls (#/hr)	0			0	0	0
Act Effct Green (s)	18.0			18.0	18.0	18.0
Actuated g/C Ratio	0.40			0.40	0.40	0.40
v/c Ratio	0.38			0.23	0.40	0.42

Lanes, Volumes, Timings
8: QEW WB Off-Ramp & Kerr Street

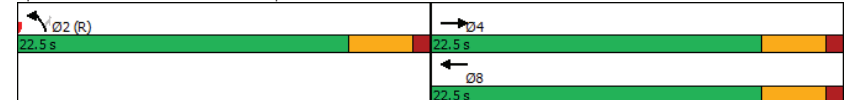
BG 2033 AM.syn
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Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Control Delay	10.5			9.5	11.8	6.1
Queue Delay	0.0			0.0	0.0	0.0
Total Delay	10.5			9.5	11.8	6.1
LOS	B			A	B	A
Approach Delay	10.5			9.5	8.8	
Approach LOS	B			A	A	
Queue Length 50th (m)	15.4			8.7	15.8	6.3
Queue Length 95th (m)	24.7			15.3	30.7	19.2
Internal Link Dist (m)	104.8			160.7	234.8	
Turn Bay Length (m)						140.0
Base Capacity (vph)	1415			1415	708	747
Starvation Cap Reductn	0			0	0	0
Spillback Cap Reductn	0			0	0	0
Storage Cap Reductn	0			0	0	0
Reduced v/c Ratio	0.38			0.23	0.40	0.42

Intersection Summary

Area Type: Other
 Cycle Length: 45
 Actuated Cycle Length: 45
 Offset: 0 (0%), Referenced to phase 2:NBL and 6: Start of Green
 Natural Cycle: 45
 Control Type: Pretimed
 Maximum v/c Ratio: 0.42
 Intersection Signal Delay: 9.6
 Intersection Capacity Utilization 39.0%
 Analysis Period (min) 15
 Intersection LOS: A
 ICU Level of Service A

Splits and Phases: 8: QEW WB Off-Ramp & Kerr Street



HCM Signalized Intersection Capacity Analysis
8: QEW WB Off-Ramp & Kerr Street

BG 2033 AM.syn
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Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↑	↑
Traffic Volume (vph)	489	0	0	297	261	290
Future Volume (vph)	489	0	0	297	261	290
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5			4.5	4.5	4.5
Lane Util. Factor	0.95			0.95	1.00	1.00
Fr _t	1.00			1.00	1.00	0.85
Fl _t Protected	1.00			1.00	0.95	1.00
Satd. Flow (prot)	3539			3539	1770	1583
Fl _t Permitted	1.00			1.00	0.95	1.00
Satd. Flow (perm)	3539			3539	1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	532	0	0	323	284	315
RTOR Reduction (vph)	0	0	0	0	0	115
Lane Group Flow (vph)	532	0	0	323	284	200
Turn Type	NA			NA	Prot	Perm
Protected Phases	4			8	2	
Permitted Phases						2
Actuated Green, G (s)	18.0			18.0	18.0	18.0
Effective Green, g (s)	18.0			18.0	18.0	18.0
Actuated g/C Ratio	0.40			0.40	0.40	0.40
Clearance Time (s)	4.5			4.5	4.5	4.5
Lane Grp Cap (vph)	1415			1415	708	633
v/s Ratio Prot	c0.15			0.09	c0.16	
v/s Ratio Perm						0.13
v/c Ratio	0.38			0.23	0.40	0.32
Uniform Delay, d1	9.5			8.9	9.6	9.3
Progression Factor	1.00			1.00	1.00	1.00
Incremental Delay, d2	0.8			0.4	1.7	1.3
Delay (s)	10.3			9.3	11.3	10.6
Level of Service	B			A	B	B
Approach Delay (s)	10.3			9.3	10.9	
Approach LOS	B			A	B	
Intersection Summary						
HCM 2000 Control Delay		10.3		HCM 2000 Level of Service		B
HCM 2000 Volume to Capacity ratio		0.39				
Actuated Cycle Length (s)		45.0		Sum of lost time (s)		9.0
Intersection Capacity Utilization		39.0%		ICU Level of Service		A
Analysis Period (min)		15				
c Critical Lane Group						

Lanes, Volumes, Timings
9: Dorval Drive & QEW WB Off-Ramp

BG 2033 AM.syn
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Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↑↑	↑	↑↑			↑↑
Traffic Volume (vph)	916	426	524	0	0	1462
Future Volume (vph)	916	426	524	0	0	1462
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	190.0		0.0	0.0	
Storage Lanes	2	1		0	0	
Taper Length (m)	7.5				7.5	
Lane Util. Factor	0.97	0.91	0.95	1.00	1.00	0.95
Fr _t	0.993	0.850				
Fl _t Protected	0.954					
Satd. Flow (prot)	3423	1441	3539	0	0	3539
Fl _t Permitted	0.954					
Satd. Flow (perm)	3423	1441	3539	0	0	3539
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)	4	309				
Link Speed (k/h)	40		60			60
Link Distance (m)	325.1		310.2			266.9
Travel Time (s)	29.3		18.6			16.0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	996	463	570	0	0	1589
Shared Lane Traffic (%)		10%				
Lane Group Flow (vph)	1042	417	570	0	0	1589
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	7.2		0.0		0.0	0.0
Link Offset(m)	0.0		0.0		0.0	0.0
Crosswalk Width(m)	4.8		4.8		4.8	4.8
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15		15	25	
Number of Detectors	1	1	2			2
Detector Template	Left	Right	Thru			Thru
Leading Detector (m)	2.0	2.0	10.0			10.0
Trailing Detector (m)	0.0	0.0	0.0			0.0
Detector 1 Position(m)	0.0	0.0	0.0			0.0
Detector 1 Size(m)	2.0	2.0	0.6			0.6
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0			0.0
Detector 1 Queue (s)	0.0	0.0	0.0			0.0
Detector 1 Delay (s)	0.0	0.0	0.0			0.0
Detector 2 Position(m)			9.4			9.4
Detector 2 Size(m)			0.6			0.6
Detector 2 Type			Cl+Ex			Cl+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type		Prot	Perm	NA		NA
Protected Phases		8		2		6
Permitted Phases		8				

Lanes, Volumes, Timings
9: Dorval Drive & QEW WB Off-Ramp

BG 2033 AM.syn
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Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Detector Phase	8	8	2			6
Switch Phase						
Minimum Initial (s)	10.0	10.0	20.0			20.0
Minimum Split (s)	24.0	24.0	26.0			26.0
Total Split (s)	45.6	45.6	74.4			74.4
Total Split (%)	38.0%	38.0%	62.0%			62.0%
Maximum Green (s)	39.6	39.6	68.4			68.4
Yellow Time (s)	4.0	4.0	4.0			4.0
All-Red Time (s)	2.0	2.0	2.0			2.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0			-2.0
Total Lost Time (s)	4.0	4.0	4.0			4.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	4.5	4.5	5.0			5.0
Recall Mode	None	None	Max			Max
Walk Time (s)	5.0	5.0	7.0			7.0
Flash Dont Walk (s)	7.0	7.0	11.0			11.0
Pedestrian Calls (#/hr)	0	0	0			0
Act Effct Green (s)	41.2	41.2	70.4			70.4
Actuated g/C Ratio	0.34	0.34	0.59			0.59
v/c Ratio	0.88	0.60	0.27			0.76
Control Delay	46.8	12.2	12.5			21.5
Queue Delay	0.0	0.0	0.0			0.0
Total Delay	46.8	12.2	12.5			21.5
LOS	D	B	B			C
Approach Delay	36.9		12.5			21.5
Approach LOS	D		B			C
Queue Length 50th (m)	123.7	20.6	34.6			147.1
Queue Length 95th (m)	#155.0	58.4	45.0			177.2
Internal Link Dist (m)	301.1		286.2			242.9
Turn Bay Length (m)		190.0				
Base Capacity (vph)	1193	702	2083			2083
Starvation Cap Reductn	0	0	0			0
Spillback Cap Reductn	0	0	0			0
Storage Cap Reductn	0	0	0			0
Reduced v/c Ratio	0.87	0.59	0.27			0.76

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 119.6
 Natural Cycle: 60
 Control Type: Semi Act-Uncoord
 Maximum v/c Ratio: 0.88
 Intersection Signal Delay: 26.3 Intersection LOS: C
 Intersection Capacity Utilization 77.7% ICU Level of Service D
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Lanes, Volumes, Timings
9: Dorval Drive & QEW WB Off-Ramp

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Signals and Phases: 9: Dorval Drive & QEW WB Off-Ramp



HCM Signalized Intersection Capacity Analysis
9: Dorval Drive & QEWB Off-Ramp

BG 2033 AM.syn
04-03-2024

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔↔	↔	↕↕			↕↕
Traffic Volume (vph)	916	426	524	0	0	1462
Future Volume (vph)	916	426	524	0	0	1462
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0			4.0
Lane Util. Factor	0.97	0.91	0.95			0.95
Fr	0.99	0.85	1.00			1.00
Fit Protected	0.95	1.00	1.00			1.00
Satd. Flow (prot)	3426	1441	3539			3539
Fit Permitted	0.95	1.00	1.00			1.00
Satd. Flow (perm)	3426	1441	3539			3539
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	996	463	570	0	0	1589
RTOR Reduction (vph)	3	203	0	0	0	0
Lane Group Flow (vph)	1039	214	570	0	0	1589
Turn Type	Prot	Perm	NA			NA
Protected Phases	8		2			6
Permitted Phases	8					
Actuated Green, G (s)	39.2	39.2	68.4			68.4
Effective Green, g (s)	41.2	41.2	70.4			70.4
Actuated g/C Ratio	0.34	0.34	0.59			0.59
Clearance Time (s)	6.0	6.0	6.0			6.0
Vehicle Extension (s)	4.5	4.5	5.0			5.0
Lane Grp Cap (vph)	1180	496	2083			2083
v/s Ratio Prot	c0.30		0.16			c0.45
v/s Ratio Perm		0.15				
v/c Ratio	0.88	0.43	0.27			0.76
Uniform Delay, d1	36.9	30.2	12.1			18.4
Progression Factor	1.00	1.00	1.00			1.00
Incremental Delay, d2	8.4	1.0	0.3			2.7
Delay (s)	45.2	31.2	12.4			21.1
Level of Service	D	C	B			C
Approach Delay (s)	41.2		12.4			21.1
Approach LOS	D		B			C

Intersection Summary			
HCM 2000 Control Delay	27.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	119.6	Sum of lost time (s)	8.0
Intersection Capacity Utilization	77.7%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
10: Dorval Drive & QEWE Off-Ramp

BG 2033 AM.syn
04-03-2024

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔↔	↔		↕↕	↕↕	
Traffic Volume (vph)	134	534	0	738	1580	0
Future Volume (vph)	134	534	0	738	1580	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	175.0	0.0	0.0			0.0
Storage Lanes	1	1	0			0
Taper Length (m)	7.5		7.5			
Lane Util. Factor	0.97	0.91	1.00	0.95	0.95	1.00
Fr	0.900	0.850				
Fit Protected	0.984					
Satd. Flow (prot)	3200	1441	0	3539	3539	0
Fit Permitted	0.984					
Satd. Flow (perm)	3200	1441	0	3539	3539	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	20	20				
Link Speed (k/h)	40			60	60	
Link Distance (m)	275.5			164.3	310.2	
Travel Time (s)	24.8			9.9	18.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	146	580	0	802	1717	0
Shared Lane Traffic (%)	50%					
Lane Group Flow (vph)	436	290	0	802	1717	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	7.2			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Number of Detectors	1	1		2	2	
Detector Template	Left	Right		Thru	Thru	
Leading Detector (m)	2.0	2.0		10.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	2.0		0.6	0.6	
Detector 1 Type	CI+Ex	CI+Ex		CI+Ex	CI+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	
Detector 2 Position(m)				9.4	9.4	
Detector 2 Size(m)				0.6	0.6	
Detector 2 Type				CI+Ex	CI+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Prot	Perm		NA	NA	
Protected Phases	4			2	6	
Permitted Phases	4					

Lanes, Volumes, Timings
10: Dorval Drive & QEW EB Off-Ramp

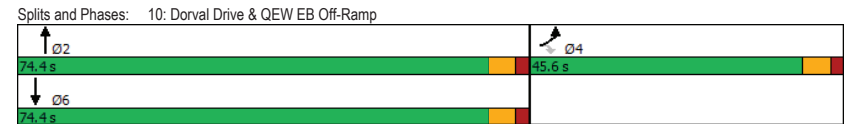
BG 2033 AM.syn
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Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Detector Phase	4	4		2	6	
Switch Phase						
Minimum Initial (s)	10.0	10.0		20.0	20.0	
Minimum Split (s)	24.0	24.0		26.0	26.0	
Total Split (s)	45.6	45.6		74.4	74.4	
Total Split (%)	38.0%	38.0%		62.0%	62.0%	
Maximum Green (s)	39.6	39.6		68.4	68.4	
Yellow Time (s)	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	4.0	4.0		5.0	5.0	
Recall Mode	None	None		Max	Max	
Walk Time (s)	0.0	0.0		7.0	7.0	
Flash Dont Walk (s)	7.0	7.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0	
Act Effct Green (s)	29.1	29.1		70.8	70.8	
Actuated g/C Ratio	0.27	0.27		0.66	0.66	
v/c Ratio	0.50	0.72		0.35	0.74	
Control Delay	33.0	43.4		9.8	16.5	
Queue Delay	0.0	0.0		0.0	0.0	
Total Delay	33.0	43.4		9.8	16.5	
LOS	C	D		A	B	
Approach Delay	37.2			9.8	16.5	
Approach LOS	D			A	B	
Queue Length 50th (m)	39.7	59.3		37.4	120.5	
Queue Length 95th (m)	54.3	92.3		66.3	204.9	
Internal Link Dist (m)	251.5			140.3	286.2	
Turn Bay Length (m)	175.0					
Base Capacity (vph)	1252	570		2320	2320	
Starvation Cap Reductn	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	
Storage Cap Reductn	0	0		0	0	
Reduced v/c Ratio	0.35	0.51		0.35	0.74	

Intersection Summary	
Area Type:	Other
Cycle Length:	120
Actuated Cycle Length:	108
Natural Cycle:	60
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.74
Intersection Signal Delay:	19.5
Intersection Capacity Utilization:	77.7%
Analysis Period (min):	15
Intersection LOS:	B
ICU Level of Service:	D

Lanes, Volumes, Timings
10: Dorval Drive & QEW EB Off-Ramp

BG 2033 AM.syn
04-03-2024



HCM Signalized Intersection Capacity Analysis
10: Dorval Drive & QEW EB Off-Ramp

BG 2033 AM.syn
04-03-2024

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔↔	↔		↕↕	↕↕	
Traffic Volume (vph)	134	534	0	738	1580	0
Future Volume (vph)	134	534	0	738	1580	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	0.91		0.95	0.95	
Frt	0.90	0.85		1.00	1.00	
Flt Protected	0.98	1.00		1.00	1.00	
Satd. Flow (prot)	3200	1441		3539	3539	
Flt Permitted	0.98	1.00		1.00	1.00	
Satd. Flow (perm)	3200	1441		3539	3539	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	146	580	0	802	1717	0
RTOR Reduction (vph)	15	15	0	0	0	0
Lane Group Flow (vph)	421	275	0	802	1717	0
Turn Type	Prot	Perm		NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4				
Actuated Green, G (s)	27.1	27.1		68.8	68.8	
Effective Green, g (s)	29.1	29.1		70.8	70.8	
Actuated g/C Ratio	0.27	0.27		0.66	0.66	
Clearance Time (s)	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	4.0	4.0		5.0	5.0	
Lane Grp Cap (vph)	863	388		2322	2322	
v/s Ratio Prot	0.13			0.23	c0.49	
v/s Ratio Perm		c0.19				
v/c Ratio	0.49	0.71		0.35	0.74	
Uniform Delay, d1	33.1	35.6		8.2	12.4	
Progression Factor	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.6	6.3		0.4	2.2	
Delay (s)	33.7	41.9		8.7	14.5	
Level of Service	C	D		A	B	
Approach Delay (s)	37.0			8.7	14.5	
Approach LOS	D			A	B	

Intersection Summary			
HCM 2000 Control Delay	18.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	107.9	Sum of lost time (s)	8.0
Intersection Capacity Utilization	77.7%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
11: Argus Rd & South Service Rd

BG 2033 AM.syn
04-03-2024

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Volume (vph)	15	76	806	197	70	143
Future Volume (vph)	15	76	806	197	70	143
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt			0.973		0.909	
Flt Protected		0.992			0.984	
Satd. Flow (prot)	0	1460	1625	0	1530	0
Flt Permitted		0.992			0.984	
Satd. Flow (perm)	0	1460	1625	0	1530	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		177.7	145.7		103.5	
Travel Time (s)		12.8	10.5		7.5	
Confl. Peds. (#/hr)	1			1	5	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	100%	0%	3%	0%	0%	0%
Adj. Flow (vph)	16	83	876	214	76	155
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	99	1090	0	231	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (k/h)	24			14	24	14
Sign Control		Free	Free		Stop	
Intersection Summary						
Area Type:	CBD					
Control Type:	Unsignalized					
Intersection Capacity Utilization	81.3%			ICU Level of Service D		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
11: Argus Rd & South Service Rd

BG 2033 AM.syn
04-03-2024

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	↕
Traffic Volume (veh/h)	15	76	806	197	70	143
Future Volume (Veh/h)	15	76	806	197	70	143
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
Hourly flow rate (vph)	16	83	876	214	76	155
Pedestrians		1	5		1	
Lane Width (m)		3.6	3.6		3.6	
Walking Speed (m/s)		1.2	1.2		1.2	
Percent Blockage		0	0		0	
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)		358				
pX, platoon unblocked						
vC, conflicting volume	1091				1104	985
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1091				1104	985
tC, single (s)	5.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	3.1				3.5	3.3
p0 queue free %	96				66	49
cM capacity (veh/h)	381				225	303
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	99	1090	231			
Volume Left	16	0	76			
Volume Right	0	214	155			
eSH	381	1700	272			
Volume to Capacity	0.04	0.64	0.85			
Queue Length 95th (m)	1.0	0.0	56.8			
Control Delay (s)	2.9	0.0	63.2			
Lane LOS	A		F			
Approach Delay (s)	2.9	0.0	63.2			
Approach LOS			F			
Intersection Summary						
Average Delay			10.5			
Intersection Capacity Utilization		81.3%		ICU Level of Service		D
Analysis Period (min)		15				

Lanes, Volumes, Timings
12: Lyons Lane & South Service Road

BG 2033 AM.syn
04-03-2024

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	↕
Traffic Volume (vph)	0	5	4	27	16	1
Future Volume (vph)	0	5	4	27	16	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt			0.881		0.992	
Fit Protected					0.955	
Satd. Flow (prot)	0	1710	1507	0	1235	0
Fit Permitted					0.955	
Satd. Flow (perm)	0	1710	1507	0	1235	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		60.5	89.6		37.6	
Travel Time (s)		4.4	6.5		2.7	
Confl. Peds. (#/hr)	6			6	1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	0%	33%	0%
Adj. Flow (vph)	0	5	4	29	17	1
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	5	33	0	18	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (k/h)	24			14	24	14
Sign Control		Free	Free		Stop	
Intersection Summary						
Area Type:	CBD					
Control Type:	Unsignalized					
Intersection Capacity Utilization 15.1%				ICU Level of Service A		
Analysis Period (min) 15						

HCM Unsignalized Intersection Capacity Analysis
12: Lyons Lane & South Service Road

BG 2033 AM.syn
04-03-2024

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Volume (veh/h)	0	5	4	27	16	1
Future Volume (Veh/h)	0	5	4	27	16	1
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)	0	5	4	29	17	1
Pedestrians			1		6	
Lane Width (m)			3.6		3.6	
Walking Speed (m/s)			1.2		1.2	
Percent Blockage			0		1	
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	39				30	24
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	39				30	24
tC, single (s)	4.1				6.7	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.8	3.3
p0 queue free %	100				98	100
cM capacity (veh/h)	1576				905	1052
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	5	33	18			
Volume Left	0	0	17			
Volume Right	0	29	1			
eSH	1576	1700	912			
Volume to Capacity	0.00	0.02	0.02			
Queue Length 95th (m)	0.0	0.0	0.5			
Control Delay (s)	0.0	0.0	9.0			
Lane LOS			A			
Approach Delay (s)	0.0	0.0	9.0			
Approach LOS			A			
Intersection Summary						
Average Delay			2.9			
Intersection Capacity Utilization			15.1%		ICU Level of Service	A
Analysis Period (min)			15			

Lanes, Volumes, Timings
13: GO Bus Terminal/Argus Rd & Cross Ave

BG 2033 AM.syn
04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↕	↕		↕	↕		↕	↕		↕	↕	
Traffic Volume (vph)	44	774	17	49	760	58	25	0	59	389	20	674
Future Volume (vph)	44	774	17	49	760	58	25	0	59	389	20	674
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6
Storage Length (m)	20.0		0.0	20.0		0.0	0.0		0.0	15.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00	1.00		1.00	1.00			0.96		0.98		0.98
Frt		0.997			0.989			0.850		0.854		
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1570	3141	0	818	3168	0	805	734	0	1570	1400	0
Fit Permitted	0.320			0.177			0.142			0.715		
Satd. Flow (perm)	529	3141	0	152	3168	0	120	734	0	1157	1400	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3			16			208				178
Link Speed (k/h)		50			50			50				50
Link Distance (m)		162.8			72.9			81.9				113.6
Travel Time (s)		11.7			5.2			5.9				8.2
Confl. Peds. (#/hr)	1		3	3		1	3		20	20		3
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
Heavy Vehicles (%)	0%	1%	100%	92%	1%	5%	95%	0%	91%	0%	93%	0%
Adj. Flow (vph)	48	841	18	53	826	63	27	0	64	423	22	733
Shared Lane Traffic (%)												
Lane Group Flow (vph)	48	859	0	53	889	0	27	64	0	423	755	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.3			3.3			3.3				3.3
Link Offset(m)		0.0			0.0			0.0				0.0
Crosswalk Width(m)		4.8			4.8			4.8				4.8
Two way Left Turn Lane												
Headway Factor	1.19	1.14	1.14	1.19	1.14	1.14	1.19	1.14	1.14	1.19	1.14	1.14
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

Lanes, Volumes, Timings
13: GO Bus Terminal/Argus Rd & Cross Ave

BG 2033 AM.syn
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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases		2		6				8			4	
Detector Phase	2	2		1	6			8	8		4	4
Switch Phase												
Minimum Initial (s)	22.0	22.0		8.0	22.0			10.0	10.0		10.0	10.0
Minimum Split (s)	45.0	45.0		12.5	29.0			29.0	29.0		29.0	29.0
Total Split (s)	45.5	45.5		12.5	58.0			32.0	32.0		32.0	32.0
Total Split (%)	50.6%	50.6%		13.9%	64.4%			35.6%	35.6%		35.6%	35.6%
Maximum Green (s)	39.5	39.5		8.5	52.0			26.0	26.0		26.0	26.0
Yellow Time (s)	4.0	4.0		3.0	4.0			4.0	4.0		4.0	4.0
All-Red Time (s)	2.0	2.0		1.0	2.0			2.0	2.0		2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0		0.0	-2.0			-2.0	-2.0		-2.0	-2.0
Total Lost Time (s)	4.0	4.0		4.0	4.0			4.0	4.0		4.0	4.0
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Vehicle Extension (s)	5.0	5.0		2.5	5.0			4.0	4.0		4.0	4.0
Recall Mode	Min	Min		Min	Min			Min	Min		Min	Min
Walk Time (s)	7.0	7.0		7.0	7.0			7.0	7.0		7.0	7.0
Flash Dont Walk (s)	16.0	16.0		16.0	16.0			16.0	16.0		16.0	16.0
Pedestrian Calls (#/hr)	0	0		0	0			0	0		0	0
Act Effct Green (s)	33.0	33.0		45.3	45.3			28.2	28.2		28.2	28.2
Actuated g/C Ratio	0.40	0.40		0.56	0.56			0.35	0.35		0.35	0.35
v/c Ratio	0.22	0.67		0.35	0.50			0.66	0.16		1.06	1.26
Control Delay	18.3	22.5		14.6	11.8			96.5	0.9		91.9	151.8
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0		0.0	0.0
Total Delay	18.3	22.5		14.6	11.8			96.5	0.9		91.9	151.8
LOS	B	C		B	B			F	A		F	F
Approach Delay		22.2			12.0			29.3				130.3
Approach LOS		C			B			C				F
Queue Length 50th (m)	4.9	57.9		3.8	42.4			3.7	0.0		-76.6	-136.4
Queue Length 95th (m)	12.8	78.0		9.0	56.4			#20.8	0.0		#150.3	#230.4
Internal Link Dist (m)		138.8			48.9			57.9				89.6
Turn Bay Length (m)	20.0			20.0							15.0	
Base Capacity (vph)	270	1610		154	2116			41	389		399	600
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	0.53		0.34	0.42			0.66	0.16		1.06	1.26

Intersection Summary	
Area Type:	CBD
Cycle Length:	90
Actuated Cycle Length:	81.5
Natural Cycle:	120
Control Type:	Semi Act-Uncooord
Maximum v/c Ratio:	1.26
Intersection Signal Delay:	60.2
Intersection LOS:	E

Lanes, Volumes, Timings
13: GO Bus Terminal/Argus Rd & Cross Ave

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Intersection Capacity Utilization	99.7%	ICU Level of Service F
Analysis Period (min)	15	
- Volume exceeds capacity, queue is theoretically infinite.		
Queue shown is maximum after two cycles.		
# 95th percentile volume exceeds capacity, queue may be longer.		
Queue shown is maximum after two cycles.		

Splits and Phases: 13: GO Bus Terminal/Argus Rd & Cross Ave



HCM Signalized Intersection Capacity Analysis
13: GO Bus Terminal/Argus Rd & Cross Ave

BG 2033 AM.syn
04-03-2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	44	774	17	49	760	58	25	0	59	389	20	674
Future Volume (vph)	44	774	17	49	760	58	25	0	59	389	20	674
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.97		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		0.98	1.00	
FrT	1.00	1.00		1.00	0.99		1.00	0.85		1.00	0.85	
FlT Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1570	3141		818	3169		805	736		1540	1402	
FlT Permitted	0.32	1.00		0.18	1.00		0.14	1.00		0.72	1.00	
Satd. Flow (perm)	529	3141		152	3169		120	736		1159	1402	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	48	841	18	53	826	63	27	0	64	423	22	733
RTOR Reduction (vph)	0	2	0	0	7	0	0	42	0	0	116	0
Lane Group Flow (vph)	48	857	0	53	882	0	27	22	0	423	639	0
Confl. Peds. (#/hr)	1		3	3		1	3		20	20		3
Heavy Vehicles (%)	0%	1%	100%	92%	1%	5%	95%	0%	91%	0%	93%	0%
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	2	2		1	6		8	8		4	4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	31.1	31.1		43.3	43.3		26.2	26.2		26.2	26.2	
Effective Green, g (s)	33.1	33.1		43.3	45.3		28.2	28.2		28.2	28.2	
Actuated g/C Ratio	0.41	0.41		0.53	0.56		0.35	0.35		0.35	0.35	
Clearance Time (s)	6.0	6.0		4.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	5.0	5.0		2.5	5.0		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	214	1275		147	1761		41	254		401	485	
v/s Ratio Prot		c0.27		0.04	c0.28			0.03			c0.46	
v/s Ratio Perm	0.09			0.15			0.22			0.36		
v/c Ratio	0.22	0.67		0.36	0.50		0.66	0.09		1.05	1.32	
Uniform Delay, d1	15.8	19.8		11.6	11.1		22.6	18.0		26.6	26.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.1	1.8		1.1	0.5		35.1	0.2		60.1	156.6	
Delay (s)	16.9	21.6		12.7	11.6		57.7	18.2		86.8	183.2	
Level of Service	B	C		B	B		E	B		F	F	
Approach Delay (s)		21.4			11.7			29.9			148.6	
Approach LOS		C			B			C			F	

Intersection Summary			
HCM 2000 Control Delay	66.7	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	81.5	Sum of lost time (s)	12.0
Intersection Capacity Utilization	99.7%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
14: Lyons Lane/Street A & Cross Ave

BG 2033 AM.syn
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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	70	279	239	267	183	7	21	4	16	20	29	50
Future Volume (vph)	70	279	239	267	183	7	21	4	16	20	29	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6
Storage Length (m)	0.0	0.0	25.0	0.0	20.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Storage Lanes	1	0	1	0	1	0	1	0	1	0	1	0
Taper Length (m)	7.5		7.5		7.5		7.5		7.5		7.5	
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.99	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	0.99		1.00	1.00		1.00	0.99		1.00	0.99	
FrT		0.931			0.994			0.879			0.906	
FlT Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1540	2827	0	1570	2728	0	1570	1484	0	1468	1506	0
FlT Permitted	0.622			0.364			0.701			0.744		
Satd. Flow (perm)	1000	2827	0	601	2728	0	1155	1484	0	1145	1506	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		260			8			17			54	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		40.1			211.2			69.1			70.9	
Travel Time (s)		2.9			15.2			5.0			5.1	
Confl. Peds. (#/hr)	5		1	1		5	3		3	3		3
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
Heavy Vehicles (%)	2%	11%	0%	0%	19%	0%	0%	0%	0%	7%	0%	3%
Adj. Flow (vph)	76	303	260	290	199	8	23	4	17	22	32	54
Shared Lane Traffic (%)												
Lane Group Flow (vph)	76	563	0	290	207	0	23	21	0	22	86	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.3			3.3			3.3			3.3	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.19	1.14	1.14	1.19	1.14	1.14	1.19	1.14	1.14	1.19	1.14	1.14
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

Lanes, Volumes, Timings
14: Lyons Lane/Street A & Cross Ave

BG 2033 AM.syn
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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	pm+pt	NA	NA	Perm	NA	NA	Perm	NA	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases		2		6				8			4	
Detector Phase	2	2		1	6			8	8		4	4
Switch Phase												
Minimum Initial (s)	35.0	35.0		8.0	35.0			10.0	10.0		10.0	10.0
Minimum Split (s)	41.0	41.0		12.5	41.0			28.0	28.0		28.0	28.0
Total Split (s)	41.0	41.0		21.0	62.0			28.0	28.0		28.0	28.0
Total Split (%)	45.6%	45.6%		23.3%	68.9%			31.1%	31.1%		31.1%	31.1%
Maximum Green (s)	35.0	35.0		17.0	56.0			22.0	22.0		22.0	22.0
Yellow Time (s)	4.0	4.0		3.0	4.0			4.0	4.0		4.0	4.0
All-Red Time (s)	2.0	2.0		1.0	2.0			2.0	2.0		2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0		0.0	-2.0			-2.0	-2.0		-2.0	-2.0
Total Lost Time (s)	4.0	4.0		4.0	4.0			4.0	4.0		4.0	4.0
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Vehicle Extension (s)	5.0	5.0		2.5	5.0			4.0	4.0		4.0	4.0
Recall Mode	Min	Min		Min	Min			Min	Min		Min	Min
Walk Time (s)	7.0	7.0		7.0	7.0			7.0	7.0		7.0	7.0
Flash Dont Walk (s)	15.0	15.0		15.0	15.0			15.0	15.0		15.0	15.0
Pedestrian Calls (#/hr)	0	0		0	0			0	0		0	0
Act Effct Green (s)	37.1	37.1		51.0	51.0			12.4	12.4		12.4	12.4
Actuated g/C Ratio	0.52	0.52		0.71	0.71			0.17	0.17		0.17	0.17
v/c Ratio	0.15	0.35		0.52	0.11			0.12	0.08		0.11	0.28
Control Delay	10.7	6.1		7.1	3.2			27.2	14.9		27.1	15.6
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0		0.0	0.0
Total Delay	10.7	6.1		7.1	3.2			27.2	14.9		27.1	15.6
LOS	B	A		A	A			C	B		C	B
Approach Delay		6.7			5.5				21.3			17.9
Approach LOS		A			A				C			B
Queue Length 50th (m)	5.0	10.9		11.1	3.5			2.8	0.5		2.6	3.8
Queue Length 95th (m)	13.9	23.4		21.5	6.9			9.2	6.3		9.0	16.0
Internal Link Dist (m)		16.1			187.2				45.1			46.9
Turn Bay Length (m)				25.0				20.0				
Base Capacity (vph)	519	1592		660	2221			389	511		385	543
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	0.15	0.35		0.44	0.09			0.06	0.04		0.06	0.16

Intersection Summary

Area Type: CBD
 Cycle Length: 90
 Actuated Cycle Length: 71.4
 Natural Cycle: 85
 Control Type: Semi Act-Uncoord
 Maximum v/c Ratio: 0.52
 Intersection Signal Delay: 7.7
 Intersection LOS: A

Lanes, Volumes, Timings
14: Lyons Lane/Street A & Cross Ave

BG 2033 AM.syn
04-03-2024

Intersection Capacity Utilization 77.6%
 Analysis Period (min) 15
 ICU Level of Service D

Splits and Phases: 14: Lyons Lane/Street A & Cross Ave



HCM Signalized Intersection Capacity Analysis
14: Lyons Lane/Street A & Cross Ave

BG 2033 AM.syn
04-03-2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	70	279	239	267	183	7	21	4	16	20	29	50
Future Volume (vph)	70	279	239	267	183	7	21	4	16	20	29	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	0.99	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Fr	1.00	0.93		1.00	0.99		1.00	0.88		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)	1530	2826		1570	2728		1566	1484		1463	1506	
Flt Permitted	0.62	1.00		0.36	1.00		0.70	1.00		0.74	1.00	
Satd. Flow (perm)	1002	2826		602	2728		1156	1484		1146	1506	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	76	303	260	290	199	8	23	4	17	22	32	54
RTOR Reduction (vph)	0	125	0	0	2	0	0	14	0	0	45	0
Lane Group Flow (vph)	76	438	0	290	205	0	23	7	0	22	41	0
Confl. Peds. (#/hr)	5		1	1		5	3		3	3		3
Heavy Vehicles (%)	2%	11%	0%	0%	19%	0%	0%	0%	0%	7%	0%	3%
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	35.0	35.0		48.9	48.9		10.4	10.4		10.4	10.4	
Effective Green, g (s)	37.0	37.0		48.9	50.9		12.4	12.4		12.4	12.4	
Actuated g/C Ratio	0.52	0.52		0.69	0.71		0.17	0.17		0.17	0.17	
Clearance Time (s)	6.0	6.0		4.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	5.0	5.0		2.5	5.0		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	519	1466		547	1947		201	258		199	261	
v/s Ratio Prot		0.15		c0.07	0.08			0.00			c0.03	
v/s Ratio Perm	0.08			c0.29			0.02			0.02		
v/c Ratio	0.15	0.30		0.53	0.11		0.11	0.03		0.11	0.16	
Uniform Delay, d1	8.9	9.8		4.8	3.2		24.8	24.4		24.8	25.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.3	0.2		0.8	0.0		0.3	0.1		0.3	0.4	
Delay (s)	9.2	10.0		5.6	3.2		25.2	24.5		25.1	25.4	
Level of Service	A	B		A	A		C	C		C	C	
Approach Delay (s)		9.9			4.6			24.9			25.4	
Approach LOS		A			A			C			C	

Intersection Summary			
HCM 2000 Control Delay	9.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	71.3	Sum of lost time (s)	12.0
Intersection Capacity Utilization	77.6%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
15: Cross Ave & Lyons Lane

BG 2033 AM.syn
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Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↕	↕	↕	↕	↕
Traffic Volume (vph)	35	513	255	22	61	65
Future Volume (vph)	35	513	255	22	61	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	5.0			0.0	0.0	0.0
Storage Lanes	1			0	1	0
Taper Length (m)	7.5				7.5	
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	1.00
Ped Bike Factor			0.988		0.930	
Flt Protected	0.950				0.976	
Satd. Flow (prot)	1624	3094	2798	0	1374	0
Flt Permitted	0.950				0.976	
Satd. Flow (perm)	1624	3094	2798	0	1374	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		281.3	40.1		41.7	
Travel Time (s)		20.3	2.9		3.0	
Confl. Peds. (#/hr)	4			4	7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	5%	16%	0%	0%	25%
Adj. Flow (vph)	38	558	277	24	66	71
Shared Lane Traffic (%)						
Lane Group Flow (vph)	38	558	301	0	137	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.6	3.6		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (k/h)		25		15	25	15
Sign Control		Free	Free		Stop	

Intersection Summary	
Area Type:	CBD
Control Type:	Unsignalized
Intersection Capacity Utilization 30.7%	ICU Level of Service A
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis
15: Cross Ave & Lyons Lane

BG 2033 AM.syn
04-03-2024

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↕↕	↕↕		↕	↕↕
Traffic Volume (veh/h)	35	513	255	22	61	65
Future Volume (Veh/h)	35	513	255	22	61	65
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)	38	558	277	24	66	71
Pedestrians			7		4	
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)			40			
pX, platoon unblocked						
vC, conflicting volume	305				655	154
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	305				655	154
tC, single (s)	4.1				6.8	7.4
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.5
p0 queue free %	97				83	91
cM capacity (veh/h)	1263				388	793
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	38	279	279	185	116	137
Volume Left	38	0	0	0	0	66
Volume Right	0	0	0	0	24	71
sSH	1263	1700	1700	1700	1700	528
Volume to Capacity	0.03	0.16	0.16	0.11	0.07	0.26
Queue Length 95th (m)	0.7	0.0	0.0	0.0	0.0	8.2
Control Delay (s)	7.9	0.0	0.0	0.0	0.0	14.2
Lane LOS	A					B
Approach Delay (s)	0.5			0.0		14.2
Approach LOS						B
Intersection Summary						
Average Delay			2.2			
Intersection Capacity Utilization			30.7%		ICU Level of Service	A
Analysis Period (min)			15			

Lanes, Volumes, Timings
16: Speers Road/Cornwall Road & Cross Avenue

BG 2033 AM.syn
04-03-2024

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↕↕	↕↕		↕	↕↕
Traffic Volume (vph)	245	735	687	32	16	356
Future Volume (vph)	245	735	687	32	16	356
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	75.0			0.0	55.0	0.0
Storage Lanes	1			0	1	2
Taper Length (m)	7.5				7.5	
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	0.88
Frt			0.993			0.850
Fit Protected	0.950				0.950	
Satd. Flow (prot)	1770	3539	3514	0	1770	2787
Fit Permitted	0.276				0.950	
Satd. Flow (perm)	514	3539	3514	0	1770	2787
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)			5			387
Link Speed (k/h)		50	50		50	
Link Distance (m)		228.9	275.4		183.9	
Travel Time (s)		16.5	19.8		13.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	266	799	747	35	17	387
Shared Lane Traffic (%)						
Lane Group Flow (vph)	266	799	782	0	17	387
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.6	3.6			
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25			15	25	15
Number of Detectors	1	2	2		1	1
Detector Template	Left	Thru	Thru		Left	Right
Leading Detector (m)	2.0	10.0	10.0		2.0	2.0
Trailing Detector (m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Size(m)	2.0	0.6	0.6		2.0	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0		0.0	0.0
Detector 2 Position(m)		9.4	9.4			
Detector 2 Size(m)		0.6	0.6			
Detector 2 Type		Cl+Ex	Cl+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type	pm+pt	NA	NA		pm+pt	Perm
Protected Phases	5	2	6		7	
Permitted Phases	2				4	4

Lanes, Volumes, Timings
16: Speers Road/Cornwall Road & Cross Avenue

BG 2033 AM.syn
04-03-2024



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Detector Phase	5	2	6		7	4
Switch Phase						
Minimum Initial (s)	6.0	25.0	25.0		6.0	6.0
Minimum Split (s)	12.0	35.0	35.0		29.0	29.0
Total Split (s)	26.0	61.0	35.0		29.0	29.0
Total Split (%)	28.9%	67.8%	38.9%		32.2%	32.2%
Maximum Green (s)	20.0	55.0	29.0		23.0	23.0
Yellow Time (s)	4.0	4.0	4.0		4.0	4.0
All-Red Time (s)	2.0	2.0	2.0		2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0		6.0	6.0
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?			Yes			
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	None	Max	Max		None	None
Walk Time (s)		18.0	18.0		12.0	12.0
Flash Dont Walk (s)		7.0	7.0		7.0	7.0
Pedestrian Calls (#/hr)		0	0		0	0
Act Effct Green (s)	55.0	55.0	39.6		7.1	7.1
Actuated g/C Ratio	0.74	0.74	0.53		0.10	0.10
v/c Ratio	0.49	0.30	0.42		0.10	0.63
Control Delay	6.4	3.7	11.9		31.5	8.7
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	6.4	3.7	11.9		31.5	8.7
LOS	A	A	B		C	A
Approach Delay		4.4	11.9		9.7	
Approach LOS		A	B		A	
Queue Length 50th (m)	8.5	14.6	31.3		2.3	0.0
Queue Length 95th (m)	19.2	26.9	58.4		8.0	13.0
Internal Link Dist (m)		204.9	251.4		159.9	
Turn Bay Length (m)	75.0				55.0	
Base Capacity (vph)	720	2625	1877		548	1131
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	0.37	0.30	0.42		0.03	0.34

Intersection Summary

Area Type:	Other
Cycle Length:	90
Actuated Cycle Length:	74.2
Natural Cycle:	80
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.63
Intersection Signal Delay:	7.9
Intersection Capacity Utilization:	54.4%
Analysis Period (min):	15
Intersection LOS:	A
ICU Level of Service:	A

Lanes, Volumes, Timings
16: Speers Road/Cornwall Road & Cross Avenue

BG 2033 AM.syn
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Splits and Phases: 16: Speers Road/Cornwall Road & Cross Avenue



HCM Signalized Intersection Capacity Analysis
16: Speers Road/Cornwall Road & Cross Avenue

BG 2033 AM.syn
04-03-2024

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↕	↕	↔	↔	↕
Traffic Volume (vph)	245	735	687	32	16	356
Future Volume (vph)	245	735	687	32	16	356
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0		6.0	6.0
Lane Util. Factor	1.00	0.95	0.95		1.00	0.88
Fr	1.00	1.00	0.99		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	3539	3515		1770	2787
Flt Permitted	0.28	1.00	1.00		0.95	1.00
Satd. Flow (perm)	514	3539	3515		1770	2787
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	266	799	747	35	17	387
RTOR Reduction (vph)	0	0	2	0	0	350
Lane Group Flow (vph)	266	799	780	0	17	37
Turn Type	pm+pt	NA	NA		pm+pt	Perm
Protected Phases	5	2	6		7	
Permitted Phases	2				4	4
Actuated Green, G (s)	55.0	55.0	39.6		7.1	7.1
Effective Green, g (s)	55.0	55.0	39.6		7.1	7.1
Actuated g/C Ratio	0.74	0.74	0.53		0.10	0.10
Clearance Time (s)	6.0	6.0	6.0		6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	540	2626	1878		169	267
v/s Ratio Prot	c0.06	0.23	0.22		0.01	
v/s Ratio Perm		c0.30				c0.01
v/c Ratio	0.49	0.30	0.42		0.10	0.14
Uniform Delay, d1	4.1	3.2	10.3		30.6	30.7
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.7	0.3	0.7		0.3	0.2
Delay (s)	4.8	3.5	11.0		30.8	30.9
Level of Service	A	A	B		C	C
Approach Delay (s)		3.8	11.0		30.9	
Approach LOS		A	B		C	

Intersection Summary			
HCM 2000 Control Delay	11.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	74.1	Sum of lost time (s)	18.0
Intersection Capacity Utilization	54.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
23: GO Station West Access/Street C & Cross Ave

BG 2033 AM.syn
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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕		↕		↕
Traffic Volume (vph)	6	325	106	887	467	70	47	0	250	253	0	11
Future Volume (vph)	6	325	106	887	467	70	47	0	250	253	0	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.0	0.0	0.0
Storage Lanes	0	0	0	0	0	1	0	1	0	1	0	0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Fr		0.964			0.993			0.850				0.850
Flt Protected		0.999			0.970		0.950			0.950		
Satd. Flow (prot)	0	3408	0	0	3409	0	1770	1583	0	1770	1583	0
Flt Permitted		0.721			0.620		0.750			0.592		
Satd. Flow (perm)	0	2460	0	0	2179	0	1397	1583	0	1103	1583	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		99			12			327				189
Link Speed (k/h)		50			50			50				50
Link Distance (m)		211.2			162.8			81.1				134.3
Travel Time (s)		15.2			11.7			5.8				9.7
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
Adj. Flow (vph)	7	353	115	964	508	76	51	0	272	275	0	12
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	475	0	0	1548	0	51	272	0	275	12	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.3			3.3			3.6				3.6
Link Offset(m)		0.0			0.0			0.0				0.0
Crosswalk Width(m)		4.8			4.8			4.8				4.8
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4				9.4
Detector 2 Size(m)		0.6			0.6			0.6				0.6
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex				Cl+Ex
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2				6
Permitted Phases		4			8			2				6

Lanes, Volumes, Timings
23: GO Station West Access/Street C & Cross Ave

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	24.0	24.0		24.0	24.0		24.0	24.0		24.0	24.0	
Total Split (s)	25.0	25.0		25.0	25.0		25.0	25.0		25.0	25.0	
Total Split (%)	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%		50.0%	50.0%	
Maximum Green (s)	19.0	19.0		19.0	19.0		19.0	19.0		19.0	19.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		6.0			6.0			6.0			6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		19.0			19.0			19.0			19.0	
Actuated g/C Ratio		0.38			0.38			0.38			0.38	
v/c Ratio		0.48			2.78dl			0.10	0.34		0.66	0.02
Control Delay		11.1			408.2			10.7	2.2		22.7	0.0
Queue Delay		0.0			0.0			0.0	0.0		0.0	0.0
Total Delay		11.1			408.2			10.7	2.2		22.7	0.0
LOS		B			F			B	A		C	A
Approach Delay		11.1			408.2			3.6			21.7	
Approach LOS		B			F			A			C	
Queue Length 50th (m)		13.0			~124.6			2.9	0.0		20.4	0.0
Queue Length 95th (m)		23.6			#162.6			8.4	7.6		#50.3	0.0
Internal Link Dist (m)		187.2			138.8			57.1			110.3	
Turn Bay Length (m)											15.0	
Base Capacity (vph)		996			835			530	804		419	718
Starvation Cap Reductn		0			0			0	0		0	0
Spillback Cap Reductn		0			0			0	0		0	0
Storage Cap Reductn		0			0			0	0		0	0
Reduced v/c Ratio		0.48			1.85			0.10	0.34		0.66	0.02

Intersection Summary

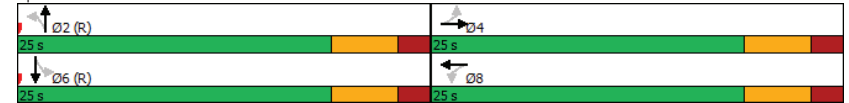
Area Type: Other
 Cycle Length: 50
 Actuated Cycle Length: 50
 Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
 Natural Cycle: 150
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.85
 Intersection Signal Delay: 244.8 Intersection LOS: F
 Intersection Capacity Utilization 111.2% ICU Level of Service H
 Analysis Period (min) 15
 ~ Volume exceeds capacity, queue is theoretically infinite.

Lanes, Volumes, Timings
23: GO Station West Access/Street C & Cross Ave

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Queue shown is maximum after two cycles.
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 dl Defacto Left Lane. Record with 1 though lane as a left lane.

Splits and Phases: 23: GO Station West Access/Street C & Cross Ave



HCM Signalized Intersection Capacity Analysis
23: GO Station West Access/Street C & Cross Ave

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔	↔		↔	↔		↔	↔	
Traffic Volume (vph)	6	325	106	887	467	70	47	0	250	253	0	11
Future Volume (vph)	6	325	106	887	467	70	47	0	250	253	0	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0		6.0		6.0		6.0		6.0		6.0
Lane Util. Factor		0.95		0.95		1.00		1.00		1.00		1.00
Fr't		0.96		0.99		1.00		0.85		1.00		0.85
Flt Protected		1.00		0.97		0.95		1.00		0.95		1.00
Satd. Flow (prot)		3408		3407		1770		1583		1770		1583
Flt Permitted		0.72		0.62		0.75		1.00		0.59		1.00
Satd. Flow (perm)		2458		2177		1397		1583		1103		1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	7	353	115	964	508	76	51	0	272	275	0	12
RTOR Reduction (vph)	0	61	0	0	7	0	0	169	0	0	7	0
Lane Group Flow (vph)	0	414	0	0	1541	0	51	103	0	275	5	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4		8		8		2		2		6
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		19.0			19.0		19.0	19.0		19.0		19.0
Effective Green, g (s)		19.0			19.0		19.0	19.0		19.0		19.0
Actuated g/C Ratio		0.38			0.38		0.38	0.38		0.38		0.38
Clearance Time (s)		6.0			6.0		6.0	6.0		6.0		6.0
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0		3.0
Lane Grp Cap (vph)		934			827		530	601		419		601
v/s Ratio Prot								0.07				0.00
v/s Ratio Perm		0.17			c0.71		0.04			c0.25		
v/c Ratio		0.44			2.78dl		0.10	0.17		0.66		0.01
Uniform Delay, d1		11.6			15.5		10.0	10.3		12.8		9.6
Progression Factor		1.00			1.00		1.00	1.00		1.00		1.00
Incremental Delay, d2		0.3			392.9		0.4	0.6		7.8		0.0
Delay (s)		11.9			408.4		10.3	10.9		20.6		9.7
Level of Service		B			F		B	B		C		A
Approach Delay (s)		11.9			408.4		10.8			20.2		
Approach LOS		B			F		B			C		

Intersection Summary			
HCM 2000 Control Delay	245.8	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.26		
Actuated Cycle Length (s)	50.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	111.2%	ICU Level of Service	H
Analysis Period (min)	15		
dl Defacto Left Lane. Recode with 1 though lane as a left lane.			
c Critical Lane Group			

Lanes, Volumes, Timings
1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔	↔		↔	↔		↔	↔	
Traffic Volume (vph)	144	121	333	948	231	191	435	2052	712	145	1424	120
Future Volume (vph)	144	121	333	948	231	191	435	2052	712	145	1424	120
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0		0.0	165.0		25.0	145.0		0.0	95.0		90.0
Storage Lanes	1		1	1		1	1		1	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		7.5
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Ped Bike Factor	0.98					0.95			0.98			0.98
Fr't			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1624	1710	1425	3120	1710	1425	1608	4577	1425	1608	4532	1425
Flt Permitted	0.603			0.376			0.105			0.118		
Satd. Flow (perm)	1006	1710	1425	1235	1710	1360	178	4577	1402	200	4532	1425
Right Turn on Red			Yes			Yes			Yes		Yes	
Satd. Flow (RTOR)			255			152			313		191	
Link Speed (k/h)		50			50		50			50		50
Link Distance (m)		347.0			285.9		280.4			353.6		
Travel Time (s)		25.0			20.6		20.2			25.5		
Confl. Peds. (#/hr)	34					34			14	14		
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
Heavy Vehicles (%)	0%	0%	2%	1%	0%	2%	1%	2%	2%	1%	3%	2%
Adj. Flow (vph)	157	132	362	1030	251	208	473	2230	774	158	1548	130
Shared Lane Traffic (%)												
Lane Group Flow (vph)	157	132	362	1030	251	208	473	2230	774	158	1548	130
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		7.2			7.2				3.6			3.6
Link Offset(m)		0.0			0.0				0.0			0.0
Crosswalk Width(m)		4.8			4.8				4.8			4.8
Two way Left Turn Lane												
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings

BG 2033 PM.syn

1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd

04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA	Free	pm+pt	NA	Perm	pm+pt	NA	Free	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		Free	8		8	2		Free	6		6
Detector Phase	7	4		3	8	8	5	2		1	6	6
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0	10.0	6.0	15.0		6.0	15.0	15.0
Minimum Split (s)	11.0	25.0		11.0	43.0	43.0	11.0	34.0		10.0	34.0	34.0
Total Split (s)	11.0	25.0		29.0	43.0	43.0	25.0	56.0		10.0	41.0	41.0
Total Split (%)	9.2%	20.8%		24.2%	35.8%	35.8%	20.8%	46.7%		8.3%	34.2%	34.2%
Maximum Green (s)	7.0	18.0		24.0	36.0	36.0	21.0	49.0		6.0	34.0	34.0
Yellow Time (s)	3.0	4.0		3.0	4.0	4.0	3.0	4.0		3.0	4.0	4.0
All-Red Time (s)	1.0	3.0		2.0	3.0	3.0	1.0	3.0		1.0	3.0	3.0
Lost Time Adjust (s)	0.0	-3.0		0.0	-3.0	-3.0	0.0	-3.0		0.0	-3.0	-3.0
Total Lost Time (s)	4.0	4.0		5.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	5.0		3.0	5.0	5.0	3.0	5.0		3.0	5.0	5.0
Recall Mode	None	None		None	None	None	None	C-Max		None	C-Max	C-Max
Walk Time (s)				7.0	7.0		7.0			7.0	7.0	
Flash Dont Walk (s)				29.0	29.0		20.0			20.0	20.0	
Pedestrian Calls (#/hr)				0	0		0			0	0	
Act Effct Green (s)	25.5	18.5	120.0	46.5	36.5	36.5	64.5	52.0	120.0	45.5	37.0	37.0
Actuated g/C Ratio	0.21	0.15	1.00	0.39	0.30	0.30	0.54	0.43	1.00	0.38	0.31	0.31
v/c Ratio	0.63	0.50	0.25	1.20	0.48	0.40	1.26	1.12	0.55	0.90	1.11	0.23
Control Delay	41.8	53.0	0.4	133.6	37.2	11.9	167.7	96.1	1.6	74.3	98.5	1.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	41.8	53.0	0.4	133.6	37.2	11.9	167.7	96.1	1.6	74.3	98.5	1.8
LOS	D	D	A	F	D	B	F	F	A	E	F	A
Approach Delay		21.1			100.4			84.8				89.6
Approach LOS		C			F			F				F
Queue Length 50th (m)	25.4	30.1	0.0	~126.0	50.2	10.0	~134.6	~233.9	0.0	22.8	~160.4	0.0
Queue Length 95th (m)	40.7	50.1	0.0	#162.7	74.8	30.0	#208.3	#264.1	0.0	#73.7	#191.4	3.3
Internal Link Dist (m)		323.0			261.9			256.4				329.6
Turn Bay Length (m)	60.0			165.0		25.0	145.0			95.0		90.0
Base Capacity (vph)	249	299	1425	855	555	544	376	1983	1402	176	1397	571
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.63	0.44	0.25	1.20	0.45	0.38	1.26	1.12	0.55	0.90	1.11	0.23

Intersection Summary

Area Type:	CBD
Cycle Length:	120
Actuated Cycle Length:	120
Offset:	105.6 (88%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle:	140
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	1.26
Intersection Signal Delay:	83.5
Intersection LOS:	F

Lanes, Volumes, Timings

BG 2033 PM.syn

1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd

04-03-2024

Intersection Capacity Utilization	109.6%	ICU Level of Service H
Analysis Period (min)	15	
- Volume exceeds capacity, queue is theoretically infinite.		
Queue shown is maximum after two cycles.		
# 95th percentile volume exceeds capacity, queue may be longer.		
Queue shown is maximum after two cycles.		

Splits and Phases: 1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd



HCM Signalized Intersection Capacity Analysis
1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd

BG 2033 PM.syn
04-03-2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	
Traffic Volume (vph)	144	121	333	948	231	191	435	2052	712	145	1424	120	
Future Volume (vph)	144	121	333	948	231	191	435	2052	712	145	1424	120	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	4.0	4.0	1.0	5.0	4.0	4.0	4.0	4.0	1.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.98	1.00	1.00	1.00	
Flpb, ped/bikes	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1602	1710	1425	3120	1710	1360	1608	4577	1402	1608	4532	1425	
Flt Permitted	0.60	1.00	1.00	0.38	1.00	1.00	0.11	1.00	1.00	0.12	1.00	1.00	
Satd. Flow (perm)	1017	1710	1425	1236	1710	1360	178	4577	1402	199	4532	1425	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	157	132	362	1030	251	208	473	2230	774	158	1548	130	
RTOR Reduction (vph)	0	0	0	0	0	106	0	0	0	0	0	90	
Lane Group Flow (vph)	157	132	362	1030	251	102	473	2230	774	158	1548	40	
Confl. Peds. (#/hr)	34				34				14	14			
Heavy Vehicles (%)	0%	0%	2%	1%	0%	2%	1%	2%	2%	1%	3%	2%	
Turn Type	pm+pt	NA	Free	pm+pt	NA	Perm	pm+pt	NA	Free	pm+pt	NA	Perm	
Protected Phases	7	4		3	8		5	2		1	6		
Permitted Phases	4		Free	8		8	2		Free	6		6	
Actuated Green, G (s)	22.5	15.5	120.0	44.5	33.5	33.5	61.5	49.0	120.0	42.5	34.0	34.0	
Effective Green, g (s)	22.5	18.5	120.0	44.5	36.5	36.5	61.5	52.0	120.0	42.5	37.0	37.0	
Actuated g/C Ratio	0.19	0.15	1.00	0.37	0.30	0.30	0.51	0.43	1.00	0.35	0.31	0.31	
Clearance Time (s)	4.0	7.0		5.0	7.0	7.0	4.0	7.0		4.0	7.0	7.0	
Vehicle Extension (s)	3.0	5.0		3.0	5.0	5.0	3.0	5.0		3.0	5.0	5.0	
Lane Grp Cap (vph)	224	263	1425	835	520	413	371	1983	1402	170	1397	439	
v/s Ratio Prot	0.04	0.08		c0.25	0.15		c0.25	0.49		0.07	0.34		
v/s Ratio Perm	0.09		0.25	c0.21		0.08	c0.40		0.55	0.26		0.03	
v/c Ratio	0.70	0.50	0.25	1.23	0.48	0.25	1.27	1.12	0.55	0.93	1.11	0.09	
Uniform Delay, d1	44.3	46.5	0.0	34.3	34.1	31.4	37.2	34.0	0.0	31.9	41.5	29.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	9.5	3.1	0.4	115.5	1.5	0.7	143.2	63.3	1.6	48.3	59.4	0.4	
Delay (s)	53.7	49.7	0.4	149.7	35.5	32.1	180.4	97.3	1.6	80.1	100.9	29.9	
Level of Service	D	D	A	F	D	C	F	F	A	F	F	C	
Approach Delay (s)		23.3			114.0			87.3			94.1		
Approach LOS		C			F			F			F		
Intersection Summary													
HCM 2000 Control Delay		88.7			HCM 2000 Level of Service				F				
HCM 2000 Volume to Capacity ratio		1.26											
Actuated Cycle Length (s)		120.0			Sum of lost time (s)				17.0				
Intersection Capacity Utilization		109.6%			ICU Level of Service				H				
Analysis Period (min)		15											
c Critical Lane Group													

Lanes, Volumes, Timings
2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp

BG 2033 PM.syn
04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	26	0	302	560	146	369	0	2804	574	0	2757	11
Future Volume (vph)	26	0	302	560	146	369	0	2804	574	0	2757	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.5	3.3	3.6	3.5	3.6	3.6	3.6	3.6	3.6	3.5
Storage Length (m)	50.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Storage Lanes	1		1	1		1	0		1	0		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.91	1.00	1.00	0.86	0.86
Ped Bike Factor	1.00					0.99			0.97		1.00	
Frt			0.850			0.850			0.850		0.999	
Flt Protected	0.950			0.950	0.971							
Satd. Flow (prot)	1570	0	1437	1463	1553	1409	0	4577	1439	0	4780	0
Flt Permitted	0.950			0.950	0.971							
Satd. Flow (perm)	1568	0	1437	1463	1553	1391	0	4577	1400	0	4780	0
Right Turn on Red			Yes			Yes			Yes		Yes	Yes
Satd. Flow (RTOR)			86			291			158		1	
Link Speed (k/h)		50			50		50			50		
Link Distance (m)		142.1			192.6		324.8			280.4		
Travel Time (s)		10.2			13.9		23.4			20.2		
Confl. Peds. (#/hr)	2					2	14		14	14		14
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
Heavy Vehicles (%)	0%	0%	0%	2%	1%	2%	0%	2%	1%	0%	23%	0%
Adj. Flow (vph)	28	0	328	609	159	401	0	3048	624	0	2997	12
Shared Lane Traffic (%)				38%								
Lane Group Flow (vph)	28	0	328	378	390	401	0	3048	624	0	3009	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.3			3.3			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.19	1.14	1.16	1.19	1.14	1.16	1.14	1.14	1.14	1.14	1.14	1.16
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1		1	1		1	2		1	2		2
Detector Template	Left		Right	Left	Thru	Right		Thru	Right		Thru	
Leading Detector (m)	2.0		2.0	2.0	10.0	2.0		10.0	2.0		10.0	
Trailing Detector (m)	0.0		0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Detector 1 Position(m)	0.0		0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Detector 1 Size(m)	2.0		2.0	2.0	0.6	2.0		0.6	2.0		0.6	
Detector 1 Type	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Detector 1 Delay (s)	0.0		0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Detector 2 Position(m)					9.4			9.4			9.4	
Detector 2 Size(m)					0.6			0.6			0.6	
Detector 2 Type					Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

Lanes, Volumes, Timings

BG 2033 PM.syn

2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp

04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)					0.0			0.0				0.0
Turn Type	Prot		Perm	Perm	NA	Free		NA	Free			NA
Protected Phases	3			4	4			6			2	
Permitted Phases			3	4		Free		Free				
Detector Phase	3		3	4	4			6			2	
Switch Phase												
Minimum Initial (s)	7.0		7.0	10.0	10.0			5.0			28.0	
Minimum Split (s)	23.0		23.0	38.0	38.0			35.0			35.0	
Total Split (s)	23.0		23.0	38.0	38.0			79.0			79.0	
Total Split (%)	16.4%		16.4%	27.1%	27.1%			56.4%			56.4%	
Maximum Green (s)	18.0		18.0	31.0	31.0			72.0			72.0	
Yellow Time (s)	3.0		3.0	4.0	4.0			4.0			4.0	
All-Red Time (s)	2.0		2.0	3.0	3.0			3.0			3.0	
Lost Time Adjust (s)	-1.0		-3.0	-3.0	-3.0			-3.0			-3.0	
Total Lost Time (s)	4.0		2.0	4.0	4.0			4.0			4.0	
Lead/Lag	Lead		Lead	Lag	Lag							
Lead-Lag Optimize?	Yes		Yes	Yes	Yes							
Vehicle Extension (s)	3.0		3.0	3.0	3.0			4.5			4.5	
Recall Mode	Min		Min	Min	Min			C-Min			C-Min	
Walk Time (s)				7.0	7.0			7.0			7.0	
Flash Dont Walk (s)				24.0	24.0			21.0			21.0	
Pedestrian Calls (#/hr)				0	0			0			0	
Act Effct Green (s)	19.0		21.0	34.0	34.0	140.0		75.0	140.0		75.0	
Actuated g/C Ratio	0.14		0.15	0.24	0.24	1.00		0.54	1.00		0.54	
v/c Ratio	0.13		1.14	1.06	1.03	0.29		1.24	0.45		1.17	
Control Delay	55.1		134.2	115.8	106.6	0.5		141.8	0.3		114.3	
Queue Delay	0.0		0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Total Delay	55.1		134.2	115.8	106.6	0.5		141.8	0.3		114.3	
LOS	E		F	F	F	A		F	A		F	
Approach Delay		128.0			73.2			117.8			114.3	
Approach LOS		F			E			F			F	
Queue Length 50th (m)	7.3		~88.7	~127.5	~128.2	0.0		~403.0	0.0		~304.9	
Queue Length 95th (m)	17.3		#151.9	#196.3	#198.2	0.0		m#403.4	m0.0		#324.7	
Internal Link Dist (m)		118.1			168.6			300.8			256.4	
Turn Bay Length (m)	50.0											
Base Capacity (vph)	213		288	355	377	1391		2451	1400		2561	
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		1.14	1.06	1.03	0.29		1.24	0.45		1.17	

Intersection Summary

Area Type: CBD
 Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 115.4 (82%), Referenced to phase 2:SBT and 6:NBT, Start of Green
 Natural Cycle: 150
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.24

Lanes, Volumes, Timings

BG 2033 PM.syn

2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp

04-03-2024

Intersection Signal Delay: 110.6 Intersection LOS: F
 Intersection Capacity Utilization 97.2% ICU Level of Service F
 Analysis Period (min) 15
 ~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp



HCM Signalized Intersection Capacity Analysis
 2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp

BG 2033 PM.syn
 04-03-2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	26	0	302	560	146	369	0	2804	574	0	2757	11
Future Volume (vph)	26	0	302	560	146	369	0	2804	574	0	2757	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.5	3.3	3.6	3.5	3.6	3.6	3.6	3.6	3.6	3.5
Total Lost time (s)	4.0	2.0	4.0	4.0	4.0	1.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	0.91	1.00	0.86	0.99	1.00	0.97	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	0.99	1.00	1.00	0.97	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	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	0.85	1.00	0.85	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.95	1.00	0.95	0.97	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1570	1437	1463	1553	1391	4577	1400	4782	1400	1900	1900	1900
Flt Permitted	0.95	1.00	0.95	0.97	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (perm)	1570	1437	1463	1553	1391	4577	1400	4782	1400	1900	1900	1900
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	28	0	328	609	159	401	0	3048	624	0	2997	12
RTOR Reduction (vph)	0	0	73	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	28	0	255	378	390	401	0	3048	624	0	3009	0
Confl. Peds. (#/hr)	2					2	14		14	14		14
Heavy Vehicles (%)	0%	0%	0%	2%	1%	2%	0%	2%	1%	0%	23%	0%
Turn Type	Prot	Perm	Perm	NA	Free	NA	Free	NA	Free	NA	Free	NA
Protected Phases	3			4		6				2		
Permitted Phases		3	4		Free		Free					
Actuated Green, G (s)	18.0	18.0	31.0	31.0	140.0	72.0	140.0	72.0	140.0	72.0	140.0	72.0
Effective Green, g (s)	19.0	21.0	34.0	34.0	140.0	75.0	140.0	75.0	140.0	75.0	140.0	75.0
Actuated g/C Ratio	0.14	0.15	0.24	0.24	1.00	0.54	1.00	0.54	1.00	0.54	1.00	0.54
Clearance Time (s)	5.0	5.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lane Grp Cap (vph)	213	215	355	377	1391	2451	1400	2561	1400	1900	1900	1900
v/s Ratio Prot	0.02					0.67		0.63				
v/s Ratio Perm		c0.18	c0.26	0.25	0.29		0.45					
v/c Ratio	0.13	1.19	1.06	1.03	0.29	1.24	0.45	1.17	1.24	0.45	1.17	1.17
Uniform Delay, d1	53.2	59.5	53.0	53.0	0.0	32.5	0.0	32.5	32.5	0.0	32.5	32.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.04	1.00	1.00	1.04	1.00	1.00	1.00
Incremental Delay, d2	0.3	120.6	66.0	55.5	0.5	110.6	0.3	83.1	110.6	0.3	83.1	83.1
Delay (s)	53.5	180.1	119.0	108.5	0.5	144.3	0.3	115.6	144.3	0.3	115.6	115.6
Level of Service	D	F	F	F	A	F	A	F	F	A	F	F
Approach Delay (s)	170.1			74.9		119.9		115.6	119.9		115.6	115.6
Approach LOS	F			E		F		F	F		F	F

Intersection Summary			
HCM 2000 Control Delay	114.1	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.20		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	97.2%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
 3: Trafalgar Rd & QEW EB-Off Ramp

BG 2033 PM.syn
 04-03-2024

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	1040	511	0	2322	2144	340
Future Volume (vph)	1040	511	0	2322	2144	340
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.5	3.6	3.6	3.6	3.6
Lane Util. Factor	0.97	1.00	1.00	0.91	0.91	1.00
Ped Bike Factor		0.99				
Frt		0.850				0.850
Flt Protected	0.950					
Satd. Flow (prot)	3046	1423	0	4577	4577	1454
Flt Permitted	0.950					
Satd. Flow (perm)	3046	1402	0	4577	4577	1454
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		3				123
Link Speed (k/h)	50			50	50	
Link Distance (m)	199.2			51.4	324.8	
Travel Time (s)	14.3			3.7	23.4	
Confl. Peds. (#/hr)		2				
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	1%	0%	2%	2%	0%
Adj. Flow (vph)	1130	555	0	2524	2330	370
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1130	555	0	2524	2330	370
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	6.6			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.19	1.16	1.14	1.14	1.14	1.14
Turning Speed (k/h)	24	14	24			14
Number of Detectors	1	1		2	2	1
Detector Template	Left	Right		Thru	Thru	Right
Leading Detector (m)	2.0	2.0		10.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	2.0	2.0		0.6	0.6	2.0
Detector 1 Type	CI+Ex	CI+Ex		CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)				9.4	9.4	
Detector 2 Size(m)				0.6	0.6	
Detector 2 Type				CI+Ex	CI+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Perm	Perm		NA	NA	Free
Protected Phases				2	2	

Lanes, Volumes, Timings
3: Trafalgar Rd & QEW EB-Off Ramp

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Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Permitted Phases	4	4				Free
Detector Phase	4	4		2	2	
Switch Phase						
Minimum Initial (s)	10.0	10.0		29.0	29.0	
Minimum Split (s)	38.0	38.0		36.0	36.0	
Total Split (s)	60.0	60.0		80.0	80.0	
Total Split (%)	42.9%	42.9%		57.1%	57.1%	
Maximum Green (s)	53.0	53.0		73.0	73.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	
All-Red Time (s)	3.0	3.0		3.0	3.0	
Lost Time Adjust (s)	-3.0	-3.0		-3.0	-3.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Recall Mode	None	None		C-Max	C-Max	
Walk Time (s)	7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	24.0	24.0		22.0	22.0	
Pedestrian Calls (#/hr)	0	0		0	0	
Act Effct Green (s)	56.0	56.0		76.0	76.0	140.0
Actuated g/C Ratio	0.40	0.40		0.54	0.54	1.00
v/c Ratio	0.93	0.99		1.02	0.94	0.25
Control Delay	53.8	76.5		44.9	16.3	0.0
Queue Delay	0.0	0.0		0.0	0.0	0.0
Total Delay	53.8	76.5		44.9	16.3	0.0
LOS	D	E		D	B	A
Approach Delay	61.3			44.9	14.1	
Approach LOS	E			D	B	
Queue Length 50th (m)	160.5	158.4		~279.8	154.6	0.0
Queue Length 95th (m)	#205.6	#239.7		m246.6	m98.2	m0.0
Internal Link Dist (m)	175.2			27.4	300.8	
Turn Bay Length (m)						
Base Capacity (vph)	1218	562		2484	2484	1454
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	0.93	0.99		1.02	0.94	0.25

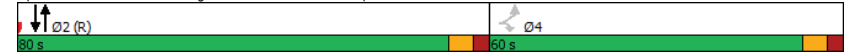
Intersection Summary	
Area Type:	CBD
Cycle Length:	140
Actuated Cycle Length:	140
Offset:	133.6 (95%), Referenced to phase 2:NBSB and 6:, Start of Green
Natural Cycle:	100
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	1.02
Intersection Signal Delay:	36.8
Intersection LOS:	D
Intersection Capacity Utilization:	89.5%
ICU Level of Service:	E
Analysis Period (min):	15

Lanes, Volumes, Timings
3: Trafalgar Rd & QEW EB-Off Ramp

BG 2033 PM.syn
04-03-2024

- Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Trafalgar Rd & QEW EB-Off Ramp



HCM Signalized Intersection Capacity Analysis
3: Trafalgar Rd & QEW EB-Off Ramp

BG 2033 PM.syn
04-03-2024

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↖ ↗	↗		↖ ↗	↖ ↗	↗
Traffic Volume (vph)	1040	511	0	2322	2144	340
Future Volume (vph)	1040	511	0	2322	2144	340
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.5	3.6	3.6	3.6	3.6
Total Lost time (s)	4.0	4.0		4.0	4.0	1.0
Lane Util. Factor	0.97	1.00		0.91	0.91	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00
Fr	1.00	0.85		1.00	1.00	0.85
Fl	0.95	1.00		1.00	1.00	1.00
Satd. Flow (prot)	3046	1402		4577	4577	1454
Fl Permitted	0.95	1.00		1.00	1.00	1.00
Satd. Flow (perm)	3046	1402		4577	4577	1454
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1130	555	0	2524	2330	370
RTOR Reduction (vph)	0	2	0	0	0	0
Lane Group Flow (vph)	1130	553	0	2524	2330	370
Confl. Peds. (#/hr)		2				
Heavy Vehicles (%)	0%	1%	0%	2%	2%	0%
Turn Type	Perm	Perm		NA	NA	Free
Protected Phases				2	2	
Permitted Phases	4	4				Free
Actuated Green, G (s)	53.0	53.0		73.0	73.0	140.0
Effective Green, g (s)	56.0	56.0		76.0	76.0	140.0
Actuated g/C Ratio	0.40	0.40		0.54	0.54	1.00
Clearance Time (s)	7.0	7.0		7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	1218	560		2484	2484	1454
v/s Ratio Prot				c0.55	0.51	
v/s Ratio Perm	0.37	c0.39				0.25
v/c Ratio	0.93	0.99		1.02	0.94	0.25
Uniform Delay, d1	40.1	41.7		32.0	29.8	0.0
Progression Factor	1.00	1.00		0.89	0.50	1.00
Incremental Delay, d2	12.1	34.6		16.1	1.0	0.0
Delay (s)	52.1	76.2		44.8	15.7	0.0
Level of Service	D	E		D	B	A
Approach Delay (s)	60.1			44.8	13.6	
Approach LOS	E			D	B	

Intersection Summary			
HCM 2000 Control Delay	36.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.03		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	89.5%	ICU Level of Service	E
Analysis Period (min)	15		

Lanes, Volumes, Timings
4: Trafalgar Rd & Argus Rd

BG 2033 PM.syn
04-03-2024

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗		↖ ↗	↖ ↗	
Traffic Volume (vph)	0	110	0	3136	1900	756
Future Volume (vph)	0	110	0	3136	1900	756
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.6	3.5	3.6	3.6	3.6	3.6
Lane Util. Factor	1.00	1.00	1.00	0.91	0.91	0.91
Ped Bike Factor						
Fr		0.865			0.957	
Fl						
Fit Protected						
Satd. Flow (prot)	0	1354	0	4577	4368	0
Fl Permitted						
Satd. Flow (perm)	0	1354	0	4577	4368	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	145.7			270.2	51.4	
Travel Time (s)	10.5			19.5	3.7	
Confl. Peds. (#/hr)						24
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	8%	0%	2%	2%	3%
Adj. Flow (vph)	0	120	0	3409	2065	822
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	120	0	3409	2887	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			3.3	3.3	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.14	1.16	1.14	1.14	1.14	1.14
Turning Speed (k/h)	24	14	24			14
Sign Control	Stop			Free	Free	

Intersection Summary	
Area Type:	CBD
Control Type:	Unsignalized
Intersection Capacity Utilization	74.4%
ICU Level of Service	D
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis
4: Trafalgar Rd & Argus Rd

BG 2033 PM.syn
04-03-2024

Movement	EBL	EBR	NBL	NBT	SBT	SBR	
Lane Configurations		↗		↖↖	↗↗		
Traffic Volume (veh/h)	0	110	0	3136	1900	756	
Future Volume (Veh/h)	0	110	0	3136	1900	756	
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	120	0	3409	2065	822	
Pedestrians	24						
Lane Width (m)	3.5						
Walking Speed (m/s)	1.2						
Percent Blockage	2						
Right turn flare (veh)							
Median type				None	None		
Median storage (veh)							
Upstream signal (m)				270	52		
pX, platoon unblocked	0.70	0.52	0.52				
vC, conflicting volume	3636	1123	2911				
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol	0	0	1471				
tC, single (s)	6.8	7.1	4.1				
tC, 2 stage (s)							
tF (s)	3.5	3.4	2.2				
pD queue free %	100	78	100				
cM capacity (veh/h)	709	548	239				
Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	120	1136	1136	1136	826	826	1235
Volume Left	0	0	0	0	0	0	0
Volume Right	120	0	0	0	0	0	822
sSH	548	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.22	0.67	0.67	0.67	0.49	0.49	0.73
Queue Length 95th (m)	6.6	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (s)	13.4	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	B						
Approach Delay (s)	13.4	0.0			0.0		
Approach LOS	B						
Intersection Summary							
Average Delay			0.3				
Intersection Capacity Utilization			74.4%		ICU Level of Service		D
Analysis Period (min)			15				

Lanes, Volumes, Timings
5: Trafalgar Rd & Cross Ave/South Service Rd

BG 2033 PM.syn
04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖↖	↖	↗	↖	↖	↗	↖↖	↖↖	↗	↖↖	↖↖	↖↖
Traffic Volume (vph)	921	55	171	80	106	199	236	1614	39	92	1495	274
Future Volume (vph)	921	55	171	80	106	199	236	1614	39	92	1495	274
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.6	3.3	3.6	3.5	3.3	3.6	3.6	3.3	3.6	3.6
Storage Length (m)	130.0		0.0	25.0		0.0	50.0		0.0	25.0		0.0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.91	0.91
Ped Bike Factor		0.96		0.98				0.99			0.99	
Ft		0.887				0.850		0.996			0.977	
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2958	1346	0	1540	1644	1423	1496	4574	0	1570	4465	0
Fit Permitted	0.950			0.606			0.078			0.085		
Satd. Flow (perm)	2958	1346	0	958	1644	1423	123	4574	0	141	4465	0
Right Turn on Red			Yes			Yes		Yes			Yes	Yes
Satd. Flow (RTOR)		143				148		3			29	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		151.2			330.4			150.2			270.2	
Travel Time (s)		10.9			23.8			10.8			19.5	
Confl. Peds. (#/hr)			15	15			18		70	70		18
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
Heavy Vehicles (%)	3%	8%	9%	2%	4%	1%	5%	1%	0%	0%	1%	3%
Adj. Flow (vph)	1001	60	186	87	115	216	257	1754	42	100	1625	298
Shared Lane Traffic (%)												
Lane Group Flow (vph)	1001	246	0	87	115	216	257	1796	0	100	1923	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		6.6			6.6			3.3			3.3	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.19	1.14	1.14	1.19	1.14	1.16	1.19	1.14	1.14	1.19	1.14	1.14
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2	1	1	2		1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	0.6	2.0		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

Lanes, Volumes, Timings
5: Trafalgar Rd & Cross Ave/South Service Rd

BG 2033 PM.syn
04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Perm	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	7	4			8		5	2		1	6	
Permitted Phases				8		8	2			6		
Detector Phase	7	4		8	8	8	5	2		1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	7.0	27.0		7.0	27.0	
Minimum Split (s)	17.0	25.0		25.0	25.0	25.0	11.5	34.0		11.5	34.0	
Total Split (s)	41.0	66.0		25.0	25.0	25.0	20.0	62.4		11.6	54.0	
Total Split (%)	29.3%	47.1%		17.9%	17.9%	17.9%	14.3%	44.6%		8.3%	38.6%	
Maximum Green (s)	34.0	59.0		18.0	18.0	18.0	16.0	55.4		7.6	47.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	3.0	4.0		3.0	4.0	
All-Red Time (s)	3.0	3.0		3.0	3.0	3.0	1.0	3.0		1.0	3.0	
Lost Time Adjust (s)	-3.0	-3.0		0.0	-3.0	-3.0	0.0	-3.0		0.0	-3.0	
Total Lost Time (s)	4.0	4.0		7.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lead/Lag	Lead			Lag	Lag	Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes			Yes	Yes	Yes	Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	4.0		4.0	4.0	4.0	3.0	5.0		3.0	5.0	
Recall Mode	Min	Min		Min	Min	Min	C-Max			Min	C-Max	
Walk Time (s)		7.0		7.0	7.0	7.0		7.0			7.0	
Flash Dont Walk (s)		11.0		11.0	11.0	11.0		11.0			11.0	
Pedestrian Calls (#/hr)		0		0	0	0		0			0	
Act Effct Green (s)	37.0	60.3		16.3	19.3	19.3	71.7	59.8		58.0	50.0	
Actuated g/C Ratio	0.26	0.43		0.12	0.14	0.14	0.51	0.43		0.41	0.36	
v/c Ratio	1.28	0.37		0.78	0.51	0.67	1.08	0.92		0.72	1.19	
Control Delay	178.1	12.1		101.4	63.8	29.6	90.3	51.8		45.5	133.5	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	178.1	12.1		101.4	63.8	29.6	90.3	51.8		45.5	133.5	
LOS	F	B		F	E	C	F	D		D	F	
Approach Delay		145.4			54.0			56.6			129.1	
Approach LOS		F			D			E			F	
Queue Length 50th (m)	~190.1	17.9		24.7	31.1	18.0	~77.1	160.9		19.4	~242.9	
Queue Length 95th (m)	#233.1	39.4		#52.9	52.0	47.7	m#71.3	m140.8		m21.5	m#268.0	
Internal Link Dist (m)		127.2			306.4			126.2			246.2	
Turn Bay Length (m)	130.0			25.0			50.0			25.0		
Base Capacity (vph)	781	675		123	246	339	237	1954		139	1613	
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	
Reduced v/c Ratio	1.28	0.36		0.71	0.47	0.64	1.08	0.92		0.72	1.19	

Intersection Summary

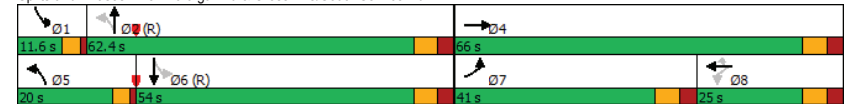
Area Type: CBD
 Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 128 (91%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
 Natural Cycle: 150
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.28

Lanes, Volumes, Timings
5: Trafalgar Rd & Cross Ave/South Service Rd

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Intersection Signal Delay: 101.2
 Intersection Capacity Utilization 104.5%
 Intersection LOS: F
 ICU Level of Service G
 Analysis Period (min) 15
 ~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Plots and Phases: 5: Trafalgar Rd & Cross Ave/South Service Rd



HCM Signalized Intersection Capacity Analysis
5: Trafalgar Rd & Cross Ave/South Service Rd

BG 2033 PM.syn
04-03-2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	921	55	171	80	106	199	236	1614	39	92	1495	274
Future Volume (vph)	921	55	171	80	106	199	236	1614	39	92	1495	274
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.6	3.3	3.6	3.5	3.3	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)	4.0	4.0		7.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	1.00		1.00	1.00	1.00	1.00	0.91		1.00	0.91	
Frpb, ped/bikes	1.00	0.96		1.00	1.00	1.00	1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		0.98	1.00	1.00	1.00	1.00		1.00	1.00	
Fr t	1.00	0.89		1.00	1.00	0.85	1.00	1.00		1.00	0.98	
Fl t Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	2958	1345		1501	1644	1423	1496	4576		1570	4464	
Fl t Permitted	0.95	1.00		0.61	1.00	1.00	0.08	1.00		0.09	1.00	
Satd. Flow (perm)	2958	1345		958	1644	1423	123	4576		141	4464	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1001	60	186	87	115	216	257	1754	42	100	1625	298
RTOR Reduction (vph)	0	81	0	0	0	128	0	2	0	0	19	0
Lane Group Flow (vph)	1001	165	0	87	115	88	257	1794	0	100	1904	0
Confl. Peds. (#/hr)			15	15			18		70	70		18
Heavy Vehicles (%)	3%	8%	9%	2%	4%	1%	5%	1%	0%	0%	1%	3%
Turn Type	Prot	NA		Perm	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		8	8	5	2	1		6	6	
Permitted Phases				8	8	2		6				
Actuated Green, G (s)	34.0	57.3		16.3	16.3	16.3	68.7	56.7		55.0	47.0	
Effective Green, g (s)	37.0	60.3		16.3	19.3	19.3	68.7	59.7		55.0	50.0	
Actuated g/C Ratio	0.26	0.43		0.12	0.14	0.14	0.49	0.43		0.39	0.36	
Clearance Time (s)	7.0	7.0		7.0	7.0	7.0	4.0	7.0		4.0	7.0	
Vehicle Extension (s)	3.0	4.0		4.0	4.0	4.0	3.0	5.0		3.0	5.0	
Lane Grp Cap (vph)	781	579		111	226	196	233	1951		137	1594	
v/s Ratio Prot	c0.34	0.12		0.07			c0.14	0.39		0.04	c0.43	
v/s Ratio Perm				c0.09		0.06	0.40			0.25		
v/c Ratio	1.28	0.28		0.78	0.51	0.45	1.10	0.92		0.73	1.19	
Uniform Delay, d1	51.5	25.9		60.1	56.0	55.5	45.3	37.9		32.4	45.0	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.24	1.34		1.28	1.16	
Incremental Delay, d2	136.5	0.4		30.9	2.4	2.2	52.9	0.9		8.0	90.5	
Delay (s)	188.0	26.2		91.0	58.4	57.7	108.9	51.7		49.6	142.6	
Level of Service	F	C		F	E	E	F	D		D	F	
Approach Delay (s)	156.1			64.8			58.8			138.0		
Approach LOS	F			E			E			F		

Intersection Summary			
HCM 2000 Control Delay	108.3	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.12		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	104.5%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
6: Trafalgar Rd & Cornwall Rd

BG 2033 PM.syn
04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	523	526	54	101	819	498	74	864	91	639	708	388
Future Volume (vph)	523	526	54	101	819	498	74	864	91	639	708	388
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.5
Storage Length (m)	80.0		0.0	80.0		0.0	25.0		0.0	80.0		0.0
Storage Lanes	2		0	1		1	1		0	1		1
Taper Length (m)	7.5			7.5		7.5			7.5			7.5
Lane Util. Factor	0.97	0.95	0.95	1.00	0.95	1.00	1.00	*0.80	0.95	0.97	*0.80	1.00
Ped Bike Factor	0.99	1.00		0.99		0.98	0.99	1.00		0.99		0.97
Fr t		0.986				0.850		0.986				0.850
Fl t Protected	0.950			0.950		0.950		0.950		0.950		0.950
Satd. Flow (prot)	3016	3101	0	1570	3217	1439	1540	2691	0	2987	1368	1409
Fl t Permitted	0.950			0.950		0.950		0.950		0.950		0.950
Satd. Flow (perm)	2991	3101	0	1549	3217	1413	1528	2691	0	2971	1368	1361
Right Turn on Red			Yes			Yes		Yes		Yes		Yes
Satd. Flow (RTOR)		8				327		7				282
Link Speed (k/h)		50			50			50				50
Link Distance (m)		285.8			142.3			311.4				130.3
Travel Time (s)		20.6			10.2			22.4				9.4
Confl. Peds. (#/hr)	21		14	14		21	17		10	10		17
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
Heavy Vehicles (%)	1%	3%	1%	0%	1%	1%	2%	0%	0%	2%	0%	2%
Adj. Flow (vph)	568	572	59	110	890	541	80	939	99	695	770	422
Shared Lane Traffic (%)												
Lane Group Flow (vph)	568	631	0	110	890	541	80	1038	0	695	770	422
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)	6.6				6.6			6.6				6.6
Link Offset(m)	0.0				0.0			0.0				0.0
Crosswalk Width(m)	4.8				4.8			4.8				4.8
Two way Left Turn Lane												
Headway Factor	1.19	1.14	1.14	1.19	1.14	1.14	1.19	1.14	1.14	1.19	1.14	1.16
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2	1	1	2		1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0		2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6		2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4				9.4
Detector 2 Size(m)		0.6			0.6			0.6				0.6
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex				Cl+Ex
Detector 2 Channel												

Lanes, Volumes, Timings
6: Trafalgar Rd & Cornwall Rd

BG 2033 PM.syn
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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA	Free	Prot	NA		Prot	NA	Perm
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases					Free							6
Detector Phase	3	8		7	4		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	7.0	10.0		7.0	10.0		7.0	20.0		7.0	20.0	20.0
Minimum Split (s)	12.0	37.0		12.0	37.0		12.0	39.0		12.0	39.0	39.0
Total Split (s)	23.0	44.0		17.0	38.0		12.0	51.0		28.0	67.0	67.0
Total Split (%)	16.4%	31.4%		12.1%	27.1%		8.6%	36.4%		20.0%	47.9%	47.9%
Maximum Green (s)	18.0	37.0		12.0	31.0		7.0	44.0		23.0	60.0	60.0
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	4.0
All-Red Time (s)	2.0	3.0		2.0	3.0		2.0	3.0		2.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-3.0		-1.0	-3.0		-1.0	-3.0		-1.0	-3.0	-3.0
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	0.2	0.2		0.2	0.2		0.2	0.2		0.2	0.2	0.2
Recall Mode	Max	Max		Max	Max		None	C-Max		Max	C-Max	C-Max
Walk Time (s)		7.0			7.0			7.0			7.0	7.0
Flash Dont Walk (s)		23.0			23.0			25.0			25.0	25.0
Pedestrian Calls (#/hr)		0			0			0			0	0
Act Effct Green (s)	19.0	40.0		13.0	34.0	140.0	8.0	47.0		24.0	63.0	63.0
Actuated g/C Ratio	0.14	0.29		0.09	0.24	1.00	0.06	0.34		0.17	0.45	0.45
v/c Ratio	1.39	0.71		0.76	1.14	0.38	0.91	1.14		1.36	1.25	0.55
Control Delay	232.9	49.3		92.6	125.1	0.8	137.9	119.3		218.8	141.6	4.8
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	232.9	49.3		92.6	125.1	0.8	137.9	119.3		218.8	141.6	4.8
LOS	F	D		F	F	A	F	F		F	F	A
Approach Delay		136.3			79.1			120.7				139.5
Approach LOS		F			E			F				F
Queue Length 50th (m)	~113.2	85.9		31.8	~158.9	0.0	23.6	~220.5		~140.8	~339.7	18.4
Queue Length 95th (m)	#151.2	108.8		#63.0	#201.8	0.0	#58.1	#273.4		m#116.2	m#273.1	m13.7
Internal Link Dist (m)		261.8			118.3			287.4				106.3
Turn Bay Length (m)	80.0			80.0			25.0			80.0		
Base Capacity (vph)	409	891		145	781	1413	88	908		512	615	767
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	0
Reduced v/c Ratio	1.39	0.71		0.76	1.14	0.38	0.91	1.14		1.36	1.25	0.55

Intersection Summary

Area Type: CBD
 Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green, Master Intersection
 Natural Cycle: 150
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.39

Lanes, Volumes, Timings
6: Trafalgar Rd & Cornwall Rd

BG 2033 PM.syn
04-03-2024

Intersection Signal Delay: 119.0	Intersection LOS: F
Intersection Capacity Utilization 105.2%	ICU Level of Service G
Analysis Period (min) 15	
* User Entered Value	
~ Volume exceeds capacity, queue is theoretically infinite. Queue shown is maximum after two cycles.	
# 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.	
m Volume for 95th percentile queue is metered by upstream signal.	

Splits and Phases: 6: Trafalgar Rd & Cornwall Rd



HCM Signalized Intersection Capacity Analysis
6: Trafalgar Rd & Cornwall Rd

BG 2033 PM.syn
04-03-2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	523	526	54	101	819	498	74	864	91	639	708	388
Future Volume (vph)	523	526	54	101	819	498	74	864	91	639	708	388
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.5
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.97	0.95		1.00	0.95	1.00	1.00	*0.80		0.97	*0.80	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.98	1.00	1.00		1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Fr	1.00	0.99		1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3016	3101		1570	3217	1413	1540	2690		2987	1368	1361
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3016	3101		1570	3217	1413	1540	2690		2987	1368	1361
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	568	572	59	110	890	541	80	939	99	695	770	422
RTOR Reduction (vph)	0	6	0	0	0	0	0	5	0	0	0	155
Lane Group Flow (vph)	568	625	0	110	890	541	80	1033	0	695	770	267
Confl. Peds. (#/hr)	21		14	14		21	17		10	10		17
Heavy Vehicles (%)	1%	3%	1%	0%	1%	1%	2%	0%	0%	2%	0%	2%
Turn Type	Prot	NA		Prot	NA	Free	Prot	NA		Prot	NA	Perm
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases						Free						6
Actuated Green, G (s)	18.0	37.0		12.0	31.0	140.0	7.0	44.0		23.0	60.0	60.0
Effective Green, g (s)	19.0	40.0		13.0	34.0	140.0	8.0	47.0		24.0	63.0	63.0
Actuated g/C Ratio	0.14	0.29		0.09	0.24	1.00	0.06	0.34		0.17	0.45	0.45
Clearance Time (s)	5.0	7.0		5.0	7.0		5.0	7.0		5.0	7.0	7.0
Vehicle Extension (s)	0.2	0.2		0.2	0.2		0.2	0.2		0.2	0.2	0.2
Lane Grp Cap (vph)	409	886		145	781	1413	88	903		512	615	612
v/s Ratio Prot	c0.19	0.20		0.07	c0.28		0.05	0.38		c0.23	c0.56	
v/s Ratio Perm						0.38						0.20
v/c Ratio	1.39	0.71		0.76	1.14	0.38	0.91	1.14		1.36	1.25	0.44
Uniform Delay, d1	60.5	44.7		62.0	53.0	0.0	65.6	46.5		58.0	38.5	26.3
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.43	0.70	0.53
Incremental Delay, d2	189.5	4.7		30.5	78.0	0.8	64.9	78.1		162.0	114.7	0.2
Delay (s)	250.0	49.4		92.4	131.0	0.8	130.5	124.6		245.3	141.7	14.1
Level of Service	F	D		F	F	A	F	F		F	F	B
Approach Delay (s)	144.4			82.5			125.0			151.3		
Approach LOS	F			F			F			F		

Intersection Summary			
HCM 2000 Control Delay	126.3	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.29		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	105.2%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings

7: South Service Road/Canadian Road & QEW EB Off-Ramp/Royal Windsor Drive 04-03-2024

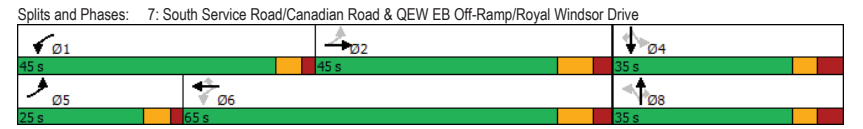
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	338	589	19	198	704	30	15	51	108	15	129	460
Future Volume (vph)	338	589	19	198	704	30	15	51	108	15	129	460
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	150.0	0.0	155.0		70.0	15.0		0.0	0.0			30.0
Storage Lanes	2	0	1		1	1		1	1			1
Taper Length (m)	7.5		7.5		7.5			7.5				7.5
Lane Util. Factor	0.97	0.95	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr		0.995				0.850		0.850				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3502	3395	0	1752	3505	1615	1805	1900	1615	1805	1900	1599
Flt Permitted	0.297			0.364			0.559			0.721		
Satd. Flow (perm)	1095	3395	0	671	3505	1615	1062	1900	1615	1370	1900	1599
Right Turn on Red			Yes			Yes			Yes		Yes	Yes
Satd. Flow (RTOR)		3				94			152			398
Link Speed (k/h)		80			80			60				40
Link Distance (m)		324.5			247.2			158.7				215.5
Travel Time (s)		14.6			11.1			9.5				19.4
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
Heavy Vehicles (%)	0%	6%	0%	3%	3%	0%	0%	0%	0%	0%	0%	1%
Adj. Flow (vph)	367	640	21	215	765	33	16	55	117	16	140	500
Shared Lane Traffic (%)												
Lane Group Flow (vph)	367	661	0	215	765	33	16	55	117	16	140	500
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		7.2			7.2			3.6				3.6
Link Offset(m)		0.0			0.0			0.0				0.0
Crosswalk Width(m)		4.8			4.8			4.8				4.8
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	CI+Ex	CI+Ex		CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4				9.4
Detector 2 Size(m)		0.6			0.6			0.6				0.6
Detector 2 Type		CI+Ex			CI+Ex			CI+Ex				CI+Ex
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8				4

Lanes, Volumes, Timings
 7: South Service Road/Canadian Road & QEW EB Off-Ramp/Royal Windsor Drive 04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	2			6		6	8		8	4		4
Detector Phase	5	2		1	6	6	8	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	8.0	20.0		8.0	30.0	30.0	8.0	8.0	8.0	10.0	10.0	10.0
Minimum Split (s)	14.0	29.4		14.0	38.4	38.4	28.8	28.8	28.8	28.8	28.8	28.8
Total Split (s)	25.0	45.0		45.0	65.0	65.0	35.0	35.0	35.0	35.0	35.0	35.0
Total Split (%)	20.0%	36.0%		36.0%	52.0%	52.0%	28.0%	28.0%	28.0%	28.0%	28.0%	28.0%
Maximum Green (s)	19.0	36.6		39.0	56.6	56.6	27.2	27.2	27.2	27.2	27.2	27.2
Yellow Time (s)	4.0	5.4		4.0	5.4	5.4	3.7	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	2.0	3.0		2.0	3.0	3.0	4.1	4.1	4.1	4.1	4.1	4.1
Lost Time Adjust (s)	-2.0	-4.4		-2.0	-4.4	-4.4	-3.8	-3.8	-3.8	-3.8	-3.8	-3.8
Total Lost Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lead	Lag		Lead	Lag	Lag						
Lead-Lag Optimize?												
Vehicle Extension (s)	3.5	4.5		3.5	6.0	6.0	3.5	3.5	3.5	3.5	3.5	3.5
Recall Mode	None	Max		None	Max	Max	None	None	None	None	None	None
Walk Time (s)		10.0			10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Flash Dont Walk (s)		10.0			10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Pedestrian Calls (#/hr)		0			0	0	0	0	0	0	0	0
Act Effct Green (s)	76.6	62.8		73.8	61.4	61.4	20.6	20.6	20.6	20.6	20.6	20.6
Actuated g/C Ratio	0.71	0.58		0.68	0.57	0.57	0.19	0.19	0.19	0.19	0.19	0.19
v/c Ratio	0.34	0.33		0.37	0.38	0.03	0.08	0.15	0.27	0.06	0.39	0.80
Control Delay	5.8	13.5		7.2	14.7	0.1	36.1	36.8	4.0	35.5	41.1	19.4
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	5.8	13.5		7.2	14.7	0.1	36.1	36.8	4.0	35.5	41.1	19.4
LOS	A	B		A	B	A	D	D	A	D	D	B
Approach Delay		10.7			12.7			16.3			24.4	
Approach LOS		B			B			B			C	
Queue Length 50th (m)	10.0	35.5		11.6	44.6	0.0	2.9	10.2	0.0	2.9	27.1	19.6
Queue Length 95th (m)	21.2	65.5		27.8	78.4	0.0	9.2	21.7	7.9	9.2	46.9	63.1
Internal Link Dist (m)		300.5			223.2			134.7			191.5	
Turn Bay Length (m)	150.0			155.0		70.0	15.0					30.0
Base Capacity (vph)	1275	1976		906	1993	959	307	549	574	396	549	745
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.29	0.33		0.24	0.38	0.03	0.05	0.10	0.20	0.04	0.26	0.67

Intersection Summary	
Area Type:	Other
Cycle Length:	125
Actuated Cycle Length:	107.9
Natural Cycle:	85
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.80
Intersection Signal Delay:	14.9
Intersection LOS:	B
Intersection Capacity Utilization:	70.1%
ICU Level of Service:	C
Analysis Period (min):	15

Lanes, Volumes, Timings
 7: South Service Road/Canadian Road & QEW EB Off-Ramp/Royal Windsor Drive 04-03-2024



HCM Signalized Intersection Capacity Analysis
 7: South Service Road/Canadian Road & QEW EB Off-Ramp/Royal Windsor Drive 04-03-2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	338	589	19	198	704	30	15	51	108	15	129	460
Future Volume (vph)	338	589	19	198	704	30	15	51	108	15	129	460
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	0.95		1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr	1.00	1.00		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3502	3396		1752	3505	1615	1805	1900	1615	1805	1900	1599
Flt Permitted	0.30	1.00		0.36	1.00	1.00	0.56	1.00	1.00	0.72	1.00	1.00
Satd. Flow (perm)	1095	3396		671	3505	1615	1061	1900	1615	1370	1900	1599
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	367	640	21	215	765	33	16	55	117	16	140	500
RTOR Reduction (vph)	0	1	0	0	0	14	0	0	95	0	0	322
Lane Group Flow (vph)	367	660	0	215	765	19	16	55	22	16	140	178
Heavy Vehicles (%)	0%	6%	0%	3%	3%	0%	0%	0%	0%	0%	0%	1%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6		6	8		8	4		4
Actuated Green, G (s)	70.3	58.4		67.5	57.0	57.0	16.8	16.8	16.8	16.8	16.8	16.8
Effective Green, g (s)	74.3	62.8		71.5	61.4	61.4	20.6	20.6	20.6	20.6	20.6	20.6
Actuated g/C Ratio	0.69	0.58		0.66	0.57	0.57	0.19	0.19	0.19	0.19	0.19	0.19
Clearance Time (s)	6.0	8.4		6.0	8.4	8.4	7.8	7.8	7.8	7.8	7.8	7.8
Vehicle Extension (s)	3.5	4.5		3.5	6.0	6.0	3.5	3.5	3.5	3.5	3.5	3.5
Lane Grp Cap (vph)	1064	1976		569	1994	919	202	362	308	261	362	305
v/s Ratio Prot	c0.04	0.19		0.04	c0.22			0.03			0.07	
v/s Ratio Perm	0.19			0.21		0.01	0.02		0.01	0.01		c0.11
v/c Ratio	0.34	0.33		0.38	0.38	0.02	0.08	0.15	0.07	0.06	0.39	0.58
Uniform Delay, d1	6.6	11.7		7.2	12.8	10.1	35.9	36.4	35.8	35.7	38.1	39.7
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.2	0.5		0.5	0.6	0.0	0.2	0.2	0.1	0.1	0.8	3.0
Delay (s)	6.8	12.2		7.7	13.4	10.2	36.1	36.6	35.9	35.9	38.9	42.8
Level of Service	A	B		A	B	B	D	D	D	D	D	D
Approach Delay (s)		10.3			12.1			36.1			41.8	
Approach LOS		B			B			D			D	

Intersection Summary			
HCM 2000 Control Delay	19.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	107.9	Sum of lost time (s)	12.0
Intersection Capacity Utilization	70.1%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
 8: QEW WB Off-Ramp & Kerr Street 04-03-2024

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	456	0	0	748	125	284
Future Volume (vph)	456	0	0	748	125	284
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)		0.0	0.0		0.0	140.0
Storage Lanes		0	0		1	1
Taper Length (m)			7.5		7.5	
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00
Fr						0.850
Flt Protected					0.950	
Satd. Flow (prot)	3574	0	0	3574	1805	1599
Flt Permitted					0.950	
Satd. Flow (perm)	3574	0	0	3574	1805	1599
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)						215
Link Speed (k/h)	60			60	40	
Link Distance (m)	130.3			194.2	262.1	
Travel Time (s)	7.8			11.7	23.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	0%	0%	1%	0%	1%
Adj. Flow (vph)	496	0	0	813	136	309
Shared Lane Traffic (%)						
Lane Group Flow (vph)	496	0	0	813	136	309
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)		15	25		25	15
Turn Type	NA			NA	Prot	Perm
Protected Phases	4			8	2	
Permitted Phases						2
Minimum Split (s)	22.5			22.5	22.5	22.5
Total Split (s)	22.5			22.5	22.5	22.5
Total Split (%)	50.0%			50.0%	50.0%	50.0%
Maximum Green (s)	18.0			18.0	18.0	18.0
Yellow Time (s)	3.5			3.5	3.5	3.5
All-Red Time (s)	1.0			1.0	1.0	1.0
Lost Time Adjust (s)	0.0			0.0	0.0	0.0
Total Lost Time (s)	4.5			4.5	4.5	4.5
Lead/Lag						
Lead-Lag Optimize?						
Walk Time (s)	7.0			7.0	7.0	7.0
Flash Dont Walk (s)	11.0			11.0	11.0	11.0
Pedestrian Calls (#/hr)	0			0	0	0
Act Effct Green (s)	18.0			18.0	18.0	18.0
Actuated g/C Ratio	0.40			0.40	0.40	0.40

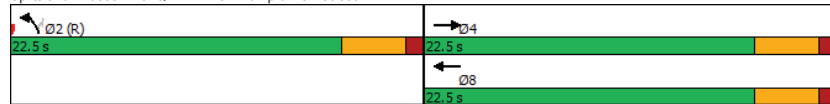
Lanes, Volumes, Timings
8: QEW WB Off-Ramp & Kerr Street

BG 2033 PM.syn
04-03-2024

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
v/c Ratio	0.35			0.57	0.19	0.40
Control Delay	10.3			12.4	9.7	5.2
Queue Delay	0.0			0.0	0.0	0.0
Total Delay	10.3			12.4	9.7	5.2
LOS	B			B	A	A
Approach Delay	10.3			12.4	6.6	
Approach LOS	B			B	A	
Queue Length 50th (m)	14.2			25.9	6.9	4.7
Queue Length 95th (m)	22.9			39.5	15.2	16.9
Internal Link Dist (m)	106.3			170.2	238.1	
Turn Bay Length (m)					140.0	
Base Capacity (vph)	1429			1429	722	768
Starvation Cap Reductn	0			0	0	0
Spillback Cap Reductn	0			0	0	0
Storage Cap Reductn	0			0	0	0
Reduced v/c Ratio	0.35			0.57	0.19	0.40

Intersection Summary	
Area Type:	Other
Cycle Length:	45
Actuated Cycle Length:	45
Offset:	0 (0%), Referenced to phase 2:NBL and 6:, Start of Green
Natural Cycle:	45
Control Type:	Pretimed
Maximum v/c Ratio:	0.57
Intersection Signal Delay:	10.3
Intersection Capacity Utilization:	37.7%
Analysis Period (min):	15
Intersection LOS:	B
ICU Level of Service A:	

Splits and Phases: 8: QEW WB Off-Ramp & Kerr Street



HCM Signalized Intersection Capacity Analysis
8: QEW WB Off-Ramp & Kerr Street

BG 2033 PM.syn
04-03-2024

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↕↕			↕↕	↕	↕
Traffic Volume (vph)	456	0	0	748	125	284
Future Volume (vph)	456	0	0	748	125	284
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5			4.5	4.5	4.5
Lane Util. Factor	0.95			0.95	1.00	1.00
Fr _t	1.00			1.00	1.00	0.85
Fit Protected	1.00			1.00	0.95	1.00
Satd. Flow (prot)	3574			3574	1805	1599
Fit Permitted	1.00			1.00	0.95	1.00
Satd. Flow (perm)	3574			3574	1805	1599
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	496	0	0	813	136	309
RTOR Reduction (vph)	0	0	0	0	0	129
Lane Group Flow (vph)	496	0	0	813	136	180
Heavy Vehicles (%)	1%	0%	0%	1%	0%	1%
Turn Type	NA			NA	Prot	Perm
Protected Phases	4			8		2
Permitted Phases						2
Actuated Green, G (s)	18.0			18.0	18.0	18.0
Effective Green, g (s)	18.0			18.0	18.0	18.0
Actuated g/C Ratio	0.40			0.40	0.40	0.40
Clearance Time (s)	4.5			4.5	4.5	4.5
Lane Grp Cap (vph)	1429			1429	722	639
v/s Ratio Prot	0.14			c0.23	0.08	
v/s Ratio Perm						c0.11
v/c Ratio	0.35			0.57	0.19	0.28
Uniform Delay, d1	9.4			10.5	8.8	9.1
Progression Factor	1.00			1.00	1.00	1.00
Incremental Delay, d2	0.7			1.6	0.6	1.1
Delay (s)	10.1			12.1	9.3	10.2
Level of Service	B			B	A	B
Approach Delay (s)	10.1			12.1	10.0	
Approach LOS	B			B	A	

Intersection Summary			
HCM 2000 Control Delay	11.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	37.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
9: Dorval Drive & QEWB WB Off-Ramp

BG 2033 PM.syn
04-03-2024

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔↔	↗	↖↖			↖↖
Traffic Volume (vph)	769	676	1080	0	0	1147
Future Volume (vph)	769	676	1080	0	0	1147
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	190.0		0.0	0.0	
Storage Lanes	2	1		0	0	
Taper Length (m)	7.5				7.5	
Lane Util. Factor	0.97	0.91	0.95	1.00	1.00	0.95
Frt	0.966	0.850				
Flt Protected	0.963					
Satd. Flow (prot)	3344	1455	3574	0	0	3539
Flt Permitted	0.963					
Satd. Flow (perm)	3344	1455	3574	0	0	3539
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)	38	62				
Link Speed (k/h)	40		60			60
Link Distance (m)	325.1		310.2			266.9
Travel Time (s)	29.3		18.6			16.0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	1%	1%	0%	0%	2%
Adj. Flow (vph)	836	735	1174	0	0	1247
Shared Lane Traffic (%)		33%				
Lane Group Flow (vph)	1079	492	1174	0	0	1247
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	7.2		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15		15	25	
Number of Detectors	1	1	2			2
Detector Template	Left	Right	Thru			Thru
Leading Detector (m)	2.0	2.0	10.0			10.0
Trailing Detector (m)	0.0	0.0	0.0			0.0
Detector 1 Position(m)	0.0	0.0	0.0			0.0
Detector 1 Size(m)	2.0	2.0	0.6			0.6
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex			CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0			0.0
Detector 1 Queue (s)	0.0	0.0	0.0			0.0
Detector 1 Delay (s)	0.0	0.0	0.0			0.0
Detector 2 Position(m)			9.4			9.4
Detector 2 Size(m)			0.6			0.6
Detector 2 Type			CI+Ex			CI+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type	Prot	Perm	NA			NA
Protected Phases	8		2			6

Lanes, Volumes, Timings
9: Dorval Drive & QEWB WB Off-Ramp

BG 2033 PM.syn
04-03-2024

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Permitted Phases		8				
Detector Phase	8	8	2			6
Switch Phase						
Minimum Initial (s)	10.0	10.0	20.0			20.0
Minimum Split (s)	24.0	24.0	26.0			26.0
Total Split (s)	50.4	50.4	69.6			69.6
Total Split (%)	42.0%	42.0%	58.0%			58.0%
Maximum Green (s)	44.4	44.4	63.6			63.6
Yellow Time (s)	4.0	4.0	4.0			4.0
All-Red Time (s)	2.0	2.0	2.0			2.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0			-2.0
Total Lost Time (s)	4.0	4.0	4.0			4.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	4.5	4.5	5.0			5.0
Recall Mode	None	None	Max			Max
Walk Time (s)	5.0	5.0	7.0			7.0
Flash Dont Walk (s)	7.0	7.0	11.0			11.0
Pedestrian Calls (#/hr)	0	0	0			0
Act Effct Green (s)	44.9	44.9	65.7			65.7
Actuated g/C Ratio	0.38	0.38	0.55			0.55
v/c Ratio	0.84	0.84	0.59			0.64
Control Delay	39.1	42.9	19.4			20.4
Queue Delay	0.0	0.0	0.0			0.0
Total Delay	39.1	42.9	19.4			20.4
LOS	D	D	B			C
Approach Delay	40.3		19.4			20.4
Approach LOS	D		B			C
Queue Length 50th (m)	118.7	105.8	99.1			109.0
Queue Length 95th (m)	147.2	#171.9	120.7			132.4
Internal Link Dist (m)	301.1		286.2			242.9
Turn Bay Length (m)		190.0				
Base Capacity (vph)	1332	607	1978			1958
Starvation Cap Reductn	0	0	0			0
Spillback Cap Reductn	0	0	0			0
Storage Cap Reductn	0	0	0			0
Reduced v/c Ratio	0.81	0.81	0.59			0.64
Intersection Summary						
Area Type:	Other					
Cycle Length:	120					
Actuated Cycle Length:	118.6					
Natural Cycle:	50					
Control Type:	Semi Act-Uncoord					
Maximum v/c Ratio:	0.84					
Intersection Signal Delay:	27.9			Intersection LOS: C		
Intersection Capacity Utilization:	67.4%			ICU Level of Service C		
Analysis Period (min)	15					
# 95th percentile volume exceeds capacity, queue may be longer.						

Lanes, Volumes, Timings
9: Dorval Drive & QEW WB Off-Ramp

BG 2033 PM.syn
04-03-2024

Queue shown is maximum after two cycles.

Splits and Phases: 9: Dorval Drive & QEW WB Off-Ramp



HCM Signalized Intersection Capacity Analysis
9: Dorval Drive & QEW WB Off-Ramp

BG 2033 PM.syn
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Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔↔	↔	↑↑			↑↑
Traffic Volume (vph)	769	676	1080	0	0	1147
Future Volume (vph)	769	676	1080	0	0	1147
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0			4.0
Lane Util. Factor	0.97	0.91	0.95			0.95
Frt	0.97	0.85	1.00			1.00
Fit Protected	0.96	1.00	1.00			1.00
Satd. Flow (prot)	3343	1455	3574			3539
Fit Permitted	0.96	1.00	1.00			1.00
Satd. Flow (perm)	3343	1455	3574			3539
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	836	735	1174	0	0	1247
RTOR Reduction (vph)	24	39	0	0	0	0
Lane Group Flow (vph)	1055	453	1174	0	0	1247
Heavy Vehicles (%)	3%	1%	1%	0%	0%	2%
Turn Type	Prot	Perm	NA			NA
Protected Phases	8		2			6
Permitted Phases		8				
Actuated Green, G (s)	42.9	42.9	63.6			63.6
Effective Green, g (s)	44.9	44.9	65.6			65.6
Actuated g/C Ratio	0.38	0.38	0.55			0.55
Clearance Time (s)	6.0	6.0	6.0			6.0
Vehicle Extension (s)	4.5	4.5	5.0			5.0
Lane Grp Cap (vph)	1266	551	1978			1959
v/s Ratio Prot	c0.32		0.33			c0.35
v/s Ratio Perm		0.31				
v/c Ratio	0.83	0.82	0.59			0.64
Uniform Delay, d1	33.4	33.2	17.6			18.2
Progression Factor	1.00	1.00	1.00			1.00
Incremental Delay, d2	5.3	10.5	1.3			1.6
Delay (s)	38.7	43.7	18.9			19.8
Level of Service	D	D	B			B
Approach Delay (s)	40.3		18.9			19.8
Approach LOS	D		B			B
Intersection Summary						
HCM 2000 Control Delay			27.6		HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.72			
Actuated Cycle Length (s)			118.5		Sum of lost time (s)	8.0
Intersection Capacity Utilization			67.4%		ICU Level of Service	C
Analysis Period (min)			15			
c Critical Lane Group						

Lanes, Volumes, Timings
10: Dorval Drive & QEW EB Off-Ramp

BG 2033 PM.syn
04-03-2024

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	299	355	0	1296	1226	0
Future Volume (vph)	299	355	0	1296	1226	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	175.0	0.0	0.0			0.0
Storage Lanes	1	1	0			0
Taper Length (m)	7.5		7.5			
Lane Util. Factor	0.97	0.91	1.00	0.95	0.95	1.00
Fr _t	0.950	0.850				
Flt Protected	0.968					
Satd. Flow (prot)	3302	1441	0	3539	3505	0
Flt Permitted	0.968					
Satd. Flow (perm)	3302	1441	0	3539	3505	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	52	52				
Link Speed (k/h)	40			60	60	
Link Distance (m)	275.5			164.3	310.2	
Travel Time (s)	24.8			9.9	18.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	2%	0%	2%	3%	0%
Adj. Flow (vph)	325	386	0	1409	1333	0
Shared Lane Traffic (%)		42%				
Lane Group Flow (vph)	487	224	0	1409	1333	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	7.2			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Number of Detectors	1	1		2	2	
Detector Template	Left	Right		Thru	Thru	
Leading Detector (m)	2.0	2.0		10.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	2.0		0.6	0.6	
Detector 1 Type	CI+Ex	CI+Ex		CI+Ex	CI+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	
Detector 2 Position(m)				9.4	9.4	
Detector 2 Size(m)				0.6	0.6	
Detector 2 Type				CI+Ex	CI+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Prot	Perm		NA	NA	
Protected Phases	4			2	6	

Lanes, Volumes, Timings
10: Dorval Drive & QEW EB Off-Ramp

BG 2033 PM.syn
04-03-2024

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Permitted Phases		4				
Detector Phase	4	4		2	6	
Switch Phase						
Minimum Initial (s)	10.0	10.0		20.0	20.0	
Minimum Split (s)	24.0	24.0		26.0	26.0	
Total Split (s)	45.6	45.6		74.4	74.4	
Total Split (%)	38.0%	38.0%		62.0%	62.0%	
Maximum Green (s)	39.6	39.6		68.4	68.4	
Yellow Time (s)	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	4.0	4.0		5.0	5.0	
Recall Mode	None	None		Max	Max	
Walk Time (s)	0.0	0.0		7.0	7.0	
Flash Dont Walk (s)	7.0	7.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0	
Act Effct Green (s)	22.9	22.9		70.6	70.6	
Actuated g/C Ratio	0.23	0.23		0.70	0.70	
v/c Ratio	0.62	0.61		0.57	0.55	
Control Delay	34.8	34.2		9.6	9.3	
Queue Delay	0.0	0.0		0.0	0.0	
Total Delay	34.8	34.2		9.6	9.3	
LOS	C	C		A	A	
Approach Delay	34.6			9.6	9.3	
Approach LOS	C			A	A	
Queue Length 50th (m)	41.9	35.1		66.5	61.2	
Queue Length 95th (m)	58.2	62.5		111.2	102.6	
Internal Link Dist (m)	251.5			140.3	286.2	
Turn Bay Length (m)	175.0					
Base Capacity (vph)	1387	622		2460	2436	
Starvation Cap Reductn	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	
Storage Cap Reductn	0	0		0	0	
Reduced v/c Ratio	0.35	0.36		0.57	0.55	
Intersection Summary						
Area Type:	Other					
Cycle Length:	120					
Actuated Cycle Length:	101.5					
Natural Cycle:	55					
Control Type:	Semi Act-Uncoord					
Maximum v/c Ratio:	0.62					
Intersection Signal Delay:	14.7			Intersection LOS: B		
Intersection Capacity Utilization:	67.4%			ICU Level of Service C		
Analysis Period (min)	15					

Lanes, Volumes, Timings
10: Dorval Drive & QEW EB Off-Ramp

BG 2033 PM.syn
04-03-2024

Splits and Phases: 10: Dorval Drive & QEW EB Off-Ramp



HCM Signalized Intersection Capacity Analysis
10: Dorval Drive & QEW EB Off-Ramp

BG 2033 PM.syn
04-03-2024

	EBL	EBR	NBL	NBT	SBT	SBR
Movement						
Lane Configurations	TTT	T		TTT	TTT	
Traffic Volume (vph)	299	355	0	1296	1226	0
Future Volume (vph)	299	355	0	1296	1226	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	0.91		0.95	0.95	
Frt	0.95	0.85		1.00	1.00	
Fit Protected	0.97	1.00		1.00	1.00	
Satd. Flow (prot)	3301	1441		3539	3505	
Fit Permitted	0.97	1.00		1.00	1.00	
Satd. Flow (perm)	3301	1441		3539	3505	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	325	386	0	1409	1333	0
RTOR Reduction (vph)	40	40	0	0	0	0
Lane Group Flow (vph)	447	184	0	1409	1333	0
Heavy Vehicles (%)	3%	2%	0%	2%	3%	0%
Turn Type	Prot	Perm		NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4				
Actuated Green, G (s)	20.9	20.9		68.6	68.6	
Effective Green, g (s)	22.9	22.9		70.6	70.6	
Actuated g/C Ratio	0.23	0.23		0.70	0.70	
Clearance Time (s)	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	4.0	4.0		5.0	5.0	
Lane Grp Cap (vph)	744	325		2461	2437	
v/s Ratio Prot	c0.14			c0.40	0.38	
v/s Ratio Perm		0.13				
v/c Ratio	0.60	0.57		0.57	0.55	
Uniform Delay, d1	35.2	34.9		7.8	7.6	
Progression Factor	1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.6	2.7		1.0	0.9	
Delay (s)	36.8	37.6		8.8	8.5	
Level of Service	D	D		A	A	
Approach Delay (s)	37.0			8.8	8.5	
Approach LOS	D			A	A	
Intersection Summary						
HCM 2000 Control Delay			14.5		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.58			
Actuated Cycle Length (s)			101.5		Sum of lost time (s)	8.0
Intersection Capacity Utilization			67.4%		ICU Level of Service	C
Analysis Period (min)			15			
c Critical Lane Group						

Lanes, Volumes, Timings
11: Argus Rd & South Service Rd

BG 2033 PM.syn
04-03-2024

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Volume (vph)	44	36	625	233	47	86
Future Volume (vph)	44	36	625	233	47	86
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt			0.963		0.913	
Flt Protected		0.973			0.983	
Satd. Flow (prot)	0	1572	1535	0	1535	0
Flt Permitted		0.973			0.983	
Satd. Flow (perm)	0	1572	1535	0	1535	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		177.7	145.7		103.5	
Travel Time (s)		12.8	10.5		7.5	
Confl. Peds. (#/hr)					5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	13%	10%	0%	0%	0%
Adj. Flow (vph)	48	39	679	253	51	93
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	87	932	0	144	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (k/h)	24			14	24	14
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type:	CBD
Control Type:	Unsignalized
Intersection Capacity Utilization	67.7%
Analysis Period (min)	15
	ICU Level of Service C

HCM Unsignalized Intersection Capacity Analysis
11: Argus Rd & South Service Rd

BG 2033 PM.syn
04-03-2024

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Volume (veh/h)	44	36	625	233	47	86
Future Volume (Veh/h)	44	36	625	233	47	86
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	48	39	679	253	51	93
Pedestrians			5			
Lane Width (m)			3.6			
Walking Speed (m/s)			1.2			
Percent Blockage			0			
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)		358				
pX, platoon unblocked						
vC, conflicting volume	932				946	806
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	932				946	806
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				81	76
cM capacity (veh/h)	743				273	385


Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	87	932	144
Volume Left	48	0	51
Volume Right	0	253	93
eSH	743	1700	336
Volume to Capacity	0.06	0.55	0.43
Queue Length 95th (m)	1.7	0.0	16.6
Control Delay (s)	5.9	0.0	23.5
Lane LOS	A		C
Approach Delay (s)	5.9	0.0	23.5
Approach LOS			C

Intersection Summary

Average Delay		3.4	
Intersection Capacity Utilization	67.7%		ICU Level of Service C
Analysis Period (min)		15	

Lanes, Volumes, Timings
12: Lyons Lane & South Service Road

BG 2033 PM.syn
04-03-2024




Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Volume (vph)	4	7	1	33	49	7
Future Volume (vph)	4	7	1	33	49	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt			0.869		0.982	
Flt Protected		0.984			0.958	
Satd. Flow (prot)	0	1683	1224	0	1609	0
Flt Permitted		0.984			0.958	
Satd. Flow (perm)	0	1683	1224	0	1609	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		60.5	89.6		37.6	
Travel Time (s)		4.4	6.5		2.7	
Confl. Peds. (#/hr)	7			7		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	22%	0%	0%
Adj. Flow (vph)	4	8	1	36	53	8
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	12	37	0	61	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (k/h)	24			14	24	14
Sign Control		Free	Free		Stop	

Intersection Summary	
Area Type:	CBD
Control Type:	Unsignalized
Intersection Capacity Utilization	15.6% ICU Level of Service A
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis
12: Lyons Lane & South Service Road

BG 2033 PM.syn
04-03-2024



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Volume (veh/h)	4	7	1	33	49	7
Future Volume (Veh/h)	4	7	1	33	49	7
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)	4	8	1	36	53	8
Pedestrians					7	
Lane Width (m)					3.6	
Walking Speed (m/s)					1.2	
Percent Blockage					1	
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	44				42	26
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	44				42	26
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				95	99
cM capacity (veh/h)	1568				966	1049

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	12	37	61
Volume Left	4	0	53
Volume Right	0	36	8
eSH	1568	1700	976
Volume to Capacity	0.00	0.02	0.06
Queue Length 95th (m)	0.1	0.0	1.6
Control Delay (s)	2.4	0.0	8.9
Lane LOS	A		A
Approach Delay (s)	2.4	0.0	8.9
Approach LOS			A

Intersection Summary	
Average Delay	5.2
Intersection Capacity Utilization	15.6% ICU Level of Service A
Analysis Period (min)	15

Lanes, Volumes, Timings
13: GO Bus Terminal/Argus Rd & Cross Ave

BG 2033 PM.syn
04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	41	1211	20	45	576	123	18	3	57	319	24	328
Future Volume (vph)	41	1211	20	45	576	123	18	3	57	319	24	328
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6
Storage Length (m)	20.0	0.0	20.0	0.0	0.0	0.0	0.0	15.0	0.0	0.0	0.0	0.0
Storage Lanes	1	0	1	0	1	0	1	0	1	0	1	0
Taper Length (m)	7.5		7.5		7.5		7.5		7.5		7.5	
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	1.00			0.99	0.99	0.99	0.97		0.98	0.98	
Frt	0.998				0.974		0.857			0.860		
Flt Protected	0.950			0.950		0.950				0.950		
Satd. Flow (prot)	1570	3189	0	797	3144	0	785	708	0	1570	1344	0
Flt Permitted	0.363			0.090		0.279				0.715		
Satd. Flow (perm)	596	3189	0	76	3144	0	229	708	0	1157	1344	0
Right Turn on Red			Yes		Yes		Yes		Yes			Yes
Satd. Flow (RTOR)		2		52		62		277				
Link Speed (k/h)		50		50		50		50				
Link Distance (m)		164.3		72.9		81.9		115.7				
Travel Time (s)		11.8		5.2		5.9		8.3				
Confl. Peds. (#/hr)	9		4	4		9	12		20	20		12
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
Heavy Vehicles (%)	0%	0%	100%	97%	0%	0%	100%	100%	100%	0%	100%	0%
Adj. Flow (vph)	45	1316	22	49	626	134	20	3	62	347	26	357
Shared Lane Traffic (%)												
Lane Group Flow (vph)	45	1338	0	49	760	0	20	65	0	347	383	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.3			3.3			3.3			3.3	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.19	1.14	1.14	1.19	1.14	1.14	1.19	1.14	1.14	1.19	1.14	1.14
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

Lanes, Volumes, Timings
13: GO Bus Terminal/Argus Rd & Cross Ave

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases		2		6			8			4		
Detector Phases	2	2		1	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	22.0	22.0		8.0	22.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	45.0	45.0		12.5	29.0		29.0	29.0		29.0	29.0	
Total Split (s)	46.5	46.5		12.5	59.0		31.0	31.0		31.0	31.0	
Total Split (%)	51.7%	51.7%		13.9%	65.6%		34.4%	34.4%		34.4%	34.4%	
Maximum Green (s)	40.5	40.5		8.5	53.0		25.0	25.0		25.0	25.0	
Yellow Time (s)	4.0	4.0		3.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		1.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0		0.0	-2.0		-2.0	-2.0		-2.0	-2.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Vehicle Extension (s)	5.0	5.0		2.5	5.0		4.0	4.0		4.0	4.0	
Recall Mode	Min	Min		Min	Min		Min	Min		Min	Min	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	16.0	16.0		16.0	16.0		16.0	16.0		16.0	16.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	42.3	42.3		54.5	54.5		27.0	27.0		27.0	27.0	
Actuated g/C Ratio	0.47	0.47		0.61	0.61		0.30	0.30		0.30	0.30	
v/c Ratio	0.16	0.89		0.44	0.39		0.29	0.25		0.99	0.64	
Control Delay	15.4	30.3		23.6	9.0		37.4	9.9		80.8	13.4	
Queue Delay	0.0	2.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	15.4	32.2		23.6	9.0		37.4	9.9		80.8	13.4	
LOS	B	C		C	A		D	A		F	B	
Approach Delay		31.7			9.9			16.4			45.4	
Approach LOS		C			A			B			D	
Queue Length 50th (m)	4.4	110.4		3.4	31.1		2.8	0.4		62.3	14.5	
Queue Length 95th (m)	11.6	#159.7		12.3	42.6		10.3	10.3		#119.9	46.2	
Internal Link Dist (m)		140.3			48.9			57.9			91.7	
Turn Bay Length (m)	20.0			20.0						15.0		
Base Capacity (vph)	283	1515		114	1951		69	256		349	598	
Starvation Cap Reductn	0	80		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	0.16	0.93		0.43	0.39		0.29	0.25		0.99	0.64	
Intersection Summary												
Area Type:	CBD											
Cycle Length:	90											
Actuated Cycle Length:	89.5											
Natural Cycle:	90											
Control Type:	Semi Act-Uncoord											
Maximum v/c Ratio:	0.99											
Intersection Signal Delay:	28.7						Intersection LOS: C					

Lanes, Volumes, Timings
13: GO Bus Terminal/Argus Rd & Cross Ave

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Intersection Capacity Utilization 74.5% ICU Level of Service D
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 13: GO Bus Terminal/Argus Rd & Cross Ave



HCM Signalized Intersection Capacity Analysis
13: GO Bus Terminal/Argus Rd & Cross Ave

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	41	1211	20	45	576	123	18	3	57	319	24	328
Future Volume (vph)	41	1211	20	45	576	123	18	3	57	319	24	328
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	0.99		1.00	0.97		1.00	0.98	
Flpb, ped/bikes	0.99	1.00		1.00	1.00		0.99	1.00		0.98	1.00	
Frt	1.00	1.00		1.00	0.97		1.00	0.86		1.00	0.86	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1561	3187		797	3142		781	708		1537	1344	
Flt Permitted	0.36	1.00		0.09	1.00		0.28	1.00		0.71	1.00	
Satd. Flow (perm)	597	3187		76	3142		230	708		1156	1344	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	45	1316	22	49	626	134	20	3	62	347	26	357
RTOR Reduction (vph)	0	1	0	0	20	0	0	43	0	0	193	0
Lane Group Flow (vph)	45	1337	0	49	740	0	20	22	0	347	190	0
Confl. Peds. (#/hr)	9		4	4		9	12		20	20		12
Heavy Vehicles (%)	0%	0%	100%	97%	0%	0%	100%	100%	100%	0%	100%	0%
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	40.3	40.3		52.5	52.5		25.0	25.0		25.0	25.0	
Effective Green, g (s)	42.3	42.3		52.5	54.5		27.0	27.0		27.0	27.0	
Actuated g/C Ratio	0.47	0.47		0.59	0.61		0.30	0.30		0.30	0.30	
Clearance Time (s)	6.0	6.0		4.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	5.0	5.0		2.5	5.0		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	282	1506		110	1913		69	213		348	405	
v/s Ratio Prot		c0.42		0.04	c0.24			0.03			0.14	
v/s Ratio Perm	0.08			0.22			0.09			c0.30		
v/c Ratio	0.16	0.89		0.45	0.39		0.29	0.10		1.00	0.47	
Uniform Delay, d1	13.5	21.4		14.6	9.0		23.9	22.5		31.2	25.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.6	7.2		2.1	0.3		3.2	0.3		47.2	1.2	
Delay (s)	14.0	28.7		16.7	9.2		27.1	22.8		78.4	26.6	
Level of Service	B	C		B	A		C	C		E	C	
Approach Delay (s)		28.2			9.7			23.8			51.2	
Approach LOS		C			A			C			D	
Intersection Summary												
HCM 2000 Control Delay				28.7			HCM 2000 Level of Service				C	
HCM 2000 Volume to Capacity ratio				0.88								
Actuated Cycle Length (s)				89.5			Sum of lost time (s)				12.0	
Intersection Capacity Utilization				74.5%			ICU Level of Service				D	
Analysis Period (min)				15								
c Critical Lane Group												

Lanes, Volumes, Timings
14: Lyons Lane/Street A & Cross Ave

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	↖	→	↘	↙	←	↖	↙	↘	↙	↘	↙	↘
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↖↗		↖	↖↗		↖	↖		↖	↖	
Traffic Volume (vph)	46	252	16	17	451	14	284	5	192	18	3	76
Future Volume (vph)	46	252	16	17	451	14	284	5	192	18	3	76
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6
Storage Length (m)	0.0	0.0	25.0		0.0	20.0		0.0	0.0			0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00	1.00		1.00	1.00		1.00	0.98		1.00	0.99	
Frt		0.991			0.996			0.854			0.855	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1525	2914	0	1570	3084	0	1570	1436	0	1570	1416	0
Flt Permitted	0.466			0.508			0.701			0.542		
Satd. Flow (perm)	746	2914	0	839	3084	0	1157	1436	0	893	1416	0
Right Turn on Red			Yes		Yes			Yes				Yes
Satd. Flow (RTOR)		9			5			209			83	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		40.1			209.8			69.1			70.9	
Travel Time (s)		2.9			15.1			5.0			5.1	
Confl. Peds. (#/hr)	3		1	1		3	1		4	4		1
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
Heavy Vehicles (%)	3%	11%	0%	0%	5%	0%	0%	0%	0%	0%	0%	2%
Adj. Flow (vph)	50	274	17	18	490	15	309	5	209	20	3	83
Shared Lane Traffic (%)												
Lane Group Flow (vph)	50	291	0	18	505	0	309	214	0	20	86	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.3			3.3			3.3			3.3	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.19	1.14	1.14	1.19	1.14	1.14	1.19	1.14	1.14	1.19	1.14	1.14
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

Lanes, Volumes, Timings
14: Lyons Lane/Street A & Cross Ave

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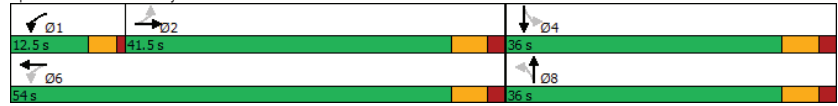
	↖	→	↘	↙	←	↖	↙	↘	↙	↘	↙	↘
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6		8		8		4	
Permitted Phases		2		6			8		8		4	
Detector Phases	2	2		1	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	35.0	35.0		8.0	35.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	41.0	41.0		12.5	41.0		28.0	28.0		28.0	28.0	
Total Split (s)	41.5	41.5		12.5	54.0		36.0	36.0		36.0	36.0	
Total Split (%)	46.1%	46.1%		13.9%	60.0%		40.0%	40.0%		40.0%	40.0%	
Maximum Green (s)	35.5	35.5		8.5	48.0		30.0	30.0		30.0	30.0	
Yellow Time (s)	4.0	4.0		3.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		1.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0		0.0	-2.0		-2.0	-2.0		-2.0	-2.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Vehicle Extension (s)	5.0	5.0		2.5	5.0		4.0	4.0		4.0	4.0	
Recall Mode	Min	Min		Min	Min		Min	Min		Min	Min	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	15.0	15.0		15.0	15.0		15.0	15.0		15.0	15.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	37.1	37.1		49.2	49.2		28.2	28.2		28.2	28.2	
Actuated g/C Ratio	0.43	0.43		0.58	0.58		0.33	0.33		0.33	0.33	
v/c Ratio	0.15	0.23		0.03	0.28		0.81	0.35		0.07	0.16	
Control Delay	17.8	16.1		9.2	10.3		43.7	5.0		19.7	5.9	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	17.8	16.1		9.2	10.3		43.7	5.0		19.7	5.9	
LOS	B	B		A	B		D	A		B	A	
Approach Delay		16.3			10.2			27.9			8.5	
Approach LOS		B			B			C			A	
Queue Length 50th (m)	5.5	16.7		1.4	23.6		47.8	0.6		2.3	0.4	
Queue Length 95th (m)	13.5	25.9		4.4	33.5		#89.2	15.0		7.3	9.9	
Internal Link Dist (m)		16.1			185.8			45.1			46.9	
Turn Bay Length (m)				25.0			20.0					
Base Capacity (vph)	328	1288		555	1813		435	670		335	584	
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	0.15	0.23		0.03	0.28		0.71	0.32		0.06	0.15	
Intersection Summary												
Area Type:	CBD											
Cycle Length:	90											
Actuated Cycle Length:	85.4											
Natural Cycle:	85											
Control Type:	Semi Act-Uncoord											
Maximum v/c Ratio:	0.81											
Intersection Signal Delay:	17.7						Intersection LOS: B					

Lanes, Volumes, Timings
14: Lyons Lane/Street A & Cross Ave

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Intersection Capacity Utilization 73.3% ICU Level of Service D
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 14: Lyons Lane/Street A & Cross Ave



HCM Signalized Intersection Capacity Analysis
14: Lyons Lane/Street A & Cross Ave

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	46	252	16	17	451	14	284	5	192	18	3	76
Future Volume (vph)	46	252	16	17	451	14	284	5	192	18	3	76
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.98		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	1.00		1.00	0.85		1.00	0.86	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1520	2915		1569	3083		1569	1436		1565	1417	
Flt Permitted	0.47	1.00		0.51	1.00		0.70	1.00		0.54	1.00	
Satd. Flow (perm)	746	2915		839	3083		1158	1436		893	1417	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	50	274	17	18	490	15	309	5	209	20	3	83
RTOR Reduction (vph)	0	5	0	0	2	0	0	140	0	0	56	0
Lane Group Flow (vph)	50	286	0	18	503	0	309	74	0	20	30	0
Confl. Peds. (#/hr)	3		1	1		3	1		4	4		1
Heavy Vehicles (%)	3%	11%	0%	0%	5%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	35.2	35.2		47.2	47.2		26.2	26.2		26.2	26.2	
Effective Green, g (s)	37.2	37.2		47.2	49.2		28.2	28.2		28.2	28.2	
Actuated g/C Ratio	0.44	0.44		0.55	0.58		0.33	0.33		0.33	0.33	
Clearance Time (s)	6.0	6.0		4.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	5.0	5.0		2.5	5.0		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	324	1269		532	1776		382	474		294	467	
v/s Ratio Prot		0.10		0.00	0.16			0.05			0.02	
v/s Ratio Perm	0.07			0.02			0.27			0.02		
v/c Ratio	0.15	0.23		0.03	0.28		0.81	0.16		0.07	0.07	
Uniform Delay, d1	14.6	15.1		8.8	9.2		26.1	20.2		19.6	19.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.5	0.2		0.0	0.2		12.5	0.2		0.1	0.1	
Delay (s)	15.0	15.3		8.8	9.4		38.7	20.4		19.7	19.7	
Level of Service	B	B		A	A		D	C		B	B	
Approach Delay (s)		15.2			9.3			31.2			19.7	
Approach LOS		B			A			C			B	

Intersection Summary			
HCM 2000 Control Delay	19.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	85.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	73.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
15: Cross Ave & Lyons Lane

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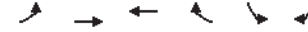
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↕	↕		↕	↕
Traffic Volume (vph)	40	267	749	58	37	58
Future Volume (vph)	40	267	749	58	37	58
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	5.0			0.0	0.0	0.0
Storage Lanes	1			0	1	0
Taper Length (m)	7.5				7.5	
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	1.00
Ped Bike Factor						
Frt			0.989		0.917	
Flt Protected	0.950				0.981	
Satd. Flow (prot)	1388	2954	3126	0	1502	0
Flt Permitted	0.950				0.981	
Satd. Flow (perm)	1388	2954	3126	0	1502	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		281.3	40.1		41.7	
Travel Time (s)		20.3	2.9		3.0	
Confl. Peds. (#/hr)	1			1	9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	17%	10%	3%	0%	0%	4%
Adj. Flow (vph)	43	290	814	63	40	63
Shared Lane Traffic (%)						
Lane Group Flow (vph)	43	290	877	0	103	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.6	3.6		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (k/h)	25			15	25	15
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type:	CBD
Control Type:	Unsignalized
Intersection Capacity Utilization	44.6%
ICU Level of Service	A
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis
15: Cross Ave & Lyons Lane

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Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↕	↕		↕	↕
Traffic Volume (veh/h)	40	267	749	58	37	58
Future Volume (Veh/h)	40	267	749	58	37	58
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)	43	290	814	63	40	63
Pedestrians			9		1	
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)			40			
pX, platoon unblocked	0.93				0.93	0.93
vC, conflicting volume	878				1086	440
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	707				933	234
tC, single (s)	4.4				6.8	7.0
tC, 2 stage (s)						
tF (s)	2.4				3.5	3.3
p0 queue free %	94				83	91
cM capacity (veh/h)	734				232	705

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	43	145	145	543	334	103
Volume Left	43	0	0	0	0	40
Volume Right	0	0	0	0	63	63
eSH	734	1700	1700	1700	1700	394
Volume to Capacity	0.06	0.09	0.09	0.32	0.20	0.26
Queue Length 95th (m)	1.5	0.0	0.0	0.0	0.0	8.3
Control Delay (s)	10.2	0.0	0.0	0.0	0.0	17.4
Lane LOS	B					C
Approach Delay (s)	1.3			0.0		17.4
Approach LOS						C

Intersection Summary

Average Delay	1.7
Intersection Capacity Utilization	44.6%
ICU Level of Service	A
Analysis Period (min)	15

Lanes, Volumes, Timings
16: Speers Road/Cornwall Road & Cross Avenue

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Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↕↕	↕↔		↔	↕↕
Traffic Volume (vph)	340	844	927	43	15	526
Future Volume (vph)	340	844	927	43	15	526
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	75.0			0.0	55.0	0.0
Storage Lanes	1			0	1	2
Taper Length (m)	7.5				7.5	
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	0.88
Frt			0.993			0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1770	3539	3514	0	1770	2787
Flt Permitted	0.151				0.950	
Satd. Flow (perm)	281	3539	3514	0	1770	2787
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)			6			572
Link Speed (k/h)		50	50		50	
Link Distance (m)		189.7	274.5		184.2	
Travel Time (s)		13.7	19.8		13.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	370	917	1008	47	16	572
Shared Lane Traffic (%)						
Lane Group Flow (vph)	370	917	1055	0	16	572
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.6	3.6		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25			15	25	15
Number of Detectors	1	2	2		1	1
Detector Template	Left	Thru	Thru		Left	Right
Leading Detector (m)	2.0	10.0	10.0		2.0	2.0
Trailing Detector (m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Size(m)	2.0	0.6	0.6		2.0	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0		0.0	0.0
Detector 2 Position(m)		9.4	9.4			
Detector 2 Size(m)		0.6	0.6			
Detector 2 Type		Cl+Ex	Cl+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type	pm+pt	NA	NA		pm+pt	Perm
Protected Phases	5	2	6		7	
Permitted Phases	2				4	4

Lanes, Volumes, Timings
16: Speers Road/Cornwall Road & Cross Avenue

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Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Detector Phase	5	2	6		7	4
Switch Phase						
Minimum Initial (s)	6.0	5.0	5.0		5.0	5.0
Minimum Split (s)	12.0	33.5	33.5		27.5	27.5
Total Split (s)	22.0	62.0	40.0		28.0	28.0
Total Split (%)	24.4%	68.9%	44.4%		31.1%	31.1%
Maximum Green (s)	16.0	56.0	34.0		22.0	22.0
Yellow Time (s)	4.0	4.0	4.0		4.0	4.0
All-Red Time (s)	2.0	2.0	2.0		2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0		6.0	6.0
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?	Yes		Yes			
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	None	Max	Max		None	None
Walk Time (s)		18.0	18.0		12.0	12.0
Flash Dont Walk (s)		7.0	7.0		7.0	7.0
Pedestrian Calls (#/hr)		0	0		0	0
Act Effct Green (s)	56.1	56.1	34.8		7.4	7.4
Actuated g/C Ratio	0.74	0.74	0.46		0.10	0.10
v/c Ratio	0.73	0.35	0.65		0.09	0.72
Control Delay	20.4	4.0	18.6		31.4	9.0
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	20.4	4.0	18.6		31.4	9.0
LOS	C	A	B		C	A
Approach Delay		8.7	18.6		9.6	
Approach LOS		A	B		A	
Queue Length 50th (m)	22.6	17.5	59.7		2.2	0.0
Queue Length 95th (m)	#69.3	35.1	93.1		7.7	15.1
Internal Link Dist (m)		165.7	250.5		160.2	
Turn Bay Length (m)	75.0				55.0	
Base Capacity (vph)	524	2627	1621		516	1218
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	0.71	0.35	0.65		0.03	0.47

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 75.5
 Natural Cycle: 80
 Control Type: Semi Act-Uncoord
 Maximum v/c Ratio: 0.73
 Intersection Signal Delay: 12.4
 Intersection Capacity Utilization 65.0%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service C
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Lanes, Volumes, Timings
16: Speers Road/Cornwall Road & Cross Avenue

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Splits and Phases: 16: Speers Road/Cornwall Road & Cross Avenue



HCM Signalized Intersection Capacity Analysis
16: Speers Road/Cornwall Road & Cross Avenue

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Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↕	↕	↔	↔	↕
Traffic Volume (vph)	340	844	927	43	15	526
Future Volume (vph)	340	844	927	43	15	526
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0		6.0	6.0
Lane Util. Factor	1.00	0.95	0.95		1.00	0.88
Frt	1.00	1.00	0.99		1.00	0.85
Fit Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	3539	3516		1770	2787
Fit Permitted	0.15	1.00	1.00		0.95	1.00
Satd. Flow (perm)	281	3539	3516		1770	2787
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	370	917	1008	47	16	572
RTOR Reduction (vph)	0	0	3	0	0	516
Lane Group Flow (vph)	370	917	1052	0	16	56
Turn Type	pm+pt	NA	NA		pm+pt	Perm
Protected Phases	5	2	6		7	
Permitted Phases	2				4	4
Actuated Green, G (s)	56.1	56.1	34.8		7.4	7.4
Effective Green, g (s)	56.1	56.1	34.8		7.4	7.4
Actuated g/C Ratio	0.74	0.74	0.46		0.10	0.10
Clearance Time (s)	6.0	6.0	6.0		6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	510	2629	1620		173	273
v/s Ratio Prot	c0.15	0.26	0.30		0.01	
v/s Ratio Perm	c0.39					c0.02
v/c Ratio	0.73	0.35	0.65		0.09	0.21
Uniform Delay, d1	12.9	3.4	15.7		31.0	31.3
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	5.1	0.4	2.0		0.2	0.4
Delay (s)	18.0	3.7	17.7		31.2	31.7
Level of Service	B	A	B		C	C
Approach Delay (s)		7.8	17.7		31.7	
Approach LOS		A	B		C	
Intersection Summary						
HCM 2000 Control Delay		16.2		HCM 2000 Level of Service		B
HCM 2000 Volume to Capacity ratio		0.70				
Actuated Cycle Length (s)		75.5		Sum of lost time (s)		18.0
Intersection Capacity Utilization		65.0%		ICU Level of Service		C
Analysis Period (min)		15				
c Critical Lane Group						

Lanes, Volumes, Timings
23: GO Station West Access/Street C & Cross Ave

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔			↔			↔	↔		↔	↔	
Traffic Volume (vph)	19	587	54	294	377	218	91	0	453	157	0	7
Future Volume (vph)	19	587	54	294	377	218	91	0	453	157	0	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.0	0.0	0.0
Storage Lanes	0	0	0	0	0	0	1	0	1	0	0	0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.988				0.963		0.850				0.850	
Flt Protected	0.999				0.984		0.950				0.950	
Satd. Flow (prot)	0	3493	0	0	3354	0	1770	1583	0	1770	1583	0
Flt Permitted	0.905				0.611		0.752				0.342	
Satd. Flow (perm)	0	3165	0	0	2082	0	1401	1583	0	637	1583	0
Right Turn on Red	Yes			Yes			Yes			Yes		
Satd. Flow (RTOR)	22				105		115				263	
Link Speed (k/h)	50				50		50				50	
Link Distance (m)	209.8				164.3		55.1				132.8	
Travel Time (s)	15.1				11.8		4.0				9.6	
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
Adj. Flow (vph)	21	638	59	320	410	237	99	0	492	171	0	8
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	718	0	0	967	0	99	492	0	171	8	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)	3.3				3.3		3.6				3.6	
Link Offset(m)	0.0				0.0		0.0				0.0	
Crosswalk Width(m)	4.8				4.8		4.8				4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15		25		15		25		15	
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)	9.4				9.4		9.4				9.4	
Detector 2 Size(m)	0.6				0.6		0.6				0.6	
Detector 2 Type	Cl+Ex				Cl+Ex		Cl+Ex				Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)	0.0				0.0		0.0				0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	4				8		2				6	
Permitted Phases	4				8		2				6	

Lanes, Volumes, Timings
23: GO Station West Access/Street C & Cross Ave

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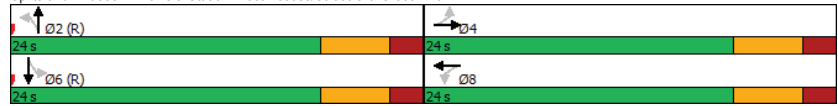
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	24.0	24.0		24.0	24.0		24.0	24.0		24.0	24.0	
Total Split (s)	24.0	24.0		24.0	24.0		24.0	24.0		24.0	24.0	
Total Split (%)	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%		50.0%	50.0%	
Maximum Green (s)	18.0	18.0		18.0	18.0		18.0	18.0		18.0	18.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0				0.0		0.0				0.0	
Total Lost Time (s)	6.0				6.0		6.0				6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	18.0				18.0		18.0				18.0	
Actuated g/C Ratio	0.38				0.38		0.38				0.38	
v/c Ratio	0.60				1.14		0.19				0.72	
Control Delay	14.2				96.7		11.3				18.8	
Queue Delay	0.0				0.0		0.0				0.0	
Total Delay	14.2				96.7		11.3				18.8	
LOS	B				F		B				A	
Approach Delay	14.2				96.7		17.6				33.4	
Approach LOS	B				F		B				C	
Queue Length 50th (m)	25.1				~52.8		5.7				26.9	
Queue Length 95th (m)	39.3				#85.4		13.7				#70.1	
Internal Link Dist (m)	185.8				140.3		31.1				108.8	
Turn Bay Length (m)											15.0	
Base Capacity (vph)	1200				846		525				665	
Starvation Cap Reductn	0				0		0				0	
Spillback Cap Reductn	0				0		0				0	
Storage Cap Reductn	0				0		0				0	
Reduced v/c Ratio	0.60				1.14		0.19				0.74	
Intersection Summary												
Area Type:	Other											
Cycle Length:	48											
Actuated Cycle Length:	48											
Offset:	0 (0%), Referenced to phase 2:NBL and 6:SBTL, Start of Green											
Natural Cycle:	70											
Control Type:	Actuated-Coordinated											
Maximum v/c Ratio:	1.14											
Intersection Signal Delay:	48.9						Intersection LOS: D					
Intersection Capacity Utilization:	101.2%						ICU Level of Service G					
Analysis Period (min):	15											
~	Volume exceeds capacity, queue is theoretically infinite.											

Lanes, Volumes, Timings
 23: GO Station West Access/Street C & Cross Ave

BG 2033 PM.syn
 04-03-2024

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

Splits and Phases: 23: GO Station West Access/Street C & Cross Ave



HCM Signalized Intersection Capacity Analysis
 23: GO Station West Access/Street C & Cross Ave

BG 2033 PM.syn
 04-03-2024



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↔			↔↔		↔	↔		↔	↔	
Traffic Volume (vph)	19	587	54	294	377	218	91	0	453	157	0	7
Future Volume (vph)	19	587	54	294	377	218	91	0	453	157	0	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0			6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor		0.95			0.95		1.00	1.00		1.00	1.00	
Fr _t		0.99			0.96		1.00	0.85		1.00	0.85	
Fit Protected		1.00			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		3490			3354		1770	1583		1770	1583	
Fit Permitted		0.91			0.61		0.75	1.00		0.34	1.00	
Satd. Flow (perm)		3164			2084		1402	1583		637	1583	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	21	638	59	320	410	237	99	0	492	171	0	8
RTOR Reduction (vph)	0	14	0	0	66	0	0	72	0	0	5	0
Lane Group Flow (vph)	0	704	0	0	901	0	99	420	0	171	3	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		18.0			18.0		18.0	18.0		18.0	18.0	
Effective Green, g (s)		18.0			18.0		18.0	18.0		18.0	18.0	
Actuated g/C Ratio		0.38			0.38		0.38	0.38		0.38	0.38	
Clearance Time (s)		6.0			6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		1186			781		525	593		238	593	
v/s Ratio Prot								0.27			0.00	
v/s Ratio Perm		0.22			0.43		0.07			0.27		
v/c Ratio		0.59			1.15		0.19	0.71		0.72	0.01	
Uniform Delay, d1		12.1			15.0		10.1	12.8		12.8	9.4	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.8			83.7		0.8	7.0		17.0	0.0	
Delay (s)		12.9			98.7		10.9	19.8		29.8	9.4	
Level of Service		B			F		B	B		C	A	
Approach Delay (s)		12.9			98.7			18.3			28.9	
Approach LOS		B			F			B			C	

Intersection Summary			
HCM 2000 Control Delay	49.1	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	48.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	101.2%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings

BG 2038 AM.syn

1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd

04-03-2024

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	41	127	350	725	90	208	170	1548	832	194	1805	55
Future Volume (vph)	41	127	350	725	90	208	170	1548	832	194	1805	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0		0.0	165.0		25.0	145.0		0.0	95.0		90.0
Storage Lanes	1		1	1		1	1		1	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Ped Bike Factor	0.99					0.98			0.99			
Frt			0.850			0.850			0.850			0.850
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1624	1693	1425	3060	1676	1398	1425	4446	1398	1562	4532	1398
Fit Permitted	0.694			0.383			0.085			0.086		
Satd. Flow (perm)	1175	1693	1425	1234	1676	1366	128	4446	1377	141	4532	1398
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			218			226			484			155
Link Speed (k/h)		50			50			50				50
Link Distance (m)		285.9			293.8			275.1				252.7
Travel Time (s)		20.6			21.2			19.8				18.2
Confl. Peds. (#/hr)	11					11			10	10		
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
Heavy Vehicles (%)	0%	1%	2%	3%	2%	4%	14%	5%	4%	4%	3%	4%
Adj. Flow (vph)	45	138	380	788	98	226	185	1683	904	211	1962	60
Shared Lane Traffic (%)												
Lane Group Flow (vph)	45	138	380	788	98	226	185	1683	904	211	1962	60
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		7.2			7.2			3.6				3.6
Link Offset(m)		0.0			0.0			0.0				0.0
Crosswalk Width(m)		4.8			4.8			4.8				4.8
Two way Left Turn Lane												
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4				9.4
Detector 2 Size(m)		0.6			0.6			0.6				0.6
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex				Cl+Ex
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0

Lanes, Volumes, Timings

BG 2038 AM.syn

1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd

04-03-2024

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA	Free	pm+pt	NA	Perm	pm+pt	NA	Free	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		Free	8		8	2		Free	6		6
Detector Phase	7	4		3	8	8	5	2		1	6	6
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0	10.0	6.0	15.0		6.0	15.0	15.0
Minimum Split (s)	10.0	34.0		11.0	43.0	43.0	10.0	34.0		10.0	34.0	34.0
Total Split (s)	10.0	34.0		19.0	43.0	43.0	13.0	52.0		15.0	54.0	54.0
Total Split (%)	8.3%	28.3%		15.8%	35.8%	35.8%	10.8%	43.3%		12.5%	45.0%	45.0%
Maximum Green (s)	6.0	27.0		14.0	36.0	36.0	9.0	45.0		11.0	47.0	47.0
Yellow Time (s)	3.0	4.0		3.0	4.0	4.0	3.0	4.0		3.0	4.0	4.0
All-Red Time (s)	1.0	3.0		2.0	3.0	3.0	1.0	3.0		1.0	3.0	3.0
Lost Time Adjust (s)	0.0	-3.0		0.0	-3.0	-3.0	0.0	-3.0		0.0	-3.0	-3.0
Total Lost Time (s)	4.0	4.0		5.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	4.0		3.0	4.0	4.0	3.0	5.0		3.0	5.0	5.0
Recall Mode	None	None		None	None	None	None	C-Max		None	C-Max	C-Max
Walk Time (s)					7.0	7.0		7.0			7.0	7.0
Flash Dont Walk (s)					29.0	29.0		20.0			20.0	20.0
Pedestrian Calls (#/hr)					0	0		0			0	0
Act Effct Green (s)	25.0	19.0	120.0	37.0	30.0	30.0	70.1	50.6	120.0	69.6	50.2	50.2
Actuated g/C Ratio	0.21	0.16	1.00	0.31	0.25	0.25	0.58	0.42	1.00	0.58	0.42	0.42
v/c Ratio	0.17	0.51	0.27	1.33	0.23	0.44	0.64	0.90	0.66	0.68	1.03	0.09
Control Delay	29.4	52.4	0.5	191.6	37.3	7.3	38.1	40.4	2.5	38.0	64.7	0.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.4	52.4	0.5	191.6	37.3	7.3	38.1	40.4	2.5	38.0	64.7	0.3
LOS	C	D	A	F	D	A	D	D	A	D	E	A
Approach Delay		15.5			140.6			27.9			60.5	
Approach LOS		B			F			C			E	
Queue Length 50th (m)	7.8	31.7	0.0	~130.6	19.9	0.0	28.3	142.6	0.0	32.5	~192.3	0.0
Queue Length 95th (m)	15.8	50.2	0.0	#162.4	33.3	19.2	#72.7	#181.1	0.0	#73.7	#223.1	0.0
Internal Link Dist (m)		261.9			269.8			251.1			228.7	
Turn Bay Length (m)	60.0			165.0		25.0	145.0			95.0		90.0
Base Capacity (vph)	267	423	1425	593	544	596	288	1874	1377	311	1897	675
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.17	0.33	0.27	1.33	0.18	0.38	0.64	0.90	0.66	0.68	1.03	0.09
Intersection Summary												
Area Type:	CBD											
Cycle Length:	120											
Actuated Cycle Length:	120											
Offset:	33.6 (28%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green											
Natural Cycle:	130											
Control Type:	Actuated-Coordinated											
Maximum v/c Ratio:	1.33											
Intersection Signal Delay:	56.5						Intersection LOS: E					

Lanes, Volumes, Timings
1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd

BG 2038 AM.syn
04-03-2024

Intersection Capacity Utilization 94.7% ICU Level of Service F
Analysis Period (min) 15
- Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd



HCM Signalized Intersection Capacity Analysis
1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd

BG 2038 AM.syn
04-03-2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↑	↗	↖	↑	↗	↖	↖	↗	↖	↗	↖
Traffic Volume (vph)	41	127	350	725	90	208	170	1548	832	194	1805	55
Future Volume (vph)	41	127	350	725	90	208	170	1548	832	194	1805	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	1.0	5.0	4.0	4.0	4.0	4.0	1.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.98	1.00	1.00	0.99	1.00	1.00	1.00
Flpb, ped/bikes	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1614	1693	1425	3060	1676	1366	1425	4446	1377	1562	4532	1398
Flt Permitted	0.69	1.00	1.00	0.38	1.00	1.00	0.09	1.00	1.00	0.09	1.00	1.00
Satd. Flow (perm)	1178	1693	1425	1233	1676	1366	128	4446	1377	142	4532	1398
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	45	138	380	788	98	226	185	1683	904	211	1962	60
RTOR Reduction (vph)	0	0	0	0	0	170	0	0	0	0	0	35
Lane Group Flow (vph)	45	138	380	788	98	57	185	1683	904	211	1962	25
Confl. Peds. (#/hr)	11					11			10		10	
Heavy Vehicles (%)	0%	1%	2%	3%	2%	4%	14%	5%	4%	4%	3%	4%
Turn Type	pm+pt	NA	Free	pm+pt	NA	Perm	pm+pt	NA	Free	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		Free	8		8	2		Free	6		6
Actuated Green, G (s)	21.6	16.8	120.0	35.8	27.0	27.0	66.6	46.8	120.0	65.8	46.4	46.4
Effective Green, g (s)	21.6	19.8	120.0	35.8	30.0	30.0	66.6	49.8	120.0	65.8	49.4	49.4
Actuated g/C Ratio	0.18	0.17	1.00	0.30	0.25	0.25	0.55	0.41	1.00	0.55	0.41	0.41
Clearance Time (s)	4.0	7.0		5.0	7.0	7.0	4.0	7.0		4.0	7.0	7.0
Vehicle Extension (s)	3.0	4.0		3.0	4.0	4.0	3.0	5.0		3.0	5.0	5.0
Lane Grp Cap (vph)	229	279	1425	580	419	341	285	1845	1377	307	1865	575
v/s Ratio Prot	0.01	0.08		c0.16	0.06		0.11	0.38		0.11	c0.43	
v/s Ratio Perm	0.03		0.27	c0.25		0.04	0.25		c0.66	0.27		0.02
v/c Ratio	0.20	0.49	0.27	1.36	0.23	0.17	0.65	0.91	0.66	0.69	1.05	0.04
Uniform Delay, d1	41.5	45.6	0.0	39.9	35.8	35.2	29.7	33.0	0.0	29.4	35.3	21.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.4	1.9	0.5	172.4	0.4	0.3	5.0	8.4	2.5	6.3	36.1	0.1
Delay (s)	41.9	47.4	0.5	212.3	36.2	35.5	34.7	41.4	2.5	35.6	71.4	21.3
Level of Service	D	D	A	F	D	D	C	D	D	A	D	E
Approach Delay (s)		15.3			160.8			28.3			66.6	
Approach LOS		B			F			C			E	
Intersection Summary												
HCM 2000 Control Delay			62.1	HCM 2000 Level of Service				E				
HCM 2000 Volume to Capacity ratio			1.11									
Actuated Cycle Length (s)			120.0	Sum of lost time (s)				17.0				
Intersection Capacity Utilization			94.7%	ICU Level of Service				F				
Analysis Period (min)			15									
c	Critical Lane Group											

Lanes, Volumes, Timings

BG 2038 AM.syn

2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp

04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	→	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	3	0	179	531	34	269	0	2279	544	0	2975	7
Future Volume (vph)	3	0	179	531	34	269	0	2279	544	0	2975	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.5	3.3	3.6	3.5	3.6	3.6	3.6	3.6	3.6	3.5
Storage Length (m)	50.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Storage Lanes	1		1	1		1	0		1	0		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.91	1.00	1.00	0.86	0.86
Ped Bike Factor									0.98		1.00	
Frt			0.850			0.850			0.850			
Flt Protected	0.950			0.950	0.958							
Satd. Flow (prot)	1570	0	1395	1421	1452	1356	0	4446	1384	0	5711	0
Flt Permitted	0.950			0.950	0.958							
Satd. Flow (perm)	1570	0	1395	1421	1452	1356	0	4446	1353	0	5711	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			31			268			184			
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		142.1			192.6			324.8			275.1	
Travel Time (s)		10.2			13.9			23.4			19.8	
Confl. Peds. (#/hr)							8		5	5		8
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
Heavy Vehicles (%)	0%	0%	3%	5%	23%	6%	0%	5%	5%	0%	3%	0%
Adj. Flow (vph)	3	0	195	577	37	292	0	2477	591	0	3234	8
Shared Lane Traffic (%)				47%								
Lane Group Flow (vph)	3	0	195	306	308	292	0	2477	591	0	3242	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.3			3.3			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.19	1.14	1.16	1.19	1.14	1.16	1.14	1.14	1.14	1.14	1.14	1.16
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1		1	1		1			1			2
Detector Template	Left		Right	Left	Thru	Right		Thru	Right		Thru	
Leading Detector (m)	2.0		2.0	2.0	10.0	2.0		10.0	2.0		10.0	
Trailing Detector (m)	0.0		0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Detector 1 Position(m)	0.0		0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Detector 1 Size(m)	2.0		2.0	2.0	0.6	2.0		0.6	2.0		0.6	
Detector 1 Type	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Detector 1 Delay (s)	0.0		0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Detector 2 Position(m)					9.4			9.4			9.4	
Detector 2 Size(m)					0.6			0.6			0.6	
Detector 2 Type					Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

Lanes, Volumes, Timings

BG 2038 AM.syn

2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp

04-03-2024

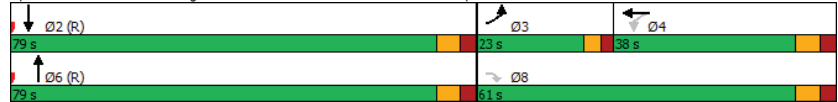
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)						0.0					0.0	0.0
Turn Type	Prot		Perm	Perm	NA	Free			NA	Free	NA	NA
Protected Phases	3				4				6			2
Permitted Phases			8	4		Free			Free			
Detector Phase	3		8	4	4				6			2
Switch Phase												
Minimum Initial (s)	7.0		10.0	10.0	10.0				5.0			28.0
Minimum Split (s)	23.0		38.0	38.0	38.0				35.0			35.0
Total Split (s)	23.0		61.0	38.0	38.0				79.0			79.0
Total Split (%)	16.4%		43.6%	27.1%	27.1%				56.4%			56.4%
Maximum Green (s)	18.0		54.0	31.0	31.0				72.0			72.0
Yellow Time (s)	3.0		4.0	4.0	4.0				4.0			4.0
All-Red Time (s)	2.0		3.0	3.0	3.0				3.0			3.0
Lost Time Adjust (s)	-1.0		-3.0	-3.0	-3.0				-3.0			-3.0
Total Lost Time (s)	4.0		4.0	4.0	4.0				4.0			4.0
Lead/Lag	Lead			Lag	Lag							
Lead-Lag Optimize?	Yes			Yes	Yes							
Vehicle Extension (s)	3.0		3.0	3.0	3.0				4.5			4.5
Recall Mode	Min		Min	Min	Min				C-Min			C-Min
Walk Time (s)			7.0	7.0	7.0				7.0			7.0
Flash Dont Walk (s)			24.0	24.0	24.0				21.0			21.0
Pedestrian Calls (#/hr)			0	0	0				0			0
Act Effct Green (s)	8.0		51.2	39.2	39.2	140.0			80.8		140.0	80.8
Actuated g/C Ratio	0.06		0.37	0.28	0.28	1.00			0.58		1.00	0.58
v/c Ratio	0.03		0.37	0.77	0.76	0.22			0.97		0.44	0.98
Control Delay	63.3		28.1	59.2	58.0	0.4			34.9		0.3	41.7
Queue Delay	0.0		0.0	0.0	0.0	0.0			0.0		0.0	0.0
Total Delay	63.3		28.1	59.2	58.0	0.4			34.9		0.3	41.7
LOS	E		C	E	E	A			C		A	D
Approach Delay		28.7			39.8				28.2			41.7
Approach LOS		C			D				C			D
Queue Length 50th (m)	0.9		34.2	85.5	85.7	0.0			175.2		0.0	262.7
Queue Length 95th (m)	4.2		52.8	118.7	118.6	0.0			m165.8		m0.0	#319.0
Internal Link Dist (m)			118.1		168.6				300.8			251.1
Turn Bay Length (m)	50.0											
Base Capacity (vph)	213		586	406	415	1356			2565		1353	3295
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	0.01		0.33	0.75	0.74	0.22			0.97		0.44	0.98
Intersection Summary												
Area Type:	CBD											
Cycle Length:	140											
Actuated Cycle Length:	140											
Offset:	115.4 (82%), Referenced to phase 2:SBT and 6:NBT, Start of Green											
Natural Cycle:	140											
Control Type:	Actuated-Coordinated											
Maximum v/c Ratio:	0.98											

Lanes, Volumes, Timings
2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp

BG 2038 AM.syn
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Intersection Signal Delay: 35.6 Intersection LOS: D
Intersection Capacity Utilization 87.7% ICU Level of Service E
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp



HCM Signalized Intersection Capacity Analysis
2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp

BG 2038 AM.syn
04-03-2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	3	0	179	531	34	269	0	2279	544	0	2975	7
Future Volume (vph)	3	0	179	531	34	269	0	2279	544	0	2975	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.5	3.3	3.6	3.5	3.6	3.6	3.6	3.6	3.6	3.5
Total Lost time (s)	4.0		4.0	4.0	4.0	1.0		4.0	4.0		4.0	
Lane Util. Factor	1.00		1.00	0.95	0.95	1.00		0.91	1.00		0.86	
Frpb, ped/bikes	1.00		1.00	1.00	1.00	1.00		1.00	0.98		1.00	
Flpb, ped/bikes	1.00		1.00	1.00	1.00	1.00		1.00	1.00		1.00	
Frt	1.00		0.85	1.00	1.00	0.85		1.00	0.85		1.00	
Flt Protected	0.95		1.00	0.95	0.96	1.00		1.00	1.00		1.00	
Satd. Flow (prot)	1570		1395	1421	1452	1356		4446	1353		5709	
Flt Permitted	0.95		1.00	0.95	0.96	1.00		1.00	1.00		1.00	
Satd. Flow (perm)	1570		1395	1421	1452	1356		4446	1353		5709	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	3	0	195	577	37	292	0	2477	591	0	3234	8
RTOR Reduction (vph)	0	0	20	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	3	0	175	306	308	292	0	2477	591	0	3242	0
Confl. Peds. (#/hr)							8		5	5		8
Heavy Vehicles (%)	0%	0%	3%	5%	23%	6%	0%	5%	5%	0%	3%	0%
Turn Type	Prot		Perm	Perm	NA	Free		NA	Free		NA	
Protected Phases	3				4			6			2	
Permitted Phases			8	4		Free			Free			
Actuated Green, G (s)	7.0		48.2	36.2	36.2	140.0		77.8	140.0		77.8	
Effective Green, g (s)	8.0		51.2	39.2	39.2	140.0		80.8	140.0		80.8	
Actuated g/C Ratio	0.06		0.37	0.28	0.28	1.00		0.58	1.00		0.58	
Clearance Time (s)	5.0		7.0	7.0	7.0			7.0			7.0	
Vehicle Extension (s)	3.0		3.0	3.0	3.0			4.5			4.5	
Lane Grp Cap (vph)	89		510	397	406	1356		2565	1353		3294	
v/s Ratio Prot	0.00							0.56			c0.57	
v/s Ratio Perm			0.13	c0.22	0.21	0.22			c0.44			
v/c Ratio	0.03		0.34	0.77	0.76	0.22		0.97	0.44		0.98	
Uniform Delay, d1	62.3		32.2	46.3	46.1	0.0		28.3	0.0		29.0	
Progression Factor	1.00		1.00	1.00	1.00	1.00		1.06	1.00		1.00	
Incremental Delay, d2	0.2		0.4	9.0	7.9	0.4		4.4	0.3		12.4	
Delay (s)	62.5		32.6	55.2	54.0	0.4		34.3	0.3		41.4	
Level of Service	E		C	E	D	A		C	A		D	
Approach Delay (s)		33.1			37.1			27.8			41.4	
Approach LOS		C			D			C			D	
Intersection Summary												
HCM 2000 Control Delay			35.0					HCM 2000 Level of Service			D	
HCM 2000 Volume to Capacity ratio			0.90									
Actuated Cycle Length (s)			140.0					Sum of lost time (s)			12.0	
Intersection Capacity Utilization			87.7%					ICU Level of Service			E	
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
3: Trafalgar Rd & QEW EB-Off Ramp

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Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔↔	↔		↕↕	↕↕	↔
Traffic Volume (vph)	940	845	0	1908	1972	496
Future Volume (vph)	940	845	0	1908	1972	496
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.5	3.6	3.6	3.6	3.6
Lane Util. Factor	0.97	1.00	1.00	0.91	0.91	1.00
Frt		0.850				0.850
Flt Protected	0.950					
Satd. Flow (prot)	2958	1423	0	4404	4489	1454
Flt Permitted	0.950					
Satd. Flow (perm)	2958	1423	0	4404	4489	1454
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		1				194
Link Speed (k/h)	50			50	50	
Link Distance (m)	199.2			51.4	324.8	
Travel Time (s)	14.3			3.7	23.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	1%	0%	6%	4%	0%
Adj. Flow (vph)	1022	918	0	2074	2143	539
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1022	918	0	2074	2143	539
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	6.6			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.19	1.16	1.14	1.14	1.14	1.14
Turning Speed (k/h)	24	14	24			14
Number of Detectors	1	1		2	2	1
Detector Template	Left	Right		Thru	Thru	Right
Leading Detector (m)	2.0	2.0		10.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	2.0	2.0		0.6	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)				9.4	9.4	
Detector 2 Size(m)				0.6	0.6	
Detector 2 Type				Cl+Ex	Cl+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Perm	Perm		NA	NA	Free
Protected Phases				2	2	
Permitted Phases	4	4				Free
Detector Phase	4	4		2	2	

Lanes, Volumes, Timings
3: Trafalgar Rd & QEW EB-Off Ramp

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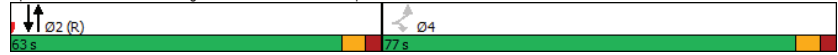
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Switch Phase						
Minimum Initial (s)	10.0	10.0		29.0	29.0	
Minimum Split (s)	38.0	38.0		36.0	36.0	
Total Split (s)	77.0	77.0		63.0	63.0	
Total Split (%)	55.0%	55.0%		45.0%	45.0%	
Maximum Green (s)	70.0	70.0		56.0	56.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	
All-Red Time (s)	3.0	3.0		3.0	3.0	
Lost Time Adjust (s)	-3.0	-3.0		-3.0	-3.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Recall Mode	None	None		C-Max	C-Max	
Walk Time (s)	7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	24.0	24.0		22.0	22.0	
Pedestrian Calls (#/hr)	0	0		0	0	
Act Effct Green (s)	73.0	73.0		59.0	59.0	140.0
Actuated g/C Ratio	0.52	0.52		0.42	0.42	1.00
v/c Ratio	0.66	1.24		1.12	1.13	0.37
Control Delay	27.1	149.3		90.5	93.3	0.3
Queue Delay	0.0	0.0		0.0	0.0	0.0
Total Delay	27.1	149.3		90.5	93.3	0.3
LOS	C	F		F	F	A
Approach Delay	84.9			90.5	74.6	
Approach LOS	F			F	E	
Queue Length 50th (m)	109.1	~332.0		~250.8	~263.1	0.0
Queue Length 95th (m)	133.3	#415.4		m163.0	m#274.6	m0.0
Internal Link Dist (m)	175.2			27.4	300.8	
Turn Bay Length (m)						
Base Capacity (vph)	1542	742		1855	1891	1454
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	0.66	1.24		1.12	1.13	0.37
Intersection Summary						
Area Type:	CBD					
Cycle Length:	140					
Actuated Cycle Length:	140					
Offset:	133.6 (95%), Referenced to phase 2:NBSB and 6.; Start of Green					
Natural Cycle:	75					
Control Type:	Actuated-Coordinated					
Maximum v/c Ratio:	1.24					
Intersection Signal Delay:	82.5			Intersection LOS: F		
Intersection Capacity Utilization	107.1%			ICU Level of Service G		
Analysis Period (min)	15					
~ Volume exceeds capacity, queue is theoretically infinite. Queue shown is maximum after two cycles.						

Lanes, Volumes, Timings
3: Trafalgar Rd & QEW EB-Off Ramp

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- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Trafalgar Rd & QEW EB-Off Ramp



HCM Signalized Intersection Capacity Analysis
3: Trafalgar Rd & QEW EB-Off Ramp

BG 2038 AM.syn
04-03-2024



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔↔	↔		↕↕	↕↕	↔
Traffic Volume (vph)	940	845	0	1908	1972	496
Future Volume (vph)	940	845	0	1908	1972	496
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.5	3.6	3.6	3.6	3.6
Total Lost time (s)	4.0	4.0		4.0	4.0	1.0
Lane Util. Factor	0.97	1.00		0.91	0.91	1.00
Friction	1.00	0.85		1.00	1.00	0.85
Fit Protected	0.95	1.00		1.00	1.00	1.00
Satd. Flow (prot)	2958	1423		4404	4489	1454
Fit Permitted	0.95	1.00		1.00	1.00	1.00
Satd. Flow (perm)	2958	1423		4404	4489	1454
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1022	918	0	2074	2143	539
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	1022	918	0	2074	2143	539
Heavy Vehicles (%)	3%	1%	0%	6%	4%	0%
Turn Type	Perm	Perm		NA	NA	Free
Protected Phases				2	2	
Permitted Phases	4	4				Free
Actuated Green, G (s)	70.0	70.0		56.0	56.0	140.0
Effective Green, g (s)	73.0	73.0		59.0	59.0	140.0
Actuated g/C Ratio	0.52	0.52		0.42	0.42	1.00
Clearance Time (s)	7.0	7.0		7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	1542	741		1855	1891	1454
v/s Ratio Prot				0.47	0.48	
v/s Ratio Perm	0.35	0.64				0.37
v/c Ratio	0.66	1.24		1.12	1.13	0.37
Uniform Delay, d1	24.5	33.5		40.5	40.5	0.0
Progression Factor	1.00	1.00		0.96	0.77	1.00
Incremental Delay, d2	1.1	118.6		53.9	62.9	0.3
Delay (s)	25.6	152.1		92.7	93.9	0.3
Level of Service	C	F		F	F	A
Approach Delay (s)	85.5			92.7	75.1	
Approach LOS	F			F	E	

Intersection Summary

HCM 2000 Control Delay	83.5	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.22		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	107.1%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
4: Trafalgar Rd & Argus Rd

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Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	233	0	2806	2225	594
Future Volume (vph)	0	233	0	2806	2225	594
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.6	3.5	3.6	3.6	3.6	3.6
Lane Util. Factor	1.00	1.00	1.00	0.91	0.91	0.91
Ped Bike Factor						
Frt		0.865			0.968	
Fit Protected						
Satd. Flow (prot)	0	1367	0	4363	4363	0
Fit Permitted						
Satd. Flow (perm)	0	1367	0	4363	4363	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	145.7			270.2	51.4	
Travel Time (s)	10.5			19.5	3.7	
Confl. Peds. (#/hr)						11
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	7%	0%	7%	4%	2%
Adj. Flow (vph)	0	253	0	3050	2418	646
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	253	0	3050	3064	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			3.3	3.3	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.14	1.16	1.14	1.14	1.14	1.14
Turning Speed (k/h)	24	14	24			14
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	CBD					
Control Type:	Unsignalized					
Intersection Capacity Utilization	85.4%			ICU Level of Service E		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
4: Trafalgar Rd & Argus Rd

BG 2038 AM.syn
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Movement	EBL	EBR	NBL	NBT	SBT	SBR	
Lane Configurations							
Traffic Volume (veh/h)	0	233	0	2806	2225	594	
Future Volume (Veh/h)	0	233	0	2806	2225	594	
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	253	0	3050	2418	646	
Pedestrians	11						
Lane Width (m)	3.5						
Walking Speed (m/s)	1.2						
Percent Blockage	1						
Right turn flare (veh)							
Median type			None	None			
Median storage (veh)							
Upstream signal (m)				270	52		
pX, platoon unblocked	0.73	0.59	0.59				
vC, conflicting volume	3769	1140	3075				
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol	774	0	2067				
tC, single (s)	6.8	7.0	4.1				
tC, 2 stage (s)							
tF (s)	3.5	3.4	2.2				
p0 queue free %	100	59	100				
cM capacity (veh/h)	247	620	159				
Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	253	1017	1017	1017	967	967	1130
Volume Left	0	0	0	0	0	0	0
Volume Right	253	0	0	0	0	0	646
eSH	620	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.41	0.60	0.60	0.60	0.57	0.57	0.66
Queue Length 95th (m)	15.9	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (s)	14.8	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	B						
Approach Delay (s)	14.8	0.0			0.0		
Approach LOS	B						
Intersection Summary							
Average Delay				0.6			
Intersection Capacity Utilization	85.4%			ICU Level of Service		E	
Analysis Period (min)	15						

Lanes, Volumes, Timings

BG 2038 AM.syn

5: Trafalgar Rd & Cross Ave/South Service Rd

04-03-2024

	↖	→	↘	↙	←	↖	↙	↘	↙	↘	↙	↘
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖↗	↖	↘	↖	↖	↖	↖↗↘	↖↗↘	↖↗↘	↖↗↘	↖↗↘	↖↗↘
Traffic Volume (vph)	1090	99	196	46	70	114	165	1323	30	239	1811	308
Future Volume (vph)	1090	99	196	46	70	114	165	1323	30	239	1811	308
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.6	3.3	3.6	3.5	3.3	3.6	3.6	3.3	3.6	3.6
Storage Length (m)	130.0	0.0	25.0	0.0	50.0	0.0	25.0	0.0	25.0	0.0	25.0	0.0
Storage Lanes	1	0	1	1	1	1	1	0	1	0	1	0
Taper Length (m)	7.5		7.5		7.5		7.5		7.5		7.5	
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.91	0.91
Ped Bike Factor	1.00	0.99		0.99		0.99		1.00		0.99		0.99
Frt	0.900				0.850		0.997			0.978		
Fit Protected	0.950		0.950		0.950		0.950		0.950		0.950	
Satd. Flow (prot)	2795	1380	0	1525	1583	1382	1428	4500	0	1525	4404	0
Fit Permitted	0.950		0.566		0.093		0.085		0.085		0.085	
Satd. Flow (perm)	2789	1380	0	903	1583	1362	140	4500	0	136	4404	0
Right Turn on Red		Yes		Yes		Yes		Yes		Yes		Yes
Satd. Flow (RTOR)		76			179		3			28		
Link Speed (k/h)	50			50		50		50		50		50
Link Distance (m)	151.2			330.4		150.2		270.2		270.2		19.5
Travel Time (s)	10.9			23.8		10.8		19.5		19.5		19.5
Confl. Peds. (#/hr)	1		4	4		1	10		52	52		10
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
Heavy Vehicles (%)	9%	6%	12%	3%	8%	4%	10%	3%	0%	3%	3%	4%
Adj. Flow (vph)	1185	108	213	50	76	124	179	1438	33	260	1968	335
Shared Lane Traffic (%)												
Lane Group Flow (vph)	1185	321	0	50	76	124	179	1471	0	260	2303	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)	6.6			6.6		6.6		3.3		3.3		3.3
Link Offset(m)	0.0			0.0		0.0		0.0		0.0		0.0
Crosswalk Width(m)	4.8			4.8		4.8		4.8		4.8		4.8
Two way Left Turn Lane												
Headway Factor	1.19	1.14	1.14	1.19	1.14	1.16	1.19	1.14	1.14	1.19	1.14	1.14
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2	1	1		1	2		2
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

Lanes, Volumes, Timings

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5: Trafalgar Rd & Cross Ave/South Service Rd

04-03-2024

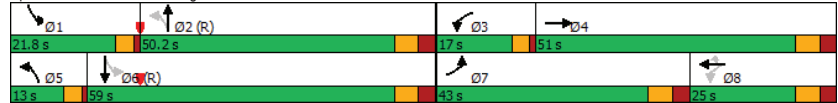
	↖	→	↘	↙	←	↖	↙	↘	↙	↘	↙	↘
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases				8		8	2			6		
Detector Phases	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		12.0	10.0	10.0	7.0	27.0		7.0	27.0	
Minimum Split (s)	17.0	25.0		17.0	25.0	25.0	11.5	34.0		11.5	34.0	
Total Split (s)	43.0	51.0		17.0	25.0	25.0	13.0	50.2		21.8	59.0	
Total Split (%)	30.7%	36.4%		12.1%	17.9%	17.9%	9.3%	35.9%		15.6%	42.1%	
Maximum Green (s)	36.0	44.0		13.0	18.0	18.0	9.0	43.2		17.8	52.0	
Yellow Time (s)	4.0	4.0		3.0	4.0	4.0	3.0	4.0		3.0	4.0	
All-Red Time (s)	3.0	3.0		1.0	3.0	3.0	1.0	3.0		1.0	3.0	
Lost Time Adjust (s)	-3.0	-3.0		0.0	-3.0	-3.0	0.0	-3.0		0.0	-3.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	4.0		3.5	4.0	4.0	3.0	5.0		3.0	5.0	
Recall Mode	Min	Min		Min	Min	Min	Min	C-Max		Min	C-Max	
Walk Time (s)		7.0			7.0	7.0		7.0			7.0	
Flash Dont Walk (s)		11.0			11.0	11.0		11.0			11.0	
Pedestrian Calls (#/hr)		0			0	0		0			0	
Act Effct Green (s)	39.0	43.4		28.4	16.4	16.4	59.8	46.2		72.6	55.0	
Actuated g/C Ratio	0.28	0.31		0.20	0.12	0.12	0.43	0.33		0.52	0.39	
v/c Ratio	1.52	0.67		0.21	0.41	0.39	0.97	0.99		0.89	1.32	
Control Delay	277.2	38.8		29.0	63.4	5.0	80.7	71.5		46.3	182.8	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	277.2	38.8		29.0	63.4	5.0	80.7	71.5		46.3	182.8	
LOS	F	D		C	E	A	F	E		D	F	
Approach Delay		226.4			27.6			72.5			169.0	
Approach LOS		F			C			E			F	
Queue Length 50th (m)	~247.9	63.3		8.6	20.9	0.0	43.6	136.7		62.0	~312.2	
Queue Length 95th (m)	#291.6	94.3		16.3	36.8	4.1	m#65.6	m#133.2		m56.5	m#250.5	
Internal Link Dist (m)		127.2			306.4			126.2			246.2	
Turn Bay Length (m)	130.0				25.0			50.0			25.0	
Base Capacity (vph)	778	515		247	237	356	185	1487		292	1747	
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	
Reduced v/c Ratio	1.52	0.62		0.20	0.32	0.35	0.97	0.99		0.89	1.32	
Intersection Summary												
Area Type:	CBD											
Cycle Length:	140											
Actuated Cycle Length:	140											
Offset:	128 (91%), Referenced to phase 2:NBL and 6:SBTL, Start of Green											
Natural Cycle:	150											
Control Type:	Actuated-Coordinated											
Maximum v/c Ratio:	1.52											

Lanes, Volumes, Timings
5: Trafalgar Rd & Cross Ave/South Service Rd

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Intersection Signal Delay: 150.9	Intersection LOS: F
Intersection Capacity Utilization 109.3%	ICU Level of Service H
Analysis Period (min) 15	
~ Volume exceeds capacity, queue is theoretically infinite.	
Queue shown is maximum after two cycles.	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	
m Volume for 95th percentile queue is metered by upstream signal.	

Splits and Phases: 5: Trafalgar Rd & Cross Ave/South Service Rd



HCM Signalized Intersection Capacity Analysis
5: Trafalgar Rd & Cross Ave/South Service Rd

BG 2038 AM.syn
04-03-2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔	↔		↔	↔	↔	↔↔↔	↔↔↔	↔	↔↔	↔↔	↔
Traffic Volume (vph)	1090	99	196	46	70	114	165	1323	30	239	1811	308
Future Volume (vph)	1090	99	196	46	70	114	165	1323	30	239	1811	308
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.3	3.6	3.5	3.3	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	1.00		1.00	1.00	1.00	1.00	0.91		1.00	0.91	
Frpb, ped/bikes	1.00	0.99		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	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.90		1.00	1.00	0.85	1.00	1.00		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	2795	1380		1520	1583	1362	1428	4498		1525	4405	
Flt Permitted	0.95	1.00		0.57	1.00	1.00	0.09	1.00		0.08	1.00	
Satd. Flow (perm)	2795	1380		905	1583	1362	139	4498		136	4405	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1185	108	213	50	76	124	179	1438	33	260	1968	335
RTOR Reduction (vph)	0	52	0	0	0	109	0	2	0	0	17	0
Lane Group Flow (vph)	1185	269	0	50	76	15	179	1469	0	260	2286	0
Confl. Peds. (#/hr)	1		4	4		1	10		52	52		10
Heavy Vehicles (%)	9%	6%	12%	3%	8%	4%	10%	3%	0%	3%	3%	4%
Turn Type	Prot	NA		pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases				8		8	2			6		
Actuated Green, G (s)	36.0	40.4		25.4	13.4	13.4	56.8	43.2		69.6	52.0	
Effective Green, g (s)	39.0	43.4		25.4	16.4	16.4	56.8	46.2		69.6	55.0	
Actuated g/C Ratio	0.28	0.31		0.18	0.12	0.12	0.41	0.33		0.50	0.39	
Clearance Time (s)	7.0	7.0		4.0	7.0	7.0	4.0	7.0		4.0	7.0	
Vehicle Extension (s)	3.0	4.0		3.5	4.0	4.0	3.0	5.0		3.0	5.0	
Lane Grp Cap (vph)	778	427		216	185	159	181	1484		289	1730	
v/s Ratio Prot	c0.42	c0.19		0.02	0.05		0.10	0.33		c0.14	c0.52	
v/s Ratio Perm				0.02		0.01	0.30			0.30		
v/c Ratio	1.52	0.63		0.23	0.41	0.09	0.99	0.99		0.90	1.32	
Uniform Delay, d1	50.5	41.4		48.5	57.3	55.2	41.0	46.7		42.7	42.5	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.24	1.27		1.13	1.17	
Incremental Delay, d2	242.0	3.3		0.7	2.0	0.3	41.2	13.4		3.8	145.0	
Delay (s)	292.5	44.7		49.2	59.3	55.5	92.2	72.8		51.9	194.9	
Level of Service	F	D		D	E	E	F	E		D	F	
Approach Delay (s)		239.6			55.4			74.9			180.4	
Approach LOS		F			E			E			F	
Intersection Summary												
HCM 2000 Control Delay		160.9										F
HCM 2000 Volume to Capacity ratio		1.27										
Actuated Cycle Length (s)		140.0					Sum of lost time (s)	16.0				
Intersection Capacity Utilization		109.3%					ICU Level of Service	H				
Analysis Period (min)		15										
c Critical Lane Group												

Lanes, Volumes, Timings
6: Trafalgar Rd & Cornwall Rd

BG 2038 AM.syn
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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	347	535	93	72	610	567	116	591	79	852	936	280
Future Volume (vph)	347	535	93	72	610	567	116	591	79	852	936	280
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.5
Storage Length (m)	80.0	0.0	80.0	0.0	25.0	0.0	80.0	0.0	80.0	0.0	0.0	0.0
Storage Lanes	2	0	1	1	1	1	0	1	0	1	1	1
Taper Length (m)	7.5		7.5		7.5		7.5		7.5		7.5	
Lane Util. Factor	0.97	0.95	0.95	1.00	0.95	1.00	1.00	*0.80	0.95	0.97	*0.80	1.00
Ped Bike Factor	0.99	0.99		0.99		0.98	1.00	1.00		0.99		0.98
Frt		0.978				0.850		0.982				0.850
Flt Protected	0.950			0.950		0.950		0.950		0.950		0.950
Satd. Flow (prot)	2987	3052	0	1481	3154	1411	1540	2652	0	2929	1341	1356
Flt Permitted	0.950			0.950		0.950		0.950		0.950		0.950
Satd. Flow (perm)	2945	3052	0	1472	3154	1384	1535	2652	0	2887	1341	1324
Right Turn on Red			Yes			Yes		Yes		Yes		Yes
Satd. Flow (RTOR)		13				499		8				169
Link Speed (k/h)		50			50			50				50
Link Distance (m)		285.8			142.3			311.4				130.3
Travel Time (s)		20.6			10.2			22.4				9.4
Confl. Peds. (#/hr)	25		7	7		25	9		18	18		9
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
Heavy Vehicles (%)	2%	4%	1%	6%	3%	3%	2%	1%	0%	4%	2%	6%
Adj. Flow (vph)	377	582	101	78	663	616	126	642	86	926	1017	304
Shared Lane Traffic (%)												
Lane Group Flow (vph)	377	683	0	78	663	616	126	728	0	926	1017	304
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		6.6			6.6			6.6			6.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.19	1.14	1.14	1.19	1.14	1.14	1.19	1.14	1.14	1.19	1.14	1.16
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2	1	1	2		1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0		2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6		2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

Lanes, Volumes, Timings
6: Trafalgar Rd & Cornwall Rd

BG 2038 AM.syn
04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA	Free	Prot	NA		Prot	NA	Perm
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases					Free							6
Detector Phases	3	8		7	4		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	7.0	10.0		7.0	10.0		7.0	20.0		7.0	20.0	20.0
Minimum Split (s)	12.0	37.0		12.0	37.0		12.0	39.0		12.0	39.0	39.0
Total Split (s)	16.0	39.0		14.0	37.0		13.0	43.0		44.0	74.0	74.0
Total Split (%)	11.4%	27.9%		10.0%	26.4%		9.3%	30.7%		31.4%	52.9%	52.9%
Maximum Green (s)	11.0	32.0		9.0	30.0		8.0	36.0		39.0	67.0	67.0
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	4.0
All-Red Time (s)	2.0	3.0		2.0	3.0		2.0	3.0		2.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-3.0		-1.0	-3.0		-1.0	-3.0		-1.0	-3.0	-3.0
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	0.2	0.2		0.2	0.2		0.2	0.2		0.2	0.2	0.2
Recall Mode	Max	Max		Max	Max		None	C-Max		Max	C-Max	C-Max
Walk Time (s)		7.0			7.0			7.0			7.0	7.0
Flash Dont Walk (s)		23.0			23.0			25.0			25.0	25.0
Pedestrian Calls (#/hr)		0			0			0			0	0
Act Effct Green (s)	12.0	35.0		10.0	33.0	140.0	9.0	39.0		40.0	70.0	70.0
Actuated g/C Ratio	0.09	0.25		0.07	0.24	1.00	0.06	0.28		0.29	0.50	0.50
v/c Ratio	1.47	0.88		0.74	0.89	0.45	1.27	0.98		1.11	1.52	0.41
Control Delay	275.3	63.8		101.2	67.2	1.0	230.5	77.5		121.5	260.5	8.7
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	275.3	63.8		101.2	67.2	1.0	230.5	77.5		121.5	260.5	8.7
LOS	F	E		F	E	A	F	E		F	F	A
Approach Delay		139.0			39.1			100.0			169.1	
Approach LOS		F			D			F			F	
Queue Length 50th (m)	~77.6	99.8		22.7	99.1	0.0	~46.3	130.8		~163.0	~505.7	17.4
Queue Length 95th (m)	#111.2	#133.7		#50.9	#133.1	0.0	#89.8	#183.0		m119.6m#357.1	m11.8	
Internal Link Dist (m)		261.8			118.3			287.4			106.3	
Turn Bay Length (m)	80.0			80.0		25.0		80.0				
Base Capacity (vph)	256	772		105	743	1384	99	744		836	670	746
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	0
Reduced v/c Ratio	1.47	0.88		0.74	0.89	0.45	1.27	0.98		1.11	1.52	0.41

Intersection Summary

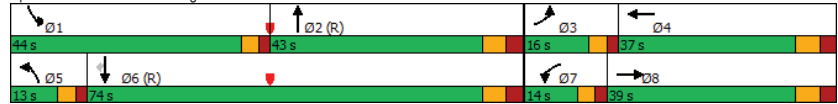
Area Type:	CBD
Cycle Length:	140
Actuated Cycle Length:	140
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green, Master Intersection	
Natural Cycle:	150
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	1.52

Lanes, Volumes, Timings
6: Trafalgar Rd & Cornwall Rd

BG 2038 AM.syn
04-03-2024

Intersection Signal Delay: 120.7	Intersection LOS: F
Intersection Capacity Utilization 111.2%	ICU Level of Service H
Analysis Period (min) 15	
* User Entered Value	
~ Volume exceeds capacity, queue is theoretically infinite. Queue shown is maximum after two cycles.	
# 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.	
m Volume for 95th percentile queue is metered by upstream signal.	

Splits and Phases: 6: Trafalgar Rd & Cornwall Rd



HCM Signalized Intersection Capacity Analysis
6: Trafalgar Rd & Cornwall Rd

BG 2038 AM.syn
04-03-2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔	↕↔	↔	↔	↕↔	↔	↔↔	↕↔	↔	↔↔	↕↔	↔
Traffic Volume (vph)	347	535	93	72	610	567	116	591	79	852	936	280
Future Volume (vph)	347	535	93	72	610	567	116	591	79	852	936	280
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.5
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.97	0.95		1.00	0.95	1.00	1.00	*0.80		0.97	*0.80	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.98	1.00	1.00		1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	2987	3051		1481	3154	1384	1540	2653		2929	1341	1324
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	2987	3051		1481	3154	1384	1540	2653		2929	1341	1324
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	377	582	101	78	663	616	126	642	86	926	1017	304
RTOR Reduction (vph)	0	10	0	0	0	0	0	6	0	0	0	85
Lane Group Flow (vph)	377	673	0	78	663	616	126	722	0	926	1017	220
Confl. Peds. (#/hr)	25		7	7		25	9		18	18		9
Heavy Vehicles (%)	2%	4%	1%	6%	3%	2%	2%	1%	0%	4%	2%	6%
Turn Type	Prot	NA		Prot	NA	Free	Prot	NA		Prot	NA	Perm
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases						Free						6
Actuated Green, G (s)	11.0	32.0		9.0	30.0	140.0	8.0	36.0		39.0	67.0	67.0
Effective Green, g (s)	12.0	35.0		10.0	33.0	140.0	9.0	39.0		40.0	70.0	70.0
Actuated g/C Ratio	0.09	0.25		0.07	0.24	1.00	0.06	0.28		0.29	0.50	0.50
Clearance Time (s)	5.0	7.0		5.0	7.0		5.0	7.0		5.0	7.0	7.0
Vehicle Extension (s)	0.2	0.2		0.2	0.2		0.2	0.2		0.2	0.2	0.2
Lane Grp Cap (vph)	256	762		105	743	1384	99	739		836	670	662
v/s Ratio Prot	c0.13	c0.22		0.05	0.21		0.08	0.27		c0.32	c0.76	
v/s Ratio Perm					c0.45							0.17
v/c Ratio	1.47	0.88		0.74	0.89	0.45	1.27	0.98		1.11	1.52	0.33
Uniform Delay, d1	64.0	50.5		63.7	51.8	0.0	65.5	50.1		50.0	35.0	21.0
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.64	0.87	0.93
Incremental Delay, d2	232.7	14.1		37.4	15.3	1.0	180.4	28.0		50.4	233.8	0.1
Delay (s)	296.7	64.7		101.2	67.0	1.0	245.9	78.1		132.5	264.3	19.6
Level of Service	F	E		F	E	A	F	E		F	F	B
Approach Delay (s)		147.2			39.0			102.8			176.9	
Approach LOS		F			D			F			F	
Intersection Summary												
HCM 2000 Control Delay		125.8									F	
HCM 2000 Volume to Capacity ratio		1.34										
Actuated Cycle Length (s)		140.0			Sum of lost time (s)			16.0				
Intersection Capacity Utilization		111.2%			ICU Level of Service			H				
Analysis Period (min)		15										
c Critical Lane Group												

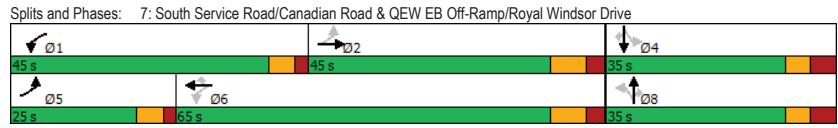
Lanes, Volumes, Timings
 7: South Service Road/Canadian Road & QEW EB Off-Ramp/Royal Windsor Drive 04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	50	619	34	101	609	8	3	9	57	4	22	32
Future Volume (vph)	50	619	34	101	609	8	3	9	57	4	22	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	150.0	0.0	155.0		70.0	15.0			0.0	0.0		30.0
Storage Lanes	2	0	1		1	1			1	1		1
Taper Length (m)	7.5		7.5		7.5				7.5			7.5
Lane Util. Factor	0.97	0.95	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.992				0.850			0.850			0.850
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3400	3300	0	1719	3139	1380	1805	1667	1468	1805	1792	1495
Fit Permitted	0.389			0.341			0.742			0.751		
Satd. Flow (perm)	1392	3300	0	617	3139	1380	1410	1667	1468	1427	1792	1495
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5				94			152			152
Link Speed (k/h)	80			80			60			40		
Link Distance (m)	324.5			247.2			158.7			215.5		
Travel Time (s)	14.6			11.1			9.5			19.4		
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
Heavy Vehicles (%)	3%	9%	0%	5%	15%	17%	0%	14%	10%	0%	6%	8%
Adj. Flow (vph)	54	673	37	110	662	9	3	10	62	4	24	35
Shared Lane Traffic (%)												
Lane Group Flow (vph)	54	710	0	110	662	9	3	10	62	4	24	35
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Right	Left	Left	Right	Right
Median Width(m)	7.2			7.2			3.6			3.6		
Link Offset(m)	0.0			0.0			0.0			0.0		
Crosswalk Width(m)	4.8			4.8			4.8			4.8		
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	CI+Ex	CI+Ex		CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		CI+Ex			CI+Ex			CI+Ex			CI+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	

Lanes, Volumes, Timings
 7: South Service Road/Canadian Road & QEW EB Off-Ramp/Royal Windsor Drive 04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	2			6		6	8		8	4		4
Detector Phase	5	2		1	6	6	8	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	8.0	20.0		8.0	30.0	30.0	8.0	8.0	8.0	10.0	10.0	10.0
Minimum Split (s)	14.0	34.0		14.0	38.4	38.4	28.8	28.8	28.8	35.0	35.0	35.0
Total Split (s)	25.0	45.0		45.0	65.0	65.0	35.0	35.0	35.0	35.0	35.0	35.0
Total Split (%)	20.0%	36.0%		36.0%	52.0%	52.0%	28.0%	28.0%	28.0%	28.0%	28.0%	28.0%
Maximum Green (s)	19.0	36.6		39.0	56.6	56.6	27.2	27.2	27.2	27.2	27.2	27.2
Yellow Time (s)	4.0	5.4		4.0	5.4	5.4	3.7	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	2.0	3.0		2.0	3.0	3.0	4.1	4.1	4.1	4.1	4.1	4.1
Lost Time Adjust (s)	-2.0	-4.4		-2.0	-4.4	-4.4	-3.8	-3.8	-3.8	-3.8	-3.8	-3.8
Total Lost Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lead	Lag		Lead	Lag	Lag						
Lead-Lag Optimize?												
Vehicle Extension (s)	3.5	4.5		3.5	6.0	6.0	3.5	3.5	3.5	3.5	3.5	3.5
Recall Mode	None	Max		None	Max	Max	None	None	None	None	None	None
Walk Time (s)	10.0			10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Flash Dont Walk (s)		10.0			10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Pedestrian Calls (#/hr)		0			0	0	0	0	0	0	0	0
Act Effct Green (s)	71.5	61.5		72.6	65.8	65.8	13.4	13.4	13.4	13.9	13.9	13.9
Actuated g/C Ratio	0.77	0.66		0.78	0.70	0.70	0.14	0.14	0.14	0.15	0.15	0.15
v/c Ratio	0.04	0.33		0.18	0.30	0.01	0.01	0.04	0.18	0.02	0.09	0.10
Control Delay	2.7	8.2		3.3	7.8	0.0	36.0	36.4	1.2	36.0	37.1	0.6
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	2.7	8.2		3.3	7.8	0.0	36.0	36.4	1.2	36.0	37.1	0.6
LOS	A	A		A	A	A	D	D	A	D	D	A
Approach Delay		7.8			7.1			7.3				16.7
Approach LOS		A			A			A				B
Queue Length 50th (m)	0.9	31.3		4.1	29.2	0.0	0.5	1.7	0.0	0.7	4.2	0.0
Queue Length 95th (m)	2.1	42.2		7.7	39.2	0.0	3.1	6.7	0.0	3.8	11.7	0.0
Internal Link Dist (m)		300.5			223.2			134.7			191.5	
Turn Bay Length (m)	150.0			155.0		70.0	15.0					30.0
Base Capacity (vph)	1581	2173		985	2210	999	470	555	591	475	597	600
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.33		0.11	0.30	0.01	0.01	0.02	0.10	0.01	0.04	0.06
Intersection Summary												
Area Type:	Other											
Cycle Length:	125											
Actuated Cycle Length:	93.4											
Natural Cycle:	90											
Control Type:	Semi Act-Uncoord											
Maximum v/c Ratio:	0.33											
Intersection Signal Delay:	7.8											
Intersection Capacity Utilization:	50.0%											
ICU Level of Service A												
Analysis Period (min)	15											

Lanes, Volumes, Timings BG 2038 AM.syn
04-03-2024
7: South Service Road/Canadian Road & QEW EB Off-Ramp/Royal Windsor Drive



HCM Signalized Intersection Capacity Analysis BG 2038 AM.syn
04-03-2024
7: South Service Road/Canadian Road & QEW EB Off-Ramp/Royal Windsor Drive

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	↖	→	↗	↖	→	↗	↖	→	↗	↖	→	↗
Lane Configurations	↖↗	↖↗	↖↗	↖↗	↖↗	↖↗	↖↗	↖↗	↖↗	↖↗	↖↗	↖↗
Traffic Volume (vph)	50	619	34	101	609	8	3	9	57	4	22	32
Future Volume (vph)	50	619	34	101	609	8	3	9	57	4	22	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	0.95		1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Fit Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3400	3300		1719	3139	1380	1805	1667	1468	1805	1792	1495
Fit Permitted	0.39	1.00		0.34	1.00	1.00	0.74	1.00	1.00	0.75	1.00	1.00
Satd. Flow (perm)	1391	3300		617	3139	1380	1409	1667	1468	1427	1792	1495
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	54	673	37	110	662	9	3	10	62	4	24	35
RTOR Reduction (vph)	0	2	0	0	0	3	0	0	55	0	0	31
Lane Group Flow (vph)	54	708	0	110	662	6	3	10	7	4	24	4
Heavy Vehicles (%)	3%	9%	0%	5%	15%	17%	0%	14%	10%	0%	6%	8%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6		6	8		8	4		4
Actuated Green, G (s)	64.7	58.5		68.5	60.4	60.4	7.7	7.7	7.7	7.7	7.7	7.7
Effective Green, g (s)	68.7	62.9		72.5	64.8	64.8	11.5	11.5	11.5	11.5	11.5	11.5
Actuated g/C Ratio	0.71	0.65		0.75	0.67	0.67	0.12	0.12	0.12	0.12	0.12	0.12
Clearance Time (s)	6.0	8.4		6.0	8.4	8.4	7.8	7.8	7.8	7.8	7.8	7.8
Vehicle Extension (s)	3.5	4.5		3.5	6.0	6.0	3.5	3.5	3.5	3.5	3.5	3.5
Lane Grp Cap (vph)	1160	2150		578	2107	926	167	198	174	170	213	178
v/s Ratio Prot	0.00	c0.21		c0.02	0.21			0.01			c0.01	
v/s Ratio Perm	0.03			0.12		0.00	0.00		0.01	0.00		0.00
v/c Ratio	0.05	0.33		0.19	0.31	0.01	0.02	0.05	0.04	0.02	0.11	0.02
Uniform Delay, d1	4.1	7.4		3.5	6.6	5.2	37.5	37.7	37.6	37.5	37.9	37.5
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.0	0.4		0.2	0.4	0.0	0.1	0.1	0.1	0.1	0.3	0.1
Delay (s)	4.1	7.9		3.7	7.0	5.2	37.6	37.8	37.7	37.6	38.2	37.6
Level of Service	A	A		A	A	A	D	D	D	D	D	D
Approach Delay (s)		7.6			6.5			37.7			37.8	
Approach LOS		A			A			D			D	
Intersection Summary												
HCM 2000 Control Delay			9.6	HCM 2000 Level of Service				A				
HCM 2000 Volume to Capacity ratio			0.28									
Actuated Cycle Length (s)			96.5	Sum of lost time (s)				12.0				
Intersection Capacity Utilization			50.0%	ICU Level of Service				A				
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
8: QEW WB Off-Ramp & Kerr Street

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Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔↔			↔↔	↔↔	↔↔
Traffic Volume (vph)	530	0	0	322	282	315
Future Volume (vph)	530	0	0	322	282	315
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)		0.0	0.0		0.0	140.0
Storage Lanes		0	0		1	1
Taper Length (m)			7.5		7.5	
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00
Frt						0.850
Flt Protected					0.950	
Satd. Flow (prot)	3539	0	0	3539	1770	1583
Flt Permitted					0.950	
Satd. Flow (perm)	3539	0	0	3539	1770	1583
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)						164
Link Speed (k/h)	60			60	40	
Link Distance (m)	128.8			184.7	258.8	
Travel Time (s)	7.7			11.1	23.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	576	0	0	350	307	342
Shared Lane Traffic (%)						
Lane Group Flow (vph)	576	0	0	350	307	342
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)		15	25		25	15
Turn Type	NA			NA	Prot	Perm
Protected Phases	4			8	2	
Permitted Phases						2
Minimum Split (s)				22.5	22.5	22.5
Total Split (s)				22.5	22.5	22.5
Total Split (%)	50.0%			50.0%	50.0%	50.0%
Maximum Green (s)	18.0			18.0	18.0	18.0
Yellow Time (s)	3.5			3.5	3.5	3.5
All-Red Time (s)	1.0			1.0	1.0	1.0
Lost Time Adjust (s)	0.0			0.0	0.0	0.0
Total Lost Time (s)	4.5			4.5	4.5	4.5
Lead/Lag						
Lead-Lag Optimize?						
Walk Time (s)	7.0			7.0	7.0	7.0
Flash Dont Walk (s)	11.0			11.0	11.0	11.0
Pedestrian Calls (#/hr)	0			0	0	0
Act Effct Green (s)	18.0			18.0	18.0	18.0
Actuated g/C Ratio	0.40			0.40	0.40	0.40
v/c Ratio	0.41			0.25	0.43	0.47

Lanes, Volumes, Timings
8: QEW WB Off-Ramp & Kerr Street

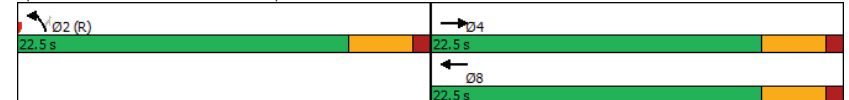
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Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Control Delay	10.8			9.6	12.2	7.7
Queue Delay	0.0			0.0	0.0	0.0
Total Delay	10.8			9.6	12.2	7.7
LOS	B			A	B	A
Approach Delay	10.8			9.6	9.8	
Approach LOS	B			A	A	
Queue Length 50th (m)	16.9			9.5	17.4	9.4
Queue Length 95th (m)	26.9			16.5	33.3	24.5
Internal Link Dist (m)	104.8			160.7	234.8	
Turn Bay Length (m)						140.0
Base Capacity (vph)	1415			1415	708	731
Starvation Cap Reductn	0			0	0	0
Spillback Cap Reductn	0			0	0	0
Storage Cap Reductn	0			0	0	0
Reduced v/c Ratio	0.41			0.25	0.43	0.47

Intersection Summary

Area Type: Other
 Cycle Length: 45
 Actuated Cycle Length: 45
 Offset: 0 (0%), Referenced to phase 2:NBL and 6:, Start of Green
 Natural Cycle: 45
 Control Type: Pretimed
 Maximum v/c Ratio: 0.47
 Intersection Signal Delay: 10.1
 Intersection Capacity Utilization 41.7%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service A

Splits and Phases: 8: QEW WB Off-Ramp & Kerr Street



HCM Signalized Intersection Capacity Analysis
8: QEW WB Off-Ramp & Kerr Street

BG 2038 AM.syn
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Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔↔			↔↔	↔↔	↔↔
Traffic Volume (vph)	530	0	0	322	282	315
Future Volume (vph)	530	0	0	322	282	315
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5			4.5	4.5	4.5
Lane Util. Factor	0.95			0.95	1.00	1.00
Fr _t	1.00			1.00	1.00	0.85
Fl _t Protected	1.00			1.00	0.95	1.00
Satd. Flow (prot)	3539			3539	1770	1583
Fl _t Permitted	1.00			1.00	0.95	1.00
Satd. Flow (perm)	3539			3539	1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	576	0	0	350	307	342
RTOR Reduction (vph)	0	0	0	0	0	98
Lane Group Flow (vph)	576	0	0	350	307	244
Turn Type	NA			NA	Prot	Perm
Protected Phases	4			8	2	
Permitted Phases						2
Actuated Green, G (s)	18.0			18.0	18.0	18.0
Effective Green, g (s)	18.0			18.0	18.0	18.0
Actuated g/C Ratio	0.40			0.40	0.40	0.40
Clearance Time (s)	4.5			4.5	4.5	4.5
Lane Grp Cap (vph)	1415			1415	708	633
v/s Ratio Prot	c0.16			0.10	c0.17	
v/s Ratio Perm						0.15
v/c Ratio	0.41			0.25	0.43	0.38
Uniform Delay, d1	9.7			9.0	9.8	9.6
Progression Factor	1.00			1.00	1.00	1.00
Incremental Delay, d2	0.9			0.4	1.9	1.8
Delay (s)	10.5			9.4	11.7	11.3
Level of Service	B			A	B	B
Approach Delay (s)	10.5			9.4	11.5	
Approach LOS	B			A	B	
Intersection Summary						
HCM 2000 Control Delay		10.7		HCM 2000 Level of Service		B
HCM 2000 Volume to Capacity ratio		0.42				
Actuated Cycle Length (s)		45.0		Sum of lost time (s)		9.0
Intersection Capacity Utilization		41.7%		ICU Level of Service		A
Analysis Period (min)		15				
c Critical Lane Group						

Lanes, Volumes, Timings
9: Dorval Drive & QEW WB Off-Ramp

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Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔↔	↔	↔↔			↔↔
Traffic Volume (vph)	992	462	568	0	0	1583
Future Volume (vph)	992	462	568	0	0	1583
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	190.0		0.0	0.0	
Storage Lanes	2	1		0	0	
Taper Length (m)	7.5				7.5	
Lane Util. Factor	0.97	0.91	0.95	1.00	1.00	0.95
Fr _t	0.993	0.850				
Fl _t Protected	0.954					
Satd. Flow (prot)	3423	1441	3539	0	0	3539
Fl _t Permitted	0.954					
Satd. Flow (perm)	3423	1441	3539	0	0	3539
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)	4	278				
Link Speed (k/h)	40		60			60
Link Distance (m)	325.1		310.2			266.9
Travel Time (s)	29.3		18.6			16.0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1078	502	617	0	0	1721
Shared Lane Traffic (%)		10%				
Lane Group Flow (vph)	1128	452	617	0	0	1721
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	7.2		0.0		0.0	
Link Offset(m)	0.0		0.0		0.0	
Crosswalk Width(m)	4.8		4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15		15	25	
Number of Detectors	1	1	2			2
Detector Template	Left	Right	Thru			Thru
Leading Detector (m)	2.0	2.0	10.0			10.0
Trailing Detector (m)	0.0	0.0	0.0			0.0
Detector 1 Position(m)	0.0	0.0	0.0			0.0
Detector 1 Size(m)	2.0	2.0	0.6			0.6
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex			CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0			0.0
Detector 1 Queue (s)	0.0	0.0	0.0			0.0
Detector 1 Delay (s)	0.0	0.0	0.0			0.0
Detector 2 Position(m)			9.4			9.4
Detector 2 Size(m)			0.6			0.6
Detector 2 Type			CI+Ex			CI+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type		Prot	Perm	NA		NA
Protected Phases		8		2		6
Permitted Phases						8

Lanes, Volumes, Timings
9: Dorval Drive & QEW WB Off-Ramp

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Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Detector Phase	8	8	2			6
Switch Phase						
Minimum Initial (s)	10.0	10.0	20.0			20.0
Minimum Split (s)	24.0	24.0	26.0			26.0
Total Split (s)	45.6	45.6	74.4			74.4
Total Split (%)	38.0%	38.0%	62.0%			62.0%
Maximum Green (s)	39.6	39.6	68.4			68.4
Yellow Time (s)	4.0	4.0	4.0			4.0
All-Red Time (s)	2.0	2.0	2.0			2.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0			-2.0
Total Lost Time (s)	4.0	4.0	4.0			4.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	4.5	4.5	5.0			5.0
Recall Mode	None	None	Max			Max
Walk Time (s)	5.0	5.0	7.0			7.0
Flash Dont Walk (s)	7.0	7.0	11.0			11.0
Pedestrian Calls (#/hr)	0	0	0			0
Act Effct Green (s)	41.6	41.6	70.4			70.4
Actuated g/C Ratio	0.35	0.35	0.59			0.59
v/c Ratio	0.95	0.66	0.30			0.83
Control Delay	54.8	17.5	12.9			24.4
Queue Delay	0.0	0.0	0.0			0.0
Total Delay	54.8	17.5	12.9			24.4
LOS	D	B	B			C
Approach Delay	44.1		12.9			24.4
Approach LOS	D		B			C
Queue Length 50th (m)	139.0	38.9	38.0			171.0
Queue Length 95th (m)	#184.4	82.5	49.1			205.9
Internal Link Dist (m)	301.1		286.2			242.9
Turn Bay Length (m)		190.0				
Base Capacity (vph)	1189	681	2076			2076
Starvation Cap Reductn	0	0	0			0
Spillback Cap Reductn	0	0	0			0
Storage Cap Reductn	0	0	0			0
Reduced v/c Ratio	0.95	0.66	0.30			0.83

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Natural Cycle: 70
 Control Type: Semi Act-Uncoord
 Maximum v/c Ratio: 0.95
 Intersection Signal Delay: 30.6
 Intersection Capacity Utilization 83.6%
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Lanes, Volumes, Timings
9: Dorval Drive & QEW WB Off-Ramp

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Signals and Phases: 9: Dorval Drive & QEW WB Off-Ramp



HCM Signalized Intersection Capacity Analysis
9: Dorval Drive & QEWB Off-Ramp

BG 2038 AM.syn
04-03-2024

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔↔	↔	↑↑			↑↑
Traffic Volume (vph)	992	462	568	0	0	1583
Future Volume (vph)	992	462	568	0	0	1583
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0			4.0
Lane Util. Factor	0.97	0.91	0.95			0.95
Fr	0.99	0.85	1.00			1.00
Fit Protected	0.95	1.00	1.00			1.00
Satd. Flow (prot)	3426	1441	3539			3539
Fit Permitted	0.95	1.00	1.00			1.00
Satd. Flow (perm)	3426	1441	3539			3539
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1078	502	617	0	0	1721
RTOR Reduction (vph)	3	182	0	0	0	0
Lane Group Flow (vph)	1125	270	617	0	0	1721
Turn Type	Prot	Perm	NA			NA
Protected Phases	8		2			6
Permitted Phases	8					
Actuated Green, G (s)	39.6	39.6	68.4			68.4
Effective Green, g (s)	41.6	41.6	70.4			70.4
Actuated g/C Ratio	0.35	0.35	0.59			0.59
Clearance Time (s)	6.0	6.0	6.0			6.0
Vehicle Extension (s)	4.5	4.5	5.0			5.0
Lane Grp Cap (vph)	1187	499	2076			2076
v/s Ratio Prot	c0.33		0.17			c0.49
v/s Ratio Perm		0.19				
v/c Ratio	0.95	0.54	0.30			0.83
Uniform Delay, d1	38.1	31.5	12.4			20.0
Progression Factor	1.00	1.00	1.00			1.00
Incremental Delay, d2	15.5	1.8	0.4			4.0
Delay (s)	53.6	33.3	12.8			24.0
Level of Service	D	C	B			C
Approach Delay (s)	47.8		12.8			24.0
Approach LOS	D		B			C

Intersection Summary			
HCM 2000 Control Delay	31.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	83.6%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
10: Dorval Drive & QEWE Off-Ramp

BG 2038 AM.syn
04-03-2024

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔↔	↔		↑↑	↑↑	
Traffic Volume (vph)	146	578	0	799	1711	0
Future Volume (vph)	146	578	0	799	1711	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	175.0	0.0	0.0			0.0
Storage Lanes	1	1	0			0
Taper Length (m)	7.5		7.5			
Lane Util. Factor	0.97	0.91	1.00	0.95	0.95	1.00
Fr	0.900	0.850				
Fit Protected	0.983					
Satd. Flow (prot)	3197	1441	0	3539	3539	0
Fit Permitted	0.983					
Satd. Flow (perm)	3197	1441	0	3539	3539	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	14	14				
Link Speed (k/h)	40			60	60	
Link Distance (m)	275.5			164.3	310.2	
Travel Time (s)	24.8			9.9	18.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	159	628	0	868	1860	0
Shared Lane Traffic (%)	50%					
Lane Group Flow (vph)	473	314	0	868	1860	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	7.2			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Number of Detectors	1	1		2	2	
Detector Template	Left	Right		Thru	Thru	
Leading Detector (m)	2.0	2.0		10.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	2.0		0.6	0.6	
Detector 1 Type	CI+Ex	CI+Ex		CI+Ex	CI+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	
Detector 2 Position(m)				9.4	9.4	
Detector 2 Size(m)				0.6	0.6	
Detector 2 Type				CI+Ex	CI+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Prot	Perm		NA	NA	
Protected Phases	4			2	6	
Permitted Phases	4					

Lanes, Volumes, Timings
10: Dorval Drive & QEW EB Off-Ramp

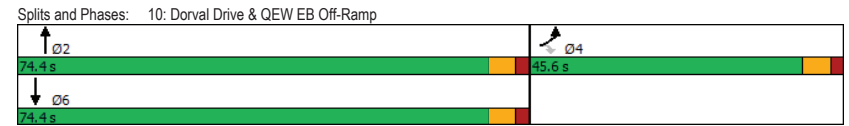
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Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Detector Phase	4	4		2	6	
Switch Phase						
Minimum Initial (s)	10.0	10.0		20.0	20.0	
Minimum Split (s)	24.0	24.0		26.0	26.0	
Total Split (s)	45.6	45.6		74.4	74.4	
Total Split (%)	38.0%	38.0%		62.0%	62.0%	
Maximum Green (s)	39.6	39.6		68.4	68.4	
Yellow Time (s)	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	4.0	4.0		5.0	5.0	
Recall Mode	None	None		Max	Max	
Walk Time (s)	0.0	0.0		7.0	7.0	
Flash Dont Walk (s)	7.0	7.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0	
Act Effct Green (s)	31.1	31.1		70.7	70.7	
Actuated g/C Ratio	0.28	0.28		0.64	0.64	
v/c Ratio	0.52	0.75		0.38	0.82	
Control Delay	33.6	45.7		10.8	20.1	
Queue Delay	0.0	0.0		0.0	0.0	
Total Delay	33.6	45.7		10.8	20.1	
LOS	C	D		B	C	
Approach Delay	38.5			10.8	20.1	
Approach LOS	D			B	C	
Queue Length 50th (m)	44.6	67.4		45.1	153.6	
Queue Length 95th (m)	59.9	103.5		73.0	241.1	
Internal Link Dist (m)	251.5			140.3	286.2	
Turn Bay Length (m)	175.0					
Base Capacity (vph)	1224	556		2277	2277	
Starvation Cap Reductn	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	
Storage Cap Reductn	0	0		0	0	
Reduced v/c Ratio	0.39	0.56		0.38	0.82	

Intersection Summary	
Area Type:	Other
Cycle Length:	120
Actuated Cycle Length:	109.9
Natural Cycle:	60
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.82
Intersection Signal Delay:	21.9
Intersection Capacity Utilization:	83.6%
Intersection LOS:	C
ICU Level of Service:	E
Analysis Period (min):	15

Lanes, Volumes, Timings
10: Dorval Drive & QEW EB Off-Ramp

BG 2038 AM.syn
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HCM Signalized Intersection Capacity Analysis
10: Dorval Drive & QEW EB Off-Ramp

BG 2038 AM.syn
04-03-2024

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	146	578	0	799	1711	0
Future Volume (vph)	146	578	0	799	1711	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	0.91		0.95	0.95	
Flt	0.90	0.85		1.00	1.00	
Flt Protected	0.98	1.00		1.00	1.00	
Satd. Flow (prot)	3200	1441		3539	3539	
Flt Permitted	0.98	1.00		1.00	1.00	
Satd. Flow (perm)	3200	1441		3539	3539	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	159	628	0	868	1860	0
RTOR Reduction (vph)	10	10	0	0	0	0
Lane Group Flow (vph)	463	304	0	868	1860	0
Turn Type	Prot	Perm		NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4				
Actuated Green, G (s)	29.1	29.1		68.7	68.7	
Effective Green, g (s)	31.1	31.1		70.7	70.7	
Actuated g/C Ratio	0.28	0.28		0.64	0.64	
Clearance Time (s)	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	4.0	4.0		5.0	5.0	
Lane Grp Cap (vph)	906	408		2278	2278	
v/s Ratio Prot	0.14			0.25	c0.53	
v/s Ratio Perm		c0.21				
v/c Ratio	0.51	0.75		0.38	0.82	
Uniform Delay, d1	33.0	35.7		9.2	14.7	
Progression Factor	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.6	7.7		0.5	3.4	
Delay (s)	33.6	43.4		9.7	18.1	
Level of Service	C	D		A	B	
Approach Delay (s)	37.5			9.7	18.1	
Approach LOS	D			A	B	

Intersection Summary			
HCM 2000 Control Delay	20.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	109.8	Sum of lost time (s)	8.0
Intersection Capacity Utilization	83.6%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
11: Argus Rd & South Service Rd

BG 2038 AM.syn
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Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	21	76	865	223	123	159
Future Volume (vph)	21	76	865	223	123	159
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Flt			0.972		0.924	
Flt Protected		0.989			0.979	
Satd. Flow (prot)	0	1390	1623	0	1547	0
Flt Permitted		0.989			0.979	
Satd. Flow (perm)	0	1390	1623	0	1547	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		177.7	145.7		103.5	
Travel Time (s)		12.8	10.5		7.5	
Confl. Peds. (#/hr)	1			1	5	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	100%	0%	3%	0%	0%	0%
Adj. Flow (vph)	23	83	940	242	134	173
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	106	1182	0	307	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (k/h)	24		14		24	14
Sign Control		Free	Free		Stop	
Intersection Summary						
Area Type:	CBD					
Control Type:	Unsignalized					
Intersection Capacity Utilization 90.8%				ICU Level of Service E		
Analysis Period (min) 15						

HCM Unsignalized Intersection Capacity Analysis
11: Argus Rd & South Service Rd

BG 2038 AM.syn
04-03-2024

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	↕
Traffic Volume (veh/h)	21	76	865	223	123	159
Future Volume (Veh/h)	21	76	865	223	123	159
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)	23	83	940	242	134	173
Pedestrians		1	5		1	
Lane Width (m)		3.6	3.6		3.6	
Walking Speed (m/s)		1.2	1.2		1.2	
Percent Blockage		0	0		0	
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)		358				
pX, platoon unblocked						
vC, conflicting volume	1183				1196	1063
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1183				1196	1063
tC, single (s)	5.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	3.1				3.5	3.3
p0 queue free %	93				30	37
cM capacity (veh/h)	346				193	273
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	106	1182	307			
Volume Left	23	0	134			
Volume Right	0	242	173			
sSH	346	1700	231			
Volume to Capacity	0.07	0.70	1.33			
Queue Length 95th (m)	1.7	0.0	131.8			
Control Delay (s)	4.4	0.0	215.9			
Lane LOS	A		F			
Approach Delay (s)	4.4	0.0	215.9			
Approach LOS			F			
Intersection Summary						
Average Delay			41.9			
Intersection Capacity Utilization			90.8%		ICU Level of Service	E
Analysis Period (min)			15			

Lanes, Volumes, Timings
13: GO Bus Terminal/Argus Rd & Cross Ave

BG 2038 AM.syn
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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↕	↕		↕	↕		↕	↕		↕	↕	↕
Traffic Volume (vph)	46	710	19	53	830	67	27	0	64	610	21	275
Future Volume (vph)	46	710	19	53	830	67	27	0	64	610	21	275
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6
Storage Length (m)	20.0		0.0	20.0		0.0	0.0		0.0	15.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00	1.00		1.00	1.00		1.00	0.96		0.98		0.99
Frt		0.996			0.989			0.850				0.861
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1570	3121	0	818	3167	0	805	734	0	1570	1361	0
Fit Permitted	0.294			0.199			0.419			0.711		
Satd. Flow (perm)	486	3121	0	171	3167	0	355	734	0	1150	1361	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		4			17			226			150	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		162.8			72.9			81.9			113.6	
Travel Time (s)		11.7			5.2			5.9			8.2	
Confl. Peds. (#/hr)	1		3	3		1	3		20	20		3
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
Heavy Vehicles (%)	0%	1%	100%	92%	1%	5%	95%	0%	91%	0%	93%	0%
Adj. Flow (vph)	50	772	21	58	902	73	29	0	70	663	23	299
Shared Lane Traffic (%)												
Lane Group Flow (vph)	50	793	0	58	975	0	29	70	0	663	322	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.3			3.3			3.3			3.3	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.19	1.14	1.14	1.19	1.14	1.14	1.19	1.14	1.14	1.19	1.14	1.14
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

Lanes, Volumes, Timings
13: GO Bus Terminal/Argus Rd & Cross Ave

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases		2		6				8			4	
Detector Phase	2	2		1	6			8	8		4	4
Switch Phase												
Minimum Initial (s)	22.0	22.0		8.0	22.0			10.0	10.0		10.0	10.0
Minimum Split (s)	45.0	45.0		12.5	29.0			29.0	29.0		29.0	29.0
Total Split (s)	45.5	45.5		12.5	58.0			32.0	32.0		32.0	32.0
Total Split (%)	50.6%	50.6%		13.9%	64.4%			35.6%	35.6%		35.6%	35.6%
Maximum Green (s)	39.5	39.5		8.5	52.0			26.0	26.0		26.0	26.0
Yellow Time (s)	4.0	4.0		3.0	4.0			4.0	4.0		4.0	4.0
All-Red Time (s)	2.0	2.0		1.0	2.0			2.0	2.0		2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0		0.0	-2.0			-2.0	-2.0		-2.0	-2.0
Total Lost Time (s)	4.0	4.0		4.0	4.0			4.0	4.0		4.0	4.0
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Vehicle Extension (s)	5.0	5.0		2.5	5.0			4.0	4.0		4.0	4.0
Recall Mode	Min	Min		Min	Min			Min	Min		Min	Min
Walk Time (s)	7.0	7.0		7.0	7.0			7.0	7.0		7.0	7.0
Flash Dont Walk (s)	16.0	16.0		16.0	16.0			16.0	16.0		16.0	16.0
Pedestrian Calls (#/hr)	0	0		0	0			0	0		0	0
Act Effct Green (s)	31.6	31.6		43.9	43.9			28.2	28.2		28.2	28.2
Actuated g/C Ratio	0.39	0.39		0.55	0.55			0.35	0.35		0.35	0.35
v/c Ratio	0.26	0.64		0.36	0.56			0.23	0.17		1.64	0.56
Control Delay	19.8	21.9		14.9	12.8			27.3	0.9		323.7	16.3
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0		0.0	0.0
Total Delay	19.8	21.9		14.9	12.8			27.3	0.9		323.7	16.3
LOS	B	C		B	B			C	A		F	B
Approach Delay		21.8			12.9				8.7			223.2
Approach LOS		C			B				A			F
Queue Length 50th (m)	5.2	51.9		4.2	48.4			3.2	0.0		~153.8	20.0
Queue Length 95th (m)	13.8	70.4		9.7	63.9			12.2	0.0		#252.1	54.8
Internal Link Dist (m)		138.8			48.9				57.9			89.6
Turn Bay Length (m)	20.0			20.0							15.0	
Base Capacity (vph)	253	1628		162	2153			124	404		404	575
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	0.49		0.36	0.45			0.23	0.17		1.64	0.56

Intersection Summary

Area Type: CBD
 Cycle Length: 90
 Actuated Cycle Length: 80.1
 Natural Cycle: 130
 Control Type: Semi Act-Uncooord
 Maximum v/c Ratio: 1.64
 Intersection Signal Delay: 85.3
 Intersection LOS: F

Lanes, Volumes, Timings
13: GO Bus Terminal/Argus Rd & Cross Ave

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Intersection Capacity Utilization 99.8%
 Analysis Period (min) 15
 - Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 13: GO Bus Terminal/Argus Rd & Cross Ave



HCM Signalized Intersection Capacity Analysis
13: GO Bus Terminal/Argus Rd & Cross Ave

BG 2038 AM.syn
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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	46	710	19	53	830	67	27	0	64	610	21	275
Future Volume (vph)	46	710	19	53	830	67	27	0	64	610	21	275
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.97		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		0.98	1.00	
Fr	1.00	1.00		1.00	0.99		1.00	0.85		1.00	0.86	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1570	3121		818	3166		804	736		1541	1361	
Flt Permitted	0.29	1.00		0.20	1.00		0.42	1.00		0.71	1.00	
Satd. Flow (perm)	485	3121		172	3166		355	736		1154	1361	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	50	772	21	58	902	73	29	0	70	663	23	299
RTOR Reduction (vph)	0	2	0	0	8	0	0	45	0	0	97	0
Lane Group Flow (vph)	50	791	0	58	967	0	29	25	0	663	225	0
Confl. Peds. (#/hr)	1		3	3		1	3		20	20		3
Heavy Vehicles (%)	0%	1%	100%	92%	1%	5%	95%	0%	91%	0%	93%	0%
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	2	2		1	6		8	8		4	4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	29.7	29.7		41.9	41.9		26.2	26.2		26.2	26.2	
Effective Green, g (s)	31.7	31.7		41.9	43.9		28.2	28.2		28.2	28.2	
Actuated g/C Ratio	0.40	0.40		0.52	0.55		0.35	0.35		0.35	0.35	
Clearance Time (s)	6.0	6.0		4.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	5.0	5.0		2.5	5.0		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	191	1235		156	1735		124	259		406	479	
v/s Ratio Prot		c0.25		0.04	c0.31			0.03			0.17	
v/s Ratio Perm	0.10			0.16			0.08			c0.57		
v/c Ratio	0.26	0.64		0.37	0.56		0.23	0.10		1.63	0.47	
Uniform Delay, d1	16.3	19.6		11.5	11.8		18.3	17.4		25.9	20.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.5	1.6		1.1	0.7		1.3	0.2		295.9	1.0	
Delay (s)	17.8	21.1		12.5	12.4		19.6	17.6		321.8	21.1	
Level of Service	B	C		B	B		B	B		F	C	
Approach Delay (s)		20.9			12.4			18.2			223.5	
Approach LOS		C			B			B			F	

Intersection Summary			
HCM 2000 Control Delay	85.3	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.05		
Actuated Cycle Length (s)	80.1	Sum of lost time (s)	12.0
Intersection Capacity Utilization	99.8%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
14: Lyons Lane/Street A & Cross Ave

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	113	237	259	289	187	24	23	4	17	82	31	120
Future Volume (vph)	113	237	259	289	187	24	23	4	17	82	31	120
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6
Storage Length (m)	0.0	0.0	25.0	0.0	20.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.99	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	0.99		1.00	1.00		1.00	0.99		1.00	0.99	
Fr		0.922			0.983			0.877			0.881	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1540	2813	0	1570	2724	0	1570	1481	0	1468	1453	0
Flt Permitted	0.609			0.369			0.563			0.743		
Satd. Flow (perm)	980	2813	0	610	2724	0	928	1481	0	1144	1453	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		282			26			18			130	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		40.1			211.2			69.1			70.9	
Travel Time (s)		2.9			15.2			5.0			5.1	
Confl. Peds. (#/hr)	5		1	1		5	3		3	3		3
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
Heavy Vehicles (%)	2%	11%	0%	0%	19%	0%	0%	0%	0%	7%	0%	3%
Adj. Flow (vph)	123	258	282	314	203	26	25	4	18	89	34	130
Shared Lane Traffic (%)												
Lane Group Flow (vph)	123	540	0	314	229	0	25	22	0	89	164	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.3			3.3			3.3			3.3	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.19	1.14	1.14	1.19	1.14	1.14	1.19	1.14	1.14	1.19	1.14	1.14
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

Lanes, Volumes, Timings
14: Lyons Lane/Street A & Cross Ave

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases		2		6			8			4		
Detector Phase	2	2		1	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	35.0	35.0		8.0	35.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	41.0	41.0		12.5	41.0		28.0	28.0		28.0	28.0	
Total Split (s)	41.0	41.0		21.0	62.0		28.0	28.0		28.0	28.0	
Total Split (%)	45.6%	45.6%		23.3%	68.9%		31.1%	31.1%		31.1%	31.1%	
Maximum Green (s)	35.0	35.0		17.0	56.0		22.0	22.0		22.0	22.0	
Yellow Time (s)	4.0	4.0		3.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		1.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0		0.0	-2.0		-2.0	-2.0		-2.0	-2.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Vehicle Extension (s)	5.0	5.0		2.5	5.0		4.0	4.0		4.0	4.0	
Recall Mode	Min	Min		Min	Min		Min	Min		Min	Min	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	15.0	15.0		15.0	15.0		15.0	15.0		15.0	15.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	37.2	37.2		52.4	52.4		14.8	14.8		14.8	14.8	
Actuated g/C Ratio	0.49	0.49		0.70	0.70		0.20	0.20		0.20	0.20	
v/c Ratio	0.25	0.35		0.55	0.12		0.14	0.07		0.40	0.42	
Control Delay	14.6	6.7		8.8	3.8		27.5	14.1		32.7	11.8	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	14.6	6.7		8.8	3.8		27.5	14.1		32.7	11.8	
LOS	B	A		A	A		C	B		C	B	
Approach Delay		8.2			6.7			21.2			19.1	
Approach LOS		A			A			C			B	
Queue Length 50th (m)	9.6	10.2		14.1	4.1		3.1	0.5		11.5	4.2	
Queue Length 95th (m)	26.6	25.8		31.6	9.6		10.0	6.4		26.5	20.7	
Internal Link Dist (m)		16.1			187.2			45.1			46.9	
Turn Bay Length (m)				25.0			20.0					
Base Capacity (vph)	484	1533		642	2116		297	487		366	554	
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	0.35		0.49	0.11		0.08	0.05		0.24	0.30	

Intersection Summary	
Area Type:	CBD
Cycle Length:	90
Actuated Cycle Length:	75.3
Natural Cycle:	85
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.55
Intersection Signal Delay:	9.9
Intersection LOS:	A

Lanes, Volumes, Timings
14: Lyons Lane/Street A & Cross Ave

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Intersection Capacity Utilization 89.6% ICU Level of Service E
Analysis Period (min) 15

Splits and Phases: 14: Lyons Lane/Street A & Cross Ave



HCM Signalized Intersection Capacity Analysis
14: Lyons Lane/Street A & Cross Ave

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	113	237	259	289	187	24	23	4	17	82	31	120
Future Volume (vph)	113	237	259	289	187	24	23	4	17	82	31	120
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	0.99	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.92		1.00	0.98		1.00	0.88		1.00	0.88	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1530	2813		1570	2724		1567	1482		1463	1454	
Flt Permitted	0.61	1.00		0.37	1.00		0.56	1.00		0.74	1.00	
Satd. Flow (perm)	981	2813		610	2724		928	1482		1144	1454	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	123	258	282	314	203	26	25	4	18	89	34	130
RTOR Reduction (vph)	0	143	0	0	8	0	0	14	0	0	104	0
Lane Group Flow (vph)	123	398	0	314	221	0	25	8	0	89	60	0
Confl. Peds. (#/hr)	5		1	1		5	3		3	3		3
Heavy Vehicles (%)	2%	11%	0%	0%	19%	0%	0%	0%	0%	7%	0%	3%
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	2			1	6		8			4		4
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	35.2	35.2		50.4	50.4		12.8	12.8		12.8	12.8	
Effective Green, g (s)	37.2	37.2		50.4	52.4		14.8	14.8		14.8	14.8	
Actuated g/C Ratio	0.49	0.49		0.67	0.70		0.20	0.20		0.20	0.20	
Clearance Time (s)	6.0	6.0		4.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	5.0	5.0		2.5	5.0		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	485	1391		551	1898		182	291		225	286	
v/s Ratio Prot		0.14		c0.08	0.08			0.01			0.04	
v/s Ratio Perm	0.13			c0.30			0.03			c0.08		
v/c Ratio	0.25	0.29		0.57	0.12		0.14	0.03		0.40	0.21	
Uniform Delay, d1	11.0	11.2		5.7	3.8		24.9	24.4		26.3	25.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.6	0.2		1.1	0.1		0.5	0.0		1.6	0.5	
Delay (s)	11.6	11.4		6.8	3.8		25.4	24.4		27.9	25.8	
Level of Service	B	B		A	A		C	C		C	C	
Approach Delay (s)		11.4			5.5			24.9			26.5	
Approach LOS		B			A			C			C	

Intersection Summary			
HCM 2000 Control Delay	12.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	75.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	89.6%	ICU Level of Service	E
Analysis Period (min)	15		

Lanes, Volumes, Timings
16: Speers Road/Cornwall Road & Cross Avenue

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Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↕	↕	↕	↕	↕
Traffic Volume (vph)	268	792	734	36	17	394
Future Volume (vph)	268	792	734	36	17	394
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	75.0			0.0	55.0	0.0
Storage Lanes	1			0	1	2
Taper Length (m)	7.5				7.5	
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	0.88
Frt			0.993			0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1770	3539	3514	0	1770	2787
Flt Permitted	0.248				0.950	
Satd. Flow (perm)	462	3539	3514	0	1770	2787
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)			6			428
Link Speed (k/h)		50	50		50	
Link Distance (m)		228.9	275.4		183.9	
Travel Time (s)		16.5	19.8		13.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	291	861	798	39	18	428
Shared Lane Traffic (%)						
Lane Group Flow (vph)	291	861	837	0	18	428
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.6	3.6		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25			15	25	15
Number of Detectors	1	2	2		1	1
Detector Template	Left	Thru	Thru		Left	Right
Leading Detector (m)	2.0	10.0	10.0		2.0	2.0
Trailing Detector (m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Size(m)	2.0	0.6	0.6		2.0	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0		0.0	0.0
Detector 2 Position(m)		9.4	9.4			
Detector 2 Size(m)		0.6	0.6			
Detector 2 Type		Cl+Ex	Cl+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type	pm+pt	NA	NA		pm+pt	Perm
Protected Phases	5	2	6		7	
Permitted Phases	2				4	4

Lanes, Volumes, Timings
16: Speers Road/Cornwall Road & Cross Avenue

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Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Detector Phase	5	2	6		7	4
Switch Phase						
Minimum Initial (s)	6.0	25.0	25.0		6.0	6.0
Minimum Split (s)	12.0	35.0	35.0		29.0	29.0
Total Split (s)	26.0	61.0	35.0		29.0	29.0
Total Split (%)	28.9%	67.8%	38.9%		32.2%	32.2%
Maximum Green (s)	20.0	55.0	29.0		23.0	23.0
Yellow Time (s)	4.0	4.0	4.0		4.0	4.0
All-Red Time (s)	2.0	2.0	2.0		2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0		6.0	6.0
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?			Yes			
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	None	Max	Max		None	None
Walk Time (s)		18.0	18.0		12.0	12.0
Flash Dont Walk (s)		7.0	7.0		7.0	7.0
Pedestrian Calls (#/hr)		0	0		0	0
Act Effct Green (s)	55.0	55.0	38.2		7.2	7.2
Actuated g/C Ratio	0.74	0.74	0.51		0.10	0.10
v/c Ratio	0.55	0.33	0.46		0.10	0.65
Control Delay	7.3	3.8	13.5		31.5	8.7
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	7.3	3.8	13.5		31.5	8.7
LOS	A	A	B		C	A
Approach Delay		4.7	13.5		9.6	
Approach LOS		A	B		A	
Queue Length 50th (m)	9.4	16.1	35.2		2.5	0.0
Queue Length 95th (m)	21.6	30.2	69.0		8.3	13.5
Internal Link Dist (m)		204.9	251.4		159.9	
Turn Bay Length (m)	75.0				55.0	
Base Capacity (vph)	694	2621	1811		548	1159
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	0.42	0.33	0.46		0.03	0.37

Intersection Summary

Area Type:	Other
Cycle Length:	90
Actuated Cycle Length:	74.3
Natural Cycle:	80
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.65
Intersection Signal Delay:	8.6
Intersection Capacity Utilization:	56.3%
Intersection LOS:	A
ICU Level of Service:	B
Analysis Period (min):	15

Lanes, Volumes, Timings
16: Speers Road/Cornwall Road & Cross Avenue

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Split and Phases: 16: Speers Road/Cornwall Road & Cross Avenue



HCM Signalized Intersection Capacity Analysis
16: Speers Road/Cornwall Road & Cross Avenue

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Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↕↕	↕↕		↔	↕↕
Traffic Volume (vph)	268	792	734	36	17	394
Future Volume (vph)	268	792	734	36	17	394
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0		6.0	6.0
Lane Util. Factor	1.00	0.95	0.95		1.00	0.88
Fr _t	1.00	1.00	0.99		1.00	0.85
Fit Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	3539	3514		1770	2787
Fit Permitted	0.25	1.00	1.00		0.95	1.00
Satd. Flow (perm)	462	3539	3514		1770	2787
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	291	861	798	39	18	428
RTOR Reduction (vph)	0	0	3	0	0	386
Lane Group Flow (vph)	291	861	834	0	18	42
Turn Type	pm+pt	NA	NA		pm+pt	Perm
Protected Phases	5	2	6		7	
Permitted Phases	2				4	4
Actuated Green, G (s)	55.0	55.0	38.2		7.2	7.2
Effective Green, g (s)	55.0	55.0	38.2		7.2	7.2
Actuated g/C Ratio	0.74	0.74	0.51		0.10	0.10
Clearance Time (s)	6.0	6.0	6.0		6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	532	2623	1809		171	270
v/s Ratio Prot	c0.08	0.24	0.24		0.01	
v/s Ratio Perm	c0.33					c0.01
v/c Ratio	0.55	0.33	0.46		0.11	0.15
Uniform Delay, d1	4.7	3.3	11.5		30.6	30.7
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	1.2	0.3	0.8		0.3	0.3
Delay (s)	5.8	3.6	12.3		30.8	31.0
Level of Service	A	A	B		C	C
Approach Delay (s)		4.2	12.3		31.0	
Approach LOS		A	B		C	

Intersection Summary			
HCM 2000 Control Delay	11.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	74.2	Sum of lost time (s)	18.0
Intersection Capacity Utilization	56.3%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
19: Street C & South Service Road

BG 2038 AM.syn
04-03-2024



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↕			↕	↕	
Traffic Volume (vph)	34	51	106	27	6	10
Future Volume (vph)	34	51	106	27	6	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t	0.919				0.917	
Fit Protected				0.962	0.981	
Satd. Flow (prot)	1712	0	0	1792	1676	0
Fit Permitted				0.962	0.981	
Satd. Flow (perm)	1712	0	0	1792	1676	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	104.5			305.2	84.1	
Travel Time (s)	7.5			22.0	6.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	37	55	115	29	7	11
Shared Lane Traffic (%)						
Lane Group Flow (vph)	92	0	0	144	18	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)		15	25		25	15
Sign Control	Free			Free	Stop	

Intersection Summary	
Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization 24.0%	ICU Level of Service A
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis
19: Street C & South Service Road

BG 2038 AM.syn
04-03-2024

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔		↔		↔	
Traffic Volume (veh/h)	34	51	106	27	6	10
Future Volume (Veh/h)	34	51	106	27	6	10
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)	37	55	115	29	7	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			92	324	64	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			92	324	64	
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	99	99	
cM capacity (veh/h)			1503	619	1000	
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	92	144	18			
Volume Left	0	115	7			
Volume Right	55	0	11			
cSH	1700	1503	807			
Volume to Capacity	0.05	0.08	0.02			
Queue Length 95th (m)	0.0	2.0	0.5			
Control Delay (s)	0.0	6.2	9.6			
Lane LOS	A		A			
Approach Delay (s)	0.0	6.2	9.6			
Approach LOS	A		A			
Intersection Summary						
Average Delay			4.2			
Intersection Capacity Utilization			24.0%	ICU Level of Service	A	
Analysis Period (min)			15			

Lanes, Volumes, Timings
20: Street A & South Service Road

BG 2038 AM.syn
04-03-2024

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔		↔		↔	
Traffic Volume (vph)	86	114	5	28	22	0
Future Volume (vph)	86	114	5	28	22	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t	0.923					
Fit Protected			0.993		0.950	
Satd. Flow (prot)	1719	0	0	1850	1770	0
Fit Permitted			0.993		0.950	
Satd. Flow (perm)	1719	0	0	1850	1770	0
Link Speed (k/h)	50		50		50	
Link Distance (m)	285.4		130.8		98.8	
Travel Time (s)	20.5		9.4		7.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	93	124	5	30	24	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	217	0	0	35	24	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0		0.0		3.6	
Link Offset(m)	0.0		0.0		0.0	
Crosswalk Width(m)	4.8		4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	15		25		25	
Sign Control	Free		Free		Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	21.5%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
20: Street A & South Service Road

BG 2038 AM.syn
04-03-2024

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔			↔	↔	
Traffic Volume (veh/h)	86	114	5	28	22	0
Future Volume (Veh/h)	86	114	5	28	22	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)	93	124	5	30	24	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			217		195	155
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			217		195	155
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	100
cM capacity (veh/h)			1353		791	891
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	217	35	24			
Volume Left	0	5	24			
Volume Right	124	0	0			
cSH	1700	1353	791			
Volume to Capacity	0.13	0.00	0.03			
Queue Length 95th (m)	0.0	0.1	0.8			
Control Delay (s)	0.0	1.1	9.7			
Lane LOS		A	A			
Approach Delay (s)	0.0	1.1	9.7			
Approach LOS			A			
Intersection Summary						
Average Delay			1.0			
Intersection Capacity Utilization		21.5%		ICU Level of Service		A
Analysis Period (min)			15			

Lanes, Volumes, Timings
21: Argus Rd & Street 1

BG 2038 AM.syn
04-03-2024

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔			↔	↔	
Traffic Volume (vph)	0	0	0	114	695	460
Future Volume (vph)	0	0	0	114	695	460
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t					0.946	
Fit Protected						
Satd. Flow (prot)	1863	0	0	1863	1762	0
Fit Permitted						
Satd. Flow (perm)	1863	0	0	1863	1762	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	162.1			113.6	67.2	
Travel Time (s)	11.7			8.2	4.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	124	755	500
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	124	1255	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			3.3	3.3	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)		25	15	25		15
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	68.0%			ICU Level of Service C		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
21: Argus Rd & Street 1

BG 2038 AM.syn
04-03-2024

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔			↑	↑	
Traffic Volume (veh/h)	0	0	0	114	695	460
Future Volume (Veh/h)	0	0	0	114	695	460
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	0	124	755	500
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)				114		
pX, platoon unblocked						
vC, conflicting volume	1129	1005	1255			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1129	1005	1255			
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)	226	293	554			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	0	124	1255			
Volume Left	0	0	0			
Volume Right	0	0	500			
eSH	1700	554	1700			
Volume to Capacity	0.00	0.00	0.74			
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		68.0%		ICU Level of Service	C	
Analysis Period (min)		15				

Lanes, Volumes, Timings
22: Street C & Street 1

BG 2038 AM.syn
04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	0	211	53	411	49	0	27	16	0	0	157	0
Future Volume (vph)	0	211	53	411	49	0	27	16	0	0	157	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t		0.973										
Fit Protected					0.957			0.969				
Satd. Flow (prot)	0	1812	0	0	1783	0	0	1805	0	0	1863	0
Fit Permitted					0.957			0.969				
Satd. Flow (perm)	0	1812	0	0	1783	0	0	1805	0	0	1863	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		43.0			162.1			134.3			75.8	
Travel Time (s)		3.1			11.7			9.7			5.5	
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
Adj. Flow (vph)	0	229	58	447	53	0	29	17	0	0	171	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	287	0	0	500	0	0	46	0	0	171	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Right	Left	Left	Right	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	64.6%						ICU Level of Service C					
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis
22: Street C & Street 1

BG 2038 AM.syn
04-03-2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔				↔			↔	
Traffic Volume (veh/h)	0	211	53	411	49	0	27	16	0	0	157	0
Future Volume (Veh/h)	0	211	53	411	49	0	27	16	0	0	157	0
Sign Control	Stop			Stop			Free			Free		
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)	0	229	58	447	53	0	29	17	0	0	171	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)	134											
pX, platoon unblocked												
vC, conflicting volume	272	246	171	418	246	17	171			17		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	272	246	171	418	246	17	171			17		
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	64	93	0	92	100	98			100		
cM capacity (veh/h)	627	643	873	362	643	1062	1406			1600		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	287	500	46	171								
Volume Left	0	447	29	0								
Volume Right	58	0	0	0								
eSH	679	380	1406	1600								
Volume to Capacity	0.42	1.32	0.02	0.00								
Queue Length 95th (m)	16.9	184.9	0.5	0.0								
Control Delay (s)	14.1	188.7	4.9	0.0								
Lane LOS	B	F	A									
Approach Delay (s)	14.1	188.7	4.9	0.0								
Approach LOS	B	F										
Intersection Summary												
Average Delay				98.3								
Intersection Capacity Utilization				64.6%			ICU Level of Service			C		
Analysis Period (min)				15								

Lanes, Volumes, Timings
23: GO Station West Access/Street C & Cross Ave

BG 2038 AM.syn
04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔				↔			↔	
Traffic Volume (vph)	11	338	115	550	512	32	51	0	271	199	411	11
Future Volume (vph)	11	338	115	550	512	32	51	0	271	199	411	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.0	0.0	0.0
Storage Lanes	0	0	0	0	0	0	1	0	1	0	0	0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.963				0.996		0.850				0.996	
Fit Protected	0.999				0.975		0.950				0.950	
Satd. Flow (prot)	0	3405	0	0	3437	0	1770	1583	0	1770	1855	0
Fit Permitted	0.874				0.636		0.378				0.577	
Satd. Flow (perm)	0	2979	0	0	2242	0	704	1583	0	1075	1855	0
Right Turn on Red	Yes						Yes		Yes		Yes	
Satd. Flow (RTOR)	104				7		311				3	
Link Speed (k/h)	50				50		50				50	
Link Distance (m)	211.2				162.8		81.1				134.3	
Travel Time (s)	15.2				11.7		5.8				9.7	
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
Adj. Flow (vph)	12	367	125	598	557	35	55	0	295	216	447	12
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	504	0	0	1190	0	55	295	0	216	459	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)	3.3				3.3		3.6				3.6	
Link Offset(m)	0.0				0.0		0.0				0.0	
Crosswalk Width(m)	4.8				4.8		4.8				4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15		25		15		25		15	
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)	9.4				9.4		9.4				9.4	
Detector 2 Size(m)	0.6				0.6		0.6				0.6	
Detector 2 Type	Cl+Ex				Cl+Ex		Cl+Ex				Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)	0.0				0.0		0.0				0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	4				8		2				6	
Permitted Phases	4				8		2				6	

Lanes, Volumes, Timings
23: GO Station West Access/Street C & Cross Ave

BG 2038 AM.syn
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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	24.0	24.0		24.0	24.0		24.0	24.0		24.0	24.0	
Total Split (s)	25.0	25.0		25.0	25.0		25.0	25.0		25.0	25.0	
Total Split (%)	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%		50.0%	50.0%	
Maximum Green (s)	19.0	19.0		19.0	19.0		19.0	19.0		19.0	19.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		6.0			6.0			6.0			6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		19.0			19.0			19.0			19.0	
Actuated g/C Ratio		0.38			0.38			0.38			0.38	
v/c Ratio		0.42			1.79dl			0.21	0.37		0.53	0.65
Control Delay		10.2			203.0			13.0	3.0		17.9	17.9
Queue Delay		0.0			0.0			0.0	0.0		0.0	0.0
Total Delay		10.2			203.0			13.0	3.0		17.9	17.9
LOS		B			F			B	A		B	B
Approach Delay		10.2			203.0			4.6			17.9	
Approach LOS		B			F			A			B	
Queue Length 50th (m)		13.5			~83.3			3.3	0.0		15.0	33.7
Queue Length 95th (m)		23.6			#118.7			10.0	10.7		32.6	59.7
Internal Link Dist (m)		187.2			138.8			57.1			110.3	
Turn Bay Length (m)											15.0	
Base Capacity (vph)		1196			856			267	794		408	706
Starvation Cap Reductn		0			0			0	0		0	0
Spillback Cap Reductn		0			0			0	0		0	0
Storage Cap Reductn		0			0			0	0		0	0
Reduced v/c Ratio		0.42			1.39			0.21	0.37		0.53	0.65

Intersection Summary

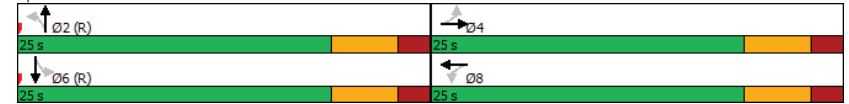
Area Type: Other
 Cycle Length: 50
 Actuated Cycle Length: 50
 Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.39
 Intersection Signal Delay: 95.8 Intersection LOS: F
 Intersection Capacity Utilization 92.3% ICU Level of Service F
 Analysis Period (min) 15
 ~ Volume exceeds capacity, queue is theoretically infinite.

Lanes, Volumes, Timings
23: GO Station West Access/Street C & Cross Ave

BG 2038 AM.syn
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Queue shown is maximum after two cycles.
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 dl Defacto Left Lane. Record with 1 though lane as a left lane.

Splits and Phases: 23: GO Station West Access/Street C & Cross Ave



HCM Signalized Intersection Capacity Analysis
23: GO Station West Access/Street C & Cross Ave

BG 2038 AM.syn
04-03-2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔	↔		↔	↔		↔	↔	
Traffic Volume (vph)	11	338	115	550	512	32	51	0	271	199	411	11
Future Volume (vph)	11	338	115	550	512	32	51	0	271	199	411	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0		6.0		6.0	6.0		6.0		6.0	
Lane Util. Factor		0.95		0.95		1.00	1.00		1.00		1.00	
Frt		0.96		1.00		1.00	0.85		1.00		1.00	
Flt Protected		1.00		0.98		0.95	1.00		0.95		1.00	
Satd. Flow (prot)		3403		3437		1770	1583		1770		1855	
Flt Permitted		0.87		0.64		0.38	1.00		0.58		1.00	
Satd. Flow (perm)		2978		2243		703	1583		1075		1855	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	12	367	125	598	557	35	55	0	295	216	447	12
RTOR Reduction (vph)	0	64	0	0	4	0	0	183	0	0	2	0
Lane Group Flow (vph)	0	440	0	0	1186	0	55	112	0	216	457	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4		8		8	2		2		6	
Permitted Phases	4			8			2				6	
Actuated Green, G (s)		19.0			19.0		19.0	19.0		19.0	19.0	
Effective Green, g (s)		19.0			19.0		19.0	19.0		19.0	19.0	
Actuated g/C Ratio		0.38			0.38		0.38	0.38		0.38	0.38	
Clearance Time (s)		6.0			6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		1131			852		267	601		408	704	
v/s Ratio Prot							0.07				c0.25	
v/s Ratio Perm		0.15			c0.53		0.08			0.20		
v/c Ratio		0.39			1.79dl		0.21	0.19		0.53	0.65	
Uniform Delay, d1		11.3			15.5		10.4	10.3		12.0	12.8	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.2			183.4		1.7	0.7		4.9	4.6	
Delay (s)		11.5			198.9		12.2	11.0		16.9	17.4	
Level of Service		B			F		B	B		B	B	
Approach Delay (s)		11.5			198.9			11.2			17.2	
Approach LOS		B			F			B			B	

Intersection Summary			
HCM 2000 Control Delay	94.9	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.02		
Actuated Cycle Length (s)	50.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	92.3%	ICU Level of Service	F
Analysis Period (min)	15		
dl	Defacto Left Lane. Recode with 1 though lane as a left lane.		
c	Critical Lane Group		

Lanes, Volumes, Timings
1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd

BG 2038 PM.syn
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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔	↔		↔	↔		↔	↔	
Traffic Volume (vph)	156	131	360	1027	250	207	471	2264	771	157	1589	130
Future Volume (vph)	156	131	360	1027	250	207	471	2264	771	157	1589	130
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0		0.0	165.0		25.0	145.0		0.0	95.0		90.0
Storage Lanes	1		1	1		1	1		1	1		1
Taper Length (m)	7.5			7.5		7.5			7.5			7.5
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Ped Bike Factor	0.98					0.95			0.98			0.98
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950				0.950	
Satd. Flow (prot)	1624	1710	1425	3120	1710	1425	1608	4577	1425	1608	4532	1425
Flt Permitted	0.592			0.369			0.100				0.111	
Satd. Flow (perm)	989	1710	1425	1212	1710	1360	169	4577	1402	188	4532	1425
Right Turn on Red			Yes			Yes			Yes		Yes	
Satd. Flow (RTOR)			255			150			307			191
Link Speed (k/h)		50			50		50		50		50	
Link Distance (m)		347.0			285.9		280.4		353.6			
Travel Time (s)		25.0			20.6		20.2		25.5			
Confl. Peds. (#/hr)	34				34		14		14			
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
Heavy Vehicles (%)	0%	0%	2%	1%	0%	2%	1%	2%	2%	1%	3%	2%
Adj. Flow (vph)	170	142	391	1116	272	225	512	2461	838	171	1727	141
Shared Lane Traffic (%)												
Lane Group Flow (vph)	170	142	391	1116	272	225	512	2461	838	171	1727	141
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		7.2			7.2		3.6		3.6		3.6	
Link Offset(m)		0.0			0.0		0.0		0.0		0.0	
Crosswalk Width(m)		4.8			4.8		4.8		4.8		4.8	
Two way Left Turn Lane												
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4		9.4		9.4		9.4	
Detector 2 Size(m)		0.6			0.6		0.6		0.6		0.6	
Detector 2 Type		Cl+Ex			Cl+Ex		Cl+Ex		Cl+Ex		Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0		0.0		0.0		0.0	

Lanes, Volumes, Timings

BG 2038 PM.syn

1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd

04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA	Free	pm+pt	NA	Perm	pm+pt	NA	Free	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		Free	8		8	2		Free	6		6
Detector Phase	7	4		3	8	8	5	2		1	6	6
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0	10.0	6.0	15.0		6.0	15.0	15.0
Minimum Split (s)	11.0	25.0		11.0	43.0	43.0	11.0	34.0		10.0	34.0	34.0
Total Split (s)	11.0	27.0		27.0	43.0	43.0	23.0	56.0		10.0	43.0	43.0
Total Split (%)	9.2%	22.5%		22.5%	35.8%	35.8%	19.2%	46.7%		8.3%	35.8%	35.8%
Maximum Green (s)	7.0	20.0		22.0	36.0	36.0	19.0	49.0		6.0	36.0	36.0
Yellow Time (s)	3.0	4.0		3.0	4.0	4.0	3.0	4.0		3.0	4.0	4.0
All-Red Time (s)	1.0	3.0		2.0	3.0	3.0	1.0	3.0		1.0	3.0	3.0
Lost Time Adjust (s)	0.0	-3.0		0.0	-3.0	-3.0	0.0	-3.0		0.0	-3.0	-3.0
Total Lost Time (s)	4.0	4.0		5.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	5.0		3.0	5.0	5.0	3.0	5.0		3.0	5.0	5.0
Recall Mode	None	None		None	None	None	None	C-Max		None	C-Max	C-Max
Walk Time (s)				7.0	7.0		7.0			7.0	7.0	
Flash Dont Walk (s)				29.0	29.0		20.0			20.0	20.0	
Pedestrian Calls (#/hr)				0	0		0			0	0	
Act Effct Green (s)	26.5	19.5	120.0	45.5	35.5	35.5	65.5	52.0	120.0	48.5	39.0	39.0
Actuated g/C Ratio	0.22	0.16	1.00	0.38	0.30	0.30	0.55	0.43	1.00	0.40	0.32	0.32
v/c Ratio	0.67	0.51	0.27	1.38	0.54	0.44	1.41	1.24	0.60	0.91	1.17	0.24
Control Delay	44.3	52.1	0.5	207.6	39.3	14.2	231.6	144.4	1.9	75.3	122.5	2.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	44.3	52.1	0.5	207.6	39.3	14.2	231.6	144.4	1.9	75.3	122.5	2.3
LOS	D	D	A	F	D	B	F	F	A	E	F	A
Approach Delay		21.5			152.3			124.8				110.2
Approach LOS		C			F			F				F
Queue Length 50th (m)	28.3	32.4	0.0	~154.8	56.1	13.8	~157.7	~277.6	0.0	25.8	~187.1	0.0
Queue Length 95th (m)	43.7	52.2	0.0	#191.1	81.2	35.5	#237.6	#307.0	0.0	#82.4	#218.1	5.5
Internal Link Dist (m)		323.0			261.9			256.4				329.6
Turn Bay Length (m)	60.0			165.0		25.0	145.0			95.0		90.0
Base Capacity (vph)	255	327	1425	809	555	543	362	1983	1402	188	1472	592
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.67	0.43	0.27	1.38	0.49	0.41	1.41	1.24	0.60	0.91	1.17	0.24

Intersection Summary

Area Type: CBD
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 105.6 (88%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
 Natural Cycle: 150
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.41
 Intersection Signal Delay: 117.7
 Intersection LOS: F

Lanes, Volumes, Timings

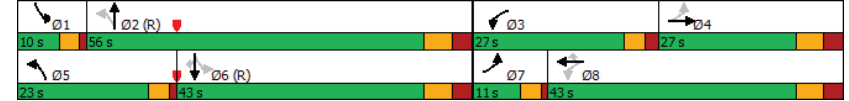
BG 2038 PM.syn

1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd

04-03-2024

Intersection Capacity Utilization 118.2% ICU Level of Service H
 Analysis Period (min) 15
 - Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd



HCM Signalized Intersection Capacity Analysis
1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd

BG 2038 PM.syn
04-03-2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	156	131	360	1027	250	207	471	2264	771	157	1589	130
Future Volume (vph)	156	131	360	1027	250	207	471	2264	771	157	1589	130
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	1.0	5.0	4.0	4.0	4.0	4.0	1.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.98	1.00	1.00	1.00
Flpb, ped/bikes	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1603	1710	1425	3120	1710	1360	1608	4577	1402	1608	4532	1425
Flt Permitted	0.59	1.00	1.00	0.37	1.00	1.00	0.10	1.00	1.00	0.11	1.00	1.00
Satd. Flow (perm)	999	1710	1425	1211	1710	1360	169	4577	1402	188	4532	1425
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	170	142	391	1116	272	225	512	2461	838	171	1727	141
RTOR Reduction (vph)	0	0	0	0	0	106	0	0	0	0	0	95
Lane Group Flow (vph)	170	142	391	1116	272	119	512	2461	838	171	1727	46
Confl. Peds. (#/hr)	34											
Heavy Vehicles (%)	0%	0%	2%	1%	0%	2%	1%	2%	2%	1%	3%	2%
Turn Type	pm+pt	NA	Free	pm+pt	NA	Perm	pm+pt	NA	Free	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		Free	8		8	2		Free	6		6
Actuated Green, G (s)	23.5	16.5	120.0	43.5	32.5	32.5	62.5	49.0	120.0	45.5	36.0	36.0
Effective Green, g (s)	23.5	19.5	120.0	43.5	35.5	35.5	62.5	52.0	120.0	45.5	39.0	39.0
Actuated g/C Ratio	0.20	0.16	1.00	0.36	0.30	0.30	0.52	0.43	1.00	0.38	0.32	0.32
Clearance Time (s)	4.0	7.0		5.0	7.0	7.0	4.0	7.0		4.0	7.0	7.0
Vehicle Extension (s)	3.0	5.0		3.0	5.0	5.0	3.0	5.0		3.0	5.0	5.0
Lane Grp Cap (vph)	230	277	1425	788	505	402	357	1983	1402	183	1472	463
v/s Ratio Prot	0.04	0.08		c0.26	0.16		c0.27	0.54		0.07	0.38	
v/s Ratio Perm	0.10		0.27	c0.25		0.09	c0.48		0.60	0.28		0.03
v/c Ratio	0.74	0.51	0.27	1.42	0.54	0.30	1.43	1.24	0.60	0.93	1.17	0.10
Uniform Delay, d1	43.9	45.9	0.0	34.8	35.4	32.6	37.5	34.0	0.0	30.6	40.5	28.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	11.7	3.2	0.5	194.8	2.0	0.9	210.8	113.0	1.9	47.6	85.5	0.4
Delay (s)	55.6	49.1	0.5	229.6	37.4	33.5	248.3	147.0	1.9	78.2	126.0	28.7
Level of Service	E	D	A	F	D	C	F	F	A	E	F	C
Approach Delay (s)	23.6			169.8			128.7			115.3		
Approach LOS	C			F			F			F		
Intersection Summary												
HCM 2000 Control Delay	124.4			HCM 2000 Level of Service			F					
HCM 2000 Volume to Capacity ratio	1.43											
Actuated Cycle Length (s)	120.0			Sum of lost time (s)			17.0					
Intersection Capacity Utilization	118.2%			ICU Level of Service			H					
Analysis Period (min)	15											
c Critical Lane Group												

Lanes, Volumes, Timings
2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp

BG 2038 PM.syn
04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	28	0	327	635	129	400	0	3078	638	0	3027	12
Future Volume (vph)	28	0	327	635	129	400	0	3078	638	0	3027	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.5	3.3	3.6	3.5	3.6	3.6	3.6	3.6	3.6	3.5
Storage Length (m)	50.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Storage Lanes	1		1	1		1	0		1	0		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.91	1.00	1.00	0.86	0.86
Ped Bike Factor	1.00					0.99			0.97		1.00	
Frt			0.850			0.850			0.850		0.999	
Flt Protected	0.950			0.950	0.968							
Satd. Flow (prot)	1570	0	1437	1463	1547	1409	0	4577	1439	0	4780	0
Flt Permitted	0.950			0.950	0.968							
Satd. Flow (perm)	1568	0	1437	1463	1547	1391	0	4577	1400	0	4780	0
Right Turn on Red			Yes			Yes			Yes		Yes	Yes
Satd. Flow (RTOR)			31			296			160			1
Link Speed (k/h)		50			50		50			50		50
Link Distance (m)		142.1			192.6		324.8			280.4		
Travel Time (s)		10.2			13.9		23.4			20.2		
Confl. Peds. (#/hr)	2					2	14		14	14		14
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
Heavy Vehicles (%)	0%	0%	0%	2%	1%	2%	0%	2%	1%	0%	23%	0%
Adj. Flow (vph)	30	0	355	690	140	435	0	3346	693	0	3290	13
Shared Lane Traffic (%)	40%											
Lane Group Flow (vph)	30	0	355	414	416	435	0	3346	693	0	3303	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.3			3.3			3.6		3.6		3.6
Link Offset(m)		0.0			0.0			0.0		0.0		0.0
Crosswalk Width(m)		4.8			4.8			4.8		4.8		4.8
Two way Left Turn Lane												
Headway Factor	1.19	1.14	1.16	1.19	1.14	1.16	1.14	1.14	1.14	1.14	1.14	1.16
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1		1	1		2	1		2	1		2
Detector Template	Left		Right	Left	Thru	Right		Thru	Right	Thru		Thru
Leading Detector (m)	2.0		2.0	2.0	10.0	2.0		10.0	2.0	10.0		10.0
Trailing Detector (m)	0.0		0.0	0.0	0.0	0.0		0.0	0.0	0.0		0.0
Detector 1 Position(m)	0.0		0.0	0.0	0.0	0.0		0.0	0.0	0.0		0.0
Detector 1 Size(m)	2.0		2.0	2.0	0.6	2.0		0.6	2.0	0.6		0.6
Detector 1 Type	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	0.0		0.0	0.0	0.0		0.0
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	0.0		0.0	0.0	0.0		0.0
Detector 1 Delay (s)	0.0		0.0	0.0	0.0	0.0		0.0	0.0	0.0		0.0
Detector 2 Position(m)					9.4			9.4		9.4		9.4
Detector 2 Size(m)					0.6			0.6		0.6		0.6
Detector 2 Type					Cl+Ex			Cl+Ex		Cl+Ex		Cl+Ex
Detector 2 Channel												

Lanes, Volumes, Timings

BG 2038 PM.syn

2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp

04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)					0.0			0.0			0.0	
Turn Type	Prot		Perm	Perm	NA	Free		NA	Free		NA	
Protected Phases	3			4	4			6			2	
Permitted Phases						Free			Free			
Detector Phase	3		8	4	4			6			2	
Switch Phase												
Minimum Initial (s)	7.0		10.0	10.0	10.0			5.0			28.0	
Minimum Split (s)	23.0		38.0	38.0	38.0			35.0			35.0	
Total Split (s)	23.0		61.0	38.0	38.0			79.0			79.0	
Total Split (%)	16.4%		43.6%	27.1%	27.1%			56.4%			56.4%	
Maximum Green (s)	18.0		54.0	31.0	31.0			72.0			72.0	
Yellow Time (s)	3.0		4.0	4.0	4.0			4.0			4.0	
All-Red Time (s)	2.0		3.0	3.0	3.0			3.0			3.0	
Lost Time Adjust (s)	-1.0		-3.0	-3.0	-3.0			-3.0			-3.0	
Total Lost Time (s)	4.0		4.0	4.0	4.0			4.0			4.0	
Lead/Lag	Lead			Lag	Lag							
Lead-Lag Optimize?	Yes			Yes	Yes							
Vehicle Extension (s)	3.0		3.0	3.0	3.0			4.5			4.5	
Recall Mode	Min		Min	Min	Min			C-Min			C-Min	
Walk Time (s)	7.0		7.0	7.0	7.0			7.0			7.0	
Flash Dont Walk (s)			24.0	24.0	24.0			21.0			21.0	
Pedestrian Calls (#/hr)			0	0	0			0			0	
Act Effct Green (s)	9.5		57.0	43.5	43.5	140.0		75.0	140.0		75.0	
Actuated g/C Ratio	0.07		0.41	0.31	0.31	1.00		0.54	1.00		0.54	
v/c Ratio	0.28		0.59	0.91	0.87	0.31		1.37	0.49		1.29	
Control Delay	68.1		34.1	72.1	64.9	0.6		194.6	0.1		163.4	
Queue Delay	0.0		0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Total Delay	68.1		34.1	72.1	64.9	0.6		194.6	0.1		163.4	
LOS	E		C	E	E	A		F	A		F	
Approach Delay		36.8						161.2			163.4	
Approach LOS		D						F			F	
Queue Length 50th (m)	8.5		73.1	121.6	119.8	0.0		~469.8	0.0		~357.3	
Queue Length 95th (m)	19.2		107.7	#199.1	#192.0	0.0		m#414.1	m0.0		#375.3	
Internal Link Dist (m)		118.1			168.6			300.8			256.4	
Turn Bay Length (m)	50.0											
Base Capacity (vph)	213		603	454	480	1391		2451	1400		2561	
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	0.14		0.59	0.91	0.87	0.31		1.37	0.49		1.29	

Intersection Summary

Area Type: CBD
 Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 115.4 (82%), Referenced to phase 2:SBT and 6:NBT, Start of Green
 Natural Cycle: 150
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.37

Lanes, Volumes, Timings

BG 2038 PM.syn

2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp

04-03-2024

Intersection Signal Delay: 140.4
 Intersection Capacity Utilization 104.9%
 Intersection LOS: F
 ICU Level of Service G
 Analysis Period (min) 15
 ~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp



HCM Signalized Intersection Capacity Analysis
 2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp

BG 2038 PM.syn
 04-03-2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	28	0	327	635	129	400	0	3078	638	0	3027	12
Future Volume (vph)	28	0	327	635	129	400	0	3078	638	0	3027	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.5	3.3	3.6	3.5	3.6	3.6	3.6	3.6	3.6	3.5
Total Lost time (s)	4.0		4.0	4.0	4.0	1.0		4.0	4.0		4.0	
Lane Util. Factor	1.00		1.00	0.95	0.95	1.00		0.91	1.00		0.86	
Frpb, ped/bikes	1.00		1.00	1.00	1.00	0.99		1.00	0.97		1.00	
Flpb, ped/bikes	1.00		1.00	1.00	1.00	1.00		1.00	1.00		1.00	
Frt	1.00		0.85	1.00	1.00	0.85		1.00	0.85		1.00	
Fit Protected	0.95		1.00	0.95	0.97	1.00		1.00	1.00		1.00	
Satd. Flow (prot)	1570		1437	1463	1547	1391		4577	1400		4782	
Fit Permitted	0.95		1.00	0.95	0.97	1.00		1.00	1.00		1.00	
Satd. Flow (perm)	1570		1437	1463	1547	1391		4577	1400		4782	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	30	0	355	690	140	435	0	3346	693	0	3290	13
RTOR Reduction (vph)	0	0	18	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	30	0	337	414	416	435	0	3346	693	0	3303	0
Confl. Peds. (#/hr)	2					2	14		14	14		14
Heavy Vehicles (%)	0%	0%	0%	2%	1%	2%	0%	2%	1%	0%	23%	0%
Turn Type	Prot		Perm	Perm	NA	Free		NA	Free		NA	
Protected Phases	3				4			6			2	
Permitted Phases			8	4		Free			Free			
Actuated Green, G (s)	8.5		54.0	40.5	40.5	140.0		72.0	140.0		72.0	
Effective Green, g (s)	9.5		57.0	43.5	43.5	140.0		75.0	140.0		75.0	
Actuated g/C Ratio	0.07		0.41	0.31	0.31	1.00		0.54	1.00		0.54	
Clearance Time (s)	5.0		7.0	7.0	7.0			7.0			7.0	
Vehicle Extension (s)	3.0		3.0	3.0	3.0			4.5			4.5	
Lane Grp Cap (vph)	106		585	454	480	1391		2451	1400		2561	
v/s Ratio Prot	0.02							c0.73			0.69	
v/s Ratio Perm			0.23	c0.28	0.27	0.31			c0.49			
v/c Ratio	0.28		0.58	0.91	0.87	0.31		1.37	0.49		1.29	
Uniform Delay, d1	62.0		32.1	46.4	45.5	0.0		32.5	0.0		32.5	
Progression Factor	1.00		1.00	1.00	1.00	1.00		1.05	1.00		1.00	
Incremental Delay, d2	1.5		1.4	22.4	15.1	0.6		164.6	0.1		133.4	
Delay (s)	63.5		33.5	68.8	60.6	0.6		198.7	0.1		165.9	
Level of Service	E		C	E	E	A		F	A		F	
Approach Delay (s)	35.8			42.7				164.6		165.9		
Approach LOS	D			D				F		F		

Intersection Summary			
HCM 2000 Control Delay	142.4	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.16		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	104.9%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
 3: Trafalgar Rd & QEW EB-Off Ramp

BG 2038 PM.syn
 04-03-2024

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	1126	589	0	2569	2368	369
Future Volume (vph)	1126	589	0	2569	2368	369
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.5	3.6	3.6	3.6	3.6
Lane Util. Factor	0.97	1.00	1.00	0.91	0.91	1.00
Ped Bike Factor	0.99					
Frt	0.850			0.850		
Fit Protected	0.950					
Satd. Flow (prot)	3046	1423	0	4577	4577	1454
Fit Permitted	0.950					
Satd. Flow (perm)	3046	1402	0	4577	4577	1454
Right Turn on Red	Yes					Yes
Satd. Flow (RTOR)	1					120
Link Speed (k/h)	50		50		50	
Link Distance (m)	199.2		51.4		324.8	
Travel Time (s)	14.3		3.7		23.4	
Confl. Peds. (#/hr)	2					
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	1%	0%	2%	2%	0%
Adj. Flow (vph)	1224	640	0	2792	2574	401
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1224	640	0	2792	2574	401
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	6.6		0.0		0.0	
Link Offset(m)	0.0		0.0		0.0	
Crosswalk Width(m)	4.8		4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.19	1.16	1.14	1.14	1.14	1.14
Turning Speed (k/h)	24		14		24	
Number of Detectors	1	1		2	2	1
Detector Template	Left	Right		Thru	Thru	Right
Leading Detector (m)	2.0		2.0		10.0	
Trailing Detector (m)	0.0		0.0		0.0	
Detector 1 Position(m)	0.0		0.0		0.0	
Detector 1 Size(m)	2.0		2.0		0.6	
Detector 1 Type	CI+Ex	CI+Ex		CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0		0.0		0.0	
Detector 1 Queue (s)	0.0		0.0		0.0	
Detector 1 Delay (s)	0.0		0.0		0.0	
Detector 2 Position(m)			9.4		9.4	
Detector 2 Size(m)			0.6		0.6	
Detector 2 Type			CI+Ex		CI+Ex	
Detector 2 Channel						
Detector 2 Extend (s)			0.0		0.0	
Turn Type	Perm	Perm		NA	NA	Free
Protected Phases	2		2		2	

Lanes, Volumes, Timings
3: Trafalgar Rd & QEW EB-Off Ramp

BG 2038 PM.syn
04-03-2024

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Permitted Phases	4	4				Free
Detector Phase	4	4		2	2	
Switch Phase						
Minimum Initial (s)	10.0	10.0		29.0	29.0	
Minimum Split (s)	38.0	38.0		36.0	36.0	
Total Split (s)	59.0	59.0		81.0	81.0	
Total Split (%)	42.1%	42.1%		57.9%	57.9%	
Maximum Green (s)	52.0	52.0		74.0	74.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	
All-Red Time (s)	3.0	3.0		3.0	3.0	
Lost Time Adjust (s)	-3.0	-3.0		-3.0	-3.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Recall Mode	None	None		C-Max	C-Max	
Walk Time (s)	7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	24.0	24.0		22.0	22.0	
Pedestrian Calls (#/hr)	0	0		0	0	
Act Effct Green (s)	55.0	55.0		77.0	77.0	140.0
Actuated g/C Ratio	0.39	0.39		0.55	0.55	1.00
v/c Ratio	1.02	1.16		1.11	1.02	0.28
Control Delay	73.8	129.9		78.5	30.6	0.0
Queue Delay	0.0	0.0		0.0	0.0	0.0
Total Delay	73.8	129.9		78.5	30.6	0.0
LOS	E	F		E	C	A
Approach Delay	93.1			78.5	26.4	
Approach LOS	F			E	C	
Queue Length 50th (m)	~195.0	~220.9		~337.7	~288.3	0.0
Queue Length 95th (m)	#238.6	#298.2		m#281.0	m119.1	m0.0
Internal Link Dist (m)	175.2			27.4	300.8	
Turn Bay Length (m)						
Base Capacity (vph)	1196	551		2517	2517	1454
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	1.02	1.16		1.11	1.02	0.28

Intersection Summary	
Area Type:	CBD
Cycle Length:	140
Actuated Cycle Length:	140
Offset:	133.6 (95%), Referenced to phase 2:NBSB and 6:, Start of Green
Natural Cycle:	140
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	1.16
Intersection Signal Delay:	61.8
Intersection Capacity Utilization:	98.2%
Analysis Period (min):	15
Intersection LOS:	E
ICU Level of Service F	

Lanes, Volumes, Timings
3: Trafalgar Rd & QEW EB-Off Ramp

BG 2038 PM.syn
04-03-2024

- Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Trafalgar Rd & QEW EB-Off Ramp



HCM Signalized Intersection Capacity Analysis
3: Trafalgar Rd & QEW EB-Off Ramp

BG 2038 PM.syn
04-03-2024

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↖ ↗	↗		↕ ↕	↕ ↕	↗
Traffic Volume (vph)	1126	589	0	2569	2368	369
Future Volume (vph)	1126	589	0	2569	2368	369
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.5	3.6	3.6	3.6	3.6
Total Lost time (s)	4.0	4.0		4.0	4.0	1.0
Lane Util. Factor	0.97	1.00		0.91	0.91	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00
Fr	1.00	0.85		1.00	1.00	0.85
Fl	0.95	1.00		1.00	1.00	1.00
Satd. Flow (prot)	3046	1402		4577	4577	1454
Fl Permitted	0.95	1.00		1.00	1.00	1.00
Satd. Flow (perm)	3046	1402		4577	4577	1454
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1224	640	0	2792	2574	401
RTOR Reduction (vph)	0	1	0	0	0	0
Lane Group Flow (vph)	1224	639	0	2792	2574	401
Confl. Peds. (#/hr)		2				
Heavy Vehicles (%)	0%	1%	0%	2%	2%	0%
Turn Type	Perm	Perm		NA	NA	Free
Protected Phases				2	2	
Permitted Phases	4	4				Free
Actuated Green, G (s)	52.0	52.0		74.0	74.0	140.0
Effective Green, g (s)	55.0	55.0		77.0	77.0	140.0
Actuated g/C Ratio	0.39	0.39		0.55	0.55	1.00
Clearance Time (s)	7.0	7.0		7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	1196	550		2517	2517	1454
v/s Ratio Prot				c0.61	0.56	
v/s Ratio Perm	0.40	c0.46				0.28
v/c Ratio	1.02	1.16		1.11	1.02	0.28
Uniform Delay, d1	42.5	42.5		31.5	31.5	0.0
Progression Factor	1.00	1.00		0.91	0.53	1.00
Incremental Delay, d2	32.1	91.8		49.8	12.6	0.0
Delay (s)	74.6	134.3		78.5	29.3	0.0
Level of Service	E	F		E	C	A
Approach Delay (s)	95.1			78.5	25.3	
Approach LOS	F			E	C	

Intersection Summary			
HCM 2000 Control Delay	61.8	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.16		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	98.2%	ICU Level of Service	F
Analysis Period (min)	15		

Lanes, Volumes, Timings
4: Trafalgar Rd & Argus Rd

BG 2038 PM.syn
04-03-2024

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗		↕ ↕	↕ ↕	↗
Traffic Volume (vph)	0	138	0	3443	2094	862
Future Volume (vph)	0	138	0	3443	2094	862
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.6	3.5	3.6	3.6	3.6	3.6
Lane Util. Factor	1.00	1.00	1.00	0.91	0.91	0.91
Ped Bike Factor						
Fr		0.865			0.956	
Fl						
Satd. Flow (prot)	0	1354	0	4577	4363	0
Fl Permitted						
Satd. Flow (perm)	0	1354	0	4577	4363	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	145.7			270.2	51.4	
Travel Time (s)	10.5			19.5	3.7	
Confl. Peds. (#/hr)						24
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	8%	0%	2%	2%	3%
Adj. Flow (vph)	0	150	0	3742	2276	937
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	150	0	3742	3213	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			3.3	3.3	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.14	1.16	1.14	1.14	1.14	1.14
Turning Speed (k/h)	24	14	24			14
Sign Control	Stop			Free	Free	

Intersection Summary	
Area Type:	CBD
Control Type:	Unsignalized
Intersection Capacity Utilization	83.2%
ICU Level of Service	E
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis
4: Trafalgar Rd & Argus Rd

BG 2038 PM.syn
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Movement	EBL	EBR	NBL	NBT	SBT	SBR	
Lane Configurations		↗		↖↖	↗↗		
Traffic Volume (veh/h)	0	138	0	3443	2094	862	
Future Volume (Veh/h)	0	138	0	3443	2094	862	
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	150	0	3742	2276	937	
Pedestrians	24						
Lane Width (m)	3.5						
Walking Speed (m/s)	1.2						
Percent Blockage	2						
Right turn flare (veh)							
Median type				None	None		
Median storage (veh)							
Upstream signal (m)				270	52		
pX, platoon unblocked	0.65	0.46	0.46				
vC, conflicting volume	4016	1251	3237				
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol	0	0	1733				
tC, single (s)	6.8	7.1	4.1				
tC, 2 stage (s)							
tF (s)	3.5	3.4	2.2				
p0 queue free %	100	69	100				
cM capacity (veh/h)	661	477	165				
Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	150	1247	1247	1247	910	910	1392
Volume Left	0	0	0	0	0	0	0
Volume Right	150	0	0	0	0	0	937
sSH	477	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.31	0.73	0.73	0.73	0.54	0.54	0.82
Queue Length 95th (m)	10.7	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (s)	16.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	C						
Approach Delay (s)	16.0	0.0			0.0		
Approach LOS	C						
Intersection Summary							
Average Delay			0.3				
Intersection Capacity Utilization			83.2%		ICU Level of Service		E
Analysis Period (min)			15				

Lanes, Volumes, Timings
5: Trafalgar Rd & Cross Ave/South Service Rd

BG 2038 PM.syn
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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖↖	↖	↗	↖	↖	↗	↖↖	↖↖	↗	↖↖	↖↖	↖↖
Traffic Volume (vph)	1051	58	193	86	116	215	300	1746	42	103	1618	338
Future Volume (vph)	1051	58	193	86	116	215	300	1746	42	103	1618	338
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.6	3.3	3.6	3.5	3.3	3.6	3.6	3.3	3.6	3.6
Storage Length (m)	130.0		0.0	25.0		0.0	50.0		0.0	25.0		0.0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.91	0.91
Ped Bike Factor		0.96		0.98				0.99			0.99	
Ft		0.885				0.850		0.996			0.974	
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2958	1342	0	1540	1644	1423	1496	4573	0	1570	4445	0
Fit Permitted	0.950			0.591			0.077			0.083		
Satd. Flow (perm)	2958	1342	0	935	1644	1423	121	4573	0	137	4445	0
Right Turn on Red			Yes			Yes		Yes			Yes	Yes
Satd. Flow (RTOR)		152				148		3			36	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		151.2			330.4			150.2			270.2	
Travel Time (s)		10.9			23.8			10.8			19.5	
Confl. Peds. (#/hr)			15	15			18		70	70		18
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
Heavy Vehicles (%)	3%	8%	9%	2%	4%	1%	5%	1%	0%	0%	1%	3%
Adj. Flow (vph)	1142	63	210	93	126	234	326	1898	46	112	1759	367
Shared Lane Traffic (%)												
Lane Group Flow (vph)	1142	273	0	93	126	234	326	1944	0	112	2126	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		6.6			6.6			3.3			3.3	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.19	1.14	1.14	1.19	1.14	1.16	1.19	1.14	1.14	1.19	1.14	1.14
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2	1	1	2		1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

Lanes, Volumes, Timings
5: Trafalgar Rd & Cross Ave/South Service Rd

BG 2038 PM.syn
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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Perm	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	7	4			8		5	2		1	6	
Permitted Phases				8		8	2			6		
Detector Phase	7	4		8	8	8	5	2		1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	7.0	27.0		7.0	27.0	
Minimum Split (s)	17.0	25.0		25.0	25.0	25.0	11.5	34.0		11.5	34.0	
Total Split (s)	40.0	65.0		25.0	25.0	25.0	20.0	63.4		11.6	55.0	
Total Split (%)	28.6%	46.4%		17.9%	17.9%	17.9%	14.3%	45.3%		8.3%	39.3%	
Maximum Green (s)	33.0	58.0		18.0	18.0	18.0	16.0	56.4		7.6	48.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	3.0	4.0		3.0	4.0	
All-Red Time (s)	3.0	3.0		3.0	3.0	3.0	1.0	3.0		1.0	3.0	
Lost Time Adjust (s)	-3.0	-3.0		0.0	-3.0	-3.0	0.0	-3.0		0.0	-3.0	
Total Lost Time (s)	4.0	4.0		7.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lead/Lag	Lead			Lag	Lag	Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes			Yes	Yes	Yes	Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	4.0		4.0	4.0	4.0	3.0	5.0		3.0	5.0	
Recall Mode	Min	Min		Min	Min	Min	C-Max			Min	C-Max	
Walk Time (s)		7.0		7.0	7.0	7.0		7.0			7.0	
Flash Dont Walk (s)		11.0		11.0	11.0	11.0		11.0			11.0	
Pedestrian Calls (#/hr)		0		0	0	0		0			0	
Act Effct Green (s)	36.0	59.9		16.9	19.9	19.9	72.1	60.2		58.9	51.0	
Actuated g/C Ratio	0.26	0.43		0.12	0.14	0.14	0.52	0.43		0.42	0.36	
v/c Ratio	1.50	0.41		0.82	0.54	0.71	1.42	0.99		0.81	1.29	
Control Delay	269.4	13.4		107.2	64.6	33.8	226.2	55.1		46.0	174.4	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	269.4	13.4		107.2	64.6	33.8	226.2	55.1		46.0	174.4	
LOS	F	B		F	E	C	F	E		D	F	
Approach Delay		220.0			57.4			79.7			168.0	
Approach LOS		F			E			E			F	
Queue Length 50th (m)	~237.4	22.1		26.6	34.3	23.5	~119.5	~176.6		22.1	~285.2	
Queue Length 95th (m)	#281.0	46.0		#58.0	56.5	55.5	m#99.1	m141.0		m21.9	m#266.8	
Internal Link Dist (m)		127.2			306.4			126.2			246.2	
Turn Bay Length (m)	130.0			25.0			50.0			25.0		
Base Capacity (vph)	760	670		120	246	339	230	1969		138	1642	
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	
Reduced v/c Ratio	1.50	0.41		0.78	0.51	0.69	1.42	0.99		0.81	1.29	

Intersection Summary

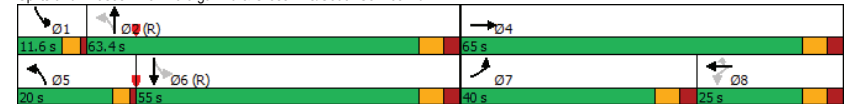
Area Type: CBD
 Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 128 (91%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
 Natural Cycle: 150
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.50

Lanes, Volumes, Timings
5: Trafalgar Rd & Cross Ave/South Service Rd

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Intersection Signal Delay: 140.2 Intersection LOS: F
 Intersection Capacity Utilization 116.9% ICU Level of Service H
 Analysis Period (min) 15
 ~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: Trafalgar Rd & Cross Ave/South Service Rd



HCM Signalized Intersection Capacity Analysis
5: Trafalgar Rd & Cross Ave/South Service Rd

BG 2038 PM.syn
04-03-2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	1051	58	193	86	116	215	300	1746	42	103	1618	338
Future Volume (vph)	1051	58	193	86	116	215	300	1746	42	103	1618	338
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.6	3.3	3.6	3.5	3.3	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)	4.0	4.0		7.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	1.00		1.00	1.00	1.00	1.00	0.91		1.00	0.91	
Frpb, ped/bikes	1.00	0.96		1.00	1.00	1.00	1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		0.98	1.00	1.00	1.00	1.00		1.00	1.00	
Fr	1.00	0.88		1.00	1.00	0.85	1.00	1.00		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	2958	1341		1503	1644	1423	1496	4575		1570	4446	
Flt Permitted	0.95	1.00		0.59	1.00	1.00	0.08	1.00		0.08	1.00	
Satd. Flow (perm)	2958	1341		936	1644	1423	121	4575		138	4446	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1142	63	210	93	126	234	326	1898	46	112	1759	367
RTOR Reduction (vph)	0	87	0	0	0	127	0	2	0	0	23	0
Lane Group Flow (vph)	1142	186	0	93	126	107	326	1942	0	112	2103	0
Confl. Peds. (#/hr)			15	15			18		70	70		18
Heavy Vehicles (%)	3%	8%	9%	2%	4%	1%	5%	1%	0%	0%	1%	3%
Turn Type	Prot	NA		Perm	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		8		5	2		1		6	
Permitted Phases			8		8	2		6				
Actuated Green, G (s)	33.0	56.9		16.9	16.9	16.9	69.1	57.2		55.9	48.0	
Effective Green, g (s)	36.0	59.9		16.9	19.9	19.9	69.1	60.2		55.9	51.0	
Actuated g/C Ratio	0.26	0.43		0.12	0.14	0.14	0.49	0.43		0.40	0.36	
Clearance Time (s)	7.0	7.0		7.0	7.0	7.0	4.0	7.0		4.0	7.0	
Vehicle Extension (s)	3.0	4.0		4.0	4.0	4.0	3.0	5.0		3.0	5.0	
Lane Grp Cap (vph)	760	573		112	233	202	227	1967		135	1619	
v/s Ratio Prot	c0.39	0.14		0.08			c0.17	0.42		0.05	0.47	
v/s Ratio Perm			c0.10		0.08		c0.53			0.28		
v/c Ratio	1.50	0.32		0.83	0.54	0.53	1.44	0.99		0.83	1.30	
Uniform Delay, d1	52.0	26.6		60.1	55.8	55.7	45.3	39.5		33.6	44.5	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.19	1.32		1.23	1.16	
Incremental Delay, d2	233.1	0.5		39.5	3.2	3.2	198.6	3.9		10.3	135.8	
Delay (s)	285.1	27.1		99.7	59.0	59.0	252.3	56.0		51.5	187.3	
Level of Service	F	C		F	E	E	F	E		D	F	
Approach Delay (s)	235.3			67.3				84.2		180.5		
Approach LOS	F			E				F		F		

Intersection Summary			
HCM 2000 Control Delay	150.3	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.33		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	116.9%	ICU Level of Service	H
Analysis Period (min)	15		

Lanes, Volumes, Timings
6: Trafalgar Rd & Cornwall Rd

BG 2038 PM.syn
04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	566	566	55	109	887	559	74	960	98	701	779	420
Future Volume (vph)	566	566	55	109	887	559	74	960	98	701	779	420
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.5
Storage Length (m)	80.0		0.0	80.0		0.0	25.0		0.0	80.0		0.0
Storage Lanes	2		0	1		1	1		0	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	0.97	0.95	0.95	1.00	0.95	1.00	1.00	*0.80	0.95	0.97	*0.80	1.00
Ped Bike Factor	0.99	1.00		0.99		0.98	0.99	1.00		1.00		0.97
Fr		0.987				0.850		0.986				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3016	3104	0	1570	3217	1439	1540	2691	0	2987	1368	1409
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2993	3104	0	1550	3217	1413	1529	2691	0	2974	1368	1361
Right Turn on Red			Yes			Yes		Yes		Yes		Yes
Satd. Flow (RTOR)		7				339		7				277
Link Speed (k/h)		50			50			50				50
Link Distance (m)		285.8			142.3			311.4				130.3
Travel Time (s)		20.6			10.2			22.4				9.4
Confl. Peds. (#/hr)	21		14	14		21	17		10	10		17
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
Heavy Vehicles (%)	1%	3%	1%	0%	1%	1%	2%	0%	0%	2%	0%	2%
Adj. Flow (vph)	615	615	60	118	964	608	80	1043	107	762	847	457
Shared Lane Traffic (%)												
Lane Group Flow (vph)	615	675	0	118	964	608	80	1150	0	762	847	457
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		6.6			6.6			6.6		6.6		6.6
Link Offset(m)		0.0			0.0			0.0		0.0		0.0
Crosswalk Width(m)		4.8			4.8			4.8		4.8		4.8
Two way Left Turn Lane												
Headway Factor	1.19	1.14	1.14	1.19	1.14	1.14	1.19	1.14	1.14	1.19	1.14	1.16
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2	1	1	2		1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0		2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6		2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4				9.4
Detector 2 Size(m)		0.6			0.6			0.6				0.6
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex				Cl+Ex
Detector 2 Channel												

Lanes, Volumes, Timings
6: Trafalgar Rd & Cornwall Rd

BG 2038 PM.syn
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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA	Free	Prot	NA		Prot	NA	Perm
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases					Free							6
Detector Phase	3	8		7	4		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	7.0	10.0		7.0	10.0		7.0	20.0		7.0	20.0	20.0
Minimum Split (s)	12.0	37.0		12.0	37.0		12.0	39.0		12.0	39.0	39.0
Total Split (s)	22.0	43.0		18.0	39.0		12.0	52.0		27.0	67.0	67.0
Total Split (%)	15.7%	30.7%		12.9%	27.9%		8.6%	37.1%		19.3%	47.9%	47.9%
Maximum Green (s)	17.0	36.0		13.0	32.0		7.0	45.0		22.0	60.0	60.0
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	4.0
All-Red Time (s)	2.0	3.0		2.0	3.0		2.0	3.0		2.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-3.0		-1.0	-3.0		-1.0	-3.0		-1.0	-3.0	-3.0
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	0.2	0.2		0.2	0.2		0.2	0.2		0.2	0.2	0.2
Recall Mode	Max	Max		Max	Max		None	C-Max		Max	C-Max	C-Max
Walk Time (s)		7.0			7.0			7.0			7.0	7.0
Flash Dont Walk (s)		23.0			23.0			25.0			25.0	25.0
Pedestrian Calls (#/hr)		0			0			0			0	0
Act Effct Green (s)	18.0	39.0		14.0	35.0	140.0	8.0	48.0		23.0	63.0	63.0
Actuated g/C Ratio	0.13	0.28		0.10	0.25	1.00	0.06	0.34		0.16	0.45	0.45
v/c Ratio	1.59	0.78		0.75	1.20	0.43	0.91	1.24		1.56	1.38	0.60
Control Delay	315.3	53.2		89.4	146.2	1.0	137.9	156.5		298.8	196.0	6.1
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	315.3	53.2		89.4	146.2	1.0	137.9	156.5		298.8	196.0	6.1
LOS	F	D		F	F	A	F	F		F	F	A
Approach Delay		178.1			90.0			155.3				191.9
Approach LOS		F			F			F				F
Queue Length 50th (m)	~131.2	94.8		34.0	~178.8	0.0	23.6	~259.7		~165.3	~398.0	20.0
Queue Length 95th (m)	#170.2	119.2		#66.2	#222.4	0.0	#58.1	#313.4		m#124.5m#289.3	m13.7	
Internal Link Dist (m)		261.8			118.3			287.4			106.3	
Turn Bay Length (m)	80.0			80.0			25.0			80.0		
Base Capacity (vph)	387	869		157	804	1413	88	927		490	615	764
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	0
Reduced v/c Ratio	1.59	0.78		0.75	1.20	0.43	0.91	1.24		1.56	1.38	0.60

Intersection Summary

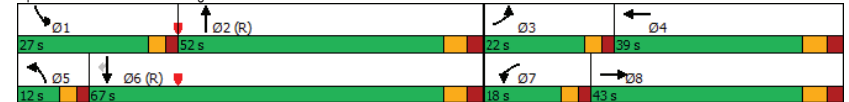
Area Type: CBD
 Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green, Master Intersection
 Natural Cycle: 150
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.59

Lanes, Volumes, Timings
6: Trafalgar Rd & Cornwall Rd

BG 2038 PM.syn
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Intersection Signal Delay: 154.4	Intersection LOS: F
Intersection Capacity Utilization 113.8%	ICU Level of Service H
Analysis Period (min) 15	
* User Entered Value	
~ Volume exceeds capacity, queue is theoretically infinite. Queue shown is maximum after two cycles.	
# 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.	
m Volume for 95th percentile queue is metered by upstream signal.	

Splits and Phases: 6: Trafalgar Rd & Cornwall Rd



HCM Signalized Intersection Capacity Analysis
6: Trafalgar Rd & Cornwall Rd

BG 2038 PM.syn
04-03-2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	566	566	55	109	887	559	74	960	98	701	779	420
Future Volume (vph)	566	566	55	109	887	559	74	960	98	701	779	420
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.5
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.97	0.95		1.00	0.95	1.00	1.00	*0.80		0.97	*0.80	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.98	1.00	1.00		1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Fr	1.00	0.99		1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3016	3103		1570	3217	1413	1540	2692		2987	1368	1361
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3016	3103		1570	3217	1413	1540	2692		2987	1368	1361
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	615	615	60	118	964	608	80	1043	107	762	847	457
RTOR Reduction (vph)	0	5	0	0	0	0	0	5	0	0	0	152
Lane Group Flow (vph)	615	670	0	118	964	608	80	1145	0	762	847	305
Confl. Peds. (#/hr)	21		14	14		21	17		10	10		17
Heavy Vehicles (%)	1%	3%	1%	0%	1%	1%	2%	0%	0%	2%	0%	2%
Turn Type	Prot	NA		Prot	NA	Free	Prot	NA		Prot	NA	Perm
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases						Free						6
Actuated Green, G (s)	17.0	36.0		13.0	32.0	140.0	7.0	45.0		22.0	60.0	60.0
Effective Green, g (s)	18.0	39.0		14.0	35.0	140.0	8.0	48.0		23.0	63.0	63.0
Actuated g/C Ratio	0.13	0.28		0.10	0.25	1.00	0.06	0.34		0.16	0.45	0.45
Clearance Time (s)	5.0	7.0		5.0	7.0		5.0	7.0		5.0	7.0	7.0
Vehicle Extension (s)	0.2	0.2		0.2	0.2		0.2	0.2		0.2	0.2	0.2
Lane Grp Cap (vph)	387	864		157	804	1413	88	922		490	615	612
v/s Ratio Prot	c0.20	0.22		0.08	c0.30		0.05	0.43		c0.26	c0.62	
v/s Ratio Perm					c0.43							0.22
v/c Ratio	1.59	0.78		0.75	1.20	0.43	0.91	1.24		1.56	1.38	0.50
Uniform Delay, d1	61.0	46.5		61.3	52.5	0.0	65.6	46.0		58.5	38.5	27.3
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.42	0.66	0.54
Incremental Delay, d2	277.1	6.7		27.8	101.5	1.0	64.9	118.3		250.7	170.7	0.3
Delay (s)	338.1	53.2		89.1	154.0	1.0	130.5	164.3		333.6	196.1	15.0
Level of Service	F	D		F	F	A	F	F		F	F	B
Approach Delay (s)	189.0			94.4			162.1			206.8		
Approach LOS	F			F			F			F		

Intersection Summary			
HCM 2000 Control Delay	164.1	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.40		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	113.8%	ICU Level of Service	H
Analysis Period (min)	15		

Lanes, Volumes, Timings
7: South Service Road/Canadian Road & QEW EB Off-Ramp/Royal Windsor Drive

BG 2038 PM.syn
04-03-2024

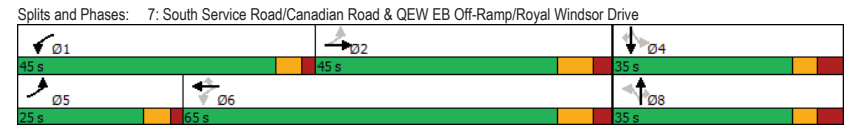
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	366	638	20	214	763	32	16	55	117	16	140	498
Future Volume (vph)	366	638	20	214	763	32	16	55	117	16	140	498
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	150.0	0.0	155.0		70.0	15.0		0.0	0.0			30.0
Storage Lanes	2		0	1		1	1		1	1		1
Taper Length (m)	7.5			7.5		7.5			7.5			7.5
Lane Util. Factor	0.97	0.95	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr		0.995				0.850		0.850				0.850
Flt Protected	0.950			0.950			0.950		0.950			0.950
Satd. Flow (prot)	3502	3395	0	1752	3505	1615	1805	1900	1615	1805	1900	1599
Flt Permitted	0.265			0.330			0.544					0.718
Satd. Flow (perm)	977	3395	0	609	3505	1615	1034	1900	1615	1364	1900	1599
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3				94			152			382
Link Speed (k/h)		80			80			60				40
Link Distance (m)		324.5			247.2			158.7				215.5
Travel Time (s)		14.6			11.1			9.5				19.4
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
Heavy Vehicles (%)	0%	6%	0%	3%	3%	0%	0%	0%	0%	0%	0%	1%
Adj. Flow (vph)	398	693	22	233	829	35	17	60	127	17	152	541
Shared Lane Traffic (%)												
Lane Group Flow (vph)	398	715	0	233	829	35	17	60	127	17	152	541
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Right	Left	Right	Left	Right
Median Width(m)		7.2			7.2			3.6				3.6
Link Offset(m)		0.0			0.0			0.0				0.0
Crosswalk Width(m)		4.8			4.8			4.8				4.8
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	CI+Ex	CI+Ex		CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4				9.4
Detector 2 Size(m)		0.6			0.6			0.6				0.6
Detector 2 Type		CI+Ex			CI+Ex			CI+Ex				CI+Ex
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8				4

Lanes, Volumes, Timings
 7: South Service Road/Canadian Road & QEW EB Off-Ramp/Royal Windsor Drive 04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	2			6		6	8		8	4		4
Detector Phase	5	2		1	6	6	8	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	8.0	20.0		8.0	30.0	30.0	8.0	8.0	8.0	10.0	10.0	10.0
Minimum Split (s)	14.0	29.4		14.0	38.4	38.4	28.8	28.8	28.8	28.8	28.8	28.8
Total Split (s)	25.0	45.0		45.0	65.0	65.0	35.0	35.0	35.0	35.0	35.0	35.0
Total Split (%)	20.0%	36.0%		36.0%	52.0%	52.0%	28.0%	28.0%	28.0%	28.0%	28.0%	28.0%
Maximum Green (s)	19.0	36.6		39.0	56.6	56.6	27.2	27.2	27.2	27.2	27.2	27.2
Yellow Time (s)	4.0	5.4		4.0	5.4	5.4	3.7	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	2.0	3.0		2.0	3.0	3.0	4.1	4.1	4.1	4.1	4.1	4.1
Lost Time Adjust (s)	-2.0	-4.4		-2.0	-4.4	-4.4	-3.8	-3.8	-3.8	-3.8	-3.8	-3.8
Total Lost Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lead	Lag		Lead	Lag	Lag						
Lead-Lag Optimize?												
Vehicle Extension (s)	3.5	4.5		3.5	6.0	6.0	3.5	3.5	3.5	3.5	3.5	3.5
Recall Mode	None	Max		None	Max	Max	None	None	None	None	None	None
Walk Time (s)		10.0			10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Flash Dont Walk (s)		10.0			10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Pedestrian Calls (#/hr)		0			0	0	0	0	0	0	0	0
Act Effct Green (s)	77.2	62.5		74.9	61.4	61.4	23.5	23.5	23.5	23.5	23.5	23.5
Actuated g/C Ratio	0.69	0.56		0.67	0.55	0.55	0.21	0.21	0.21	0.21	0.21	0.21
v/c Ratio	0.40	0.38		0.43	0.43	0.04	0.08	0.15	0.28	0.06	0.38	0.85
Control Delay	7.0	15.8		8.7	17.0	0.1	35.6	36.3	4.9	35.1	40.4	25.7
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.0	15.8		8.7	17.0	0.1	35.6	36.3	4.9	35.1	40.4	25.7
LOS	A	B		A	B	A	D	D	A	D	D	C
Approach Delay		12.7			14.7			16.7			29.1	
Approach LOS		B			B			B			C	
Queue Length 50th (m)	14.0	46.7		16.2	58.6	0.0	3.1	11.3	0.0	3.1	30.1	36.2
Queue Length 95th (m)	22.9	74.7		30.1	87.0	0.0	9.7	23.3	10.4	9.6	50.8	86.5
Internal Link Dist (m)		300.5			223.2			134.7			191.5	
Turn Bay Length (m)	150.0			155.0		70.0	15.0					30.0
Base Capacity (vph)	1175	1901		858	1926	929	288	530	560	380	530	722
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.34	0.38		0.27	0.43	0.04	0.06	0.11	0.23	0.04	0.29	0.75

Intersection Summary	
Area Type:	Other
Cycle Length:	125
Actuated Cycle Length:	111.7
Natural Cycle:	85
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.85
Intersection Signal Delay:	17.4
Intersection Capacity Utilization:	72.5%
Analysis Period (min):	15
Intersection LOS:	B
ICU Level of Service:	C

Lanes, Volumes, Timings
 7: South Service Road/Canadian Road & QEW EB Off-Ramp/Royal Windsor Drive 04-03-2024



HCM Signalized Intersection Capacity Analysis
 7: South Service Road/Canadian Road & QEW EB Off-Ramp/Royal Windsor Drive 04-03-2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	366	638	20	214	763	32	16	55	117	16	140	498
Future Volume (vph)	366	638	20	214	763	32	16	55	117	16	140	498
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	0.95		1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr	1.00	1.00		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3502	3396		1752	3505	1615	1805	1900	1615	1805	1900	1599
Flt Permitted	0.26	1.00		0.33	1.00	1.00	0.54	1.00	1.00	0.72	1.00	1.00
Satd. Flow (perm)	976	3396		609	3505	1615	1034	1900	1615	1364	1900	1599
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	398	693	22	233	829	35	17	60	127	17	152	541
RTOR Reduction (vph)	0	1	0	0	0	16	0	0	100	0	0	302
Lane Group Flow (vph)	398	714	0	233	829	19	17	60	27	17	152	239
Heavy Vehicles (%)	0%	6%	0%	3%	3%	0%	0%	0%	0%	0%	0%	1%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6		6	8		8	4		4
Actuated Green, G (s)	70.9	58.2		68.5	57.0	57.0	19.7	19.7	19.7	19.7	19.7	19.7
Effective Green, g (s)	74.9	62.6		72.5	61.4	61.4	23.5	23.5	23.5	23.5	23.5	23.5
Actuated g/C Ratio	0.67	0.56		0.65	0.55	0.55	0.21	0.21	0.21	0.21	0.21	0.21
Clearance Time (s)	6.0	8.4		6.0	8.4	8.4	7.8	7.8	7.8	7.8	7.8	7.8
Vehicle Extension (s)	3.5	4.5		3.5	6.0	6.0	3.5	3.5	3.5	3.5	3.5	3.5
Lane Grp Cap (vph)	987	1904		533	1928	888	217	400	340	287	400	336
v/s Ratio Prot	c0.05	0.21		0.05	c0.24			0.03			0.08	
v/s Ratio Perm	0.22			0.23		0.01	0.02		0.02	0.01		c0.15
v/c Ratio	0.40	0.37		0.44	0.43	0.02	0.08	0.15	0.08	0.06	0.38	0.71
Uniform Delay, d1	8.0	13.6		8.3	14.8	11.4	35.4	35.9	35.4	35.2	37.8	40.9
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.3	0.6		0.7	0.7	0.0	0.2	0.2	0.1	0.1	0.7	7.2
Delay (s)	8.3	14.2		9.0	15.5	11.5	35.5	36.1	35.5	35.3	38.5	48.1
Level of Service	A	B		A	B	B	D	D	D	D	D	D
Approach Delay (s)		12.1			14.0			35.7			45.8	
Approach LOS		B			B			D			D	

Intersection Summary			
HCM 2000 Control Delay	21.9	HCM 2000 Level of Service	
HCM 2000 Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	111.6	Sum of lost time (s)	
Intersection Capacity Utilization	72.5%	ICU Level of Service	
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
 8: QEW WB Off-Ramp & Kerr Street 04-03-2024

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	494	0	0	810	135	307
Future Volume (vph)	494	0	0	810	135	307
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)		0.0	0.0		0.0	140.0
Storage Lanes		0	0		1	1
Taper Length (m)			7.5		7.5	
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00
Fr						0.850
Flt Protected					0.950	
Satd. Flow (prot)	3574	0	0	3574	1805	1599
Flt Permitted					0.950	
Satd. Flow (perm)	3574	0	0	3574	1805	1599
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)						188
Link Speed (k/h)	60			60	40	
Link Distance (m)	130.3			194.2	262.1	
Travel Time (s)	7.8			11.7	23.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	0%	0%	1%	0%	1%
Adj. Flow (vph)	537	0	0	880	147	334
Shared Lane Traffic (%)						
Lane Group Flow (vph)	537	0	0	880	147	334
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)		15	25		25	15
Turn Type	NA			NA	Prot	Perm
Protected Phases	4			8	2	
Permitted Phases						2
Minimum Split (s)	22.5			22.5	22.5	22.5
Total Split (s)	22.5			22.5	22.5	22.5
Total Split (%)	50.0%			50.0%	50.0%	50.0%
Maximum Green (s)	18.0			18.0	18.0	18.0
Yellow Time (s)	3.5			3.5	3.5	3.5
All-Red Time (s)	1.0			1.0	1.0	1.0
Lost Time Adjust (s)	0.0			0.0	0.0	0.0
Total Lost Time (s)	4.5			4.5	4.5	4.5
Lead/Lag						
Lead-Lag Optimize?						
Walk Time (s)	7.0			7.0	7.0	7.0
Flash Dont Walk (s)	11.0			11.0	11.0	11.0
Pedestrian Calls (#/hr)	0			0	0	0
Act Effct Green (s)	18.0			18.0	18.0	18.0
Actuated g/C Ratio	0.40			0.40	0.40	0.40

Lanes, Volumes, Timings
8: QEWS WB Off-Ramp & Kerr Street

BG 2038 PM.syn
04-03-2024

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
v/c Ratio	0.38			0.62	0.20	0.44
Control Delay	10.5			13.1	9.8	6.6
Queue Delay	0.0			0.0	0.0	0.0
Total Delay	10.5			13.1	9.8	6.6
LOS	B			B	A	A
Approach Delay	10.5			13.1	7.6	
Approach LOS	B			B	A	
Queue Length 50th (m)	15.5			28.7	7.5	7.5
Queue Length 95th (m)	24.8			43.5	16.4	21.4
Internal Link Dist (m)	106.3			170.2	238.1	
Turn Bay Length (m)						140.0
Base Capacity (vph)	1429			1429	722	752
Starvation Cap Reductn	0			0	0	0
Spillback Cap Reductn	0			0	0	0
Storage Cap Reductn	0			0	0	0
Reduced v/c Ratio	0.38			0.62	0.20	0.44

Intersection Summary	
Area Type:	Other
Cycle Length:	45
Actuated Cycle Length:	45
Offset:	0 (0%), Referenced to phase 2:NBL and 6:, Start of Green
Natural Cycle:	45
Control Type:	Pretimed
Maximum v/c Ratio:	0.62
Intersection Signal Delay:	11.0
Intersection Capacity Utilization:	40.2%
Analysis Period (min):	15
Intersection LOS:	B
ICU Level of Service A	

Splits and Phases: 8: QEWS WB Off-Ramp & Kerr Street

<p>← 02 (R) 22.5 s</p>	<p>→ 04 22.5 s</p>
<p>← 08 22.5 s</p>	

HCM Signalized Intersection Capacity Analysis
8: QEWS WB Off-Ramp & Kerr Street

BG 2038 PM.syn
04-03-2024

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↑	↑
Traffic Volume (vph)	494	0	0	810	135	307
Future Volume (vph)	494	0	0	810	135	307
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5			4.5	4.5	4.5
Lane Util. Factor	0.95			0.95	1.00	1.00
Fr _t	1.00			1.00	1.00	0.85
Fit Protected	1.00			1.00	0.95	1.00
Satd. Flow (prot)	3574			3574	1805	1599
Fit Permitted	1.00			1.00	0.95	1.00
Satd. Flow (perm)	3574			3574	1805	1599
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	537	0	0	880	147	334
RTOR Reduction (vph)	0	0	0	0	0	113
Lane Group Flow (vph)	537	0	0	880	147	221
Heavy Vehicles (%)	1%	0%	0%	1%	0%	1%
Turn Type	NA			NA	Prot	Perm
Protected Phases	4			8	2	
Permitted Phases						2
Actuated Green, G (s)	18.0			18.0	18.0	18.0
Effective Green, g (s)	18.0			18.0	18.0	18.0
Actuated g/C Ratio	0.40			0.40	0.40	0.40
Clearance Time (s)	4.5			4.5	4.5	4.5
Lane Grp Cap (vph)	1429			1429	722	639
v/s Ratio Prot	0.15			c0.25	0.08	
v/s Ratio Perm						c0.14
v/c Ratio	0.38			0.62	0.20	0.35
Uniform Delay, d1	9.5			10.7	8.8	9.4
Progression Factor	1.00			1.00	1.00	1.00
Incremental Delay, d2	0.8			2.0	0.6	1.5
Delay (s)	10.3			12.7	9.5	10.9
Level of Service	B			B	A	B
Approach Delay (s)	10.3			12.7	10.4	
Approach LOS	B			B	B	

Intersection Summary			
HCM 2000 Control Delay	11.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	40.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
9: Dorval Drive & QEW WB Off-Ramp

BG 2038 PM.syn
04-03-2024

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔↔	↗	↖↖			↖↖
Traffic Volume (vph)	833	732	1169	0	0	1242
Future Volume (vph)	833	732	1169	0	0	1242
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	190.0		0.0	0.0	
Storage Lanes	2	1		0	0	
Taper Length (m)	7.5			7.5		
Lane Util. Factor	0.97	0.91	0.95	1.00	1.00	0.95
Frt	0.966	0.850				
Flt Protected	0.963					
Satd. Flow (prot)	3344	1455	3574	0	0	3539
Flt Permitted	0.963					
Satd. Flow (perm)	3344	1455	3574	0	0	3539
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)	38	48				
Link Speed (k/h)	40		60			60
Link Distance (m)	325.1		310.2			266.9
Travel Time (s)	29.3		18.6			16.0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	1%	1%	0%	0%	2%
Adj. Flow (vph)	905	796	1271	0	0	1350
Shared Lane Traffic (%)		33%				
Lane Group Flow (vph)	1168	533	1271	0	0	1350
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	7.2		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15		15	25	
Number of Detectors	1	1	2			2
Detector Template	Left	Right	Thru			Thru
Leading Detector (m)	2.0	2.0	10.0			10.0
Trailing Detector (m)	0.0	0.0	0.0			0.0
Detector 1 Position(m)	0.0	0.0	0.0			0.0
Detector 1 Size(m)	2.0	2.0	0.6			0.6
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex			CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0			0.0
Detector 1 Queue (s)	0.0	0.0	0.0			0.0
Detector 1 Delay (s)	0.0	0.0	0.0			0.0
Detector 2 Position(m)			9.4			9.4
Detector 2 Size(m)			0.6			0.6
Detector 2 Type			CI+Ex			CI+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type	Prot	Perm	NA			NA
Protected Phases	8		2			6

Lanes, Volumes, Timings
9: Dorval Drive & QEW WB Off-Ramp

BG 2038 PM.syn
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Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Permitted Phases		8				
Detector Phase	8	8	2			6
Switch Phase						
Minimum Initial (s)	10.0	10.0	20.0			20.0
Minimum Split (s)	24.0	24.0	26.0			26.0
Total Split (s)	50.4	50.4	69.6			69.6
Total Split (%)	42.0%	42.0%	58.0%			58.0%
Maximum Green (s)	44.4	44.4	63.6			63.6
Yellow Time (s)	4.0	4.0	4.0			4.0
All-Red Time (s)	2.0	2.0	2.0			2.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0			-2.0
Total Lost Time (s)	4.0	4.0	4.0			4.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	4.5	4.5	5.0			5.0
Recall Mode	None	None	Max			Max
Walk Time (s)	5.0	5.0	7.0			7.0
Flash Dont Walk (s)	7.0	7.0	11.0			11.0
Pedestrian Calls (#/hr)	0	0	0			0
Act Effct Green (s)	46.1	46.1	65.6			65.6
Actuated g/C Ratio	0.39	0.39	0.55			0.55
v/c Ratio	0.89	0.90	0.65			0.70
Control Delay	43.2	52.1	21.0			22.2
Queue Delay	0.0	0.0	0.0			0.0
Total Delay	43.2	52.1	21.0			22.2
LOS	D	D	C			C
Approach Delay	46.0		21.0			22.2
Approach LOS	D		C			C
Queue Length 50th (m)	134.1	125.3	111.7			123.5
Queue Length 95th (m)	#168.0	#202.4	135.5			149.6
Internal Link Dist (m)	301.1		286.2			242.9
Turn Bay Length (m)		190.0				
Base Capacity (vph)	1319	593	1958			1939
Starvation Cap Reductn	0	0	0			0
Spillback Cap Reductn	0	0	0			0
Storage Cap Reductn	0	0	0			0
Reduced v/c Ratio	0.89	0.90	0.65			0.70
Intersection Summary						
Area Type:	Other					
Cycle Length:	120					
Actuated Cycle Length:	119.7					
Natural Cycle:	55					
Control Type:	Semi Act-Uncooord					
Maximum v/c Ratio:	0.90					
Intersection Signal Delay:	31.2			Intersection LOS: C		
Intersection Capacity Utilization:	72.4%			ICU Level of Service C		
Analysis Period (min)	15					
# 95th percentile volume exceeds capacity, queue may be longer.						

Lanes, Volumes, Timings
9: Dorval Drive & QEW WB Off-Ramp

BG 2038 PM.syn
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Queue shown is maximum after two cycles.

Splits and Phases: 9: Dorval Drive & QEW WB Off-Ramp



HCM Signalized Intersection Capacity Analysis
9: Dorval Drive & QEW WB Off-Ramp

BG 2038 PM.syn
04-03-2024

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔↔	↔	↕↕			↕↕
Traffic Volume (vph)	833	732	1169	0	0	1242
Future Volume (vph)	833	732	1169	0	0	1242
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0			4.0
Lane Util. Factor	0.97	0.91	0.95			0.95
Fr _t	0.97	0.85	1.00			1.00
Fit Protected	0.96	1.00	1.00			1.00
Satd. Flow (prot)	3343	1455	3574			3539
Fit Permitted	0.96	1.00	1.00			1.00
Satd. Flow (perm)	3343	1455	3574			3539
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	905	796	1271	0	0	1350
RTOR Reduction (vph)	23	30	0	0	0	0
Lane Group Flow (vph)	1145	503	1271	0	0	1350
Heavy Vehicles (%)	3%	1%	1%	0%	0%	2%
Turn Type	Prot	Perm	NA			NA
Protected Phases	8		2			6
Permitted Phases		8				
Actuated Green, G (s)	44.1	44.1	63.6			63.6
Effective Green, g (s)	46.1	46.1	65.6			65.6
Actuated g/C Ratio	0.39	0.39	0.55			0.55
Clearance Time (s)	6.0	6.0	6.0			6.0
Vehicle Extension (s)	4.5	4.5	5.0			5.0
Lane Grp Cap (vph)	1287	560	1958			1939
v/s Ratio Prot	0.34		0.36			c0.38
v/s Ratio Perm		c0.35				
v/c Ratio	0.89	0.90	0.65			0.70
Uniform Delay, d1	34.4	34.6	19.0			19.8
Progression Factor	1.00	1.00	1.00			1.00
Incremental Delay, d2	8.3	17.8	1.7			2.1
Delay (s)	42.7	52.5	20.7			21.9
Level of Service	D	D	C			C
Approach Delay (s)	45.7		20.7			21.9
Approach LOS	D		C			C
Intersection Summary						
HCM 2000 Control Delay			30.9		HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.78			
Actuated Cycle Length (s)			119.7		Sum of lost time (s)	8.0
Intersection Capacity Utilization			72.4%		ICU Level of Service	C
Analysis Period (min)			15			
c Critical Lane Group						

Lanes, Volumes, Timings
10: Dorval Drive & QEW EB Off-Ramp

BG 2038 PM.syn
04-03-2024

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	323	384	0	1404	1328	0
Future Volume (vph)	323	384	0	1404	1328	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	175.0	0.0	0.0			0.0
Storage Lanes	1	1	0			0
Taper Length (m)	7.5		7.5			
Lane Util. Factor	0.97	0.91	1.00	0.95	0.95	1.00
Fr't	0.950	0.850				
Flt Protected	0.968					
Satd. Flow (prot)	3302	1441	0	3539	3505	0
Flt Permitted	0.968					
Satd. Flow (perm)	3302	1441	0	3539	3505	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	40	40				
Link Speed (k/h)	40			60	60	
Link Distance (m)	275.5			164.3	310.2	
Travel Time (s)	24.8			9.9	18.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	2%	0%	2%	3%	0%
Adj. Flow (vph)	351	417	0	1526	1443	0
Shared Lane Traffic (%)		42%				
Lane Group Flow (vph)	526	242	0	1526	1443	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	7.2			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Number of Detectors	1	1		2	2	
Detector Template	Left	Right		Thru	Thru	
Leading Detector (m)	2.0	2.0		10.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	2.0		0.6	0.6	
Detector 1 Type	CI+Ex	CI+Ex		CI+Ex	CI+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	
Detector 2 Position(m)				9.4	9.4	
Detector 2 Size(m)				0.6	0.6	
Detector 2 Type				CI+Ex	CI+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Prot	Perm		NA	NA	
Protected Phases	4			2	6	

Lanes, Volumes, Timings
10: Dorval Drive & QEW EB Off-Ramp

BG 2038 PM.syn
04-03-2024

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Permitted Phases		4				
Detector Phase	4	4		2	6	
Switch Phase						
Minimum Initial (s)	10.0	10.0		20.0	20.0	
Minimum Split (s)	24.0	24.0		26.0	26.0	
Total Split (s)	45.6	45.6		74.4	74.4	
Total Split (%)	38.0%	38.0%		62.0%	62.0%	
Maximum Green (s)	39.6	39.6		68.4	68.4	
Yellow Time (s)	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	4.0	4.0		5.0	5.0	
Recall Mode	None	None		Max	Max	
Walk Time (s)	0.0	0.0		7.0	7.0	
Flash Dont Walk (s)	7.0	7.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0	
Act Effct Green (s)	25.1	25.1		70.6	70.6	
Actuated g/C Ratio	0.24	0.24		0.68	0.68	
v/c Ratio	0.64	0.64		0.63	0.60	
Control Delay	35.8	37.1		11.7	11.2	
Queue Delay	0.0	0.0		0.0	0.0	
Total Delay	35.8	37.1		11.7	11.2	
LOS	D	D		B	B	
Approach Delay	36.2			11.7	11.2	
Approach LOS	D			B	B	
Queue Length 50th (m)	47.6	42.1		81.6	74.5	
Queue Length 95th (m)	64.4	70.7		141.7	130.1	
Internal Link Dist (m)	251.5			140.3	286.2	
Turn Bay Length (m)	175.0					
Base Capacity (vph)	1352	603		2410	2386	
Starvation Cap Reductn	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	
Storage Cap Reductn	0	0		0	0	
Reduced v/c Ratio	0.39	0.40		0.63	0.60	
Intersection Summary						
Area Type:	Other					
Cycle Length:	120					
Actuated Cycle Length:	103.7					
Natural Cycle:	60					
Control Type:	Semi Act-Uncoord					
Maximum v/c Ratio:	0.64					
Intersection Signal Delay:	16.5			Intersection LOS: B		
Intersection Capacity Utilization:	72.4%			ICU Level of Service C		
Analysis Period (min)	15					

Lanes, Volumes, Timings
10: Dorval Drive & QEW EB Off-Ramp

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Splits and Phases: 10: Dorval Drive & QEW EB Off-Ramp



HCM Signalized Intersection Capacity Analysis
10: Dorval Drive & QEW EB Off-Ramp

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	EBL	EBR	NBL	NBT	SBT	SBR
Movement						
Lane Configurations	↔↔	↔		↕↕	↕↕	
Traffic Volume (vph)	323	384	0	1404	1328	0
Future Volume (vph)	323	384	0	1404	1328	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	0.91		0.95	0.95	
Fr _t	0.95	0.85		1.00	1.00	
Fit Protected	0.97	1.00		1.00	1.00	
Satd. Flow (prot)	3301	1441		3539	3505	
Fit Permitted	0.97	1.00		1.00	1.00	
Satd. Flow (perm)	3301	1441		3539	3505	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	351	417	0	1526	1443	0
RTOR Reduction (vph)	30	30	0	0	0	0
Lane Group Flow (vph)	496	212	0	1526	1443	0
Heavy Vehicles (%)	3%	2%	0%	2%	3%	0%
Turn Type	Prot	Perm		NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4				
Actuated Green, G (s)	23.1	23.1		68.6	68.6	
Effective Green, g (s)	25.1	25.1		70.6	70.6	
Actuated g/C Ratio	0.24	0.24		0.68	0.68	
Clearance Time (s)	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	4.0	4.0		5.0	5.0	
Lane Grp Cap (vph)	798	348		2409	2386	
v/s Ratio Prot	c0.15			c0.43	0.41	
v/s Ratio Perm		0.15				
v/c Ratio	0.62	0.61		0.63	0.60	
Uniform Delay, d ₁	35.1	34.9		9.3	9.0	
Progression Factor	1.00	1.00		1.00	1.00	
Incremental Delay, d ₂	1.7	3.5		1.3	1.1	
Delay (s)	36.8	38.4		10.6	10.1	
Level of Service	D	D		B	B	
Approach Delay (s)	37.3			10.6	10.1	
Approach LOS	D			B	B	
Intersection Summary						
HCM 2000 Control Delay			15.9	HCM 2000 Level of Service		B
HCM 2000 Volume to Capacity ratio			0.63			
Actuated Cycle Length (s)			103.7	Sum of lost time (s)		8.0
Intersection Capacity Utilization			72.4%	ICU Level of Service		C
Analysis Period (min)			15			
c Critical Lane Group						

Lanes, Volumes, Timings
11: Argus Rd & South Service Rd

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Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Volume (vph)	13	11	529	320	72	89
Future Volume (vph)	13	11	529	320	72	89
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt			0.949		0.925	
Flt Protected		0.974			0.978	
Satd. Flow (prot)	0	1571	1528	0	1547	0
Flt Permitted		0.974			0.978	
Satd. Flow (perm)	0	1571	1528	0	1547	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		177.7	145.7		103.5	
Travel Time (s)		12.8	10.5		7.5	
Confl. Peds. (#/hr)					5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	13%	10%	0%	0%	0%
Adj. Flow (vph)	14	12	575	348	78	97
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	26	923	0	175	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (k/h)	24			14	24	14
Sign Control		Free	Free		Stop	

Intersection Summary	
Area Type:	CBD
Control Type:	Unsignalized
Intersection Capacity Utilization	69.8%
Analysis Period (min)	15
	ICU Level of Service C

HCM Unsignalized Intersection Capacity Analysis
11: Argus Rd & South Service Rd

BG 2038 PM.syn
04-03-2024

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Volume (veh/h)	13	11	529	320	72	89
Future Volume (Veh/h)	13	11	529	320	72	89
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)	14	12	575	348	78	97
Pedestrians			5			
Lane Width (m)			3.6			
Walking Speed (m/s)			1.2			
Percent Blockage			0			
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)		358				
pX, platoon unblocked						
vC, conflicting volume	923				794	749
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	923				794	749
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				78	77
cM capacity (veh/h)	748				352	415

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	26	923	175
Volume Left	14	0	78
Volume Right	0	348	97
eSH	748	1700	384
Volume to Capacity	0.02	0.54	0.46
Queue Length 95th (m)	0.5	0.0	18.4
Control Delay (s)	5.4	0.0	22.0
Lane LOS	A		C
Approach Delay (s)	5.4	0.0	22.0
Approach LOS			C

Intersection Summary	
Average Delay	3.5
Intersection Capacity Utilization	69.8%
Analysis Period (min)	15
	ICU Level of Service C

Lanes, Volumes, Timings
13: GO Bus Terminal/Argus Rd & Cross Ave

BG 2038 PM.syn
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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	37	1184	21	48	562	161	20	3	61	462	26	78
Future Volume (vph)	37	1184	21	48	562	161	20	3	61	462	26	78
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6
Storage Length (m)	20.0	0.0	20.0	0.0	0.0	0.0	0.0	15.0	0.0	0.0	0.0	0.0
Storage Lanes	1	0	1	0	1	0	1	0	1	0	1	0
Taper Length (m)	7.5		7.5		7.5		7.5		7.5		7.5	
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	1.00			0.99	0.97	0.99	0.97	0.98	0.98		
Frt	0.997			0.967			0.857		0.887			
Flt Protected	0.950			0.950			0.950		0.950			
Satd. Flow (prot)	1570	3182	0	797	3116	0	785	708	0	1570	1192	0
Flt Permitted	0.354			0.091			0.680		0.712			
Satd. Flow (perm)	582	3182	0	76	3116	0	555	708	0	1152	1192	0
Right Turn on Red			Yes		Yes			Yes				Yes
Satd. Flow (RTOR)		3		75			66		85			
Link Speed (k/h)		50		50			50		50			
Link Distance (m)		164.3		72.9			81.9		115.7			
Travel Time (s)		11.8		5.2			5.9		8.3			
Confl. Peds. (#/hr)	9		4	4		9	12		20	20		12
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
Heavy Vehicles (%)	0%	0%	100%	97%	0%	0%	100%	100%	100%	0%	100%	0%
Adj. Flow (vph)	40	1287	23	52	611	175	22	3	66	502	28	85
Shared Lane Traffic (%)												
Lane Group Flow (vph)	40	1310	0	52	786	0	22	69	0	502	113	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.3			3.3			3.3			3.3	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.19	1.14	1.14	1.19	1.14	1.14	1.19	1.14	1.14	1.19	1.14	1.14
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

Lanes, Volumes, Timings
13: GO Bus Terminal/Argus Rd & Cross Ave

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6		8		8		4	
Permitted Phases		2		6			8		8		4	
Detector Phases	2	2		1	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	22.0	22.0		8.0	22.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	45.0	45.0		12.5	29.0		29.0	29.0		29.0	29.0	
Total Split (s)	46.5	46.5		12.5	59.0		31.0	31.0		31.0	31.0	
Total Split (%)	51.7%	51.7%		13.9%	65.6%		34.4%	34.4%		34.4%	34.4%	
Maximum Green (s)	40.5	40.5		8.5	53.0		25.0	25.0		25.0	25.0	
Yellow Time (s)	4.0	4.0		3.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		1.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0		0.0	-2.0		-2.0	-2.0		-2.0	-2.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Vehicle Extension (s)	5.0	5.0		2.5	5.0		4.0	4.0		4.0	4.0	
Recall Mode	Min	Min		Min	Min		Min	Min		Min	Min	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	16.0	16.0		16.0	16.0		16.0	16.0		16.0	16.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	42.1	42.1		54.3	54.3		27.0	27.0		27.0	27.0	
Actuated g/C Ratio	0.47	0.47		0.61	0.61		0.30	0.30		0.30	0.30	
v/c Ratio	0.15	0.87		0.46	0.41		0.13	0.27		1.44	0.27	
Control Delay	15.2	29.2		25.1	8.9		25.6	9.8		243.0	10.3	
Queue Delay	0.0	1.4		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	15.2	30.6		25.1	8.9		25.6	9.8		243.0	10.3	
LOS	B	C		C	A		C	A		F	B	
Approach Delay		30.1			9.9			13.6			200.3	
Approach LOS		C			A			B			F	
Queue Length 50th (m)	3.9	106.6		3.6	31.5		2.9	0.4		~124.8	3.6	
Queue Length 95th (m)	10.5	#143.5		13.2	43.2		9.2	10.6		#187.1	16.5	
Internal Link Dist (m)		140.3			48.9			57.9			91.7	
Turn Bay Length (m)	20.0			20.0						15.0		
Base Capacity (vph)	276	1515		114	1947		167	259		348	419	
Starvation Cap Reductn	0	79		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	0.14	0.91		0.46	0.40		0.13	0.27		1.44	0.27	
Intersection Summary												
Area Type:	CBD											
Cycle Length:	90											
Actuated Cycle Length:	89.3											
Natural Cycle:	100											
Control Type:	Semi Act-Uncoord											
Maximum v/c Ratio:	1.44											
Intersection Signal Delay:	59.9						Intersection LOS: E					

Lanes, Volumes, Timings
13: GO Bus Terminal/Argus Rd & Cross Ave

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Intersection Capacity Utilization 86.1% ICU Level of Service E
Analysis Period (min) 15
- Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 13: GO Bus Terminal/Argus Rd & Cross Ave



HCM Signalized Intersection Capacity Analysis
13: GO Bus Terminal/Argus Rd & Cross Ave

BG 2038 PM.syn
04-03-2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	37	1184	21	48	562	161	20	3	61	462	26	78
Future Volume (vph)	37	1184	21	48	562	161	20	3	61	462	26	78
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	0.99		1.00	0.97		1.00	0.98	
Flpb, ped/bikes	0.99	1.00		1.00	1.00		0.99	1.00		0.98	1.00	
Frt	1.00	1.00		1.00	0.97		1.00	0.86		1.00	0.89	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1561	3183		797	3115		776	708		1537	1192	
Flt Permitted	0.35	1.00		0.09	1.00		0.68	1.00		0.71	1.00	
Satd. Flow (perm)	582	3183		76	3115		555	708		1152	1192	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	40	1287	23	52	611	175	22	3	66	502	28	85
RTOR Reduction (vph)	0	2	0	0	29	0	0	46	0	0	59	0
Lane Group Flow (vph)	40	1308	0	52	757	0	22	23	0	502	54	0
Confl. Peds. (#/hr)	9		4	4		9	12		20	20		12
Heavy Vehicles (%)	0%	0%	100%	97%	0%	0%	100%	100%	100%	0%	100%	0%
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	40.1	40.1		52.3	52.3		25.0	25.0		25.0	25.0	
Effective Green, g (s)	42.1	42.1		52.3	54.3		27.0	27.0		27.0	27.0	
Actuated g/C Ratio	0.47	0.47		0.59	0.61		0.30	0.30		0.30	0.30	
Clearance Time (s)	6.0	6.0		4.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	5.0	5.0		2.5	5.0		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	274	1500		110	1894		167	214		348	360	
v/s Ratio Prot		c0.41		c0.04	0.24			0.03			0.05	
v/s Ratio Perm	0.07			0.23			0.04			c0.44		
v/c Ratio	0.15	0.87		0.47	0.40		0.13	0.11		1.44	0.15	
Uniform Delay, d1	13.4	21.2		14.4	9.1		22.6	22.5		31.1	22.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.5	6.4		2.3	0.3		0.5	0.3		214.8	0.3	
Delay (s)	13.9	27.6		16.8	9.4		23.1	22.8		245.9	23.0	
Level of Service	B	C		B	A		C	C		F	C	
Approach Delay (s)		27.2			9.8			22.9			205.0	
Approach LOS		C			A			C			F	
Intersection Summary												
HCM 2000 Control Delay				59.8			HCM 2000 Level of Service				E	
HCM 2000 Volume to Capacity ratio				1.03								
Actuated Cycle Length (s)				89.3			Sum of lost time (s)			12.0		
Intersection Capacity Utilization				86.1%			ICU Level of Service			E		
Analysis Period (min)				15								
c Critical Lane Group												

Lanes, Volumes, Timings
14: Lyons Lane/Street A & Cross Ave

BG 2038 PM.syn
04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	62	233	17	19	421	26	308	6	208	42	3	123
Future Volume (vph)	62	233	17	19	421	26	308	6	208	42	3	123
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6
Storage Length (m)	0.0	0.0	25.0		0.0	20.0		0.0	0.0			0.0
Storage Lanes	1	0	1		0	1		0	1			0
Taper Length (m)	7.5		7.5		7.5		7.5		7.5			7.5
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00	1.00		1.00	1.00		1.00	0.98		1.00	0.99	
Frt	0.990			0.991			0.855			0.853		
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1525	2913	0	1570	3070	0	1570	1438	0	1570	1412	0
Flt Permitted	0.475			0.520			0.654			0.524		
Satd. Flow (perm)	760	2913	0	858	3070	0	1080	1438	0	863	1412	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		10			11			226			134	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		40.1			209.8			69.1			70.9	
Travel Time (s)		2.9			15.1			5.0			5.1	
Confl. Peds. (#/hr)	3		1	1		3	1		4	4		1
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
Heavy Vehicles (%)	3%	11%	0%	0%	5%	0%	0%	0%	0%	0%	0%	2%
Adj. Flow (vph)	67	253	18	21	458	28	335	7	226	46	3	134
Shared Lane Traffic (%)												
Lane Group Flow (vph)	67	271	0	21	486	0	335	233	0	46	137	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.3			3.3			3.3			3.3	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.19	1.14	1.14	1.19	1.14	1.14	1.19	1.14	1.14	1.19	1.14	1.14
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

Lanes, Volumes, Timings
14: Lyons Lane/Street A & Cross Ave

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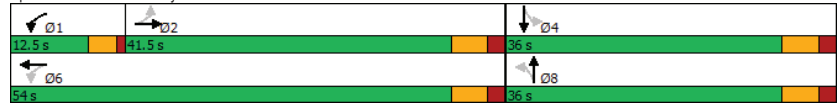
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6		8		8		4	
Permitted Phases		2		6			8		8		4	
Detector Phases	2	2		1	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	35.0	35.0		8.0	35.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	41.0	41.0		12.5	41.0		28.0	28.0		28.0	28.0	
Total Split (s)	41.5	41.5		12.5	54.0		36.0	36.0		36.0	36.0	
Total Split (%)	46.1%	46.1%		13.9%	60.0%		40.0%	40.0%		40.0%	40.0%	
Maximum Green (s)	35.5	35.5		8.5	48.0		30.0	30.0		30.0	30.0	
Yellow Time (s)	4.0	4.0		3.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		1.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0		0.0	-2.0		-2.0	-2.0		-2.0	-2.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Vehicle Extension (s)	5.0	5.0		2.5	5.0		4.0	4.0		4.0	4.0	
Recall Mode	Min	Min		Min	Min		Min	Min		Min	Min	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	15.0	15.0		15.0	15.0		15.0	15.0		15.0	15.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	37.0	37.0		49.0	49.0		30.6	30.6		30.6	30.6	
Actuated g/C Ratio	0.42	0.42		0.56	0.56		0.35	0.35		0.35	0.35	
v/c Ratio	0.21	0.22		0.04	0.28		0.89	0.36		0.15	0.24	
Control Delay	19.0	16.4		9.4	10.6		54.3	4.9		21.0	5.0	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	19.0	16.4		9.4	10.6		54.3	4.9		21.0	5.0	
LOS	B	B		A	B		D	A		C	A	
Approach Delay		16.9			10.6			34.1			9.1	
Approach LOS		B			B			C			A	
Queue Length 50th (m)	7.5	15.4		1.6	22.3		55.1	0.8		5.5	0.3	
Queue Length 95th (m)	17.3	24.2		4.9	31.8		#105.4	15.9		13.6	12.1	
Internal Link Dist (m)		16.1			185.8			45.1			46.9	
Turn Bay Length (m)				25.0			20.0					
Base Capacity (vph)	325	1253		549	1757		394	668		315	601	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.21	0.22		0.04	0.28		0.85	0.35		0.15	0.23	
Intersection Summary												
Area Type:	CBD											
Cycle Length:	90											
Actuated Cycle Length:	87.6											
Natural Cycle:	85											
Control Type:	Semi Act-Uncoord											
Maximum v/c Ratio:	0.89											
Intersection Signal Delay:	20.1						Intersection LOS: C					

Lanes, Volumes, Timings
14: Lyons Lane/Street A & Cross Ave

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Intersection Capacity Utilization 95.3%
ICU Level of Service F
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 14: Lyons Lane/Street A & Cross Ave



HCM Signalized Intersection Capacity Analysis
14: Lyons Lane/Street A & Cross Ave

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	62	233	17	19	421	26	308	6	208	42	3	123
Future Volume (vph)	62	233	17	19	421	26	308	6	208	42	3	123
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.98		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	0.99		1.00	0.85		1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1520	2913		1569	3071		1569	1438		1565	1413	
Flt Permitted	0.48	1.00		0.52	1.00		0.65	1.00		0.52	1.00	
Satd. Flow (perm)	760	2913		858	3071		1080	1438		863	1413	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	67	253	18	21	458	28	335	7	226	46	3	134
RTOR Reduction (vph)	0	6	0	0	5	0	0	147	0	0	87	0
Lane Group Flow (vph)	67	265	0	21	481	0	335	86	0	46	50	0
Confl. Peds. (#/hr)	3		1	1		3	1		4	4		1
Heavy Vehicles (%)	3%	11%	0%	0%	5%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	35.0	35.0		47.0	47.0		28.6	28.6		28.6	28.6	
Effective Green, g (s)	37.0	37.0		47.0	49.0		30.6	30.6		30.6	30.6	
Actuated g/C Ratio	0.42	0.42		0.54	0.56		0.35	0.35		0.35	0.35	
Clearance Time (s)	6.0	6.0		4.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	5.0	5.0		2.5	5.0		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	321	1230		525	1717		377	502		301	493	
v/s Ratio Prot		0.09		0.00	c0.16			0.06			0.04	
v/s Ratio Perm	0.09			0.02			c0.31			0.05		
v/c Ratio	0.21	0.22		0.04	0.28		0.89	0.17		0.15	0.10	
Uniform Delay, d1	16.0	16.1		9.6	10.1		26.9	19.7		19.6	19.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.7	0.2		0.0	0.2		22.0	0.2		0.3	0.1	
Delay (s)	16.7	16.3		9.7	10.3		48.9	19.9		19.9	19.3	
Level of Service	B	B		A	B		D	B		B	B	
Approach Delay (s)		16.4			10.2			37.0			19.5	
Approach LOS		B			B			D			B	

Intersection Summary			
HCM 2000 Control Delay	22.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	87.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	95.3%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
16: Speers Road/Cornwall Road & Cross Avenue

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Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↕↕	↕↕		↕	↕↕
Traffic Volume (vph)	340	905	995	42	11	551
Future Volume (vph)	340	905	995	42	11	551
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	75.0			0.0	55.0	0.0
Storage Lanes	1			0	1	2
Taper Length (m)	7.5				7.5	
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	0.88
Frt			0.994			0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1770	3539	3518	0	1770	2787
Flt Permitted	0.128				0.950	
Satd. Flow (perm)	238	3539	3518	0	1770	2787
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)			5			599
Link Speed (k/h)	50	50			50	
Link Distance (m)	189.7	274.5			184.2	
Travel Time (s)	13.7	19.8			13.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	370	984	1082	46	12	599
Shared Lane Traffic (%)						
Lane Group Flow (vph)	370	984	1128	0	12	599
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.6	3.6		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25			15	25	15
Number of Detectors	1	2	2		1	1
Detector Template	Left	Thru	Thru		Left	Right
Leading Detector (m)	2.0	10.0	10.0		2.0	2.0
Trailing Detector (m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Size(m)	2.0	0.6	0.6		2.0	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0		0.0	0.0
Detector 2 Position(m)		9.4	9.4			
Detector 2 Size(m)		0.6	0.6			
Detector 2 Type		Cl+Ex	Cl+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type	pm+pt	NA	NA		pm+pt	Perm
Protected Phases	5	2	6		7	
Permitted Phases	2				4	4

Lanes, Volumes, Timings
16: Speers Road/Cornwall Road & Cross Avenue

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Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Detector Phase	5	2	6		7	4
Switch Phase						
Minimum Initial (s)	6.0	5.0	5.0		5.0	5.0
Minimum Split (s)	12.0	33.5	33.5		27.5	27.5
Total Split (s)	22.0	62.0	40.0		28.0	28.0
Total Split (%)	24.4%	68.9%	44.4%		31.1%	31.1%
Maximum Green (s)	16.0	56.0	34.0		22.0	22.0
Yellow Time (s)	4.0	4.0	4.0		4.0	4.0
All-Red Time (s)	2.0	2.0	2.0		2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0		6.0	6.0
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?	Yes		Yes			
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	None	Max	Max		None	None
Walk Time (s)		18.0	18.0		12.0	12.0
Flash Dont Walk (s)		7.0	7.0		7.0	7.0
Pedestrian Calls (#/hr)		0	0		0	0
Act Effct Green (s)	56.1	56.1	34.7		7.4	7.4
Actuated g/C Ratio	0.74	0.74	0.46		0.10	0.10
v/c Ratio	0.76	0.37	0.70		0.07	0.74
Control Delay	25.0	4.2	19.6		30.9	9.0
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	25.0	4.2	19.6		30.9	9.0
LOS	C	A	B		C	A
Approach Delay		9.9	19.6		9.5	
Approach LOS		A	B		A	
Queue Length 50th (m)	27.2	18.9	65.5		1.7	0.0
Queue Length 95th (m)	#77.7	39.1	103.0		6.4	15.2
Internal Link Dist (m)		165.7	250.5		160.2	
Turn Bay Length (m)	75.0				55.0	
Base Capacity (vph)	501	2627	1620		516	1236
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	0.74	0.37	0.70		0.02	0.48

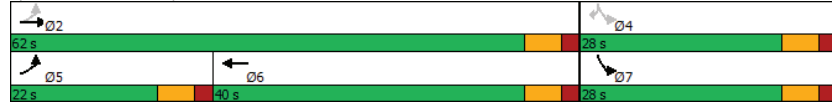
Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 75.5
 Natural Cycle: 90
 Control Type: Semi Act-Uncoord
 Maximum v/c Ratio: 0.76
 Intersection Signal Delay: 13.4
 Intersection Capacity Utilization 66.8%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service C
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Lanes, Volumes, Timings
16: Speers Road/Cornwall Road & Cross Avenue

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Splits and Phases: 16: Speers Road/Cornwall Road & Cross Avenue





HCM Signalized Intersection Capacity Analysis
16: Speers Road/Cornwall Road & Cross Avenue

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04-03-2024

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↔↔	↔↔		↔	↔↔
Traffic Volume (vph)	340	905	995	42	11	551
Future Volume (vph)	340	905	995	42	11	551
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0		6.0	6.0
Lane Util. Factor	1.00	0.95	0.95		1.00	0.88
Frt	1.00	1.00	0.99		1.00	0.85
Fit Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	3539	3518		1770	2787
Fit Permitted	0.13	1.00	1.00		0.95	1.00
Satd. Flow (perm)	239	3539	3518		1770	2787
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	370	984	1082	46	12	599
RTOR Reduction (vph)	0	0	3	0	0	540
Lane Group Flow (vph)	370	984	1125	0	12	59
Turn Type	pm+pt	NA	NA		pm+pt	Perm
Protected Phases	5	2	6		7	
Permitted Phases	2				4	4
Actuated Green, G (s)	56.1	56.1	34.8		7.4	7.4
Effective Green, g (s)	56.1	56.1	34.8		7.4	7.4
Actuated g/C Ratio	0.74	0.74	0.46		0.10	0.10
Clearance Time (s)	6.0	6.0	6.0		6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	487	2629	1621		173	273
v/s Ratio Prot	c0.15	0.28	0.32		0.01	
v/s Ratio Perm	c0.41					c0.02
v/c Ratio	0.76	0.37	0.69		0.07	0.22
Uniform Delay, d1	15.6	3.5	16.1		30.9	31.4
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	6.7	0.4	2.5		0.2	0.4
Delay (s)	22.3	3.9	18.6		31.1	31.8
Level of Service	C	A	B		C	C
Approach Delay (s)		8.9	18.6		31.8	
Approach LOS		A	B		C	
Intersection Summary						
HCM 2000 Control Delay		17.0		HCM 2000 Level of Service		B
HCM 2000 Volume to Capacity ratio		0.73				
Actuated Cycle Length (s)		75.5		Sum of lost time (s)		18.0
Intersection Capacity Utilization		66.8%		ICU Level of Service		C
Analysis Period (min)		15				
c Critical Lane Group						

Lanes, Volumes, Timings
19: Street C & South Service Road

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Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	22	28	41	68	19	39
Future Volume (vph)	22	28	41	68	19	39
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.925			0.910		
Flt Protected				0.981	0.984	
Satd. Flow (prot)	1723	0	0	1827	1668	0
Flt Permitted				0.981	0.984	
Satd. Flow (perm)	1723	0	0	1827	1668	0
Link Speed (k/h)	50		50		50	
Link Distance (m)	110.2		306.3		76.4	
Travel Time (s)	7.9		22.1		5.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	24	30	45	74	21	42
Shared Lane Traffic (%)						
Lane Group Flow (vph)	54	0	0	119	63	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0		0.0		3.6	
Link Offset(m)	0.0		0.0		0.0	
Crosswalk Width(m)	4.8		4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	15		25		15	
Sign Control	Free		Free		Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	22.6%
ICU Level of Service A	
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis
19: Street C & South Service Road



BG 2038 PM.syn
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Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	22	28	41	68	19	39
Future Volume (Veh/h)	22	28	41	68	19	39
Sign Control	Free			Free Stop		
Grade	0%					
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	24	30	45	74	21	42
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			54			203 39
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			54			203 39
tC, single (s)			4.1			6.4 6.2
tC, 2 stage (s)						
tF (s)			2.2			3.5 3.3
p0 queue free %			97			97 96
cM capacity (veh/h)			1551			763 1033
Direction, Lane #						
	EB 1	WB 1	NB 1			
Volume Total	54	119	63			
Volume Left	0	45	21			
Volume Right	30	0	42			
eSH	1700	1551	924			
Volume to Capacity	0.03	0.03	0.07			
Queue Length 95th (m)	0.0	0.7	1.8			
Control Delay (s)	0.0	2.9	9.2			
Lane LOS	A			A		
Approach Delay (s)	0.0	2.9	9.2			
Approach LOS	A			A		

Intersection Summary						
Average Delay			3.9			
Intersection Capacity Utilization			22.6%	ICU Level of Service	A	
Analysis Period (min)			15			

Lanes, Volumes, Timings
20: Street A & South Service Road

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Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	50	4	17	70	10	0
Future Volume (vph)	50	4	17	70	10	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.991					
Fit Protected			0.991		0.950	
Satd. Flow (prot)	1846		0		0	
Fit Permitted			0.991		0.950	
Satd. Flow (perm)	1846		0		0	
Link Speed (k/h)	50		50		50	
Link Distance (m)	255.1		154.2		119.8	
Travel Time (s)	18.4		11.1		8.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	54	4	18	76	11	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	58	0	0	94	11	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0		0.0		3.6	
Link Offset(m)	0.0		0.0		0.0	
Crosswalk Width(m)	4.8		4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	15		25		15	
Sign Control	Free		Free		Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	21.3%
Analysis Period (min)	15
	ICU Level of Service A

HCM Unsignalized Intersection Capacity Analysis
20: Street A & South Service Road

BG 2038 PM.syn
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Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	50	4	17	70	10	0
Future Volume (Veh/h)	50	4	17	70	10	0
Sign Control	Free		Free		Stop	
Grade	0%					
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	54	4	18	76	11	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			58		168	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			58		168	
tC, single (s)			4.1		6.4	
tC, 2 stage (s)						
tF (s)			2.2		3.5	
p0 queue free %			99		99	
cM capacity (veh/h)			1546		813	
			1011		1011	

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	58	94	11
Volume Left	0	18	11
Volume Right	4	0	0
eSH	1700	1546	813
Volume to Capacity	0.03	0.01	0.01
Queue Length 95th (m)	0.0	0.3	0.3
Control Delay (s)	0.0	1.5	9.5
Lane LOS	A		
Approach Delay (s)	0.0	1.5	9.5
Approach LOS	A		

Intersection Summary

Average Delay	1.5	
Intersection Capacity Utilization	21.3%	ICU Level of Service A
Analysis Period (min)	15	

Lanes, Volumes, Timings
21: Argus Rd & Street 1

BG 2038 PM.syn
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Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	0	201	436	267
Future Volume (vph)	0	0	0	201	436	267
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Fr	0.949					
Fit Protected						
Satd. Flow (prot)	1863	0	0	1863	1768	0
Fit Permitted						
Satd. Flow (perm)	1863	0	0	1863	1768	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	165.4			115.7	65.0	
Travel Time (s)	11.9			8.3	4.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	218	474	290
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	218	764	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			3.3	3.3	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	42.6%
Analysis Period (min)	15
	ICU Level of Service A

HCM Unsignalized Intersection Capacity Analysis
21: Argus Rd & Street 1

BG 2038 PM.syn
04-03-2024

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	0	201	436	267
Future Volume (Veh/h)	0	0	0	201	436	267
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	0	218	474	290
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None	None		
Median storage (veh)						
Upstream signal (m)	116					
pX, platoon unblocked						
vC, conflicting volume	837	619	764			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	837	619	764			
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)	337	489	849			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	0	218	764
Volume Left	0	0	0
Volume Right	0	0	290
eSH	1700	849	1700
Volume to Capacity	0.00	0.00	0.45
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	42.6%
Analysis Period (min)	15
	ICU Level of Service A

Lanes, Volumes, Timings
22: Street C & Street 1

BG 2038 PM.syn
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	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	0	131	33	113	154	0	83	58	0	0	69	0
Future Volume (vph)	0	131	33	113	154	0	83	58	0	0	69	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr	0.973											
Flt Protected					0.979				0.971			
Satd. Flow (prot)	0	1812	0	0	1824	0	0	1809	0	0	1863	0
Flt Permitted	0.979											
Satd. Flow (perm)	0	1812	0	0	1824	0	0	1809	0	0	1863	0
Link Speed (k/h)	50			50			50			50		
Link Distance (m)	41.9			165.4			132.8			87.9		
Travel Time (s)	3.0			11.9			9.6			6.3		
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
Adj. Flow (vph)	0	142	36	123	167	0	90	63	0	0	75	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	178	0	0	290	0	0	153	0	0	75	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Right	Left	Left	Right	Right
Median Width(m)	0.0			0.0			3.6			3.6		
Link Offset(m)	0.0			0.0			0.0			0.0		
Crosswalk Width(m)	4.8			4.8			4.8			4.8		
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control	Stop				Stop		Free				Free	

Intersection Summary

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

HCM Unsignalized Intersection Capacity Analysis
22: Street C & Street 1

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	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (veh/h)	0	131	33	113	154	0	83	58	0	0	69	0
Future Volume (Veh/h)	0	131	33	113	154	0	83	58	0	0	69	0
Sign Control	Stop			Stop			Free			Free		
Grade	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)	0	142	36	123	167	0	90	63	0	0	75	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)	133											
pX, platoon unblocked												
vC, conflicting volume	402	318	75	425	318	63	75				63	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	402	318	75	425	318	63	75				63	
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	75	96	69	70	100	94				100	
cM capacity (veh/h)	412	563	986	401	563	1002	1524				1540	
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	178	290	153	75								
Volume Left	0	123	90	0								
Volume Right	36	0	0	0								
eSH	617	480	1524	1540								
Volume to Capacity	0.29	0.60	0.06	0.00								
Queue Length 95th (m)	9.5	31.4	1.5	0.0								
Control Delay (s)	13.2	23.3	4.6	0.0								
Lane LOS	B	C	A									
Approach Delay (s)	13.2	23.3	4.6	0.0								
Approach LOS	B	C										

Intersection Summary

Average Delay	14.1
Intersection Capacity Utilization	47.6%
ICU Level of Service A	
Analysis Period (min)	15

Lanes, Volumes, Timings
23: GO Station West Access/Street C & Cross Ave

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔			↔	↔		↔	↔	
Traffic Volume (vph)	38	598	58	206	351	103	99	0	491	95	113	7
Future Volume (vph)	38	598	58	206	351	103	99	0	491	95	113	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.0	0.0	0.0
Storage Lanes	0	0	0	0	0	0	1	0	1	0	0	0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.987			0.977			0.850			0.991		
Flt Protected	0.997			0.985			0.950			0.950		
Satd. Flow (prot)	0	3483	0	0	3406	0	1770	1583	0	1770	1846	0
Flt Permitted	0.877			0.603			0.673			0.303		
Satd. Flow (perm)	0	3064	0	0	2085	0	1254	1583	0	564	1846	0
Right Turn on Red		Yes		Yes			Yes			Yes		Yes
Satd. Flow (RTOR)		23		51			110			8		
Link Speed (k/h)	50			50			50			50		
Link Distance (m)	209.8			164.3			55.1			132.8		
Travel Time (s)	15.1			11.8			4.0			9.6		
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
Adj. Flow (vph)	41	650	63	224	382	112	108	0	534	103	123	8
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	754	0	0	718	0	108	534	0	103	131	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)	3.3			3.3			3.6			3.6		
Link Offset(m)	0.0			0.0			0.0			0.0		
Crosswalk Width(m)	4.8			4.8			4.8			4.8		
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		

Lanes, Volumes, Timings
23: GO Station West Access/Street C & Cross Ave

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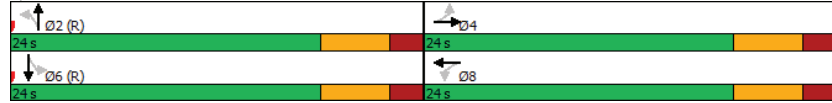
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	24.0	24.0		24.0	24.0		24.0	24.0		24.0	24.0	
Total Split (s)	24.0	24.0		24.0	24.0		24.0	24.0		24.0	24.0	
Total Split (%)	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%		50.0%	50.0%	
Maximum Green (s)	18.0	18.0		18.0	18.0		18.0	18.0		18.0	18.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		6.0			6.0			6.0			6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		17.5			17.5			18.5			18.5	
Actuated g/C Ratio		0.36			0.36			0.39			0.39	
v/c Ratio		0.67			0.91			0.22			0.79	
Control Delay		15.7			32.1			11.9			22.0	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		15.7			32.1			11.9			22.0	
Median LOS		B			C			B			C	
Approach Delay		15.7			32.1			20.3			15.0	
Approach LOS		B			C			C			B	
Queue Length 50th (m)		27.0			28.0			6.3			32.0	
Queue Length 95th (m)		42.4			#59.1			15.1			#81.0	
Internal Link Dist (m)		185.8			140.3			31.1			108.8	
Turn Bay Length (m)											15.0	
Base Capacity (vph)		1163			813			483			677	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.65			0.88			0.22			0.79	
Intersection Summary												
Area Type:	Other											
Cycle Length:	48											
Actuated Cycle Length:	48											
Offset:	0 (0%), Referenced to phase 2:NBL and 6:SBTL, Start of Green											
Natural Cycle:	55											
Control Type:	Actuated-Coordinated											
Maximum v/c Ratio:	0.91											
Intersection Signal Delay:	21.9						Intersection LOS: C					
Intersection Capacity Utilization:	94.1%						ICU Level of Service F					
Analysis Period (min):	15											
# 95th percentile volume exceeds capacity, queue may be longer.												

Lanes, Volumes, Timings
23: GO Station West Access/Street C & Cross Ave

BG 2038 PM.syn
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Queue shown is maximum after two cycles.

Splits and Phases: 23: GO Station West Access/Street C & Cross Ave



HCM Signalized Intersection Capacity Analysis
23: GO Station West Access/Street C & Cross Ave

BG 2038 PM.syn
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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔		↔	↔		↔	↔	
Traffic Volume (vph)	38	598	58	206	351	103	99	0	491	95	113	7
Future Volume (vph)	38	598	58	206	351	103	99	0	491	95	113	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0			6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor		0.95			0.95		1.00	1.00		1.00	1.00	
Frt		0.99			0.98		1.00	0.85		1.00	0.99	
Fit Protected		1.00			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		3485			3403		1770	1583		1770	1846	
Fit Permitted		0.88			0.60		0.67	1.00		0.30	1.00	
Satd. Flow (perm)		3064			2083		1254	1583		565	1846	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	41	650	63	224	382	112	108	0	534	103	123	8
RTOR Reduction (vph)	0	15	0	0	32	0	0	68	0	0	5	0
Lane Group Flow (vph)	0	739	0	0	686	0	108	466	0	103	126	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		17.5			17.5		18.5	18.5		18.5	18.5	
Effective Green, g (s)		17.5			17.5		18.5	18.5		18.5	18.5	
Actuated g/C Ratio		0.36			0.36		0.39	0.39		0.39	0.39	
Clearance Time (s)		6.0			6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		1117			759		483	610		217	711	
v/s Ratio Prot								c0.29			0.07	
v/s Ratio Perm		0.24			c0.33		0.09			0.18		
v/c Ratio		0.66			0.90		0.22	0.76		0.47	0.18	
Uniform Delay, d1		12.8			14.4		9.9	12.9		11.1	9.7	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		1.5			14.1		1.1	8.8		7.3	0.5	
Delay (s)		14.3			28.5		11.0	21.7		18.4	10.3	
Level of Service		B			C		B	C		B	B	
Approach Delay (s)		14.3			28.5			19.9			13.8	
Approach LOS		B			C			B			B	

Intersection Summary

HCM 2000 Control Delay		20.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio		0.83		
Actuated Cycle Length (s)		48.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	94.1%		ICU Level of Service	F
Analysis Period (min)		15		

c Critical Lane Group

Lanes, Volumes, Timings

1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd

BG 2043 AM.syn

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	45	140	386	800	100	230	188	1709	919	214	1992	61
Future Volume (vph)	45	140	386	800	100	230	188	1709	919	214	1992	61
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0		0.0	165.0		25.0	145.0		0.0	95.0		90.0
Storage Lanes	1		1	1		1	1		1	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Ped Bike Factor	0.99					0.98			0.99			
Frt			0.850						0.850			0.850
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1624	1693	1425	3060	1676	1398	1425	4446	1398	1562	4532	1398
Fit Permitted	0.687			0.366			0.090			0.083		
Satd. Flow (perm)	1164	1693	1425	1179	1676	1366	135	4446	1377	136	4532	1398
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			218			219			484			155
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		285.9			293.8			275.1			252.7	
Travel Time (s)		20.6			21.2			19.8			18.2	
Confl. Peds. (#/hr)	11					11			10	10		
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
Heavy Vehicles (%)	0%	1%	2%	3%	2%	4%	14%	5%	4%	4%	3%	4%
Adj. Flow (vph)	49	152	420	870	109	250	204	1858	999	233	2165	66
Shared Lane Traffic (%)												
Lane Group Flow (vph)	49	152	420	870	109	250	204	1858	999	233	2165	66
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		7.2			7.2			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings

1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd

BG 2043 AM.syn

04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA	Free	pm+pt	NA	Perm	pm+pt	NA	Free	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		Free	8		8	2		Free	6		6
Detector Phase	7	4		3	8	8	5	2		1	6	6
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0	10.0	6.0	15.0		6.0	15.0	15.0
Minimum Split (s)	10.0	34.0		11.0	43.0	43.0	10.0	34.0		10.0	34.0	34.0
Total Split (s)	10.0	34.0		19.0	43.0	43.0	11.0	52.0		15.0	56.0	56.0
Total Split (%)	8.3%	28.3%		15.8%	35.8%	35.8%	9.2%	43.3%		12.5%	46.7%	46.7%
Maximum Green (s)	6.0	27.0		14.0	36.0	36.0	7.0	45.0		11.0	49.0	49.0
Yellow Time (s)	3.0	4.0		3.0	4.0	4.0	3.0	4.0		3.0	4.0	4.0
All-Red Time (s)	1.0	3.0		2.0	3.0	3.0	1.0	3.0		1.0	3.0	3.0
Lost Time Adjust (s)	0.0	-3.0		0.0	-3.0	-3.0	0.0	-3.0		0.0	-3.0	-3.0
Total Lost Time (s)	4.0	4.0		5.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	4.0		3.0	4.0	4.0	3.0	5.0		3.0	5.0	5.0
Recall Mode	None	None		None	None	None	None	C-Max		None	C-Max	C-Max
Walk Time (s)					7.0	7.0		7.0			7.0	7.0
Flash Dont Walk (s)					29.0	29.0		20.0			20.0	20.0
Pedestrian Calls (#/hr)					0	0		0			0	0
Act Effct Green (s)	26.0	20.0	120.0	38.0	31.0	31.0	65.0	48.0	120.0	73.0	52.0	52.0
Actuated g/C Ratio	0.22	0.17	1.00	0.32	0.26	0.26	0.54	0.40	1.00	0.61	0.43	0.43
v/c Ratio	0.18	0.54	0.29	1.47	0.25	0.49	0.80	1.04	0.73	0.70	1.10	0.10
Control Delay	28.8	52.3	0.5	250.6	36.8	10.2	53.4	69.7	3.4	39.8	87.7	0.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.8	52.3	0.5	250.6	36.8	10.2	53.4	69.7	3.4	39.8	87.7	0.3
LOS	C	D	A	F	D	B	D	E	A	D	F	A
Approach Delay		15.4			182.7			47.0			80.8	
Approach LOS		B			F			D			F	
Queue Length 50th (m)	8.4	34.9	0.0	~152.5	22.0	6.0	34.6	~183.0	0.0	38.2	~223.5	0.0
Queue Length 95th (m)	16.5	53.9	0.0	#185.1	36.1	27.8	#93.7	#213.8	0.0	#91.7	#253.9	0.0
Internal Link Dist (m)		261.9			269.8			251.1			228.7	
Turn Bay Length (m)	60.0			165.0		25.0	145.0			95.0		90.0
Base Capacity (vph)	274	423	1425	592	544	591	256	1778	1377	332	1963	693
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.18	0.36	0.29	1.47	0.20	0.42	0.80	1.04	0.73	0.70	1.10	0.10

Intersection Summary

Area Type: CBD
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 33.6 (28%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
 Natural Cycle: 150
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.47
 Intersection Signal Delay: 78.2 Intersection LOS: E

Lanes, Volumes, Timings
1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd

BG 2043 AM.syn
04-03-2024

Intersection Capacity Utilization 102.2% ICU Level of Service G
Analysis Period (min) 15
- Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd



HCM Signalized Intersection Capacity Analysis
1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd

BG 2043 AM.syn
04-03-2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↑	↗	↖	↑	↗	↖	↖	↗	↖	↗	↖
Traffic Volume (vph)	45	140	386	800	100	230	188	1709	919	214	1992	61
Future Volume (vph)	45	140	386	800	100	230	188	1709	919	214	1992	61
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	1.0	5.0	4.0	4.0	4.0	4.0	1.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.98	1.00	1.00	0.99	1.00	1.00	1.00
Flpb, ped/bikes	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1614	1693	1425	3060	1676	1366	1425	4446	1377	1562	4532	1398
Flt Permitted	0.69	1.00	1.00	0.37	1.00	1.00	0.09	1.00	1.00	0.08	1.00	1.00
Satd. Flow (perm)	1167	1693	1425	1180	1676	1366	136	4446	1377	136	4532	1398
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	49	152	420	870	109	250	204	1858	999	233	2165	66
RTOR Reduction (vph)	0	0	0	0	0	162	0	0	0	0	0	38
Lane Group Flow (vph)	49	152	420	870	109	88	204	1858	999	233	2165	28
Confl. Peds. (#/hr)	11					11			10		10	
Heavy Vehicles (%)	0%	1%	2%	3%	2%	4%	14%	5%	4%	4%	3%	4%
Turn Type	pm+pt	NA	Free	pm+pt	NA	Perm	pm+pt	NA	Free	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		Free	8		8	2		Free	6		6
Actuated Green, G (s)	22.6	17.8	120.0	36.8	28.0	28.0	61.2	44.2	120.0	69.2	48.2	48.2
Effective Green, g (s)	22.6	20.8	120.0	36.8	31.0	31.0	61.2	47.2	120.0	69.2	51.2	51.2
Actuated g/C Ratio	0.19	0.17	1.00	0.31	0.26	0.26	0.51	0.39	1.00	0.58	0.43	0.43
Clearance Time (s)	4.0	7.0		5.0	7.0	7.0	4.0	7.0		4.0	7.0	7.0
Vehicle Extension (s)	3.0	4.0		3.0	4.0	4.0	3.0	5.0		3.0	5.0	5.0
Lane Grp Cap (vph)	237	293	1425	581	432	352	251	1748	1377	327	1933	596
v/s Ratio Prot	0.01	0.09		c0.17	0.07		0.11	0.42		0.12	c0.48	
v/s Ratio Perm	0.03		0.29	c0.28		0.06	0.30		c0.73	0.28		0.02
v/c Ratio	0.21	0.52	0.29	1.50	0.25	0.25	0.81	1.06	0.73	0.71	1.12	0.05
Uniform Delay, d1	40.8	45.1	0.0	39.2	35.3	35.3	33.1	36.4	0.0	32.1	34.4	20.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.4	2.1	0.5	232.8	0.4	0.5	17.9	40.5	3.4	7.2	61.6	0.1
Delay (s)	41.2	47.1	0.5	272.1	35.7	35.8	50.9	76.9	3.4	39.2	96.0	20.3
Level of Service	D	D	A	F	D	D	D	E	A	D	F	C
Approach Delay (s)		15.1			203.0			51.2			88.6	
Approach LOS		B			F			D			F	

Intersection Summary			
HCM 2000 Control Delay	86.0	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.23		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	102.2%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings

BG 2043 AM.syn

2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp

04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	3	0	198	587	37	297	0	2516	600	0	3284	7
Future Volume (vph)	3	0	198	587	37	297	0	2516	600	0	3284	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.5	3.3	3.6	3.5	3.6	3.6	3.6	3.6	3.6	3.5
Storage Length (m)	50.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Storage Lanes	1		1	1		1	0		1	0		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.91	1.00	1.00	0.86	0.86
Ped Bike Factor									0.98			1.00
Frt			0.850			0.850			0.850			
Flt Protected	0.950			0.950	0.958							
Satd. Flow (prot)	1570	0	1395	1421	1453	1356	0	4446	1384	0	5711	0
Flt Permitted	0.950			0.950	0.958							
Satd. Flow (perm)	1570	0	1395	1421	1453	1356	0	4446	1353	0	5711	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			31			269			184			
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		142.1			192.6			324.8			275.1	
Travel Time (s)		10.2			13.9			23.4			19.8	
Confl. Peds. (#/hr)							8		5	5		8
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
Heavy Vehicles (%)	0%	0%	3%	5%	23%	6%	0%	5%	5%	0%	3%	0%
Adj. Flow (vph)	3	0	215	638	40	323	0	2735	652	0	3570	8
Shared Lane Traffic (%)				47%								
Lane Group Flow (vph)	3	0	215	338	340	323	0	2735	652	0	3578	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.3			3.3			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.19	1.14	1.16	1.19	1.14	1.16	1.14	1.14	1.14	1.14	1.14	1.16
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1		1	1		1			1			2
Detector Template	Left		Right	Left	Thru	Right		Thru	Right		Thru	
Leading Detector (m)	2.0		2.0	2.0	10.0	2.0		10.0	2.0		10.0	
Trailing Detector (m)	0.0		0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Detector 1 Position(m)	0.0		0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Detector 1 Size(m)	2.0		2.0	2.0	0.6	2.0		0.6	2.0		0.6	
Detector 1 Type	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Detector 1 Delay (s)	0.0		0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Detector 2 Position(m)					9.4			9.4			9.4	
Detector 2 Size(m)					0.6			0.6			0.6	
Detector 2 Type					Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

Lanes, Volumes, Timings

BG 2043 AM.syn

2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp

04-03-2024

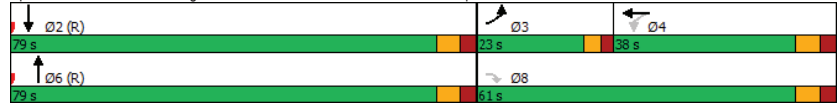
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)								0.0			0.0	0.0
Turn Type	Prot		Perm	Perm	NA	Free		NA	Free		NA	NA
Protected Phases	3				4			6			2	
Permitted Phases						Free			Free			
Detector Phase	3		8	4	4			6			2	
Switch Phase												
Minimum Initial (s)	7.0		10.0	10.0	10.0			5.0			28.0	
Minimum Split (s)	23.0		38.0	38.0	38.0			35.0			35.0	
Total Split (s)	23.0		61.0	38.0	38.0			79.0			79.0	
Total Split (%)	16.4%		43.6%	27.1%	27.1%			56.4%			56.4%	
Maximum Green (s)	18.0		54.0	31.0	31.0			72.0			72.0	
Yellow Time (s)	3.0		4.0	4.0	4.0			4.0			4.0	
All-Red Time (s)	2.0		3.0	3.0	3.0			3.0			3.0	
Lost Time Adjust (s)	-1.0		-3.0	-3.0	-3.0			-3.0			-3.0	
Total Lost Time (s)	4.0		4.0	4.0	4.0			4.0			4.0	
Lead/Lag	Lead				Lag			Lag				
Lead-Lag Optimize?	Yes				Yes			Yes			Yes	
Vehicle Extension (s)	3.0		3.0	3.0	3.0			4.5			4.5	
Recall Mode	Min		Min	Min	Min			C-Min			C-Min	
Walk Time (s)			7.0	7.0	7.0			7.0			7.0	
Flash Dont Walk (s)			24.0	24.0	24.0			21.0			21.0	
Pedestrian Calls (#/hr)			0	0	0			0			0	
Act Effct Green (s)	8.0		55.3	43.3	43.3	140.0		76.7	140.0		76.7	
Actuated g/C Ratio	0.06		0.40	0.31	0.31	1.00		0.55	1.00		0.55	
v/c Ratio	0.03		0.38	0.77	0.76	0.24		1.12	0.48		1.14	
Control Delay	63.3		27.3	56.5	55.3	0.4		87.2	0.1		100.0	
Queue Delay	0.0		0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Total Delay	63.3		27.3	56.5	55.3	0.4		87.2	0.1		100.0	
LOS	E		C	E	E	A		F	A		F	
Approach Delay		27.8			38.0			70.5			100.0	
Approach LOS		C			D			E			F	
Queue Length 50th (m)	0.9		36.7	92.3	92.4	0.0		~337.9	0.0		~360.0	
Queue Length 95th (m)	4.2		59.0	133.5	133.5	0.0		m#170.6	m0.0		#376.0	
Internal Link Dist (m)		118.1			168.6			300.8			251.1	
Turn Bay Length (m)	50.0											
Base Capacity (vph)	213		586	439	450	1356		2434	1353		3127	
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	0.01		0.37	0.77	0.76	0.24		1.12	0.48		1.14	
Intersection Summary												
Area Type:	CBD											
Cycle Length:	140											
Actuated Cycle Length:	140											
Offset:	115.4 (82%), Referenced to phase 2:SBT and 6:NBT, Start of Green											
Natural Cycle:	150											
Control Type:	Actuated-Coordinated											
Maximum v/c Ratio:	1.14											

Lanes, Volumes, Timings
2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp

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Intersection Signal Delay: 78.2 Intersection LOS: E
Intersection Capacity Utilization 95.8% ICU Level of Service F
Analysis Period (min) 15
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp



HCM Signalized Intersection Capacity Analysis
2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp

BG 2043 AM.syn
04-03-2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↘		↗	↘	↗	↘	↘	↗	↘	↘	↗	↘
Traffic Volume (vph)	3	0	198	587	37	297	0	2516	600	0	3284	7
Future Volume (vph)	3	0	198	587	37	297	0	2516	600	0	3284	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.5	3.3	3.6	3.5	3.6	3.6	3.6	3.6	3.6	3.5
Total Lost time (s)	4.0		4.0	4.0	4.0	1.0		4.0	4.0		4.0	
Lane Util. Factor	1.00		1.00	0.95	0.95	1.00		0.91	1.00		0.86	
Frpb, ped/bikes	1.00		1.00	1.00	1.00	1.00		1.00	0.98		1.00	
Flpb, ped/bikes	1.00		1.00	1.00	1.00	1.00		1.00	1.00		1.00	
Frt	1.00		0.85	1.00	1.00	0.85		1.00	0.85		1.00	
Flt Protected	0.95		1.00	0.95	0.96	1.00		1.00	1.00		1.00	
Flt Permitted	0.95		1.00	0.95	0.96	1.00		1.00	1.00		1.00	
Satd. Flow (perm)	1570		1395	1421	1452	1356		4446	1353		5709	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	3	0	215	638	40	323	0	2735	652	0	3570	8
RTOR Reduction (vph)	0	0	19	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	3	0	196	338	340	323	0	2735	652	0	3578	0
Confl. Peds. (#/hr)							8		5	5		8
Heavy Vehicles (%)	0%	0%	3%	5%	23%	6%	0%	5%	5%	0%	3%	0%
Turn Type	Prot		Perm	Perm	NA	Free		NA	Free		NA	
Protected Phases	3				4			6			2	
Permitted Phases			8	4		Free			Free			
Actuated Green, G (s)	7.0		52.3	40.3	40.3	140.0		73.7	140.0		73.7	
Effective Green, g (s)	8.0		55.3	43.3	43.3	140.0		76.7	140.0		76.7	
Actuated g/C Ratio	0.06		0.39	0.31	0.31	1.00		0.55	1.00		0.55	
Clearance Time (s)	5.0		7.0	7.0	7.0			7.0			7.0	
Vehicle Extension (s)	3.0		3.0	3.0	3.0			4.5			4.5	
Lane Grp Cap (vph)	89		551	439	449	1356		2435	1353		3127	
v/s Ratio Prot	0.00							0.62			c0.63	
v/s Ratio Perm			0.14	c0.24	0.23	0.24			c0.48			
v/c Ratio	0.03		0.36	0.77	0.76	0.24		1.12	0.48		1.14	
Uniform Delay, d1	62.3		29.8	43.8	43.6	0.0		31.6	0.0		31.6	
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	8.0	7.2	0.4		56.0	0.1		69.2	
Delay (s)	62.5		30.2	51.8	50.8	0.4		87.8	0.1		100.8	
Level of Service	E		C	D	D	A		F	A		F	
Approach Delay (s)		30.7			34.9			70.9			100.8	
Approach LOS		C			C			E			F	
Intersection Summary												
HCM 2000 Control Delay			78.5					HCM 2000 Level of Service			E	
HCM 2000 Volume to Capacity ratio			0.99									
Actuated Cycle Length (s)			140.0			Sum of lost time (s)			12.0			
Intersection Capacity Utilization			95.8%			ICU Level of Service			F			
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
3: Trafalgar Rd & QEW EB-Off Ramp

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Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔↔	↔		↕↕	↕↕	↔
Traffic Volume (vph)	1038	933	0	2107	2178	548
Future Volume (vph)	1038	933	0	2107	2178	548
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.5	3.6	3.6	3.6	3.6
Lane Util. Factor	0.97	1.00	1.00	0.91	0.91	1.00
Frt		0.850				0.850
Flt Protected	0.950					
Satd. Flow (prot)	2958	1423	0	4404	4489	1454
Flt Permitted	0.950					
Satd. Flow (perm)	2958	1423	0	4404	4489	1454
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)						194
Link Speed (k/h)	50			50	50	
Link Distance (m)	199.2			51.4	324.8	
Travel Time (s)	14.3			3.7	23.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	1%	0%	6%	4%	0%
Adj. Flow (vph)	1128	1014	0	2290	2367	596
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1128	1014	0	2290	2367	596
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	6.6			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.19	1.16	1.14	1.14	1.14	1.14
Turning Speed (k/h)	24	14	24			14
Number of Detectors	1	1		2	2	1
Detector Template	Left	Right		Thru	Thru	Right
Leading Detector (m)	2.0	2.0		10.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	2.0	2.0		0.6	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)				9.4	9.4	
Detector 2 Size(m)				0.6	0.6	
Detector 2 Type				Cl+Ex	Cl+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Perm	Perm		NA	NA	Free
Protected Phases				2	2	
Permitted Phases	4	4				Free
Detector Phase	4	4		2	2	

Lanes, Volumes, Timings
3: Trafalgar Rd & QEW EB-Off Ramp

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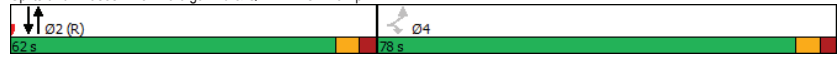
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Switch Phase						
Minimum Initial (s)	10.0	10.0		29.0	29.0	
Minimum Split (s)	38.0	38.0		36.0	36.0	
Total Split (s)	78.0	78.0		62.0	62.0	
Total Split (%)	55.7%	55.7%		44.3%	44.3%	
Maximum Green (s)	71.0	71.0		55.0	55.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	
All-Red Time (s)	3.0	3.0		3.0	3.0	
Lost Time Adjust (s)	-3.0	-3.0		-3.0	-3.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Recall Mode	None	None		C-Max	C-Max	
Walk Time (s)	7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	24.0	24.0		22.0	22.0	
Pedestrian Calls (#/hr)	0	0		0	0	
Act Effct Green (s)	74.0	74.0		58.0	58.0	140.0
Actuated g/C Ratio	0.53	0.53		0.41	0.41	1.00
v/c Ratio	0.72	1.35		1.26	1.27	0.41
Control Delay	28.5	195.2		151.7	153.9	0.1
Queue Delay	0.0	0.0		0.0	0.0	0.0
Total Delay	28.5	195.2		151.7	153.9	0.1
LOS	C	F		F	F	A
Approach Delay	107.4			151.7	123.0	
Approach LOS	F			F	F	
Queue Length 50th (m)	125.4	~385.8		~303.4	~316.4	0.0
Queue Length 95th (m)	152.3	#469.2		m#232.1	m#267.9	m0.0
Internal Link Dist (m)	175.2			27.4	300.8	
Turn Bay Length (m)						
Base Capacity (vph)	1563	752		1824	1859	1454
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	0.72	1.35		1.26	1.27	0.41
Intersection Summary						
Area Type:	CBD					
Cycle Length:	140					
Actuated Cycle Length:	140					
Offset:	133.6 (95%), Referenced to phase 2:NBSB and 6.; Start of Green					
Natural Cycle:	75					
Control Type:	Actuated-Coordinated					
Maximum v/c Ratio:	1.35					
Intersection Signal Delay:	127.4			Intersection LOS: F		
Intersection Capacity Utilization	117.6%			ICU Level of Service H		
Analysis Period (min)	15					
~	Volume exceeds capacity, queue is theoretically infinite. Queue shown is maximum after two cycles.					

Lanes, Volumes, Timings
3: Trafalgar Rd & QEW EB-Off Ramp

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- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Trafalgar Rd & QEW EB-Off Ramp



HCM Signalized Intersection Capacity Analysis
3: Trafalgar Rd & QEW EB-Off Ramp

BG 2043 AM.syn
04-03-2024



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔↔	↔		↕↕	↕↕	↕
Traffic Volume (vph)	1038	933	0	2107	2178	548
Future Volume (vph)	1038	933	0	2107	2178	548
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.5	3.6	3.6	3.6	3.6
Total Lost time (s)	4.0	4.0		4.0	4.0	1.0
Lane Util. Factor	0.97	1.00		0.91	0.91	1.00
Frt	1.00	0.85		1.00	1.00	0.85
Flt Protected	0.95	1.00		1.00	1.00	1.00
Satd. Flow (prot)	2958	1423		4404	4489	1454
Flt Permitted	0.95	1.00		1.00	1.00	1.00
Satd. Flow (perm)	2958	1423		4404	4489	1454
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1128	1014	0	2290	2367	596
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	1128	1014	0	2290	2367	596
Heavy Vehicles (%)	3%	1%	0%	6%	4%	0%
Turn Type	Perm	Perm		NA	NA	Free
Protected Phases				2	2	
Permitted Phases	4	4				Free
Actuated Green, G (s)	71.0	71.0		55.0	55.0	140.0
Effective Green, g (s)	74.0	74.0		58.0	58.0	140.0
Actuated g/C Ratio	0.53	0.53		0.41	0.41	1.00
Clearance Time (s)	7.0	7.0		7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	1563	752		1824	1859	1454
v/s Ratio Prot				0.52	c0.53	
v/s Ratio Perm	0.38	c0.71				0.41
v/c Ratio	0.72	1.35		1.26	1.27	0.41
Uniform Delay, d1	25.2	33.0		41.0	41.0	0.0
Progression Factor	1.00	1.00		1.02	0.81	1.00
Incremental Delay, d2	1.7	165.6		115.4	123.4	0.1
Delay (s)	26.8	198.6		157.3	156.5	0.1
Level of Service	C	F		F	F	A
Approach Delay (s)	108.1			157.3	125.0	
Approach LOS	F			F	F	

Intersection Summary

HCM 2000 Control Delay	130.1	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.35		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	117.6%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
4: Trafalgar Rd & Argus Rd

BG 2043 AM.syn
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Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	257	0	3098	2456	656
Future Volume (vph)	0	257	0	3098	2456	656
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.6	3.5	3.6	3.6	3.6	3.6
Lane Util. Factor	1.00	1.00	1.00	0.91	0.91	0.91
Ped Bike Factor						
Frt		0.865			0.968	
Fit Protected						
Satd. Flow (prot)	0	1367	0	4363	4363	0
Fit Permitted						
Satd. Flow (perm)	0	1367	0	4363	4363	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	145.7			270.2	51.4	
Travel Time (s)	10.5			19.5	3.7	
Confl. Peds. (#/hr)						11
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	7%	0%	7%	4%	2%
Adj. Flow (vph)	0	279	0	3367	2670	713
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	279	0	3367	3383	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			3.3	3.3	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.14	1.16	1.14	1.14	1.14	1.14
Turning Speed (k/h)	24	14	24			14
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	CBD					
Control Type:	Unsignalized					
Intersection Capacity Utilization	93.6%		ICU Level of Service		F	
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
4: Trafalgar Rd & Argus Rd

BG 2043 AM.syn
04-03-2024

Movement	EBL	EBR	NBL	NBT	SBT	SBR	
Lane Configurations							
Traffic Volume (veh/h)	0	257	0	3098	2456	656	
Future Volume (Veh/h)	0	257	0	3098	2456	656	
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	279	0	3367	2670	713	
Pedestrians	11						
Lane Width (m)	3.5						
Walking Speed (m/s)	1.2						
Percent Blockage	1						
Right turn flare (veh)							
Median type			None	None			
Median storage (veh)							
Upstream signal (m)				270	52		
pX, platoon unblocked	0.76	0.59	0.59				
vC, conflicting volume	4160	1258	3394				
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol	1102	0	2634				
tC, single (s)	6.8	7.0	4.1				
tC, 2 stage (s)							
tF (s)	3.5	3.4	2.2				
p0 queue free %	100	56	100				
cM capacity (veh/h)	157	628	96				
Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	279	1122	1122	1122	1068	1068	1247
Volume Left	0	0	0	0	0	0	0
Volume Right	279	0	0	0	0	0	713
eSH	628	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.44	0.66	0.66	0.66	0.63	0.63	0.73
Queue Length 95th (m)	18.3	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (s)	15.2	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	C						
Approach Delay (s)	15.2	0.0			0.0		
Approach LOS	C						
Intersection Summary							
Average Delay				0.6			
Intersection Capacity Utilization	93.6%		ICU Level of Service		F		
Analysis Period (min)	15						

Lanes, Volumes, Timings

BG 2043 AM.syn

5: Trafalgar Rd & Cross Ave/South Service Rd

04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	1203	109	217	51	77	126	182	1460	33	264	1999	340	
Future Volume (vph)	1203	109	217	51	77	126	182	1460	33	264	1999	340	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (m)	3.3	3.6	3.6	3.3	3.6	3.5	3.3	3.6	3.6	3.3	3.6	3.6	
Storage Length (m)	130.0	0.0	25.0	0.0	50.0	0.0	25.0	0.0	25.0	0.0	0.0	0.0	
Storage Lanes	1	0	1	1	1	1	1	0	1	0	1	0	
Taper Length (m)	7.5		7.5		7.5		7.5		7.5		7.5		
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.91	0.91	
Ped Bike Factor	1.00	0.99		0.99		0.99		1.00		0.99		0.99	
Frt	0.900					0.850		0.997		0.978			
Fit Protected	0.950			0.950		0.950		0.950		0.950			
Satd. Flow (prot)	2795	1379	0	1525	1583	1382	1428	4500	0	1525	4404	0	
Fit Permitted	0.950			0.549		0.82		0.075		0.075			
Satd. Flow (perm)	2789	1379	0	876	1583	1362	123	4500	0	120	4404	0	
Right Turn on Red			Yes			Yes		Yes			Yes		
Satd. Flow (RTOR)		77				148		3			28		
Link Speed (k/h)		50			50			50			50		
Link Distance (m)		151.2			330.4			150.2			270.2		
Travel Time (s)		10.9			23.8			10.8			19.5		
Confl. Peds. (#/hr)	1		4	4		1	10		52	52		10	
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	
Heavy Vehicles (%)	9%	6%	12%	3%	8%	4%	10%	3%	0%	3%	3%	4%	
Adj. Flow (vph)	1308	118	236	55	84	137	198	1587	36	287	2173	370	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	1308	354	0	55	84	137	198	1623	0	287	2543	0	
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No	
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right	
Median Width(m)		6.6			6.6			3.3			3.3		
Link Offset(m)		0.0			0.0			0.0			0.0		
Crosswalk Width(m)		4.8			4.8			4.8			4.8		
Two way Left Turn Lane													
Headway Factor	1.19	1.14	1.14	1.19	1.14	1.16	1.19	1.14	1.14	1.19	1.14	1.14	
Turning Speed (k/h)	24		14	24		14	24		14	24		14	
Number of Detectors	1	2		1	2	1	1		1	2		2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru		
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0		2.0	10.0		
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0		
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0		
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6		2.0	0.6		
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		
Detector 1 Channel													
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0		
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0		
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0		
Detector 2 Position(m)		9.4			9.4			9.4			9.4		
Detector 2 Size(m)		0.6			0.6			0.6			0.6		
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex		
Detector 2 Channel													

Lanes, Volumes, Timings

BG 2043 AM.syn

5: Trafalgar Rd & Cross Ave/South Service Rd

04-03-2024

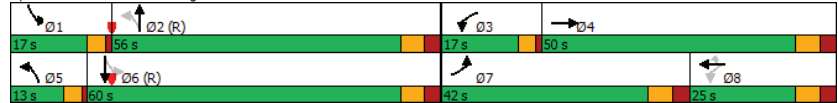
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Detector 2 Extend (s)		0.0			0.0			0.0			0.0		
Turn Type	Prot	NA		pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA		
Protected Phases	7	4		3	8		5	2		1	6		
Permitted Phases				8		8	2			6			
Detector Phases	7	4		3	8	8	5	2		1	6		
Switch Phase													
Minimum Initial (s)	10.0	10.0		12.0	10.0	10.0	7.0	27.0		7.0	27.0		
Minimum Split (s)	17.0	25.0		17.0	25.0	25.0	11.5	34.0		11.5	34.0		
Total Split (s)	42.0	50.0		17.0	25.0	25.0	13.0	56.0		17.0	60.0		
Total Split (%)	30.0%	35.7%		12.1%	17.9%	17.9%	9.3%	40.0%		12.1%	42.9%		
Maximum Green (s)	35.0	43.0		13.0	18.0	18.0	9.0	49.0		13.0	53.0		
Yellow Time (s)	4.0	4.0		3.0	4.0	4.0	3.0	4.0		3.0	4.0		
All-Red Time (s)	3.0	3.0		1.0	3.0	3.0	1.0	3.0		1.0	3.0		
Lost Time Adjust (s)	-3.0	-3.0		0.0	-3.0	-3.0	0.0	-3.0		0.0	-3.0		
Total Lost Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0		
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag		Lead	Lag		
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes		Yes	Yes		
Vehicle Extension (s)	3.0	4.0		3.5	4.0	4.0	3.0	5.0		3.0	5.0		
Recall Mode	Min	Min		Min	Min	Min	Min	C-Max		Min	C-Max		
Walk Time (s)		7.0			7.0	7.0		7.0			7.0		
Flash Dont Walk (s)		11.0			11.0	11.0		11.0			11.0		
Pedestrian Calls (#/hr)		0			0	0		0			0		
Act Effct Green (s)	38.0	42.8		28.8	16.8	16.8	65.2	52.0		73.2	56.0		
Actuated g/C Ratio	0.27	0.31		0.21	0.12	0.12	0.47	0.37		0.52	0.40		
v/c Ratio	1.73	0.75		0.23	0.44	0.47	1.10	0.97		1.22	1.43		
Control Delay	363.8	44.1		29.5	64.1	11.9	115.7	59.2		141.7	228.5		
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0		
Total Delay	363.8	44.1		29.5	64.1	11.9	115.7	59.2		141.7	228.5		
LOS	F	D		C	E	B	F	E		F	F		
Approach Delay		295.7			31.3			65.3			219.7		
Approach LOS		F			C			E			F		
Queue Length 50th (m)	~289.4	74.3		9.6	23.1	0.0	~52.2	143.2		~88.6	~362.0		
Queue Length 95th (m)	#333.4	109.6		17.8	39.8	16.9	m#88.7	m#148.7		m#73.1	m#248.0		
Internal Link Dist (m)		127.2			306.4			126.2			246.2		
Turn Bay Length (m)	130.0			25.0		50.0		25.0			25.0		
Base Capacity (vph)	758	506		246	237	330	180	1673		235	1778		
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0		
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0		
Storage Cap Reductn	0	0		0	0	0	0	0		0	0		
Reduced v/c Ratio	1.73	0.70		0.22	0.35	0.42	1.10	0.97		1.22	1.43		
Intersection Summary													
Area Type:	CBD												
Cycle Length:	140												
Actuated Cycle Length:	140												
Offset:	128 (91%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green												
Natural Cycle:	150												
Control Type:	Actuated-Coordinated												
Maximum v/c Ratio:	1.73												

Lanes, Volumes, Timings
5: Trafalgar Rd & Cross Ave/South Service Rd

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Intersection Signal Delay: 188.3	Intersection LOS: F
Intersection Capacity Utilization 119.8%	ICU Level of Service H
Analysis Period (min) 15	
~ Volume exceeds capacity, queue is theoretically infinite.	
Queue shown is maximum after two cycles.	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	
m Volume for 95th percentile queue is metered by upstream signal.	

Splits and Phases: 5: Trafalgar Rd & Cross Ave/South Service Rd



HCM Signalized Intersection Capacity Analysis
5: Trafalgar Rd & Cross Ave/South Service Rd

BG 2043 AM.syn
04-03-2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔	↔		↔	↔	↔	↔↔↔	↔↔↔	↔	↔↔↔	↔↔↔	↔
Traffic Volume (vph)	1203	109	217	51	77	126	182	1460	33	264	1999	340
Future Volume (vph)	1203	109	217	51	77	126	182	1460	33	264	1999	340
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.3	3.6	3.5	3.3	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	1.00		1.00	1.00	1.00	1.00	0.91		1.00	0.91	
Frpb, ped/bikes	1.00	0.99		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	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.90		1.00	1.00	0.85	1.00	1.00		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	2795	1379		1520	1583	1362	1428	4498		1525	4405	
Flt Permitted	0.95	1.00		0.55	1.00	1.00	0.08	1.00		0.08	1.00	
Satd. Flow (perm)	2795	1379		879	1583	1362	123	4498		121	4405	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1308	118	236	55	84	137	198	1587	36	287	2173	370
RTOR Reduction (vph)	0	53	0	0	0	121	0	2	0	0	17	0
Lane Group Flow (vph)	1308	301	0	55	84	16	198	1621	0	287	2526	0
Confl. Peds. (#/hr)	1		4	4		1	10		52	52		10
Heavy Vehicles (%)	9%	6%	12%	3%	8%	4%	10%	3%	0%	3%	3%	3%
Turn Type	Prot	NA		pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases				8		8	2			6		
Actuated Green, G (s)	35.0	39.8		25.8	13.8	13.8	62.2	49.0		70.2	53.0	
Effective Green, g (s)	38.0	42.8		25.8	16.8	16.8	62.2	52.0		70.2	56.0	
Actuated g/C Ratio	0.27	0.31		0.18	0.12	0.12	0.44	0.37		0.50	0.40	
Clearance Time (s)	7.0	7.0		4.0	7.0	7.0	4.0	7.0		4.0	7.0	
Vehicle Extension (s)	3.0	4.0		3.5	4.0	4.0	3.0	5.0		3.0	5.0	
Lane Grp Cap (vph)	758	421		216	189	163	177	1670		233	1762	
v/s Ratio Prot	c0.47	c0.22		0.02	0.05		0.11	0.36		c0.15	c0.57	
v/s Ratio Perm				0.02		0.01	0.39			0.47		
v/c Ratio	1.73	0.71		0.25	0.44	0.10	1.12	0.97		1.23	1.43	
Uniform Delay, d1	51.0	43.2		48.3	57.3	54.9	42.4	43.3		45.0	42.0	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.15	1.15		1.12	1.09	
Incremental Delay, d2	332.1	6.1		0.7	2.3	0.4	83.2	9.9		107.9	195.5	
Delay (s)	383.1	49.2		49.1	59.5	55.2	132.0	59.8		158.2	241.2	
Level of Service	F	D		D	E	E	F	E		F	F	
Approach Delay (s)		312.0			55.3			67.6			232.8	
Approach LOS		F			E			E			F	
Intersection Summary												
HCM 2000 Control Delay		199.7									F	
HCM 2000 Volume to Capacity ratio		1.44										
Actuated Cycle Length (s)		140.0					Sum of lost time (s)	16.0				
Intersection Capacity Utilization		119.8%					ICU Level of Service	H				
Analysis Period (min)		15										
c Critical Lane Group												

Lanes, Volumes, Timings
6: Trafalgar Rd & Cornwall Rd

BG 2043 AM.syn
04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↕	↔	↕	↔	↕	↕	↕
Traffic Volume (vph)	383	591	103	80	673	626	128	652	87	941	1033	309
Future Volume (vph)	383	591	103	80	673	626	128	652	87	941	1033	309
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.5
Storage Length (m)	80.0	0.0	80.0	0.0	25.0	0.0	80.0	0.0	80.0	0.0	80.0	0.0
Storage Lanes	2	0	1	1	1	1	1	0	1	1	1	1
Taper Length (m)	7.5		7.5		7.5		7.5		7.5		7.5	
Lane Util. Factor	0.97	0.95	0.95	1.00	0.95	1.00	1.00	*0.80	0.95	0.97	*0.80	1.00
Ped Bike Factor	0.99	0.99		0.99		0.98	1.00	1.00		0.99		0.98
Frt		0.978				0.850		0.982				0.850
Flt Protected	0.950			0.950		0.950		0.950		0.950		0.950
Satd. Flow (prot)	2987	3052	0	1481	3154	1411	1540	2652	0	2929	1341	1356
Flt Permitted	0.950			0.950		0.950		0.950		0.950		0.950
Satd. Flow (perm)	2949	3052	0	1473	3154	1384	1536	2652	0	2892	1341	1324
Right Turn on Red			Yes			Yes		Yes			Yes	
Satd. Flow (RTOR)		14				500		10				169
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		285.8			142.3			311.4			130.3	
Travel Time (s)		20.6			10.2			22.4			9.4	
Confl. Peds. (#/hr)	25		7	7		25	9		18	18		9
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
Heavy Vehicles (%)	2%	4%	1%	6%	3%	3%	2%	1%	0%	4%	2%	6%
Adj. Flow (vph)	416	642	112	87	732	680	139	709	95	1023	1123	336
Shared Lane Traffic (%)												
Lane Group Flow (vph)	416	754	0	87	732	680	139	804	0	1023	1123	336
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		6.6			6.6			6.6			6.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.19	1.14	1.14	1.19	1.14	1.14	1.19	1.14	1.14	1.19	1.14	1.16
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2	1	1	2		1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0		2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6		2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

Lanes, Volumes, Timings
6: Trafalgar Rd & Cornwall Rd

BG 2043 AM.syn
04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA	Free	Prot	NA		Prot	NA	Perm
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases					Free							6
Detector Phases	3	8		7	4		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	7.0	10.0		7.0	10.0		7.0	20.0		7.0	20.0	20.0
Minimum Split (s)	12.0	37.0		12.0	37.0		12.0	39.0		12.0	39.0	39.0
Total Split (s)	16.0	40.0		13.0	37.0		13.0	58.0		29.0	74.0	74.0
Total Split (%)	11.4%	28.6%		9.3%	26.4%		9.3%	41.4%		20.7%	52.9%	52.9%
Maximum Green (s)	11.0	33.0		8.0	30.0		8.0	51.0		24.0	67.0	67.0
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	4.0
All-Red Time (s)	2.0	3.0		2.0	3.0		2.0	3.0		2.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-3.0		-1.0	-3.0		-1.0	-3.0		-1.0	-3.0	-3.0
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	0.2	0.2		0.2	0.2		0.2	0.2		0.2	0.2	0.2
Recall Mode	Max	Max		Max	Max		None	C-Max		Max	C-Max	C-Max
Walk Time (s)		7.0			7.0			7.0			7.0	7.0
Flash Dont Walk (s)		23.0			23.0			25.0			25.0	25.0
Pedestrian Calls (#/hr)		0			0			0			0	0
Act Effct Green (s)	12.0	36.0		9.0	33.0	140.0	9.0	54.0		25.0	70.0	70.0
Actuated g/C Ratio	0.09	0.26		0.06	0.24	1.00	0.06	0.39		0.18	0.50	0.50
v/c Ratio	1.62	0.95		0.92	0.99	0.49	1.40	0.78		1.96	1.68	0.45
Control Delay	336.9	71.6		135.5	82.5	1.2	276.7	43.8		467.8	326.3	2.2
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	336.9	71.6		135.5	82.5	1.2	276.7	43.8		467.8	326.3	2.2
LOS	F	E		F	F	A	F	D		F	F	A
Approach Delay		165.9			48.7			78.1				340.7
Approach LOS		F			D			E				F
Queue Length 50th (m)	-89.7	112.5		25.7	112.6	0.0	-54.1	126.5		-244.0	-585.6	0.6
Queue Length 95th (m)	#124.3	#153.8		#61.3	#156.0	0.0	#98.9	159.1		m#163.3	m#375.6	m0.3
Internal Link Dist (m)		261.8			118.3			287.4			106.3	
Turn Bay Length (m)	80.0			80.0		25.0				80.0		
Base Capacity (vph)	256	795		95	743	1384	99	1029		523	670	746
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	0
Reduced v/c Ratio	1.63	0.95		0.92	0.99	0.49	1.40	0.78		1.96	1.68	0.45

Intersection Summary

Area Type:	CBD
Cycle Length:	140
Actuated Cycle Length:	140
Offset:	0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green, Master Intersection
Natural Cycle:	150
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	1.96

Lanes, Volumes, Timings
6: Trafalgar Rd & Cornwall Rd

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Intersection Signal Delay: 194.7	Intersection LOS: F
Intersection Capacity Utilization 118.8%	ICU Level of Service H
Analysis Period (min) 15	
* User Entered Value	
~ Volume exceeds capacity, queue is theoretically infinite. Queue shown is maximum after two cycles.	
# 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.	
m Volume for 95th percentile queue is metered by upstream signal.	

Splits and Phases: 6: Trafalgar Rd & Cornwall Rd

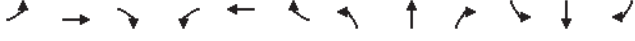


HCM Signalized Intersection Capacity Analysis
6: Trafalgar Rd & Cornwall Rd

BG 2043 AM.syn
04-03-2024

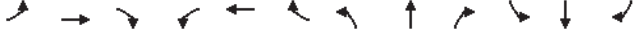
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔	↕↕		↔↔	↕↕	↔↔	↔↔	↕↕		↔↔	↕↕	↔↔
Traffic Volume (vph)	383	591	103	80	673	626	128	652	87	941	1033	309
Future Volume (vph)	383	591	103	80	673	626	128	652	87	941	1033	309
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.5
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.97	0.95		1.00	0.95	1.00	1.00	*0.80		0.97	*0.80	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.98	1.00	1.00		1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	2987	3051		1481	3154	1384	1540	2653		2929	1341	1324
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	2987	3051		1481	3154	1384	1540	2653		2929	1341	1324
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	416	642	112	87	732	680	139	709	95	1023	1123	336
RTOR Reduction (vph)	0	10	0	0	0	0	0	6	0	0	0	85
Lane Group Flow (vph)	416	744	0	87	732	680	139	798	0	1023	1123	252
Confl. Peds. (#/hr)	25		7	7		25	9		18	18		9
Heavy Vehicles (%)	2%	4%	1%	6%	3%	3%	2%	1%	0%	4%	2%	6%
Turn Type	Prot	NA		Prot	NA	Free	Prot	NA		Prot	NA	Perm
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases						Free						6
Actuated Green, G (s)	11.0	33.0		8.0	30.0	140.0	8.0	51.0		24.0	67.0	67.0
Effective Green, g (s)	12.0	36.0		9.0	33.0	140.0	9.0	54.0		25.0	70.0	70.0
Actuated g/C Ratio	0.09	0.26		0.06	0.24	1.00	0.06	0.39		0.18	0.50	0.50
Clearance Time (s)	5.0	7.0		5.0	7.0		5.0	7.0		5.0	7.0	7.0
Vehicle Extension (s)	0.2	0.2		0.2	0.2		0.2	0.2		0.2	0.2	0.2
Lane Grp Cap (vph)	256	784		95	743	1384	99	1023		523	670	662
v/s Ratio Prot	c0.14	c0.24		0.06	0.23		0.09	0.30		c0.35	c0.84	
v/s Ratio Perm						c0.49						0.19
v/c Ratio	1.62	0.95		0.92	0.99	0.49	1.40	0.78		1.96	1.68	0.38
Uniform Delay, d1	64.0	51.1		65.1	53.3	0.0	65.5	37.8		57.5	35.0	21.6
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.46	0.56	0.19
Incremental Delay, d2	298.5	21.8		71.4	29.6	1.2	231.5	5.9		430.8	304.9	0.1
Delay (s)	362.5	72.9		136.5	82.9	1.2	297.0	43.7		515.0	324.5	4.2
Level of Service	F	E		F	F	A	F	D		F	F	A
Approach Delay (s)		175.8			49.0			81.0			359.6	
Approach LOS		F			D			F			F	
Intersection Summary												
HCM 2000 Control Delay		204.8									F	
HCM 2000 Volume to Capacity ratio		1.58										
Actuated Cycle Length (s)		140.0				Sum of lost time (s)		16.0				
Intersection Capacity Utilization		118.8%				ICU Level of Service		H				
Analysis Period (min)		15										
c Critical Lane Group												

Lanes, Volumes, Timings
 7: South Service Road/Canadian Road & QEW EB Off-Ramp/Royal Windsor Drive 04-03-2024



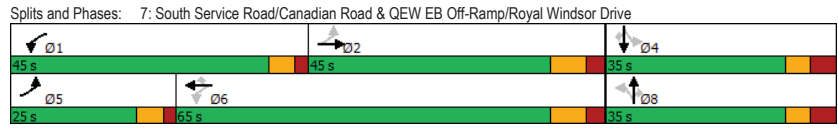
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	55	683	37	111	673	9	3	10	62	4	24	36
Future Volume (vph)	55	683	37	111	673	9	3	10	62	4	24	36
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	150.0	0.0	155.0		70.0	15.0		0.0	0.0			30.0
Storage Lanes	2	0	1		1	1		1	1			1
Taper Length (m)	7.5		7.5		7.5			7.5				7.5
Lane Util. Factor	0.97	0.95	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.992				0.850			0.850			0.850
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3400	3299	0	1719	3139	1380	1805	1667	1468	1805	1792	1495
Fit Permitted	0.357			0.310			0.740			0.750		
Satd. Flow (perm)	1278	3299	0	561	3139	1380	1406	1667	1468	1425	1792	1495
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5				94			152			152
Link Speed (k/h)	80			80			60					40
Link Distance (m)	324.5			247.2			158.7					215.5
Travel Time (s)	14.6			11.1			9.5					19.4
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
Heavy Vehicles (%)	3%	9%	0%	5%	15%	17%	0%	14%	10%	0%	6%	8%
Adj. Flow (vph)	60	742	40	121	732	10	3	11	67	4	26	39
Shared Lane Traffic (%)												
Lane Group Flow (vph)	60	782	0	121	732	10	3	11	67	4	26	39
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Right	Left	Left	Right	Right
Median Width(m)	7.2			7.2			3.6					3.6
Link Offset(m)	0.0			0.0			0.0					0.0
Crosswalk Width(m)	4.8			4.8			4.8					4.8
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	CI+Ex	CI+Ex		CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		CI+Ex			CI+Ex			CI+Ex			CI+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	

Lanes, Volumes, Timings
 7: South Service Road/Canadian Road & QEW EB Off-Ramp/Royal Windsor Drive 04-03-2024



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	2			6		6	8		8	4		4
Detector Phase	5	2		1	6	6	8	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	8.0	20.0		8.0	30.0	30.0	8.0	8.0	8.0	10.0	10.0	10.0
Minimum Split (s)	14.0	34.0		14.0	38.4	38.4	28.8	28.8	28.8	35.0	35.0	35.0
Total Split (s)	25.0	45.0		45.0	65.0	65.0	35.0	35.0	35.0	35.0	35.0	35.0
Total Split (%)	20.0%	36.0%		36.0%	52.0%	52.0%	28.0%	28.0%	28.0%	28.0%	28.0%	28.0%
Maximum Green (s)	19.0	36.6		39.0	56.6	56.6	27.2	27.2	27.2	27.2	27.2	27.2
Yellow Time (s)	4.0	5.4		4.0	5.4	5.4	3.7	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	2.0	3.0		2.0	3.0	3.0	4.1	4.1	4.1	4.1	4.1	4.1
Lost Time Adjust (s)	-2.0	-4.4		-2.0	-4.4	-4.4	-3.8	-3.8	-3.8	-3.8	-3.8	-3.8
Total Lost Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lead	Lag		Lead	Lag	Lag						
Lead-Lag Optimize?												
Vehicle Extension (s)	3.5	4.5		3.5	6.0	6.0	3.5	3.5	3.5	3.5	3.5	3.5
Recall Mode	None	Max		None	Max	Max	None	None	None	None	None	None
Walk Time (s)		10.0			10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Flash Dont Walk (s)		10.0			10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Pedestrian Calls (#/hr)		0			0	0	0	0	0	0	0	0
Act Effct Green (s)	71.4	61.4		72.7	65.8	65.8	13.4	13.4	13.4	13.9	13.9	13.9
Actuated g/C Ratio	0.76	0.66		0.78	0.70	0.70	0.14	0.14	0.14	0.15	0.15	0.15
v/c Ratio	0.05	0.36		0.21	0.33	0.01	0.01	0.05	0.20	0.02	0.10	0.11
Control Delay	2.7	8.6		3.5	8.1	0.0	36.0	36.5	1.3	36.0	37.3	0.6
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	2.7	8.6		3.5	8.1	0.0	36.0	36.5	1.3	36.0	37.3	0.6
LOS	A	A		A	A	A	D	D	A	D	D	A
Approach Delay		8.1			7.3			7.4				16.5
Approach LOS		A			A			A				B
Queue Length 50th (m)	1.0	35.5		4.6	33.2	0.0	0.5	1.9	0.0	0.7	4.5	0.0
Queue Length 95th (m)	2.3	47.9		8.4	44.2	0.0	3.1	7.0	0.0	3.8	12.3	0.0
Internal Link Dist (m)		300.5			223.2			134.7			191.5	
Turn Bay Length (m)	150.0			155.0		70.0	15.0					30.0
Base Capacity (vph)	1514	2169		965	2210	999	469	555	591	475	597	600
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.04	0.36		0.13	0.33	0.01	0.01	0.02	0.11	0.01	0.04	0.07
Intersection Summary												
Area Type:	Other											
Cycle Length:	125											
Actuated Cycle Length:	93.4											
Natural Cycle:	90											
Control Type:	Semi Act-Uncoord											
Maximum v/c Ratio:	0.36											
Intersection Signal Delay:	8.0											
Intersection Capacity Utilization:	50.0%						Intersection LOS: A					
ICU Level of Service:	A											
Analysis Period (min)	15											

Lanes, Volumes, Timings BG 2043 AM.syn
04-03-2024
7: South Service Road/Canadian Road & QEW EB Off-Ramp/Royal Windsor Drive



HCM Signalized Intersection Capacity Analysis BG 2043 AM.syn
04-03-2024
7: South Service Road/Canadian Road & QEW EB Off-Ramp/Royal Windsor Drive

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	↔↔	↕↕		↔↔	↕↕	↔↔	↔↔	↕↕	↔↔	↔↔	↕↕	↔↔	
Traffic Volume (vph)	55	683	37	111	673	9	3	10	62	4	24	36	
Future Volume (vph)	55	683	37	111	673	9	3	10	62	4	24	36	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	0.97	0.95		1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	
Fit Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	3400	3300		1719	3139	1380	1805	1667	1468	1805	1792	1495	
Fit Permitted	0.36	1.00		0.31	1.00	1.00	0.74	1.00	1.00	0.75	1.00	1.00	
Satd. Flow (perm)	1279	3300		561	3139	1380	1407	1667	1468	1426	1792	1495	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	60	742	40	121	732	10	3	11	67	4	26	39	
RTOR Reduction (vph)	0	2	0	0	0	3	0	0	59	0	0	34	
Lane Group Flow (vph)	60	780	0	121	732	7	3	11	8	4	26	5	
Heavy Vehicles (%)	3%	9%	0%	5%	15%	17%	0%	14%	10%	0%	6%	8%	
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	
Protected Phases	5	2		1	6			8			4		
Permitted Phases	2			6		6	8		8	4		4	
Actuated Green, G (s)	64.6	58.4		68.6	60.4	60.4	7.7	7.7	7.7	7.7	7.7	7.7	
Effective Green, g (s)	68.6	62.8		72.6	64.8	64.8	11.5	11.5	11.5	11.5	11.5	11.5	
Actuated g/C Ratio	0.71	0.65		0.75	0.67	0.67	0.12	0.12	0.12	0.12	0.12	0.12	
Clearance Time (s)	6.0	8.4		6.0	8.4	8.4	7.8	7.8	7.8	7.8	7.8	7.8	
Vehicle Extension (s)	3.5	4.5		3.5	6.0	6.0	3.5	3.5	3.5	3.5	3.5	3.5	
Lane Grp Cap (vph)	1089	2147		544	2107	926	167	198	174	169	213	178	
v/s Ratio Prot	0.00	c0.24		c0.02	0.23			0.01			c0.01		
v/s Ratio Perm	0.03			0.14		0.00	0.00		0.01	0.00		0.00	
v/c Ratio	0.06	0.36		0.22	0.35	0.01	0.02	0.06	0.05	0.02	0.12	0.03	
Uniform Delay, d1	4.1	7.7		3.6	6.8	5.2	37.5	37.7	37.6	37.5	38.0	37.6	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.0	0.5		0.2	0.5	0.0	0.1	0.1	0.1	0.1	0.3	0.1	
Delay (s)	4.2	8.2		3.8	7.2	5.2	37.6	37.8	37.8	37.6	38.3	37.6	
Level of Service	A	A		A	A	A	D	D	D	D	D	D	
Approach Delay (s)		7.9			6.7			37.8			37.9		
Approach LOS		A			A			D			D		
Intersection Summary													
HCM 2000 Control Delay			9.8	HCM 2000 Level of Service				A					
HCM 2000 Volume to Capacity ratio			0.31										
Actuated Cycle Length (s)			96.5	Sum of lost time (s)				12.0					
Intersection Capacity Utilization			50.0%	ICU Level of Service				A					
Analysis Period (min)			15										
c Critical Lane Group													

Lanes, Volumes, Timings
8: QEWS WB Off-Ramp & Kerr Street

BG 2043 AM.syn
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Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔↔			↔↔	↔↔	↔↔
Traffic Volume (vph)	585	0	0	355	312	347
Future Volume (vph)	585	0	0	355	312	347
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)		0.0	0.0		0.0	140.0
Storage Lanes		0	0		1	1
Taper Length (m)			7.5		7.5	
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00
Fr						0.850
Flt Protected					0.950	
Satd. Flow (prot)	3539	0	0	3539	1770	1583
Flt Permitted					0.950	
Satd. Flow (perm)	3539	0	0	3539	1770	1583
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)						134
Link Speed (k/h)	60			60	40	
Link Distance (m)	128.8			184.7	258.8	
Travel Time (s)	7.7			11.1	23.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	636	0	0	386	339	377
Shared Lane Traffic (%)						
Lane Group Flow (vph)	636	0	0	386	339	377
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)		15	25		25	15
Turn Type	NA			NA	Prot	Perm
Protected Phases	4			8	2	
Permitted Phases						2
Minimum Split (s)	22.5			22.5	22.5	22.5
Total Split (s)	22.5			22.5	22.5	22.5
Total Split (%)	50.0%			50.0%	50.0%	50.0%
Maximum Green (s)	18.0			18.0	18.0	18.0
Yellow Time (s)	3.5			3.5	3.5	3.5
All-Red Time (s)	1.0			1.0	1.0	1.0
Lost Time Adjust (s)	0.0			0.0	0.0	0.0
Total Lost Time (s)	4.5			4.5	4.5	4.5
Lead/Lag						
Lead-Lag Optimize?						
Walk Time (s)	7.0			7.0	7.0	7.0
Flash Dont Walk (s)	11.0			11.0	11.0	11.0
Pedestrian Calls (#/hr)	0			0	0	0
Act Effct Green (s)	18.0			18.0	18.0	18.0
Actuated g/C Ratio	0.40			0.40	0.40	0.40
v/c Ratio	0.45			0.27	0.48	0.53

Lanes, Volumes, Timings
8: QEWS WB Off-Ramp & Kerr Street

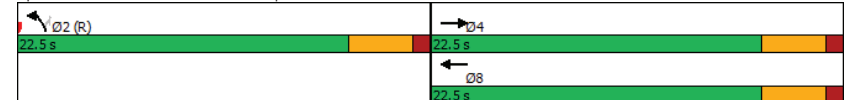
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Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Control Delay	11.2			9.8	12.9	9.7
Queue Delay	0.0			0.0	0.0	0.0
Total Delay	11.2			9.8	12.9	9.7
LOS	B			A	B	A
Approach Delay	11.2			9.8	11.2	
Approach LOS	B			A	B	
Queue Length 50th (m)	19.1			10.6	19.6	13.4
Queue Length 95th (m)	29.9			18.1	37.3	31.8
Internal Link Dist (m)	104.8			160.7	234.8	
Turn Bay Length (m)						140.0
Base Capacity (vph)	1415			1415	708	713
Starvation Cap Reductn	0			0	0	0
Spillback Cap Reductn	0			0	0	0
Storage Cap Reductn	0			0	0	0
Reduced v/c Ratio	0.45			0.27	0.48	0.53

Intersection Summary

Area Type: Other
 Cycle Length: 45
 Actuated Cycle Length: 45
 Offset: 0 (0%), Referenced to phase 2:NBL and 6: Start of Green
 Natural Cycle: 45
 Control Type: Pretimed
 Maximum v/c Ratio: 0.53
 Intersection Signal Delay: 10.9
 Intersection Capacity Utilization 45.2%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service A

Splits and Phases: 8: QEWS WB Off-Ramp & Kerr Street



HCM Signalized Intersection Capacity Analysis
8: QEW WB Off-Ramp & Kerr Street

BG 2043 AM.syn
04-03-2024

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔↔			↔↔	↔↔	↔↔
Traffic Volume (vph)	585	0	0	355	312	347
Future Volume (vph)	585	0	0	355	312	347
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5			4.5	4.5	4.5
Lane Util. Factor	0.95			0.95	1.00	1.00
Fr _t	1.00			1.00	1.00	0.85
Fit Protected	1.00			1.00	0.95	1.00
Satd. Flow (prot)	3539			3539	1770	1583
Fit Permitted	1.00			1.00	0.95	1.00
Satd. Flow (perm)	3539			3539	1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	636	0	0	386	339	377
RTOR Reduction (vph)	0	0	0	0	0	80
Lane Group Flow (vph)	636	0	0	386	339	297
Turn Type	NA			NA	Prot	Perm
Protected Phases	4			8	2	
Permitted Phases						2
Actuated Green, G (s)	18.0			18.0	18.0	18.0
Effective Green, g (s)	18.0			18.0	18.0	18.0
Actuated g/C Ratio	0.40			0.40	0.40	0.40
Clearance Time (s)	4.5			4.5	4.5	4.5
Lane Grp Cap (vph)	1415			1415	708	633
v/s Ratio Prot	c0.18			0.11	c0.19	
v/s Ratio Perm						0.19
v/c Ratio	0.45			0.27	0.48	0.47
Uniform Delay, d1	9.9			9.1	10.0	10.0
Progression Factor	1.00			1.00	1.00	1.00
Incremental Delay, d2	1.0			0.5	2.3	2.5
Delay (s)	10.9			9.6	12.3	12.4
Level of Service	B			A	B	B
Approach Delay (s)	10.9			9.6	12.4	
Approach LOS	B			A	B	
Intersection Summary						
HCM 2000 Control Delay			11.2		HCM 2000 Level of Service B	
HCM 2000 Volume to Capacity ratio			0.46			
Actuated Cycle Length (s)			45.0		Sum of lost time (s) 9.0	
Intersection Capacity Utilization			45.2%		ICU Level of Service A	
Analysis Period (min)			15			
c Critical Lane Group						

Lanes, Volumes, Timings
9: Dorval Drive & QEW WB Off-Ramp

BG 2043 AM.syn
04-03-2024

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔↔	↔	↔↔			↔↔
Traffic Volume (vph)	1095	510	627	0	0	1747
Future Volume (vph)	1095	510	627	0	0	1747
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	190.0		0.0	0.0	
Storage Lanes	2	1		0	0	
Taper Length (m)	7.5				7.5	
Lane Util. Factor	0.97	0.91	0.95	1.00	1.00	0.95
Fr _t	0.993	0.850				
Fit Protected	0.954					
Satd. Flow (prot)	3423	1441	3539	0	0	3539
Fit Permitted	0.954					
Satd. Flow (perm)	3423	1441	3539	0	0	3539
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)	4	239				
Link Speed (k/h)	40		60			60
Link Distance (m)	325.1		310.2			266.9
Travel Time (s)	29.3		18.6			16.0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1190	554	682	0	0	1899
Shared Lane Traffic (%)		10%				
Lane Group Flow (vph)	1245	499	682	0	0	1899
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	7.2		0.0		0.0	0.0
Link Offset(m)	0.0		0.0		0.0	0.0
Crosswalk Width(m)	4.8		4.8		4.8	4.8
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15		15	25	
Number of Detectors	1	1	2			2
Detector Template	Left	Right	Thru			Thru
Leading Detector (m)	2.0	2.0	10.0			10.0
Trailing Detector (m)	0.0	0.0	0.0			0.0
Detector 1 Position(m)	0.0	0.0	0.0			0.0
Detector 1 Size(m)	2.0	2.0	0.6			0.6
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex			CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0			0.0
Detector 1 Queue (s)	0.0	0.0	0.0			0.0
Detector 1 Delay (s)	0.0	0.0	0.0			0.0
Detector 2 Position(m)			9.4			9.4
Detector 2 Size(m)			0.6			0.6
Detector 2 Type			CI+Ex			CI+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type		Prot	Perm	NA		NA
Protected Phases		8		2		6
Permitted Phases						8

Lanes, Volumes, Timings
9: Dorval Drive & QEW WB Off-Ramp

BG 2043 AM.syn
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Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Detector Phase	8	8	2			6
Switch Phase						
Minimum Initial (s)	10.0	10.0	20.0			20.0
Minimum Split (s)	24.0	24.0	26.0			26.0
Total Split (s)	45.6	45.6	74.4			74.4
Total Split (%)	38.0%	38.0%	62.0%			62.0%
Maximum Green (s)	39.6	39.6	68.4			68.4
Yellow Time (s)	4.0	4.0	4.0			4.0
All-Red Time (s)	2.0	2.0	2.0			2.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0			-2.0
Total Lost Time (s)	4.0	4.0	4.0			4.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	4.5	4.5	5.0			5.0
Recall Mode	None	None	Max			Max
Walk Time (s)	5.0	5.0	7.0			7.0
Flash Dont Walk (s)	7.0	7.0	11.0			11.0
Pedestrian Calls (#/hr)	0	0	0			0
Act Effct Green (s)	41.6	41.6	70.4			70.4
Actuated g/C Ratio	0.35	0.35	0.59			0.59
v/c Ratio	1.05	0.76	0.33			0.91
Control Delay	77.7	26.2	13.2			30.5
Queue Delay	0.0	0.0	0.0			0.0
Total Delay	77.7	26.2	13.2			30.5
LOS	E	C	B			C
Approach Delay	62.9		13.2			30.5
Approach LOS	E		B			C
Queue Length 50th (m)	~172.8	64.9	43.1			209.1
Queue Length 95th (m)	#216.5	116.5	54.8			252.7
Internal Link Dist (m)	301.1		286.2			242.9
Turn Bay Length (m)		190.0				
Base Capacity (vph)	1189	655	2076			2076
Starvation Cap Reductn	0	0	0			0
Spillback Cap Reductn	0	0	0			0
Storage Cap Reductn	0	0	0			0
Reduced v/c Ratio	1.05	0.76	0.33			0.91

Intersection Summary

Area Type:	Other
Cycle Length:	120
Actuated Cycle Length:	120
Natural Cycle:	90
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	1.05
Intersection Signal Delay:	40.8
Intersection Capacity Utilization:	91.5%
Analysis Period (min):	15
~ Volume exceeds capacity, queue is theoretically infinite. Queue shown is maximum after two cycles.	

Lanes, Volumes, Timings
9: Dorval Drive & QEW WB Off-Ramp

BG 2043 AM.syn
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95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 9: Dorval Drive & QEW WB Off-Ramp



HCM Signalized Intersection Capacity Analysis
9: Dorval Drive & QEWB Off-Ramp

BG 2043 AM.syn
04-03-2024

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔↔	↔	↕↕			↕↕
Traffic Volume (vph)	1095	510	627	0	0	1747
Future Volume (vph)	1095	510	627	0	0	1747
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0			4.0
Lane Util. Factor	0.97	0.91	0.95			0.95
Fr _t	0.99	0.85	1.00			1.00
Fit Protected	0.95	1.00	1.00			1.00
Satd. Flow (prot)	3426	1441	3539			3539
Fit Permitted	0.95	1.00	1.00			1.00
Satd. Flow (perm)	3426	1441	3539			3539
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1190	554	682	0	0	1899
RTOR Reduction (vph)	3	156	0	0	0	0
Lane Group Flow (vph)	1242	343	682	0	0	1899
Turn Type	Prot	Perm	NA			NA
Protected Phases	8		2			6
Permitted Phases	8					
Actuated Green, G (s)	39.6	39.6	68.4			68.4
Effective Green, g (s)	41.6	41.6	70.4			70.4
Actuated g/C Ratio	0.35	0.35	0.59			0.59
Clearance Time (s)	6.0	6.0	6.0			6.0
Vehicle Extension (s)	4.5	4.5	5.0			5.0
Lane Grp Cap (vph)	1187	499	2076			2076
v/s Ratio Prot	c0.36		0.19			c0.54
v/s Ratio Perm		0.24				
v/c Ratio	1.05	0.69	0.33			0.91
Uniform Delay, d1	39.2	33.6	12.7			22.1
Progression Factor	1.00	1.00	1.00			1.00
Incremental Delay, d2	39.2	4.6	0.4			7.7
Delay (s)	78.4	38.2	13.1			29.9
Level of Service	E	D	B			C
Approach Delay (s)	66.9		13.1			29.9
Approach LOS	E		B			C

Intersection Summary			
HCM 2000 Control Delay	42.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	91.5%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
10: Dorval Drive & QEWB Off-Ramp

BG 2043 AM.syn
04-03-2024

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔↔	↔		↕↕	↕↕	
Traffic Volume (vph)	161	638	0	883	1889	0
Future Volume (vph)	161	638	0	883	1889	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	175.0	0.0	0.0			0.0
Storage Lanes	1	1	0			0
Taper Length (m)	7.5		7.5			
Lane Util. Factor	0.97	0.91	1.00	0.95	0.95	1.00
Fr _t	0.900	0.850				
Fit Protected	0.984					
Satd. Flow (prot)	3200	1441	0	3539	3539	0
Fit Permitted	0.984					
Satd. Flow (perm)	3200	1441	0	3539	3539	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	9	9				
Link Speed (k/h)	40			60	60	
Link Distance (m)	275.5			164.3	310.2	
Travel Time (s)	24.8			9.9	18.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	175	693	0	960	2053	0
Shared Lane Traffic (%)	50%					
Lane Group Flow (vph)	522	346	0	960	2053	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	7.2			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Number of Detectors	1	1		2	2	
Detector Template	Left	Right		Thru	Thru	
Leading Detector (m)	2.0	2.0		10.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	2.0		0.6	0.6	
Detector 1 Type	CI+Ex	CI+Ex		CI+Ex	CI+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	
Detector 2 Position(m)				9.4	9.4	
Detector 2 Size(m)				0.6	0.6	
Detector 2 Type				CI+Ex	CI+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Prot	Perm		NA	NA	
Protected Phases	4			2	6	
Permitted Phases	4					

Lanes, Volumes, Timings
10: Dorval Drive & QEW EB Off-Ramp

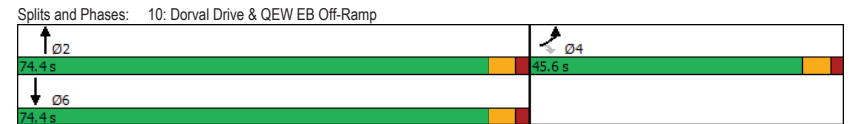
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Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Detector Phase	4	4		2	6	
Switch Phase						
Minimum Initial (s)	10.0	10.0		20.0	20.0	
Minimum Split (s)	24.0	24.0		26.0	26.0	
Total Split (s)	45.6	45.6		74.4	74.4	
Total Split (%)	38.0%	38.0%		62.0%	62.0%	
Maximum Green (s)	39.6	39.6		68.4	68.4	
Yellow Time (s)	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	4.0	4.0		5.0	5.0	
Recall Mode	None	None		Max	Max	
Walk Time (s)	0.0	0.0		7.0	7.0	
Flash Dont Walk (s)	7.0	7.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0	
Act Effct Green (s)	34.0	34.0		70.7	70.7	
Actuated g/C Ratio	0.30	0.30		0.63	0.63	
v/c Ratio	0.54	0.79		0.43	0.92	
Control Delay	34.0	48.3		12.4	28.7	
Queue Delay	0.0	0.0		0.0	0.0	
Total Delay	34.0	48.3		12.4	28.7	
LOS	C	D		B	C	
Approach Delay	39.7			12.4	28.7	
Approach LOS	D			B	C	
Queue Length 50th (m)	50.7	78.2		58.5	217.4	
Queue Length 95th (m)	67.3	118.0		83.1	#319.4	
Internal Link Dist (m)	251.5			140.3	286.2	
Turn Bay Length (m)	175.0					
Base Capacity (vph)	1192	539		2220	2220	
Starvation Cap Reductn	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	
Storage Cap Reductn	0	0		0	0	
Reduced v/c Ratio	0.44	0.64		0.43	0.92	

Intersection Summary
 Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 112.7
 Natural Cycle: 80
 Control Type: Semi Act-Uncoord
 Maximum v/c Ratio: 0.92
 Intersection Signal Delay: 27.1
 Intersection Capacity Utilization 91.5%
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Lanes, Volumes, Timings
10: Dorval Drive & QEW EB Off-Ramp

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HCM Signalized Intersection Capacity Analysis
10: Dorval Drive & QEW EB Off-Ramp

BG 2043 AM.syn
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Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔↔	↗		↕↕	↕↕	
Traffic Volume (vph)	161	638	0	883	1889	0
Future Volume (vph)	161	638	0	883	1889	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	0.91		0.95	0.95	
Flt	0.90	0.85		1.00	1.00	
Flt Protected	0.98	1.00		1.00	1.00	
Satd. Flow (prot)	3200	1441		3539	3539	
Flt Permitted	0.98	1.00		1.00	1.00	
Satd. Flow (perm)	3200	1441		3539	3539	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	175	693	0	960	2053	0
RTOR Reduction (vph)	6	6	0	0	0	0
Lane Group Flow (vph)	516	340	0	960	2053	0
Turn Type	Prot	Perm		NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4				
Actuated Green, G (s)	31.9	31.9		68.7	68.7	
Effective Green, g (s)	33.9	33.9		70.7	70.7	
Actuated g/C Ratio	0.30	0.30		0.63	0.63	
Clearance Time (s)	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	4.0	4.0		5.0	5.0	
Lane Grp Cap (vph)	963	433		2222	2222	
v/s Ratio Prot	0.16			0.27	c0.58	
v/s Ratio Perm		c0.24				
v/c Ratio	0.54	0.78		0.43	0.92	
Uniform Delay, d1	32.8	36.0		10.7	18.6	
Progression Factor	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.7	9.5		0.6	8.0	
Delay (s)	33.5	45.5		11.3	26.5	
Level of Service	C	D		B	C	
Approach Delay (s)	38.3			11.3	26.5	
Approach LOS	D			B	C	

Intersection Summary			
HCM 2000 Control Delay	25.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	112.6	Sum of lost time (s)	8.0
Intersection Capacity Utilization	91.5%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
11: Argus Rd & South Service Rd

BG 2043 AM.syn
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Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Volume (vph)	24	84	955	246	135	176
Future Volume (vph)	24	84	955	246	135	176
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Flt			0.972		0.924	
Flt Protected		0.989			0.979	
Satd. Flow (prot)	0	1384	1623	0	1547	0
Flt Permitted		0.989			0.979	
Satd. Flow (perm)	0	1384	1623	0	1547	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		177.7	145.7		103.5	
Travel Time (s)		12.8	10.5		7.5	
Confl. Peds. (#/hr)	1			1	5	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	100%	0%	3%	0%	0%	0%
Adj. Flow (vph)	26	91	1038	267	147	191
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	117	1305	0	338	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (k/h)	24			14	24	14
Sign Control		Free	Free		Stop	
Intersection Summary						
Area Type:	CBD					
Control Type:	Unsignalized					
Intersection Capacity Utilization 99.5%				ICU Level of Service F		
Analysis Period (min) 15						

HCM Unsignalized Intersection Capacity Analysis
11: Argus Rd & South Service Rd

BG 2043 AM.syn
04-03-2024

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	↕
Traffic Volume (veh/h)	24	84	955	246	135	176
Future Volume (Veh/h)	24	84	955	246	135	176
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)	26	91	1038	267	147	191
Pedestrians		1	5		1	
Lane Width (m)		3.6	3.6		3.6	
Walking Speed (m/s)		1.2	1.2		1.2	
Percent Blockage		0	0		0	
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)		358				
pX, platoon unblocked						
vC, conflicting volume	1306				1320	1174
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1306				1320	1174
tC, single (s)	5.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	3.1				3.5	3.3
p0 queue free %	91				7	19
cM capacity (veh/h)	304				159	236
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	117	1305	338			
Volume Left	26	0	147			
Volume Right	0	267	191			
eSH	304	1700	195			
Volume to Capacity	0.09	0.77	1.74			
Queue Length 95th (m)	2.2	0.0	186.7			
Control Delay (s)	5.3	0.0	393.7			
Lane LOS	A		F			
Approach Delay (s)	5.3	0.0	393.7			
Approach LOS			F			
Intersection Summary						
Average Delay			76.0			
Intersection Capacity Utilization			99.5%		ICU Level of Service	F
Analysis Period (min)			15			

Lanes, Volumes, Timings
13: GO Bus Terminal/Argus Rd & Cross Ave

BG 2043 AM.syn
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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕
Traffic Volume (vph)	51	784	20	58	916	74	30	0	71	674	24	303
Future Volume (vph)	51	784	20	58	916	74	30	0	71	674	24	303
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6
Storage Length (m)	20.0		0.0	20.0		0.0	0.0		0.0	15.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00	1.00		1.00	1.00		1.00	0.96		0.98		0.99
Frt		0.996			0.989			0.850				0.861
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1570	3125	0	818	3167	0	805	734	0	1570	1359	0
Fit Permitted	0.262			0.174			0.369			0.707		
Satd. Flow (perm)	433	3125	0	150	3167	0	312	734	0	1144	1359	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		4			16			206			121	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		162.8			72.9			81.9			113.6	
Travel Time (s)		11.7			5.2			5.9			8.2	
Confl. Peds. (#/hr)	1		3	3		1	3		20	20		3
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
Heavy Vehicles (%)	0%	1%	100%	92%	1%	5%	95%	0%	91%	0%	93%	0%
Adj. Flow (vph)	55	852	22	63	996	80	33	0	77	733	26	329
Shared Lane Traffic (%)												
Lane Group Flow (vph)	55	874	0	63	1076	0	33	77	0	733	355	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.3			3.3			3.3			3.3	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.19	1.14	1.14	1.19	1.14	1.14	1.19	1.14	1.14	1.19	1.14	1.14
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

Lanes, Volumes, Timings
13: GO Bus Terminal/Argus Rd & Cross Ave

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases		2		6				8			4	
Detector Phase	2	2		1	6			8	8		4	4
Switch Phase												
Minimum Initial (s)	22.0	22.0		8.0	22.0			10.0	10.0		10.0	10.0
Minimum Split (s)	45.0	45.0		12.5	29.0			29.0	29.0		29.0	29.0
Total Split (s)	45.5	45.5		12.5	58.0			32.0	32.0		32.0	32.0
Total Split (%)	50.6%	50.6%		13.9%	64.4%			35.6%	35.6%		35.6%	35.6%
Maximum Green (s)	39.5	39.5		8.5	52.0			26.0	26.0		26.0	26.0
Yellow Time (s)	4.0	4.0		3.0	4.0			4.0	4.0		4.0	4.0
All-Red Time (s)	2.0	2.0		1.0	2.0			2.0	2.0		2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0		0.0	-2.0			-2.0	-2.0		-2.0	-2.0
Total Lost Time (s)	4.0	4.0		4.0	4.0			4.0	4.0		4.0	4.0
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Vehicle Extension (s)	5.0	5.0		2.5	5.0			4.0	4.0		4.0	4.0
Recall Mode	Min	Min		Min	Min			Min	Min		Min	Min
Walk Time (s)	7.0	7.0		7.0	7.0			7.0	7.0		7.0	7.0
Flash Dont Walk (s)	16.0	16.0		16.0	16.0			16.0	16.0		16.0	16.0
Pedestrian Calls (#/hr)	0	0		0	0			0	0		0	0
Act Effct Green (s)	33.7	33.7		46.0	46.0			28.2	28.2		28.2	28.2
Actuated g/C Ratio	0.41	0.41		0.56	0.56			0.34	0.34		0.34	0.34
v/c Ratio	0.31	0.68		0.42	0.61			0.31	0.20		1.87	0.65
Control Delay	21.3	22.5		16.8	13.3			32.4	1.2		424.4	22.6
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0		0.0	0.0
Total Delay	21.3	22.5		16.8	13.3			32.4	1.2		424.4	22.6
LOS	C	C		B	B			C	A		F	C
Approach Delay		22.4			13.5				10.5			293.3
Approach LOS		C			B				B			F
Queue Length 50th (m)	5.9	59.3		4.6	56.2			4.0	0.0		~188.8	32.1
Queue Length 95th (m)	15.5	79.8		10.4	73.8			14.3	0.0		#281.5	71.0
Internal Link Dist (m)		138.8			48.9				57.9			89.6
Turn Bay Length (m)	20.0			20.0							15.0	
Base Capacity (vph)	220	1589		153	2099			107	387		392	545
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	0.55		0.41	0.51			0.31	0.20		1.87	0.65

Intersection Summary

Area Type:	CBD
Cycle Length:	90
Actuated Cycle Length:	82.2
Natural Cycle:	130
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	1.87
Intersection Signal Delay:	109.2
Intersection LOS:	F

Lanes, Volumes, Timings
13: GO Bus Terminal/Argus Rd & Cross Ave

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Intersection Capacity Utilization	107.2%	ICU Level of Service G
Analysis Period (min)	15	
- Volume exceeds capacity, queue is theoretically infinite.		
Queue shown is maximum after two cycles.		
# 95th percentile volume exceeds capacity, queue may be longer.		
Queue shown is maximum after two cycles.		

Splits and Phases: 13: GO Bus Terminal/Argus Rd & Cross Ave



HCM Signalized Intersection Capacity Analysis
13: GO Bus Terminal/Argus Rd & Cross Ave

BG 2043 AM.syn
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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	51	784	20	58	916	74	30	0	71	674	24	303
Future Volume (vph)	51	784	20	58	916	74	30	0	71	674	24	303
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.97		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		0.98	1.00	
Fr	1.00	1.00		1.00	0.99		1.00	0.85		1.00	0.86	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1570	3126		818	3166		804	736		1540	1359	
Flt Permitted	0.26	1.00		0.17	1.00		0.37	1.00		0.71	1.00	
Satd. Flow (perm)	434	3126		149	3166		312	736		1146	1359	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	55	852	22	63	996	80	33	0	77	733	26	329
RTOR Reduction (vph)	0	2	0	0	7	0	0	51	0	0	79	0
Lane Group Flow (vph)	55	872	0	63	1069	0	33	26	0	733	276	0
Confl. Peds. (#/hr)	1		3	3		1	3		20	20		3
Heavy Vehicles (%)	0%	1%	100%	92%	1%	5%	95%	0%	91%	0%	93%	0%
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	31.7	31.7		43.9	43.9		26.2	26.2		26.2	26.2	
Effective Green, g (s)	33.7	33.7		43.9	45.9		28.2	28.2		28.2	28.2	
Actuated g/C Ratio	0.41	0.41		0.53	0.56		0.34	0.34		0.34	0.34	
Clearance Time (s)	6.0	6.0		4.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	5.0	5.0		2.5	5.0		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	178	1283		146	1770		107	252		393	466	
v/s Ratio Prot		c0.28		0.04	c0.34			0.04			0.20	
v/s Ratio Perm	0.13			0.19			0.11			c0.64		
v/c Ratio	0.31	0.68		0.43	0.60		0.31	0.10		1.87	0.59	
Uniform Delay, d1	16.3	19.8		11.8	12.0		19.8	18.4		26.9	22.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.1	1.9		1.5	0.9		2.2	0.3		398.9	2.4	
Delay (s)	18.4	21.7		13.3	12.9		22.0	18.6		425.9	24.6	
Level of Service	B	C		B	B		C	B		F	C	
Approach Delay (s)		21.5			12.9			19.6			294.9	
Approach LOS		C			B			B			F	

Intersection Summary			
HCM 2000 Control Delay	109.5	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.16		
Actuated Cycle Length (s)	82.1	Sum of lost time (s)	12.0
Intersection Capacity Utilization	107.2%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
14: Lyons Lane/Street A & Cross Ave

BG 2043 AM.syn
04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	125	262	286	319	206	27	25	5	19	91	35	133
Future Volume (vph)	125	262	286	319	206	27	25	5	19	91	35	133
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6
Storage Length (m)	0.0	0.0	25.0	0.0	20.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Storage Lanes	1	0	1	0	1	0	1	0	1	0	1	0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	0.99		1.00	1.00		1.00	0.99		1.00	0.99	
Fr		0.922			0.983			0.879			0.881	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1540	2813	0	1570	2724	0	1570	1484	0	1468	1453	0
Flt Permitted	0.595			0.337			0.521			0.740		
Satd. Flow (perm)	957	2813	0	557	2724	0	859	1484	0	1139	1453	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		311			29			21			145	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		40.1			211.2			69.1			70.9	
Travel Time (s)		2.9			15.2			5.0			5.1	
Confl. Peds. (#/hr)	5		1	1		5	3		3	3		3
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
Heavy Vehicles (%)	2%	11%	0%	0%	19%	0%	0%	0%	0%	7%	0%	3%
Adj. Flow (vph)	136	285	311	347	224	29	27	5	21	99	38	145
Shared Lane Traffic (%)												
Lane Group Flow (vph)	136	596	0	347	253	0	27	26	0	99	183	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.3			3.3			3.3			3.3	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.19	1.14	1.14	1.19	1.14	1.14	1.19	1.14	1.14	1.19	1.14	1.14
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

Lanes, Volumes, Timings
14: Lyons Lane/Street A & Cross Ave

BG 2043 AM.syn
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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	pm+pt	NA	NA	Perm	NA	NA	Perm	NA	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases		2		6				8			4	
Detector Phase	2	2		1	6			8	8		4	4
Switch Phase												
Minimum Initial (s)	35.0	35.0		8.0	35.0			10.0	10.0		10.0	10.0
Minimum Split (s)	41.0	41.0		12.5	41.0			28.0	28.0		28.0	28.0
Total Split (s)	41.0	41.0		21.0	62.0			28.0	28.0		28.0	28.0
Total Split (%)	45.6%	45.6%		23.3%	68.9%			31.1%	31.1%		31.1%	31.1%
Maximum Green (s)	35.0	35.0		17.0	56.0			22.0	22.0		22.0	22.0
Yellow Time (s)	4.0	4.0		3.0	4.0			4.0	4.0		4.0	4.0
All-Red Time (s)	2.0	2.0		1.0	2.0			2.0	2.0		2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0		0.0	-2.0			-2.0	-2.0		-2.0	-2.0
Total Lost Time (s)	4.0	4.0		4.0	4.0			4.0	4.0		4.0	4.0
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Vehicle Extension (s)	5.0	5.0		2.5	5.0			4.0	4.0		4.0	4.0
Recall Mode	Min	Min		Min	Min			Min	Min		Min	Min
Walk Time (s)	7.0	7.0		7.0	7.0			7.0	7.0		7.0	7.0
Flash Dont Walk (s)	15.0	15.0		15.0	15.0			15.0	15.0		15.0	15.0
Pedestrian Calls (#/hr)	0	0		0	0			0	0		0	0
Act Effct Green (s)	37.3	37.3		53.2	53.2			15.6	15.6		15.6	15.6
Actuated g/C Ratio	0.49	0.49		0.69	0.69			0.20	0.20		0.20	0.20
v/c Ratio	0.29	0.39		0.64	0.13			0.16	0.08		0.43	0.45
Control Delay	16.1	7.3		11.0	4.1			28.1	13.6		33.6	11.7
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0		0.0	0.0
Total Delay	16.1	7.3		11.0	4.1			28.1	13.6		33.6	11.7
LOS	B	A		B	A			C	B		C	B
Approach Delay		8.9			8.1				21.0			19.4
Approach LOS		A			A				C			B
Queue Length 50th (m)	11.4	12.0		16.7	4.8			3.4	0.6		13.1	4.8
Queue Length 95th (m)	30.6	29.9		37.5	11.1			10.8	7.0		29.3	22.3
Internal Link Dist (m)		16.1			187.2				45.1			46.9
Turn Bay Length (m)				25.0				20.0				
Base Capacity (vph)	464	1526		611	2080			270	481		358	556
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	0.29	0.39		0.57	0.12			0.10	0.05		0.28	0.33

Intersection Summary

Area Type: CBD
 Cycle Length: 90
 Actuated Cycle Length: 76.8
 Natural Cycle: 85
 Control Type: Semi Act-Uncoord
 Maximum v/c Ratio: 0.64
 Intersection Signal Delay: 10.8
 Intersection LOS: B

Lanes, Volumes, Timings
14: Lyons Lane/Street A & Cross Ave

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Intersection Capacity Utilization 91.4%
 Analysis Period (min) 15
 ICU Level of Service F

Splits and Phases: 14: Lyons Lane/Street A & Cross Ave



HCM Signalized Intersection Capacity Analysis
14: Lyons Lane/Street A & Cross Ave

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	125	262	286	319	206	27	25	5	19	91	35	133
Future Volume (vph)	125	262	286	319	206	27	25	5	19	91	35	133
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	0.99	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.92		1.00	0.98		1.00	0.88		1.00	0.88	
Fit Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1530	2813		1570	2724		1567	1485		1463	1454	
Fit Permitted	0.60	1.00		0.34	1.00		0.52	1.00		0.74	1.00	
Satd. Flow (perm)	958	2813		556	2724		860	1485		1140	1454	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	136	285	311	347	224	29	27	5	21	99	38	145
RTOR Reduction (vph)	0	160	0	0	9	0	0	17	0	0	116	0
Lane Group Flow (vph)	136	436	0	347	244	0	27	9	0	99	67	0
Confl. Peds. (#/hr)	5		1	1		5	3		3	3		3
Heavy Vehicles (%)	2%	11%	0%	0%	19%	0%	0%	0%	0%	7%	0%	3%
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	2	2		1	6		8	8		4	4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	35.3	35.3		51.1	51.1		13.5	13.5		13.5	13.5	
Effective Green, g (s)	37.3	37.3		51.1	53.1		15.5	15.5		15.5	15.5	
Actuated g/C Ratio	0.49	0.49		0.67	0.69		0.20	0.20		0.20	0.20	
Clearance Time (s)	6.0	6.0		4.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	5.0	5.0		2.5	5.0		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	466	1369		527	1888		174	300		230	294	
v/s Ratio Prot		0.16		c0.10	0.09			0.01			0.05	
v/s Ratio Perm	0.14			c0.34			0.03			c0.09		
v/c Ratio	0.29	0.32		0.66	0.13		0.16	0.03		0.43	0.23	
Uniform Delay, d1	11.8	11.9		6.3	4.0		25.2	24.5		26.7	25.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.7	0.3		2.7	0.1		0.6	0.1		1.8	0.5	
Delay (s)	12.5	12.2		9.0	4.0		25.7	24.6		28.5	26.1	
Level of Service	B	B		A	A		C	C		C	C	
Approach Delay (s)		12.3			6.9			25.2			26.9	
Approach LOS		B			A			C			C	

Intersection Summary			
HCM 2000 Control Delay	13.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	76.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	91.4%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
16: Speers Road/Cornwall Road & Cross Avenue

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Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↕	↕	↕	↕	↕
Traffic Volume (vph)	296	874	810	40	19	435
Future Volume (vph)	296	874	810	40	19	435
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	75.0			0.0	55.0	0.0
Storage Lanes	1			0	1	2
Taper Length (m)	7.5				7.5	
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	0.88
Frt			0.993			0.850
Fit Protected	0.950				0.950	
Satd. Flow (prot)	1770	3539	3514	0	1770	2787
Fit Permitted	0.205				0.950	
Satd. Flow (perm)	382	3539	3514	0	1770	2787
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)			6			473
Link Speed (k/h)		50	50		50	
Link Distance (m)		228.9	275.4		183.9	
Travel Time (s)		16.5	19.8		13.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	322	950	880	43	21	473
Shared Lane Traffic (%)						
Lane Group Flow (vph)	322	950	923	0	21	473
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.6	3.6		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25			15	25	15
Number of Detectors	1	2	2		1	1
Detector Template	Left	Thru	Thru		Left	Right
Leading Detector (m)	2.0	10.0	10.0		2.0	2.0
Trailing Detector (m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Size(m)	2.0	0.6	0.6		2.0	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0		0.0	0.0
Detector 2 Position(m)		9.4	9.4			
Detector 2 Size(m)		0.6	0.6			
Detector 2 Type		Cl+Ex	Cl+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type	pm+pt	NA	NA		pm+pt	Perm
Protected Phases	5	2	6		7	
Permitted Phases	2				4	4

Lanes, Volumes, Timings
16: Speers Road/Cornwall Road & Cross Avenue

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Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Detector Phase	5	2	6		7	4
Switch Phase						
Minimum Initial (s)	6.0	25.0	25.0		6.0	6.0
Minimum Split (s)	12.0	35.0	35.0		29.0	29.0
Total Split (s)	26.0	61.0	35.0		29.0	29.0
Total Split (%)	28.9%	67.8%	38.9%		32.2%	32.2%
Maximum Green (s)	20.0	55.0	29.0		23.0	23.0
Yellow Time (s)	4.0	4.0	4.0		4.0	4.0
All-Red Time (s)	2.0	2.0	2.0		2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0		6.0	6.0
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?			Yes			
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	None	Max	Max		None	None
Walk Time (s)		18.0	18.0		12.0	12.0
Flash Dont Walk (s)		7.0	7.0		7.0	7.0
Pedestrian Calls (#/hr)		0	0		0	0
Act Effct Green (s)	55.0	55.0	35.9		7.4	7.4
Actuated g/C Ratio	0.74	0.74	0.48		0.10	0.10
v/c Ratio	0.61	0.36	0.54		0.12	0.67
Control Delay	10.1	4.1	16.3		31.6	8.7
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	10.1	4.1	16.3		31.6	8.7
LOS	B	A	B		C	A
Approach Delay		5.6	16.3		9.6	
Approach LOS		A	B		A	
Queue Length 50th (m)	10.8	18.7	45.0		2.9	0.0
Queue Length 95th (m)	33.9	34.9	84.3		9.2	14.0
Internal Link Dist (m)		204.9	251.4		159.9	
Turn Bay Length (m)	75.0				55.0	
Base Capacity (vph)	655	2616	1701		547	1188
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	0.49	0.36	0.54		0.04	0.40

Intersection Summary

Area Type:	Other
Cycle Length:	90
Actuated Cycle Length:	74.4
Natural Cycle:	80
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.67
Intersection Signal Delay:	10.0
Intersection Capacity Utilization:	60.1%
Intersection LOS:	B
ICU Level of Service:	B
Analysis Period (min):	15

Lanes, Volumes, Timings
16: Speers Road/Cornwall Road & Cross Avenue

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Splits and Phases: 16: Speers Road/Cornwall Road & Cross Avenue



HCM Signalized Intersection Capacity Analysis
16: Speers Road/Cornwall Road & Cross Avenue

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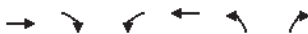
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↕↕	↕↕		↔	↕↕
Traffic Volume (vph)	296	874	810	40	19	435
Future Volume (vph)	296	874	810	40	19	435
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0		6.0	6.0
Lane Util. Factor	1.00	0.95	0.95		1.00	0.88
Frt	1.00	1.00	0.99		1.00	0.85
Fit Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	3539	3514		1770	2787
Fit Permitted	0.20	1.00	1.00		0.95	1.00
Satd. Flow (perm)	381	3539	3514		1770	2787
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	322	950	880	43	21	473
RTOR Reduction (vph)	0	0	3	0	0	426
Lane Group Flow (vph)	322	950	920	0	21	47
Turn Type	pm+pt	NA	NA		pm+pt	Perm
Protected Phases	5	2	6		7	
Permitted Phases	2				4	4
Actuated Green, G (s)	55.1	55.1	36.0		7.4	7.4
Effective Green, g (s)	55.1	55.1	36.0		7.4	7.4
Actuated g/C Ratio	0.74	0.74	0.48		0.10	0.10
Clearance Time (s)	6.0	6.0	6.0		6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	526	2617	1698		175	276
v/s Ratio Prot	c0.11	0.27	0.26		0.01	
v/s Ratio Perm	c0.35					c0.02
v/c Ratio	0.61	0.36	0.54		0.12	0.17
Uniform Delay, d1	6.2	3.5	13.5		30.6	30.7
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	2.1	0.4	1.2		0.3	0.3
Delay (s)	8.3	3.8	14.7		30.9	31.0
Level of Service	A	A	B		C	C
Approach Delay (s)		5.0	14.7		31.0	
Approach LOS		A	B		C	

Intersection Summary			
HCM 2000 Control Delay	13.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	74.5	Sum of lost time (s)	18.0
Intersection Capacity Utilization	60.1%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
19: Street C & South Service Road

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Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔			↔	↕↕	
Traffic Volume (vph)	38	56	117	29	7	11
Future Volume (vph)	38	56	117	29	7	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.919				0.919	
Fit Protected				0.962	0.980	
Satd. Flow (prot)	1712	0	0	1792	1678	0
Fit Permitted				0.962	0.980	
Satd. Flow (perm)	1712	0	0	1792	1678	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	104.5			305.2	84.1	
Travel Time (s)	7.5			22.0	6.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	41	61	127	32	8	12
Shared Lane Traffic (%)						
Lane Group Flow (vph)	102	0	0	159	20	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)		15	25		25	15
Sign Control	Free			Free	Stop	

Intersection Summary	
Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization 24.7%	ICU Level of Service A
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis
19: Street C & South Service Road

BG 2043 AM.syn
04-03-2024

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔		↔		↔	
Traffic Volume (veh/h)	38	56	117	29	7	11
Future Volume (Veh/h)	38	56	117	29	7	11
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)	41	61	127	32	8	12
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			102		358	72
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			102		358	72
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		99	99
cM capacity (veh/h)			1490		586	991
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	102	159	20			
Volume Left	0	127	8			
Volume Right	61	0	12			
sSH	1700	1490	777			
Volume to Capacity	0.06	0.09	0.03			
Queue Length 95th (m)	0.0	2.2	0.6			
Control Delay (s)	0.0	6.2	9.8			
Lane LOS	A		A			
Approach Delay (s)	0.0	6.2	9.8			
Approach LOS	A		A			
Intersection Summary						
Average Delay			4.2			
Intersection Capacity Utilization	24.7%		ICU Level of Service	A		
Analysis Period (min)	15					

Lanes, Volumes, Timings
20: Street A & South Service Road

BG 2043 AM.syn
04-03-2024

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔		↔		↔	
Traffic Volume (vph)	95	126	6	31	24	0
Future Volume (vph)	95	126	6	31	24	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t	0.923					
Fit Protected			0.992		0.950	
Satd. Flow (prot)	1719	0	0	1848	1770	0
Fit Permitted			0.992		0.950	
Satd. Flow (perm)	1719	0	0	1848	1770	0
Link Speed (k/h)	50		50		50	
Link Distance (m)	285.4		130.8		98.8	
Travel Time (s)	20.5		9.4		7.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	103	137	7	34	26	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	240	0	0	41	26	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0		0.0		3.6	
Link Offset(m)	0.0		0.0		0.0	
Crosswalk Width(m)	4.8		4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	15		25		25	
Sign Control	Free		Free		Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization 22.7%					ICU Level of Service A	
Analysis Period (min) 15						

HCM Unsignalized Intersection Capacity Analysis
20: Street A & South Service Road

BG 2043 AM.syn
04-03-2024

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔		↔		↔	
Traffic Volume (veh/h)	95	126	6	31	24	0
Future Volume (Veh/h)	95	126	6	31	24	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)	103	137	7	34	26	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			240		220	172
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			240		220	172
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		97	100
cM capacity (veh/h)			1327		765	872
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	240	41	26			
Volume Left	0	7	26			
Volume Right	137	0	0			
cSH	1700	1327	765			
Volume to Capacity	0.14	0.01	0.03			
Queue Length 95th (m)	0.0	0.1	0.8			
Control Delay (s)	0.0	1.4	9.9			
Lane LOS	A		A			
Approach Delay (s)	0.0	1.4	9.9			
Approach LOS	A		A			
Intersection Summary						
Average Delay			1.0			
Intersection Capacity Utilization			22.7%	ICU Level of Service	A	
Analysis Period (min)			15			

Lanes, Volumes, Timings
21: Argus Rd & Street 1

BG 2043 AM.syn
04-03-2024

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔		↔		↔	
Traffic Volume (vph)	0	233	0	125	768	508
Future Volume (vph)	0	233	0	125	768	508
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t	0.865		0.946			
Fit Protected						
Satd. Flow (prot)	1611	0	0	1863	1762	0
Fit Permitted						
Satd. Flow (perm)	1611	0	0	1863	1762	0
Link Speed (k/h)	50		50			
Link Distance (m)	162.1		113.6			
Travel Time (s)	11.7		8.2			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	253	0	136	835	552
Shared Lane Traffic (%)						
Lane Group Flow (vph)	253	0	0	136	1387	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6		3.3			
Link Offset(m)	0.0		0.0			
Crosswalk Width(m)	4.8		4.8			
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15		25	
Sign Control	Stop		Free		Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	92.5%			ICU Level of Service F		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
21: Argus Rd & Street 1

BG 2043 AM.syn
04-03-2024

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔	↔		↑	↑	
Traffic Volume (veh/h)	0	233	0	125	768	508
Future Volume (Veh/h)	0	233	0	125	768	508
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	253	0	136	835	552
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None	None		
Median storage (veh)						
Upstream signal (m)			114			
pX, platoon unblocked						
vC, conflicting volume	1247	1111	1387			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1247	1111	1387			
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	1	100			
cM capacity (veh/h)	192	254	494			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	253	136	1387			
Volume Left	0	0	0			
Volume Right	253	0	552			
cSH	254	494	1700			
Volume to Capacity	0.99	0.00	0.82			
Queue Length 95th (m)	77.3	0.0	0.0			
Control Delay (s)	97.6	0.0	0.0			
Lane LOS	F					
Approach Delay (s)	97.6	0.0	0.0			
Approach LOS	F					
Intersection Summary						
Average Delay		13.9				
Intersection Capacity Utilization		92.5%		ICU Level of Service	F	
Analysis Period (min)		15				

Lanes, Volumes, Timings
22: Street C & Street 1

BG 2043 AM.syn
04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	0	233	59	454	54	0	30	18	0	0	173	0
Future Volume (vph)	0	233	59	454	54	0	30	18	0	0	173	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t		0.973										
Fit Protected					0.957			0.970				
Satd. Flow (prot)	0	1812	0	0	1783	0	0	1807	0	0	1863	0
Fit Permitted					0.957			0.970				
Satd. Flow (perm)	0	1812	0	0	1783	0	0	1807	0	0	1863	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		43.0			162.1			134.3			75.8	
Travel Time (s)		3.1			11.7			9.7			5.5	
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
Adj. Flow (vph)	0	253	64	493	59	0	33	20	0	0	188	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	317	0	0	552	0	0	53	0	0	188	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Right	Left	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	69.6%						ICU Level of Service C					
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis
22: Street C & Street 1

BG 2043 AM.syn
04-03-2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↔		↔				↔			↔		
Traffic Volume (veh/h)	0	233	59	454	54	0	30	18	0	0	173	0	
Future Volume (Veh/h)	0	233	59	454	54	0	30	18	0	0	173	0	
Sign Control	Stop			Stop			Free			Free			
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)	0	253	64	493	59	0	33	20	0	0	188	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)	134												
pX, platoon unblocked													
vC, conflicting volume	304	274	188	464	274	20	188						20
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	304	274	188	464	274	20	188						20
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	59	93	0	90	100	98						100
cM capacity (veh/h)	591	618	854	314	618	1058	1386						1596
Direction, Lane #	EB 1	WB 1	NB 1	SB 1									
Volume Total	317	552	53	188									
Volume Left	0	493	33	0									
Volume Right	64	0	0	0									
eSH	655	332	1386	1596									
Volume to Capacity	0.48	1.66	0.02	0.00									
Queue Length 95th (m)	21.2	269.3	0.6	0.0									
Control Delay (s)	15.6	339.4	4.8	0.0									
Lane LOS	C	F	A										
Approach Delay (s)	15.6	339.4	4.8	0.0									
Approach LOS	C	F											
Intersection Summary													
Average Delay				173.4									
Intersection Capacity Utilization				69.6%	ICU Level of Service							C	
Analysis Period (min)				15									

Lanes, Volumes, Timings
23: GO Station West Access/Street C & Cross Ave

BG 2043 AM.syn
04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔				↔			↔	
Traffic Volume (vph)	12	373	127	607	566	35	56	0	299	220	454	12
Future Volume (vph)	12	373	127	607	566	35	56	0	299	220	454	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.0	0.0	0.0
Storage Lanes	0	0	0	0	0	0	1	0	1	0	0	0
Taper Length (m)	7.5			7.5			7.5		7.5		7.5	
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.963		0.996		0.850		0.996					
Fit Protected	0.999		0.975		0.950		0.950					
Satd. Flow (prot)	0	3405	0	0	3437	0	1770	1583	0	1770	1855	0
Fit Permitted	0.804		0.623		0.324		0.539					
Satd. Flow (perm)	0	2740	0	0	2196	0	604	1583	0	1004	1855	0
Right Turn on Red	Yes						Yes		Yes		Yes	
Satd. Flow (RTOR)	103		7		273		3					
Link Speed (k/h)	50		50		50		50					
Link Distance (m)	211.2		162.8		81.1		134.3					
Travel Time (s)	15.2		11.7		5.8		9.7					
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
Adj. Flow (vph)	13	405	138	660	615	38	61	0	325	239	493	13
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	556	0	0	1313	0	61	325	0	239	506	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)	3.3		3.3		3.6		3.6					
Link Offset(m)	0.0		0.0		0.0		0.0					
Crosswalk Width(m)	4.8		4.8		4.8		4.8					
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	25	15	25	15	25	15	25	15	25	15	25
Number of Detectors	1	2	1	2	1	2	1	2	1	2	1	2
Detector Template	Left	Thru	Left	Thru	Left	Thru	Left	Thru	Left	Thru	Left	Thru
Leading Detector (m)	2.0	10.0	2.0	10.0	2.0	10.0	2.0	10.0	2.0	10.0	2.0	10.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6	2.0	0.6	2.0	0.6	2.0	0.6	2.0	0.6	2.0	0.6
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)	9.4		9.4		9.4		9.4					
Detector 2 Size(m)	0.6		0.6		0.6		0.6					
Detector 2 Type	Cl+Ex		Cl+Ex		Cl+Ex		Cl+Ex					
Detector 2 Channel												
Detector 2 Extend (s)	0.0		0.0		0.0		0.0					
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	4		8		2		6					
Permitted Phases	4		8		2		6					

Lanes, Volumes, Timings
23: GO Station West Access/Street C & Cross Ave

BG 2043 AM.syn
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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	24.0	24.0		24.0	24.0		24.0	24.0		24.0	24.0	
Total Split (s)	25.0	25.0		25.0	25.0		25.0	25.0		25.0	25.0	
Total Split (%)	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%		50.0%	50.0%	
Maximum Green (s)	19.0	19.0		19.0	19.0		19.0	19.0		19.0	19.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		6.0			6.0			6.0			6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		19.0			19.0			19.0			19.0	
Actuated g/C Ratio		0.38			0.38			0.38			0.38	
v/c Ratio		0.50			2.08dl			0.27	0.42		0.63	0.72
Control Delay		11.4			281.0			14.5	4.7		22.2	20.6
Queue Delay		0.0			0.0			0.0	0.0		0.0	0.0
Total Delay		11.4			281.0			14.5	4.7		22.2	20.6
LOS		B			F			B	A		C	C
Approach Delay		11.4			281.0				6.2			21.1
Approach LOS		B			F				A			C
Queue Length 50th (m)		15.8			~98.2			3.8	3.0		17.5	38.4
Queue Length 95th (m)		27.6			#134.5			11.4	16.2		#44.9	#78.8
Internal Link Dist (m)		187.2			138.8				57.1			110.3
Turn Bay Length (m)											15.0	
Base Capacity (vph)		1105			838			229	770		381	706
Starvation Cap Reductn		0			0			0	0		0	0
Spillback Cap Reductn		0			0			0	0		0	0
Storage Cap Reductn		0			0			0	0		0	0
Reduced v/c Ratio		0.50			1.57			0.27	0.42		0.63	0.72

Intersection Summary

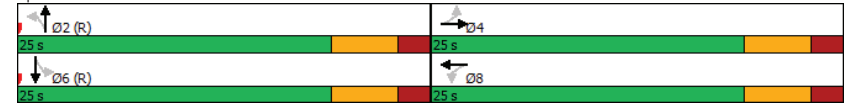
Area Type: Other
 Cycle Length: 50
 Actuated Cycle Length: 50
 Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
 Natural Cycle: 110
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.57
 Intersection Signal Delay: 131.1 Intersection LOS: F
 Intersection Capacity Utilization 99.8% ICU Level of Service F
 Analysis Period (min) 15
 ~ Volume exceeds capacity, queue is theoretically infinite.

Lanes, Volumes, Timings
23: GO Station West Access/Street C & Cross Ave

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Queue shown is maximum after two cycles.
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 dl Defacto Left Lane. Record with 1 though lane as a left lane.

Splits and Phases: 23: GO Station West Access/Street C & Cross Ave



HCM Signalized Intersection Capacity Analysis
23: GO Station West Access/Street C & Cross Ave

BG 2043 AM.syn
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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔	↔		↔	↔		↔	↔	
Traffic Volume (vph)	12	373	127	607	566	35	56	0	299	220	454	12
Future Volume (vph)	12	373	127	607	566	35	56	0	299	220	454	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0		6.0		6.0		6.0		6.0		6.0	
Lane Util. Factor	0.95		0.95		1.00		1.00		1.00		1.00	
Fr	0.96		1.00		1.00		0.85		1.00		1.00	
Flt Protected	1.00		0.98		0.95		1.00		0.95		1.00	
Satd. Flow (prot)	3403		3437		1770		1583		1770		1856	
Flt Permitted	0.80		0.62		0.32		1.00		0.54		1.00	
Satd. Flow (perm)	2739		2197		603		1583		1005		1856	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	13	405	138	660	615	38	61	0	325	239	493	13
RTOR Reduction (vph)	0	64	0	0	4	0	0	169	0	0	2	0
Lane Group Flow (vph)	0	492	0	0	1309	0	61	156	0	239	504	0
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	4		8		8		2		6		6	
Permitted Phases	4		8		8		2		6		6	
Actuated Green, G (s)	19.0		19.0		19.0		19.0		19.0		19.0	
Effective Green, g (s)	19.0		19.0		19.0		19.0		19.0		19.0	
Actuated g/C Ratio	0.38		0.38		0.38		0.38		0.38		0.38	
Clearance Time (s)	6.0		6.0		6.0		6.0		6.0		6.0	
Vehicle Extension (s)	3.0		3.0		3.0		3.0		3.0		3.0	
Lane Grp Cap (vph)	1040		834		229		601		381		705	
v/s Ratio Prot					0.10		0.10		c0.27			
v/s Ratio Perm	0.18		c0.60		0.10		0.10		0.24			
v/c Ratio	0.47		2.08dl		0.27		0.26		0.63		0.32	
Uniform Delay, d1	11.7		15.5		10.7		10.7		12.6		17.2	
Progression Factor	1.00		1.00		1.00		1.00		1.00		1.00	
Incremental Delay, d2	0.3		261.9		2.8		1.0		7.6		6.1	
Delay (s)	12.1		277.4		13.5		11.7		20.2		19.3	
Level of Service	B		F		B		B		C		B	
Approach Delay (s)	12.1		277.4		12.0		12.0		19.6		19.6	
Approach LOS	B		F		B		B		C		B	

Intersection Summary			
HCM 2000 Control Delay	130.1	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.14		
Actuated Cycle Length (s)	50.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	99.8%	ICU Level of Service	F
Analysis Period (min)	15		
dl Defacto Left Lane. Recode with 1 though lane as a left lane.			
c Critical Lane Group			

Lanes, Volumes, Timings
1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd

BG 2043 PM.syn
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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	172	145	398	1134	277	228	520	2500	851	174	1754	143
Future Volume (vph)	172	145	398	1134	277	228	520	2500	851	174	1754	143
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0		0.0		165.0		25.0		145.0		0.0	
Storage Lanes	1		1		1		1		1		1	
Taper Length (m)	7.5		7.5		7.5		7.5		7.5		7.5	
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Ped Bike Factor	0.98				0.95		0.95		0.98		0.98	
Fr			0.850				0.850				0.850	
Flt Protected	0.950		0.950				0.950				0.950	
Satd. Flow (prot)	1624	1710	1425	3120	1710	1425	1608	4577	1425	1608	4532	1425
Flt Permitted	0.577		0.348				0.098				0.108	
Satd. Flow (perm)	965	1710	1425	1143	1710	1360	166	4577	1402	183	4532	1425
Right Turn on Red			Yes				Yes				Yes	
Satd. Flow (RTOR)			255				146				307	
Link Speed (k/h)	50		50		50		50		50		50	
Link Distance (m)	347.0		285.9		280.4		353.6		25.5		25.5	
Travel Time (s)	25.0		20.6		20.2		25.5					
Confl. Peds. (#/hr)	34		34		14		14					
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
Heavy Vehicles (%)	0%	0%	2%	1%	0%	2%	1%	2%	2%	1%	3%	2%
Adj. Flow (vph)	187	158	433	1233	301	248	565	2717	925	189	1907	155
Shared Lane Traffic (%)												
Lane Group Flow (vph)	187	158	433	1233	301	248	565	2717	925	189	1907	155
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)	7.2		7.2		3.6		3.6		3.6		3.6	
Link Offset(m)	0.0		0.0		0.0		0.0		0.0		0.0	
Crosswalk Width(m)	4.8		4.8		4.8		4.8		4.8		4.8	
Two way Left Turn Lane												
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (k/h)	25		15		25		15		25		15	
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)	9.4		9.4		9.4		9.4		9.4		9.4	
Detector 2 Size(m)	0.6		0.6		0.6		0.6		0.6		0.6	
Detector 2 Type	Cl+Ex		Cl+Ex		Cl+Ex		Cl+Ex		Cl+Ex		Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)	0.0		0.0		0.0		0.0		0.0		0.0	

Lanes, Volumes, Timings

BG 2043 PM.syn

1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd

04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA	Free	pm+pt	NA	Perm	pm+pt	NA	Free	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		Free	8		8	2		Free	6		6
Detector Phase	7	4		3	8	8	5	2		1	6	6
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0	10.0	6.0	15.0		6.0	15.0	15.0
Minimum Split (s)	11.0	25.0		11.0	43.0	43.0	11.0	34.0		10.0	34.0	34.0
Total Split (s)	11.0	28.0		26.0	43.0	43.0	22.0	56.0		10.0	44.0	44.0
Total Split (%)	9.2%	23.3%		21.7%	35.8%	35.8%	18.3%	46.7%		8.3%	36.7%	36.7%
Maximum Green (s)	7.0	21.0		21.0	36.0	36.0	18.0	49.0		6.0	37.0	37.0
Yellow Time (s)	3.0	4.0		3.0	4.0	4.0	3.0	4.0		3.0	4.0	4.0
All-Red Time (s)	1.0	3.0		2.0	3.0	3.0	1.0	3.0		1.0	3.0	3.0
Lost Time Adjust (s)	0.0	-3.0		0.0	-3.0	-3.0	0.0	-3.0		0.0	-3.0	-3.0
Total Lost Time (s)	4.0	4.0		5.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	5.0		3.0	5.0	5.0	3.0	5.0		3.0	5.0	5.0
Recall Mode	None	None		None	None	None	None	C-Max		None	C-Max	C-Max
Walk Time (s)				7.0	7.0		7.0			7.0	7.0	
Flash Dont Walk (s)				29.0	29.0		20.0			20.0	20.0	
Pedestrian Calls (#/hr)				0	0		0			0	0	
Act Effct Green (s)	27.5	20.5	120.0	45.5	35.5	35.5	65.5	52.0	120.0	49.5	40.0	40.0
Actuated g/C Ratio	0.23	0.17	1.00	0.38	0.30	0.30	0.55	0.43	1.00	0.41	0.33	0.33
v/c Ratio	0.72	0.54	0.30	1.58	0.60	0.49	1.62	1.37	0.66	1.01	1.26	0.26
Control Delay	48.3	52.1	0.6	295.2	41.1	16.9	319.7	199.8	2.5	98.7	158.7	2.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	48.3	52.1	0.6	295.2	41.1	16.9	319.7	199.8	2.5	98.7	158.7	2.9
LOS	D	D	A	F	D	B	F	F	A	F	F	A
Approach Delay		22.5			213.5			172.5				143.0
Approach LOS		C			F			F				F
Queue Length 50th (m)	31.4	35.9	0.0	~192.6	63.2	19.2	~189.2	~325.9	0.0	~34.8	~217.5	0.0
Queue Length 95th (m)	48.0	56.9	0.0	#228.5	90.2	43.4	#271.0	#354.5	0.0	#94.0	#248.3	8.4
Internal Link Dist (m)		323.0			261.9			256.4				329.6
Turn Bay Length (m)	60.0			165.0		25.0	145.0			95.0		90.0
Base Capacity (vph)	259	342	1425	779	555	540	348	1983	1402	188	1510	602
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.72	0.46	0.30	1.58	0.54	0.46	1.62	1.37	0.66	1.01	1.26	0.26

Intersection Summary

Area Type: CBD
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 105.6 (88%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
 Natural Cycle: 150
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.62
 Intersection Signal Delay: 160.3
 Intersection LOS: F

Lanes, Volumes, Timings

BG 2043 PM.syn

1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd

04-03-2024

Intersection Capacity Utilization 128.3% ICU Level of Service H
 Analysis Period (min) 15
 - Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd



HCM Signalized Intersection Capacity Analysis
1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd

BG 2043 PM.syn
04-03-2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	
Traffic Volume (vph)	172	145	398	1134	277	228	520	2500	851	174	1754	143	
Future Volume (vph)	172	145	398	1134	277	228	520	2500	851	174	1754	143	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	4.0	4.0	1.0	5.0	4.0	4.0	4.0	4.0	1.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.98	1.00	1.00	1.00	
Flpb, ped/bikes	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1604	1710	1425	3120	1710	1360	1608	4577	1402	1608	4532	1425	
Flt Permitted	0.58	1.00	1.00	0.35	1.00	1.00	0.10	1.00	1.00	0.11	1.00	1.00	
Satd. Flow (perm)	974	1710	1425	1143	1710	1360	165	4577	1402	183	4532	1425	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	187	158	433	1233	301	248	565	2717	925	189	1907	155	
RTOR Reduction (vph)	0	0	0	0	0	103	0	0	0	0	0	103	
Lane Group Flow (vph)	187	158	433	1233	301	145	565	2717	925	189	1907	52	
Confl. Peds. (#/hr)	34					34			14	14			
Heavy Vehicles (%)	0%	0%	2%	1%	0%	2%	1%	2%	2%	1%	3%	2%	
Turn Type	pm+pt	NA	Free	pm+pt	NA	Perm	pm+pt	NA	Free	pm+pt	NA	Perm	
Protected Phases	7	4		3	8		5	2		1	6		
Permitted Phases	4		Free	8		8	2		Free	6		6	
Actuated Green, G (s)	24.5	17.5	120.0	43.5	32.5	32.5	62.5	49.0	120.0	46.5	37.0	37.0	
Effective Green, g (s)	24.5	20.5	120.0	43.5	35.5	35.5	62.5	52.0	120.0	46.5	40.0	40.0	
Actuated g/C Ratio	0.20	0.17	1.00	0.36	0.30	0.30	0.52	0.43	1.00	0.39	0.33	0.33	
Clearance Time (s)	4.0	7.0		5.0	7.0	7.0	4.0	7.0		4.0	7.0	7.0	
Vehicle Extension (s)	3.0	5.0		3.0	5.0	5.0	3.0	5.0		3.0	5.0	5.0	
Lane Grp Cap (vph)	235	292	1425	760	505	402	344	1983	1402	183	1510	475	
v/s Ratio Prot	0.05	0.09		c0.28	0.18		c0.29	0.59		0.08	0.42		
v/s Ratio Perm	0.12		0.30	c0.30		0.11	c0.56		0.66	0.32		0.04	
v/c Ratio	0.80	0.54	0.30	1.62	0.60	0.36	1.64	1.37	0.66	1.03	1.26	0.11	
Uniform Delay, d1	43.8	45.5	0.0	34.6	36.1	33.3	37.7	34.0	0.0	30.5	40.0	27.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	16.8	3.6	0.6	286.1	2.8	1.2	301.9	169.9	2.5	75.4	123.8	0.5	
Delay (s)	60.6	49.0	0.6	320.7	39.0	34.5	339.6	203.9	2.5	105.9	163.8	28.1	
Level of Service	E	D	A	F	D	C	F	F	A	F	F	C	
Approach Delay (s)		24.8			233.3			177.8			149.6		
Approach LOS		C			F			F			F		
Intersection Summary													
HCM 2000 Control Delay	168.5		HCM 2000 Level of Service					F					
HCM 2000 Volume to Capacity ratio	1.63												
Actuated Cycle Length (s)	120.0												
Sum of lost time (s)	17.0												
Intersection Capacity Utilization	128.3%		ICU Level of Service					H					
Analysis Period (min)	15												
c Critical Lane Group													

Lanes, Volumes, Timings
2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp

BG 2043 PM.syn
04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	31	0	361	701	143	441	0	3398	704	0	3342	13
Future Volume (vph)	31	0	361	701	143	441	0	3398	704	0	3342	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.5	3.3	3.6	3.5	3.6	3.5	3.6	3.6	3.6	3.5
Storage Length (m)	50.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		1	1		1	0		1	0		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.91	1.00	1.00	0.86	0.86
Ped Bike Factor	1.00					0.99			0.97		1.00	
Frt			0.850			0.850			0.850		0.999	
Flt Protected	0.950			0.950	0.968							
Satd. Flow (prot)	1570	0	1437	1463	1547	1409	0	4577	1439	0	4780	0
Flt Permitted	0.950			0.950	0.968							
Satd. Flow (perm)	1568	0	1437	1463	1547	1391	0	4577	1400	0	4780	0
Right Turn on Red			Yes			Yes			Yes		Yes	Yes
Satd. Flow (RTOR)			31			295			160		1	
Link Speed (k/h)		50			50		50				50	
Link Distance (m)		142.1			192.6		324.8				280.4	
Travel Time (s)		10.2			13.9		23.4				20.2	
Confl. Peds. (#/hr)	2					2	14		14	14		14
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
Heavy Vehicles (%)	0%	0%	0%	2%	1%	2%	0%	2%	1%	0%	23%	0%
Adj. Flow (vph)	34	0	392	762	155	479	0	3693	765	0	3633	14
Shared Lane Traffic (%)				40%								
Lane Group Flow (vph)	34	0	392	457	460	479	0	3693	765	0	3647	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.3			3.3			3.6		3.6		3.6
Link Offset(m)		0.0			0.0			0.0		0.0		0.0
Crosswalk Width(m)		4.8			4.8			4.8		4.8		4.8
Two way Left Turn Lane												
Headway Factor	1.19	1.14	1.16	1.19	1.14	1.16	1.14	1.14	1.14	1.14	1.14	1.16
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1		1	1		1	2		1	2		2
Detector Template	Left		Right	Left	Thru	Right		Thru	Right		Thru	
Leading Detector (m)	2.0		2.0	2.0	10.0	2.0		10.0	2.0		10.0	
Trailing Detector (m)	0.0		0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Detector 1 Position(m)	0.0		0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Detector 1 Size(m)	2.0		2.0	2.0	0.6	2.0		0.6	2.0		0.6	
Detector 1 Type	CI+Ex		CI+Ex	CI+Ex	CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Detector 1 Delay (s)	0.0		0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Detector 2 Position(m)					9.4			9.4			9.4	
Detector 2 Size(m)					0.6			0.6			0.6	
Detector 2 Type					CI+Ex			CI+Ex			CI+Ex	
Detector 2 Channel												

Lanes, Volumes, Timings

BG 2043 PM.syn

2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp

04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)					0.0			0.0				0.0
Turn Type	Prot		Perm	Perm	NA	Free	NA	NA	Free	NA		NA
Protected Phases	3			4	4			6			2	
Permitted Phases			8	4		Free		Free				
Detector Phase	3		8	4	4			6			2	
Switch Phase												
Minimum Initial (s)	7.0		10.0	10.0	10.0			5.0				28.0
Minimum Split (s)	23.0		38.0	38.0	38.0			35.0				35.0
Total Split (s)	23.0		63.0	40.0	40.0			77.0				77.0
Total Split (%)	16.4%		45.0%	28.6%	28.6%			55.0%				55.0%
Maximum Green (s)	18.0		56.0	33.0	33.0			70.0				70.0
Yellow Time (s)	3.0		4.0	4.0	4.0			4.0				4.0
All-Red Time (s)	2.0		3.0	3.0	3.0			3.0				3.0
Lost Time Adjust (s)	-1.0		-3.0	-3.0	-3.0			-3.0				-3.0
Total Lost Time (s)	4.0		4.0	4.0	4.0			4.0				4.0
Lead/Lag	Lead			Lag	Lag							
Lead-Lag Optimize?	Yes			Yes	Yes							
Vehicle Extension (s)	3.0		3.0	3.0	3.0			4.5				4.5
Recall Mode	Min		Min	Min	Min			C-Min				C-Min
Walk Time (s)	7.0		7.0	7.0	7.0			7.0				7.0
Flash Dont Walk (s)			24.0	24.0	24.0			21.0				21.0
Pedestrian Calls (#/hr)			0	0	0			0				0
Act Effct Green (s)	9.8		59.0	45.2	45.2	140.0		73.0	140.0			73.0
Actuated g/C Ratio	0.07		0.42	0.32	0.32	1.00		0.52	1.00			0.52
v/c Ratio	0.31		0.63	0.97	0.92	0.34		1.55	0.55			1.46
Control Delay	68.7		34.6	81.0	71.0	0.7		275.2	0.1			239.4
Queue Delay	0.0		0.0	0.0	0.0	0.0		0.0	0.0			0.0
Total Delay	68.7		34.6	81.0	71.0	0.7		275.2	0.1			239.4
LOS	E		C	F	E	A		F	A			F
Approach Delay		37.3			50.2			228.0				239.4
Approach LOS		D			D			F				F
Queue Length 50th (m)	9.6		82.2	137.4	135.4	0.0		~554.7	0.0			~424.8
Queue Length 95th (m)	21.2		119.6	#223.7	#217.5	0.0		m#419.1	m0.0			#440.7
Internal Link Dist (m)		118.1			168.6			300.8				256.4
Turn Bay Length (m)	50.0											
Base Capacity (vph)	213		623	472	499	1391		2386	1400			2492
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	0.16		0.63	0.97	0.92	0.34		1.55	0.55			1.46

Intersection Summary

Area Type: CBD
 Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 115.4 (82%), Referenced to phase 2:SBT and 6:NBT, Start of Green
 Natural Cycle: 150
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.55

Lanes, Volumes, Timings

BG 2043 PM.syn

2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp

04-03-2024

Intersection Signal Delay: 199.0 Intersection LOS: F
 Intersection Capacity Utilization 114.6% ICU Level of Service H
 Analysis Period (min) 15
 ~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp



HCM Signalized Intersection Capacity Analysis
 2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp

BG 2043 PM.syn
 04-03-2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	31	0	361	701	143	441	0	3398	704	0	3342	13
Future Volume (vph)	31	0	361	701	143	441	0	3398	704	0	3342	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.5	3.3	3.6	3.5	3.6	3.5	3.6	3.6	3.6	3.5
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	1.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	0.91	1.00	0.86	1.00	0.97	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	0.99	1.00	0.97	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	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	0.85	1.00	0.85	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.95	1.00	0.95	0.97	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1570	1437	1463	1547	1391	4577	1400	4782	1400	1900	1900	1900
Flt Permitted	0.95	1.00	0.95	0.97	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (perm)	1570	1437	1463	1547	1391	4577	1400	4782	1400	1900	1900	1900
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	34	0	392	762	155	479	0	3693	765	0	3633	14
RTOR Reduction (vph)	0	0	18	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	34	0	374	457	460	479	0	3693	765	0	3647	0
Confl. Peds. (#/hr)	2					2	14		14	14		14
Heavy Vehicles (%)	0%	0%	0%	2%	1%	2%	0%	2%	1%	0%	23%	0%
Turn Type	Prot	Perm	Perm	NA	Free	NA	Free	NA	Free	NA	Free	NA
Protected Phases	3			4		6				2		
Permitted Phases		8	4		Free		Free					
Actuated Green, G (s)	8.8	56.0	42.2	42.2	140.0	70.0	140.0	70.0	140.0	70.0	70.0	70.0
Effective Green, g (s)	9.8	59.0	45.2	45.2	140.0	73.0	140.0	73.0	140.0	73.0	73.0	73.0
Actuated g/C Ratio	0.07	0.42	0.32	0.32	1.00	0.52	1.00	0.52	1.00	0.52	1.00	0.52
Clearance Time (s)	5.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lane Grp Cap (vph)	109	605	472	499	1391	2386	1400	2493	1400	1900	1900	1900
v/s Ratio Prot	0.02					c0.81		0.76				
v/s Ratio Perm		0.26	c0.31	0.30	0.34		c0.55					
v/c Ratio	0.31	0.62	0.97	0.92	0.34	1.55	0.55	1.46	1.06	1.00	1.00	1.00
Uniform Delay, d1	61.9	31.7	46.7	45.7	0.0	33.5	0.0	33.5	1.06	1.00	1.00	1.00
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.06	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.6	1.9	32.9	22.6	0.7	246.7	0.1	210.5	0.1	0.1	0.1	0.1
Delay (s)	63.5	33.6	79.6	68.3	0.7	282.2	0.1	244.0	0.1	0.1	0.1	0.1
Level of Service	E	C	E	E	A	F	A	F	A	F	F	F
Approach Delay (s)	36.0			48.8			233.8			244.0		
Approach LOS	D			D			F			F		

Intersection Summary			
HCM 2000 Control Delay	203.0	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.28		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	114.6%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
 3: Trafalgar Rd & QEW EB-Off Ramp

BG 2043 PM.syn
 04-03-2024

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	1243	650	0	2836	2614	407
Future Volume (vph)	1243	650	0	2836	2614	407
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.5	3.6	3.6	3.6	3.6
Lane Util. Factor	0.97	1.00	1.00	0.91	0.91	1.00
Ped Bike Factor	0.99					
Frt	0.850			0.850		
Flt Protected	0.950					
Satd. Flow (prot)	3046	1423	0	4577	4577	1454
Flt Permitted	0.950					
Satd. Flow (perm)	3046	1402	0	4577	4577	1454
Right Turn on Red	Yes					Yes
Satd. Flow (RTOR)	1					120
Link Speed (k/h)	50		50		50	
Link Distance (m)	199.2		51.4		324.8	
Travel Time (s)	14.3		3.7		23.4	
Confl. Peds. (#/hr)	2					
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	1%	0%	2%	2%	0%
Adj. Flow (vph)	1351	707	0	3083	2841	442
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1351	707	0	3083	2841	442
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	6.6		0.0		0.0	
Link Offset(m)	0.0		0.0		0.0	
Crosswalk Width(m)	4.8		4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.19	1.16	1.14	1.14	1.14	1.14
Turning Speed (k/h)	24	14	24			14
Number of Detectors	1	1		2	2	1
Detector Template	Left	Right		Thru	Thru	Right
Leading Detector (m)	2.0	2.0		10.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	2.0	2.0		0.6	0.6	2.0
Detector 1 Type	CI+Ex	CI+Ex		CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)				9.4	9.4	
Detector 2 Size(m)				0.6	0.6	
Detector 2 Type				CI+Ex	CI+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Perm	Perm		NA	NA	Free
Protected Phases	2		2		2	

Lanes, Volumes, Timings
3: Trafalgar Rd & QEW EB-Off Ramp

BG 2043 PM.syn
04-03-2024

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Permitted Phases	4	4				Free
Detector Phase	4	4		2	2	
Switch Phase						
Minimum Initial (s)	10.0	10.0		29.0	29.0	
Minimum Split (s)	38.0	38.0		36.0	36.0	
Total Split (s)	60.0	60.0		80.0	80.0	
Total Split (%)	42.9%	42.9%		57.1%	57.1%	
Maximum Green (s)	53.0	53.0		73.0	73.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	
All-Red Time (s)	3.0	3.0		3.0	3.0	
Lost Time Adjust (s)	-3.0	-3.0		-3.0	-3.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Recall Mode	None	None		C-Max	C-Max	
Walk Time (s)	7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	24.0	24.0		22.0	22.0	
Pedestrian Calls (#/hr)	0	0		0	0	
Act Effct Green (s)	56.0	56.0		76.0	76.0	140.0
Actuated g/C Ratio	0.40	0.40		0.54	0.54	1.00
v/c Ratio	1.11	1.26		1.24	1.14	0.30
Control Delay	100.5	167.2		137.1	84.1	0.0
Queue Delay	0.0	0.0		0.0	0.0	0.0
Total Delay	100.5	167.2		137.1	84.1	0.0
LOS	F	F		F	F	A
Approach Delay	123.4			137.1	72.8	
Approach LOS	F			F	E	
Queue Length 50th (m)	~231.1	~258.9		~408.0	~351.3	0.0
Queue Length 95th (m)	#275.1	#338.0		m#296.7	m119.9	m0.0
Internal Link Dist (m)	175.2			27.4	300.8	
Turn Bay Length (m)						
Base Capacity (vph)	1218	561		2484	2484	1454
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	1.11	1.26		1.24	1.14	0.30

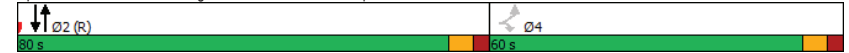
Intersection Summary
 Area Type: CBD
 Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 133.6 (95%), Referenced to phase 2:NBSB and 6:, Start of Green
 Natural Cycle: 150
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.26
 Intersection Signal Delay: 108.7 Intersection LOS: F
 Intersection Capacity Utilization 107.7% ICU Level of Service G
 Analysis Period (min) 15

Lanes, Volumes, Timings
3: Trafalgar Rd & QEW EB-Off Ramp

BG 2043 PM.syn
04-03-2024

- Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Trafalgar Rd & QEW EB-Off Ramp



HCM Signalized Intersection Capacity Analysis
3: Trafalgar Rd & QEW EB-Off Ramp

BG 2043 PM.syn
04-03-2024

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↖ ↗	↗		↕ ↕	↕ ↕	↗
Traffic Volume (vph)	1243	650	0	2836	2614	407
Future Volume (vph)	1243	650	0	2836	2614	407
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.5	3.6	3.6	3.6	3.6
Total Lost time (s)	4.0	4.0		4.0	4.0	1.0
Lane Util. Factor	0.97	1.00		0.91	0.91	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00
Fr	1.00	0.85		1.00	1.00	0.85
Fl	0.95	1.00		1.00	1.00	1.00
Satd. Flow (prot)	3046	1402		4577	4577	1454
Fl Permitted	0.95	1.00		1.00	1.00	1.00
Satd. Flow (perm)	3046	1402		4577	4577	1454
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1351	707	0	3083	2841	442
RTOR Reduction (vph)	0	1	0	0	0	0
Lane Group Flow (vph)	1351	706	0	3083	2841	442
Confl. Peds. (#/hr)		2				
Heavy Vehicles (%)	0%	1%	0%	2%	2%	0%
Turn Type	Perm	Perm		NA	NA	Free
Protected Phases				2	2	
Permitted Phases	4	4				Free
Actuated Green, G (s)	53.0	53.0		73.0	73.0	140.0
Effective Green, g (s)	56.0	56.0		76.0	76.0	140.0
Actuated g/C Ratio	0.40	0.40		0.54	0.54	1.00
Clearance Time (s)	7.0	7.0		7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	1218	560		2484	2484	1454
v/s Ratio Prot				c0.67	0.62	
v/s Ratio Perm	0.44	c0.50				0.30
v/c Ratio	1.11	1.26		1.24	1.14	0.30
Uniform Delay, d1	42.0	42.0		32.0	32.0	0.0
Progression Factor	1.00	1.00		0.91	0.50	1.00
Incremental Delay, d2	61.2	131.5		108.8	65.2	0.0
Delay (s)	103.2	173.5		137.9	81.3	0.0
Level of Service	F	F		F	F	A
Approach Delay (s)	127.4			137.9	70.4	
Approach LOS	F			F	E	

Intersection Summary			
HCM 2000 Control Delay	109.0	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.28		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	107.7%	ICU Level of Service	G
Analysis Period (min)	15		

Lanes, Volumes, Timings
4: Trafalgar Rd & Argus Rd

BG 2043 PM.syn
04-03-2024

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗		↕ ↕	↕ ↕	↗
Traffic Volume (vph)	0	153	0	3801	2312	952
Future Volume (vph)	0	153	0	3801	2312	952
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.6	3.5	3.6	3.6	3.6	3.6
Lane Util. Factor	1.00	1.00	1.00	0.91	0.91	0.91
Ped Bike Factor						
Fr		0.865			0.956	
Fl						
Fit Protected						
Satd. Flow (prot)	0	1354	0	4577	4363	0
Fl Permitted						
Satd. Flow (perm)	0	1354	0	4577	4363	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	145.7			270.2	51.4	
Travel Time (s)	10.5			19.5	3.7	
Confl. Peds. (#/hr)						24
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	8%	0%	2%	2%	3%
Adj. Flow (vph)	0	166	0	4132	2513	1035
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	166	0	4132	3548	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			3.3	3.3	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.14	1.16	1.14	1.14	1.14	1.14
Turning Speed (k/h)	24	14	24			14
Sign Control	Stop			Free	Free	

Intersection Summary	
Area Type:	CBD
Control Type:	Unsignalized
Intersection Capacity Utilization 91.1%	ICU Level of Service F
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis
4: Trafalgar Rd & Argus Rd

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Movement	EBL	EBR	NBL	NBT	SBT	SBR	
Lane Configurations		↗		↖↖	↗↗		
Traffic Volume (veh/h)	0	153	0	3801	2312	952	
Future Volume (Veh/h)	0	153	0	3801	2312	952	
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	166	0	4132	2513	1035	
Pedestrians	24						
Lane Width (m)	3.5						
Walking Speed (m/s)	1.2						
Percent Blockage	2						
Right turn flare (veh)							
Median type				None	None		
Median storage (veh)							
Upstream signal (m)				270	52		
pX, platoon unblocked	0.66	0.46	0.46				
vC, conflicting volume	4432	1379	3572				
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol	331	0	2498				
tC, single (s)	6.8	7.1	4.1				
tC, 2 stage (s)							
tF (s)	3.5	3.4	2.2				
p0 queue free %	100	66	100				
cM capacity (veh/h)	418	484	84				
Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	166	1377	1377	1377	1005	1005	1538
Volume Left	0	0	0	0	0	0	0
Volume Right	166	0	0	0	0	0	1035
sSH	484	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.34	0.81	0.81	0.81	0.59	0.59	0.90
Queue Length 95th (m)	12.1	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (s)	16.3	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	C						
Approach Delay (s)	16.3	0.0			0.0		
Approach LOS	C						
Intersection Summary							
Average Delay			0.3				
Intersection Capacity Utilization			91.1%		ICU Level of Service		F
Analysis Period (min)			15				

Lanes, Volumes, Timings
5: Trafalgar Rd & Cross Ave/South Service Rd

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖↖	↖	↗	↖	↖	↗	↖↖	↖↖	↗	↖↖	↖↖	↖↖
Traffic Volume (vph)	1160	64	213	95	128	238	332	1928	46	114	1786	373
Future Volume (vph)	1160	64	213	95	128	238	332	1928	46	114	1786	373
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.6	3.3	3.6	3.5	3.3	3.6	3.6	3.3	3.6	3.6
Storage Length (m)	130.0		0.0	25.0		0.0	50.0		0.0	25.0		0.0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.91	0.91
Ped Bike Factor		0.96		0.98				0.99				0.99
Ft		0.885				0.850		0.997				0.974
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2958	1342	0	1540	1644	1423	1496	4578	0	1570	4445	0
Fit Permitted	0.950			0.576			0.077			0.083		
Satd. Flow (perm)	2958	1342	0	912	1644	1423	121	4578	0	137	4445	0
Right Turn on Red			Yes			Yes		Yes		Yes		Yes
Satd. Flow (RTOR)		151				148		3		36		
Link Speed (k/h)		50			50			50		50		
Link Distance (m)		151.2			330.4			150.2		270.2		
Travel Time (s)		10.9			23.8			10.8		19.5		
Confl. Peds. (#/hr)			15	15			18		70	70		18
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
Heavy Vehicles (%)	3%	8%	9%	2%	4%	1%	5%	1%	0%	0%	1%	3%
Adj. Flow (vph)	1261	70	232	103	139	259	361	2096	50	124	1941	405
Shared Lane Traffic (%)												
Lane Group Flow (vph)	1261	302	0	103	139	259	361	2146	0	124	2346	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		6.6			6.6			3.3		3.3		
Link Offset(m)		0.0			0.0			0.0		0.0		
Crosswalk Width(m)		4.8			4.8			4.8		4.8		
Two way Left Turn Lane												
Headway Factor	1.19	1.14	1.14	1.19	1.14	1.16	1.19	1.14	1.14	1.19	1.14	1.14
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2	1	1	2		1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	0.6	2.0		0.6	2.0	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4		9.4		
Detector 2 Size(m)		0.6			0.6			0.6		0.6		
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex		Cl+Ex		
Detector 2 Channel												

Lanes, Volumes, Timings
5: Trafalgar Rd & Cross Ave/South Service Rd

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Perm	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	7	4			8		5	2		1	6	
Permitted Phases				8		8	2			6		
Detector Phase	7	4		8	8	8	5	2		1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	7.0	27.0		7.0	27.0	
Minimum Split (s)	17.0	25.0		25.0	25.0	25.0	11.5	34.0		11.5	34.0	
Total Split (s)	40.0	65.0		25.0	25.0	25.0	20.0	63.5		11.5	55.0	
Total Split (%)	28.6%	46.4%		17.9%	17.9%	17.9%	14.3%	45.4%		8.2%	39.3%	
Maximum Green (s)	33.0	58.0		18.0	18.0	18.0	16.0	56.5		7.5	48.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	3.0	4.0		3.0	4.0	
All-Red Time (s)	3.0	3.0		3.0	3.0	3.0	1.0	3.0		1.0	3.0	
Lost Time Adjust (s)	-3.0	-3.0		0.0	-3.0	-3.0	0.0	-3.0		0.0	-3.0	
Total Lost Time (s)	4.0	4.0		7.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lead/Lag	Lead			Lag	Lag	Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes			Yes	Yes	Yes	Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	4.0		4.0	4.0	4.0	3.0	5.0		3.0	5.0	
Recall Mode	Min	Min		Min	Min	Min	C-Max			Min	C-Max	
Walk Time (s)		7.0		7.0	7.0	7.0	7.0			7.0		
Flash Dont Walk (s)		11.0		11.0	11.0	11.0		11.0			11.0	
Pedestrian Calls (#/hr)		0		0	0	0		0			0	
Act Effct Green (s)	36.0	60.6		17.6	20.6	20.6	71.4	59.5		58.9	51.0	
Actuated g/C Ratio	0.26	0.43		0.13	0.15	0.15	0.51	0.42		0.42	0.36	
v/c Ratio	1.66	0.45		0.90	0.58	0.77	1.63	1.10		0.89	1.43	
Control Delay	335.7	15.6		120.8	65.9	40.4	314.1	94.8		43.6	230.7	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	335.7	15.6		120.8	65.9	40.4	314.1	94.8		43.6	230.7	
LOS	F	B		F	E	D	F	F		D	F	
Approach Delay		273.9			64.0			126.4			221.3	
Approach LOS		F			E			F			F	
Queue Length 50th (m)	~274.4	29.0		29.9	38.1	31.7	~141.5	~256.1		25.6	~334.2	
Queue Length 95th (m)	#318.1	55.3		#66.7	61.5	#72.5 m#104.6	m146.3	m22.0 m#266.4				
Internal Link Dist (m)		127.2			306.4			126.2			246.2	
Turn Bay Length (m)	130.0			25.0			50.0			25.0		
Base Capacity (vph)	760	669		117	246	339	222	1947		139	1642	
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	
Reduced v/c Ratio	1.66	0.45		0.88	0.57	0.76	1.63	1.10		0.89	1.43	

Intersection Summary

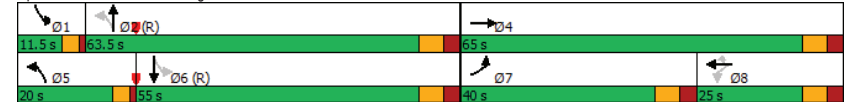
Area Type:	CBD
Cycle Length:	140
Actuated Cycle Length:	140
Offset:	128 (91%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle:	150
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	1.66

Lanes, Volumes, Timings
5: Trafalgar Rd & Cross Ave/South Service Rd

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Intersection Signal Delay: 188.0	Intersection LOS: F
Intersection Capacity Utilization 126.8%	ICU Level of Service H
Analysis Period (min) 15	
~ Volume exceeds capacity, queue is theoretically infinite.	
Queue shown is maximum after two cycles.	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	
m Volume for 95th percentile queue is metered by upstream signal.	

Splits and Phases: 5: Trafalgar Rd & Cross Ave/South Service Rd



HCM Signalized Intersection Capacity Analysis
5: Trafalgar Rd & Cross Ave/South Service Rd

BG 2043 PM.syn
04-03-2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	1160	64	213	95	128	238	332	1928	46	114	1786	373
Future Volume (vph)	1160	64	213	95	128	238	332	1928	46	114	1786	373
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.3	3.6	3.5	3.3	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)	4.0	4.0		7.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	1.00		1.00	1.00	1.00	1.00	0.91		1.00	0.91	
Frbp, ped/bikes	1.00	0.96		1.00	1.00	1.00	1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		0.98	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.88		1.00	1.00	0.85	1.00	1.00		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	2958	1342		1504	1644	1423	1496	4576		1570	4446	
Flt Permitted	0.95	1.00		0.58	1.00	1.00	0.08	1.00		0.08	1.00	
Satd. Flow (perm)	2958	1342		912	1644	1423	121	4576		138	4446	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1261	70	232	103	139	259	361	2096	50	124	1941	405
RTOR Reduction (vph)	0	86	0	0	0	126	0	2	0	0	23	0
Lane Group Flow (vph)	1261	216	0	103	139	133	361	2144	0	124	2323	0
Confl. Peds. (#/hr)			15	15			18		70	70		18
Heavy Vehicles (%)	3%	8%	9%	2%	4%	1%	5%	1%	0%	0%	1%	3%
Turn Type	Prot	NA		Perm	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		8		8	5	2		1	6	
Permitted Phases				8		8	2			6		
Actuated Green, G (s)	33.0	57.6		17.6	17.6	17.6	68.4	56.5		55.9	48.0	
Effective Green, g (s)	36.0	60.6		17.6	20.6	20.6	68.4	59.5		55.9	51.0	
Actuated g/C Ratio	0.26	0.43		0.13	0.15	0.15	0.49	0.42		0.40	0.36	
Clearance Time (s)	7.0	7.0		7.0	7.0	7.0	4.0	7.0		4.0	7.0	
Vehicle Extension (s)	3.0	4.0		4.0	4.0	4.0	3.0	5.0		3.0	5.0	
Lane Grp Cap (vph)	760	580		114	241	209	220	1944		135	1619	
v/s Ratio Prot	c0.43	0.16		0.08			c0.19	0.47		0.05	0.52	
v/s Ratio Perm				c0.11			0.09	c0.61		0.31		
v/c Ratio	1.66	0.37		0.90	0.58	0.64	1.64	1.10		0.92	1.43	
Uniform Delay, d1	52.0	26.9		60.4	55.6	56.2	45.1	40.2		34.9	44.5	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.18	1.30		1.21	1.16	
Incremental Delay, d2	302.5	0.6		55.7	4.0	6.9	290.3	47.2		9.2	196.0	
Delay (s)	354.5	27.4		116.1	59.6	63.1	343.4	99.8		51.4	247.8	
Level of Service	F	C		F	E	E	F	F		D	F	
Approach Delay (s)	291.3			73.0			134.8			238.0		
Approach LOS	F			E			F			F		

Intersection Summary			
HCM 2000 Control Delay	201.3	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.49		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	126.8%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
6: Trafalgar Rd & Cornwall Rd

BG 2043 PM.syn
04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	625	625	61	120	980	618	82	1060	108	774	860	464
Future Volume (vph)	625	625	61	120	980	618	82	1060	108	774	860	464
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.5
Storage Length (m)	80.0		0.0	80.0		0.0	25.0		0.0	80.0		0.0
Storage Lanes	2		0	1		1	1		0	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	0.97	0.95	0.95	1.00	0.95	1.00	1.00	*0.80	0.95	0.97	*0.80	1.00
Ped Bike Factor	0.99	1.00		0.99		0.98	0.99	1.00		1.00		0.97
Frt		0.987				0.850		0.986				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3016	3104	0	1570	3217	1439	1540	2692	0	2987	1368	1409
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2996	3104	0	1552	3217	1413	1530	2692	0	2976	1368	1361
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		7				339		7				270
Link Speed (k/h)		50			50			50				50
Link Distance (m)		285.8			142.3			311.4				130.3
Travel Time (s)		20.6			10.2			22.4				9.4
Confl. Peds. (#/hr)	21		14	14		21	17		10	10		17
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
Heavy Vehicles (%)	1%	3%	1%	0%	1%	1%	2%	0%	0%	2%	0%	2%
Adj. Flow (vph)	679	679	66	130	1065	672	89	1152	117	841	935	504
Shared Lane Traffic (%)												
Lane Group Flow (vph)	679	745	0	130	1065	672	89	1269	0	841	935	504
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		6.6			6.6			6.6				6.6
Link Offset(m)		0.0			0.0			0.0				0.0
Crosswalk Width(m)		4.8			4.8			4.8				4.8
Two way Left Turn Lane												
Headway Factor	1.19	1.14	1.14	1.19	1.14	1.14	1.19	1.14	1.14	1.19	1.14	1.16
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2	1	1	2		1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0		2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6		2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4				9.4
Detector 2 Size(m)		0.6			0.6			0.6				0.6
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex				Cl+Ex
Detector 2 Channel												

Lanes, Volumes, Timings
6: Trafalgar Rd & Cornwall Rd

BG 2043 PM.syn
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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA	Free	Prot	NA		Prot	NA	Perm
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases					Free							6
Detector Phase	3	8		7	4		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	7.0	10.0		7.0	10.0		7.0	20.0		7.0	20.0	20.0
Minimum Split (s)	12.0	37.0		12.0	37.0		12.0	39.0		12.0	39.0	39.0
Total Split (s)	22.0	44.0		19.0	41.0		12.0	52.0		25.0	65.0	65.0
Total Split (%)	15.7%	31.4%		13.6%	29.3%		8.6%	37.1%		17.9%	46.4%	46.4%
Maximum Green (s)	17.0	37.0		14.0	34.0		7.0	45.0		20.0	58.0	58.0
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	4.0
All-Red Time (s)	2.0	3.0		2.0	3.0		2.0	3.0		2.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-3.0		-1.0	-3.0		-1.0	-3.0		-1.0	-3.0	-3.0
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	0.2	0.2		0.2	0.2		0.2	0.2		0.2	0.2	0.2
Recall Mode	Max	Max		Max	Max		None	C-Max		Max	C-Max	C-Max
Walk Time (s)		7.0			7.0			7.0			7.0	7.0
Flash Dont Walk (s)		23.0			23.0			25.0			25.0	25.0
Pedestrian Calls (#/hr)		0			0			0			0	0
Act Effct Green (s)	18.0	40.0		15.0	37.0	140.0	8.0	48.0		21.0	61.0	61.0
Actuated g/C Ratio	0.13	0.29		0.11	0.26	1.00	0.06	0.34		0.15	0.44	0.44
v/c Ratio	1.75	0.84		0.77	1.25	0.48	1.01	1.37		1.88	1.57	0.68
Control Delay	384.5	56.0		89.7	165.9	1.1	162.8	209.1		434.2	280.1	9.0
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	384.5	56.0		89.7	165.9	1.1	162.8	209.1		434.2	280.1	9.0
LOS	F	E		F	F	A	F	F		F	F	A
Approach Delay		212.7			101.3			206.1			277.0	
Approach LOS		F			F			F			F	
Queue Length 50th (m)	~151.1	106.6		37.5	~203.6	0.0	~26.8	~305.3		~197.9	~471.8	23.0
Queue Length 95th (m)	#190.7	133.1		#71.9	#247.5	0.0	#64.7	#358.9		m#134.8	m#306.6	m14.3
Internal Link Dist (m)		261.8			118.3			287.4			106.3	
Turn Bay Length (m)	80.0			80.0			25.0			80.0		
Base Capacity (vph)	387	891		168	850	1413	88	927		448	596	745
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	0
Reduced v/c Ratio	1.75	0.84		0.77	1.25	0.48	1.01	1.37		1.88	1.57	0.68

Intersection Summary

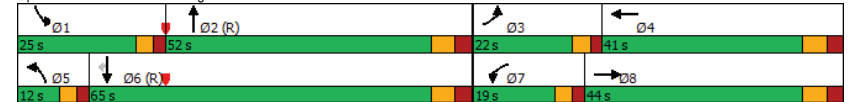
Area Type: CBD
 Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green, Master Intersection
 Natural Cycle: 150
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.88

Lanes, Volumes, Timings
6: Trafalgar Rd & Cornwall Rd

BG 2043 PM.syn
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Intersection Signal Delay: 202.5	Intersection LOS: F
Intersection Capacity Utilization 124.3%	ICU Level of Service H
Analysis Period (min) 15	
* User Entered Value	
~ Volume exceeds capacity, queue is theoretically infinite. Queue shown is maximum after two cycles.	
# 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.	
m Volume for 95th percentile queue is metered by upstream signal.	

Splits and Phases: 6: Trafalgar Rd & Cornwall Rd



HCM Signalized Intersection Capacity Analysis
6: Trafalgar Rd & Cornwall Rd

BG 2043 PM.syn
04-03-2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	625	625	61	120	980	618	82	1060	108	774	860	464
Future Volume (vph)	625	625	61	120	980	618	82	1060	108	774	860	464
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.5
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.97	0.95		1.00	0.95	1.00	1.00	*0.80		0.97	*0.80	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.98	1.00	1.00		1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Fr	1.00	0.99		1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3016	3103		1570	3217	1413	1540	2692		2987	1368	1361
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3016	3103		1570	3217	1413	1540	2692		2987	1368	1361
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	679	679	66	130	1065	672	89	1152	117	841	935	504
RTOR Reduction (vph)	0	5	0	0	0	0	0	5	0	0	0	152
Lane Group Flow (vph)	679	740	0	130	1065	672	89	1264	0	841	935	352
Confl. Peds. (#/hr)	21		14	14		21	17		10	10		17
Heavy Vehicles (%)	1%	3%	1%	0%	1%	1%	2%	0%	0%	2%	0%	2%
Turn Type	Prot	NA		Prot	NA	Free	Prot	NA		Prot	NA	Perm
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases						Free						6
Actuated Green, G (s)	17.0	37.0		14.0	34.0	140.0	7.0	45.0		20.0	58.0	58.0
Effective Green, g (s)	18.0	40.0		15.0	37.0	140.0	8.0	48.0		21.0	61.0	61.0
Actuated g/C Ratio	0.13	0.29		0.11	0.26	1.00	0.06	0.34		0.15	0.44	0.44
Clearance Time (s)	5.0	7.0		5.0	7.0		5.0	7.0		5.0	7.0	7.0
Vehicle Extension (s)	0.2	0.2		0.2	0.2		0.2	0.2		0.2	0.2	0.2
Lane Grp Cap (vph)	387	886		168	850	1413	88	922		448	596	593
v/s Ratio Prot	c0.23	0.24		0.08	c0.33		0.06	0.47		c0.28	c0.68	
v/s Ratio Perm					c0.48							0.26
v/c Ratio	1.75	0.84		0.77	1.25	0.48	1.01	1.37		1.88	1.57	0.59
Uniform Delay, d1	61.0	46.9		60.8	51.5	0.0	66.0	46.0		59.5	39.5	30.1
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.41	0.59	0.61
Incremental Delay, d2	350.0	9.2		28.6	123.5	1.1	99.1	174.0		395.5	256.7	0.4
Delay (s)	411.0	56.1		89.5	175.0	1.1	165.1	220.0		479.3	280.2	18.6
Level of Service	F	E		F	F	A	F	F		F	F	B
Approach Delay (s)	225.3			106.5			216.4			295.8		
Approach LOS	F			F			F			F		

Intersection Summary			
HCM 2000 Control Delay	214.8	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.58		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	124.3%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
7: South Service Road/Canadian Road & QEW EB Off-Ramp/Royal Windsor Drive

BG 2043 PM.syn
04-03-2024

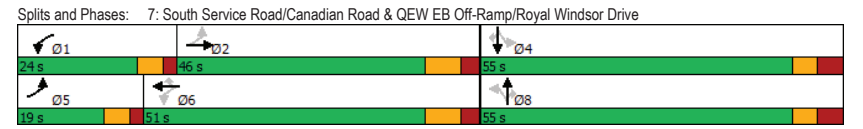
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	404	704	22	236	842	36	18	61	129	18	154	550
Future Volume (vph)	404	704	22	236	842	36	18	61	129	18	154	550
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	150.0	0.0	155.0		70.0	15.0		0.0	0.0			30.0
Storage Lanes	2	0	1		1	1		1	1			1
Taper Length (m)	7.5		7.5		7.5			7.5				7.5
Lane Util. Factor	0.97	0.95	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr		0.995				0.850		0.850				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3502	3394	0	1752	3505	1615	1805	1900	1615	1805	1900	1599
Flt Permitted	0.197			0.229			0.583			0.714		
Satd. Flow (perm)	726	3394	0	422	3505	1615	1108	1900	1615	1357	1900	1599
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3				94			140			311
Link Speed (k/h)	80			80			60					40
Link Distance (m)	324.5			247.2			158.7					215.5
Travel Time (s)	14.6			11.1			9.5					19.4
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
Heavy Vehicles (%)	0%	6%	0%	3%	3%	0%	0%	0%	0%	0%	0%	1%
Adj. Flow (vph)	439	765	24	257	915	39	20	66	140	20	167	598
Shared Lane Traffic (%)												
Lane Group Flow (vph)	439	789	0	257	915	39	20	66	140	20	167	598
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)	7.2			7.2			3.6			3.6		
Link Offset(m)	0.0			0.0			0.0			0.0		
Crosswalk Width(m)	4.8			4.8			4.8			4.8		
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	CI+Ex	CI+Ex		CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4				9.4
Detector 2 Size(m)		0.6			0.6			0.6				0.6
Detector 2 Type		CI+Ex			CI+Ex			CI+Ex				CI+Ex
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8				4

Lanes, Volumes, Timings
 7: South Service Road/Canadian Road & QEW EB Off-Ramp/Royal Windsor Drive 04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	2			6		6	8		8	4		4
Detector Phase	5	2		1	6	6	8	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	8.0	20.0		8.0	30.0	30.0	8.0	8.0	8.0	10.0	10.0	10.0
Minimum Split (s)	14.0	29.4		14.0	38.4	38.4	28.8	28.8	28.8	28.8	28.8	28.8
Total Split (s)	19.0	46.0		24.0	51.0	51.0	55.0	55.0	55.0	55.0	55.0	55.0
Total Split (%)	15.2%	36.8%		19.2%	40.8%	40.8%	44.0%	44.0%	44.0%	44.0%	44.0%	44.0%
Maximum Green (s)	13.0	37.6		18.0	42.6	42.6	47.2	47.2	47.2	47.2	47.2	47.2
Yellow Time (s)	4.0	5.4		4.0	5.4	5.4	3.7	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	2.0	3.0		2.0	3.0	3.0	4.1	4.1	4.1	4.1	4.1	4.1
Lost Time Adjust (s)	-2.0	-4.4		-2.0	-4.4	-4.4	-3.8	-3.8	-3.8	-3.8	-3.8	-3.8
Total Lost Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lead	Lag		Lead	Lag	Lag						
Lead-Lag Optimize?												
Vehicle Extension (s)	3.5	4.5		3.5	6.0	6.0	3.5	3.5	3.5	3.5	3.5	3.5
Recall Mode	None	Max		None	Max	Max	None	None	None	None	None	None
Walk Time (s)		10.0			10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Flash Dont Walk (s)		10.0			10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Pedestrian Calls (#/hr)		0			0	0	0	0	0	0	0	0
Act Effct Green (s)	59.9	46.1		62.8	47.7	47.7	33.7	33.7	33.7	33.7	33.7	33.7
Actuated g/C Ratio	0.56	0.43		0.58	0.44	0.44	0.31	0.31	0.31	0.31	0.31	0.31
v/c Ratio	0.58	0.54		0.59	0.59	0.05	0.06	0.11	0.23	0.05	0.28	0.84
Control Delay	15.1	27.5		17.6	26.7	0.1	24.3	25.1	4.9	24.0	27.9	26.6
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.1	27.5		17.6	26.7	0.1	24.3	25.1	4.9	24.0	27.9	26.6
LOS	B	C		B	C	A	C	C	A	C	C	C
Approach Delay		23.1			23.9			12.5			26.8	
Approach LOS		C			C			B			C	
Queue Length 50th (m)	21.1	67.3		24.7	80.4	0.0	3.1	10.3	0.0	3.1	27.6	62.4
Queue Length 95th (m)	40.6	115.4		53.3	128.6	0.0	8.4	20.1	12.7	8.4	44.1	110.2
Internal Link Dist (m)		300.5			223.2			134.7			191.5	
Turn Bay Length (m)	150.0			155.0		70.0	15.0					30.0
Base Capacity (vph)	806	1457		508	1557	769	534	916	851	654	916	932
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.54	0.54		0.51	0.59	0.05	0.04	0.07	0.16	0.03	0.18	0.64

Intersection Summary	
Area Type:	Other
Cycle Length:	125
Actuated Cycle Length:	107.4
Natural Cycle:	85
Control Type:	Semi Act-Uncooord
Maximum v/c Ratio:	0.84
Intersection Signal Delay:	23.5
Intersection Capacity Utilization:	75.7%
Intersection LOS:	C
ICU Level of Service:	D
Analysis Period (min):	15

Lanes, Volumes, Timings
 7: South Service Road/Canadian Road & QEW EB Off-Ramp/Royal Windsor Drive 04-03-2024



HCM Signalized Intersection Capacity Analysis
 7: South Service Road/Canadian Road & QEW EB Off-Ramp/Royal Windsor Drive 04-03-2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↕	↔	↕	↕	↔	↕	↕
Traffic Volume (vph)	404	704	22	236	842	36	18	61	129	18	154	550
Future Volume (vph)	404	704	22	236	842	36	18	61	129	18	154	550
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	0.95		1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr	1.00	1.00		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3502	3396		1752	3505	1615	1805	1900	1615	1805	1900	1599
Flt Permitted	0.20	1.00		0.23	1.00	1.00	0.58	1.00	1.00	0.71	1.00	1.00
Satd. Flow (perm)	725	3396		422	3505	1615	1109	1900	1615	1357	1900	1599
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	439	765	24	257	915	39	20	66	140	20	167	598
RTOR Reduction (vph)	0	2	0	0	0	22	0	0	96	0	0	213
Lane Group Flow (vph)	439	787	0	257	915	17	20	66	44	20	167	385
Heavy Vehicles (%)	0%	6%	0%	3%	3%	0%	0%	0%	0%	0%	0%	1%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6		6	8		8	4		4
Actuated Green, G (s)	53.4	41.6		56.6	43.2	43.2	29.8	29.8	29.8	29.8	29.8	29.8
Effective Green, g (s)	57.4	46.0		60.6	47.6	47.6	33.6	33.6	33.6	33.6	33.6	33.6
Actuated g/C Ratio	0.54	0.43		0.57	0.44	0.44	0.31	0.31	0.31	0.31	0.31	0.31
Clearance Time (s)	6.0	8.4		6.0	8.4	8.4	7.8	7.8	7.8	7.8	7.8	7.8
Vehicle Extension (s)	3.5	4.5		3.5	6.0	6.0	3.5	3.5	3.5	3.5	3.5	3.5
Lane Grp Cap (vph)	747	1459		430	1559	718	348	596	507	426	596	502
v/s Ratio Prot	0.08	0.23		c0.09	c0.26			0.03			0.09	
v/s Ratio Perm	0.24			0.25		0.01	0.02		0.03	0.01		c0.24
v/c Ratio	0.59	0.54		0.60	0.59	0.02	0.06	0.11	0.09	0.05	0.28	0.77
Uniform Delay, d1	15.1	22.6		13.7	22.3	16.7	25.6	26.1	25.9	25.6	27.6	33.2
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.3	1.4		2.4	1.6	0.1	0.1	0.1	0.1	0.1	0.3	7.1
Delay (s)	16.4	24.1		16.1	23.9	16.7	25.7	26.2	26.0	25.6	27.9	40.2
Level of Service	B	C		B	C	B	C	C	C	C	C	D
Approach Delay (s)		21.3			22.0			26.0			37.2	
Approach LOS		C			C			C			D	

Intersection Summary			
HCM 2000 Control Delay	25.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	107.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	75.7%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
 8: QEW WB Off-Ramp & Kerr Street 04-03-2024

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↕	↕	↔	↕	↕	↕
Traffic Volume (vph)	545	0	0	894	150	339
Future Volume (vph)	545	0	0	894	150	339
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)		0.0	0.0		0.0	140.0
Storage Lanes		0	0		1	1
Taper Length (m)			7.5		7.5	
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00
Fr						0.850
Flt Protected					0.950	
Satd. Flow (prot)	3574	0	0	3574	1805	1599
Flt Permitted					0.950	
Satd. Flow (perm)	3574	0	0	3574	1805	1599
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)						156
Link Speed (k/h)	60			60	40	
Link Distance (m)	130.3			194.2	262.1	
Travel Time (s)	7.8			11.7	23.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	0%	0%	1%	0%	1%
Adj. Flow (vph)	592	0	0	972	163	368
Shared Lane Traffic (%)						
Lane Group Flow (vph)	592	0	0	972	163	368
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)		15	25		25	15
Turn Type	NA			NA	Prot	Perm
Protected Phases	4			8	2	
Permitted Phases						2
Minimum Split (s)	22.5			22.5	22.5	22.5
Total Split (s)	22.5			22.5	22.5	22.5
Total Split (%)	50.0%			50.0%	50.0%	50.0%
Maximum Green (s)	18.0			18.0	18.0	18.0
Yellow Time (s)	3.5			3.5	3.5	3.5
All-Red Time (s)	1.0			1.0	1.0	1.0
Lost Time Adjust (s)	0.0			0.0	0.0	0.0
Total Lost Time (s)	4.5			4.5	4.5	4.5
Lead/Lag						
Lead-Lag Optimize?						
Walk Time (s)	7.0			7.0	7.0	7.0
Flash Dont Walk (s)	11.0			11.0	11.0	11.0
Pedestrian Calls (#/hr)	0			0	0	0
Act Effct Green (s)	18.0			18.0	18.0	18.0
Actuated g/C Ratio	0.40			0.40	0.40	0.40

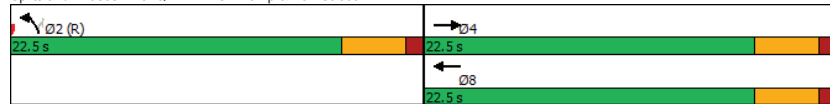
Lanes, Volumes, Timings
8: QEW WB Off-Ramp & Kerr Street

BG 2043 PM.syn
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	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
v/c Ratio	0.41			0.68	0.23	0.50
Control Delay	10.8			14.1	10.0	8.5
Queue Delay	0.0			0.0	0.0	0.0
Total Delay	10.8			14.1	10.0	8.5
LOS	B			B	A	A
Approach Delay	10.8			14.1	9.0	
Approach LOS	B			B	A	
Queue Length 50th (m)	17.4			32.7	8.4	11.4
Queue Length 95th (m)	27.6			49.4	18.0	28.4
Internal Link Dist (m)	106.3			170.2	238.1	
Turn Bay Length (m)					140.0	
Base Capacity (vph)	1429			1429	722	733
Starvation Cap Reductn	0			0	0	0
Spillback Cap Reductn	0			0	0	0
Storage Cap Reductn	0			0	0	0
Reduced v/c Ratio	0.41			0.68	0.23	0.50

Intersection Summary	
Area Type:	Other
Cycle Length:	45
Actuated Cycle Length:	45
Offset:	0 (0%), Referenced to phase 2:NBL and 6:, Start of Green
Natural Cycle:	45
Control Type:	Pretimed
Maximum v/c Ratio:	0.68
Intersection Signal Delay:	11.9
Intersection Capacity Utilization:	43.6%
Analysis Period (min):	15
Intersection LOS:	B
ICU Level of Service A:	

Splits and Phases: 8: QEW WB Off-Ramp & Kerr Street



HCM Signalized Intersection Capacity Analysis
8: QEW WB Off-Ramp & Kerr Street

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	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↗↘			↗↘	↖↗	↖↗
Traffic Volume (vph)	545	0	0	894	150	339
Future Volume (vph)	545	0	0	894	150	339
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5			4.5	4.5	4.5
Lane Util. Factor	0.95			0.95	1.00	1.00
Fr't	1.00			1.00	1.00	0.85
Fit Protected	1.00			1.00	0.95	1.00
Sat'd. Flow (prot)	3574			3574	1805	1599
Fit Permitted	1.00			1.00	0.95	1.00
Sat'd. Flow (perm)	3574			3574	1805	1599
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	592	0	0	972	163	368
RTOR Reduction (vph)	0	0	0	0	0	94
Lane Group Flow (vph)	592	0	0	972	163	274
Heavy Vehicles (%)	1%	0%	0%	1%	0%	1%
Turn Type	NA			NA	Prot	Perm
Protected Phases	4			8	2	
Permitted Phases						2
Actuated Green, G (s)	18.0			18.0	18.0	18.0
Effective Green, g (s)	18.0			18.0	18.0	18.0
Actuated g/C Ratio	0.40			0.40	0.40	0.40
Clearance Time (s)	4.5			4.5	4.5	4.5
Lane Grp Cap (vph)	1429			1429	722	639
v/s Ratio Prot	0.17			c0.27	0.09	
v/s Ratio Perm						c0.17
v/c Ratio	0.41			0.68	0.23	0.43
Uniform Delay, d1	9.7			11.1	8.9	9.8
Progression Factor	1.00			1.00	1.00	1.00
Incremental Delay, d2	0.9			2.6	0.7	2.1
Delay (s)	10.6			13.8	9.6	11.9
Level of Service	B			B	A	B
Approach Delay (s)	10.6			13.8	11.2	
Approach LOS	B			B	B	

Intersection Summary			
HCM 2000 Control Delay	12.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	43.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
9: Dorval Drive & QEWB WB Off-Ramp

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Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔↔	↔	↕↕			↕↕
Traffic Volume (vph)	920	809	1291	0	0	1371
Future Volume (vph)	920	809	1291	0	0	1371
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	190.0		0.0	0.0	
Storage Lanes	2	1		0	0	
Taper Length (m)	7.5			7.5		
Lane Util. Factor	0.97	0.91	0.95	1.00	1.00	0.95
Frt	0.966	0.850				
Flt Protected	0.963					
Satd. Flow (prot)	3344	1455	3574	0	0	3539
Flt Permitted	0.963					
Satd. Flow (perm)	3344	1455	3574	0	0	3539
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)	34	34				
Link Speed (k/h)	40		60			60
Link Distance (m)	325.1		310.2			266.9
Travel Time (s)	29.3		18.6			16.0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	1%	1%	0%	0%	2%
Adj. Flow (vph)	1000	879	1403	0	0	1490
Shared Lane Traffic (%)		33%				
Lane Group Flow (vph)	1290	589	1403	0	0	1490
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	7.2		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15		15	25	
Number of Detectors	1	1	2			2
Detector Template	Left	Right	Thru			Thru
Leading Detector (m)	2.0	2.0	10.0			10.0
Trailing Detector (m)	0.0	0.0	0.0			0.0
Detector 1 Position(m)	0.0	0.0	0.0			0.0
Detector 1 Size(m)	2.0	2.0	0.6			0.6
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex			CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0			0.0
Detector 1 Queue (s)	0.0	0.0	0.0			0.0
Detector 1 Delay (s)	0.0	0.0	0.0			0.0
Detector 2 Position(m)			9.4			9.4
Detector 2 Size(m)			0.6			0.6
Detector 2 Type			CI+Ex			CI+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type	Prot	Perm	NA			NA
Protected Phases	8		2			6

Lanes, Volumes, Timings
9: Dorval Drive & QEWB WB Off-Ramp

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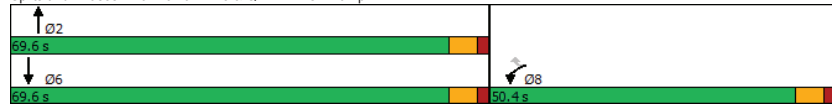
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Permitted Phases		8				
Detector Phase	8	8	2			6
Switch Phase						
Minimum Initial (s)	10.0	10.0	20.0			20.0
Minimum Split (s)	24.0	24.0	26.0			26.0
Total Split (s)	50.4	50.4	69.6			69.6
Total Split (%)	42.0%	42.0%	58.0%			58.0%
Maximum Green (s)	44.4	44.4	63.6			63.6
Yellow Time (s)	4.0	4.0	4.0			4.0
All-Red Time (s)	2.0	2.0	2.0			2.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0			-2.0
Total Lost Time (s)	4.0	4.0	4.0			4.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	4.5	4.5	5.0			5.0
Recall Mode	None	None	Max			Max
Walk Time (s)	5.0	5.0	7.0			7.0
Flash Dont Walk (s)	7.0	7.0	11.0			11.0
Pedestrian Calls (#/hr)	0	0	0			0
Act Effct Green (s)	46.4	46.4	65.6			65.6
Actuated g/C Ratio	0.39	0.39	0.55			0.55
v/c Ratio	0.98	1.01	0.72			0.77
Control Delay	56.8	75.0	23.0			24.7
Queue Delay	0.0	0.0	0.0			0.0
Total Delay	56.8	75.0	23.0			24.7
LOS	E	E	C			C
Approach Delay	62.5		23.0			24.7
Approach LOS	E		C			C
Queue Length 50th (m)	158.1	~155.9	130.7			145.7
Queue Length 95th (m)	#209.4	#241.9	158.0			175.7
Internal Link Dist (m)	301.1		286.2			242.9
Turn Bay Length (m)		190.0				
Base Capacity (vph)	1313	583	1953			1934
Starvation Cap Reductn	0	0	0			0
Spillback Cap Reductn	0	0	0			0
Storage Cap Reductn	0	0	0			0
Reduced v/c Ratio	0.98	1.01	0.72			0.77
Intersection Summary						
Area Type:	Other					
Cycle Length:	120					
Actuated Cycle Length:	120					
Natural Cycle:	65					
Control Type:	Semi Act-Uncoord					
Maximum v/c Ratio:	1.01					
Intersection Signal Delay:	39.1			Intersection LOS: D		
Intersection Capacity Utilization:	79.3%			ICU Level of Service D		
Analysis Period (min):	15					
~ Volume exceeds capacity, queue is theoretically infinite.						

Lanes, Volumes, Timings
9: Dorval Drive & QEW WB Off-Ramp

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

Splits and Phases: 9: Dorval Drive & QEW WB Off-Ramp



HCM Signalized Intersection Capacity Analysis
9: Dorval Drive & QEW WB Off-Ramp

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	WBL	WBR	NBT	NBR	SBL	SBT
Movement	↙	↘	↑	↗	↖	↓
Lane Configurations	↙↘	↗	↑↑			↓↙
Traffic Volume (vph)	920	809	1291	0	0	1371
Future Volume (vph)	920	809	1291	0	0	1371
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0			4.0
Lane Util. Factor	0.97	0.91	0.95			0.95
Fr _t	0.97	0.85	1.00			1.00
Fit Protected	0.96	1.00	1.00			1.00
Satd. Flow (prot)	3344	1455	3574			3539
Fit Permitted	0.96	1.00	1.00			1.00
Satd. Flow (perm)	3344	1455	3574			3539
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1000	879	1403	0	0	1490
RTOR Reduction (vph)	21	21	0	0	0	0
Lane Group Flow (vph)	1269	568	1403	0	0	1490
Heavy Vehicles (%)	3%	1%	1%	0%	0%	2%
Turn Type	Prot	Perm	NA			NA
Protected Phases	8		2			6
Permitted Phases		8				
Actuated Green, G (s)	44.4	44.4	63.6			63.6
Effective Green, g (s)	46.4	46.4	65.6			65.6
Actuated g/C Ratio	0.39	0.39	0.55			0.55
Clearance Time (s)	6.0	6.0	6.0			6.0
Vehicle Extension (s)	4.5	4.5	5.0			5.0
Lane Grp Cap (vph)	1293	562	1953			1934
v/s Ratio Prot	0.38		0.39			c0.42
v/s Ratio Perm		c0.39				
v/c Ratio	0.98	1.01	0.72			0.77
Uniform Delay, d1	36.4	36.8	20.3			21.3
Progression Factor	1.00	1.00	1.00			1.00
Incremental Delay, d2	20.7	40.7	2.3			3.0
Delay (s)	57.1	77.5	22.6			24.3
Level of Service	E	E	C			C
Approach Delay (s)	63.5		22.6			24.3
Approach LOS	E		C			C
Intersection Summary						
HCM 2000 Control Delay			39.2		HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio			0.87			
Actuated Cycle Length (s)			120.0		Sum of lost time (s)	8.0
Intersection Capacity Utilization			79.3%		ICU Level of Service	D
Analysis Period (min)			15			
c Critical Lane Group						

Lanes, Volumes, Timings
10: Dorval Drive & QEW EB Off-Ramp

BG 2043 PM.syn
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Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	357	424	0	1550	1466	0
Future Volume (vph)	357	424	0	1550	1466	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	175.0	0.0	0.0			0.0
Storage Lanes	1	1	0			0
Taper Length (m)	7.5		7.5			
Lane Util. Factor	0.97	0.91	1.00	0.95	0.95	1.00
Fr't	0.950	0.850				
Flt Protected	0.968					
Satd. Flow (prot)	3302	1441	0	3539	3505	0
Flt Permitted	0.968					
Satd. Flow (perm)	3302	1441	0	3539	3505	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	28	28				
Link Speed (k/h)	40			60	60	
Link Distance (m)	275.5			164.3	310.2	
Travel Time (s)	24.8			9.9	18.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	2%	0%	2%	3%	0%
Adj. Flow (vph)	388	461	0	1685	1593	0
Shared Lane Traffic (%)		42%				
Lane Group Flow (vph)	582	267	0	1685	1593	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	7.2			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Number of Detectors	1	1		2	2	
Detector Template	Left	Right		Thru	Thru	
Leading Detector (m)	2.0	2.0		10.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	2.0		0.6	0.6	
Detector 1 Type	CI+Ex	CI+Ex		CI+Ex	CI+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	
Detector 2 Position(m)				9.4	9.4	
Detector 2 Size(m)				0.6	0.6	
Detector 2 Type				CI+Ex	CI+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Prot	Perm		NA	NA	
Protected Phases	4			2	6	

Lanes, Volumes, Timings
10: Dorval Drive & QEW EB Off-Ramp

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Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Permitted Phases		4				
Detector Phase	4	4		2	6	
Switch Phase						
Minimum Initial (s)	10.0	10.0		20.0	20.0	
Minimum Split (s)	24.0	24.0		26.0	26.0	
Total Split (s)	45.6	45.6		74.4	74.4	
Total Split (%)	38.0%	38.0%		62.0%	62.0%	
Maximum Green (s)	39.6	39.6		68.4	68.4	
Yellow Time (s)	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	4.0	4.0		5.0	5.0	
Recall Mode	None	None		Max	Max	
Walk Time (s)	0.0	0.0		7.0	7.0	
Flash Dont Walk (s)	7.0	7.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0	
Act Effct Green (s)	28.0	28.0		70.7	70.7	
Actuated g/C Ratio	0.26	0.26		0.66	0.66	
v/c Ratio	0.66	0.67		0.72	0.69	
Control Delay	36.7	39.8		15.0	14.2	
Queue Delay	0.0	0.0		0.0	0.0	
Total Delay	36.7	39.8		15.0	14.2	
LOS	D	D		B	B	
Approach Delay	37.7			15.0	14.2	
Approach LOS	D			B	B	
Queue Length 50th (m)	55.5	51.4		110.2	100.1	
Queue Length 95th (m)	73.3	82.0		187.3	170.5	
Internal Link Dist (m)	251.5			140.3	286.2	
Turn Bay Length (m)	175.0					
Base Capacity (vph)	1309	581		2344	2322	
Starvation Cap Reductn	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	
Storage Cap Reductn	0	0		0	0	
Reduced v/c Ratio	0.44	0.46		0.72	0.69	
Intersection Summary						
Area Type:	Other					
Cycle Length:	120					
Actuated Cycle Length:	106.7					
Natural Cycle:	60					
Control Type:	Semi Act-Uncoord					
Maximum v/c Ratio:	0.72					
Intersection Signal Delay:	19.4			Intersection LOS: B		
Intersection Capacity Utilization:	79.3%			ICU Level of Service D		
Analysis Period (min)	15					

Lanes, Volumes, Timings
10: Dorval Drive & QEW EB Off-Ramp

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Splits and Phases: 10: Dorval Drive & QEW EB Off-Ramp



HCM Signalized Intersection Capacity Analysis
10: Dorval Drive & QEW EB Off-Ramp

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	EBL	EBR	NBL	NBT	SBT	SBR
Movement						
Lane Configurations	↔↔	↔		↕↕	↕↕	
Traffic Volume (vph)	357	424	0	1550	1466	0
Future Volume (vph)	357	424	0	1550	1466	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	0.91		0.95	0.95	
Frt	0.95	0.85		1.00	1.00	
Fit Protected	0.97	1.00		1.00	1.00	
Satd. Flow (prot)	3301	1441		3539	3505	
Fit Permitted	0.97	1.00		1.00	1.00	
Satd. Flow (perm)	3301	1441		3539	3505	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	388	461	0	1685	1593	0
RTOR Reduction (vph)	21	21	0	0	0	0
Lane Group Flow (vph)	561	246	0	1685	1593	0
Heavy Vehicles (%)	3%	2%	0%	2%	3%	0%
Turn Type	Prot	Perm		NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4				
Actuated Green, G (s)	26.0	26.0		68.7	68.7	
Effective Green, g (s)	28.0	28.0		70.7	70.7	
Actuated g/C Ratio	0.26	0.26		0.66	0.66	
Clearance Time (s)	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	4.0	4.0		5.0	5.0	
Lane Grp Cap (vph)	866	378		2344	2322	
v/s Ratio Prot	0.17			c0.48	0.45	
v/s Ratio Perm		c0.17				
v/c Ratio	0.65	0.65		0.72	0.69	
Uniform Delay, d1	35.0	35.0		11.6	11.1	
Progression Factor	1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.9	4.4		1.9	1.7	
Delay (s)	36.9	39.4		13.5	12.8	
Level of Service	D	D		B	B	
Approach Delay (s)	37.7			13.5	12.8	
Approach LOS	D			B	B	
Intersection Summary						
HCM 2000 Control Delay			18.2		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.70			
Actuated Cycle Length (s)			106.7		Sum of lost time (s)	8.0
Intersection Capacity Utilization			79.3%		ICU Level of Service	D
Analysis Period (min)			15			
c Critical Lane Group						

Lanes, Volumes, Timings
11: Argus Rd & South Service Rd

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Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Volume (vph)	14	13	584	353	80	98
Future Volume (vph)	14	13	584	353	80	98
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt			0.949		0.926	
Flt Protected		0.975			0.978	
Satd. Flow (prot)	0	1569	1528	0	1549	0
Flt Permitted		0.975			0.978	
Satd. Flow (perm)	0	1569	1528	0	1549	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		177.7	145.7		103.5	
Travel Time (s)		12.8	10.5		7.5	
Confl. Peds. (#/hr)					5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	13%	10%	0%	0%	0%
Adj. Flow (vph)	15	14	635	384	87	107
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	29	1019	0	194	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (k/h)	24			14	24	14
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type: CBD
Control Type: Unsignalized
Intersection Capacity Utilization 76.4%
Analysis Period (min) 15
ICU Level of Service D

HCM Unsignalized Intersection Capacity Analysis
11: Argus Rd & South Service Rd

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Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Volume (veh/h)	14	13	584	353	80	98
Future Volume (Veh/h)	14	13	584	353	80	98
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)	15	14	635	384	87	107
Pedestrians			5			
Lane Width (m)			3.6			
Walking Speed (m/s)			1.2			
Percent Blockage			0			
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)		358				
pX, platoon unblocked						
vC, conflicting volume	1019				876	827
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1019				876	827
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				72	71
cM capacity (veh/h)	689				314	375

Direction, Lane #

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	29	1019	194
Volume Left	15	0	87
Volume Right	0	384	107
eSH	689	1700	345
Volume to Capacity	0.02	0.60	0.56
Queue Length 95th (m)	0.5	0.0	26.3
Control Delay (s)	5.5	0.0	28.1
Lane LOS	A		D
Approach Delay (s)	5.5	0.0	28.1
Approach LOS			D

Intersection Summary

Average Delay 4.5
Intersection Capacity Utilization 76.4%
Analysis Period (min) 15
ICU Level of Service D

Lanes, Volumes, Timings
13: GO Bus Terminal/Argus Rd & Cross Ave

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	40	1307	24	53	620	177	22	3	68	510	28	87
Future Volume (vph)	40	1307	24	53	620	177	22	3	68	510	28	87
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6
Storage Length (m)	20.0	0.0	20.0	0.0	0.0	0.0	0.0	15.0	0.0	0.0	0.0	0.0
Storage Lanes	1	0	1	0	1	0	1	0	1	0	1	0
Taper Length (m)	7.5		7.5		7.5		7.5		7.5		7.5	
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	1.00			0.99	0.99	0.99	0.97	0.98	0.98	0.98	
Frt	0.997				0.967			0.856		0.886		
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1570	3180	0	797	3116	0	785	707	0	1570	1198	0
Flt Permitted	0.327			0.090			0.660			0.707		
Satd. Flow (perm)	538	3180	0	76	3116	0	539	707	0	1144	1198	0
Right Turn on Red			Yes		Yes		Yes		Yes		Yes	
Satd. Flow (RTOR)		3		75			74		95			
Link Speed (k/h)		50		50			50		50			
Link Distance (m)		164.3		72.9			81.9		115.7			
Travel Time (s)		11.8		5.2			5.9		8.3			
Confl. Peds. (#/hr)	9		4	4		9	12		20	20		12
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
Heavy Vehicles (%)	0%	0%	100%	97%	0%	0%	100%	100%	100%	0%	100%	0%
Adj. Flow (vph)	43	1421	26	58	674	192	24	3	74	554	30	95
Shared Lane Traffic (%)												
Lane Group Flow (vph)	43	1447	0	58	866	0	24	77	0	554	125	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.3			3.3			3.3			3.3	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.19	1.14	1.14	1.19	1.14	1.14	1.19	1.14	1.14	1.19	1.14	1.14
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

Lanes, Volumes, Timings
13: GO Bus Terminal/Argus Rd & Cross Ave

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6		8		8		4	
Permitted Phases		2		6			8		8		4	
Detector Phases		2	2	1	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	22.0	22.0		8.0	22.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	45.0	45.0		12.5	29.0		29.0	29.0		29.0	29.0	
Total Split (s)	46.5	46.5		12.5	59.0		31.0	31.0		31.0	31.0	
Total Split (%)	51.7%	51.7%		13.9%	65.6%		34.4%	34.4%		34.4%	34.4%	
Maximum Green (s)	40.5	40.5		8.5	53.0		25.0	25.0		25.0	25.0	
Yellow Time (s)	4.0	4.0		3.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		1.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0		0.0	-2.0		-2.0	-2.0		-2.0	-2.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Vehicle Extension (s)	5.0	5.0		2.5	5.0		4.0	4.0		4.0	4.0	
Recall Mode	Min	Min		Min	Min		Min	Min		Min	Min	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	16.0	16.0		16.0	16.0		16.0	16.0		16.0	16.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	42.5	42.5		54.7	54.7		27.0	27.0		27.0	27.0	
Actuated g/C Ratio	0.47	0.47		0.61	0.61		0.30	0.30		0.30	0.30	
v/c Ratio	0.17	0.96		0.52	0.45		0.15	0.29		1.61	0.29	
Control Delay	15.8	39.2		30.1	9.3		26.0	9.7		313.7	10.1	
Queue Delay	0.0	8.6		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	15.8	47.8		30.1	9.3		26.0	9.7		313.7	10.1	
LOS	B	D		C	A		C	A		F	B	
Approach Delay		46.9			10.6			13.6			257.8	
Approach LOS		D			B			B			F	
Queue Length 50th (m)	4.3	127.0		4.0	36.4		3.2	0.4		-145.0	3.9	
Queue Length 95th (m)	11.3	#183.2		#17.4	49.5		9.9	11.2		#209.4	17.4	
Internal Link Dist (m)		140.3			48.9			57.9			91.7	
Turn Bay Length (m)	20.0			20.0						15.0		
Base Capacity (vph)	255	1508		114	1939		162	264		344	426	
Starvation Cap Reductn	0	72		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	0.17	1.01		0.51	0.45		0.15	0.29		1.61	0.29	

Intersection Summary

Area Type: CBD
 Cycle Length: 90
 Actuated Cycle Length: 89.7
 Natural Cycle: 120
 Control Type: Semi Act-Uncoord
 Maximum v/c Ratio: 1.61
 Intersection Signal Delay: 80.2
 Intersection LOS: F

Lanes, Volumes, Timings
13: GO Bus Terminal/Argus Rd & Cross Ave

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Intersection Capacity Utilization 93.7% ICU Level of Service F
Analysis Period (min) 15
- Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 13: GO Bus Terminal/Argus Rd & Cross Ave



HCM Signalized Intersection Capacity Analysis
13: GO Bus Terminal/Argus Rd & Cross Ave

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	40	1307	24	53	620	177	22	3	68	510	28	87
Future Volume (vph)	40	1307	24	53	620	177	22	3	68	510	28	87
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	0.99		1.00	0.97		1.00	0.98	
Flpb, ped/bikes	0.99	1.00		1.00	1.00		0.99	1.00		0.98	1.00	
Frt	1.00	1.00		1.00	0.97		1.00	0.86		1.00	0.89	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1562	3181		797	3115		776	707		1537	1198	
Flt Permitted	0.33	1.00		0.09	1.00		0.66	1.00		0.71	1.00	
Satd. Flow (perm)	538	3181		75	3115		539	707		1144	1198	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	43	1421	26	58	674	192	24	3	74	554	30	95
RTOR Reduction (vph)	0	2	0	0	29	0	0	52	0	0	66	0
Lane Group Flow (vph)	43	1445	0	58	837	0	24	25	0	554	59	0
Confl. Peds. (#/hr)	9		4	4		9	12		20	20		12
Heavy Vehicles (%)	0%	0%	100%	97%	0%	0%	100%	100%	100%	0%	100%	0%
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	40.5	40.5		52.7	52.7		25.0	25.0		25.0	25.0	
Effective Green, g (s)	42.5	42.5		52.7	54.7		27.0	27.0		27.0	27.0	
Actuated g/C Ratio	0.47	0.47		0.59	0.61		0.30	0.30		0.30	0.30	
Clearance Time (s)	6.0	6.0		4.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	5.0	5.0		2.5	5.0		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	254	1507		110	1899		162	212		344	360	
v/s Ratio Prot		c0.45		c0.05	0.27			0.04			0.05	
v/s Ratio Perm	0.08			0.26			0.04			c0.48		
v/c Ratio	0.17	0.96		0.53	0.44		0.15	0.12		1.61	0.16	
Uniform Delay, d1	13.5	22.8		16.3	9.3		22.9	22.7		31.4	23.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.7	14.8		3.4	0.3		0.6	0.3		287.9	0.3	
Delay (s)	14.2	37.5		19.7	9.7		23.5	23.1		319.2	23.3	
Level of Service	B	D		B	A		C	C		F	C	
Approach Delay (s)		36.9			10.3			23.2			264.8	
Approach LOS		D			B			C			F	

Intersection Summary			
HCM 2000 Control Delay	77.2	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.14		
Actuated Cycle Length (s)	89.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	93.7%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
14: Lyons Lane/Street A & Cross Ave

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	68	257	19	20	464	28	340	6	230	46	3	135
Future Volume (vph)	68	257	19	20	464	28	340	6	230	46	3	135
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6
Storage Length (m)	0.0	0.0	25.0	0.0	20.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Storage Lanes	1	0	1	0	1	0	1	0	1	0	1	0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00	1.00		1.00	1.00		1.00	0.98		1.00	0.99	
Frt		0.989			0.992			0.854			0.853	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1525	2911	0	1570	3073	0	1570	1436	0	1570	1412	0
Flt Permitted	0.453			0.496			0.637			0.497		
Satd. Flow (perm)	725	2911	0	819	3073	0	1052	1436	0	819	1412	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		11			11			250			147	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		40.1			209.8			69.1			70.9	
Travel Time (s)		2.9			15.1			5.0			5.1	
Confl. Peds. (#/hr)	3		1	1		3	1		4	4		1
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
Heavy Vehicles (%)	3%	11%	0%	0%	5%	0%	0%	0%	0%	0%	0%	2%
Adj. Flow (vph)	74	279	21	22	504	30	370	7	250	50	3	147
Shared Lane Traffic (%)												
Lane Group Flow (vph)	74	300	0	22	534	0	370	257	0	50	150	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.3			3.3			3.3			3.3	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.19	1.14	1.14	1.19	1.14	1.14	1.19	1.14	1.14	1.19	1.14	1.14
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

Lanes, Volumes, Timings
14: Lyons Lane/Street A & Cross Ave

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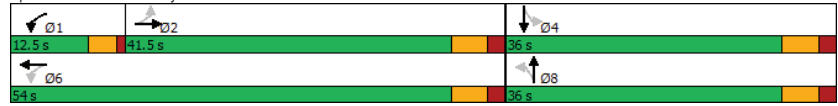
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6		8		8		4	
Permitted Phases		2		6			8		8		4	
Detector Phases		2	2	1	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	35.0	35.0		8.0	35.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	41.0	41.0		12.5	41.0		28.0	28.0		28.0	28.0	
Total Split (s)	41.5	41.5		12.5	54.0		36.0	36.0		36.0	36.0	
Total Split (%)	46.1%	46.1%		13.9%	60.0%		40.0%	40.0%		40.0%	40.0%	
Maximum Green (s)	35.5	35.5		8.5	48.0		30.0	30.0		30.0	30.0	
Yellow Time (s)	4.0	4.0		3.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		1.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0		0.0	-2.0		-2.0	-2.0		-2.0	-2.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Vehicle Extension (s)	5.0	5.0		2.5	5.0		4.0	4.0		4.0	4.0	
Recall Mode	Min	Min		Min	Min		Min	Min		Min	Min	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	15.0	15.0		15.0	15.0		15.0	15.0		15.0	15.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	37.0	37.0		49.0	49.0		32.0	32.0		32.0	32.0	
Actuated g/C Ratio	0.42	0.42		0.55	0.55		0.36	0.36		0.36	0.36	
v/c Ratio	0.25	0.25		0.04	0.31		0.98	0.38		0.17	0.25	
Control Delay	19.8	16.9		9.4	11.3		72.1	4.9		21.5	4.9	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	19.8	16.9		9.4	11.3		72.1	4.9		21.5	4.9	
LOS	B	B		A	B		E	A		C	A	
Approach Delay		17.5			11.2			44.5			9.0	
Approach LOS		B			B			D			A	
Queue Length 50th (m)	8.4	17.2		1.7	25.1		64.8	0.8		6.1	0.3	
Queue Length 95th (m)	19.0	26.6		5.0	35.3		#122.8	16.6		14.7	12.6	
Internal Link Dist (m)		16.1			185.8			45.1			46.9	
Turn Bay Length (m)				25.0			20.0					
Base Capacity (vph)	305	1232		522	1731		378	676		294	601	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.24	0.24		0.04	0.31		0.98	0.38		0.17	0.25	
Intersection Summary												
Area Type:	CBD											
Cycle Length:	90											
Actuated Cycle Length:	89											
Natural Cycle:	85											
Control Type:	Semi Act-Uncoord											
Maximum v/c Ratio:	0.98											
Intersection Signal Delay:	24.2						Intersection LOS: C					

Lanes, Volumes, Timings
14: Lyons Lane/Street A & Cross Ave

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Intersection Capacity Utilization 102.4% ICU Level of Service G
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 14: Lyons Lane/Street A & Cross Ave



HCM Signalized Intersection Capacity Analysis
14: Lyons Lane/Street A & Cross Ave

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	68	257	19	20	464	28	340	6	230	46	3	135
Future Volume (vph)	68	257	19	20	464	28	340	6	230	46	3	135
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.98		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	0.99		1.00	0.85		1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1520	2912		1569	3072		1569	1437		1566	1412	
Flt Permitted	0.45	1.00		0.50	1.00		0.64	1.00		0.50	1.00	
Satd. Flow (perm)	726	2912		819	3072		1052	1437		819	1412	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	74	279	21	22	504	30	370	7	250	50	3	147
RTOR Reduction (vph)	0	6	0	0	5	0	0	160	0	0	94	0
Lane Group Flow (vph)	74	294	0	22	529	0	370	97	0	50	56	0
Confl. Peds. (#/hr)	3		1	1		3	1		4	4		1
Heavy Vehicles (%)	3%	11%	0%	0%	5%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	35.0	35.0		47.0	47.0		30.0	30.0		30.0	30.0	
Effective Green, g (s)	37.0	37.0		47.0	49.0		32.0	32.0		32.0	32.0	
Actuated g/C Ratio	0.42	0.42		0.53	0.55		0.36	0.36		0.36	0.36	
Clearance Time (s)	6.0	6.0		4.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	5.0	5.0		2.5	5.0		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	301	1210		499	1691		378	516		294	507	
v/s Ratio Prot		0.10		0.00	0.17			0.07			0.04	
v/s Ratio Perm	0.10			0.02			0.35			0.06		
v/c Ratio	0.25	0.24		0.04	0.31		0.98	0.19		0.17	0.11	
Uniform Delay, d1	16.9	16.9		10.2	10.9		28.2	19.6		19.4	19.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.9	0.2		0.0	0.2		40.3	0.2		0.4	0.1	
Delay (s)	17.8	17.1		10.2	11.1		68.5	19.8		19.8	19.1	
Level of Service	B	B		B	B		E	B		B	B	
Approach Delay (s)		17.3			11.0			48.5			19.3	
Approach LOS		B			B			D			B	
Intersection Summary												
HCM 2000 Control Delay				26.7			HCM 2000 Level of Service				C	
HCM 2000 Volume to Capacity ratio				0.61								
Actuated Cycle Length (s)				89.0			Sum of lost time (s)			12.0		
Intersection Capacity Utilization				102.4%			ICU Level of Service			G		
Analysis Period (min)				15								
c Critical Lane Group												

Lanes, Volumes, Timings
16: Speers Road/Cornwall Road & Cross Avenue

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Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↕↕	↕↕		↕	↕↕
Traffic Volume (vph)	376	1000	1098	46	12	609
Future Volume (vph)	376	1000	1098	46	12	609
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	75.0			0.0	55.0	0.0
Storage Lanes	1			0	1	2
Taper Length (m)	7.5				7.5	
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	0.88
Frt			0.994			0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1770	3539	3518	0	1770	2787
Flt Permitted	0.100				0.950	
Satd. Flow (perm)	186	3539	3518	0	1770	2787
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)			5			632
Link Speed (k/h)		50	50		50	
Link Distance (m)		189.7	274.5		184.2	
Travel Time (s)		13.7	19.8		13.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	409	1087	1193	50	13	662
Shared Lane Traffic (%)						
Lane Group Flow (vph)	409	1087	1243	0	13	662
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.6	3.6		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25			15	25	15
Number of Detectors	1	2	2		1	1
Detector Template	Left	Thru	Thru		Left	Right
Leading Detector (m)	2.0	10.0	10.0		2.0	2.0
Trailing Detector (m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Size(m)	2.0	0.6	0.6		2.0	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0		0.0	0.0
Detector 2 Position(m)		9.4	9.4			
Detector 2 Size(m)		0.6	0.6			
Detector 2 Type		Cl+Ex	Cl+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type	pm+pt	NA	NA		pm+pt	Perm
Protected Phases	5	2	6		7	
Permitted Phases	2				4	4

Lanes, Volumes, Timings
16: Speers Road/Cornwall Road & Cross Avenue

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Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Detector Phase	5	2	6		7	4
Switch Phase						
Minimum Initial (s)	6.0	5.0	5.0		5.0	5.0
Minimum Split (s)	12.0	33.5	33.5		27.5	27.5
Total Split (s)	22.0	62.0	40.0		28.0	28.0
Total Split (%)	24.4%	68.9%	44.4%		31.1%	31.1%
Maximum Green (s)	16.0	56.0	34.0		22.0	22.0
Yellow Time (s)	4.0	4.0	4.0		4.0	4.0
All-Red Time (s)	2.0	2.0	2.0		2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0		6.0	6.0
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?	Yes		Yes			
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	None	Max	Max		None	None
Walk Time (s)		18.0	18.0		12.0	12.0
Flash Dont Walk (s)		7.0	7.0		7.0	7.0
Pedestrian Calls (#/hr)		0	0		0	0
Act Effct Green (s)	56.1	56.1	34.1		8.2	8.2
Actuated g/C Ratio	0.73	0.73	0.45		0.11	0.11
v/c Ratio	0.87	0.42	0.79		0.07	0.77
Control Delay	40.2	4.9	23.5		30.2	10.2
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	40.2	4.9	23.5		30.2	10.2
LOS	D	A	C		C	B
Approach Delay		14.5	23.5		10.6	
Approach LOS		B	C		B	
Queue Length 50th (m)	40.4	22.8	77.0		1.8	2.3
Queue Length 95th (m)	#108.0	51.0	#129.6		6.7	18.1
Internal Link Dist (m)		165.7	250.5		160.2	
Turn Bay Length (m)	75.0				55.0	
Base Capacity (vph)	469	2599	1572		510	1254
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	0.87	0.42	0.79		0.03	0.53

Intersection Summary

Area Type:	Other
Cycle Length:	90
Actuated Cycle Length:	76.4
Natural Cycle:	90
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.87
Intersection Signal Delay:	17.0
Intersection Capacity Utilization:	71.8%
Intersection LOS:	B
ICU Level of Service:	C
Analysis Period (min):	15
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Lanes, Volumes, Timings
16: Speers Road/Cornwall Road & Cross Avenue

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Splits and Phases: 16: Speers Road/Cornwall Road & Cross Avenue



HCM Signalized Intersection Capacity Analysis
16: Speers Road/Cornwall Road & Cross Avenue


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Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↕	↕		↔	↕
Traffic Volume (vph)	376	1000	1098	46	12	609
Future Volume (vph)	376	1000	1098	46	12	609
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0		6.0	6.0
Lane Util. Factor	1.00	0.95	0.95		1.00	0.88
Frt	1.00	1.00	0.99		1.00	0.85
Fit Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	3539	3518		1770	2787
Fit Permitted	0.10	1.00	1.00		0.95	1.00
Satd. Flow (perm)	186	3539	3518		1770	2787
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	409	1087	1193	50	13	662
RTOR Reduction (vph)	0	0	3	0	0	564
Lane Group Flow (vph)	409	1087	1240	0	13	98
Turn Type	pm+pt	NA	NA		pm+pt	Perm
Protected Phases	5	2	6		7	
Permitted Phases	2				4	4
Actuated Green, G (s)	56.1	56.1	34.1		8.2	8.2
Effective Green, g (s)	56.1	56.1	34.1		8.2	8.2
Actuated g/C Ratio	0.74	0.74	0.45		0.11	0.11
Clearance Time (s)	6.0	6.0	6.0		6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	468	2602	1572		190	299
v/s Ratio Prot	c0.18	0.31	0.35		0.01	
v/s Ratio Perm	c0.46					c0.04
v/c Ratio	0.87	0.42	0.79		0.07	0.33
Uniform Delay, d1	20.6	3.9	18.0		30.6	31.5
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	16.4	0.5	4.1		0.2	0.6
Delay (s)	37.0	4.4	22.1		30.8	32.1
Level of Service	D	A	C		C	C
Approach Delay (s)		13.3	22.1		32.1	
Approach LOS		B	C		C	
Intersection Summary						
HCM 2000 Control Delay		20.2		HCM 2000 Level of Service		C
HCM 2000 Volume to Capacity ratio		0.84				
Actuated Cycle Length (s)		76.3		Sum of lost time (s)		18.0
Intersection Capacity Utilization		71.8%		ICU Level of Service		C
Analysis Period (min)		15				

c Critical Lane Group

Lanes, Volumes, Timings
19: Street C & South Service Road

BG 2043 PM.syn
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Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔	↘	↙	↙	↙	↘
Traffic Volume (vph)	25	31	45	75	21	43
Future Volume (vph)	25	31	45	75	21	43
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.925			0.909		
Fit Protected				0.982	0.984	
Satd. Flow (prot)	1723	0	0	1829	1666	0
Fit Permitted				0.982	0.984	
Satd. Flow (perm)	1723	0	0	1829	1666	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	110.2			306.3	76.4	
Travel Time (s)	7.9			22.1	5.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	27	34	49	82	23	47
Shared Lane Traffic (%)						
Lane Group Flow (vph)	61	0	0	131	70	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)		15	25		25	15
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	23.6%
Analysis Period (min)	15
	ICU Level of Service A

HCM Unsignalized Intersection Capacity Analysis
19: Street C & South Service Road

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Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔	↘	↙	↙	↙	↘
Traffic Volume (veh/h)	25	31	45	75	21	43
Future Volume (Veh/h)	25	31	45	75	21	43
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)	27	34	49	82	23	47
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			61		224	44
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			61		224	44
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			97		97	95
cM capacity (veh/h)			1542		740	1026

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	61	131	70
Volume Left	0	49	23
Volume Right	34	0	47
eSH	1700	1542	910
Volume to Capacity	0.04	0.03	0.08
Queue Length 95th (m)	0.0	0.8	2.0
Control Delay (s)	0.0	2.9	9.3
Lane LOS	A	A	A
Approach Delay (s)	0.0	2.9	9.3
Approach LOS		A	

Intersection Summary

Average Delay		3.9	
Intersection Capacity Utilization	23.6%	ICU Level of Service	A
Analysis Period (min)	15		

Lanes, Volumes, Timings
20: Street A & South Service Road

BG 2043 PM.syn
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	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↘			↘	↗	
Traffic Volume (vph)	56	4	19	78	11	0
Future Volume (vph)	56	4	19	78	11	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Fr	0.992					
Fit Protected				0.990	0.950	
Satd. Flow (prot)	1848	0	0	1844	1770	0
Fit Permitted				0.990	0.950	
Satd. Flow (perm)	1848	0	0	1844	1770	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	255.1			154.2	119.8	
Travel Time (s)	18.4			11.1	8.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	61	4	21	85	12	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	65	0	0	106	12	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)		15	25		25	15
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	21.8%
Analysis Period (min)	15
	ICU Level of Service A

HCM Unsignalized Intersection Capacity Analysis
20: Street A & South Service Road

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	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↘			↘	↗	
Traffic Volume (veh/h)	56	4	19	78	11	0
Future Volume (Veh/h)	56	4	19	78	11	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)	61	4	21	85	12	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			65		190	63
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			65		190	63
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		98	100
cM capacity (veh/h)			1537		788	1002

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	65	106	12
Volume Left	0	21	12
Volume Right	4	0	0
eSH	1700	1537	788
Volume to Capacity	0.04	0.01	0.02
Queue Length 95th (m)	0.0	0.3	0.4
Control Delay (s)	0.0	1.5	9.6
Lane LOS	A	A	A
Approach Delay (s)	0.0	1.5	9.6
Approach LOS		A	

Intersection Summary

Average Delay		1.5	
Intersection Capacity Utilization	21.8%	ICU Level of Service	A
Analysis Period (min)		15	

Lanes, Volumes, Timings
21: Argus Rd & Street 1

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Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	145	0	222	481	295
Future Volume (vph)	0	145	0	222	481	295
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Fr	0.865				0.949	
Fit Protected						
Satd. Flow (prot)	1611	0	0	1863	1768	0
Fit Permitted						
Satd. Flow (perm)	1611	0	0	1863	1768	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	165.4			115.7	65.0	
Travel Time (s)	11.9			8.3	4.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	158	0	241	523	321
Shared Lane Traffic (%)						
Lane Group Flow (vph)	158	0	0	241	844	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			3.3	3.3	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	59.0%
Analysis Period (min)	15
	ICU Level of Service B

HCM Unsignalized Intersection Capacity Analysis
21: Argus Rd & Street 1

BG 2043 PM.syn
04-03-2024

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	145	0	222	481	295
Future Volume (Veh/h)	0	145	0	222	481	295
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	158	0	241	523	321
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)				116		
pX, platoon unblocked						
vC, conflicting volume	924	684	844			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	924	684	844			
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	65	100			
cM capacity (veh/h)	299	449	792			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	158	241	844
Volume Left	0	0	0
Volume Right	158	0	321
eSH	449	792	1700
Volume to Capacity	0.35	0.00	0.50
Queue Length 95th (m)	12.5	0.0	0.0
Control Delay (s)	17.3	0.0	0.0
Lane LOS	C		
Approach Delay (s)	17.3	0.0	0.0
Approach LOS	C		

Intersection Summary

Average Delay	2.2
Intersection Capacity Utilization	59.0%
Analysis Period (min)	15
	ICU Level of Service B

Lanes, Volumes, Timings
22: Street C & Street 1

BG 2043 PM.syn
04-03-2024

	↖	→	↘	↙	←	↖	↙	↑	↘	↙	↓	↘
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (vph)	0	145	36	125	170	0	92	64	0	0	76	0
Future Volume (vph)	0	145	36	125	170	0	92	64	0	0	76	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.973											
Flt Protected					0.979				0.971			
Satd. Flow (prot)	0	1812	0	0	1824	0	0	1809	0	0	1863	0
Flt Permitted	0.979											
Satd. Flow (perm)	0	1812	0	0	1824	0	0	1809	0	0	1863	0
Link Speed (k/h)	50			50			50			50		
Link Distance (m)	41.9			165.4			132.8			87.9		
Travel Time (s)	3.0			11.9			9.6			6.3		
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
Adj. Flow (vph)	0	158	39	136	185	0	100	70	0	0	83	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	197	0	0	321	0	0	170	0	0	83	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Right	Left	Left	Right	Right
Median Width(m)	0.0			0.0			3.6			3.6		
Link Offset(m)	0.0			0.0			0.0			0.0		
Crosswalk Width(m)	4.8			4.8			4.8			4.8		
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control	Stop				Stop		Free				Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	50.8%
ICU Level of Service A	
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis
22: Street C & Street 1

BG 2043 PM.syn
04-03-2024

	↖	→	↘	↙	←	↖	↙	↑	↘	↙	↓	↘
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (veh/h)	0	145	36	125	170	0	92	64	0	0	76	0
Future Volume (Veh/h)	0	145	36	125	170	0	92	64	0	0	76	0
Sign Control	Stop			Stop			Free			Free		
Grade	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)	0	158	39	136	185	0	100	70	0	0	83	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)	133											
pX, platoon unblocked												
vC, conflicting volume	446	353	83	471	353	70	83				70	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	446	353	83	471	353	70	83				70	
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	70	96	62	65	100	93				100	
cM capacity (veh/h)	364	534	976	355	534	993	1514				1531	
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	197	321	170	83								
Volume Left	0	136	100	0								
Volume Right	39	0	0	0								
eSH	587	440	1514	1531								
Volume to Capacity	0.34	0.73	0.07	0.00								
Queue Length 95th (m)	11.8	46.6	1.7	0.0								
Control Delay (s)	14.2	32.3	4.7	0.0								
Lane LOS	B	D	A									
Approach Delay (s)	14.2	32.3	4.7	0.0								
Approach LOS	B	D										

Intersection Summary

Average Delay	18.1
Intersection Capacity Utilization	50.8%
ICU Level of Service A	
Analysis Period (min)	15

Lanes, Volumes, Timings
23: GO Station West Access/Street C & Cross Ave

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔			↔	↔		↔	↔	
Traffic Volume (vph)	42	660	64	227	388	114	109	0	542	105	125	8
Future Volume (vph)	42	660	64	227	388	114	109	0	542	105	125	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.0	0.0	0.0
Storage Lanes	0	0	0	0	0	0	1	0	1	0	0	0
Taper Length (m)	7.5			7.5			7.5		7.5			7.5
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.987			0.977			0.850			0.991		
Flt Protected	0.997			0.985			0.950			0.950		
Satd. Flow (prot)	0	3483	0	0	3406	0	1770	1583	0	1770	1846	0
Flt Permitted	0.864			0.578			0.665			0.231		
Satd. Flow (perm)	0	3018	0	0	1999	0	1239	1583	0	430	1846	0
Right Turn on Red		Yes		Yes			Yes			Yes		Yes
Satd. Flow (RTOR)	23			51			86			8		
Link Speed (k/h)	50			50			50			50		
Link Distance (m)	209.8			164.3			55.1			132.8		
Travel Time (s)	15.1			11.8			4.0			9.6		
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
Adj. Flow (vph)	46	717	70	247	422	124	118	0	589	114	136	9
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	833	0	0	793	0	118	589	0	114	145	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)	3.3			3.3			3.6			3.6		
Link Offset(m)	0.0			0.0			0.0			0.0		
Crosswalk Width(m)	4.8			4.8			4.8			4.8		
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		

Lanes, Volumes, Timings
23: GO Station West Access/Street C & Cross Ave

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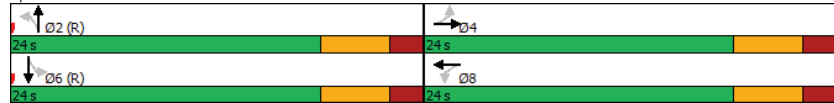
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	24.0	24.0		24.0	24.0		24.0	24.0		24.0	24.0	
Total Split (s)	24.0	24.0		24.0	24.0		24.0	24.0		24.0	24.0	
Total Split (%)	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%		50.0%	50.0%	
Maximum Green (s)	18.0	18.0		18.0	18.0		18.0	18.0		18.0	18.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		6.0			6.0			6.0			6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		18.0			18.0			18.0			18.0	
Actuated g/C Ratio		0.38			0.38			0.38			0.38	
v/c Ratio		0.73			1.13dl			0.25		0.91	0.71	0.21
Control Delay		17.1			54.7			12.2		35.2	42.9	10.6
Queue Delay		0.0			0.0			0.0		0.0	0.0	0.0
Total Delay		17.1			54.7			12.2		35.2	42.9	10.6
LOS		B			D			B		D	B	
Approach Delay		17.1			54.7			31.4			24.8	
Approach LOS		B			D			C			C	
Queue Length 50th (m)		31.2			~35.1			7.0		40.9	8.3	7.9
Queue Length 95th (m)		48.7			#70.1			16.4		#97.5	#31.0	17.4
Internal Link Dist (m)		185.8			140.3			31.1			108.8	
Turn Bay Length (m)											15.0	
Base Capacity (vph)		1146			781			464		647	161	697
Starvation Cap Reductn		0			0			0		0	0	0
Spillback Cap Reductn		0			0			0		0	0	0
Storage Cap Reductn		0			0			0		0	0	0
Reduced v/c Ratio		0.73			1.02			0.25		0.91	0.71	0.21
Intersection Summary												
Area Type:	Other											
Cycle Length:	48											
Actuated Cycle Length:	48											
Offset:	0 (0%), Referenced to phase 2:NBL and 6:SBTL, Start of Green											
Natural Cycle:	65											
Control Type:	Actuated-Coordinated											
Maximum v/c Ratio:	1.02											
Intersection Signal Delay:	33.3						Intersection LOS: C					
Intersection Capacity Utilization:	101.8%						ICU Level of Service G					
Analysis Period (min):	15											
~	Volume exceeds capacity, queue is theoretically infinite.											

Lanes, Volumes, Timings
 23: GO Station West Access/Street C & Cross Ave

BG 2043 PM.syn
 04-03-2024

- Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
- Queue shown is maximum after two cycles.
- dl Defacto Left Lane. Recode with 1 though lane as a left lane.

Splits and Phases: 23: GO Station West Access/Street C & Cross Ave



HCM Signalized Intersection Capacity Analysis
 23: GO Station West Access/Street C & Cross Ave

BG 2043 PM.syn
 04-03-2024



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔		↔	↔		↔	↔	
Traffic Volume (vph)	42	660	64	227	388	114	109	0	542	105	125	8
Future Volume (vph)	42	660	64	227	388	114	109	0	542	105	125	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0			6.0			6.0	6.0			6.0
Lane Util. Factor		0.95			0.95			1.00	1.00			1.00
Flt		0.99			0.98			1.00	0.85			1.00
Flt Protected		1.00			0.98			0.95	1.00			0.95
Satd. Flow (prot)		3485			3403			1770	1583			1770
Flt Permitted		0.86			0.58			0.66	1.00			0.23
Satd. Flow (perm)		3020			1998			1238	1583			431
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	46	717	70	247	422	124	118	0	589	114	136	9
RTOR Reduction (vph)	0	14	0	0	32	0	0	54	0	0	5	0
Lane Group Flow (vph)	0	819	0	0	761	0	118	535	0	114	140	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		18.0			18.0			18.0	18.0		18.0	18.0
Effective Green, g (s)		18.0			18.0			18.0	18.0		18.0	18.0
Actuated g/C Ratio		0.38			0.38			0.38	0.38		0.38	0.38
Clearance Time (s)		6.0			6.0			6.0	6.0		6.0	6.0
Vehicle Extension (s)		3.0			3.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)		1132			749			464	593		161	691
v/s Ratio Prot								c0.34				0.08
v/s Ratio Perm		0.27			c0.38			0.10			0.26	
v/c Ratio		0.72			1.13dl			0.25	0.90		0.71	0.20
Uniform Delay, d1		12.9			15.0			10.4	14.2		12.8	10.1
Progression Factor		1.00			1.00			1.00	1.00		1.00	1.00
Incremental Delay, d2		2.3			37.0			1.3	19.5		23.1	0.7
Delay (s)		15.2			52.0			11.7	33.6		35.8	10.8
Level of Service		B			D			B	C		D	B
Approach Delay (s)		15.2			52.0			30.0			21.8	
Approach LOS		B			D			C			C	

Intersection Summary

HCM 2000 Control Delay	31.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	48.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	101.8%	ICU Level of Service	G
Analysis Period (min)	15		

- dl Defacto Left Lane. Recode with 1 though lane as a left lane.

c Critical Lane Group

Lanes, Volumes, Timings

1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd

FT 2028 AM.syn

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	34	106	294	610	76	174	148	938	707	162	1410	46
Future Volume (vph)	34	106	294	610	76	174	148	938	707	162	1410	46
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0		0.0	165.0			25.0	145.0		0.0	95.0	90.0
Storage Lanes	1		1	1			1	1		1	1	1
Taper Length (m)	7.5			7.5			7.5	7.5		7.5	7.5	
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Ped Bike Factor	0.99						0.98		0.99	1.00		
Frt			0.850				0.850		0.850			0.850
Fit Protected	0.950			0.950			0.950		0.950			
Satd. Flow (prot)	1624	1693	1425	3060	1676	1398	1425	4446	1398	1562	4532	1398
Fit Permitted	0.703			0.429			0.080			0.214		
Satd. Flow (perm)	1190	1693	1425	1382	1676	1366	120	4446	1377	351	4532	1398
Right Turn on Red			Yes			Yes		Yes		Yes		Yes
Satd. Flow (RTOR)			219			189			678			155
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		285.9			293.8			275.1			252.7	
Travel Time (s)		20.6			21.2			19.8			18.2	
Confl. Peds. (#/hr)	11				11			10		10		
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
Heavy Vehicles (%)	0%	1%	2%	3%	2%	4%	14%	5%	4%	4%	3%	4%
Adj. Flow (vph)	37	115	320	663	83	189	161	1020	768	176	1533	50
Shared Lane Traffic (%)												
Lane Group Flow (vph)	37	115	320	663	83	189	161	1020	768	176	1533	50
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		7.2			7.2			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (k/h)	25		15	25			15	25		15	25	15
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings

1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd

FT 2028 AM.syn

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA	Free	pm+pt	NA	Perm	pm+pt	NA	Free	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		Free	8		8	2		Free	6		6
Detector Phase	7	4		3	8	8	5	2		1	6	6
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0	10.0	6.0	15.0		6.0	15.0	15.0
Minimum Split (s)	10.0	34.0		11.0	43.0	43.0	10.0	34.0		10.0	34.0	34.0
Total Split (s)	10.0	34.0		19.0	43.0	43.0	16.0	47.0		20.0	51.0	51.0
Total Split (%)	8.3%	28.3%		15.8%	35.8%	35.8%	13.3%	39.2%		16.7%	42.5%	42.5%
Maximum Green (s)	6.0	27.0		14.0	36.0	36.0	12.0	40.0		16.0	44.0	44.0
Yellow Time (s)	3.0	4.0		3.0	4.0	4.0	3.0	4.0		3.0	4.0	4.0
All-Red Time (s)	1.0	3.0		2.0	3.0	3.0	1.0	3.0		1.0	3.0	3.0
Lost Time Adjust (s)	0.0	-3.0		0.0	-3.0	-3.0	0.0	-3.0		0.0	-3.0	-3.0
Total Lost Time (s)	4.0	4.0		5.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	4.0		3.0	4.0	4.0	3.0	5.0		3.0	5.0	5.0
Recall Mode	None	None		None	None	None	None	C-Max		None	C-Max	C-Max
Walk Time (s)					7.0	7.0		7.0			7.0	7.0
Flash Dont Walk (s)					29.0	29.0		20.0			20.0	20.0
Pedestrian Calls (#/hr)					0	0		0			0	0
Act Effct Green (s)	23.6	17.6	120.0	35.6	30.6	30.6	73.2	59.2	120.0	69.7	57.4	57.4
Actuated g/C Ratio	0.20	0.15	1.00	0.30	0.26	0.26	0.61	0.49	1.00	0.58	0.48	0.48
v/c Ratio	0.15	0.47	0.22	1.10	0.19	0.39	0.72	0.47	0.56	0.54	0.71	0.07
Control Delay	30.3	52.4	0.4	102.7	37.0	7.5	41.4	22.1	1.6	16.7	28.2	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	30.3	52.4	0.4	102.7	37.0	7.5	41.4	22.1	1.6	16.7	28.2	0.2
LOS	C	D	A	F	D	A	D	C	A	B	C	A
Approach Delay		15.4			77.6			15.6			26.3	
Approach LOS		B			E			B			C	
Queue Length 50th (m)	6.5	26.5	0.0	-85.9	17.0	0.0	22.4	58.0	0.0	16.9	105.6	0.0
Queue Length 95th (m)	14.1	43.7	0.0	#116.5	30.0	18.3	47.6	85.8	0.0	31.1	147.8	0.0
Internal Link Dist (m)		261.9			269.8			251.1			228.7	
Turn Bay Length (m)	60.0			165.0		25.0	145.0		95.0			90.0
Base Capacity (vph)	255	423	1425	605	544	571	233	2192	1377	379	2169	749
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.15	0.27	0.22	1.10	0.15	0.33	0.69	0.47	0.56	0.46	0.71	0.07

Intersection Summary

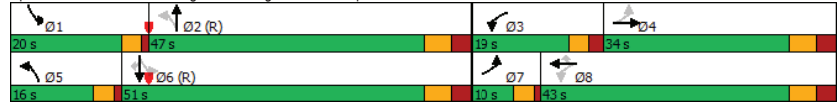
Area Type:	CBD
Cycle Length:	120
Actuated Cycle Length:	120
Offset:	33.6 (28%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle:	100
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	1.10
Intersection Signal Delay:	30.6
Intersection LOS:	C

Lanes, Volumes, Timings
1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd

FT 2028 AM.syn
04-03-2024

Intersection Capacity Utilization 76.6% ICU Level of Service D
Analysis Period (min) 15
- Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd



HCM Signalized Intersection Capacity Analysis
1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd

FT 2028 AM.syn
04-03-2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↑	↗	↖	↑	↗	↖	↖	↗	↖	↗	↖
Traffic Volume (vph)	34	106	294	610	76	174	148	938	707	162	1410	46
Future Volume (vph)	34	106	294	610	76	174	148	938	707	162	1410	46
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	1.0	5.0	4.0	4.0	4.0	4.0	1.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.98	1.00	1.00	0.99	1.00	1.00	1.00
Flpb, ped/bikes	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1614	1693	1425	3060	1676	1366	1425	4446	1377	1561	4532	1398
Flt Permitted	0.70	1.00	1.00	0.43	1.00	1.00	0.08	1.00	1.00	0.21	1.00	1.00
Satd. Flow (perm)	1194	1693	1425	1382	1676	1366	119	4446	1377	352	4532	1398
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	37	115	320	663	83	189	161	1020	768	176	1533	50
RTOR Reduction (vph)	0	0	0	0	0	141	0	0	0	0	0	27
Lane Group Flow (vph)	37	115	320	663	83	48	161	1020	768	176	1533	23
Confl. Peds. (#/hr)	11				11				10	10		
Heavy Vehicles (%)	0%	1%	2%	3%	2%	4%	14%	5%	4%	4%	3%	4%
Turn Type	pm+pt	NA	Free	pm+pt	NA	Perm	pm+pt	NA	Free	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		Free	8		8	2		Free	6		6
Actuated Green, G (s)	19.8	16.2	120.0	35.2	27.6	27.6	68.5	54.5	120.0	65.1	52.8	52.8
Effective Green, g (s)	19.8	19.2	120.0	35.2	30.6	30.6	68.5	57.5	120.0	65.1	55.8	55.8
Actuated g/C Ratio	0.17	0.16	1.00	0.29	0.26	0.26	0.57	0.48	1.00	0.54	0.46	0.46
Clearance Time (s)	4.0	7.0		5.0	7.0	7.0	4.0	7.0		4.0	7.0	7.0
Vehicle Extension (s)	3.0	4.0		3.0	4.0	4.0	3.0	5.0		3.0	5.0	5.0
Lane Grp Cap (vph)	209	270	1425	601	427	348	220	2130	1377	314	2107	650
v/s Ratio Prot	0.01	0.07		c0.13	0.05		c0.09	0.23		0.06	c0.34	
v/s Ratio Perm	0.02		0.22	c0.19		0.04	0.33		c0.56	0.25		0.02
v/c Ratio	0.18	0.43	0.22	1.10	0.19	0.14	0.73	0.48	0.56	0.56	0.73	0.04
Uniform Delay, d1	42.8	45.4	0.0	40.5	35.0	34.5	27.1	21.1	0.0	14.9	26.0	17.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.4	1.5	0.4	68.2	0.3	0.2	11.8	0.8	1.6	2.3	2.2	0.1
Delay (s)	43.2	46.9	0.4	108.8	35.3	34.8	38.9	21.9	1.6	17.2	28.2	17.6
Level of Service	D	D	A	F	D	C	D	C	A	B	C	B
Approach Delay (s)		15.1			87.3			15.3			26.8	
Approach LOS		B			F			B			C	
Intersection Summary												
HCM 2000 Control Delay			32.4			HCM 2000 Level of Service		C				
HCM 2000 Volume to Capacity ratio			0.86									
Actuated Cycle Length (s)			120.0			Sum of lost time (s)		17.0				
Intersection Capacity Utilization			76.6%			ICU Level of Service		D				
Analysis Period (min)			15									
c	Critical Lane Group											

Lanes, Volumes, Timings

FT 2028 AM.syn

2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp

04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	→	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	2	0	150	430	28	225	0	1566	363	0	2308	6
Future Volume (vph)	2	0	150	430	28	225	0	1566	363	0	2308	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.5	3.3	3.6	3.5	3.6	3.6	3.6	3.6	3.6	3.5
Storage Length (m)	50.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Storage Lanes	1		1	1		1	0		1	0		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.91	1.00	1.00	0.86	0.86
Ped Bike Factor									0.98		1.00	
Frt			0.850			0.850			0.850			
Flt Protected	0.950			0.950	0.958							
Satd. Flow (prot)	1570	0	1395	1421	1452	1356	0	4446	1384	0	5711	0
Flt Permitted	0.950			0.950	0.958							
Satd. Flow (perm)	1570	0	1395	1421	1452	1356	0	4446	1353	0	5711	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			31			245			179			1
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		142.1			192.6			324.8			275.1	
Travel Time (s)		10.2			13.9			23.4			19.8	
Confl. Peds. (#/hr)							8		5	5		8
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
Heavy Vehicles (%)	0%	0%	3%	5%	23%	6%	0%	5%	5%	0%	3%	0%
Adj. Flow (vph)	2	0	163	467	30	245	0	1702	395	0	2509	7
Shared Lane Traffic (%)				47%								
Lane Group Flow (vph)	2	0	163	248	249	245	0	1702	395	0	2516	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.3			3.3			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.19	1.14	1.16	1.19	1.14	1.16	1.14	1.14	1.14	1.14	1.14	1.16
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1		1	1		1			1			2
Detector Template	Left		Right	Left	Thru	Right		Thru	Right		Thru	
Leading Detector (m)	2.0		2.0	2.0	10.0	2.0		10.0	2.0		10.0	
Trailing Detector (m)	0.0		0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Detector 1 Position(m)	0.0		0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Detector 1 Size(m)	2.0		2.0	2.0	0.6	2.0		0.6	2.0		0.6	
Detector 1 Type	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Detector 1 Delay (s)	0.0		0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Detector 2 Position(m)					9.4			9.4			9.4	
Detector 2 Size(m)					0.6			0.6			0.6	
Detector 2 Type					Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

Lanes, Volumes, Timings

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2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp

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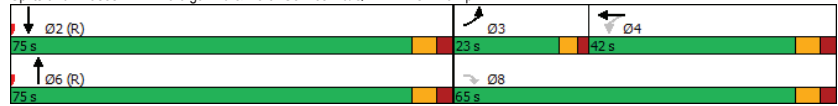
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)								0.0			0.0	0.0
Turn Type	Prot		Perm	Perm	NA	Free		NA	Free		NA	NA
Protected Phases	3				4			6			2	
Permitted Phases			8	4		Free		Free				
Detector Phase	3		8	4	4			6			2	
Switch Phase												
Minimum Initial (s)	7.0		10.0	10.0	10.0			5.0			28.0	
Minimum Split (s)	23.0		38.0	38.0	38.0			35.0			35.0	
Total Split (s)	23.0		65.0	42.0	42.0			75.0			75.0	
Total Split (%)	16.4%		46.4%	30.0%	30.0%			53.6%			53.6%	
Maximum Green (s)	18.0		58.0	35.0	35.0			68.0			68.0	
Yellow Time (s)	3.0		4.0	4.0	4.0			4.0			4.0	
All-Red Time (s)	2.0		3.0	3.0	3.0			3.0			3.0	
Lost Time Adjust (s)	-1.0		-3.0	-3.0	-3.0			-3.0			-3.0	
Total Lost Time (s)	4.0		4.0	4.0	4.0			4.0			4.0	
Lead/Lag	Lead			Lag	Lag							
Lead-Lag Optimize?	Yes			Yes	Yes							
Vehicle Extension (s)	3.0		3.0	3.0	3.0			4.5			4.5	
Recall Mode	Min		Min	Min	Min			C-Min			C-Min	
Walk Time (s)			7.0	7.0	7.0			7.0			7.0	
Flash Dont Walk (s)			24.0	24.0	24.0			21.0			21.0	
Pedestrian Calls (#/hr)			0	0	0			0			0	
Act Effct Green (s)	8.0		44.6	32.6	32.6	140.0		87.4		140.0	87.4	
Actuated g/C Ratio	0.06		0.32	0.23	0.23	1.00		0.62		1.00	0.62	
v/c Ratio	0.02		0.35	0.75	0.74	0.18		0.61		0.29	0.71	
Control Delay	63.0		30.1	63.6	62.3	0.3		15.6		0.4	20.0	
Queue Delay	0.0		0.0	0.0	0.0	0.0		0.0		0.0	0.0	
Total Delay	63.0		30.1	63.6	62.3	0.3		15.6		0.4	20.0	
LOS	E		C	E	E	A		B		A	C	
Approach Delay		30.5			42.3			12.7			20.0	
Approach LOS		C			D			B			C	
Queue Length 50th (m)	0.6		29.3	71.2	71.3	0.0		89.0		0.0	135.4	
Queue Length 95th (m)	3.7		44.6	96.2	96.2	0.0		122.0		0.0	179.0	
Internal Link Dist (m)		118.1			168.6			300.8			251.1	
Turn Bay Length (m)	50.0											
Base Capacity (vph)	213		625	394	403	1356		2776		1353	3567	
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	0.01		0.26	0.63	0.62	0.18		0.61		0.29	0.71	
Intersection Summary												
Area Type:	CBD											
Cycle Length:	140											
Actuated Cycle Length:	140											
Offset:	115.4 (82%), Referenced to phase 2:SBT and 6:NBT, Start of Green											
Natural Cycle:	110											
Control Type:	Actuated-Coordinated											
Maximum v/c Ratio:	0.75											

Lanes, Volumes, Timings
2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp

FT 2028 AM.syn
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Intersection Signal Delay: 20.6	Intersection LOS: C
Intersection Capacity Utilization 71.6%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp



HCM Signalized Intersection Capacity Analysis
2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp

FT 2028 AM.syn
04-03-2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↘		↗	↘	↗	↘		↕	↕	↕	↕	↕
Traffic Volume (vph)	2	0	150	430	28	225	0	1566	363	0	2308	6
Future Volume (vph)	2	0	150	430	28	225	0	1566	363	0	2308	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.5	3.3	3.6	3.5	3.6	3.6	3.6	3.6	3.6	3.5
Total Lost time (s)	4.0		4.0	4.0	4.0	1.0		4.0	4.0		4.0	
Lane Util. Factor	1.00		1.00	0.95	0.95	1.00		0.91	1.00		0.86	
Frbp, ped/bikes	1.00		1.00	1.00	1.00	1.00		1.00	0.98		1.00	
Flpb, ped/bikes	1.00		1.00	1.00	1.00	1.00		1.00	1.00		1.00	
Frt	1.00		0.85	1.00	1.00	0.85		1.00	0.85		1.00	
Flt Protected	0.95		1.00	0.95	0.96	1.00		1.00	1.00		1.00	
Satd. Flow (prot)	1570		1395	1421	1452	1356		4446	1353		5709	
Flt Permitted	0.95		1.00	0.95	0.96	1.00		1.00	1.00		1.00	
Satd. Flow (perm)	1570		1395	1421	1452	1356		4446	1353		5709	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	2	0	163	467	30	245	0	1702	395	0	2509	7
RTOR Reduction (vph)	0	0	21	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	2	0	142	248	249	245	0	1702	395	0	2516	0
Confl. Peds. (#/hr)							8		5	5		8
Heavy Vehicles (%)	0%	0%	3%	5%	23%	6%	0%	5%	5%	0%	3%	0%
Turn Type	Prot		Perm	Perm	NA	Free		NA	Free		NA	
Protected Phases	3				4			6			2	
Permitted Phases			8	4		Free			Free			
Actuated Green, G (s)	7.0		41.6	29.6	29.6	140.0		84.4	140.0		84.4	
Effective Green, g (s)	8.0		44.6	32.6	32.6	140.0		87.4	140.0		87.4	
Actuated g/C Ratio	0.06		0.32	0.23	0.23	1.00		0.62	1.00		0.62	
Clearance Time (s)	5.0		7.0	7.0	7.0			7.0			7.0	
Vehicle Extension (s)	3.0		3.0	3.0	3.0			4.5			4.5	
Lane Grp Cap (vph)	89		444	330	338	1356		2775	1353		3564	
v/s Ratio Prot	0.00							0.38			c0.44	
v/s Ratio Perm			0.10	c0.17	0.17	0.18			c0.29			
v/c Ratio	0.02		0.32	0.75	0.74	0.18		0.61	0.29		0.71	
Uniform Delay, d1	62.3		36.2	49.9	49.7	0.0		16.0	0.0		17.7	
Progression Factor	1.00		1.00	1.00	1.00	1.00		0.86	1.00		1.00	
Incremental Delay, d2	0.1		0.4	9.3	8.1	0.3		0.8	0.4		1.2	
Delay (s)	62.4		36.6	59.2	57.8	0.3		14.6	0.4		18.9	
Level of Service	E		D	E	E	A		B	A		B	
Approach Delay (s)		36.9			39.3			11.9			18.9	
Approach LOS		D			D			B			B	
Intersection Summary												
HCM 2000 Control Delay			19.5		HCM 2000 Level of Service				B			
HCM 2000 Volume to Capacity ratio			0.70									
Actuated Cycle Length (s)			140.0		Sum of lost time (s)				12.0			
Intersection Capacity Utilization			71.6%		ICU Level of Service				C			
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
3: Trafalgar Rd & QEW EB-Off Ramp

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Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔↔	↔		↑↑↑	↑↑↑	↔
Traffic Volume (vph)	787	646	0	1154	1542	416
Future Volume (vph)	787	646	0	1154	1542	416
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.5	3.6	3.6	3.6	3.6
Lane Util. Factor	0.97	1.00	1.00	0.91	0.91	1.00
Frt		0.850				0.850
Flt Protected	0.950					
Satd. Flow (prot)	2958	1423	0	4404	4489	1454
Flt Permitted	0.950					
Satd. Flow (perm)	2958	1423	0	4404	4489	1454
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		4				208
Link Speed (k/h)	50			50	50	
Link Distance (m)	199.2			51.4	324.8	
Travel Time (s)	14.3			3.7	23.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	1%	0%	6%	4%	0%
Adj. Flow (vph)	855	702	0	1254	1676	452
Shared Lane Traffic (%)						
Lane Group Flow (vph)	855	702	0	1254	1676	452
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	6.6			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.19	1.16	1.14	1.14	1.14	1.14
Turning Speed (k/h)	24	14	24			14
Number of Detectors	1	1		2	2	1
Detector Template	Left	Right		Thru	Thru	Right
Leading Detector (m)	2.0	2.0		10.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	2.0	2.0		0.6	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)				9.4	9.4	
Detector 2 Size(m)				0.6	0.6	
Detector 2 Type				Cl+Ex	Cl+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Perm	Perm		NA	NA	Free
Protected Phases				2	2	
Permitted Phases	4	4				Free
Detector Phase	4	4		2	2	

Lanes, Volumes, Timings
3: Trafalgar Rd & QEW EB-Off Ramp

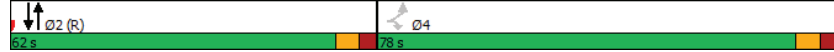
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Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Switch Phase						
Minimum Initial (s)	10.0	10.0		29.0	29.0	
Minimum Split (s)	38.0	38.0		36.0	36.0	
Total Split (s)	78.0	78.0		62.0	62.0	
Total Split (%)	55.7%	55.7%		44.3%	44.3%	
Maximum Green (s)	71.0	71.0		55.0	55.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	
All-Red Time (s)	3.0	3.0		3.0	3.0	
Lost Time Adjust (s)	-3.0	-3.0		-3.0	-3.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Recall Mode	None	None		C-Max	C-Max	
Walk Time (s)	7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	24.0	24.0		22.0	22.0	
Pedestrian Calls (#/hr)	0	0		0	0	
Act Effct Green (s)	72.8	72.8		59.2	59.2	140.0
Actuated g/C Ratio	0.52	0.52		0.42	0.42	1.00
v/c Ratio	0.56	0.95		0.67	0.88	0.31
Control Delay	24.2	54.1		33.8	33.0	0.4
Queue Delay	0.0	0.0		0.0	0.0	0.0
Total Delay	24.2	54.1		33.8	33.0	0.4
LOS	C	D		C	C	A
Approach Delay	37.7			33.8	26.1	
Approach LOS	D			C	C	
Queue Length 50th (m)	82.7	183.6		121.2	172.7	0.0
Queue Length 95th (m)	102.1	#274.6		76.9	156.7	0.0
Internal Link Dist (m)	175.2			27.4	300.8	
Turn Bay Length (m)						
Base Capacity (vph)	1563	754		1860	1896	1454
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	0.55	0.93		0.67	0.88	0.31
Intersection Summary						
Area Type:	CBD					
Cycle Length:	140					
Actuated Cycle Length:	140					
Offset:	133.6 (95%), Referenced to phase 2:NBSB and 6.; Start of Green					
Natural Cycle:	75					
Control Type:	Actuated-Coordinated					
Maximum v/c Ratio:	0.95					
Intersection Signal Delay:	31.7					
Intersection Capacity Utilization	84.2%					
ICU Level of Service E						
Analysis Period (min)	15					
# 95th percentile volume exceeds capacity, queue may be longer.						
Queue shown is maximum after two cycles.						

Lanes, Volumes, Timings
3: Trafalgar Rd & QEW EB-Off Ramp

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Splits and Phases: 3: Trafalgar Rd & QEW EB-Off Ramp



HCM Signalized Intersection Capacity Analysis
3: Trafalgar Rd & QEW EB-Off Ramp

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	EBL	EBR	NBL	NBT	SBT	SBR
Movement	↔	↔	↔	↕	↕	↕
Lane Configurations	↔	↔		↕	↕	↕
Traffic Volume (vph)	787	646	0	1154	1542	416
Future Volume (vph)	787	646	0	1154	1542	416
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.5	3.6	3.6	3.6	3.6
Total Lost time (s)	4.0	4.0		4.0	4.0	1.0
Lane Util. Factor	0.97	1.00		0.91	0.91	1.00
Fr _t	1.00	0.85		1.00	1.00	0.85
Fl _t Protected	0.95	1.00		1.00	1.00	1.00
Satd. Flow (prot)	2958	1423		4404	4489	1454
Fl _t Permitted	0.95	1.00		1.00	1.00	1.00
Satd. Flow (perm)	2958	1423		4404	4489	1454
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	855	702	0	1254	1676	452
RTOR Reduction (vph)	0	2	0	0	0	0
Lane Group Flow (vph)	855	700	0	1254	1676	452
Heavy Vehicles (%)	3%	1%	0%	6%	4%	0%
Turn Type	Perm	Perm		NA	NA	Free
Protected Phases				2	2	
Permitted Phases	4	4				Free
Actuated Green, G (s)	69.8	69.8		56.2	56.2	140.0
Effective Green, g (s)	72.8	72.8		59.2	59.2	140.0
Actuated g/C Ratio	0.52	0.52		0.42	0.42	1.00
Clearance Time (s)	7.0	7.0		7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	1538	739		1862	1898	1454
v/s Ratio Prot				0.28	c0.37	
v/s Ratio Perm	0.29	c0.49				0.31
v/c Ratio	0.56	0.95		0.67	0.88	0.31
Uniform Delay, d1	22.7	31.8		32.6	37.2	0.0
Progression Factor	1.00	1.00		0.97	0.74	1.00
Incremental Delay, d2	0.4	21.0		1.7	4.8	0.4
Delay (s)	23.1	52.8		33.3	32.3	0.4
Level of Service	C	D		C	C	A
Approach Delay (s)	36.5			33.3	25.6	
Approach LOS	D			C	C	
Intersection Summary						
HCM 2000 Control Delay			31.0		HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.94			
Actuated Cycle Length (s)			140.0		Sum of lost time (s)	11.0
Intersection Capacity Utilization			84.2%		ICU Level of Service	E
Analysis Period (min)			15			
c Critical Lane Group						

Lanes, Volumes, Timings
4: Trafalgar Rd & Argus Rd

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Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	39	0	1835	1802	387
Future Volume (vph)	0	39	0	1835	1802	387
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.6	3.5	3.6	3.6	3.6	3.6
Lane Util. Factor	1.00	1.00	1.00	0.91	0.91	0.91
Ped Bike Factor						
Frt		0.865			0.973	
Fit Protected						
Satd. Flow (prot)	0	1367	0	4363	4382	0
Fit Permitted						
Satd. Flow (perm)	0	1367	0	4363	4382	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	145.7			270.2	51.4	
Travel Time (s)	10.5			19.5	3.7	
Confl. Peds. (#/hr)						11
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	7%	0%	7%	4%	2%
Adj. Flow (vph)	0	42	0	1995	1959	421
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	42	0	1995	2380	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			3.3	3.3	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.14	1.16	1.14	1.14	1.14	1.14
Turning Speed (k/h)	24	14	24			14
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	CBD					
Control Type:	Unsignalized					
Intersection Capacity Utilization	58.5%		ICU Level of Service B			
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
4: Trafalgar Rd & Argus Rd

FT 2028 AM.syn
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Movement	EBL	EBR	NBL	NBT	SBT	SBR	
Lane Configurations							
Traffic Volume (veh/h)	0	39	0	1835	1802	387	
Future Volume (Veh/h)	0	39	0	1835	1802	387	
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	42	0	1995	1959	421	
Pedestrians	11						
Lane Width (m)	3.5						
Walking Speed (m/s)	1.2						
Percent Blockage	1						
Right turn flare (veh)							
Median type			None	None			
Median storage (veh)							
Upstream signal (m)				270	52		
pX, platoon unblocked	0.74	0.66	0.66				
vC, conflicting volume	2846	874	2391				
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol	777	0	1303				
tC, single (s)	6.8	7.0	4.1				
tC, 2 stage (s)							
tF (s)	3.5	3.4	2.2				
p0 queue free %	100	94	100				
cM capacity (veh/h)	248	698	352				
Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	42	665	665	665	784	784	813
Volume Left	0	0	0	0	0	0	0
Volume Right	42	0	0	0	0	0	421
eSH	698	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.06	0.39	0.39	0.39	0.46	0.46	0.48
Queue Length 95th (m)	1.5	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (s)	10.5	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	B						
Approach Delay (s)	10.5	0.0			0.0		
Approach LOS	B						
Intersection Summary							
Average Delay				0.1			
Intersection Capacity Utilization	58.5%		ICU Level of Service		B		
Analysis Period (min)	15						

Lanes, Volumes, Timings

FT 2028 AM.syn

5: Trafalgar Rd & Cross Ave/South Service Rd

04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	401	29	82	38	33	96	87	1078	25	168	1362	227
Future Volume (vph)	401	29	82	38	33	96	87	1078	25	168	1362	227
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.6	3.3	3.6	3.5	3.3	3.6	3.6	3.3	3.6	3.6
Storage Length (m)	130.0	0.0	25.0	0.0	50.0	0.0	25.0	0.0	25.0	0.0	0.0	0.0
Storage Lanes	1	0	1	1	1	1	1	0	1	1	0	0
Taper Length (m)	7.5		7.5		7.5		7.5		7.5		7.5	
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.91	0.91
Ped Bike Factor	1.00	0.98		0.99		0.99		1.00		1.00		1.00
Frt	0.890					0.850		0.997				0.979
Fit Protected	0.950			0.950		0.950		0.950		0.950		
Satd. Flow (prot)	2795	1357	0	1525	1583	1382	1428	4499	0	1525	4409	0
Fit Permitted	0.950			0.679		0.074		0.147		0.147		
Satd. Flow (perm)	2789	1357	0	1081	1583	1362	111	4499	0	236	4409	0
Right Turn on Red			Yes			Yes		Yes		Yes		Yes
Satd. Flow (RTOR)		89				179		3		30		30
Link Speed (k/h)	50			50		50		50		50		50
Link Distance (m)	151.2			330.4		150.2		270.2		270.2		19.5
Travel Time (s)	10.9			23.8		10.8		19.5		19.5		19.5
Confl. Peds. (#/hr)	1		4	4		1	10		52	52		10
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
Heavy Vehicles (%)	9%	6%	12%	3%	8%	4%	10%	3%	0%	3%	3%	4%
Adj. Flow (vph)	436	32	89	41	36	104	95	1172	27	183	1480	247
Shared Lane Traffic (%)												
Lane Group Flow (vph)	436	121	0	41	36	104	95	1199	0	183	1727	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)	6.6			6.6		6.6		3.3		3.3		3.3
Link Offset(m)	0.0			0.0		0.0		0.0		0.0		0.0
Crosswalk Width(m)	4.8			4.8		4.8		4.8		4.8		4.8
Two way Left Turn Lane												
Headway Factor	1.19	1.14	1.14	1.19	1.14	1.16	1.19	1.14	1.14	1.19	1.14	1.14
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2	1	1		1	2		2
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

Lanes, Volumes, Timings

FT 2028 AM.syn

5: Trafalgar Rd & Cross Ave/South Service Rd

04-03-2024

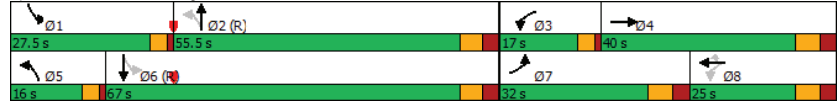
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases				8		8	2			6		
Detector Phases	7	4		3	8	8	5	2		1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		12.0	10.0	10.0	7.0	27.0		7.0	27.0	
Minimum Split (s)	17.0	25.0		17.0	25.0	25.0	11.5	34.0		11.5	34.0	
Total Split (s)	32.0	40.0		17.0	25.0	25.0	16.0	55.5		27.5	67.0	
Total Split (%)	22.9%	28.6%		12.1%	17.9%	17.9%	11.4%	39.6%		19.6%	47.9%	
Maximum Green (s)	25.0	33.0		13.0	18.0	18.0	12.0	48.5		23.5	60.0	
Yellow Time (s)	4.0	4.0		3.0	4.0	4.0	3.0	4.0		3.0	4.0	
All-Red Time (s)	3.0	3.0		1.0	3.0	3.0	1.0	3.0		1.0	3.0	
Lost Time Adjust (s)	-3.0	-3.0		0.0	-3.0	-3.0	0.0	-3.0		0.0	-3.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	4.0		3.5	4.0	4.0	3.0	5.0		3.0	5.0	
Recall Mode	Min	Min		Min	Min	Min	Min	C-Max		Min	C-Max	
Walk Time (s)		7.0			7.0	7.0		7.0			7.0	
Flash Dont Walk (s)		11.0			11.0	11.0		11.0			11.0	
Pedestrian Calls (#/hr)		0			0	0		0			0	
Act Effct Green (s)	26.9	28.7		25.8	13.8	13.8	78.1	67.8		86.8	73.0	
Actuated g/C Ratio	0.19	0.20		0.18	0.10	0.10	0.56	0.48		0.62	0.52	
v/c Ratio	0.81	0.35		0.17	0.23	0.35	0.60	0.55		0.63	0.75	
Control Delay	66.7	17.7		35.7	61.8	3.3	38.7	33.3		29.6	32.0	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	66.7	17.7		35.7	61.8	3.3	38.7	33.3		29.6	32.0	
LOS	E	B		D	E	A	D	C		C	C	
Approach Delay		56.1			22.3			33.7			31.8	
Approach LOS		E			C			C			C	
Queue Length 50th (m)	62.7	7.7		8.3	9.9	0.0	19.4	83.5		32.1	123.7	
Queue Length 95th (m)	82.9	25.8		17.2	21.2	0.0	m29.6	m102.5		m38.5	m151.0	
Internal Link Dist (m)		127.2			306.4			126.2			246.2	
Turn Bay Length (m)	130.0			25.0			50.0			25.0		
Base Capacity (vph)	559	415		247	237	356	183	2179		363	2314	
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	
Reduced v/c Ratio	0.78	0.29		0.17	0.15	0.29	0.52	0.55		0.50	0.75	
Intersection Summary												
Area Type:	CBD											
Cycle Length:	140											
Actuated Cycle Length:	140											
Offset:	128 (91%), Referenced to phase 2:NBT and 6:SBTL, Start of Green											
Natural Cycle:	90											
Control Type:	Actuated-Coordinated											
Maximum v/c Ratio:	0.81											

Lanes, Volumes, Timings
5: Trafalgar Rd & Cross Ave/South Service Rd

FT 2028 AM.syn
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Intersection Signal Delay: 35.4	Intersection LOS: D
Intersection Capacity Utilization 70.2%	ICU Level of Service C
Analysis Period (min) 15	
m Volume for 95th percentile queue is metered by upstream signal.	

Splits and Phases: 5: Trafalgar Rd & Cross Ave/South Service Rd



HCM Signalized Intersection Capacity Analysis
5: Trafalgar Rd & Cross Ave/South Service Rd

FT 2028 AM.syn
04-03-2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	401	29	82	38	33	96	87	1078	25	168	1362	227
Future Volume (vph)	401	29	82	38	33	96	87	1078	25	168	1362	227
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.3	3.6	3.5	3.3	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	1.00		1.00	1.00	1.00	1.00	0.91		1.00	0.91	
Frpb, ped/bikes	1.00	0.98		1.00	1.00	0.99	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	1.00	
Frt	1.00	0.89		1.00	1.00	0.85	1.00	1.00		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	2795	1356		1517	1583	1362	1428	4498		1525	4407	
Flt Permitted	0.95	1.00		0.68	1.00	1.00	0.07	1.00		0.15	1.00	
Satd. Flow (perm)	2795	1356		1084	1583	1362	111	4498		236	4407	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	436	32	89	41	36	104	95	1172	27	183	1480	247
RTOR Reduction (vph)	0	71	0	0	0	94	0	2	0	0	14	0
Lane Group Flow (vph)	436	50	0	41	36	10	95	1197	0	183	1713	0
Confl. Peds. (#/hr)	1		4	4		1	10		52	52		10
Heavy Vehicles (%)	9%	6%	12%	3%	8%	4%	10%	3%	0%	3%	3%	4%
Turn Type	Prot	NA		pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases				8		8	2			6		
Actuated Green, G (s)	23.9	25.7		22.8	10.8	10.8	75.1	64.8		84.3	70.0	
Effective Green, g (s)	26.9	28.7		22.8	13.8	13.8	75.1	67.8		84.3	73.0	
Actuated g/C Ratio	0.19	0.20		0.16	0.10	0.10	0.54	0.48		0.60	0.52	
Clearance Time (s)	7.0	7.0		4.0	7.0	7.0	4.0	7.0		4.0	7.0	
Vehicle Extension (s)	3.0	4.0		3.5	4.0	4.0	3.0	5.0		3.0	5.0	
Lane Grp Cap (vph)	537	277		213	156	134	156	2178		284	2297	
v/s Ratio Prot	c0.16	0.04		0.02	c0.02		0.04	0.27		c0.07	c0.39	
v/s Ratio Perm				0.01		0.01	0.28			0.32		
v/c Ratio	0.81	0.18		0.19	0.23	0.08	0.61	0.55		0.64	0.75	
Uniform Delay, d1	54.1	46.0		50.4	58.2	57.3	21.3	25.4		16.6	26.2	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.19	1.22		1.84	1.15	
Incremental Delay, d2	9.1	0.4		0.5	1.0	0.3	4.9	0.7		2.3	1.0	
Delay (s)	63.2	46.4		50.9	59.2	57.6	30.3	31.7		32.8	31.2	
Level of Service	E	D		D	E	E	C	C		C	C	
Approach Delay (s)		59.6			56.4			31.6			31.4	
Approach LOS		E			E			C			C	
Intersection Summary												
HCM 2000 Control Delay			36.6								D	
HCM 2000 Volume to Capacity ratio			0.71									
Actuated Cycle Length (s)			140.0								16.0	
Intersection Capacity Utilization			70.2%								C	
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
6: Trafalgar Rd & Cornwall Rd

FT 2028 AM.syn
04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔		↔	↔	↔	↔	↔		↔	↔	↔
Traffic Volume (vph)	290	448	73	56	497	449	97	450	62	575	674	234
Future Volume (vph)	290	448	73	56	497	449	97	450	62	575	674	234
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.5
Storage Length (m)	80.0	0.0	80.0	0.0	25.0	0.0	80.0	0.0	80.0	0.0	0.0	0.0
Storage Lanes	2	0	1	1	1	1	0	1	0	1	1	1
Taper Length (m)	7.5		7.5		7.5		7.5		7.5		7.5	
Lane Util. Factor	0.97	0.95	0.95	1.00	0.95	1.00	1.00	*0.80	0.95	0.97	*0.80	1.00
Ped Bike Factor	0.98	0.99		0.99		0.98	1.00	1.00		0.98		0.98
Frt		0.979				0.850		0.982				0.850
Flt Protected	0.950		0.950		0.950		0.950		0.950		0.950	
Satd. Flow (prot)	2987	3055	0	1481	3154	1411	1540	2652	0	2929	1341	1356
Flt Permitted	0.950		0.950		0.950		0.950		0.950		0.950	
Satd. Flow (perm)	2937	3055	0	1470	3154	1384	1533	2652	0	2876	1341	1324
Right Turn on Red			Yes			Yes		Yes		Yes		Yes
Satd. Flow (RTOR)		12				486		9				196
Link Speed (k/h)		50			50			50				50
Link Distance (m)		285.8			142.3			311.4				130.3
Travel Time (s)		20.6			10.2			22.4				9.4
Confl. Peds. (#/hr)	25		7	7		25	9		18	18		9
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
Heavy Vehicles (%)	2%	4%	1%	6%	3%	3%	2%	1%	0%	4%	2%	6%
Adj. Flow (vph)	315	487	79	61	540	488	105	489	67	625	733	254
Shared Lane Traffic (%)												
Lane Group Flow (vph)	315	566	0	61	540	488	105	556	0	625	733	254
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		6.6			6.6			6.6			6.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.19	1.14	1.14	1.19	1.14	1.14	1.19	1.14	1.14	1.19	1.14	1.16
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2	1	1	2		1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0		2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6		2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

Lanes, Volumes, Timings
6: Trafalgar Rd & Cornwall Rd

FT 2028 AM.syn
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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA	Free	Prot	NA		Prot	NA	Perm
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases					Free							6
Detector Phases	3	8		7	4		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	7.0	10.0		7.0	10.0		7.0	20.0		7.0	20.0	20.0
Minimum Split (s)	12.0	37.0		12.0	37.0		12.0	39.0		12.0	39.0	39.0
Total Split (s)	17.0	38.0		16.0	37.0		12.0	47.0		39.0	74.0	74.0
Total Split (%)	12.1%	27.1%		11.4%	26.4%		8.6%	33.6%		27.9%	52.9%	52.9%
Maximum Green (s)	12.0	31.0		11.0	30.0		7.0	40.0		34.0	67.0	67.0
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	4.0
All-Red Time (s)	2.0	3.0		2.0	3.0		2.0	3.0		2.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-3.0		-1.0	-3.0		-1.0	-3.0		-1.0	-3.0	-3.0
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	0.2	0.2		0.2	0.2		0.2	0.2		0.2	0.2	0.2
Recall Mode	Max	Max		Max	Max		None	C-Max		Max	C-Max	C-Max
Walk Time (s)		7.0			7.0			7.0			7.0	7.0
Flash Dont Walk (s)		23.0			23.0			25.0			25.0	25.0
Pedestrian Calls (#/hr)		0			0			0			0	0
Act Effct Green (s)	13.0	34.0		12.0	33.0	140.0	8.0	43.0		35.0	70.0	70.0
Actuated g/C Ratio	0.09	0.24		0.09	0.24	1.00	0.06	0.31		0.25	0.50	0.50
v/c Ratio	1.14	0.75		0.48	0.73	0.35	1.19	0.68		0.85	1.09	0.33
Control Delay	151.3	55.4		74.6	55.9	0.7	210.6	46.7		79.1	83.5	4.5
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	151.3	55.4		74.6	55.9	0.7	210.6	46.7		79.1	83.5	4.5
LOS	F	E		E	E	A	F	D		E	F	A
Approach Delay		89.7			32.2			72.7				69.4
Approach LOS		F			C			E				E
Queue Length 50th (m)	-54.9	79.3		17.2	77.0	0.0	-36.9	87.4		82.8	-295.7	7.3
Queue Length 95th (m)	#86.7	101.9		33.2	98.7	0.0	#76.8	113.5		#121.9	#391.3	m15.9
Internal Link Dist (m)		261.8			118.3			287.4				106.3
Turn Bay Length (m)	80.0			80.0		25.0				80.0		
Base Capacity (vph)	277	751		126	743	1384	88	820		732	670	760
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	0
Reduced v/c Ratio	1.14	0.75		0.48	0.73	0.35	1.19	0.68		0.85	1.09	0.33

Intersection Summary

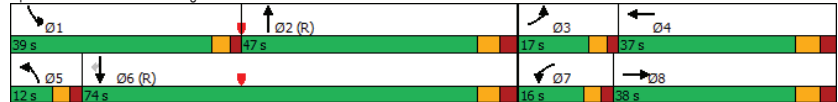
Area Type:	CBD
Cycle Length:	140
Actuated Cycle Length:	140
Offset:	0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green, Master Intersection
Natural Cycle:	150
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	1.19

Lanes, Volumes, Timings
6: Trafalgar Rd & Cornwall Rd

FT 2028 AM.syn
04-03-2024

Intersection Signal Delay: 64.6	Intersection LOS: E
Intersection Capacity Utilization 92.9%	ICU Level of Service F
Analysis Period (min) 15	
* User Entered Value	
~ Volume exceeds capacity, queue is theoretically infinite. Queue shown is maximum after two cycles.	
# 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.	
m Volume for 95th percentile queue is metered by upstream signal.	

Splits and Phases: 6: Trafalgar Rd & Cornwall Rd



HCM Signalized Intersection Capacity Analysis
6: Trafalgar Rd & Cornwall Rd

FT 2028 AM.syn
04-03-2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	290	448	73	56	497	449	97	450	62	575	674	234
Future Volume (vph)	290	448	73	56	497	449	97	450	62	575	674	234
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.5
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.97	0.95		1.00	0.95	1.00	1.00	*0.80		0.97	*0.80	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.98	1.00	1.00		1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	2987	3056		1481	3154	1384	1540	2652		2929	1341	1324
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	2987	3056		1481	3154	1384	1540	2652		2929	1341	1324
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	315	487	79	61	540	488	105	489	67	625	733	254
RTOR Reduction (vph)	0	9	0	0	0	0	0	6	0	0	0	98
Lane Group Flow (vph)	315	557	0	61	540	488	105	550	0	625	733	156
Confl. Peds. (#/hr)	25		7	7		25	9		18	18		9
Heavy Vehicles (%)	2%	4%	1%	6%	3%	2%	2%	1%	0%	4%	2%	6%
Turn Type	Prot	NA		Prot	NA	Free	Prot	NA		Prot	NA	Perm
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases						Free						6
Actuated Green, G (s)	12.0	31.0		11.0	30.0	140.0	7.0	40.0		34.0	67.0	67.0
Effective Green, g (s)	13.0	34.0		12.0	33.0	140.0	8.0	43.0		35.0	70.0	70.0
Actuated g/C Ratio	0.09	0.24		0.09	0.24	1.00	0.06	0.31		0.25	0.50	0.50
Clearance Time (s)	5.0	7.0		5.0	7.0		5.0	7.0		5.0	7.0	7.0
Vehicle Extension (s)	0.2	0.2		0.2	0.2		0.2	0.2		0.2	0.2	0.2
Lane Grp Cap (vph)	277	742		126	743	1384	88	814		732	670	662
v/s Ratio Prot	c0.11	c0.18		0.04	0.17		c0.07	0.21		0.21	c0.55	
v/s Ratio Perm						c0.35						0.12
v/c Ratio	1.14	0.75		0.48	0.73	0.35	1.19	0.68		0.85	1.09	0.24
Uniform Delay, d1	63.5	49.1		61.0	49.3	0.0	66.0	42.4		50.1	35.0	19.8
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.40	0.69	0.71
Incremental Delay, d2	96.3	6.9		12.7	6.1	0.7	156.9	4.5		8.8	58.1	0.6
Delay (s)	159.8	56.0		73.8	55.5	0.7	222.9	46.9		79.1	82.2	14.6
Level of Service	F	E		E	E	A	F	D		E	F	B
Approach Delay (s)	93.1			32.0			74.8			70.4		
Approach LOS	F			C			E			E		
Intersection Summary												
HCM 2000 Control Delay	65.9			HCM 2000 Level of Service			E					
HCM 2000 Volume to Capacity ratio	1.02											
Actuated Cycle Length (s)	140.0			Sum of lost time (s)			16.0					
Intersection Capacity Utilization	92.9%			ICU Level of Service			F					
Analysis Period (min)	15											
c Critical Lane Group												

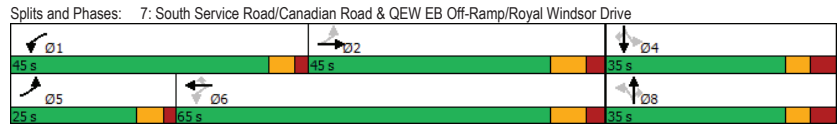
Lanes, Volumes, Timings
 7: South Service Road/Canadian Road & QEW EB Off-Ramp/Royal Windsor Drive FT 2028 AM.syn
 04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	42	518	28	84	510	7	2	8	47	3	18	27
Future Volume (vph)	42	518	28	84	510	7	2	8	47	3	18	27
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	150.0	0.0	155.0		70.0	15.0		0.0	0.0			30.0
Storage Lanes	2	0	1		1	1		1	1			1
Taper Length (m)	7.5		7.5		7.5			7.5				7.5
Lane Util. Factor	0.97	0.95	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.992				0.850			0.850			0.850
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3400	3299	0	1719	3139	1380	1805	1667	1468	1805	1792	1495
Fit Permitted	0.445		0.397				0.744			0.752		
Satd. Flow (perm)	1592	3299	0	718	3139	1380	1414	1667	1468	1429	1792	1495
Right Turn on Red			Yes			Yes			Yes		Yes	
Satd. Flow (RTOR)		5				94			152			152
Link Speed (k/h)	80			80			60					40
Link Distance (m)	324.5			247.2			158.7					215.5
Travel Time (s)	14.6			11.1			9.5					19.4
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
Heavy Vehicles (%)	3%	9%	0%	5%	15%	17%	0%	14%	10%	0%	6%	8%
Adj. Flow (vph)	46	563	30	91	554	8	2	9	51	3	20	29
Shared Lane Traffic (%)												
Lane Group Flow (vph)	46	593	0	91	554	8	2	9	51	3	20	29
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)	7.2			7.2			3.6					3.6
Link Offset(m)	0.0			0.0			0.0					0.0
Crosswalk Width(m)	4.8			4.8			4.8					4.8
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	CI+Ex	CI+Ex		CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4				9.4
Detector 2 Size(m)		0.6			0.6			0.6				0.6
Detector 2 Type		CI+Ex			CI+Ex			CI+Ex				CI+Ex
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8				4

Lanes, Volumes, Timings
 7: South Service Road/Canadian Road & QEW EB Off-Ramp/Royal Windsor Drive FT 2028 AM.syn
 04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	2			6		6	8		8	4		4
Detector Phase	5	2		1	6	6	8	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	8.0	20.0		8.0	30.0	30.0	8.0	8.0	8.0	10.0	10.0	10.0
Minimum Split (s)	14.0	34.0		14.0	38.4	38.4	28.8	28.8	28.8	35.0	35.0	35.0
Total Split (s)	25.0	45.0		45.0	65.0	65.0	35.0	35.0	35.0	35.0	35.0	35.0
Total Split (%)	20.0%	36.0%		36.0%	52.0%	52.0%	28.0%	28.0%	28.0%	28.0%	28.0%	28.0%
Maximum Green (s)	19.0	36.6		39.0	56.6	56.6	27.2	27.2	27.2	27.2	27.2	27.2
Yellow Time (s)	4.0	5.4		4.0	5.4	5.4	3.7	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	2.0	3.0		2.0	3.0	3.0	4.1	4.1	4.1	4.1	4.1	4.1
Lost Time Adjust (s)	-2.0	-4.4		-2.0	-4.4	-4.4	-3.8	-3.8	-3.8	-3.8	-3.8	-3.8
Total Lost Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lead	Lag		Lead	Lag	Lag						
Lead-Lag Optimize?												
Vehicle Extension (s)	3.5	4.5		3.5	6.0	6.0	3.5	3.5	3.5	3.5	3.5	3.5
Recall Mode	None	Max		None	Max	Max	None	None	None	None	None	None
Walk Time (s)	10.0			10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Flash Dont Walk (s)		10.0			10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Pedestrian Calls (#/hr)		0			0	0	0	0	0	0	0	0
Act Effct Green (s)	69.5	62.6		70.5	65.7	65.7	13.4	13.4	13.4	13.9	13.9	13.9
Actuated g/C Ratio	0.77	0.69		0.78	0.73	0.73	0.15	0.15	0.15	0.15	0.15	0.15
v/c Ratio	0.03	0.26		0.14	0.24	0.01	0.01	0.04	0.15	0.01	0.07	0.08
Control Delay	2.7	7.6		3.2	6.7	0.0	36.0	36.4	0.9	36.0	36.6	0.4
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	2.7	7.6		3.2	6.7	0.0	36.0	36.4	0.9	36.0	36.6	0.4
LOS	A	A		A	A	A	D	D	A	D	D	A
Approach Delay		7.3			6.1			7.2				16.4
Approach LOS		A			A			A				B
Queue Length 50th (m)	0.8	24.9		3.4	23.4	0.0	0.3	1.6	0.0	0.5	3.5	0.0
Queue Length 95th (m)	1.9	33.8		6.6	32.0	0.0	2.4	6.1	0.0	3.1	10.4	0.0
Internal Link Dist (m)		300.5			223.2			134.7			191.5	
Turn Bay Length (m)	150.0			155.0		70.0	15.0					30.0
Base Capacity (vph)	1699	2282		1032	2277	1027	486	574	605	492	617	614
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.26		0.09	0.24	0.01	0.00	0.02	0.08	0.01	0.03	0.05
Intersection Summary												
Area Type:	Other											
Cycle Length:	125											
Actuated Cycle Length:	90.6											
Natural Cycle:	90											
Control Type:	Semi Act-Uncoord											
Maximum v/c Ratio:	0.26											
Intersection Signal Delay:	7.1											
Intersection Capacity Utilization:	50.0%						Intersection LOS: A					
Analysis Period (min):	15											
ICU Level of Service:	A											

Lanes, Volumes, Timings FT 2028 AM.syn
04-03-2024
7: South Service Road/Canadian Road & QEW EB Off-Ramp/Royal Windsor Drive



HCM Signalized Intersection Capacity Analysis FT 2028 AM.syn
04-03-2024
7: South Service Road/Canadian Road & QEW EB Off-Ramp/Royal Windsor Drive

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕		↔	↕	↕	↔	↕	↕	↔	↕	↕
Traffic Volume (vph)	42	518	28	84	510	7	2	8	47	3	18	27
Future Volume (vph)	42	518	28	84	510	7	2	8	47	3	18	27
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	0.95		1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Fit Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3400	3301		1719	3139	1380	1805	1667	1468	1805	1792	1495
Fit Permitted	0.44	1.00		0.40	1.00	1.00	0.74	1.00	1.00	0.75	1.00	1.00
Satd. Flow (perm)	1591	3301		719	3139	1380	1414	1667	1468	1428	1792	1495
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	46	563	30	91	554	8	2	9	51	3	20	29
RTOR Reduction (vph)	0	2	0	0	0	3	0	0	45	0	0	25
Lane Group Flow (vph)	46	591	0	91	554	5	2	9	6	3	20	4
Heavy Vehicles (%)	3%	9%	0%	5%	15%	17%	0%	14%	10%	0%	6%	8%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8				4
Permitted Phases	2			6		6	8		8	4		4
Actuated Green, G (s)	63.1	58.6		66.7	60.4	60.4	7.8	7.8	7.8	7.8	7.8	7.8
Effective Green, g (s)	67.1	63.0		70.7	64.8	64.8	11.6	11.6	11.6	11.6	11.6	11.6
Actuated g/C Ratio	0.71	0.66		0.74	0.68	0.68	0.12	0.12	0.12	0.12	0.12	0.12
Clearance Time (s)	6.0	8.4		6.0	8.4	8.4	7.8	7.8	7.8	7.8	7.8	7.8
Vehicle Extension (s)	3.5	4.5		3.5	6.0	6.0	3.5	3.5	3.5	3.5	3.5	3.5
Lane Grp Cap (vph)	1248	2191		623	2143	942	172	203	179	174	219	182
v/s Ratio Prot	0.00	c0.18		c0.01	0.18			0.01			c0.01	
v/s Ratio Perm	0.02			0.10		0.00	0.00		0.00	0.00		0.00
w/c Ratio	0.04	0.27		0.15	0.26	0.01	0.01	0.04	0.03	0.02	0.09	0.02
Uniform Delay, d1	4.1	6.5		3.4	5.8	4.8	36.6	36.8	36.7	36.6	37.0	36.6
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.0	0.3		0.1	0.3	0.0	0.0	0.1	0.1	0.0	0.2	0.1
Delay (s)	4.1	6.8		3.5	6.1	4.8	36.6	36.9	36.8	36.7	37.2	36.7
Level of Service	A	A		A	A	A	D	D	D	D	D	D
Approach Delay (s)		6.6			5.7			36.8			36.9	
Approach LOS		A			A			D			D	
Intersection Summary												
HCM 2000 Control Delay		8.7			HCM 2000 Level of Service			A				
HCM 2000 Volume to Capacity ratio		0.23										
Actuated Cycle Length (s)		94.9			Sum of lost time (s)			12.0				
Intersection Capacity Utilization		50.0%			ICU Level of Service			A				
Analysis Period (min)		15										
c Critical Lane Group												

Lanes, Volumes, Timings
8: QEW WB Off-Ramp & Kerr Street

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Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↔	↔
Traffic Volume (vph)	444	0	0	269	236	263
Future Volume (vph)	444	0	0	269	236	263
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)		0.0	0.0		0.0	140.0
Storage Lanes		0	0		1	1
Taper Length (m)			7.5		7.5	
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00
Frt						0.850
Flt Protected					0.950	
Satd. Flow (prot)	3539	0	0	3539	1770	1583
Flt Permitted					0.950	
Satd. Flow (perm)	3539	0	0	3539	1770	1583
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)						225
Link Speed (k/h)	60			60	40	
Link Distance (m)	128.8			184.7	258.8	
Travel Time (s)	7.7			11.1	23.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	483	0	0	292	257	286
Shared Lane Traffic (%)						
Lane Group Flow (vph)	483	0	0	292	257	286
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)		15	25		25	15
Turn Type	NA			NA	Prot	Perm
Protected Phases	4			8	2	
Permitted Phases						2
Minimum Split (s)	22.5			22.5	22.5	22.5
Total Split (s)	22.5			22.5	22.5	22.5
Total Split (%)	50.0%			50.0%	50.0%	50.0%
Maximum Green (s)	18.0			18.0	18.0	18.0
Yellow Time (s)	3.5			3.5	3.5	3.5
All-Red Time (s)	1.0			1.0	1.0	1.0
Lost Time Adjust (s)	0.0			0.0	0.0	0.0
Total Lost Time (s)	4.5			4.5	4.5	4.5
Lead/Lag						
Lead-Lag Optimize?						
Walk Time (s)	7.0			7.0	7.0	7.0
Flash Dont Walk (s)	11.0			11.0	11.0	11.0
Pedestrian Calls (#/hr)	0			0	0	0
Act Effct Green (s)	18.0			18.0	18.0	18.0
Actuated g/C Ratio	0.40			0.40	0.40	0.40
v/c Ratio	0.34			0.21	0.36	0.37

Lanes, Volumes, Timings
8: QEW WB Off-Ramp & Kerr Street

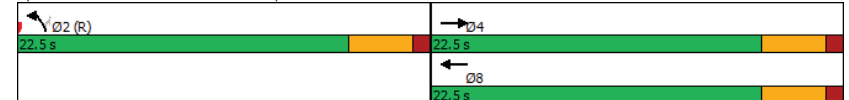
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Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Control Delay	10.2			9.3	11.4	4.4
Queue Delay	0.0			0.0	0.0	0.0
Total Delay	10.2			9.3	11.4	4.4
LOS	B			A	B	A
Approach Delay	10.2			9.3	7.7	
Approach LOS	B			A	A	
Queue Length 50th (m)	13.7			7.8	14.0	3.0
Queue Length 95th (m)	22.4			14.0	27.7	14.4
Internal Link Dist (m)	104.8			160.7	234.8	
Turn Bay Length (m)						140.0
Base Capacity (vph)	1415			1415	708	768
Starvation Cap Reductn	0			0	0	0
Spillback Cap Reductn	0			0	0	0
Storage Cap Reductn	0			0	0	0
Reduced v/c Ratio	0.34			0.21	0.36	0.37

Intersection Summary

Area Type: Other
 Cycle Length: 45
 Actuated Cycle Length: 45
 Offset: 0 (0%), Referenced to phase 2:NBL and 6: Start of Green
 Natural Cycle: 45
 Control Type: Pretimed
 Maximum v/c Ratio: 0.37
 Intersection Signal Delay: 9.0
 Intersection Capacity Utilization 36.1%
 Analysis Period (min) 15
 Intersection LOS: A
 ICU Level of Service A

Splits and Phases: 8: QEW WB Off-Ramp & Kerr Street



HCM Signalized Intersection Capacity Analysis
8: QEW WB Off-Ramp & Kerr Street

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Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↔	↔
Traffic Volume (vph)	444	0	0	269	236	263
Future Volume (vph)	444	0	0	269	236	263
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5			4.5	4.5	4.5
Lane Util. Factor	0.95			0.95	1.00	1.00
Fr _t	1.00			1.00	1.00	0.85
Fit Protected	1.00			1.00	0.95	1.00
Satd. Flow (prot)	3539			3539	1770	1583
Fit Permitted	1.00			1.00	0.95	1.00
Satd. Flow (perm)	3539			3539	1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	483	0	0	292	257	286
RTOR Reduction (vph)	0	0	0	0	0	135
Lane Group Flow (vph)	483	0	0	292	257	151
Turn Type	NA			NA	Prot	Perm
Protected Phases	4			8	2	
Permitted Phases						2
Actuated Green, G (s)	18.0			18.0	18.0	18.0
Effective Green, g (s)	18.0			18.0	18.0	18.0
Actuated g/C Ratio	0.40			0.40	0.40	0.40
Clearance Time (s)	4.5			4.5	4.5	4.5
Lane Grp Cap (vph)	1415			1415	708	633
v/s Ratio Prot	c0.14			0.08	c0.15	
v/s Ratio Perm						0.10
v/c Ratio	0.34			0.21	0.36	0.24
Uniform Delay, d1	9.4			8.8	9.5	9.0
Progression Factor	1.00			1.00	1.00	1.00
Incremental Delay, d2	0.7			0.3	1.4	0.9
Delay (s)	10.0			9.2	10.9	9.8
Level of Service	B			A	B	A
Approach Delay (s)	10.0			9.2	10.4	
Approach LOS	B			A	B	

Intersection Summary			
HCM 2000 Control Delay	10.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.35		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	36.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
9: Dorval Drive & QEW WB Off-Ramp

FT 2028 AM.syn
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Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↑			↑
Traffic Volume (vph)	830	386	475	0	0	1325
Future Volume (vph)	830	386	475	0	0	1325
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	190.0		0.0	0.0	
Storage Lanes	2	1		0	0	
Taper Length (m)	7.5				7.5	
Lane Util. Factor	0.97	0.91	0.95	1.00	1.00	0.95
Fr _t	0.993	0.850				
Fit Protected	0.954					
Satd. Flow (prot)	3423	1441	3539	0	0	3539
Fit Permitted	0.954					
Satd. Flow (perm)	3423	1441	3539	0	0	3539
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)	4	349				
Link Speed (k/h)	40		60			60
Link Distance (m)	325.1		310.2			266.9
Travel Time (s)	29.3		18.6			16.0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	902	420	516	0	0	1440
Shared Lane Traffic (%)		10%				
Lane Group Flow (vph)	944	378	516	0	0	1440
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	7.2		0.0		0.0	
Link Offset(m)	0.0		0.0		0.0	
Crosswalk Width(m)	4.8		4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15		15	25	
Number of Detectors	1	1	2			2
Detector Template	Left	Right	Thru			Thru
Leading Detector (m)	2.0	2.0	10.0			10.0
Trailing Detector (m)	0.0	0.0	0.0			0.0
Detector 1 Position(m)	0.0	0.0	0.0			0.0
Detector 1 Size(m)	2.0	2.0	0.6			0.6
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex			CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0			0.0
Detector 1 Queue (s)	0.0	0.0	0.0			0.0
Detector 1 Delay (s)	0.0	0.0	0.0			0.0
Detector 2 Position(m)			9.4			9.4
Detector 2 Size(m)			0.6			0.6
Detector 2 Type			CI+Ex			CI+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type	Prot	Perm	NA			NA
Protected Phases	8		2			6
Permitted Phases		8				

Lanes, Volumes, Timings
9: Dorval Drive & QEW WB Off-Ramp

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Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Detector Phase	8	8	2			6
Switch Phase						
Minimum Initial (s)	10.0	10.0	20.0			20.0
Minimum Split (s)	24.0	24.0	26.0			26.0
Total Split (s)	45.6	45.6	74.4			74.4
Total Split (%)	38.0%	38.0%	62.0%			62.0%
Maximum Green (s)	39.6	39.6	68.4			68.4
Yellow Time (s)	4.0	4.0	4.0			4.0
All-Red Time (s)	2.0	2.0	2.0			2.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0			-2.0
Total Lost Time (s)	4.0	4.0	4.0			4.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	4.5	4.5	5.0			5.0
Recall Mode	None	None	Max			Max
Walk Time (s)	5.0	5.0	7.0			7.0
Flash Dont Walk (s)	7.0	7.0	11.0			11.0
Pedestrian Calls (#/hr)	0	0	0			0
Act Effct Green (s)	40.0	40.0	70.4			70.4
Actuated g/C Ratio	0.34	0.34	0.59			0.59
v/c Ratio	0.81	0.53	0.25			0.68
Control Delay	42.3	7.1	12.0			18.9
Queue Delay	0.0	0.0	0.0			0.0
Total Delay	42.3	7.1	12.0			18.9
LOS	D	A	B			B
Approach Delay	32.2		12.0			18.9
Approach LOS	C		B			B
Queue Length 50th (m)	107.7	5.2	30.7			123.8
Queue Length 95th (m)	133.7	32.5	40.5			149.7
Internal Link Dist (m)	301.1		286.2			242.9
Turn Bay Length (m)		190.0				
Base Capacity (vph)	1205	732	2103			2103
Starvation Cap Reductn	0	0	0			0
Spillback Cap Reductn	0	0	0			0
Storage Cap Reductn	0	0	0			0
Reduced v/c Ratio	0.78	0.52	0.25			0.68

Intersection Summary

Area Type:	Other
Cycle Length:	120
Actuated Cycle Length:	118.5
Natural Cycle:	60
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.81
Intersection Signal Delay:	23.2
Intersection Capacity Utilization:	71.0%
Intersection LOS:	C
ICU Level of Service:	C
Analysis Period (min):	15

Lanes, Volumes, Timings
9: Dorval Drive & QEW WB Off-Ramp

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Splits and Phases: 9: Dorval Drive & QEW WB Off-Ramp



HCM Signalized Intersection Capacity Analysis
9: Dorval Drive & QEWB WB Off-Ramp

FT 2028 AM.syn
04-03-2024

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔↔	↔	↕↕			↕↕
Traffic Volume (vph)	830	386	475	0	0	1325
Future Volume (vph)	830	386	475	0	0	1325
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0			4.0
Lane Util. Factor	0.97	0.91	0.95			0.95
Fr	0.99	0.85	1.00			1.00
Fit Protected	0.95	1.00	1.00			1.00
Satd. Flow (prot)	3426	1441	3539			3539
Fit Permitted	0.95	1.00	1.00			1.00
Satd. Flow (perm)	3426	1441	3539			3539
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	902	420	516	0	0	1440
RTOR Reduction (vph)	3	231	0	0	0	0
Lane Group Flow (vph)	941	147	516	0	0	1440
Turn Type	Prot	Perm	NA			NA
Protected Phases	8		2			6
Permitted Phases	8					
Actuated Green, G (s)	38.0	38.0	68.4			68.4
Effective Green, g (s)	40.0	40.0	70.4			70.4
Actuated g/C Ratio	0.34	0.34	0.59			0.59
Clearance Time (s)	6.0	6.0	6.0			6.0
Vehicle Extension (s)	4.5	4.5	5.0			5.0
Lane Grp Cap (vph)	1157	486	2104			2104
v/s Ratio Prot	c0.27		0.15			c0.41
v/s Ratio Perm		0.10				
v/c Ratio	0.81	0.30	0.25			0.68
Uniform Delay, d1	35.8	28.9	11.4			16.4
Progression Factor	1.00	1.00	1.00			1.00
Incremental Delay, d2	5.0	0.6	0.3			1.8
Delay (s)	40.7	29.5	11.7			18.2
Level of Service	D	C	B			B
Approach Delay (s)	37.5		11.7			18.2
Approach LOS	D		B			B

Intersection Summary			
HCM 2000 Control Delay	25.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	118.4	Sum of lost time (s)	8.0
Intersection Capacity Utilization	71.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
10: Dorval Drive & QEWB EB Off-Ramp

FT 2028 AM.syn
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Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔↔	↔		↕↕	↕↕	
Traffic Volume (vph)	122	484	0	669	1432	0
Future Volume (vph)	122	484	0	669	1432	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	175.0	0.0	0.0			0.0
Storage Lanes	1	1	0			0
Taper Length (m)	7.5		7.5			
Lane Util. Factor	0.97	0.91	1.00	0.95	0.95	1.00
Fr	0.900	0.850				
Fit Protected	0.983					
Satd. Flow (prot)	3197	1441	0	3539	3539	0
Fit Permitted	0.983					
Satd. Flow (perm)	3197	1441	0	3539	3539	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	30	30				
Link Speed (k/h)	40			60	60	
Link Distance (m)	275.5			164.3	310.2	
Travel Time (s)	24.8			9.9	18.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	133	526	0	727	1557	0
Shared Lane Traffic (%)	50%					
Lane Group Flow (vph)	396	263	0	727	1557	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	7.2			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Number of Detectors	1	1		2	2	
Detector Template	Left	Right		Thru	Thru	
Leading Detector (m)	2.0	2.0		10.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	2.0		0.6	0.6	
Detector 1 Type	CI+Ex	CI+Ex		CI+Ex	CI+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	
Detector 2 Position(m)				9.4	9.4	
Detector 2 Size(m)				0.6	0.6	
Detector 2 Type				CI+Ex	CI+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Prot	Perm		NA	NA	
Protected Phases	4			2	6	
Permitted Phases	4					

Lanes, Volumes, Timings
10: Dorval Drive & QEW EB Off-Ramp

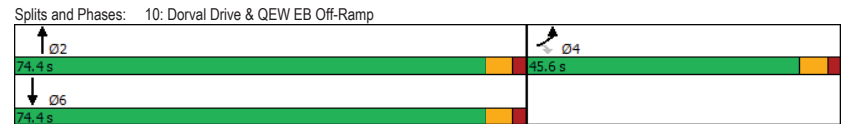
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Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Detector Phase	4	4		2	6	
Switch Phase						
Minimum Initial (s)	10.0	10.0		20.0	20.0	
Minimum Split (s)	24.0	24.0		26.0	26.0	
Total Split (s)	45.6	45.6		74.4	74.4	
Total Split (%)	38.0%	38.0%		62.0%	62.0%	
Maximum Green (s)	39.6	39.6		68.4	68.4	
Yellow Time (s)	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	4.0	4.0		5.0	5.0	
Recall Mode	None	None		Max	Max	
Walk Time (s)	0.0	0.0		7.0	7.0	
Flash Dont Walk (s)	7.0	7.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0	
Act Effct Green (s)	25.7	25.7		70.8	70.8	
Actuated g/C Ratio	0.25	0.25		0.68	0.68	
v/c Ratio	0.49	0.70		0.30	0.65	
Control Delay	32.6	41.5		8.1	12.6	
Queue Delay	0.0	0.0		0.0	0.0	
Total Delay	32.6	41.5		8.1	12.6	
LOS	C	D		A	B	
Approach Delay	36.2			8.1	12.6	
Approach LOS	D			A	B	
Queue Length 50th (m)	34.4	49.8		29.7	90.5	
Queue Length 95th (m)	48.2	80.6		53.8	156.0	
Internal Link Dist (m)	251.5			140.3	286.2	
Turn Bay Length (m)	175.0					
Base Capacity (vph)	1297	594		2396	2396	
Starvation Cap Reductn	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	
Storage Cap Reductn	0	0		0	0	
Reduced v/c Ratio	0.31	0.44		0.30	0.65	

Intersection Summary	
Area Type:	Other
Cycle Length:	120
Actuated Cycle Length:	104.5
Natural Cycle:	60
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.70
Intersection Signal Delay:	16.8
Intersection Capacity Utilization:	71.0%
Analysis Period (min):	15
Intersection LOS:	B
ICU Level of Service:	C

Lanes, Volumes, Timings
10: Dorval Drive & QEW EB Off-Ramp

FT 2028 AM.syn
04-03-2024



HCM Signalized Intersection Capacity Analysis
10: Dorval Drive & QEW EB Off-Ramp

FT 2028 AM.syn
04-03-2024

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔	↔		↕	↕	
Traffic Volume (vph)	122	484	0	669	1432	0
Future Volume (vph)	122	484	0	669	1432	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	0.91		0.95	0.95	
Flt	0.90	0.85		1.00	1.00	
Flt Protected	0.98	1.00		1.00	1.00	
Satd. Flow (prot)	3200	1441		3539	3539	
Flt Permitted	0.98	1.00		1.00	1.00	
Satd. Flow (perm)	3200	1441		3539	3539	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	133	526	0	727	1557	0
RTOR Reduction (vph)	23	23	0	0	0	0
Lane Group Flow (vph)	373	240	0	727	1557	0
Turn Type	Prot	Perm		NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4				
Actuated Green, G (s)	23.7	23.7		68.7	68.7	
Effective Green, g (s)	25.7	25.7		70.7	70.7	
Actuated g/C Ratio	0.25	0.25		0.68	0.68	
Clearance Time (s)	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	4.0	4.0		5.0	5.0	
Lane Grp Cap (vph)	787	354		2396	2396	
v/s Ratio Prot	0.12			0.21	c0.44	
v/s Ratio Perm		c0.17				
v/c Ratio	0.47	0.68		0.30	0.65	
Uniform Delay, d1	33.6	35.6		6.8	9.7	
Progression Factor	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.6	5.6		0.3	1.4	
Delay (s)	34.2	41.2		7.2	11.1	
Level of Service	C	D		A	B	
Approach Delay (s)	37.0			7.2	11.1	
Approach LOS	D			A	B	

Intersection Summary			
HCM 2000 Control Delay	15.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	104.4	Sum of lost time (s)	8.0
Intersection Capacity Utilization	71.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
11: Argus Rd & South Service Rd

FT 2028 AM.syn
04-03-2024

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Volume (vph)	1	6	643	170	18	125
Future Volume (vph)	1	6	643	170	18	125
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Flt			0.972		0.882	
Flt Protected		0.994			0.994	
Satd. Flow (prot)	0	1511	1624	0	1499	0
Flt Permitted		0.994			0.994	
Satd. Flow (perm)	0	1511	1624	0	1499	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		177.7	145.7		103.5	
Travel Time (s)		12.8	10.5		7.5	
Confl. Peds. (#/hr)	1			1	5	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	100%	0%	3%	0%	0%	0%
Adj. Flow (vph)	1	7	699	185	20	136
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	8	884	0	156	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (k/h)	24		14		24	14
Sign Control		Free	Free		Stop	
Intersection Summary						
Area Type:	CBD					
Control Type:	Unsignalized					
Intersection Capacity Utilization 65.7%				ICU Level of Service C		
Analysis Period (min) 15						

HCM Unsignalized Intersection Capacity Analysis
11: Argus Rd & South Service Rd

FT 2028 AM.syn
04-03-2024

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Volume (veh/h)	1	6	643	170	18	125
Future Volume (Veh/h)	1	6	643	170	18	125
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)	1	7	699	185	20	136
Pedestrians		1	5		1	
Lane Width (m)		3.6	3.6		3.6	
Walking Speed (m/s)		1.2	1.2		1.2	
Percent Blockage		0	0		0	
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)		358				
pX, platoon unblocked						
vC, conflicting volume	885				806	794
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	885				806	794
tC, single (s)	5.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	3.1				3.5	3.3
p0 queue free %	100				94	65
cM capacity (veh/h)	473				351	391
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	8	884	156			
Volume Left	1	0	20			
Volume Right	0	185	136			
eSH	473	1700	385			
Volume to Capacity	0.00	0.52	0.40			
Queue Length 95th (m)	0.1	0.0	15.3			
Control Delay (s)	1.6	0.0	20.6			
Lane LOS	A		C			
Approach Delay (s)	1.6	0.0	20.6			
Approach LOS			C			
Intersection Summary						
Average Delay		3.1				
Intersection Capacity Utilization		65.7%		ICU Level of Service		C
Analysis Period (min)		15				

Lanes, Volumes, Timings
12: Lyons Lane & South Service Road

FT 2028 AM.syn
04-03-2024

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Volume (vph)	0	5	4	12	20	1
Future Volume (vph)	0	5	4	12	20	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt			0.897		0.994	
Fit Protected					0.954	
Satd. Flow (prot)	0	1710	1534	0	1233	0
Fit Permitted					0.954	
Satd. Flow (perm)	0	1710	1534	0	1233	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		60.5	89.6		37.6	
Travel Time (s)		4.4	6.5		2.7	
Confl. Peds. (#/hr)	6			6	1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	0%	33%	0%
Adj. Flow (vph)	0	5	4	13	22	1
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	5	17	0	23	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (k/h)	24			14	24	14
Sign Control		Free	Free		Stop	
Intersection Summary						
Area Type:	CBD					
Control Type:	Unsignalized					
Intersection Capacity Utilization 15.1%				ICU Level of Service A		
Analysis Period (min) 15						

HCM Unsignalized Intersection Capacity Analysis
12: Lyons Lane & South Service Road

FT 2028 AM.syn
04-03-2024

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Volume (veh/h)	0	5	4	12	20	1
Future Volume (Veh/h)	0	5	4	12	20	1
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)	0	5	4	13	22	1
Pedestrians			1		6	
Lane Width (m)			3.6		3.6	
Walking Speed (m/s)			1.2		1.2	
Percent Blockage			0		1	
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	23				22	16
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	23				22	16
tC, single (s)	4.1				6.7	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.8	3.3
p0 queue free %	100				98	100
cM capacity (veh/h)	1597				915	1063
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	5	17	23			
Volume Left	0	0	22			
Volume Right	0	13	1			
sSH	1597	1700	920			
Volume to Capacity	0.00	0.01	0.02			
Queue Length 95th (m)	0.0	0.0	0.6			
Control Delay (s)	0.0	0.0	9.0			
Lane LOS			A			
Approach Delay (s)	0.0	0.0	9.0			
Approach LOS			A			
Intersection Summary						
Average Delay			4.6			
Intersection Capacity Utilization			15.1%		ICU Level of Service	A
Analysis Period (min)			15			

Lanes, Volumes, Timings
13: GO Bus Terminal/Argus Rd & Cross Ave

FT 2028 AM.syn
04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↕	↕		↕	↕		↕	↕		↕	↕	
Traffic Volume (vph)	35	423	16	44	661	26	23	0	54	185	18	552
Future Volume (vph)	35	423	16	44	661	26	23	0	54	185	18	552
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6
Storage Length (m)	20.0		0.0	20.0		0.0	0.0		0.0	15.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00	1.00		1.00	1.00			0.96		0.98		0.99
Frt		0.995			0.994			0.850				0.855
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1570	3090	0	818	3190	0	805	734	0	1570	1398	0
Fit Permitted	0.368			0.338			0.143			0.719		
Satd. Flow (perm)	608	3090	0	290	3190	0	121	734	0	1163	1398	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5			8			371			227	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		162.8			72.9			81.9			113.6	
Travel Time (s)		11.7			5.2			5.9			8.2	
Confl. Peds. (#/hr)	1		3	3		1	3		20	20		3
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
Heavy Vehicles (%)	0%	1%	100%	92%	1%	5%	95%	0%	91%	0%	93%	0%
Adj. Flow (vph)	38	460	17	48	718	28	25	0	59	201	20	600
Shared Lane Traffic (%)												
Lane Group Flow (vph)	38	477	0	48	746	0	25	59	0	201	620	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.3			3.3			3.3			3.3	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.19	1.14	1.14	1.19	1.14	1.14	1.19	1.14	1.14	1.19	1.14	1.14
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

Lanes, Volumes, Timings
13: GO Bus Terminal/Argus Rd & Cross Ave

FT 2028 AM.syn
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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases		2		6				8			4	
Detector Phase	2	2		1	6			8	8		4	4
Switch Phase												
Minimum Initial (s)	22.0	22.0		8.0	22.0			10.0	10.0		10.0	10.0
Minimum Split (s)	45.0	45.0		12.5	29.0			29.0	29.0		29.0	29.0
Total Split (s)	45.5	45.5		12.5	58.0			32.0	32.0		32.0	32.0
Total Split (%)	50.6%	50.6%		13.9%	64.4%			35.6%	35.6%		35.6%	35.6%
Maximum Green (s)	39.5	39.5		8.5	52.0			26.0	26.0		26.0	26.0
Yellow Time (s)	4.0	4.0		3.0	4.0			4.0	4.0		4.0	4.0
All-Red Time (s)	2.0	2.0		1.0	2.0			2.0	2.0		2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0		0.0	-2.0			-2.0	-2.0		-2.0	-2.0
Total Lost Time (s)	4.0	4.0		4.0	4.0			4.0	4.0		4.0	4.0
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Vehicle Extension (s)	5.0	5.0		2.5	5.0			4.0	4.0		4.0	4.0
Recall Mode	Min	Min		Min	Min			Min	Min		Min	Min
Walk Time (s)	7.0	7.0		7.0	7.0			7.0	7.0		7.0	7.0
Flash Dont Walk (s)	16.0	16.0		16.0	16.0			16.0	16.0		16.0	16.0
Pedestrian Calls (#/hr)	0	0		0	0			0	0		0	0
Act Effct Green (s)	24.5	24.5		36.7	36.7			28.0	28.0		28.0	28.0
Actuated g/C Ratio	0.34	0.34		0.50	0.50			0.39	0.39		0.39	0.39
v/c Ratio	0.19	0.46		0.23	0.46			0.54	0.12		0.45	0.91
Control Delay	19.9	20.4		12.4	12.6			65.7	0.5		20.9	34.9
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0		0.0	0.0
Total Delay	19.9	20.4		12.4	12.6			65.7	0.5		20.9	34.9
LOS	B	C		B	B			E	A		C	C
Approach Delay		20.3			12.6				19.9			31.5
Approach LOS		C			B				B			C
Queue Length 50th (m)	3.8	27.3		3.4	33.7			2.7	0.0		20.5	54.2
Queue Length 95th (m)	10.9	40.7		8.8	47.1			#16.3	0.0		41.4	#130.1
Internal Link Dist (m)		138.8			48.9				57.9			89.6
Turn Bay Length (m)	20.0			20.0							15.0	
Base Capacity (vph)	347	1766		208	2372			46	511		448	678
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	0.11	0.27		0.23	0.31			0.54	0.12		0.45	0.91

Intersection Summary

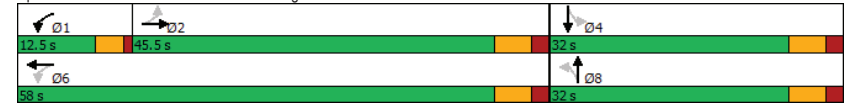
Area Type: CBD
 Cycle Length: 90
 Actuated Cycle Length: 72.7
 Natural Cycle: 90
 Control Type: Semi Act-Uncoord
 Maximum v/c Ratio: 0.91
 Intersection Signal Delay: 21.7
 Intersection LOS: C

Lanes, Volumes, Timings
13: GO Bus Terminal/Argus Rd & Cross Ave

FT 2028 AM.syn
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Intersection Capacity Utilization 86.6%
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 13: GO Bus Terminal/Argus Rd & Cross Ave



HCM Signalized Intersection Capacity Analysis
13: GO Bus Terminal/Argus Rd & Cross Ave

FT 2028 AM.syn
04-03-2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	35	423	16	44	661	26	23	0	54	185	18	552
Future Volume (vph)	35	423	16	44	661	26	23	0	54	185	18	552
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.3	3.6	3.3	3.6
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frbp, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.97		1.00	0.99	
Fipb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		0.98	1.00	
Frt	1.00	0.99		1.00	0.99		1.00	0.85		1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1569	3089		817	3191		805	738		1543	1399	
Flt Permitted	0.37	1.00		0.34	1.00		0.14	1.00		0.72	1.00	
Satd. Flow (perm)	609	3089		291	3191		121	738		1167	1399	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	38	460	17	48	718	28	25	0	59	201	20	600
RTOR Reduction (vph)	0	3	0	0	4	0	0	36	0	0	140	0
Lane Group Flow (vph)	38	474	0	48	742	0	25	23	0	201	480	0
Confl. Peds. (#/hr)	1		3	3		1	3		20	20		3
Heavy Vehicles (%)	0%	1%	100%	92%	1%	5%	95%	0%	91%	0%	93%	0%
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	2	2		1	6		8	8		4	4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	22.5	22.5		34.7	34.7		26.0	26.0		26.0	26.0	
Effective Green, g (s)	24.5	24.5		34.7	36.7		28.0	28.0		28.0	28.0	
Actuated g/C Ratio	0.34	0.34		0.48	0.50		0.39	0.39		0.39	0.39	
Clearance Time (s)	6.0	6.0		4.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	5.0	5.0		2.5	5.0		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	205	1040		198	1610		46	284		449	538	
v/s Ratio Prot		0.15		0.03	c0.23			0.03			c0.34	
v/s Ratio Perm	0.06			0.09			0.21			0.17		
v/c Ratio	0.19	0.46		0.24	0.46		0.54	0.08		0.45	0.89	
Uniform Delay, d1	17.0	18.9		11.0	11.6		17.4	14.2		16.6	20.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.9	0.7		0.5	0.4		15.4	0.2		1.0	17.4	
Delay (s)	18.0	19.5		11.5	12.1		32.8	14.3		17.6	38.3	
Level of Service	B	B		B	B		C	B		B	D	
Approach Delay (s)		19.4			12.0			19.8			33.2	
Approach LOS		B			B			B			C	

Intersection Summary			
HCM 2000 Control Delay	21.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	72.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	86.6%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
14: Lyons Lane/Street A & Cross Ave

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	63	190	217	242	133	6	19	4	14	18	26	45
Future Volume (vph)	63	190	217	242	133	6	19	4	14	18	26	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6
Storage Length (m)	0.0	0.0	25.0	0.0	20.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	0.99		1.00	1.00		1.00	0.99		1.00	0.99	
Frt		0.920			0.993			0.882			0.905	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1540	2810	0	1570	2727	0	1570	1490	0	1468	1503	0
Flt Permitted	0.656			0.432			0.707			0.745		
Satd. Flow (perm)	1054	2810	0	713	2727	0	1165	1490	0	1147	1503	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		236			7			15			49	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		40.1			211.2			69.1			70.9	
Travel Time (s)		2.9			15.2			5.0			5.1	
Confl. Peds. (#/hr)	5		1	1		5	3		3	3		3
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
Heavy Vehicles (%)	2%	11%	0%	0%	19%	0%	0%	0%	0%	7%	0%	3%
Adj. Flow (vph)	68	207	236	263	145	7	21	4	15	20	28	49
Shared Lane Traffic (%)												
Lane Group Flow (vph)	68	443	0	263	152	0	21	19	0	20	77	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.3			3.3			3.3			3.3	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.19	1.14	1.14	1.19	1.14	1.14	1.19	1.14	1.14	1.19	1.14	1.14
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

Lanes, Volumes, Timings
14: Lyons Lane/Street A & Cross Ave

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases		2		6			8			4		
Detector Phase	2	2		1	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	35.0	35.0		8.0	35.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	41.0	41.0		12.5	41.0		28.0	28.0		28.0	28.0	
Total Split (s)	41.0	41.0		21.0	62.0		28.0	28.0		28.0	28.0	
Total Split (%)	45.6%	45.6%		23.3%	68.9%		31.1%	31.1%		31.1%	31.1%	
Maximum Green (s)	35.0	35.0		17.0	56.0		22.0	22.0		22.0	22.0	
Yellow Time (s)	4.0	4.0		3.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		1.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0		0.0	-2.0		-2.0	-2.0		-2.0	-2.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Vehicle Extension (s)	5.0	5.0		2.5	5.0		4.0	4.0		4.0	4.0	
Recall Mode	Min	Min		Min	Min		Min	Min		Min	Min	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	15.0	15.0		15.0	15.0		15.0	15.0		15.0	15.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	37.0	37.0		50.4	50.4		12.3	12.3		12.3	12.3	
Actuated g/C Ratio	0.52	0.52		0.71	0.71		0.17	0.17		0.17	0.17	
v/c Ratio	0.12	0.28		0.42	0.08		0.10	0.07		0.10	0.26	
Control Delay	10.0	4.9		5.8	3.1		26.7	15.4		26.7	15.3	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	10.0	4.9		5.8	3.1		26.7	15.4		26.7	15.3	
LOS	A	A		A	A		C	B		C	B	
Approach Delay		5.6			4.8			21.4			17.6	
Approach LOS		A			A			C			B	
Queue Length 50th (m)	4.4	7.0		9.8	2.5		2.5	0.5		2.4	3.3	
Queue Length 95th (m)	12.0	16.3		18.8	5.1		8.6	6.0		8.3	14.6	
Internal Link Dist (m)		16.1			187.2			45.1			46.9	
Turn Bay Length (m)				25.0			20.0					
Base Capacity (vph)	552	1583		714	2238		395	515		389	542	
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	0.28		0.37	0.07		0.05	0.04		0.05	0.14	

Intersection Summary

Area Type: CBD
 Cycle Length: 90
 Actuated Cycle Length: 70.7
 Natural Cycle: 85
 Control Type: Semi Act-Uncoord
 Maximum v/c Ratio: 0.42
 Intersection Signal Delay: 7.0
 Intersection LOS: A

Lanes, Volumes, Timings
14: Lyons Lane/Street A & Cross Ave

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Intersection Capacity Utilization 77.6%
 Analysis Period (min) 15
 ICU Level of Service D

Splits and Phases: 14: Lyons Lane/Street A & Cross Ave



HCM Signalized Intersection Capacity Analysis
14: Lyons Lane/Street A & Cross Ave

FT 2028 AM.syn
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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	63	190	217	242	133	6	19	4	14	18	26	45
Future Volume (vph)	63	190	217	242	133	6	19	4	14	18	26	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.3	3.6	3.6	3.6
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	0.99	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Fr	1.00	0.92		1.00	0.99		1.00	0.88		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)	1530	2811		1570	2728		1566	1490		1463	1503	
Flt Permitted	0.66	1.00		0.43	1.00		0.71	1.00		0.75	1.00	
Satd. Flow (perm)	1056	2811		713	2728		1165	1490		1148	1503	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	68	207	236	263	145	7	21	4	15	20	28	49
RTOR Reduction (vph)	0	112	0	0	2	0	0	12	0	0	40	0
Lane Group Flow (vph)	68	331	0	263	150	0	21	7	0	20	37	0
Confl. Peds. (#/hr)	5		1	1		5	3		3	3		3
Heavy Vehicles (%)	2%	11%	0%	0%	19%	0%	0%	0%	0%	7%	0%	3%
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	35.0	35.0		48.4	48.4		10.3	10.3		10.3	10.3	
Effective Green, g (s)	37.0	37.0		48.4	50.4		12.3	12.3		12.3	12.3	
Actuated g/C Ratio	0.52	0.52		0.68	0.71		0.17	0.17		0.17	0.17	
Clearance Time (s)	6.0	6.0		4.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	5.0	5.0		2.5	5.0		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	552	1471		602	1944		202	259		199	261	
v/s Ratio Prot		0.12		c0.06	0.05			0.00			c0.02	
v/s Ratio Perm	0.06			c0.24			0.02			0.02		
v/c Ratio	0.12	0.22		0.44	0.08		0.10	0.03		0.10	0.14	
Uniform Delay, d1	8.6	9.1		4.5	3.1		24.6	24.2		24.5	24.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	0.2		0.4	0.0		0.3	0.1		0.3	0.3	
Delay (s)	8.8	9.3		4.9	3.1		24.9	24.3		24.9	25.1	
Level of Service	A	A		A	A		C	C		C	C	
Approach Delay (s)		9.2			4.2			24.6			25.0	
Approach LOS		A			A			C			C	

Intersection Summary			
HCM 2000 Control Delay	9.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.38		
Actuated Cycle Length (s)	70.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	77.6%	ICU Level of Service	D
Analysis Period (min)	15		

Lanes, Volumes, Timings
15: Cross Ave & Lyons Lane

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Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↕	↕	↕	↕	↕
Traffic Volume (vph)	31	454	206	11	6	21
Future Volume (vph)	31	454	206	11	6	21
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	5.0			0.0	0.0	0.0
Storage Lanes	1			0	1	0
Taper Length (m)	7.5				7.5	
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	1.00
Ped Bike Factor			0.992		0.896	
Flt Protected	0.950				0.988	
Satd. Flow (prot)	1624	3094	2798	0	1270	0
Flt Permitted	0.950				0.988	
Satd. Flow (perm)	1624	3094	2798	0	1270	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		281.3	40.1		41.7	
Travel Time (s)		20.3	2.9		3.0	
Confl. Peds. (#/hr)	4			4	7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	5%	16%	0%	0%	25%
Adj. Flow (vph)	34	493	224	12	7	23
Shared Lane Traffic (%)						
Lane Group Flow (vph)	34	493	236	0	30	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.6	3.6		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (k/h)	25			15	25	15
Sign Control		Free	Free		Stop	

Intersection Summary	
Area Type:	CBD
Control Type:	Unsignalized
Intersection Capacity Utilization	24.2%
Analysis Period (min)	15
ICU Level of Service	A

HCM Unsignalized Intersection Capacity Analysis
15: Cross Ave & Lyons Lane

FT 2028 AM.syn
04-03-2024

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↕↕	↕↕		↕	↕↕
Traffic Volume (veh/h)	31	454	206	11	6	21
Future Volume (Veh/h)	31	454	206	11	6	21
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)	34	493	224	12	7	23
Pedestrians			7		4	
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)			40			
pX, platoon unblocked						
vC, conflicting volume	240				556	122
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	240				556	122
tC, single (s)	4.1				6.8	7.4
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.5
p0 queue free %	97				98	97
cM capacity (veh/h)	1334				450	835
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	34	246	246	149	87	30
Volume Left	34	0	0	0	0	7
Volume Right	0	0	0	0	12	23
cSH	1334	1700	1700	1700	1700	696
Volume to Capacity	0.03	0.14	0.14	0.09	0.05	0.04
Queue Length 95th (m)	0.6	0.0	0.0	0.0	0.0	1.1
Control Delay (s)	7.8	0.0	0.0	0.0	0.0	10.4
Lane LOS	A					B
Approach Delay (s)	0.5			0.0		10.4
Approach LOS						B
Intersection Summary						
Average Delay			0.7			
Intersection Capacity Utilization			24.2%		ICU Level of Service	A
Analysis Period (min)			15			

Lanes, Volumes, Timings
16: Speers Road/Cornwall Road & Cross Avenue

FT 2028 AM.syn
04-03-2024

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↕↕	↕↕		↕	↕↕
Traffic Volume (vph)	214	662	614	25	12	263
Future Volume (vph)	214	662	614	25	12	263
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	75.0			0.0	55.0	0.0
Storage Lanes	1			0	1	2
Taper Length (m)	7.5				7.5	
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	0.88
Frt			0.994			0.850
Fit Protected	0.950				0.950	
Satd. Flow (prot)	1770	3539	3518	0	1770	2787
Fit Permitted	0.317				0.950	
Satd. Flow (perm)	590	3539	3518	0	1770	2787
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)			5			286
Link Speed (k/h)		50	50		50	
Link Distance (m)		228.9	275.4		183.9	
Travel Time (s)		16.5	19.8		13.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	233	720	667	27	13	286
Shared Lane Traffic (%)						
Lane Group Flow (vph)	233	720	694	0	13	286
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.6	3.6		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25			15	25	15
Number of Detectors	1	2	2		1	1
Detector Template	Left	Thru	Thru		Left	Right
Leading Detector (m)	2.0	10.0	10.0		2.0	2.0
Trailing Detector (m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Size(m)	2.0	0.6	0.6		2.0	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0		0.0	0.0
Detector 2 Position(m)		9.4	9.4			
Detector 2 Size(m)		0.6	0.6			
Detector 2 Type		Cl+Ex	Cl+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type	pm+pt	NA	NA		pm+pt	Perm
Protected Phases	5	2	6		7	
Permitted Phases	2				4	4

Lanes, Volumes, Timings
16: Speers Road/Cornwall Road & Cross Avenue

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Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Detector Phase	5	2	6		7	4
Switch Phase						
Minimum Initial (s)	6.0	25.0	25.0		6.0	6.0
Minimum Split (s)	12.0	35.0	35.0		29.0	29.0
Total Split (s)	26.0	61.0	35.0		29.0	29.0
Total Split (%)	28.9%	67.8%	38.9%		32.2%	32.2%
Maximum Green (s)	20.0	55.0	29.0		23.0	23.0
Yellow Time (s)	4.0	4.0	4.0		4.0	4.0
All-Red Time (s)	2.0	2.0	2.0		2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0		6.0	6.0
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?			Yes			
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	None	Max	Max		None	None
Walk Time (s)		18.0	18.0		12.0	12.0
Flash Dont Walk (s)		7.0	7.0		7.0	7.0
Pedestrian Calls (#/hr)		0	0		0	0
Act Effct Green (s)	55.0	55.0	40.6		6.9	6.9
Actuated g/C Ratio	0.74	0.74	0.55		0.09	0.09
v/c Ratio	0.41	0.27	0.36		0.08	0.55
Control Delay	5.1	3.4	10.4		31.3	8.8
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	5.1	3.4	10.4		31.3	8.8
LOS	A	A	B		C	A
Approach Delay		3.9	10.4		9.8	
Approach LOS		A	B		A	
Queue Length 50th (m)	7.2	12.6	26.2		1.8	0.0
Queue Length 95th (m)	15.9	22.5	45.0		6.8	11.6
Internal Link Dist (m)		204.9	251.4		159.9	
Turn Bay Length (m)	75.0				55.0	
Base Capacity (vph)	758	2634	1934		551	1064
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	0.31	0.27	0.36		0.02	0.27

Intersection Summary

Area Type:	Other
Cycle Length:	90
Actuated Cycle Length:	73.9
Natural Cycle:	80
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.55
Intersection Signal Delay:	7.1
Intersection Capacity Utilization:	52.7%
Analysis Period (min):	15
Intersection LOS:	A
ICU Level of Service:	A

Lanes, Volumes, Timings
16: Speers Road/Cornwall Road & Cross Avenue

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Splits and Phases: 16: Speers Road/Cornwall Road & Cross Avenue



HCM Signalized Intersection Capacity Analysis
16: Speers Road/Cornwall Road & Cross Avenue

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Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↕↕	↕↕		↔	↕↕
Traffic Volume (vph)	214	662	614	25	12	263
Future Volume (vph)	214	662	614	25	12	263
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0		6.0	6.0
Lane Util. Factor	1.00	0.95	0.95		1.00	0.88
Fr _t	1.00	1.00	0.99		1.00	0.85
Fit Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	3539	3519		1770	2787
Fit Permitted	0.32	1.00	1.00		0.95	1.00
Satd. Flow (perm)	591	3539	3519		1770	2787
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	233	720	667	27	13	286
RTOR Reduction (vph)	0	0	2	0	0	259
Lane Group Flow (vph)	233	720	692	0	13	27
Turn Type	pm+pt	NA	NA		pm+pt	Perm
Protected Phases	5	2	6		7	
Permitted Phases	2				4	4
Actuated Green, G (s)	55.0	55.0	40.6		6.9	6.9
Effective Green, g (s)	55.0	55.0	40.6		6.9	6.9
Actuated g/C Ratio	0.74	0.74	0.55		0.09	0.09
Clearance Time (s)	6.0	6.0	6.0		6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	573	2633	1933		165	260
v/s Ratio Prot	c0.05	0.20	0.20		0.01	
v/s Ratio Perm	c0.26					c0.01
v/c Ratio	0.41	0.27	0.36		0.08	0.10
Uniform Delay, d1	3.5	3.0	9.3		30.6	30.7
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.5	0.3	0.5		0.2	0.2
Delay (s)	4.0	3.3	9.9		30.8	30.8
Level of Service	A	A	A		C	C
Approach Delay (s)		3.5	9.9		30.8	
Approach LOS		A	A		C	

Intersection Summary			
HCM 2000 Control Delay	9.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	73.9	Sum of lost time (s)	18.0
Intersection Capacity Utilization	52.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
17: North Access & South Service Road

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Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔			↔	↕↕	↕↕
Traffic Volume (vph)	0	9	35	0	17	135
Future Volume (vph)	0	9	35	0	17	135
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t	0.865				0.880	
Fit Protected				0.950	0.995	
Satd. Flow (prot)	1611	0	0	1770	1631	0
Fit Permitted				0.950	0.995	
Satd. Flow (perm)	1611	0	0	1770	1631	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	130.8			104.5	72.7	
Travel Time (s)	9.4			7.5	5.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	10	38	0	18	147
Shared Lane Traffic (%)						
Lane Group Flow (vph)	10	0	0	38	165	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)		15	25		25	15
Sign Control	Free			Free	Stop	

Intersection Summary	
Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	24.6%
Analysis Period (min)	15
ICU Level of Service	A

HCM Unsignalized Intersection Capacity Analysis
17: North Access & South Service Road

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Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔	↔	↔	↔	↔	↔
Traffic Volume (veh/h)	0	9	35	0	17	135
Future Volume (Veh/h)	0	9	35	0	17	135
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)	0	10	38	0	18	147
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			10		81	5
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			10		81	5
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		98	86
cM capacity (veh/h)			1610		899	1078
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	10	38	165			
Volume Left	0	38	18			
Volume Right	10	0	147			
eSH	1700	1610	1055			
Volume to Capacity	0.01	0.02	0.16			
Queue Length 95th (m)	0.0	0.6	4.4			
Control Delay (s)	0.0	7.3	9.0			
Lane LOS		A	A			
Approach Delay (s)	0.0	7.3	9.0			
Approach LOS		A	A			
Intersection Summary						
Average Delay			8.3			
Intersection Capacity Utilization			24.6%		ICU Level of Service	A
Analysis Period (min)			15			

Lanes, Volumes, Timings
23: GO Station West Access/Street C & Cross Ave

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	0	232	96	804	400	0	43	0	227	0	0	0
Future Volume (vph)	0	232	96	804	400	0	43	0	227	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.0	0.0	0.0
Storage Lanes	0	0	0	0	0	0	1	0	1	0	0	0
Taper Length (m)	7.5			7.5			7.5		7.5			7.5
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.956						0.850				
Fit Protected					0.968		0.950					
Satd. Flow (prot)	0	3383	0	0	3426	0	1770	1583	0	1863	1863	0
Fit Permitted					0.644		0.757					
Satd. Flow (perm)	0	3383	0	0	2279	0	1410	1583	0	1863	1863	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		104						465				
Link Speed (k/h)		50			50			50				50
Link Distance (m)		211.2			162.8			81.1				134.3
Travel Time (s)		15.2			11.7			5.8				9.7
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
Adj. Flow (vph)	0	252	104	874	435	0	47	0	247	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	356	0	0	1309	0	47	247	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.3			3.3			3.6				3.6
Link Offset(m)		0.0			0.0			0.0				0.0
Crosswalk Width(m)		4.8			4.8			4.8				4.8
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	25	15	25	15	25	25	15	25	25	15	25
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		CI+Ex			CI+Ex			CI+Ex			CI+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type		NA			Perm			NA			Perm	
Protected Phases		4			8			8			2	
Permitted Phases		4			8			2			6	

Lanes, Volumes, Timings
23: GO Station West Access/Street C & Cross Ave

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	24.0	24.0		24.0	24.0		24.0	24.0		24.0	24.0	
Total Split (s)	25.0	25.0		25.0	25.0		25.0	25.0		25.0	25.0	
Total Split (%)	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%		50.0%	50.0%	
Maximum Green (s)	19.0	19.0		19.0	19.0		19.0	19.0		19.0	19.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		6.0			6.0			6.0			6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		19.0			19.0			19.0			19.0	
Actuated g/C Ratio		0.38			0.38			0.38			0.38	
v/c Ratio		0.26			2.29dl			0.09			0.28	
Control Delay		8.0			256.4			10.6			0.8	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		8.0			256.4			10.6			0.8	
LOS		A			F			B			A	
Approach Delay		8.0			256.4			2.3				
Approach LOS		A			F			A				
Queue Length 50th (m)		8.0			~94.3			2.7			0.0	
Queue Length 95th (m)		15.2			#129.2			7.9			0.0	
Internal Link Dist (m)		187.2			138.8			57.1			110.3	
Turn Bay Length (m)												
Base Capacity (vph)		1350			866			535			889	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.26			1.51			0.09			0.28	

Intersection Summary

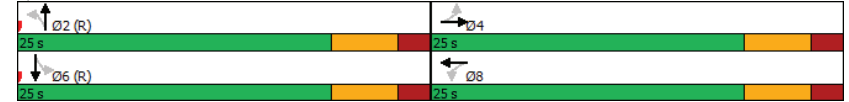
Area Type: Other
 Cycle Length: 50
 Actuated Cycle Length: 50
 Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
 Natural Cycle: 80
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.51
 Intersection Signal Delay: 173.1 Intersection LOS: F
 Intersection Capacity Utilization 83.1% ICU Level of Service E
 Analysis Period (min) 15
 ~ Volume exceeds capacity, queue is theoretically infinite.

Lanes, Volumes, Timings
23: GO Station West Access/Street C & Cross Ave

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Queue shown is maximum after two cycles.
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 dl Defacto Left Lane. Record with 1 though lane as a left lane.

Splits and Phases: 23: GO Station West Access/Street C & Cross Ave



HCM Signalized Intersection Capacity Analysis
23: GO Station West Access/Street C & Cross Ave

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔			↔	↔		↔	↔	
Traffic Volume (vph)	0	232	96	804	400	0	43	0	227	0	0	0
Future Volume (vph)	0	232	96	804	400	0	43	0	227	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0					6.0	6.0				
Lane Util. Factor		0.95			0.95		1.00	1.00				
Fr't		0.96			1.00		1.00	0.85				
Flt Protected		1.00			0.97		0.95	1.00				
Satd. Flow (prot)		3384			3425		1770	1583				
Flt Permitted		1.00			0.64		0.76	1.00				
Satd. Flow (perm)		3384			2279		1410	1583				
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	252	104	874	435	0	47	0	247	0	0	0
RTOR Reduction (vph)	0	64	0	0	0	0	0	153	0	0	0	0
Lane Group Flow (vph)	0	292	0	0	1309	0	47	94	0	0	0	0
Turn Type	NA		Perm	NA		Perm	NA		Perm			
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		19.0			19.0		19.0	19.0				
Effective Green, g (s)		19.0			19.0		19.0	19.0				
Actuated g/C Ratio		0.38			0.38		0.38	0.38				
Clearance Time (s)		6.0			6.0		6.0	6.0				
Vehicle Extension (s)		3.0			3.0		3.0	3.0				
Lane Grp Cap (vph)		1285			866		535	601				
v/s Ratio Prot		0.09						c0.06				
v/s Ratio Perm					c0.57		0.03					
v/c Ratio		0.23			2.29dl		0.09	0.16				
Uniform Delay, d1		10.5			15.5		9.9	10.2				
Progression Factor		1.00			1.00		1.00	1.00				
Incremental Delay, d2		0.1			236.2		0.3	0.6				
Delay (s)		10.6			251.7		10.3	10.8				
Level of Service		B			F		B	B				
Approach Delay (s)		10.6			251.7		10.7				0.0	
Approach LOS		B			F		B				A	

Intersection Summary			
HCM 2000 Control Delay	171.7	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	50.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	83.1%	ICU Level of Service	E
Analysis Period (min)	15		
dl Defacto Left Lane. Recode with 1 though lane as a left lane.			
c Critical Lane Group			

Lanes, Volumes, Timings
1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd

FT 2028 PM.syn
04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔			↔	↔		↔	↔	
Traffic Volume (vph)	130	110	306	870	210	173	398	1734	651	132	1072	108
Future Volume (vph)	130	110	306	870	210	173	398	1734	651	132	1072	108
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0		0.0	165.0		25.0	145.0		0.0	95.0		90.0
Storage Lanes	1		1	1		1	1		1	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		7.5
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Ped Bike Factor	0.98					0.95			0.98	1.00		
Fr't			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1624	1710	1425	3120	1710	1425	1608	4577	1425	1608	4532	1425
Flt Permitted	0.616			0.405			0.124			0.141		
Satd. Flow (perm)	1027	1710	1425	1330	1710	1360	210	4577	1402	239	4532	1425
Right Turn on Red			Yes			Yes			Yes		Yes	
Satd. Flow (RTOR)			321			151			339		191	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		347.0			285.9			280.4			353.6	
Travel Time (s)		25.0			20.6			20.2			25.5	
Confl. Peds. (#/hr)	34					34			14	14		
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
Heavy Vehicles (%)	0%	0%	2%	1%	0%	2%	1%	2%	2%	1%	3%	2%
Adj. Flow (vph)	141	120	333	946	228	188	433	1885	708	143	1165	117
Shared Lane Traffic (%)												
Lane Group Flow (vph)	141	120	333	946	228	188	433	1885	708	143	1165	117
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		7.2			7.2			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings

FT 2028 PM.syn

1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd

04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA	Free	pm+pt	NA	Perm	pm+pt	NA	Free	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		Free	8		8	2		Free	6		6
Detector Phase	7	4		3	8	8	5	2		1	6	6
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0	10.0	6.0	15.0		6.0	15.0	15.0
Minimum Split (s)	11.0	25.0		11.0	43.0	43.0	11.0	34.0		10.0	34.0	34.0
Total Split (s)	11.0	27.0		27.0	43.0	43.0	31.0	56.0		10.0	35.0	35.0
Total Split (%)	9.2%	22.5%		22.5%	35.8%	35.8%	25.8%	46.7%		8.3%	29.2%	29.2%
Maximum Green (s)	7.0	20.0		22.0	36.0	36.0	27.0	49.0		6.0	28.0	28.0
Yellow Time (s)	3.0	4.0		3.0	4.0	4.0	3.0	4.0		3.0	4.0	4.0
All-Red Time (s)	1.0	3.0		2.0	3.0	3.0	1.0	3.0		1.0	3.0	3.0
Lost Time Adjust (s)	0.0	-3.0		0.0	-3.0	-3.0	0.0	-3.0		0.0	-3.0	-3.0
Total Lost Time (s)	4.0	4.0		5.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	5.0		3.0	5.0	5.0	3.0	5.0		3.0	5.0	5.0
Recall Mode	None	None		None	None	None	None	C-Max		None	C-Max	C-Max
Walk Time (s)				7.0	7.0		7.0			7.0	7.0	
Flash Dont Walk (s)				29.0	29.0		20.0			20.0	20.0	
Pedestrian Calls (#/hr)				0	0		0			0	0	
Act Effct Green (s)	25.4	18.4	120.0	44.4	34.4	34.4	66.6	52.3	120.0	41.6	31.3	31.3
Actuated g/C Ratio	0.21	0.15	1.00	0.37	0.29	0.29	0.56	0.44	1.00	0.35	0.26	0.26
v/c Ratio	0.56	0.46	0.23	1.15	0.47	0.38	0.90	0.94	0.50	0.71	0.98	0.23
Control Delay	38.3	51.3	0.4	115.0	38.1	10.3	54.4	43.6	1.3	46.6	67.2	1.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	38.3	51.3	0.4	115.0	38.1	10.3	54.4	43.6	1.3	46.6	67.2	1.1
LOS	D	D	A	F	D	B	D	D	A	D	E	A
Approach Delay		19.7			87.7			35.3			59.7	
Approach LOS		B			F			D			E	
Queue Length 50th (m)	23.5	27.4	0.0	~108.2	46.5	6.7	86.3	161.7	0.0	17.9	105.9	0.0
Queue Length 95th (m)	36.8	45.0	0.0	#135.7	67.7	24.8	#163.6	#199.5	0.0	#62.1	#139.9	0.4
Internal Link Dist (m)		323.0			261.9			256.4			329.6	
Turn Bay Length (m)	60.0			165.0		25.0	145.0			95.0		90.0
Base Capacity (vph)	252	327	1425	820	555	543	481	1995	1402	200	1183	513
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.56	0.37	0.23	1.15	0.41	0.35	0.90	0.94	0.50	0.71	0.98	0.23

Intersection Summary

Area Type:	CBD
Cycle Length:	120
Actuated Cycle Length:	120
Offset:	105.6 (88%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle:	110
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	1.15
Intersection Signal Delay:	50.4
Intersection LOS:	D

Lanes, Volumes, Timings

FT 2028 PM.syn

1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd

04-03-2024

Intersection Capacity Utilization	97.6%	ICU Level of Service F
Analysis Period (min)	15	
-	Volume exceeds capacity, queue is theoretically infinite.	
	Queue shown is maximum after two cycles.	
#	95th percentile volume exceeds capacity, queue may be longer.	
	Queue shown is maximum after two cycles.	

Splits and Phases: 1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd



HCM Signalized Intersection Capacity Analysis
1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd

FT 2028 PM.syn
04-03-2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	↔	↗	↘	↔	↗	↘	↔	↗	↘	↔	↗	↘	
Traffic Volume (vph)	130	110	306	870	210	173	398	1734	651	132	1072	108	
Future Volume (vph)	130	110	306	870	210	173	398	1734	651	132	1072	108	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	4.0	4.0	1.0	5.0	4.0	4.0	4.0	4.0	1.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.98	1.00	1.00	1.00	
Flpb, ped/bikes	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1601	1710	1425	3120	1710	1360	1608	4577	1402	1608	4532	1425	
Flt Permitted	0.62	1.00	1.00	0.40	1.00	1.00	0.12	1.00	1.00	0.14	1.00	1.00	
Satd. Flow (perm)	1038	1710	1425	1329	1710	1360	210	4577	1402	239	4532	1425	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	141	120	333	946	228	188	433	1885	708	143	1165	117	
RTOR Reduction (vph)	0	0	0	0	0	108	0	0	0	0	0	86	
Lane Group Flow (vph)	141	120	333	946	228	80	433	1885	708	143	1165	31	
Confl. Peds. (#/hr)	34				34				14	14			
Heavy Vehicles (%)	0%	0%	2%	1%	0%	2%	1%	2%	2%	1%	3%	2%	
Turn Type	pm+pt	NA	Free	pm+pt	NA	Perm	pm+pt	NA	Free	pm+pt	NA	Perm	
Protected Phases	7	4		3	8		5	2		1	6		
Permitted Phases	4		Free	8		8	2		Free	6		6	
Actuated Green, G (s)	22.4	15.4	120.0	42.4	31.4	31.4	63.6	49.3	120.0	38.6	28.3	28.3	
Effective Green, g (s)	22.4	18.4	120.0	42.4	34.4	34.4	63.6	52.3	120.0	38.6	31.3	31.3	
Actuated g/C Ratio	0.19	0.15	1.00	0.35	0.29	0.29	0.53	0.44	1.00	0.32	0.26	0.26	
Clearance Time (s)	4.0	7.0		5.0	7.0	7.0	4.0	7.0		4.0	7.0	7.0	
Vehicle Extension (s)	3.0	5.0		3.0	5.0	5.0	3.0	5.0		3.0	5.0	5.0	
Lane Grp Cap (vph)	226	262	1425	797	490	389	475	1994	1402	194	1182	371	
v/s Ratio Prot	0.04	0.07		c0.22	0.13		c0.24	c0.41		0.06	0.26		
v/s Ratio Perm	0.08		0.23	c0.20		0.06	0.25		0.50	0.17		0.02	
v/c Ratio	0.62	0.46	0.23	1.19	0.47	0.21	0.91	0.95	0.50	0.74	0.99	0.08	
Uniform Delay, d1	43.7	46.3	0.0	35.7	35.2	32.5	33.3	32.5	0.0	31.9	44.1	33.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	5.3	2.6	0.4	96.6	1.5	0.6	21.7	10.8	1.3	13.6	23.0	0.4	
Delay (s)	49.0	48.9	0.4	132.4	36.7	33.0	55.0	43.3	1.3	45.5	67.1	33.9	
Level of Service	D	D	A	F	D	C	D	D	A	D	E	C	
Approach Delay (s)		21.7			102.6			35.2			62.2		
Approach LOS		C			F			D			E		
Intersection Summary													
HCM 2000 Control Delay			54.3		HCM 2000 Level of Service							D	
HCM 2000 Volume to Capacity ratio			1.06										
Actuated Cycle Length (s)			120.0		Sum of lost time (s)							17.0	
Intersection Capacity Utilization			97.6%		ICU Level of Service							F	
Analysis Period (min)			15										
c Critical Lane Group													

Lanes, Volumes, Timings
2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp

FT 2028 PM.syn
04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↗	↘	↔	↗	↘	↔	↗	↘	↔	↗	↘
Traffic Volume (vph)	24	0	273	537	108	334	0	2425	488	0	2238	10
Future Volume (vph)	24	0	273	537	108	334	0	2425	488	0	2238	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.5	3.3	3.6	3.5	3.6	3.6	3.6	3.6	3.6	3.5
Storage Length (m)	50.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Storage Lanes	1		1	1		1	0		1	0		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.91	1.00	1.00	0.86	0.86
Ped Bike Factor	1.00					0.99			0.97		1.00	
Frt			0.850			0.850			0.850		0.999	
Flt Protected	0.950			0.950	0.968							
Satd. Flow (prot)	1570	0	1437	1463	1547	1409	0	4577	1439	0	4781	0
Flt Permitted	0.950			0.950	0.968							
Satd. Flow (perm)	1568	0	1437	1463	1547	1391	0	4577	1400	0	4781	0
Right Turn on Red			Yes			Yes			Yes		Yes	Yes
Satd. Flow (RTOR)			31			293			155		1	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		142.1			192.6			324.8			280.4	
Travel Time (s)		10.2			13.9			23.4			20.2	
Confl. Peds. (#/hr)	2					2	14		14	14		14
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
Heavy Vehicles (%)	0%	0%	0%	2%	1%	2%	0%	2%	1%	0%	23%	0%
Adj. Flow (vph)	26	0	297	584	117	363	0	2636	530	0	2433	11
Shared Lane Traffic (%)				40%								
Lane Group Flow (vph)	26	0	297	350	351	363	0	2636	530	0	2444	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.3			3.3			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.19	1.14	1.16	1.19	1.14	1.16	1.14	1.14	1.14	1.14	1.14	1.16
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1		1	1		2	1		2	1		2
Detector Template	Left		Right	Left	Thru	Right		Thru	Right		Thru	
Leading Detector (m)	2.0		2.0	2.0	10.0	2.0		10.0	2.0		10.0	
Trailing Detector (m)	0.0		0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Detector 1 Position(m)	0.0		0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Detector 1 Size(m)	2.0		2.0	2.0	0.6	2.0		0.6	2.0		0.6	
Detector 1 Type	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Detector 1 Delay (s)	0.0		0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Detector 2 Position(m)					9.4			9.4			9.4	
Detector 2 Size(m)					0.6			0.6			0.6	
Detector 2 Type					Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

Lanes, Volumes, Timings

FT 2028 PM.syn

2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp

04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)					0.0			0.0			0.0	
Turn Type	Prot		Perm	Perm	NA	Free		NA	Free		NA	
Protected Phases	3			4	4			6			2	
Permitted Phases						Free			Free			
Detector Phase	3		8	4	4			6			2	
Switch Phase												
Minimum Initial (s)	7.0		10.0	10.0	10.0			5.0			28.0	
Minimum Split (s)	23.0		38.0	38.0	38.0			35.0			35.0	
Total Split (s)	23.0		61.0	38.0	38.0			79.0			79.0	
Total Split (%)	16.4%		43.6%	27.1%	27.1%			56.4%			56.4%	
Maximum Green (s)	18.0		54.0	31.0	31.0			72.0			72.0	
Yellow Time (s)	3.0		4.0	4.0	4.0			4.0			4.0	
All-Red Time (s)	2.0		3.0	3.0	3.0			3.0			3.0	
Lost Time Adjust (s)	-1.0		-3.0	-3.0	-3.0			-3.0			-3.0	
Total Lost Time (s)	4.0		4.0	4.0	4.0			4.0			4.0	
Lead/Lag	Lead			Lag	Lag							
Lead-Lag Optimize?	Yes			Yes	Yes							
Vehicle Extension (s)	3.0		3.0	3.0	3.0			4.5			4.5	
Recall Mode	Min		Min	Min	Min			C-Min			C-Min	
Walk Time (s)	7.0		7.0	7.0	7.0			7.0			7.0	
Flash Dont Walk (s)			24.0	24.0	24.0			21.0			21.0	
Pedestrian Calls (#/hr)			0	0	0			0			0	
Act Effct Green (s)	9.2		55.6	42.4	42.4	140.0		76.4	140.0		76.4	
Actuated g/C Ratio	0.07		0.40	0.30	0.30	1.00		0.55	1.00		0.55	
v/c Ratio	0.25		0.50	0.79	0.75	0.26		1.06	0.38		0.94	
Control Delay	67.6		31.4	58.9	55.3	0.5		59.5	0.4		38.1	
Queue Delay	0.0		0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Total Delay	67.6		31.4	58.9	55.3	0.5		59.5	0.4		38.1	
LOS	E		C	E	E	A		E	A		D	
Approach Delay		34.3			37.8			49.6			38.1	
Approach LOS		C			D			D			D	
Queue Length 50th (m)	7.4		56.9	96.5	95.2	0.0		~309.0	0.0		190.6	
Queue Length 95th (m)	17.6		86.0	#151.8	140.1	0.0		#337.9	m0.0		#213.6	
Internal Link Dist (m)		118.1			168.6			300.8			256.4	
Turn Bay Length (m)	50.0											
Base Capacity (vph)	213		603	442	468	1391		2496	1400		2607	
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		0.49	0.79	0.75	0.26		1.06	0.38		0.94	

Intersection Summary

Area Type: CBD
 Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 115.4 (82%), Referenced to phase 2:SBT and 6:NBT, Start of Green
 Natural Cycle: 150
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.06

Lanes, Volumes, Timings

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2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp

04-03-2024

Intersection Signal Delay: 43.1 Intersection LOS: D
 Intersection Capacity Utilization 85.1% ICU Level of Service E
 Analysis Period (min) 15
 ~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp



HCM Signalized Intersection Capacity Analysis
2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp

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04-03-2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	24	0	273	537	108	334	0	2425	488	0	2238	10
Future Volume (vph)	24	0	273	537	108	334	0	2425	488	0	2238	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.5	3.3	3.6	3.5	3.6	3.6	3.6	3.6	3.6	3.5
Total Lost time (s)	4.0		4.0	4.0	4.0	1.0		4.0	4.0		4.0	
Lane Util. Factor	1.00		1.00	0.95	0.95	1.00		0.91	1.00		0.86	
Frpb, ped/bikes	1.00		1.00	1.00	1.00	0.99		1.00	0.97		1.00	
Flpb, ped/bikes	1.00		1.00	1.00	1.00	1.00		1.00	1.00		1.00	
Frt	1.00		0.85	1.00	1.00	0.85		1.00	0.85		1.00	
Flt Protected	0.95		1.00	0.95	0.97	1.00		1.00	1.00		1.00	
Satd. Flow (prot)	1570		1437	1463	1546	1391		4577	1400		4782	
Flt Permitted	0.95		1.00	0.95	0.97	1.00		1.00	1.00		1.00	
Satd. Flow (perm)	1570		1437	1463	1546	1391		4577	1400		4782	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	26	0	297	584	117	363	0	2636	530	0	2433	11
RTOR Reduction (vph)	0	0	19	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	26	0	278	350	351	363	0	2636	530	0	2444	0
Confl. Peds. (#/hr)	2					2	14		14	14		14
Heavy Vehicles (%)	0%	0%	0%	2%	1%	2%	0%	2%	1%	0%	23%	0%
Turn Type	Prot		Perm	Perm	NA	Free		NA	Free		NA	
Protected Phases	3				4			6			2	
Permitted Phases			8	4		Free			Free			
Actuated Green, G (s)	8.2		52.6	39.4	39.4	140.0		73.4	140.0		73.4	
Effective Green, g (s)	9.2		55.6	42.4	42.4	140.0		76.4	140.0		76.4	
Actuated g/C Ratio	0.07		0.40	0.30	0.30	1.00		0.55	1.00		0.55	
Clearance Time (s)	5.0		7.0	7.0	7.0			7.0			7.0	
Vehicle Extension (s)	3.0		3.0	3.0	3.0			4.5			4.5	
Lane Grp Cap (vph)	103		570	443	468	1391		2497	1400		2609	
v/s Ratio Prot	0.02							c0.58			0.51	
v/s Ratio Perm			c0.19	c0.24	0.23	0.26			0.38			
v/c Ratio	0.25		0.49	0.79	0.75	0.26		1.06	0.38		0.94	
Uniform Delay, d1	62.1		31.6	44.7	44.0	0.0		31.8	0.0		29.5	
Progression Factor	1.00		1.00	1.00	1.00	1.00		0.88	1.00		1.00	
Incremental Delay, d2	1.3		0.7	9.3	6.6	0.5		30.9	0.4		8.0	
Delay (s)	63.4		32.2	54.0	50.7	0.5		59.0	0.4		37.5	
Level of Service	E		C	D	D	A		E	A		D	
Approach Delay (s)		34.7			34.6			49.2			37.5	
Approach LOS		C			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	42.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	85.1%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
3: Trafalgar Rd & QEW EB-Off Ramp

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Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	943	355	0	1955	1742	309
Future Volume (vph)	943	355	0	1955	1742	309
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.5	3.6	3.6	3.6	3.6
Lane Util. Factor	0.97	1.00	1.00	0.91	0.91	1.00
Ped Bike Factor		0.99				
Frt		0.850				0.850
Flt Protected	0.950					
Satd. Flow (prot)	3046	1423	0	4577	4577	1454
Flt Permitted	0.950					
Satd. Flow (perm)	3046	1402	0	4577	4577	1454
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		8				137
Link Speed (k/h)	50			50	50	
Link Distance (m)	199.2			51.4	324.8	
Travel Time (s)	14.3			3.7	23.4	
Confl. Peds. (#/hr)		2				
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	1%	0%	2%	2%	0%
Adj. Flow (vph)	1025	386	0	2125	1893	336
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1025	386	0	2125	1893	336
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	6.6			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.19	1.16	1.14	1.14	1.14	1.14
Turning Speed (k/h)	24	14	24			14
Number of Detectors	1	1		2	2	1
Detector Template	Left	Right		Thru	Thru	Right
Leading Detector (m)	2.0	2.0		10.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	2.0	2.0		0.6	0.6	2.0
Detector 1 Type	CI+Ex	CI+Ex		CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)				9.4	9.4	
Detector 2 Size(m)				0.6	0.6	
Detector 2 Type				CI+Ex	CI+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Perm	Perm		NA	NA	Free
Protected Phases				2	2	

Lanes, Volumes, Timings
3: Trafalgar Rd & QEW EB-Off Ramp

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Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Permitted Phases	4	4				Free
Detector Phase	4	4		2	2	
Switch Phase						
Minimum Initial (s)	10.0	10.0		29.0	29.0	
Minimum Split (s)	38.0	38.0		36.0	36.0	
Total Split (s)	61.0	61.0		79.0	79.0	
Total Split (%)	43.6%	43.6%		56.4%	56.4%	
Maximum Green (s)	54.0	54.0		72.0	72.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	
All-Red Time (s)	3.0	3.0		3.0	3.0	
Lost Time Adjust (s)	-3.0	-3.0		-3.0	-3.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Recall Mode	None	None		C-Max	C-Max	
Walk Time (s)	7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	24.0	24.0		22.0	22.0	
Pedestrian Calls (#/hr)	0	0		0	0	
Act Effct Green (s)	54.2	54.2		77.8	77.8	140.0
Actuated g/C Ratio	0.39	0.39		0.56	0.56	1.00
v/c Ratio	0.87	0.71		0.84	0.74	0.23
Control Delay	48.4	42.9		23.9	14.8	0.2
Queue Delay	0.0	0.0		0.0	0.0	0.0
Total Delay	48.4	42.9		23.9	14.8	0.2
LOS	D	D		C	B	A
Approach Delay	46.9			23.9	12.6	
Approach LOS	D			C	B	
Queue Length 50th (m)	136.8	89.5		148.2	91.6	0.0
Queue Length 95th (m)	165.9	128.7		162.7	m120.2	m0.0
Internal Link Dist (m)	175.2			27.4	300.8	
Turn Bay Length (m)						
Base Capacity (vph)	1240	575		2541	2541	1454
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	0.83	0.67		0.84	0.74	0.23

Intersection Summary
 Area Type: CBD
 Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 133.6 (95%), Referenced to phase 2:NBSB and 6:, Start of Green
 Natural Cycle: 80
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.87
 Intersection Signal Delay: 25.2 Intersection LOS: C
 Intersection Capacity Utilization 78.5% ICU Level of Service D
 Analysis Period (min) 15

Lanes, Volumes, Timings
3: Trafalgar Rd & QEW EB-Off Ramp

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



HCM Signalized Intersection Capacity Analysis
3: Trafalgar Rd & QEW EB-Off Ramp

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04-03-2024

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↖ ↗	↗		↖ ↗	↖ ↗	↗
Traffic Volume (vph)	943	355	0	1955	1742	309
Future Volume (vph)	943	355	0	1955	1742	309
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.5	3.6	3.6	3.6	3.6
Total Lost time (s)	4.0	4.0		4.0	4.0	1.0
Lane Util. Factor	0.97	1.00		0.91	0.91	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00
Fr	1.00	0.85		1.00	1.00	0.85
Fl	0.95	1.00		1.00	1.00	1.00
Satd. Flow (prot)	3046	1402		4577	4577	1454
Fl Permitted	0.95	1.00		1.00	1.00	1.00
Satd. Flow (perm)	3046	1402		4577	4577	1454
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1025	386	0	2125	1893	336
RTOR Reduction (vph)	0	5	0	0	0	0
Lane Group Flow (vph)	1025	381	0	2125	1893	336
Confl. Peds. (#/hr)		2				
Heavy Vehicles (%)	0%	1%	0%	2%	2%	0%
Turn Type	Perm	Perm		NA	NA	Free
Protected Phases				2	2	
Permitted Phases	4	4				Free
Actuated Green, G (s)	51.2	51.2		74.8	74.8	140.0
Effective Green, g (s)	54.2	54.2		77.8	77.8	140.0
Actuated g/C Ratio	0.39	0.39		0.56	0.56	1.00
Clearance Time (s)	7.0	7.0		7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	1179	542		2543	2543	1454
v/s Ratio Prot				0.46	0.41	
v/s Ratio Perm	0.34	0.27				0.23
v/c Ratio	0.87	0.70		0.84	0.74	0.23
Uniform Delay, d1	39.6	36.1		25.8	23.6	0.0
Progression Factor	1.00	1.00		0.80	0.57	1.00
Incremental Delay, d2	7.0	4.1		2.4	1.0	0.2
Delay (s)	46.7	40.2		23.1	14.4	0.2
Level of Service	D	D		C	B	A
Approach Delay (s)	44.9			23.1	12.2	
Approach LOS	D			C	B	

Intersection Summary			
HCM 2000 Control Delay	24.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	78.5%	ICU Level of Service	D
Analysis Period (min)	15		

Lanes, Volumes, Timings
4: Trafalgar Rd & Argus Rd

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Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗		↖ ↗	↖ ↗	↗
Traffic Volume (vph)	0	56	0	2659	1659	437
Future Volume (vph)	0	56	0	2659	1659	437
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.6	3.5	3.6	3.6	3.6	3.6
Lane Util. Factor	1.00	1.00	1.00	0.91	0.91	0.91
Ped Bike Factor						
Fr		0.865			0.969	
Fl						
Satd. Flow (prot)	0	1354	0	4577	4426	0
Fl Permitted						
Satd. Flow (perm)	0	1354	0	4577	4426	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	145.7			270.2	51.4	
Travel Time (s)	10.5			19.5	3.7	
Confl. Peds. (#/hr)						24
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	8%	0%	2%	2%	3%
Adj. Flow (vph)	0	61	0	2890	1803	475
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	61	0	2890	2278	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			3.3	3.3	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.14	1.16	1.14	1.14	1.14	1.14
Turning Speed (k/h)	24	14	24			14
Sign Control	Stop			Free	Free	

Intersection Summary	
Area Type:	CBD
Control Type:	Unsignalized
Intersection Capacity Utilization 60.4%	ICU Level of Service B
Analysis Period (min) 15	

HCM Unsignalized Intersection Capacity Analysis
4: Trafalgar Rd & Argus Rd

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Movement	EBL	EBR	NBL	NBT	SBT	SBR	
Lane Configurations		↗		↖↖	↗↗		
Traffic Volume (veh/h)	0	56	0	2659	1659	437	
Future Volume (Veh/h)	0	56	0	2659	1659	437	
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	61	0	2890	1803	475	
Pedestrians	24						
Lane Width (m)	3.5						
Walking Speed (m/s)	1.2						
Percent Blockage	2						
Right turn flare (veh)							
Median type				None	None		
Median storage (veh)							
Upstream signal (m)				270	52		
pX, platoon unblocked	0.83	0.69	0.69				
vC, conflicting volume	3028	862	2302				
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol	380	0	1307				
tC, single (s)	6.8	7.1	4.1				
tC, 2 stage (s)							
tF (s)	3.5	3.4	2.2				
p0 queue free %	100	92	100				
cM capacity (veh/h)	491	719	362				
Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	61	963	963	963	721	721	836
Volume Left	0	0	0	0	0	0	0
Volume Right	61	0	0	0	0	0	475
sSH	719	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.08	0.57	0.57	0.57	0.42	0.42	0.49
Queue Length 95th (m)	2.2	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (s)	10.5	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	B						
Approach Delay (s)	10.5	0.0			0.0		
Approach LOS	B						
Intersection Summary							
Average Delay			0.1				
Intersection Capacity Utilization			60.4%		ICU Level of Service		B
Analysis Period (min)			15				

Lanes, Volumes, Timings
5: Trafalgar Rd & Cross Ave/South Service Rd

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖↖	↖	↗	↖	↖	↗	↖↖	↖↖	↗	↖↖	↖↖	↖
Traffic Volume (vph)	664	38	116	72	61	180	112	1445	35	77	1262	232
Future Volume (vph)	664	38	116	72	61	180	112	1445	35	77	1262	232
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.6	3.3	3.6	3.5	3.3	3.6	3.6	3.3	3.6	3.6
Storage Length (m)	130.0		0.0	25.0		0.0	50.0		0.0	25.0		0.0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.91	0.91
Ped Bike Factor		0.97		0.97				0.99			0.99	
Ft		0.887				0.850		0.996			0.977	
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2958	1346	0	1540	1644	1423	1496	4573	0	1570	4465	0
Fit Permitted	0.950			0.651			0.069			0.072		
Satd. Flow (perm)	2958	1346	0	1026	1644	1423	109	4573	0	119	4465	0
Right Turn on Red			Yes			Yes		Yes			Yes	Yes
Satd. Flow (RTOR)		126				117		3			31	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		151.2			330.4			150.2			270.2	
Travel Time (s)		10.9			23.8			10.8			19.5	
Confl. Peds. (#/hr)			15	15			18		70	70		18
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
Heavy Vehicles (%)	3%	8%	9%	2%	4%	1%	5%	1%	0%	0%	1%	3%
Adj. Flow (vph)	722	41	126	78	66	196	122	1571	38	84	1372	252
Shared Lane Traffic (%)												
Lane Group Flow (vph)	722	167	0	78	66	196	122	1609	0	84	1624	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		6.6			6.6			3.3			3.3	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.19	1.14	1.14	1.19	1.14	1.16	1.19	1.14	1.14	1.19	1.14	1.14
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2	1	1	2		1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

Lanes, Volumes, Timings
5: Trafalgar Rd & Cross Ave/South Service Rd

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Perm	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	7	4			8		5	2		1	6	
Permitted Phases						8	2			6		
Detector Phase	7	4		8	8	8	5	2		1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	7.0	27.0		7.0	27.0	
Minimum Split (s)	17.0	25.0		25.0	25.0	25.0	11.5	34.0		11.5	34.0	
Total Split (s)	41.0	66.0		25.0	25.0	25.0	15.0	61.9		12.1	59.0	
Total Split (%)	29.3%	47.1%		17.9%	17.9%	17.9%	10.7%	44.2%		8.6%	42.1%	
Maximum Green (s)	34.0	59.0		18.0	18.0	18.0	11.0	54.9		8.1	52.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	3.0	4.0		3.0	4.0	
All-Red Time (s)	3.0	3.0		3.0	3.0	3.0	1.0	3.0		1.0	3.0	
Lost Time Adjust (s)	-3.0	-3.0		0.0	-3.0	-3.0	0.0	-3.0		0.0	-3.0	
Total Lost Time (s)	4.0	4.0		7.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lead/Lag	Lead			Lag	Lag	Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes			Yes	Yes	Yes	Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	4.0		4.0	4.0	4.0	3.0	5.0		3.0	5.0	
Recall Mode	Min	Min		Min	Min	Min	C-Max			Min	C-Max	
Walk Time (s)		7.0		7.0	7.0	7.0	7.0	7.0		7.0	7.0	
Flash Dont Walk (s)		11.0		11.0	11.0	11.0	11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)		0		0	0	0	0	0		0	0	
Act Effct Green (s)	36.8	59.1		15.3	18.3	18.3	71.3	60.8		66.4	58.3	
Actuated g/C Ratio	0.26	0.42		0.11	0.13	0.13	0.51	0.43		0.47	0.42	
v/c Ratio	0.93	0.26		0.70	0.31	0.68	0.76	0.81		0.60	0.87	
Control Delay	69.5	8.0		90.2	58.0	35.8	57.3	46.6		47.7	41.7	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	69.5	8.0		90.2	58.0	35.8	57.3	46.6		47.7	41.7	
LOS	E	A		F	E	D	E	D		D	D	
Approach Delay		58.0			52.6			47.4			42.0	
Approach LOS		E			D			D			D	
Queue Length 50th (m)	106.1	6.9		22.0	17.5	21.5	29.4	132.1		16.3	113.5	
Queue Length 95th (m)	#143.4	21.9		#43.0	32.8	49.7	m33.4	m132.0		m25.4	150.8	
Internal Link Dist (m)		127.2			306.4			126.2			246.2	
Turn Bay Length (m)	130.0			25.0			50.0			25.0		
Base Capacity (vph)	781	666		131	246	312	167	1986		142	1877	
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	
Reduced v/c Ratio	0.92	0.25		0.60	0.27	0.63	0.73	0.81		0.59	0.87	

Intersection Summary

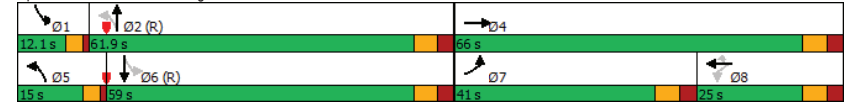
Area Type: CBD
 Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 128 (91%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
 Natural Cycle: 100
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.93

Lanes, Volumes, Timings
5: Trafalgar Rd & Cross Ave/South Service Rd

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Intersection Signal Delay: 47.8
 Intersection Capacity Utilization 82.7%
 Intersection LOS: D
 ICU Level of Service E
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: Trafalgar Rd & Cross Ave/South Service Rd



HCM Signalized Intersection Capacity Analysis
5: Trafalgar Rd & Cross Ave/South Service Rd

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	
Traffic Volume (vph)	664	38	116	72	61	180	112	1445	35	77	1262	232	
Future Volume (vph)	664	38	116	72	61	180	112	1445	35	77	1262	232	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width	3.3	3.6	3.6	3.3	3.6	3.5	3.3	3.6	3.6	3.3	3.6	3.6	
Total Lost time (s)	4.0	4.0		7.0	4.0	4.0	4.0	4.0		4.0	4.0		
Lane Util. Factor	0.97	1.00		1.00	1.00	1.00	1.00	0.91		1.00	0.91		
Frpb, ped/bikes	1.00	0.97		1.00	1.00	1.00	1.00	0.99		1.00	0.99		
Flpb, ped/bikes	1.00	1.00		0.97	1.00	1.00	1.00	1.00		1.00	1.00		
Fr	1.00	0.89		1.00	1.00	0.85	1.00	1.00		1.00	0.98		
Fl	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00		
Satd. Flow (prot)	2958	1346		1497	1644	1423	1496	4576		1570	4464		
Fl Permitted	0.95	1.00		0.65	1.00	1.00	0.07	1.00		0.07	1.00		
Satd. Flow (perm)	2958	1346		1026	1644	1423	109	4576		120	4464		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	722	41	126	78	66	196	122	1571	38	84	1372	252	
RTOR Reduction (vph)	0	73	0	0	0	102	0	2	0	0	18	0	
Lane Group Flow (vph)	722	94	0	78	66	94	122	1607	0	84	1606	0	
Confl. Peds. (#/hr)			15	15			18		70	70		18	
Heavy Vehicles (%)	3%	8%	9%	2%	4%	1%	5%	1%	0%	0%	1%	3%	
Turn Type	Prot	NA		Perm	NA	Perm	pm+pt	NA		pm+pt	NA		
Protected Phases	7	4		8		8	5	2		1	6		
Permitted Phases				8		8	2			6			
Actuated Green, G (s)	33.8	56.1		15.3	15.3	15.3	68.4	57.8		63.4	55.3		
Effective Green, g (s)	36.8	59.1		15.3	18.3	18.3	68.4	60.8		63.4	58.3		
Actuated g/C Ratio	0.26	0.42		0.11	0.13	0.13	0.49	0.43		0.45	0.42		
Clearance Time (s)	7.0	7.0		7.0	7.0	7.0	4.0	7.0		4.0	7.0		
Vehicle Extension (s)	3.0	4.0		4.0	4.0	4.0	3.0	5.0		3.0	5.0		
Lane Grp Cap (vph)	777	568		112	214	186	158	1987		138	1858		
v/s Ratio Prot	c0.24	0.07		0.04			c0.06	0.35		0.04	c0.36		
v/s Ratio Perm				c0.08			0.07	0.32		0.24			
v/c Ratio	0.93	0.17		0.70	0.31	0.51	0.77	0.81		0.61	0.86		
Uniform Delay, d1	50.3	25.1		60.1	55.1	56.7	31.8	34.5		27.3	37.2		
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.48	1.26		1.53	1.01		
Incremental Delay, d2	17.2	0.2		18.4	1.1	2.9	11.0	1.9		5.2	4.0		
Delay (s)	67.5	25.3		78.5	56.2	59.6	58.1	45.4		46.9	41.5		
Level of Service	E	C		E	E	E	E	D		D	D		
Approach Delay (s)		59.6			63.3			46.3			41.8		
Approach LOS		E			E			D			D		
Intersection Summary													
HCM 2000 Control Delay		48.4		HCM 2000 Level of Service				D					
HCM 2000 Volume to Capacity ratio		0.83											
Actuated Cycle Length (s)		140.0		Sum of lost time (s)				16.0					
Intersection Capacity Utilization		82.7%		ICU Level of Service				E					
Analysis Period (min)		15											
c Critical Lane Group													

Lanes, Volumes, Timings
6: Trafalgar Rd & Cornwall Rd

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	474	471	46	87	725	398	62	720	79	490	608	352
Future Volume (vph)	474	471	46	87	725	398	62	720	79	490	608	352
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.5
Storage Length (m)	80.0		0.0	80.0		0.0	25.0		0.0	80.0		0.0
Storage Lanes	2		0	1		1	1		0	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	0.97	0.95	0.95	1.00	0.95	1.00	1.00	*0.80	0.95	0.97	*0.80	1.00
Ped Bike Factor	0.99	1.00		0.99		0.98	0.99	1.00		0.99		0.97
Fr		0.987				0.850		0.985				0.850
Fl	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3016	3104	0	1570	3217	1439	1540	2688	0	2987	1368	1409
Fl Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2987	3104	0	1547	3217	1413	1526	2688	0	2967	1368	1361
Right Turn on Red			Yes			Yes		Yes		Yes		Yes
Satd. Flow (RTOR)		7				295		7				290
Link Speed (k/h)		50			50			50				50
Link Distance (m)		285.8			142.3			311.4				130.3
Travel Time (s)		20.6			10.2			22.4				9.4
Confl. Peds. (#/hr)	21		14	14		21	17		10	10		17
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
Heavy Vehicles (%)	1%	3%	1%	0%	1%	1%	2%	0%	0%	2%	0%	2%
Adj. Flow (vph)	515	512	50	95	788	433	67	783	86	533	661	383
Shared Lane Traffic (%)												
Lane Group Flow (vph)	515	562	0	95	788	433	67	869	0	533	661	383
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		6.6			6.6			6.6				6.6
Link Offset(m)		0.0			0.0			0.0				0.0
Crosswalk Width(m)		4.8			4.8			4.8				4.8
Two way Left Turn Lane												
Headway Factor	1.19	1.14	1.14	1.19	1.14	1.14	1.19	1.14	1.14	1.19	1.14	1.16
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2	1	1	2		1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0		2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6		2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4				9.4
Detector 2 Size(m)		0.6			0.6			0.6				0.6
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex				Cl+Ex
Detector 2 Channel												

Lanes, Volumes, Timings
6: Trafalgar Rd & Cornwall Rd

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA	Free	Prot	NA		Prot	NA	Perm
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases					Free							6
Detector Phase	3	8		7	4		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	7.0	10.0		7.0	10.0		7.0	20.0		7.0	20.0	20.0
Minimum Split (s)	12.0	37.0		12.0	37.0		12.0	39.0		12.0	39.0	39.0
Total Split (s)	26.0	43.0		20.0	37.0		12.0	49.0		28.0	65.0	65.0
Total Split (%)	18.6%	30.7%		14.3%	26.4%		8.6%	35.0%		20.0%	46.4%	46.4%
Maximum Green (s)	21.0	36.0		15.0	30.0		7.0	42.0		23.0	58.0	58.0
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	4.0
All-Red Time (s)	2.0	3.0		2.0	3.0		2.0	3.0		2.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-3.0		-1.0	-3.0		-1.0	-3.0		-1.0	-3.0	-3.0
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	0.2	0.2		0.2	0.2		0.2	0.2		0.2	0.2	0.2
Recall Mode	Max	Max		Max	Max		None	C-Max		Max	C-Max	C-Max
Walk Time (s)		7.0			7.0			7.0			7.0	7.0
Flash Dont Walk (s)		23.0			23.0			25.0			25.0	25.0
Pedestrian Calls (#/hr)		0			0			0			0	0
Act Effct Green (s)	22.0	39.0		16.0	33.0	140.0	8.0	45.0		24.0	61.0	61.0
Actuated g/C Ratio	0.16	0.28		0.11	0.24	1.00	0.06	0.32		0.17	0.44	0.44
v/c Ratio	1.09	0.65		0.53	1.04	0.31	0.76	1.00		1.04	1.11	0.51
Control Delay	121.5	47.9		70.1	94.8	0.6	110.6	77.6		119.0	89.6	7.1
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	121.5	47.9		70.1	94.8	0.6	110.6	77.6		119.0	89.6	7.1
LOS	F	D		E	F	A	F	E		F	F	A
Approach Delay		83.1			62.0			80.0				79.5
Approach LOS		F			E			E				E
Queue Length 50th (m)	-86.6	75.2		26.5	-130.1	0.0	19.6	-157.5		-88.7	-264.6	16.3
Queue Length 95th (m)	#123.7	96.4		46.0	#172.1	0.0	#47.2	#215.1		m#116.6	m#346.5	m28.9
Internal Link Dist (m)		261.8			118.3			287.4				106.3
Turn Bay Length (m)	80.0			80.0			25.0			80.0		
Base Capacity (vph)	473	869		179	758	1413	88	868		512	596	756
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	0
Reduced v/c Ratio	1.09	0.65		0.53	1.04	0.31	0.76	1.00		1.04	1.11	0.51

Intersection Summary

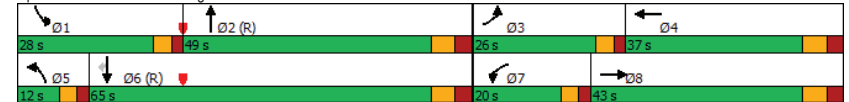
Area Type: CBD
 Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green, Master Intersection
 Natural Cycle: 140
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.11

Lanes, Volumes, Timings
6: Trafalgar Rd & Cornwall Rd

FT 2028 PM.syn
04-03-2024

Intersection Signal Delay: 75.7	Intersection LOS: E
Intersection Capacity Utilization 95.6%	ICU Level of Service F
Analysis Period (min) 15	
* User Entered Value	
~ Volume exceeds capacity, queue is theoretically infinite. Queue shown is maximum after two cycles.	
# 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.	
m Volume for 95th percentile queue is metered by upstream signal.	

Splits and Phases: 6: Trafalgar Rd & Cornwall Rd



HCM Signalized Intersection Capacity Analysis
6: Trafalgar Rd & Cornwall Rd

FT 2028 PM.syn
04-03-2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	474	471	46	87	725	398	62	720	79	490	608	352
Future Volume (vph)	474	471	46	87	725	398	62	720	79	490	608	352
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.5
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.97	0.95		1.00	0.95	1.00	1.00	*0.80		0.97	*0.80	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.98	1.00	1.00		1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Fr	1.00	0.99		1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85
Fit Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3016	3103		1570	3217	1413	1540	2689		2987	1368	1361
Fit Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3016	3103		1570	3217	1413	1540	2689		2987	1368	1361
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	515	512	50	95	788	433	67	783	86	533	661	383
RTOR Reduction (vph)	0	5	0	0	0	0	0	5	0	0	0	164
Lane Group Flow (vph)	515	557	0	95	788	433	67	864	0	533	661	219
Confl. Peds. (#/hr)	21		14	14		21	17		10	10		17
Heavy Vehicles (%)	1%	3%	1%	0%	1%	1%	2%	0%	0%	2%	0%	2%
Turn Type	Prot	NA		Prot	NA	Free	Prot	NA		Prot	NA	Perm
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases					Free							6
Actuated Green, G (s)	21.0	36.0		15.0	30.0	140.0	7.0	42.0		23.0	58.0	58.0
Effective Green, g (s)	22.0	39.0		16.0	33.0	140.0	8.0	45.0		24.0	61.0	61.0
Actuated g/C Ratio	0.16	0.28		0.11	0.24	1.00	0.06	0.32		0.17	0.44	0.44
Clearance Time (s)	5.0	7.0		5.0	7.0		5.0	7.0		5.0	7.0	7.0
Vehicle Extension (s)	0.2	0.2		0.2	0.2		0.2	0.2		0.2	0.2	0.2
Lane Grp Cap (vph)	473	864		179	758	1413	88	864		512	596	593
v/s Ratio Prot	c0.17	0.18		0.06	c0.24		0.04	0.32		c0.18	c0.48	
v/s Ratio Perm					0.31							0.16
v/c Ratio	1.09	0.64		0.53	1.04	0.31	0.76	1.00		1.04	1.11	0.37
Uniform Delay, d1	59.0	44.4		58.5	53.5	0.0	65.1	47.5		58.0	39.5	26.6
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.45	0.65	0.83
Incremental Delay, d2	67.6	3.7		10.8	43.4	0.6	28.8	30.7		41.2	62.8	1.0
Delay (s)	126.6	48.1		69.3	96.9	0.6	93.9	78.2		125.6	88.5	23.2
Level of Service	F	D		E	F	A	F	E		F	F	C
Approach Delay (s)	85.6			63.2			79.3			85.2		
Approach LOS	F			E			E			F		

Intersection Summary			
HCM 2000 Control Delay	78.3	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.10		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	95.6%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings

7: South Service Road/Canadian Road & QEW EB Off-Ramp/Royal Windsor Drive 04-03-2024

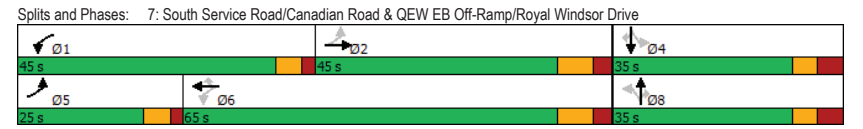
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	306	534	17	179	638	27	14	46	98	14	117	417
Future Volume (vph)	306	534	17	179	638	27	14	46	98	14	117	417
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	150.0	0.0	155.0		70.0	15.0		0.0	0.0			30.0
Storage Lanes	2		0	1		1		1	1			1
Taper Length (m)	7.5			7.5		7.5						7.5
Lane Util. Factor	0.97	0.95	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr		0.995				0.850		0.850				0.850
Fit Protected	0.950			0.950			0.950		0.950			0.950
Satd. Flow (prot)	3502	3394	0	1752	3505	1615	1805	1900	1615	1805	1900	1599
Fit Permitted	0.335			0.400			0.581			0.724		
Satd. Flow (perm)	1235	3394	0	738	3505	1615	1104	1900	1615	1376	1900	1599
Right Turn on Red			Yes			Yes		Yes		Yes		Yes
Satd. Flow (RTOR)		3				94		152				421
Link Speed (k/h)		80			80			60				40
Link Distance (m)		324.5			247.2			158.7				215.5
Travel Time (s)		14.6			11.1			9.5				19.4
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
Heavy Vehicles (%)	0%	6%	0%	3%	3%	0%	0%	0%	0%	0%	0%	1%
Adj. Flow (vph)	333	580	18	195	693	29	15	50	107	15	127	453
Shared Lane Traffic (%)												
Lane Group Flow (vph)	333	598	0	195	693	29	15	50	107	15	127	453
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		7.2			7.2			3.6				3.6
Link Offset(m)		0.0			0.0			0.0				0.0
Crosswalk Width(m)		4.8			4.8			4.8				4.8
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	CI+Ex	CI+Ex		CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4				9.4
Detector 2 Size(m)		0.6			0.6			0.6				0.6
Detector 2 Type		CI+Ex			CI+Ex			CI+Ex				CI+Ex
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8				4

Lanes, Volumes, Timings
 7: South Service Road/Canadian Road & QEW EB Off-Ramp/Royal Windsor Drive 04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	2			6		6	8		8	4		4
Detector Phase	5	2		1	6	6	8	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	8.0	20.0		8.0	30.0	30.0	8.0	8.0	8.0	10.0	10.0	10.0
Minimum Split (s)	14.0	29.4		14.0	38.4	38.4	28.8	28.8	28.8	28.8	28.8	28.8
Total Split (s)	25.0	45.0		45.0	65.0	65.0	35.0	35.0	35.0	35.0	35.0	35.0
Total Split (%)	20.0%	36.0%		36.0%	52.0%	52.0%	28.0%	28.0%	28.0%	28.0%	28.0%	28.0%
Maximum Green (s)	19.0	36.6		39.0	56.6	56.6	27.2	27.2	27.2	27.2	27.2	27.2
Yellow Time (s)	4.0	5.4		4.0	5.4	5.4	3.7	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	2.0	3.0		2.0	3.0	3.0	4.1	4.1	4.1	4.1	4.1	4.1
Lost Time Adjust (s)	-2.0	-4.4		-2.0	-4.4	-4.4	-3.8	-3.8	-3.8	-3.8	-3.8	-3.8
Total Lost Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lead	Lag		Lead	Lag	Lag						
Lead-Lag Optimize?												
Vehicle Extension (s)	3.5	4.5		3.5	6.0	6.0	3.5	3.5	3.5	3.5	3.5	3.5
Recall Mode	None	Max		None	Max	Max	None	None	None	None	None	None
Walk Time (s)		10.0			10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Flash Dont Walk (s)		10.0			10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Pedestrian Calls (#/hr)		0			0	0	0	0	0	0	0	0
Act Effct Green (s)	75.6	62.6		73.0	61.2	61.2	18.4	18.4	18.4	18.4	18.4	18.4
Actuated g/C Ratio	0.72	0.60		0.70	0.58	0.58	0.18	0.18	0.18	0.18	0.18	0.18
v/c Ratio	0.28	0.29		0.31	0.34	0.03	0.08	0.15	0.26	0.06	0.38	0.72
Control Delay	4.8	11.6		5.9	12.7	0.1	36.6	37.4	3.4	36.1	41.5	12.5
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	4.8	11.6		5.9	12.7	0.1	36.6	37.4	3.4	36.1	41.5	12.5
LOS	A	B		A	B	A	D	D	A	D	D	B
Approach Delay		9.2			10.9			16.2			19.3	
Approach LOS		A			B			B			B	
Queue Length 50th (m)	8.1	29.1		9.4	36.5	0.0	2.7	9.1	0.0	2.7	24.2	5.8
Queue Length 95th (m)	17.8	54.6		23.4	65.4	0.0	8.7	20.2	5.5	8.6	43.1	38.1
Internal Link Dist (m)		300.5			223.2			134.7			191.5	
Turn Bay Length (m)	150.0			155.0		70.0	15.0					30.0
Base Capacity (vph)	1380	2028		950	2050	983	328	564	586	409	564	771
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.24	0.29		0.21	0.34	0.03	0.05	0.09	0.18	0.04	0.23	0.59

Intersection Summary	
Area Type:	Other
Cycle Length:	125
Actuated Cycle Length:	104.7
Natural Cycle:	85
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.72
Intersection Signal Delay:	12.5
Intersection LOS:	B
Intersection Capacity Utilization:	67.5%
ICU Level of Service:	C
Analysis Period (min):	15

Lanes, Volumes, Timings
 7: South Service Road/Canadian Road & QEW EB Off-Ramp/Royal Windsor Drive 04-03-2024



HCM Signalized Intersection Capacity Analysis FT 2028 PM.syn
 7: South Service Road/Canadian Road & QEW EB Off-Ramp/Royal Windsor Drive 04-03-2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↕	↔	↕	↕	↔	↕	↕
Traffic Volume (vph)	306	534	17	179	638	27	14	46	98	14	117	417
Future Volume (vph)	306	534	17	179	638	27	14	46	98	14	117	417
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	0.95		1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr	1.00	1.00		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3502	3396		1752	3505	1615	1805	1900	1615	1805	1900	1599
Flt Permitted	0.33	1.00		0.40	1.00	1.00	0.58	1.00	1.00	0.72	1.00	1.00
Satd. Flow (perm)	1233	3396		738	3505	1615	1105	1900	1615	1376	1900	1599
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	333	580	18	195	693	29	15	50	107	15	127	453
RTOR Reduction (vph)	0	1	0	0	0	12	0	0	88	0	0	347
Lane Group Flow (vph)	333	597	0	195	693	17	15	50	19	15	127	106
Heavy Vehicles (%)	0%	6%	0%	3%	3%	0%	0%	0%	0%	0%	0%	1%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6		6	8		8	4		4
Actuated Green, G (s)	69.2	58.2		66.6	56.9	56.9	14.5	14.5	14.5	14.5	14.5	14.5
Effective Green, g (s)	73.2	62.6		70.6	61.3	61.3	18.3	18.3	18.3	18.3	18.3	18.3
Actuated g/C Ratio	0.70	0.60		0.67	0.59	0.59	0.17	0.17	0.17	0.17	0.17	0.17
Clearance Time (s)	6.0	8.4		6.0	8.4	8.4	7.8	7.8	7.8	7.8	7.8	7.8
Vehicle Extension (s)	3.5	4.5		3.5	6.0	6.0	3.5	3.5	3.5	3.5	3.5	3.5
Lane Grp Cap (vph)	1144	2032		611	2054	946	193	332	282	240	332	279
v/s Ratio Prot	c0.04	0.18		0.04	c0.20			0.03			c0.07	
v/s Ratio Perm	0.17			0.18		0.01	0.01		0.01	0.01		0.07
v/c Ratio	0.29	0.29		0.32	0.34	0.02	0.08	0.15	0.07	0.06	0.38	0.38
Uniform Delay, d1	5.6	10.2		6.3	11.2	9.1	36.1	36.6	36.0	36.0	38.2	38.1
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.2	0.4		0.4	0.4	0.0	0.2	0.2	0.1	0.1	0.9	1.0
Delay (s)	5.8	10.6		6.7	11.6	9.1	36.3	36.8	36.1	36.1	39.0	39.1
Level of Service	A	B		A	B	A	D	D	D	D	D	D
Approach Delay (s)		8.9			10.5			36.3			39.0	
Approach LOS		A			B			D			D	

Intersection Summary	
HCM 2000 Control Delay	18.1 HCM 2000 Level of Service B
HCM 2000 Volume to Capacity ratio	0.34
Actuated Cycle Length (s)	104.6 Sum of lost time (s) 12.0
Intersection Capacity Utilization	67.5% ICU Level of Service C
Analysis Period (min)	15
c Critical Lane Group	

Lanes, Volumes, Timings FT 2028 PM.syn
 8: QEW WB Off-Ramp & Kerr Street 04-03-2024

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	413	0	0	678	113	257
Future Volume (vph)	413	0	0	678	113	257
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)		0.0	0.0		0.0	140.0
Storage Lanes		0	0		1	1
Taper Length (m)			7.5		7.5	
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00
Fr						0.850
Flt Protected					0.950	
Satd. Flow (prot)	3574	0	0	3574	1805	1599
Flt Permitted					0.950	
Satd. Flow (perm)	3574	0	0	3574	1805	1599
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)						253
Link Speed (k/h)	60			60	40	
Link Distance (m)	130.3			194.2	262.1	
Travel Time (s)	7.8			11.7	23.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	0%	0%	1%	0%	1%
Adj. Flow (vph)	449	0	0	737	123	279
Shared Lane Traffic (%)						
Lane Group Flow (vph)	449	0	0	737	123	279
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)		15	25		25	15
Turn Type	NA			NA	Prot	Perm
Protected Phases	4			8	2	
Permitted Phases						2
Minimum Split (s)	22.5			22.5	22.5	22.5
Total Split (s)	22.5			22.5	22.5	22.5
Total Split (%)	50.0%			50.0%	50.0%	50.0%
Maximum Green (s)	18.0			18.0	18.0	18.0
Yellow Time (s)	3.5			3.5	3.5	3.5
All-Red Time (s)	1.0			1.0	1.0	1.0
Lost Time Adjust (s)	0.0			0.0	0.0	0.0
Total Lost Time (s)	4.5			4.5	4.5	4.5
Lead/Lag						
Lead-Lag Optimize?						
Walk Time (s)	7.0			7.0	7.0	7.0
Flash Dont Walk (s)	11.0			11.0	11.0	11.0
Pedestrian Calls (#/hr)	0			0	0	0
Act Effct Green (s)	18.0			18.0	18.0	18.0
Actuated g/C Ratio	0.40			0.40	0.40	0.40

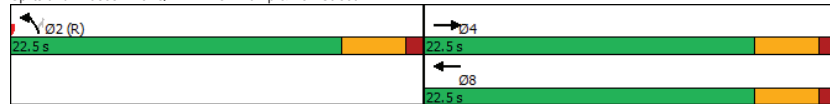
Lanes, Volumes, Timings
8: QEW WB Off-Ramp & Kerr Street

FT 2028 PM.syn
04-03-2024

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
v/c Ratio	0.31			0.52	0.17	0.35
Control Delay	10.0			11.8	9.5	3.6
Queue Delay	0.0			0.0	0.0	0.0
Total Delay	10.0			11.8	9.5	3.6
LOS	B			B	A	A
Approach Delay	10.0			11.8	5.4	
Approach LOS	B			B	A	
Queue Length 50th (m)	12.6			22.8	6.2	1.2
Queue Length 95th (m)	20.8			35.2	14.0	11.9
Internal Link Dist (m)	106.3			170.2	238.1	
Turn Bay Length (m)					140.0	
Base Capacity (vph)	1429			1429	722	791
Starvation Cap Reductn	0			0	0	0
Spillback Cap Reductn	0			0	0	0
Storage Cap Reductn	0			0	0	0
Reduced v/c Ratio	0.31			0.52	0.17	0.35

Intersection Summary	
Area Type:	Other
Cycle Length:	45
Actuated Cycle Length:	45
Offset:	0 (0%), Referenced to phase 2:NBL and 6:, Start of Green
Natural Cycle:	45
Control Type:	Pretimed
Maximum v/c Ratio:	0.52
Intersection Signal Delay:	9.7
Intersection Capacity Utilization:	34.8%
Analysis Period (min):	15
Intersection LOS:	A
ICU Level of Service A	

Splits and Phases: 8: QEW WB Off-Ramp & Kerr Street



HCM Signalized Intersection Capacity Analysis
8: QEW WB Off-Ramp & Kerr Street

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	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↕↕			↕↕	↕	↕
Traffic Volume (vph)	413	0	0	678	113	257
Future Volume (vph)	413	0	0	678	113	257
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5			4.5	4.5	4.5
Lane Util. Factor	0.95			0.95	1.00	1.00
Fr't	1.00			1.00	1.00	0.85
Fit Protected	1.00			1.00	0.95	1.00
Sat'd. Flow (prot)	3574			3574	1805	1599
Fit Permitted	1.00			1.00	0.95	1.00
Sat'd. Flow (perm)	3574			3574	1805	1599
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	449	0	0	737	123	279
RTOR Reduction (vph)	0	0	0	0	0	152
Lane Group Flow (vph)	449	0	0	737	123	127
Heavy Vehicles (%)	1%	0%	0%	1%	0%	1%
Turn Type	NA			NA	Prot	Perm
Protected Phases	4			8		2
Permitted Phases						2
Actuated Green, G (s)	18.0			18.0	18.0	18.0
Effective Green, g (s)	18.0			18.0	18.0	18.0
Actuated g/C Ratio	0.40			0.40	0.40	0.40
Clearance Time (s)	4.5			4.5	4.5	4.5
Lane Grp Cap (vph)	1429			1429	722	639
v/s Ratio Prot	0.13			c0.21	0.07	
v/s Ratio Perm						c0.08
v/c Ratio	0.31			0.52	0.17	0.20
Uniform Delay, d1	9.3			10.2	8.7	8.8
Progression Factor	1.00			1.00	1.00	1.00
Incremental Delay, d2	0.6			1.3	0.5	0.7
Delay (s)	9.8			11.5	9.2	9.5
Level of Service	A			B	A	A
Approach Delay (s)	9.8			11.5	9.4	
Approach LOS	A			B	A	

Intersection Summary			
HCM 2000 Control Delay	10.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.36		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	34.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
9: Dorval Drive & QEWB WB Off-Ramp

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Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔↔	↔	↕↕			↕↕
Traffic Volume (vph)	697	613	979	0	0	1040
Future Volume (vph)	697	613	979	0	0	1040
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	190.0		0.0	0.0	
Storage Lanes	2	1		0	0	
Taper Length (m)	7.5			7.5		
Lane Util. Factor	0.97	0.91	0.95	1.00	1.00	0.95
Frt	0.966	0.850				
Flt Protected	0.963					
Satd. Flow (prot)	3344	1455	3574	0	0	3539
Flt Permitted	0.963					
Satd. Flow (perm)	3344	1455	3574	0	0	3539
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)	38	82				
Link Speed (k/h)	40		60			60
Link Distance (m)	325.1		310.2			266.9
Travel Time (s)	29.3		18.6			16.0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	1%	1%	0%	0%	2%
Adj. Flow (vph)	758	666	1064	0	0	1130
Shared Lane Traffic (%)		33%				
Lane Group Flow (vph)	978	446	1064	0	0	1130
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	7.2		0.0		0.0	
Link Offset(m)	0.0		0.0		0.0	
Crosswalk Width(m)	4.8		4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15		15	25	
Number of Detectors	1	1	2			2
Detector Template	Left	Right	Thru			Thru
Leading Detector (m)	2.0	2.0	10.0			10.0
Trailing Detector (m)	0.0	0.0	0.0			0.0
Detector 1 Position(m)	0.0	0.0	0.0			0.0
Detector 1 Size(m)	2.0	2.0	0.6			0.6
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex			CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0			0.0
Detector 1 Queue (s)	0.0	0.0	0.0			0.0
Detector 1 Delay (s)	0.0	0.0	0.0			0.0
Detector 2 Position(m)			9.4			9.4
Detector 2 Size(m)			0.6			0.6
Detector 2 Type			CI+Ex			CI+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type	Prot	Perm	NA			NA
Protected Phases	8		2			6

Lanes, Volumes, Timings
9: Dorval Drive & QEWB WB Off-Ramp

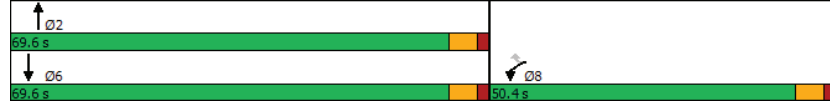
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Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Permitted Phases		8				
Detector Phase	8	8	2			6
Switch Phase						
Minimum Initial (s)	10.0	10.0	20.0			20.0
Minimum Split (s)	24.0	24.0	26.0			26.0
Total Split (s)	50.4	50.4	69.6			69.6
Total Split (%)	42.0%	42.0%	58.0%			58.0%
Maximum Green (s)	44.4	44.4	63.6			63.6
Yellow Time (s)	4.0	4.0	4.0			4.0
All-Red Time (s)	2.0	2.0	2.0			2.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0			-2.0
Total Lost Time (s)	4.0	4.0	4.0			4.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	4.5	4.5	5.0			5.0
Recall Mode	None	None	Max			Max
Walk Time (s)	5.0	5.0	7.0			7.0
Flash Dont Walk (s)	7.0	7.0	11.0			11.0
Pedestrian Calls (#/hr)	0	0	0			0
Act Effct Green (s)	43.1	43.1	65.7			65.7
Actuated g/C Ratio	0.37	0.37	0.56			0.56
v/c Ratio	0.78	0.76	0.53			0.57
Control Delay	36.2	35.3	17.6			18.3
Queue Delay	0.0	0.0	0.0			0.0
Total Delay	36.2	35.3	17.6			18.3
LOS	D	D	B			B
Approach Delay	35.9		17.6			18.3
Approach LOS	D		B			B
Queue Length 50th (m)	102.6	84.9	85.7			94.0
Queue Length 95th (m)	128.0	131.4	105.1			115.0
Internal Link Dist (m)	301.1		286.2			242.9
Turn Bay Length (m)		190.0				
Base Capacity (vph)	1353	628	2010			1991
Starvation Cap Reductn	0	0	0			0
Spillback Cap Reductn	0	0	0			0
Storage Cap Reductn	0	0	0			0
Reduced v/c Ratio	0.72	0.71	0.53			0.57
Intersection Summary						
Area Type:	Other					
Cycle Length:	120					
Actuated Cycle Length:	116.8					
Natural Cycle:	50					
Control Type:	Semi Act-Uncoord					
Maximum v/c Ratio:	0.78					
Intersection Signal Delay:	25.0			Intersection LOS: C		
Intersection Capacity Utilization:	61.7%			ICU Level of Service B		
Analysis Period (min)	15					

Lanes, Volumes, Timings
9: Dorval Drive & QEW WB Off-Ramp

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Splits and Phases: 9: Dorval Drive & QEW WB Off-Ramp



HCM Signalized Intersection Capacity Analysis
9: Dorval Drive & QEW WB Off-Ramp

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	WBL	WBR	NBT	NBR	SBL	SBT
Movement	↔	↔	↑	↔	↔	↔
Lane Configurations	↔	↔	↑			↔
Traffic Volume (vph)	697	613	979	0	0	1040
Future Volume (vph)	697	613	979	0	0	1040
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0			4.0
Lane Util. Factor	0.97	0.91	0.95			0.95
Frt	0.97	0.85	1.00			1.00
Fit Protected	0.96	1.00	1.00			1.00
Satd. Flow (prot)	3343	1455	3574			3539
Fit Permitted	0.96	1.00	1.00			1.00
Satd. Flow (perm)	3343	1455	3574			3539
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	758	666	1064	0	0	1130
RTOR Reduction (vph)	24	52	0	0	0	0
Lane Group Flow (vph)	954	394	1064	0	0	1130
Heavy Vehicles (%)	3%	1%	1%	0%	0%	2%
Turn Type	Prot	Perm	NA			NA
Protected Phases	8		2			6
Permitted Phases		8				
Actuated Green, G (s)	41.1	41.1	63.7			63.7
Effective Green, g (s)	43.1	43.1	65.7			65.7
Actuated g/C Ratio	0.37	0.37	0.56			0.56
Clearance Time (s)	6.0	6.0	6.0			6.0
Vehicle Extension (s)	4.5	4.5	5.0			5.0
Lane Grp Cap (vph)	1233	536	2010			1990
v/s Ratio Prot	c0.29		0.30			c0.32
v/s Ratio Perm		0.27				
v/c Ratio	0.77	0.74	0.53			0.57
Uniform Delay, d1	32.5	31.9	15.9			16.4
Progression Factor	1.00	1.00	1.00			1.00
Incremental Delay, d2	3.5	5.9	1.0			1.2
Delay (s)	36.0	37.8	16.9			17.6
Level of Service	D	D	B			B
Approach Delay (s)	36.6		16.9			17.6
Approach LOS	D		B			B
Intersection Summary						
HCM 2000 Control Delay			24.9		HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.65			
Actuated Cycle Length (s)			116.8		Sum of lost time (s)	8.0
Intersection Capacity Utilization			61.7%		ICU Level of Service	B
Analysis Period (min)			15			
c Critical Lane Group						

Lanes, Volumes, Timings
10: Dorval Drive & QEW EB Off-Ramp

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Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔↔	↔		↑↑	↑↑	
Traffic Volume (vph)	271	322	0	1175	1112	0
Future Volume (vph)	271	322	0	1175	1112	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	175.0	0.0	0.0			0.0
Storage Lanes	1	1	0			0
Taper Length (m)	7.5		7.5			
Lane Util. Factor	0.97	0.91	1.00	0.95	0.95	1.00
Fr _t	0.950	0.850				
Flt Protected	0.968					
Satd. Flow (prot)	3302	1441	0	3539	3505	0
Flt Permitted	0.968					
Satd. Flow (perm)	3302	1441	0	3539	3505	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	70	70				
Link Speed (k/h)	40			60	60	
Link Distance (m)	275.5			164.3	310.2	
Travel Time (s)	24.8			9.9	18.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	2%	0%	2%	3%	0%
Adj. Flow (vph)	295	350	0	1277	1209	0
Shared Lane Traffic (%)		42%				
Lane Group Flow (vph)	442	203	0	1277	1209	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	7.2			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Number of Detectors	1	1		2	2	
Detector Template	Left	Right		Thru	Thru	
Leading Detector (m)	2.0	2.0		10.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	2.0		0.6	0.6	
Detector 1 Type	CI+Ex	CI+Ex		CI+Ex	CI+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	
Detector 2 Position(m)				9.4	9.4	
Detector 2 Size(m)				0.6	0.6	
Detector 2 Type				CI+Ex	CI+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Prot	Perm		NA	NA	
Protected Phases	4			2	6	

Lanes, Volumes, Timings
10: Dorval Drive & QEW EB Off-Ramp

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Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Permitted Phases					4	
Detector Phase	4	4		2	6	
Switch Phase						
Minimum Initial (s)	10.0	10.0		20.0	20.0	
Minimum Split (s)	24.0	24.0		26.0	26.0	
Total Split (s)	45.6	45.6		74.4	74.4	
Total Split (%)	38.0%	38.0%		62.0%	62.0%	
Maximum Green (s)	39.6	39.6		68.4	68.4	
Yellow Time (s)	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	4.0	4.0		5.0	5.0	
Recall Mode	None	None		Max	Max	
Walk Time (s)	0.0	0.0		7.0	7.0	
Flash Dont Walk (s)	7.0	7.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0	
Act Effct Green (s)	20.2	20.2		70.5	70.5	
Actuated g/C Ratio	0.20	0.20		0.71	0.71	
v/c Ratio	0.60	0.58		0.51	0.48	
Control Delay	33.2	29.6		7.7	7.4	
Queue Delay	0.0	0.0		0.0	0.0	
Total Delay	33.2	29.6		7.7	7.4	
LOS	C	C		A	A	
Approach Delay	32.1			7.7	7.4	
Approach LOS	C			A	A	
Queue Length 50th (m)	35.0	26.1		52.0	48.0	
Queue Length 95th (m)	50.6	51.7		85.3	79.2	
Internal Link Dist (m)	251.5			140.3	286.2	
Turn Bay Length (m)	175.0					
Base Capacity (vph)	1434	648		2527	2503	
Starvation Cap Reductn	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	
Storage Cap Reductn	0	0		0	0	
Reduced v/c Ratio	0.31	0.31		0.51	0.48	
Intersection Summary						
Area Type:	Other					
Cycle Length:	120					
Actuated Cycle Length:	98.7					
Natural Cycle:	50					
Control Type:	Semi Act-Uncoord					
Maximum v/c Ratio:	0.60					
Intersection Signal Delay:	12.6			Intersection LOS: B		
Intersection Capacity Utilization:	61.7%			ICU Level of Service B		
Analysis Period (min)	15					

Lanes, Volumes, Timings
10: Dorval Drive & QEW EB Off-Ramp

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Splits and Phases: 10: Dorval Drive & QEW EB Off-Ramp

↑ Ø2	Ø4
74.4 s	45.6 s
↓ Ø6	
74.4 s	

HCM Signalized Intersection Capacity Analysis
10: Dorval Drive & QEW EB Off-Ramp

FT 2028 PM.syn
04-03-2024

	↖ ↗		↙ ↘		↑ ↓	
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔↔	↔		↕↕	↕↕	
Traffic Volume (vph)	271	322	0	1175	1112	0
Future Volume (vph)	271	322	0	1175	1112	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	0.91		0.95	0.95	
Fr _t	0.95	0.85		1.00	1.00	
Fit Protected	0.97	1.00		1.00	1.00	
Satd. Flow (prot)	3301	1441		3539	3505	
Fit Permitted	0.97	1.00		1.00	1.00	
Satd. Flow (perm)	3301	1441		3539	3505	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	295	350	0	1277	1209	0
RTOR Reduction (vph)	56	56	0	0	0	0
Lane Group Flow (vph)	386	147	0	1277	1209	0
Heavy Vehicles (%)	3%	2%	0%	2%	3%	0%
Turn Type	Prot	Perm		NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4				
Actuated Green, G (s)	18.2	18.2		68.5	68.5	
Effective Green, g (s)	20.2	20.2		70.5	70.5	
Actuated g/C Ratio	0.20	0.20		0.71	0.71	
Clearance Time (s)	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	4.0	4.0		5.0	5.0	
Lane Grp Cap (vph)	675	294		2527	2503	
v/s Ratio Prot	c0.12			c0.36	0.34	
v/s Ratio Perm		0.10				
v/c Ratio	0.57	0.50		0.51	0.48	
Uniform Delay, d ₁	35.4	34.8		6.3	6.2	
Progression Factor	1.00	1.00		1.00	1.00	
Incremental Delay, d ₂	1.4	1.8		0.7	0.7	
Delay (s)	36.8	36.6		7.0	6.8	
Level of Service	D	D		A	A	
Approach Delay (s)	36.7			7.0	6.8	
Approach LOS	D			A	A	
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)			98.7	Sum of lost time (s)		8.0
Intersection Capacity Utilization			61.7%	ICU Level of Service		B
Analysis Period (min)			15			
c Critical Lane Group						

Lanes, Volumes, Timings
11: Argus Rd & South Service Rd

FT 2028 PM.syn
04-03-2024

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Volume (vph)	11	10	314	217	22	84
Future Volume (vph)	11	10	314	217	22	84
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt			0.945		0.893	
Flt Protected		0.975			0.990	
Satd. Flow (prot)	0	1570	1526	0	1512	0
Flt Permitted		0.975			0.990	
Satd. Flow (perm)	0	1570	1526	0	1512	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		177.7	145.7		103.5	
Travel Time (s)		12.8	10.5		7.5	
Confl. Peds. (#/hr)					5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	13%	10%	0%	0%	0%
Adj. Flow (vph)	12	11	341	236	24	91
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	23	577	0	115	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (k/h)	24			14	24	14
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type:	CBD
Control Type:	Unsignalized
Intersection Capacity Utilization	46.9%
Analysis Period (min)	15
	ICU Level of Service A

HCM Unsignalized Intersection Capacity Analysis
11: Argus Rd & South Service Rd

FT 2028 PM.syn
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Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Volume (veh/h)	11	10	314	217	22	84
Future Volume (Veh/h)	11	10	314	217	22	84
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)	12	11	341	236	24	91
Pedestrians			5			
Lane Width (m)			3.6			
Walking Speed (m/s)			1.2			
Percent Blockage			0			
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)		358				
pX, platoon unblocked						
vC, conflicting volume	577				499	459
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	577				499	459
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				95	85
cM capacity (veh/h)	1006				526	606

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	23	577	115
Volume Left	12	0	24
Volume Right	0	236	91
eSH	1006	1700	588
Volume to Capacity	0.01	0.34	0.20
Queue Length 95th (m)	0.3	0.0	5.8
Control Delay (s)	4.5	0.0	12.6
Lane LOS	A		B
Approach Delay (s)	4.5	0.0	12.6
Approach LOS			B

Intersection Summary

Average Delay		2.2	
Intersection Capacity Utilization	46.9%	ICU Level of Service	A
Analysis Period (min)	15		

Lanes, Volumes, Timings
12: Lyons Lane & South Service Road

FT 2028 PM.syn
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Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Volume (vph)	4	6	1	37	24	6
Future Volume (vph)	4	6	1	37	24	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt			0.868		0.971	
Flt Protected		0.982			0.962	
Satd. Flow (prot)	0	1679	1222	0	1597	0
Flt Permitted		0.982			0.962	
Satd. Flow (perm)	0	1679	1222	0	1597	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		60.5	89.6		37.6	
Travel Time (s)		4.4	6.5		2.7	
Confl. Peds. (#/hr)	7			7		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	22%	0%	0%
Adj. Flow (vph)	4	7	1	40	26	7
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	11	41	0	33	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (k/h)	24			14	24	14
Sign Control		Free	Free		Stop	

Intersection Summary						
Area Type:	CBD					
Control Type:	Unsignalized					
Intersection Capacity Utilization	15.4%		ICU Level of Service A			
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
12: Lyons Lane & South Service Road

FT 2028 PM.syn
04-03-2024

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Volume (veh/h)	4	6	1	37	24	6
Future Volume (Veh/h)	4	6	1	37	24	6
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)	4	7	1	40	26	7
Pedestrians					7	
Lane Width (m)					3.6	
Walking Speed (m/s)					1.2	
Percent Blockage					1	
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	48				43	28
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	48				43	28
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)	1563				965	1047

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	11	41	33
Volume Left	4	0	26
Volume Right	0	40	7
eSH	1563	1700	981
Volume to Capacity	0.00	0.02	0.03
Queue Length 95th (m)	0.1	0.0	0.8
Control Delay (s)	2.7	0.0	8.8
Lane LOS	A		A
Approach Delay (s)	2.7	0.0	8.8
Approach LOS			A

Intersection Summary			
Average Delay		3.8	
Intersection Capacity Utilization	15.4%	ICU Level of Service	A
Analysis Period (min)	15		

Lanes, Volumes, Timings
13: GO Bus Terminal/Argus Rd & Cross Ave

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	16	938	18	41	404	47	17	2	51	228	21	144
Future Volume (vph)	16	938	18	41	404	47	17	2	51	228	21	144
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6
Storage Length (m)	20.0	0.0	20.0	0.0	0.0	0.0	0.0	15.0	0.0	0.0	0.0	0.0
Storage Lanes	1	0	1	0	1	0	1	0	1	0	1	0
Taper Length (m)	7.5		7.5		7.5		7.5		7.5		7.5	
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	1.00		1.00	1.00	0.99	0.97		0.98	0.98		
Frt	0.997			0.984		0.855			0.869			
Flt Protected	0.950			0.950		0.950			0.950			
Satd. Flow (prot)	1570	3176	0	797	3185	0	785	706	0	1570	1288	0
Flt Permitted	0.473			0.141		0.578			0.720			
Satd. Flow (perm)	775	3176	0	118	3185	0	473	706	0	1164	1288	0
Right Turn on Red			Yes		Yes		Yes		Yes			Yes
Satd. Flow (RTOR)		3		25		55		157				
Link Speed (k/h)		50		50		50		50				
Link Distance (m)		164.3		72.9		81.9		115.7				
Travel Time (s)		11.8		5.2		5.9		8.3				
Confl. Peds. (#/hr)	9		4	4		9	12		20	20		12
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
Heavy Vehicles (%)	0%	0%	100%	97%	0%	0%	100%	100%	100%	0%	100%	0%
Adj. Flow (vph)	17	1020	20	45	439	51	18	2	55	248	23	157
Shared Lane Traffic (%)												
Lane Group Flow (vph)	17	1040	0	45	490	0	18	57	0	248	180	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.3			3.3			3.3			3.3	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.19	1.14	1.14	1.19	1.14	1.14	1.19	1.14	1.14	1.19	1.14	1.14
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

Lanes, Volumes, Timings
13: GO Bus Terminal/Argus Rd & Cross Ave

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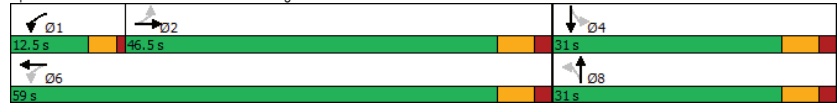
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6		8		8		4	
Permitted Phases		2		6		8		4		4		
Detector Phase	2	2		1	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	22.0	22.0		8.0	22.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	45.0	45.0		12.5	29.0		29.0	29.0		29.0	29.0	
Total Split (s)	46.5	46.5		12.5	59.0		31.0	31.0		31.0	31.0	
Total Split (%)	51.7%	51.7%		13.9%	65.6%		34.4%	34.4%		34.4%	34.4%	
Maximum Green (s)	40.5	40.5		8.5	53.0		25.0	25.0		25.0	25.0	
Yellow Time (s)	4.0	4.0		3.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		1.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0		0.0	-2.0		-2.0	-2.0		-2.0	-2.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Vehicle Extension (s)	5.0	5.0		2.5	5.0		4.0	4.0		4.0	4.0	
Recall Mode	Min	Min		Min	Min		Min	Min		Min	Min	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	16.0	16.0		16.0	16.0		16.0	16.0		16.0	16.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	36.9	36.9		49.3	49.3		23.2	23.2		23.2	23.2	
Actuated g/C Ratio	0.46	0.46		0.61	0.61		0.29	0.29		0.29	0.29	
v/c Ratio	0.05	0.72		0.32	0.25		0.13	0.24		0.74	0.37	
Control Delay	13.4	21.2		13.2	7.5		25.7	9.9		42.0	8.4	
Queue Delay	0.0	0.1		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	13.4	21.3		13.2	7.5		25.7	9.9		42.0	8.4	
LOS	B	C		B	A		C	A		D	A	
Approach Delay		21.1			8.0			13.7			27.9	
Approach LOS		C			A			B			C	
Queue Length 50th (m)	1.6	73.6		3.1	18.3		2.3	0.3		38.2	2.9	
Queue Length 95th (m)	5.4	98.2		7.7	26.3		8.1	9.4		#75.1	18.7	
Internal Link Dist (m)		140.3			48.9			57.9			91.7	
Turn Bay Length (m)	20.0			20.0						15.0		
Base Capacity (vph)	417	1712		145	2228		161	277		398	544	
Starvation Cap Reductn	0	60		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	0.04	0.63		0.31	0.22		0.11	0.21		0.62	0.33	
Intersection Summary												
Area Type:	CBD											
Cycle Length:	90											
Actuated Cycle Length:	80.7											
Natural Cycle:	90											
Control Type:	Semi Act-Uncoord											
Maximum v/c Ratio:	0.74											
Intersection Signal Delay:	18.9						Intersection LOS: B					

Lanes, Volumes, Timings
13: GO Bus Terminal/Argus Rd & Cross Ave

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Intersection Capacity Utilization 65.2% ICU Level of Service C
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 13: GO Bus Terminal/Argus Rd & Cross Ave



HCM Signalized Intersection Capacity Analysis
13: GO Bus Terminal/Argus Rd & Cross Ave

FT 2028 PM.syn
04-03-2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	16	938	18	41	404	47	17	2	51	228	21	144
Future Volume (vph)	16	938	18	41	404	47	17	2	51	228	21	144
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.97		1.00	0.98	
Flpb, ped/bikes	0.99	1.00		1.00	1.00		0.99	1.00		0.98	1.00	
Frt	1.00	1.00		1.00	0.98		1.00	0.86		1.00	0.87	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Flt Permitted	0.47	1.00		0.14	1.00		0.58	1.00		0.72	1.00	
Satd. Flow (perm)	776	3177		118	3186		474	708		1167	1290	
Satd. Flow (prot)	1558	3177		797	3186		778	708		1540	1290	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	17	1020	20	45	439	51	18	2	55	248	23	157
RTOR Reduction (vph)	0	2	0	0	10	0	0	39	0	0	112	0
Lane Group Flow (vph)	17	1038	0	45	480	0	18	18	0	248	68	0
Confl. Peds. (#/hr)	9		4	4		9	12		20	20		12
Heavy Vehicles (%)	0%	0%	100%	97%	0%	0%	100%	100%	100%	0%	100%	0%
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	34.9	34.9		47.2	47.2		21.2	21.2		21.2	21.2	
Effective Green, g (s)	36.9	36.9		47.2	49.2		23.2	23.2		23.2	23.2	
Actuated g/C Ratio	0.46	0.46		0.59	0.61		0.29	0.29		0.29	0.29	
Clearance Time (s)	6.0	6.0		4.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	5.0	5.0		2.5	5.0		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	356	1458		139	1949		136	204		336	372	
v/s Ratio Prot		c0.33		c0.03	0.15			0.03			0.05	
v/s Ratio Perm	0.02			0.16			0.04			c0.21		
v/c Ratio	0.05	0.71		0.32	0.25		0.13	0.09		0.74	0.18	
Uniform Delay, d1	12.0	17.5		10.1	7.1		21.2	20.9		25.9	21.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	2.1		1.0	0.1		0.6	0.3		8.7	0.3	
Delay (s)	12.1	19.6		11.0	7.3		21.8	21.1		34.6	21.8	
Level of Service	B	B		B	A		C	C		C	C	
Approach Delay (s)		19.4			7.6			21.3			29.2	
Approach LOS		B			A			C			C	
Intersection Summary												
HCM 2000 Control Delay				18.5			HCM 2000 Level of Service				B	
HCM 2000 Volume to Capacity ratio				0.67								
Actuated Cycle Length (s)				80.4			Sum of lost time (s)				12.0	
Intersection Capacity Utilization				65.2%			ICU Level of Service				C	
Analysis Period (min)				15								
c Critical Lane Group												

Lanes, Volumes, Timings
14: Lyons Lane/Street A & Cross Ave

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	42	168	14	16	359	13	258	5	174	17	2	69
Future Volume (vph)	42	168	14	16	359	13	258	5	174	17	2	69
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6
Storage Length (m)	0.0	0.0	25.0	0.0	20.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Storage Lanes	1	0	1	0	1	0	1	0	1	0	1	0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00	1.00		1.00	1.00		1.00	0.98		1.00	0.99	
Frt	0.989			0.995			0.854			0.854		
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1525	2912	0	1570	3081	0	1570	1436	0	1570	1414	0
Flt Permitted	0.514			0.563			0.707			0.565		
Satd. Flow (perm)	822	2912	0	929	3081	0	1167	1436	0	931	1414	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		12			6			189			75	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		40.1			209.8			69.1			70.9	
Travel Time (s)		2.9			15.1			5.0			5.1	
Confl. Peds. (#/hr)	3		1	1		3	1		4	4		1
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
Heavy Vehicles (%)	3%	11%	0%	0%	5%	0%	0%	0%	0%	0%	0%	2%
Adj. Flow (vph)	46	183	15	17	390	14	280	5	189	18	2	75
Shared Lane Traffic (%)												
Lane Group Flow (vph)	46	198	0	17	404	0	280	194	0	18	77	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.3			3.3			3.3			3.3	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.19	1.14	1.14	1.19	1.14	1.14	1.19	1.14	1.14	1.19	1.14	1.14
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

Lanes, Volumes, Timings
14: Lyons Lane/Street A & Cross Ave

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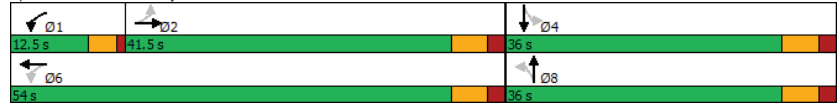
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6		8		8		4	
Permitted Phases		2		6			8		8		4	
Detector Phases		2	2	1	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	35.0	35.0		8.0	35.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	41.0	41.0		12.5	41.0		28.0	28.0		28.0	28.0	
Total Split (s)	41.5	41.5		12.5	54.0		36.0	36.0		36.0	36.0	
Total Split (%)	46.1%	46.1%		13.9%	60.0%		40.0%	40.0%		40.0%	40.0%	
Maximum Green (s)	35.5	35.5		8.5	48.0		30.0	30.0		30.0	30.0	
Yellow Time (s)	4.0	4.0		3.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		1.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0		0.0	-2.0		-2.0	-2.0		-2.0	-2.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Vehicle Extension (s)	5.0	5.0		2.5	5.0		4.0	4.0		4.0	4.0	
Recall Mode	Min	Min		Min	Min		Min	Min		Min	Min	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	15.0	15.0		15.0	15.0		15.0	15.0		15.0	15.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	37.2	37.2		49.2	49.2		26.2	26.2		26.2	26.2	
Actuated g/C Ratio	0.45	0.45		0.59	0.59		0.31	0.31		0.31	0.31	
v/c Ratio	0.13	0.15		0.03	0.22		0.77	0.33		0.06	0.16	
Control Delay	16.7	14.4		9.0	9.2		40.4	5.2		19.6	6.1	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	16.7	14.4		9.0	9.2		40.4	5.2		19.6	6.1	
LOS	B	B		A	A		D	A		B	A	
Approach Delay		14.9			9.2			26.0			8.7	
Approach LOS		B			A			C			A	
Queue Length 50th (m)	4.6	9.7		1.1	16.0		41.7	0.6		2.1	0.3	
Queue Length 95th (m)	12.3	17.9		4.2	26.4		71.7	14.5		6.8	9.2	
Internal Link Dist (m)		16.1			185.8			45.1			46.9	
Turn Bay Length (m)				25.0			20.0					
Base Capacity (vph)	371	1321		613	1857		449	669		358	590	
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	0.15		0.03	0.22		0.62	0.29		0.05	0.13	
Intersection Summary												
Area Type:	CBD											
Cycle Length:	90											
Actuated Cycle Length:	83.4											
Natural Cycle:	85											
Control Type:	Semi Act-Uncoord											
Maximum v/c Ratio:	0.77											
Intersection Signal Delay:	16.7						Intersection LOS: B					

Lanes, Volumes, Timings
14: Lyons Lane/Street A & Cross Ave

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Intersection Capacity Utilization 68.0% ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 14: Lyons Lane/Street A & Cross Ave




HCM Signalized Intersection Capacity Analysis
14: Lyons Lane/Street A & Cross Ave

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	42	168	14	16	359	13	258	5	174	17	2	69
Future Volume (vph)	42	168	14	16	359	13	258	5	174	17	2	69
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frbp, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.98		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	0.99		1.00	0.85		1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1520	2911		1569	3081		1569	1437		1565	1414	
Flt Permitted	0.51	1.00		0.56	1.00		0.71	1.00		0.57	1.00	
Satd. Flow (perm)	823	2911		931	3081		1167	1437		931	1414	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	46	183	15	17	390	14	280	5	189	18	2	75
RTOR Reduction (vph)	0	7	0	0	2	0	0	130	0	0	51	0
Lane Group Flow (vph)	46	191	0	17	402	0	280	64	0	18	26	0
Confl. Peds. (#/hr)	3		1	1		3	1		4	4		1
Heavy Vehicles (%)	3%	11%	0%	0%	5%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	35.2	35.2		47.2	47.2		24.2	24.2		24.2	24.2	
Effective Green, g (s)	37.2	37.2		47.2	49.2		26.2	26.2		26.2	26.2	
Actuated g/C Ratio	0.45	0.45		0.57	0.59		0.31	0.31		0.31	0.31	
Clearance Time (s)	6.0	6.0		4.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	5.0	5.0		2.5	5.0		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	367	1298		588	1817		366	451		292	444	
v/s Ratio Prot		0.07		0.00	c0.13			0.04			0.02	
v/s Ratio Perm	0.06			0.01			c0.24			0.02		
v/c Ratio	0.13	0.15		0.03	0.22		0.77	0.14		0.06	0.06	
Uniform Delay, d1	13.6	13.7		8.0	8.1		25.8	20.5		20.0	20.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.3	0.1		0.0	0.1		9.7	0.2		0.1	0.1	
Delay (s)	13.9	13.8		8.1	8.2		35.6	20.7		20.1	20.1	
Level of Service	B	B		A	A		D	C		C	C	
Approach Delay (s)		13.8			8.2			29.5			20.1	
Approach LOS		B			A			C			C	
Intersection Summary												
HCM 2000 Control Delay				18.4			HCM 2000 Level of Service				B	
HCM 2000 Volume to Capacity ratio				0.43								
Actuated Cycle Length (s)				83.4			Sum of lost time (s)			12.0		
Intersection Capacity Utilization				68.0%			ICU Level of Service			C		
Analysis Period (min)				15								
c Critical Lane Group												

Lanes, Volumes, Timings
15: Cross Ave & Lyons Lane

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Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↕↕	↕↕		↕↕	
Traffic Volume (vph)	24	203	659	22	17	40
Future Volume (vph)	24	203	659	22	17	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	5.0			0.0	0.0	0.0
Storage Lanes	1			0	1	0
Taper Length (m)	7.5				7.5	
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	1.00
Ped Bike Factor						
Frt			0.995		0.905	
Flt Protected	0.950				0.985	
Satd. Flow (prot)	1388	2954	3142	0	1483	0
Flt Permitted	0.950				0.985	
Satd. Flow (perm)	1388	2954	3142	0	1483	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		281.3	40.1		41.7	
Travel Time (s)		20.3	2.9		3.0	
Confl. Peds. (#/hr)	1			1	9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	17%	10%	3%	0%	0%	4%
Adj. Flow (vph)	26	221	716	24	18	43
Shared Lane Traffic (%)						
Lane Group Flow (vph)	26	221	740	0	61	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.6	3.6		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (k/h)	25			15	25	15
Sign Control		Free	Free		Stop	

Intersection Summary	
Area Type:	CBD
Control Type:	Unsignalized
Intersection Capacity Utilization	32.6%
ICU Level of Service	A
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis
15: Cross Ave & Lyons Lane

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Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↕↕	↕↕		↕↕	
Traffic Volume (veh/h)	24	203	659	22	17	40
Future Volume (Veh/h)	24	203	659	22	17	40
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)	26	221	716	24	18	43
Pedestrians			9		1	
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)			40			
pX, platoon unblocked	0.95				0.95	0.95
vC, conflicting volume	741				900	371
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCU, unblocked vol	616				785	226
tC, single (s)	4.4				6.8	7.0
tC, 2 stage (s)						
tF (s)	2.4				3.5	3.3
p0 queue free %	97				94	94
cM capacity (veh/h)	818				304	730

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	26	110	110	477	263	61
Volume Left	26	0	0	0	0	18
Volume Right	0	0	0	0	24	43
eSH	818	1700	1700	1700	1700	516
Volume to Capacity	0.03	0.07	0.07	0.28	0.15	0.12
Queue Length 95th (m)	0.8	0.0	0.0	0.0	0.0	3.2
Control Delay (s)	9.5	0.0	0.0	0.0	0.0	12.9
Lane LOS	A					B
Approach Delay (s)	1.0			0.0		12.9
Approach LOS						B

Intersection Summary	
Average Delay	1.0
Intersection Capacity Utilization	32.6%
ICU Level of Service	A
Analysis Period (min)	15

Lanes, Volumes, Timings
16: Speers Road/Cornwall Road & Cross Avenue

FT 2028 PM.syn
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Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↕↕	↕↔		↔	↕↕
Traffic Volume (vph)	272	758	832	25	13	446
Future Volume (vph)	272	758	832	25	13	446
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	75.0			0.0	55.0	0.0
Storage Lanes	1			0	1	2
Taper Length (m)	7.5				7.5	
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	0.88
Frt			0.996			0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1770	3539	3525	0	1770	2787
Flt Permitted	0.216				0.950	
Satd. Flow (perm)	402	3539	3525	0	1770	2787
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)			4			485
Link Speed (k/h)	50	50			50	
Link Distance (m)	189.7	274.5			184.2	
Travel Time (s)	13.7	19.8			13.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	296	824	904	27	14	485
Shared Lane Traffic (%)						
Lane Group Flow (vph)	296	824	931	0	14	485
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.6	3.6		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25			15	25	15
Number of Detectors	1	2	2		1	1
Detector Template	Left	Thru	Thru		Left	Right
Leading Detector (m)	2.0	10.0	10.0		2.0	2.0
Trailing Detector (m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Size(m)	2.0	0.6	0.6		2.0	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0		0.0	0.0
Detector 2 Position(m)		9.4	9.4			
Detector 2 Size(m)		0.6	0.6			
Detector 2 Type		Cl+Ex	Cl+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type	pm+pt	NA	NA		pm+pt	Perm
Protected Phases	5	2	6		7	
Permitted Phases	2				4	4

Lanes, Volumes, Timings
16: Speers Road/Cornwall Road & Cross Avenue

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Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Detector Phase	5	2	6		7	4
Switch Phase						
Minimum Initial (s)	6.0	5.0	5.0		5.0	5.0
Minimum Split (s)	12.0	33.5	33.5		27.5	27.5
Total Split (s)	22.0	62.0	40.0		28.0	28.0
Total Split (%)	24.4%	68.9%	44.4%		31.1%	31.1%
Maximum Green (s)	16.0	56.0	34.0		22.0	22.0
Yellow Time (s)	4.0	4.0	4.0		4.0	4.0
All-Red Time (s)	2.0	2.0	2.0		2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0		6.0	6.0
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?	Yes		Yes			
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	None	Max	Max		None	None
Walk Time (s)		18.0	18.0		12.0	12.0
Flash Dont Walk (s)		7.0	7.0		7.0	7.0
Pedestrian Calls (#/hr)		0	0		0	0
Act Effct Green (s)	56.0	56.0	39.3		7.2	7.2
Actuated g/C Ratio	0.74	0.74	0.52		0.10	0.10
v/c Ratio	0.60	0.31	0.50		0.08	0.69
Control Delay	9.4	3.8	13.9		31.5	9.0
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	9.4	3.8	13.9		31.5	9.0
LOS	A	A	B		C	A
Approach Delay		5.2	13.9		9.6	
Approach LOS		A	B		A	
Queue Length 50th (m)	9.5	15.1	40.9		2.0	0.0
Queue Length 95th (m)	26.8	29.5	77.5		7.1	14.2
Internal Link Dist (m)		165.7	250.5		160.2	
Turn Bay Length (m)	75.0				55.0	
Base Capacity (vph)	590	2636	1844		517	1158
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	0.50	0.31	0.50		0.03	0.42

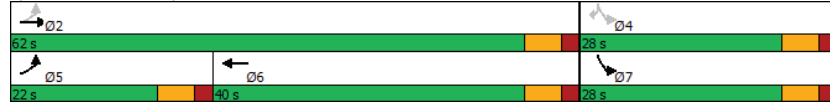
Intersection Summary

Area Type:	Other
Cycle Length:	90
Actuated Cycle Length:	75.2
Natural Cycle:	75
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.69
Intersection Signal Delay:	9.2
Intersection Capacity Utilization:	58.0%
Intersection LOS:	A
ICU Level of Service:	B
Analysis Period (min):	15

Lanes, Volumes, Timings
16: Speers Road/Cornwall Road & Cross Avenue

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Splits and Phases: 16: Speers Road/Cornwall Road & Cross Avenue



HCM Signalized Intersection Capacity Analysis
16: Speers Road/Cornwall Road & Cross Avenue

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04-03-2024

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↕	↕	↔	↔	↕
Traffic Volume (vph)	272	758	832	25	13	446
Future Volume (vph)	272	758	832	25	13	446
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0		6.0	6.0
Lane Util. Factor	1.00	0.95	0.95		1.00	0.88
Frt	1.00	1.00	1.00		1.00	0.85
Fit Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	3539	3524		1770	2787
Fit Permitted	0.22	1.00	1.00		0.95	1.00
Satd. Flow (perm)	402	3539	3524		1770	2787
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	296	824	904	27	14	485
RTOR Reduction (vph)	0	0	2	0	0	439
Lane Group Flow (vph)	296	824	929	0	14	46
Turn Type	pm+pt	NA	NA		pm+pt	Perm
Protected Phases	5	2	6		7	
Permitted Phases	2				4	4
Actuated Green, G (s)	56.0	56.0	39.3		7.2	7.2
Effective Green, g (s)	56.0	56.0	39.3		7.2	7.2
Actuated g/C Ratio	0.74	0.74	0.52		0.10	0.10
Clearance Time (s)	6.0	6.0	6.0		6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	494	2635	1841		169	266
v/s Ratio Prot	c0.09	0.23	0.26		0.01	
v/s Ratio Perm	c0.36					c0.02
v/c Ratio	0.60	0.31	0.50		0.08	0.17
Uniform Delay, d1	5.4	3.2	11.6		31.0	31.3
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	2.0	0.3	1.0		0.2	0.3
Delay (s)	7.4	3.5	12.6		31.2	31.6
Level of Service	A	A	B		C	C
Approach Delay (s)		4.5	12.6		31.6	
Approach LOS		A	B		C	
Intersection Summary						
HCM 2000 Control Delay		12.8			HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio		0.58				
Actuated Cycle Length (s)		75.2			Sum of lost time (s)	18.0
Intersection Capacity Utilization		58.0%			ICU Level of Service	B
Analysis Period (min)		15				

c Critical Lane Group

Lanes, Volumes, Timings
23: GO Station West Access/Street C & Cross Ave

FT 2028 PM.syn
04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔			↔			↔	↔		↔	↔	
Traffic Volume (vph)	0	489	49	267	298	0	83	0	411	0	0	0
Future Volume (vph)	0	489	49	267	298	0	83	0	411	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.0	0.0	0.0
Storage Lanes	0	0	0	0	0	0	1	0	1	0	0	0
Taper Length (m)	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.986						0.850					
Flt Protected					0.977		0.950					
Satd. Flow (prot)	0	3490	0	0	3458	0	1770	1583	0	1863	1863	0
Flt Permitted					0.621		0.757					
Satd. Flow (perm)	0	3490	0	0	2198	0	1410	1583	0	1863	1863	0
Right Turn on Red			Yes				Yes				Yes	
Satd. Flow (RTOR)	25						169					
Link Speed (k/h)	50				50				50			
Link Distance (m)	209.8				164.3				55.1		132.8	
Travel Time (s)	15.1				11.8				4.0		9.6	
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
Adj. Flow (vph)	0	532	53	290	324	0	90	0	447	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	585	0	0	614	0	90	447	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)	3.3				3.3				3.6		3.6	
Link Offset(m)	0.0				0.0				0.0		0.0	
Crosswalk Width(m)	4.8				4.8				4.8		4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15		25		15		25		15	
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)	9.4				9.4				9.4		9.4	
Detector 2 Size(m)	0.6				0.6				0.6		0.6	
Detector 2 Type	Cl+Ex				Cl+Ex				Cl+Ex		Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)	0.0				0.0				0.0		0.0	
Turn Type	NA		Perm		NA		Perm		NA		Perm	
Protected Phases	4		8		8		2		2		6	
Permitted Phases	4		8		8		2		2		6	

Lanes, Volumes, Timings
23: GO Station West Access/Street C & Cross Ave

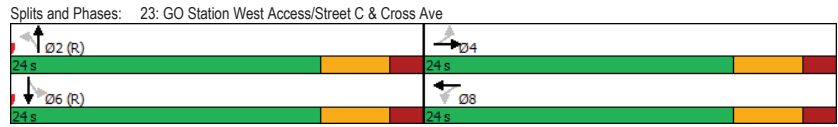
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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	24.0	24.0		24.0	24.0		24.0	24.0		24.0	24.0	
Total Split (s)	24.0	24.0		24.0	24.0		24.0	24.0		24.0	24.0	
Total Split (%)	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%		50.0%	50.0%	
Maximum Green (s)	18.0	18.0		18.0	18.0		18.0	18.0		18.0	18.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0				0.0		0.0		0.0		0.0	
Total Lost Time (s)	6.0				6.0		6.0		6.0		6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	16.6				16.6		19.4		19.4			
Actuated g/C Ratio	0.35				0.35		0.40		0.40			
v/c Ratio	0.48				1.07dl		0.16		0.60			
Control Delay	12.9				24.1		10.9		11.5			
Queue Delay	0.0				0.0		0.0		0.0			
Total Delay	12.9				24.1		10.9		11.5			
LOS	B				C		B		B			
Approach Delay	12.9				24.1		11.4					
Approach LOS	B				C		B					
Queue Length 50th (m)	18.6				23.9		5.1		18.0			
Queue Length 95th (m)	29.8				#47.2		12.7		43.0			
Internal Link Dist (m)	185.8				140.3		31.1				108.8	
Turn Bay Length (m)												
Base Capacity (vph)	1324				824		569		740			
Starvation Cap Reductn	0				0		0		0			
Spillback Cap Reductn	0				0		0		0			
Storage Cap Reductn	0				0		0		0			
Reduced v/c Ratio	0.44				0.75		0.16		0.60			
Intersection Summary												
Area Type:	Other											
Cycle Length:	48											
Actuated Cycle Length:	48											
Offset:	0 (0%), Referenced to phase 2:NBL and 6:SBTL, Start of Green											
Natural Cycle:	55											
Control Type:	Actuated-Coordinated											
Maximum v/c Ratio:	0.81											
Intersection Signal Delay:	16.4						Intersection LOS: B					
Intersection Capacity Utilization:	71.5%						ICU Level of Service C					
Analysis Period (min)	15											
# 95th percentile volume exceeds capacity, queue may be longer.												

Lanes, Volumes, Timings
 23: GO Station West Access/Street C & Cross Ave

FT 2028 PM.syn
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Queue shown is maximum after two cycles.
 dl Defacto Left Lane. Recode with 1 though lane as a left lane.



HCM Signalized Intersection Capacity Analysis
 23: GO Station West Access/Street C & Cross Ave

FT 2028 PM.syn
 04-03-2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔	↔		↔	↔	↔	↔		↔	↔	↔
Traffic Volume (vph)	0	489	49	267	298	0	83	0	411	0	0	0
Future Volume (vph)	0	489	49	267	298	0	83	0	411	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0			6.0		6.0		6.0			
Lane Util. Factor		0.95			0.95		1.00		1.00			
Frt		0.99			1.00		1.00		0.85			
Fit Protected		1.00			0.98		0.95		1.00			
Satd. Flow (prot)		3491			3458		1770		1583			
Fit Permitted		1.00			0.62		0.76		1.00			
Satd. Flow (perm)		3491			2198		1410		1583			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	532	53	290	324	0	90	0	447	0	0	0
RTOR Reduction (vph)	0	16	0	0	0	0	0	101	0	0	0	0
Lane Group Flow (vph)	0	569	0	0	614	0	90	346	0	0	0	0
Turn Type		NA		Perm	NA		Perm	NA		Perm		
Protected Phases		4			8			2				6
Permitted Phases	4				8			2				6
Actuated Green, G (s)		16.6			16.6		19.4		19.4			
Effective Green, g (s)		16.6			16.6		19.4		19.4			
Actuated g/C Ratio		0.35			0.35		0.40		0.40			
Clearance Time (s)		6.0			6.0		6.0		6.0			
Vehicle Extension (s)		3.0			3.0		3.0		3.0			
Lane Grp Cap (vph)		1207			760		569		639			
v/s Ratio Prot		0.16							c0.22			
v/s Ratio Perm					c0.28		0.06					
v/c Ratio		0.47			1.07dl		0.16		0.54			
Uniform Delay, d1		12.3			14.3		9.1		10.9			
Progression Factor		1.00			1.00		1.00		1.00			
Incremental Delay, d2		0.3			6.3		0.6		3.3			
Delay (s)		12.6			20.6		9.7		14.2			
Level of Service		B			C		A		B			
Approach Delay (s)		12.6			20.6				13.4			0.0
Approach LOS		B			C				B			A

Intersection Summary

HCM 2000 Control Delay	15.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	48.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	71.5%	ICU Level of Service	C
Analysis Period (min)	15		

dl Defacto Left Lane. Recode with 1 though lane as a left lane.
 c Critical Lane Group

Lanes, Volumes, Timings

FT 2033 AM.syn

1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd

04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	38	117	324	672	83	192	163	1631	779	179	1645	51
Future Volume (vph)	38	117	324	672	83	192	163	1631	779	179	1645	51
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0		0.0	165.0		25.0	145.0		0.0	95.0		90.0
Storage Lanes	1		1	1		1	1		1	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Ped Bike Factor	0.99					0.98			0.99			
Frt			0.850			0.850			0.850			0.850
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1624	1693	1425	3060	1676	1398	1425	4446	1398	1562	4532	1398
Fit Permitted	0.699			0.398			0.082			0.082		
Satd. Flow (perm)	1184	1693	1425	1282	1676	1366	123	4446	1377	135	4532	1398
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			218			209			431			155
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		285.9			293.8			275.1			252.7	
Travel Time (s)		20.6			21.2			19.8			18.2	
Confl. Peds. (#/hr)	11					11			10	10		
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
Heavy Vehicles (%)	0%	1%	2%	3%	2%	4%	14%	5%	4%	4%	3%	4%
Adj. Flow (vph)	41	127	352	730	90	209	177	1773	847	195	1788	55
Shared Lane Traffic (%)												
Lane Group Flow (vph)	41	127	352	730	90	209	177	1773	847	195	1788	55
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		7.2			7.2			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings

FT 2033 AM.syn

1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd

04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA	Free	pm+pt	NA	Perm	pm+pt	NA	Free	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		Free	8		8	2		Free	6		6
Detector Phase	7	4		3	8	8	5	2		1	6	6
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0	10.0	6.0	15.0		6.0	15.0	15.0
Minimum Split (s)	10.0	34.0		11.0	43.0	43.0	10.0	34.0		10.0	34.0	34.0
Total Split (s)	10.0	34.0		19.0	43.0	43.0	14.0	53.0		14.0	53.0	53.0
Total Split (%)	8.3%	28.3%		15.8%	35.8%	35.8%	11.7%	44.2%		11.7%	44.2%	44.2%
Maximum Green (s)	6.0	27.0		14.0	36.0	36.0	10.0	46.0		10.0	46.0	46.0
Yellow Time (s)	3.0	4.0		3.0	4.0	4.0	3.0	4.0		3.0	4.0	4.0
All-Red Time (s)	1.0	3.0		2.0	3.0	3.0	1.0	3.0		1.0	3.0	3.0
Lost Time Adjust (s)	0.0	-3.0		0.0	-3.0	-3.0	0.0	-3.0		0.0	-3.0	-3.0
Total Lost Time (s)	4.0	4.0		5.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	4.0		3.0	4.0	4.0	3.0	5.0		3.0	5.0	5.0
Recall Mode	None	None		None	None	None	None	C-Max		None	C-Max	C-Max
Walk Time (s)					7.0	7.0		7.0			7.0	7.0
Flash Dont Walk (s)					29.0	29.0		20.0			20.0	20.0
Pedestrian Calls (#/hr)					0	0		0			0	0
Act Effct Green (s)	24.3	18.3	120.0	36.3	29.3	29.3	70.6	52.3	120.0	70.9	52.5	52.5
Actuated g/C Ratio	0.20	0.15	1.00	0.30	0.24	0.24	0.59	0.44	1.00	0.59	0.44	0.44
v/c Ratio	0.16	0.49	0.25	1.23	0.22	0.43	0.66	0.92	0.62	0.65	0.90	0.08
Control Delay	29.8	52.5	0.4	151.1	37.7	7.5	38.3	40.9	2.1	36.7	39.5	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.8	52.5	0.4	151.1	37.7	7.5	38.3	40.9	2.1	36.7	39.5	0.2
LOS	C	D	A	F	D	A	D	D	A	D	D	A
Approach Delay		15.4			112.0			29.0			38.2	
Approach LOS		B			F			C			D	
Queue Length 50th (m)	7.2	29.2	0.0	~108.2	18.4	0.0	26.6	150.0	0.0	29.2	149.8	0.0
Queue Length 95th (m)	14.9	47.1	0.0	#142.2	31.5	18.7	#61.7	#194.4	0.0	#65.6	#193.9	0.0
Internal Link Dist (m)		261.9			269.8			251.1			228.7	
Turn Bay Length (m)	60.0			165.0		25.0	145.0			95.0		90.0
Base Capacity (vph)	261	423	1425	594	544	585	270	1937	1377	298	1981	698
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.16	0.30	0.25	1.23	0.17	0.36	0.66	0.92	0.62	0.65	0.90	0.08
Intersection Summary												
Area Type:	CBD											
Cycle Length:	120											
Actuated Cycle Length:	120											
Offset:	33.6 (28%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green											
Natural Cycle:	110											
Control Type:	Actuated-Coordinated											
Maximum v/c Ratio:	1.23											
Intersection Signal Delay:	44.2						Intersection LOS: D					

Lanes, Volumes, Timings
1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd

FT 2033 AM.syn
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Intersection Capacity Utilization 84.6% ICU Level of Service E
Analysis Period (min) 15
- Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd



HCM Signalized Intersection Capacity Analysis
1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd

FT 2033 AM.syn
04-03-2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↑	↗	↖	↑	↗	↖	↖	↗	↖	↗	↖
Traffic Volume (vph)	38	117	324	672	83	192	163	1631	779	179	1645	51
Future Volume (vph)	38	117	324	672	83	192	163	1631	779	179	1645	51
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	1.0	5.0	4.0	4.0	4.0	4.0	1.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.98	1.00	1.00	0.99	1.00	1.00	1.00
Flpb, ped/bikes	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1614	1693	1425	3060	1676	1366	1425	4446	1377	1562	4532	1398
Flt Permitted	0.70	1.00	1.00	0.40	1.00	1.00	0.08	1.00	1.00	0.08	1.00	1.00
Satd. Flow (perm)	1187	1693	1425	1283	1676	1366	124	4446	1377	135	4532	1398
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	41	127	352	730	90	209	177	1773	847	195	1788	55
RTOR Reduction (vph)	0	0	0	0	0	158	0	0	0	0	0	31
Lane Group Flow (vph)	41	127	352	730	90	51	177	1773	847	195	1788	24
Confl. Peds. (#/hr)	11				11				10	10		
Heavy Vehicles (%)	0%	1%	2%	3%	2%	4%	14%	5%	4%	4%	3%	4%
Turn Type	pm+pt	NA	Free	pm+pt	NA	Perm	pm+pt	NA	Free	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		Free	8		8	2		Free	6		6
Actuated Green, G (s)	20.9	16.1	120.0	35.1	26.3	26.3	66.8	48.5	120.0	67.0	48.6	48.6
Effective Green, g (s)	20.9	19.1	120.0	35.1	29.3	29.3	66.8	51.5	120.0	67.0	51.6	51.6
Actuated g/C Ratio	0.17	0.16	1.00	0.29	0.24	0.24	0.56	0.43	1.00	0.56	0.43	0.43
Clearance Time (s)	4.0	7.0		5.0	7.0	7.0	4.0	7.0		4.0	7.0	7.0
Vehicle Extension (s)	3.0	4.0		3.0	4.0	4.0	3.0	5.0		3.0	5.0	5.0
Lane Grp Cap (vph)	223	269	1425	582	409	333	267	1908	1377	294	1948	601
v/s Ratio Prot	0.01	0.08		c0.15	0.05		0.10	c0.40		0.10	0.39	
v/s Ratio Perm	0.02		0.25	c0.22		0.04	0.27		c0.62	0.27		0.02
v/c Ratio	0.18	0.47	0.25	1.25	0.22	0.15	0.66	0.93	0.62	0.66	0.92	0.04
Uniform Delay, d1	42.0	45.9	0.0	40.4	36.2	35.6	28.9	32.5	0.0	28.9	32.2	19.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.4	1.8	0.4	128.1	0.4	0.3	6.1	9.5	2.1	5.5	8.4	0.1
Delay (s)	42.4	47.6	0.4	168.4	36.6	35.9	34.9	42.1	2.1	34.4	40.6	20.0
Level of Service	D	D	A	F	D	D	C	D	D	A	C	D
Approach Delay (s)		15.3			130.0			29.5				39.5
Approach LOS		B			F			C				D

Intersection Summary			
HCM 2000 Control Delay	47.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.01		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	84.6%	ICU Level of Service	E
Analysis Period (min)	15		
c	Critical Lane Group		

Lanes, Volumes, Timings

FT 2033 AM.syn

2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp

04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	→	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	2	0	166	507	31	248	0	2022	477	0	2738	6
Future Volume (vph)	2	0	166	507	31	248	0	2022	477	0	2738	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.5	3.3	3.6	3.5	3.6	3.6	3.6	3.6	3.6	3.5
Storage Length (m)	50.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Storage Lanes	1		1	1		1	0		1	0		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.91	1.00	1.00	0.86	0.86
Ped Bike Factor									0.98		1.00	
Frt			0.850			0.850			0.850			
Flt Protected	0.950			0.950	0.958							
Satd. Flow (prot)	1570	0	1395	1421	1453	1356	0	4446	1384	0	5711	0
Flt Permitted	0.950			0.950	0.958							
Satd. Flow (perm)	1570	0	1395	1421	1453	1356	0	4446	1353	0	5711	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			31			261			182			
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		142.1			192.6			324.8			275.1	
Travel Time (s)		10.2			13.9			23.4			19.8	
Confl. Peds. (#/hr)							8		5	5		8
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
Heavy Vehicles (%)	0%	0%	3%	5%	23%	6%	0%	5%	5%	0%	3%	0%
Adj. Flow (vph)	2	0	180	551	34	270	0	2198	518	0	2976	7
Shared Lane Traffic (%)				47%								
Lane Group Flow (vph)	2	0	180	292	293	270	0	2198	518	0	2983	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.3			3.3			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.19	1.14	1.16	1.19	1.14	1.16	1.14	1.14	1.14	1.14	1.14	1.16
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1		1	1		1			1			2
Detector Template	Left		Right	Left	Thru	Right		Thru	Right		Thru	
Leading Detector (m)	2.0		2.0	2.0	10.0	2.0		10.0	2.0		10.0	
Trailing Detector (m)	0.0		0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Detector 1 Position(m)	0.0		0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Detector 1 Size(m)	2.0		2.0	2.0	0.6	2.0		0.6	2.0		0.6	
Detector 1 Type	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Detector 1 Delay (s)	0.0		0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Detector 2 Position(m)					9.4			9.4			9.4	
Detector 2 Size(m)					0.6			0.6			0.6	
Detector 2 Type					Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

Lanes, Volumes, Timings

FT 2033 AM.syn

2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp

04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)								0.0			0.0	0.0
Turn Type	Prot		Perm	Perm	NA	Free		NA	Free		NA	NA
Protected Phases	3				4			6			2	
Permitted Phases			8	4		Free			Free			
Detector Phase	3		8	4	4			6			2	
Switch Phase												
Minimum Initial (s)	7.0		10.0	10.0	10.0			5.0			28.0	
Minimum Split (s)	23.0		38.0	38.0	38.0			35.0			35.0	
Total Split (s)	23.0		61.0	38.0	38.0			79.0			79.0	
Total Split (%)	16.4%		43.6%	27.1%	27.1%			56.4%			56.4%	
Maximum Green (s)	18.0		54.0	31.0	31.0			72.0			72.0	
Yellow Time (s)	3.0		4.0	4.0	4.0			4.0			4.0	
All-Red Time (s)	2.0		3.0	3.0	3.0			3.0			3.0	
Lost Time Adjust (s)	-1.0		-3.0	-3.0	-3.0			-3.0			-3.0	
Total Lost Time (s)	4.0		4.0	4.0	4.0			4.0			4.0	
Lead/Lag	Lead				Lag			Lag				
Lead-Lag Optimize?	Yes				Yes			Yes				
Vehicle Extension (s)	3.0		3.0	3.0	3.0			4.5			4.5	
Recall Mode	Min		Min	Min	Min			C-Min			C-Min	
Walk Time (s)			7.0	7.0	7.0			7.0			7.0	
Flash Dont Walk (s)			24.0	24.0	24.0			21.0			21.0	
Pedestrian Calls (#/hr)			0	0	0			0			0	
Act Effct Green (s)	8.0		49.4	37.4	37.4	140.0		82.6		140.0	82.6	
Actuated g/C Ratio	0.06		0.35	0.27	0.27	1.00		0.59		1.00	0.59	
v/c Ratio	0.02		0.35	0.77	0.76	0.20		0.84		0.38	0.89	
Control Delay	63.0		28.2	60.6	59.2	0.3		28.0		0.4	29.7	
Queue Delay	0.0		0.0	0.0	0.0	0.0		0.0		0.0	0.0	
Total Delay	63.0		28.2	60.6	59.2	0.3		28.0		0.4	29.7	
LOS	E		C	E	E	A		C		A	C	
Approach Delay		28.6						41.1			22.7	
Approach LOS		C						D			C	
Queue Length 50th (m)	0.6		31.5	82.5	82.4	0.0		148.7		0.0	209.9	
Queue Length 95th (m)	3.7		48.4	112.7	111.7	0.0		m160.4		m0.0	#264.4	
Internal Link Dist (m)			118.1					300.8			251.1	
Turn Bay Length (m)	50.0											
Base Capacity (vph)	213		586	393	401	1356		2622		1353	3368	
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	0.01		0.31	0.74	0.73	0.20		0.84		0.38	0.89	
Intersection Summary												
Area Type:	CBD											
Cycle Length:	140											
Actuated Cycle Length:	140											
Offset:	115.4 (82%), Referenced to phase 2:SBT and 6:NBT, Start of Green											
Natural Cycle:	130											
Control Type:	Actuated-Coordinated											
Maximum v/c Ratio:	0.89											

Lanes, Volumes, Timings

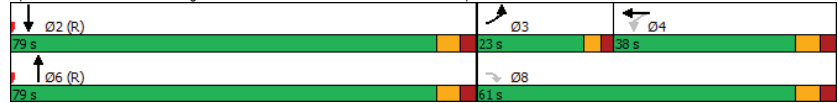
2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp

FT 2033 AM.syn

04-03-2024

Intersection Signal Delay: 28.3	Intersection LOS: C
Intersection Capacity Utilization 82.1%	ICU Level of Service E
Analysis Period (min) 15	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	
m Volume for 95th percentile queue is metered by upstream signal.	

Splits and Phases: 2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp



HCM Signalized Intersection Capacity Analysis

2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp

FT 2033 AM.syn

04-03-2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	2	0	166	507	31	248	0	2022	477	0	2738	6
Future Volume (vph)	2	0	166	507	31	248	0	2022	477	0	2738	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.5	3.3	3.6	3.5	3.6	3.6	3.6	3.6	3.6	3.5
Total Lost time (s)	4.0		4.0	4.0	4.0	1.0		4.0	4.0		4.0	
Lane Util. Factor	1.00		1.00	0.95	0.95	1.00		0.91	1.00		0.86	
Frpb, ped/bikes	1.00		1.00	1.00	1.00	1.00		1.00	0.98		1.00	
Flpb, ped/bikes	1.00		1.00	1.00	1.00	1.00		1.00	1.00		1.00	
Frt	1.00		0.85	1.00	1.00	0.85		1.00	0.85		1.00	
Flt Protected	0.95		1.00	0.95	0.96	1.00		1.00	1.00		1.00	
Satd. Flow (prot)	1570		1395	1421	1453	1356		4446	1353		5709	
Flt Permitted	0.95		1.00	0.95	0.96	1.00		1.00	1.00		1.00	
Satd. Flow (perm)	1570		1395	1421	1453	1356		4446	1353		5709	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	2	0	180	551	34	270	0	2198	518	0	2976	7
RTOR Reduction (vph)	0	0	20	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	2	0	160	292	293	270	0	2198	518	0	2983	0
Confl. Peds. (#/hr)							8		5	5		8
Heavy Vehicles (%)	0%	0%	3%	5%	23%	6%	0%	5%	5%	0%	3%	0%
Turn Type	Prot		Perm	Perm	NA	Free		NA	Free		NA	
Protected Phases	3				4			6			2	
Permitted Phases			8	4		Free			Free			
Actuated Green, G (s)	7.0		46.4	34.4	34.4	140.0		79.6	140.0		79.6	
Effective Green, g (s)	8.0		49.4	37.4	37.4	140.0		82.6	140.0		82.6	
Actuated g/C Ratio	0.06		0.35	0.27	0.27	1.00		0.59	1.00		0.59	
Clearance Time (s)	5.0		7.0	7.0	7.0			7.0			7.0	
Vehicle Extension (s)	3.0		3.0	3.0	3.0			4.5			4.5	
Lane Grp Cap (vph)	89		492	379	388	1356		2623	1353		3368	
v/s Ratio Prot	0.00							0.49			c0.52	
v/s Ratio Perm			0.11	c0.21	0.20	0.20			c0.38			
v/c Ratio	0.02		0.33	0.77	0.76	0.20		0.84	0.38		0.89	
Uniform Delay, d1	62.3		33.1	47.3	47.1	0.0		23.3	0.0		24.6	
Progression Factor	1.00		1.00	1.00	1.00	1.00		1.06	1.00		1.00	
Incremental Delay, d2	0.1		0.4	9.3	8.1	0.3		1.7	0.4		3.9	
Delay (s)	62.4		33.5	56.7	55.2	0.3		26.5	0.4		28.5	
Level of Service	E		C	E	E	A		C	A		C	
Approach Delay (s)		33.8			38.4			21.5			28.5	
Approach LOS		C			D			C			C	
Intersection Summary												
HCM 2000 Control Delay			27.1		HCM 2000 Level of Service				C			
HCM 2000 Volume to Capacity ratio			0.83									
Actuated Cycle Length (s)			140.0		Sum of lost time (s)				12.0			
Intersection Capacity Utilization			82.1%		ICU Level of Service				E			
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
3: Trafalgar Rd & QEW EB-Off Ramp

FT 2033 AM.syn
04-03-2024

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔↔	↔		↑↑↑	↑↑↑	↔
Traffic Volume (vph)	868	772	0	1656	1797	458
Future Volume (vph)	868	772	0	1656	1797	458
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.5	3.6	3.6	3.6	3.6
Lane Util. Factor	0.97	1.00	1.00	0.91	0.91	1.00
Frt		0.850				0.850
Flt Protected	0.950					
Satd. Flow (prot)	2958	1423	0	4404	4489	1454
Flt Permitted	0.950					
Satd. Flow (perm)	2958	1423	0	4404	4489	1454
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		1				197
Link Speed (k/h)	50			50	50	
Link Distance (m)	199.2			51.4	324.8	
Travel Time (s)	14.3			3.7	23.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	1%	0%	6%	4%	0%
Adj. Flow (vph)	943	839	0	1800	1953	498
Shared Lane Traffic (%)						
Lane Group Flow (vph)	943	839	0	1800	1953	498
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	6.6			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.19	1.16	1.14	1.14	1.14	1.14
Turning Speed (k/h)	24	14	24			14
Number of Detectors	1	1		2	2	1
Detector Template	Left	Right		Thru	Thru	Right
Leading Detector (m)	2.0	2.0		10.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	2.0	2.0		0.6	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)				9.4	9.4	
Detector 2 Size(m)				0.6	0.6	
Detector 2 Type				Cl+Ex	Cl+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Perm	Perm		NA	NA	Free
Protected Phases				2	2	
Permitted Phases	4	4				Free
Detector Phase	4	4		2	2	

Lanes, Volumes, Timings
3: Trafalgar Rd & QEW EB-Off Ramp

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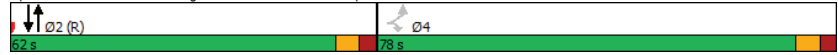
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Switch Phase						
Minimum Initial (s)	10.0	10.0		29.0	29.0	
Minimum Split (s)	38.0	38.0		36.0	36.0	
Total Split (s)	78.0	78.0		62.0	62.0	
Total Split (%)	55.7%	55.7%		44.3%	44.3%	
Maximum Green (s)	71.0	71.0		55.0	55.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	
All-Red Time (s)	3.0	3.0		3.0	3.0	
Lost Time Adjust (s)	-3.0	-3.0		-3.0	-3.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Recall Mode	None	None		C-Max	C-Max	
Walk Time (s)	7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	24.0	24.0		22.0	22.0	
Pedestrian Calls (#/hr)	0	0		0	0	
Act Effct Green (s)	74.0	74.0		58.0	58.0	140.0
Actuated g/C Ratio	0.53	0.53		0.41	0.41	1.00
v/c Ratio	0.60	1.12		0.99	1.05	0.34
Control Delay	24.9	101.4		48.5	61.6	0.3
Queue Delay	0.0	0.0		0.0	0.0	0.0
Total Delay	24.9	101.4		48.5	61.6	0.3
LOS	C	F		D	E	A
Approach Delay	60.9			48.5	49.1	
Approach LOS	E			D	D	
Queue Length 50th (m)	95.1	~280.4		154.9	~223.6	0.0
Queue Length 95th (m)	116.7	#362.6		m144.4	#254.6	m0.0
Internal Link Dist (m)	175.2			27.4	300.8	
Turn Bay Length (m)						
Base Capacity (vph)	1563	752		1824	1859	1454
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	0.60	1.12		0.99	1.05	0.34
Intersection Summary						
Area Type:	CBD					
Cycle Length:	140					
Actuated Cycle Length:	140					
Offset:	133.6 (95%), Referenced to phase 2.NBSB and 6.; Start of Green					
Natural Cycle:	75					
Control Type:	Actuated-Coordinated					
Maximum v/c Ratio:	1.12					
Intersection Signal Delay:	52.4					
Intersection Capacity Utilization:	98.4%					
ICU Level of Service F						
Analysis Period (min)	15					
~ Volume exceeds capacity, queue is theoretically infinite.						
Queue shown is maximum after two cycles.						

Lanes, Volumes, Timings
3: Trafalgar Rd & QEW EB-Off Ramp

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- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Trafalgar Rd & QEW EB-Off Ramp



HCM Signalized Intersection Capacity Analysis
3: Trafalgar Rd & QEW EB-Off Ramp

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Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔↔	↗		↕↕	↕↕	↖
Traffic Volume (vph)	868	772	0	1656	1797	458
Future Volume (vph)	868	772	0	1656	1797	458
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.5	3.6	3.6	3.6	3.6
Total Lost time (s)	4.0	4.0		4.0	4.0	1.0
Lane Util. Factor	0.97	1.00		0.91	0.91	1.00
Friction	1.00	0.85		1.00	1.00	0.85
Fit Protected	0.95	1.00		1.00	1.00	1.00
Satd. Flow (prot)	2958	1423		4404	4489	1454
Fit Permitted	0.95	1.00		1.00	1.00	1.00
Satd. Flow (perm)	2958	1423		4404	4489	1454
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	943	839	0	1800	1953	498
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	943	839	0	1800	1953	498
Heavy Vehicles (%)	3%	1%	0%	6%	4%	0%
Turn Type	Perm	Perm		NA	NA	Free
Protected Phases				2	2	
Permitted Phases	4	4				Free
Actuated Green, G (s)	71.0	71.0		55.0	55.0	140.0
Effective Green, g (s)	74.0	74.0		58.0	58.0	140.0
Actuated g/C Ratio	0.53	0.53		0.41	0.41	1.00
Clearance Time (s)	7.0	7.0		7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	1563	752		1824	1859	1454
v/s Ratio Prot				0.41	0.44	
v/s Ratio Perm	0.32	0.59				0.34
v/c Ratio	0.60	1.12		0.99	1.05	0.34
Uniform Delay, d1	22.8	33.0		40.6	41.0	0.0
Progression Factor	1.00	1.00		0.93	0.76	1.00
Incremental Delay, d2	0.7	69.1		10.5	30.6	0.3
Delay (s)	23.5	102.1		48.5	61.6	0.3
Level of Service	C	F		D	E	A
Approach Delay (s)	60.5			48.5	49.1	
Approach LOS	E			D	D	

Intersection Summary

HCM 2000 Control Delay	52.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.11		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	98.4%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
4: Trafalgar Rd & Argus Rd

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Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	176	0	2525	2028	568
Future Volume (vph)	0	176	0	2525	2028	568
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.6	3.5	3.6	3.6	3.6	3.6
Lane Util. Factor	1.00	1.00	1.00	0.91	0.91	0.91
Ped Bike Factor						
Frt		0.865			0.967	
Fit Protected						
Satd. Flow (prot)	0	1367	0	4363	4359	0
Fit Permitted						
Satd. Flow (perm)	0	1367	0	4363	4359	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	145.7			270.2	51.4	
Travel Time (s)	10.5			19.5	3.7	
Confl. Peds. (#/hr)						11
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	7%	0%	7%	4%	2%
Adj. Flow (vph)	0	191	0	2745	2204	617
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	191	0	2745	2821	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			3.3	3.3	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.14	1.16	1.14	1.14	1.14	1.14
Turning Speed (k/h)	24	14	24			14
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	CBD					
Control Type:	Unsignalized					
Intersection Capacity Utilization	76.6%		ICU Level of Service D			
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
4: Trafalgar Rd & Argus Rd

FT 2033 AM.syn
04-03-2024

Movement	EBL	EBR	NBL	NBT	SBT	SBR	
Lane Configurations							
Traffic Volume (veh/h)	0	176	0	2525	2028	568	
Future Volume (Veh/h)	0	176	0	2525	2028	568	
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	191	0	2745	2204	617	
Pedestrians	11						
Lane Width (m)	3.5						
Walking Speed (m/s)	1.2						
Percent Blockage	1						
Right turn flare (veh)							
Median type			None	None			
Median storage (veh)							
Upstream signal (m)				270	52		
pX, platoon unblocked	0.73	0.59	0.59				
vC, conflicting volume	3438	1054	2832				
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol	572	0	1686				
tC, single (s)	6.8	7.0	4.1				
tC, 2 stage (s)							
tF (s)	3.5	3.4	2.2				
p0 queue free %	100	70	100				
cM capacity (veh/h)	327	628	226				
Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	191	915	915	915	882	882	1058
Volume Left	0	0	0	0	0	0	0
Volume Right	191	0	0	0	0	0	617
eSH	628	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.30	0.54	0.54	0.54	0.52	0.52	0.62
Queue Length 95th (m)	10.3	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (s)	13.2	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	B						
Approach Delay (s)	13.2	0.0			0.0		
Approach LOS	B						
Intersection Summary							
Average Delay				0.4			
Intersection Capacity Utilization	76.6%		ICU Level of Service		D		
Analysis Period (min)	15						

Lanes, Volumes, Timings

FT 2033 AM.syn

5: Trafalgar Rd & Cross Ave/South Service Rd

04-03-2024

	↖	→	↗	↙	←	↖	↙	↗	↘	↖	↙	↗
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖↗	↖		↖	↖	↖	↖↗↘	↖↗↘		↖↗↘	↖↗	↖↗
Traffic Volume (vph)	930	90	160	42	50	106	141	1224	27	212	1645	255
Future Volume (vph)	930	90	160	42	50	106	141	1224	27	212	1645	255
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.6	3.3	3.6	3.5	3.3	3.6	3.6	3.3	3.6	3.6
Storage Length (m)	130.0		0.0	25.0		0.0	50.0		0.0	25.0		0.0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.91	0.91
Ped Bike Factor	1.00	0.99		0.99		0.99		1.00			1.00	
Frt		0.904				0.850		0.997			0.980	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2795	1388	0	1525	1583	1382	1428	4500	0	1525	4415	0
Flt Permitted	0.950			0.592			0.090			0.082		
Satd. Flow (perm)	2789	1388	0	944	1583	1362	135	4500	0	132	4415	0
Right Turn on Red			Yes			Yes		Yes			Yes	
Satd. Flow (RTOR)		69				179		2			24	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		151.2			330.4			150.2			270.2	
Travel Time (s)		10.9			23.8			10.8			19.5	
Confl. Peds. (#/hr)	1		4	4		1	10		52	52		10
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
Heavy Vehicles (%)	9%	6%	12%	3%	8%	4%	10%	3%	0%	3%	3%	4%
Adj. Flow (vph)	1011	98	174	46	54	115	153	1330	29	230	1788	277
Shared Lane Traffic (%)												
Lane Group Flow (vph)	1011	272	0	46	54	115	153	1359	0	230	2065	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		6.6			6.6			3.3			3.3	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.19	1.14	1.14	1.19	1.14	1.16	1.19	1.14	1.14	1.19	1.14	1.14
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2	1	1		1	2		2
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

Lanes, Volumes, Timings

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5: Trafalgar Rd & Cross Ave/South Service Rd

04-03-2024

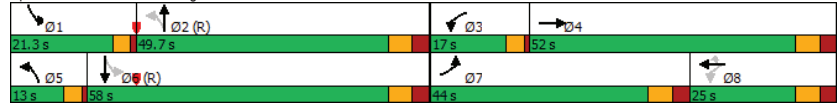
	↖	→	↗	↙	←	↖	↙	↗	↘	↖	↙	↗
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases				8		8	2			6		
Detector Phases	7	4		3	8	8	5	2		1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		12.0	10.0	10.0	7.0	27.0		7.0	27.0	
Minimum Split (s)	17.0	25.0		17.0	25.0	25.0	11.5	34.0		11.5	34.0	
Total Split (s)	44.0	52.0		17.0	25.0	25.0	13.0	49.7		21.3	58.0	
Total Split (%)	31.4%	37.1%		12.1%	17.9%	17.9%	9.3%	35.5%		15.2%	41.4%	
Maximum Green (s)	37.0	45.0		13.0	18.0	18.0	9.0	42.7		17.3	51.0	
Yellow Time (s)	4.0	4.0		3.0	4.0	4.0	3.0	4.0		3.0	4.0	
All-Red Time (s)	3.0	3.0		1.0	3.0	3.0	1.0	3.0		1.0	3.0	
Lost Time Adjust (s)	-3.0	-3.0		0.0	-3.0	-3.0	0.0	-3.0		0.0	-3.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	4.0		3.5	4.0	4.0	3.0	5.0		3.0	5.0	
Recall Mode	Min	Min		Min	Min	Min	Min	C-Max		Min	C-Max	
Walk Time (s)		7.0			7.0	7.0		7.0			7.0	
Flash Dont Walk (s)		11.0			11.0	11.0		11.0			11.0	
Pedestrian Calls (#/hr)		0			0	0		0			0	
Act Effct Green (s)	40.0	42.8		26.8	14.8	14.8	62.6	47.5		72.7	54.0	
Actuated g/C Ratio	0.29	0.31		0.19	0.11	0.11	0.45	0.34		0.52	0.39	
v/c Ratio	1.27	0.58		0.20	0.32	0.38	0.77	0.89		0.81	1.20	
Control Delay	171.1	35.1		29.7	62.7	4.1	55.3	61.2		47.8	135.8	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	171.1	35.1		29.7	62.7	4.1	55.3	61.2		47.8	135.8	
LOS	F	D		C	E	A	E	E		D	F	
Approach Delay		142.3			24.3			60.6			127.0	
Approach LOS		F			C			E			F	
Queue Length 50th (m)	~190.6	50.5		8.0	14.9	0.0	36.3	124.1		53.1	~262.7	
Queue Length 95th (m)	#233.3	78.5		15.8	28.6	1.3	m#46.2	m129.7		m53.0	m#238.2	
Internal Link Dist (m)		127.2			306.4			126.2			246.2	
Turn Bay Length (m)	130.0			25.0			50.0			25.0		
Base Capacity (vph)	798	521		241	237	356	200	1527		284	1717	
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	
Reduced v/c Ratio	1.27	0.52		0.19	0.23	0.32	0.77	0.89		0.81	1.20	
Intersection Summary												
Area Type:	CBD											
Cycle Length:	140											
Actuated Cycle Length:	140											
Offset:	128 (91%), Referenced to phase 2:NBL and 6:SBTL, Start of Green											
Natural Cycle:	150											
Control Type:	Actuated-Coordinated											
Maximum v/c Ratio:	1.27											

Lanes, Volumes, Timings
5: Trafalgar Rd & Cross Ave/South Service Rd

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Intersection Signal Delay: 107.6	Intersection LOS: F
Intersection Capacity Utilization 99.2%	ICU Level of Service F
Analysis Period (min) 15	
~ Volume exceeds capacity, queue is theoretically infinite.	
Queue shown is maximum after two cycles.	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	
m Volume for 95th percentile queue is metered by upstream signal.	

Splits and Phases: 5: Trafalgar Rd & Cross Ave/South Service Rd



HCM Signalized Intersection Capacity Analysis
5: Trafalgar Rd & Cross Ave/South Service Rd

FT 2033 AM.syn
04-03-2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔	↔		↔	↔	↔	↔↔↔	↔↔↔		↔↔↔	↔↔↔	
Traffic Volume (vph)	930	90	160	42	50	106	141	1224	27	212	1645	255
Future Volume (vph)	930	90	160	42	50	106	141	1224	27	212	1645	255
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.3	3.6	3.5	3.3	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	1.00		1.00	1.00	1.00	1.00	0.91		1.00	0.91	
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.99	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	1.00	
Frt	1.00	0.90		1.00	1.00	0.85	1.00	1.00		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	2795	1388		1519	1583	1362	1428	4500		1525	4415	
Flt Permitted	0.95	1.00		0.59	1.00	1.00	0.09	1.00		0.08	1.00	
Satd. Flow (perm)	2795	1388		947	1583	1362	135	4500		132	4415	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1011	98	174	46	54	115	153	1330	29	230	1788	277
RTOR Reduction (vph)	0	48	0	0	0	103	0	1	0	0	15	0
Lane Group Flow (vph)	1011	224	0	46	54	12	153	1358	0	230	2050	0
Confl. Peds. (#/hr)	1		4	4		1	10		52	52		10
Heavy Vehicles (%)	9%	6%	12%	3%	8%	4%	10%	3%	0%	3%	3%	3%
Turn Type	Prot	NA		pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases				8		8	2			6		
Actuated Green, G (s)	37.0	39.8		23.8	11.8	11.8	59.7	44.5		70.2	51.0	
Effective Green, g (s)	40.0	42.8		23.8	14.8	14.8	59.7	47.5		70.2	54.0	
Actuated g/C Ratio	0.29	0.31		0.17	0.11	0.11	0.43	0.34		0.50	0.39	
Clearance Time (s)	7.0	7.0		4.0	7.0	7.0	4.0	7.0		4.0	7.0	
Vehicle Extension (s)	3.0	4.0		3.5	4.0	4.0	3.0	5.0		3.0	5.0	
Lane Grp Cap (vph)	798	424		210	167	143	197	1526		282	1702	
v/s Ratio Prot	c0.36	c0.16		0.02	0.03		0.08	0.30		c0.13	c0.46	
v/s Ratio Perm				0.02		0.01	0.25			0.28		
v/c Ratio	1.27	0.53		0.22	0.32	0.09	0.78	0.89		0.82	1.20	
Uniform Delay, d1	50.0	40.2		49.7	58.0	56.5	35.7	43.8		39.9	43.0	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.23	1.28		1.15	1.18	
Incremental Delay, d2	130.0	1.5		0.6	1.5	0.4	10.2	4.8		5.1	93.8	
Delay (s)	180.0	41.8		50.4	59.5	56.8	54.0	60.9		51.2	144.5	
Level of Service	F	D		D	E	E	D	E		D	F	
Approach Delay (s)		150.7			56.1			60.2			135.1	
Approach LOS		F			E			E			F	
Intersection Summary												
HCM 2000 Control Delay		114.3									F	
HCM 2000 Volume to Capacity ratio		1.12										
Actuated Cycle Length (s)		140.0						Sum of lost time (s)		16.0		
Intersection Capacity Utilization		99.2%						ICU Level of Service		F		
Analysis Period (min)		15										
c Critical Lane Group												

Lanes, Volumes, Timings
6: Trafalgar Rd & Cornwall Rd

FT 2033 AM.syn
04-03-2024

	↖	→	↗	↙	←	↖	↗	↙	↘	↖	↗	↙
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗
Traffic Volume (vph)	320	501	87	67	563	520	108	540	73	757	836	258
Future Volume (vph)	320	501	87	67	563	520	108	540	73	757	836	258
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.5
Storage Length (m)	80.0	0.0	80.0	0.0	25.0	0.0	80.0	0.0	80.0	0.0	0.0	0.0
Storage Lanes	2	0	1	1	1	1	0	1	0	1	1	1
Taper Length (m)	7.5		7.5		7.5		7.5		7.5		7.5	
Lane Util. Factor	0.97	0.95	0.95	1.00	0.95	1.00	1.00	*0.80	0.95	0.97	*0.80	1.00
Ped Bike Factor	0.99	0.99		0.99		0.98	1.00	1.00		0.98		0.98
Frt		0.978				0.850		0.982				0.850
Flt Protected	0.950		0.950		0.950		0.950		0.950		0.950	
Satd. Flow (prot)	2987	3052	0	1481	3154	1411	1540	2652	0	2929	1341	1356
Flt Permitted	0.950		0.950		0.950		0.950		0.950		0.950	
Satd. Flow (perm)	2942	3052	0	1472	3154	1384	1534	2652	0	2884	1341	1324
Right Turn on Red			Yes		Yes		Yes		Yes		Yes	
Satd. Flow (RTOR)		13			496		8					177
Link Speed (k/h)		50			50		50				50	
Link Distance (m)		285.8			142.3		311.4				130.3	
Travel Time (s)		20.6			10.2		22.4				9.4	
Confl. Peds. (#/hr)	25		7	7		25	9		18	18		9
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
Heavy Vehicles (%)	2%	4%	1%	6%	3%	3%	2%	1%	0%	4%	2%	6%
Adj. Flow (vph)	348	545	95	73	612	565	117	587	79	823	909	280
Shared Lane Traffic (%)												
Lane Group Flow (vph)	348	640	0	73	612	565	117	666	0	823	909	280
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		6.6			6.6			6.6			6.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.19	1.14	1.14	1.19	1.14	1.14	1.19	1.14	1.14	1.19	1.14	1.16
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2	1	1		1	2		1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0		2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6		2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

Lanes, Volumes, Timings
6: Trafalgar Rd & Cornwall Rd

FT 2033 AM.syn
04-03-2024

	↖	→	↗	↙	←	↖	↗	↙	↘	↖	↗	↙
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA	Free	Prot	NA		Prot	NA	Perm
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases					Free							6
Detector Phases	3	8		7	4		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	7.0	10.0		7.0	10.0		7.0	20.0		7.0	20.0	20.0
Minimum Split (s)	12.0	37.0		12.0	37.0		12.0	39.0		12.0	39.0	39.0
Total Split (s)	16.0	39.0		14.0	37.0		12.0	43.0		44.0	75.0	75.0
Total Split (%)	11.4%	27.9%		10.0%	26.4%		8.6%	30.7%		31.4%	53.6%	53.6%
Maximum Green (s)	11.0	32.0		9.0	30.0		7.0	36.0		39.0	68.0	68.0
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	4.0
All-Red Time (s)	2.0	3.0		2.0	3.0		2.0	3.0		2.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-3.0		-1.0	-3.0		-1.0	-3.0		-1.0	-3.0	-3.0
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	0.2	0.2		0.2	0.2		0.2	0.2		0.2	0.2	0.2
Recall Mode	Max	Max		Max	Max		None	C-Max		Max	C-Max	C-Max
Walk Time (s)		7.0			7.0			7.0			7.0	7.0
Flash Dont Walk (s)		23.0			23.0			25.0			25.0	25.0
Pedestrian Calls (#/hr)		0			0			0			0	0
Act Effct Green (s)	12.0	35.0		10.0	33.0	140.0	8.0	39.0		40.0	71.0	71.0
Actuated g/C Ratio	0.09	0.25		0.07	0.24	1.00	0.06	0.28		0.29	0.51	0.51
v/c Ratio	1.36	0.83		0.70	0.82	0.41	1.33	0.90		0.98	1.34	0.37
Control Delay	231.1	59.0		95.4	61.1	0.9	255.4	63.7		86.7	182.3	7.4
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	231.1	59.0		95.4	61.1	0.9	255.4	63.7		86.7	182.3	7.4
LOS	F	E		F	E	A	F	E		F	F	A
Approach Delay		119.6			35.9			92.4			118.8	
Approach LOS		F			D			F			F	
Queue Length 50th (m)	-68.5	91.7		21.2	89.7	0.0	-44.2	115.8		131.8	-419.8	14.5
Queue Length 95th (m)	#101.5	116.2		#46.6	113.4	0.0	#85.9	#158.1		m114.3m#329.1	m11.3	
Internal Link Dist (m)		261.8			118.3			287.4			106.3	
Turn Bay Length (m)	80.0			80.0		25.0		80.0				
Base Capacity (vph)	256	772		105	743	1384	88	744		836	680	758
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	0
Reduced v/c Ratio	1.36	0.83		0.70	0.82	0.41	1.33	0.90		0.98	1.34	0.37

Intersection Summary

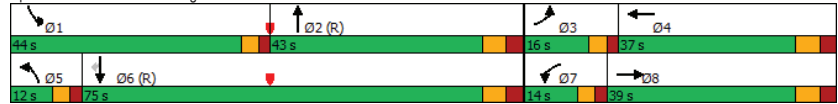
Area Type:	CBD
Cycle Length:	140
Actuated Cycle Length:	140
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green, Master Intersection	
Natural Cycle:	150
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	1.36

Lanes, Volumes, Timings
6: Trafalgar Rd & Cornwall Rd

FT 2033 AM.syn
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Intersection Signal Delay: 94.3	Intersection LOS: F
Intersection Capacity Utilization 104.0%	ICU Level of Service G
Analysis Period (min) 15	
* User Entered Value	
~ Volume exceeds capacity, queue is theoretically infinite. Queue shown is maximum after two cycles.	
# 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.	
m Volume for 95th percentile queue is metered by upstream signal.	

Splits and Phases: 6: Trafalgar Rd & Cornwall Rd



HCM Signalized Intersection Capacity Analysis
6: Trafalgar Rd & Cornwall Rd

FT 2033 AM.syn
04-03-2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	320	501	87	67	563	520	108	540	73	757	836	258
Future Volume (vph)	320	501	87	67	563	520	108	540	73	757	836	258
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.5
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.97	0.95		1.00	0.95	1.00	1.00	*0.80		0.97	*0.80	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.98	1.00	1.00		1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	2987	3051		1481	3154	1384	1540	2653		2929	1341	1324
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	2987	3051		1481	3154	1384	1540	2653		2929	1341	1324
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	348	545	95	73	612	565	117	587	79	823	909	280
RTOR Reduction (vph)	0	10	0	0	0	0	0	6	0	0	0	87
Lane Group Flow (vph)	348	630	0	73	612	565	117	660	0	823	909	193
Confl. Peds. (#/hr)	25		7	7		25	9		18	18		9
Heavy Vehicles (%)	2%	4%	1%	6%	3%	3%	2%	1%	0%	4%	2%	6%
Turn Type	Prot	NA		Prot	NA	Free	Prot	NA		Prot	NA	Perm
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases						Free						6
Actuated Green, G (s)	11.0	32.0		9.0	30.0	140.0	7.0	36.0		39.0	68.0	68.0
Effective Green, g (s)	12.0	35.0		10.0	33.0	140.0	8.0	39.0		40.0	71.0	71.0
Actuated g/C Ratio	0.09	0.25		0.07	0.24	1.00	0.06	0.28		0.29	0.51	0.51
Clearance Time (s)	5.0	7.0		5.0	7.0		5.0	7.0		5.0	7.0	7.0
Vehicle Extension (s)	0.2	0.2		0.2	0.2		0.2	0.2		0.2	0.2	0.2
Lane Grp Cap (vph)	256	762		105	743	1384	88	739		836	680	671
v/s Ratio Prot	c0.12	c0.21		0.05	0.19		c0.08	0.25		0.28	c0.68	
v/s Ratio Perm						c0.41						0.15
v/c Ratio	1.36	0.83		0.70	0.82	0.41	1.33	0.89		0.98	1.34	0.29
Uniform Delay, d1	64.0	49.6		63.5	50.7	0.0	66.0	48.5		49.7	34.5	19.9
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.67	0.96	0.99
Incremental Delay, d2	185.0	10.0		31.8	10.0	0.9	207.3	15.4		6.4	152.5	0.1
Delay (s)	249.0	59.7		95.3	60.8	0.9	273.3	63.9		89.4	185.5	19.9
Level of Service	F	E		F	E	A	F	E		F	F	B
Approach Delay (s)	126.3			35.7			95.2			123.2		
Approach LOS	F			D			F			F		
Intersection Summary												
HCM 2000 Control Delay	97.7			HCM 2000 Level of Service		F						
HCM 2000 Volume to Capacity ratio	1.22											
Actuated Cycle Length (s)	140.0			Sum of lost time (s)		16.0						
Intersection Capacity Utilization	104.0%			ICU Level of Service		G						
Analysis Period (min)	15											
c Critical Lane Group												

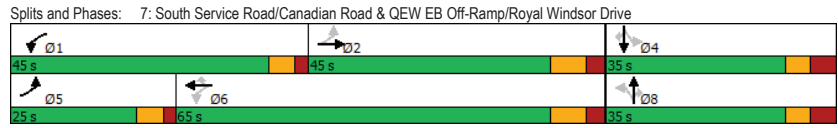
Lanes, Volumes, Timings
 7: South Service Road/Canadian Road & QEW EB Off-Ramp/Royal Windsor Drive FT 2033 AM.syn
 04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	46	571	31	93	563	7	2	9	52	4	20	30
Future Volume (vph)	46	571	31	93	563	7	2	9	52	4	20	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	150.0	0.0	155.0		70.0	15.0			0.0	0.0		30.0
Storage Lanes	2	0	1		1	1			1	1		1
Taper Length (m)	7.5		7.5		7.5				7.5			7.5
Lane Util. Factor	0.97	0.95	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.992				0.850			0.850			0.850
Flt Protected	0.950			0.950		0.950			0.950			0.950
Satd. Flow (prot)	3400	3300	0	1719	3139	1380	1805	1667	1468	1805	1792	1495
Flt Permitted	0.401			0.380		0.743			0.751			0.751
Satd. Flow (perm)	1435	3300	0	688	3139	1380	1412	1667	1468	1427	1792	1495
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5				94			152			152
Link Speed (k/h)	80			80		60			40			40
Link Distance (m)	324.5			247.2		158.7			215.5			215.5
Travel Time (s)	14.6			11.1		9.5			19.4			19.4
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
Heavy Vehicles (%)	3%	9%	0%	5%	15%	17%	0%	14%	10%	0%	6%	8%
Adj. Flow (vph)	50	621	34	101	612	8	2	10	57	4	22	33
Shared Lane Traffic (%)												
Lane Group Flow (vph)	50	655	0	101	612	8	2	10	57	4	22	33
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Right	Left	Left	Right	Right
Median Width(m)	7.2			7.2		3.6			3.6			3.6
Link Offset(m)	0.0			0.0		0.0			0.0			0.0
Crosswalk Width(m)	4.8			4.8		4.8			4.8			4.8
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15			15			15
Number of Detectors	1	2		1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	CI+Ex	CI+Ex		CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		CI+Ex			CI+Ex			CI+Ex			CI+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	

Lanes, Volumes, Timings
 7: South Service Road/Canadian Road & QEW EB Off-Ramp/Royal Windsor Drive FT 2033 AM.syn
 04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	2			6		6	8		8	4		4
Detector Phase	5	2		1	6	6	8	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	8.0	20.0		8.0	30.0	30.0	8.0	8.0	8.0	10.0	10.0	10.0
Minimum Split (s)	14.0	34.0		14.0	38.4	38.4	28.8	28.8	28.8	35.0	35.0	35.0
Total Split (s)	25.0	45.0		45.0	65.0	65.0	35.0	35.0	35.0	35.0	35.0	35.0
Total Split (%)	20.0%	36.0%		36.0%	52.0%	52.0%	28.0%	28.0%	28.0%	28.0%	28.0%	28.0%
Maximum Green (s)	19.0	36.6		39.0	56.6	56.6	27.2	27.2	27.2	27.2	27.2	27.2
Yellow Time (s)	4.0	5.4		4.0	5.4	5.4	3.7	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	2.0	3.0		2.0	3.0	3.0	4.1	4.1	4.1	4.1	4.1	4.1
Lost Time Adjust (s)	-2.0	-4.4		-2.0	-4.4	-4.4	-3.8	-3.8	-3.8	-3.8	-3.8	-3.8
Total Lost Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lead	Lag		Lead	Lag	Lag						
Lead-Lag Optimize?												
Vehicle Extension (s)	3.5	4.5		3.5	6.0	6.0	3.5	3.5	3.5	3.5	3.5	3.5
Recall Mode	None	Max		None	Max	Max	None	None	None	None	None	None
Walk Time (s)	10.0			10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Flash Dont Walk (s)	10.0			10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Pedestrian Calls (#/hr)	0			0	0	0	0	0	0	0	0	0
Act Effct Green (s)	72.5	65.7		72.6	65.8	65.8	13.4	13.4	13.4	13.9	13.9	13.9
Actuated g/C Ratio	0.78	0.70		0.78	0.70	0.70	0.14	0.14	0.14	0.15	0.15	0.15
v/c Ratio	0.04	0.28		0.16	0.28	0.01	0.01	0.04	0.17	0.02	0.08	0.09
Control Delay	2.7	7.6		3.2	7.6	0.0	36.0	36.4	1.1	36.0	37.0	0.5
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	2.7	7.6		3.2	7.6	0.0	36.0	36.4	1.1	36.0	37.0	0.5
LOS	A	A		A	A	A	D	D	A	D	D	A
Approach Delay		7.3			6.9			7.2				16.6
Approach LOS		A			A			A				B
Queue Length 50th (m)	0.9	28.2		3.8	26.5	0.0	0.3	1.7	0.0	0.7	3.8	0.0
Queue Length 95th (m)	2.0	38.2		7.1	35.8	0.0	2.4	6.7	0.0	3.8	11.0	0.0
Internal Link Dist (m)		300.5			223.2			134.7			191.5	
Turn Bay Length (m)	150.0			155.0		70.0	15.0					30.0
Base Capacity (vph)	1606	2323		1011	2210	999	471	555	591	475	597	600
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.28		0.10	0.28	0.01	0.00	0.02	0.10	0.01	0.04	0.06
Intersection Summary												
Area Type:	Other											
Cycle Length:	125											
Actuated Cycle Length:	93.4											
Natural Cycle:	90											
Control Type:	Semi Act-Uncoord											
Maximum v/c Ratio:	0.28											
Intersection Signal Delay:	7.5											
Intersection Capacity Utilization:	50.0%											
ICU Level of Service A												
Analysis Period (min)	15											

Lanes, Volumes, Timings FT 2033 AM.syn
04-03-2024
7: South Service Road/Canadian Road & QEW EB Off-Ramp/Royal Windsor Drive



HCM Signalized Intersection Capacity Analysis FT 2033 AM.syn
04-03-2024
7: South Service Road/Canadian Road & QEW EB Off-Ramp/Royal Windsor Drive

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	↖	→	↗	↖	→	↗	↖	→	↗	↖	→	↗
Lane Configurations	↖↗	↖↗	↖↗	↖↗	↖↗	↖↗	↖↗	↖↗	↖↗	↖↗	↖↗	↖↗
Traffic Volume (vph)	46	571	31	93	563	7	2	9	52	4	20	30
Future Volume (vph)	46	571	31	93	563	7	2	9	52	4	20	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	0.95		1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Fit Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3400	3300		1719	3139	1380	1805	1667	1468	1805	1792	1495
Fit Permitted	0.40	1.00		0.38	1.00	1.00	0.74	1.00	1.00	0.75	1.00	1.00
Satd. Flow (perm)	1434	3300		688	3139	1380	1412	1667	1468	1427	1792	1495
Peak-hour factor, PHF	0.92	0.92		0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	50	621		34	101	612	8	10	57	4	22	33
RTOR Reduction (vph)	0	2		0	0	3	0	0	50	0	0	29
Lane Group Flow (vph)	50	653		101	612	5	2	10	7	4	22	4
Heavy Vehicles (%)	3%	9%		0%	5%	15%	17%	0%	14%	10%	0%	6%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6		6	8		8	4		4
Actuated Green, G (s)	66.6	60.4		66.6	60.4	60.4	7.7	7.7	7.7	7.7	7.7	7.7
Effective Green, g (s)	70.6	64.8		70.6	64.8	64.8	11.5	11.5	11.5	11.5	11.5	11.5
Actuated g/C Ratio	0.73	0.67		0.73	0.67	0.67	0.12	0.12	0.12	0.12	0.12	0.12
Clearance Time (s)	6.0	8.4		6.0	8.4	8.4	7.8	7.8	7.8	7.8	7.8	7.8
Vehicle Extension (s)	3.5	4.5		3.5	6.0	6.0	3.5	3.5	3.5	3.5	3.5	3.5
Lane Grp Cap (vph)	1216	2215		590	2107	926	168	198	174	170	213	178
v/s Ratio Prot	0.00	c0.20		c0.01	0.19			0.01			c0.01	
v/s Ratio Perm	0.03			0.11		0.00	0.00		0.00	0.00		0.00
v/c Ratio	0.04	0.29		0.17	0.29	0.01	0.01	0.05	0.04	0.02	0.10	0.02
Uniform Delay, d1	3.6	6.5		3.8	6.5	5.2	37.5	37.7	37.6	37.5	37.9	37.5
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.0	0.3		0.2	0.3	0.0	0.0	0.1	0.1	0.1	0.3	0.1
Delay (s)	3.6	6.8		3.9	6.8	5.2	37.5	37.8	37.7	37.6	38.2	37.6
Level of Service	A	A		A	A	A	D	D	D	D	D	D
Approach Delay (s)		6.6			6.4			37.7				37.8
Approach LOS		A			A			D				D
Intersection Summary												
HCM 2000 Control Delay				9.1			HCM 2000 Level of Service			A		
HCM 2000 Volume to Capacity ratio				0.26								
Actuated Cycle Length (s)				96.5			Sum of lost time (s)			12.0		
Intersection Capacity Utilization				50.0%			ICU Level of Service			A		
Analysis Period (min)				15								
c Critical Lane Group												

Lanes, Volumes, Timings
8: QEW WB Off-Ramp & Kerr Street

FT 2033 AM.syn
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Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔↔			↔↔	↔	↔
Traffic Volume (vph)	489	0	0	297	261	290
Future Volume (vph)	489	0	0	297	261	290
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)		0.0	0.0		0.0	140.0
Storage Lanes		0	0		1	1
Taper Length (m)			7.5		7.5	
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00
Frt						0.850
Flt Protected					0.950	
Satd. Flow (prot)	3539	0	0	3539	1770	1583
Flt Permitted					0.950	
Satd. Flow (perm)	3539	0	0	3539	1770	1583
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)						191
Link Speed (k/h)	60			60	40	
Link Distance (m)	128.8			184.7	258.8	
Travel Time (s)	7.7			11.1	23.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	532	0	0	323	284	315
Shared Lane Traffic (%)						
Lane Group Flow (vph)	532	0	0	323	284	315
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)		15	25		25	15
Turn Type	NA			NA	Prot	Perm
Protected Phases	4			8	2	
Permitted Phases						2
Minimum Split (s)				22.5	22.5	22.5
Total Split (s)				22.5	22.5	22.5
Total Split (%)	50.0%			50.0%	50.0%	50.0%
Maximum Green (s)	18.0			18.0	18.0	18.0
Yellow Time (s)	3.5			3.5	3.5	3.5
All-Red Time (s)	1.0			1.0	1.0	1.0
Lost Time Adjust (s)	0.0			0.0	0.0	0.0
Total Lost Time (s)	4.5			4.5	4.5	4.5
Lead/Lag						
Lead-Lag Optimize?						
Walk Time (s)	7.0			7.0	7.0	7.0
Flash Dont Walk (s)	11.0			11.0	11.0	11.0
Pedestrian Calls (#/hr)	0			0	0	0
Act Effct Green (s)	18.0			18.0	18.0	18.0
Actuated g/C Ratio	0.40			0.40	0.40	0.40
v/c Ratio	0.38			0.23	0.40	0.42

Lanes, Volumes, Timings
8: QEW WB Off-Ramp & Kerr Street

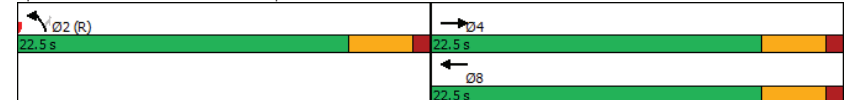
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Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Control Delay	10.5			9.5	11.8	6.1
Queue Delay	0.0			0.0	0.0	0.0
Total Delay	10.5			9.5	11.8	6.1
LOS	B			A	B	A
Approach Delay	10.5			9.5	8.8	
Approach LOS	B			A	A	
Queue Length 50th (m)	15.4			8.7	15.8	6.3
Queue Length 95th (m)	24.7			15.3	30.7	19.2
Internal Link Dist (m)	104.8			160.7	234.8	
Turn Bay Length (m)						140.0
Base Capacity (vph)	1415			1415	708	747
Starvation Cap Reductn	0			0	0	0
Spillback Cap Reductn	0			0	0	0
Storage Cap Reductn	0			0	0	0
Reduced v/c Ratio	0.38			0.23	0.40	0.42

Intersection Summary

Area Type: Other
 Cycle Length: 45
 Actuated Cycle Length: 45
 Offset: 0 (0%), Referenced to phase 2:NBL and 6: Start of Green
 Natural Cycle: 45
 Control Type: Pretimed
 Maximum v/c Ratio: 0.42
 Intersection Signal Delay: 9.6
 Intersection Capacity Utilization 39.0%
 Analysis Period (min) 15
 Intersection LOS: A
 ICU Level of Service A

Splits and Phases: 8: QEW WB Off-Ramp & Kerr Street



HCM Signalized Intersection Capacity Analysis
8: QEW WB Off-Ramp & Kerr Street

FT 2033 AM.syn
04-03-2024

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔↔			↔↔	↔↔	↔↔
Traffic Volume (vph)	489	0	0	297	261	290
Future Volume (vph)	489	0	0	297	261	290
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5			4.5	4.5	4.5
Lane Util. Factor	0.95			0.95	1.00	1.00
Fr _t	1.00			1.00	1.00	0.85
Fl _t Protected	1.00			1.00	0.95	1.00
Satd. Flow (prot)	3539			3539	1770	1583
Fl _t Permitted	1.00			1.00	0.95	1.00
Satd. Flow (perm)	3539			3539	1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	532	0	0	323	284	315
RTOR Reduction (vph)	0	0	0	0	0	115
Lane Group Flow (vph)	532	0	0	323	284	200
Turn Type	NA			NA	Prot	Perm
Protected Phases	4			8	2	
Permitted Phases						2
Actuated Green, G (s)	18.0			18.0	18.0	18.0
Effective Green, g (s)	18.0			18.0	18.0	18.0
Actuated g/C Ratio	0.40			0.40	0.40	0.40
Clearance Time (s)	4.5			4.5	4.5	4.5
Lane Grp Cap (vph)	1415			1415	708	633
v/s Ratio Prot	c0.15			0.09	c0.16	
v/s Ratio Perm						0.13
v/c Ratio	0.38			0.23	0.40	0.32
Uniform Delay, d1	9.5			8.9	9.6	9.3
Progression Factor	1.00			1.00	1.00	1.00
Incremental Delay, d2	0.8			0.4	1.7	1.3
Delay (s)	10.3			9.3	11.3	10.6
Level of Service	B			A	B	B
Approach Delay (s)	10.3			9.3	10.9	
Approach LOS	B			A	B	
Intersection Summary						
HCM 2000 Control Delay			10.3		HCM 2000 Level of Service B	
HCM 2000 Volume to Capacity ratio			0.39			
Actuated Cycle Length (s)			45.0		Sum of lost time (s) 9.0	
Intersection Capacity Utilization			39.0%		ICU Level of Service A	
Analysis Period (min)			15			
c Critical Lane Group						

Lanes, Volumes, Timings
9: Dorval Drive & QEW WB Off-Ramp

FT 2033 AM.syn
04-03-2024

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔↔	↔	↔↔			↔↔
Traffic Volume (vph)	916	426	524	0	0	1462
Future Volume (vph)	916	426	524	0	0	1462
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	190.0		0.0	0.0	
Storage Lanes	2	1		0	0	
Taper Length (m)	7.5				7.5	
Lane Util. Factor	0.97	0.91	0.95	1.00	1.00	0.95
Fr _t	0.993	0.850				
Fl _t Protected	0.954					
Satd. Flow (prot)	3423	1441	3539	0	0	3539
Fl _t Permitted	0.954					
Satd. Flow (perm)	3423	1441	3539	0	0	3539
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)	4	309				
Link Speed (k/h)	40		60			60
Link Distance (m)	325.1		310.2			266.9
Travel Time (s)	29.3		18.6			16.0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	996	463	570	0	0	1589
Shared Lane Traffic (%)		10%				
Lane Group Flow (vph)	1042	417	570	0	0	1589
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	7.2		0.0		0.0	0.0
Link Offset(m)	0.0		0.0		0.0	0.0
Crosswalk Width(m)	4.8		4.8		4.8	4.8
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15		15	25	
Number of Detectors	1	1	2			2
Detector Template	Left	Right	Thru			Thru
Leading Detector (m)	2.0	2.0	10.0			10.0
Trailing Detector (m)	0.0	0.0	0.0			0.0
Detector 1 Position(m)	0.0	0.0	0.0			0.0
Detector 1 Size(m)	2.0	2.0	0.6			0.6
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0			0.0
Detector 1 Queue (s)	0.0	0.0	0.0			0.0
Detector 1 Delay (s)	0.0	0.0	0.0			0.0
Detector 2 Position(m)			9.4			9.4
Detector 2 Size(m)			0.6			0.6
Detector 2 Type			Cl+Ex			Cl+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type		Prot	Perm	NA		NA
Protected Phases		8		2		6
Permitted Phases						8

Lanes, Volumes, Timings
9: Dorval Drive & QEW WB Off-Ramp

FT 2033 AM.syn
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Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Detector Phase	8	8	2			6
Switch Phase						
Minimum Initial (s)	10.0	10.0	20.0			20.0
Minimum Split (s)	24.0	24.0	26.0			26.0
Total Split (s)	45.6	45.6	74.4			74.4
Total Split (%)	38.0%	38.0%	62.0%			62.0%
Maximum Green (s)	39.6	39.6	68.4			68.4
Yellow Time (s)	4.0	4.0	4.0			4.0
All-Red Time (s)	2.0	2.0	2.0			2.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0			-2.0
Total Lost Time (s)	4.0	4.0	4.0			4.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	4.5	4.5	5.0			5.0
Recall Mode	None	None	Max			Max
Walk Time (s)	5.0	5.0	7.0			7.0
Flash Dont Walk (s)	7.0	7.0	11.0			11.0
Pedestrian Calls (#/hr)	0	0	0			0
Act Effct Green (s)	41.2	41.2	70.4			70.4
Actuated g/C Ratio	0.34	0.34	0.59			0.59
v/c Ratio	0.88	0.60	0.27			0.76
Control Delay	46.8	12.2	12.5			21.5
Queue Delay	0.0	0.0	0.0			0.0
Total Delay	46.8	12.2	12.5			21.5
LOS	D	B	B			C
Approach Delay	36.9		12.5			21.5
Approach LOS	D		B			C
Queue Length 50th (m)	123.7	20.6	34.6			147.1
Queue Length 95th (m)	#155.0	58.4	45.0			177.2
Internal Link Dist (m)	301.1		286.2			242.9
Turn Bay Length (m)		190.0				
Base Capacity (vph)	1193	702	2083			2083
Starvation Cap Reductn	0	0	0			0
Spillback Cap Reductn	0	0	0			0
Storage Cap Reductn	0	0	0			0
Reduced v/c Ratio	0.87	0.59	0.27			0.76

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 119.6
 Natural Cycle: 60
 Control Type: Semi Act-Uncoord
 Maximum v/c Ratio: 0.88
 Intersection Signal Delay: 26.3 Intersection LOS: C
 Intersection Capacity Utilization 77.7% ICU Level of Service D
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Lanes, Volumes, Timings
9: Dorval Drive & QEW WB Off-Ramp

FT 2033 AM.syn
04-03-2024

Signals and Phases: 9: Dorval Drive & QEW WB Off-Ramp



HCM Signalized Intersection Capacity Analysis
9: Dorval Drive & QEWB Off-Ramp

FT 2033 AM.syn
04-03-2024

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔↔	↔	↕↕			↕↕
Traffic Volume (vph)	916	426	524	0	0	1462
Future Volume (vph)	916	426	524	0	0	1462
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0			4.0
Lane Util. Factor	0.97	0.91	0.95			0.95
Fr	0.99	0.85	1.00			1.00
Fit Protected	0.95	1.00	1.00			1.00
Satd. Flow (prot)	3426	1441	3539			3539
Fit Permitted	0.95	1.00	1.00			1.00
Satd. Flow (perm)	3426	1441	3539			3539
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	996	463	570	0	0	1589
RTOR Reduction (vph)	3	203	0	0	0	0
Lane Group Flow (vph)	1039	214	570	0	0	1589
Turn Type	Prot	Perm	NA			NA
Protected Phases	8		2			6
Permitted Phases	8					
Actuated Green, G (s)	39.2	39.2	68.4			68.4
Effective Green, g (s)	41.2	41.2	70.4			70.4
Actuated g/C Ratio	0.34	0.34	0.59			0.59
Clearance Time (s)	6.0	6.0	6.0			6.0
Vehicle Extension (s)	4.5	4.5	5.0			5.0
Lane Grp Cap (vph)	1180	496	2083			2083
v/s Ratio Prot	c0.30		0.16			c0.45
v/s Ratio Perm		0.15				
v/c Ratio	0.88	0.43	0.27			0.76
Uniform Delay, d1	36.9	30.2	12.1			18.4
Progression Factor	1.00	1.00	1.00			1.00
Incremental Delay, d2	8.4	1.0	0.3			2.7
Delay (s)	45.2	31.2	12.4			21.1
Level of Service	D	C	B			C
Approach Delay (s)	41.2		12.4			21.1
Approach LOS	D		B			C

Intersection Summary			
HCM 2000 Control Delay	27.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	119.6	Sum of lost time (s)	8.0
Intersection Capacity Utilization	77.7%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
10: Dorval Drive & QEWE Off-Ramp

FT 2033 AM.syn
04-03-2024

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔↔	↔		↕↕	↕↕	
Traffic Volume (vph)	134	534	0	738	1580	0
Future Volume (vph)	134	534	0	738	1580	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	175.0	0.0	0.0			0.0
Storage Lanes	1	1	0			0
Taper Length (m)	7.5		7.5			
Lane Util. Factor	0.97	0.91	1.00	0.95	0.95	1.00
Fr	0.900	0.850				
Fit Protected	0.984					
Satd. Flow (prot)	3200	1441	0	3539	3539	0
Fit Permitted	0.984					
Satd. Flow (perm)	3200	1441	0	3539	3539	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	20	20				
Link Speed (k/h)	40			60	60	
Link Distance (m)	275.5			164.3	310.2	
Travel Time (s)	24.8			9.9	18.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	146	580	0	802	1717	0
Shared Lane Traffic (%)	50%					
Lane Group Flow (vph)	436	290	0	802	1717	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	7.2			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Number of Detectors	1	1		2	2	
Detector Template	Left	Right		Thru	Thru	
Leading Detector (m)	2.0	2.0		10.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	2.0		0.6	0.6	
Detector 1 Type	CI+Ex	CI+Ex		CI+Ex	CI+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	
Detector 2 Position(m)				9.4	9.4	
Detector 2 Size(m)				0.6	0.6	
Detector 2 Type				CI+Ex	CI+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Prot	Perm		NA	NA	
Protected Phases	4			2	6	
Permitted Phases	4					

Lanes, Volumes, Timings
10: Dorval Drive & QEW EB Off-Ramp

FT 2033 AM.syn
04-03-2024



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Detector Phase	4	4		2	6	
Switch Phase						
Minimum Initial (s)	10.0	10.0		20.0	20.0	
Minimum Split (s)	24.0	24.0		26.0	26.0	
Total Split (s)	45.6	45.6		74.4	74.4	
Total Split (%)	38.0%	38.0%		62.0%	62.0%	
Maximum Green (s)	39.6	39.6		68.4	68.4	
Yellow Time (s)	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	4.0	4.0		5.0	5.0	
Recall Mode	None	None		Max	Max	
Walk Time (s)	0.0	0.0		7.0	7.0	
Flash Dont Walk (s)	7.0	7.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0	
Act Effct Green (s)	29.1	29.1		70.8	70.8	
Actuated g/C Ratio	0.27	0.27		0.66	0.66	
v/c Ratio	0.50	0.72		0.35	0.74	
Control Delay	33.0	43.4		9.8	16.5	
Queue Delay	0.0	0.0		0.0	0.0	
Total Delay	33.0	43.4		9.8	16.5	
LOS	C	D		A	B	
Approach Delay	37.2			9.8	16.5	
Approach LOS	D			A	B	
Queue Length 50th (m)	39.7	59.3		37.4	120.5	
Queue Length 95th (m)	54.3	92.3		66.3	204.9	
Internal Link Dist (m)	251.5			140.3	286.2	
Turn Bay Length (m)	175.0					
Base Capacity (vph)	1252	570		2320	2320	
Starvation Cap Reductn	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	
Storage Cap Reductn	0	0		0	0	
Reduced v/c Ratio	0.35	0.51		0.35	0.74	

Intersection Summary	
Area Type:	Other
Cycle Length:	120
Actuated Cycle Length:	108
Natural Cycle:	60
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.74
Intersection Signal Delay:	19.5
Intersection Capacity Utilization:	77.7%
Analysis Period (min):	15
Intersection LOS:	B
ICU Level of Service:	D

Lanes, Volumes, Timings
10: Dorval Drive & QEW EB Off-Ramp

FT 2033 AM.syn
04-03-2024

Signals and Phases: 10: Dorval Drive & QEW EB Off-Ramp



HCM Signalized Intersection Capacity Analysis
10: Dorval Drive & QEW EB Off-Ramp

FT 2033 AM.syn
04-03-2024

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔	↔		↕	↕	
Traffic Volume (vph)	134	534	0	738	1580	0
Future Volume (vph)	134	534	0	738	1580	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	0.91		0.95	0.95	
Fr _t	0.90	0.85		1.00	1.00	
Fit Protected	0.98	1.00		1.00	1.00	
Satd. Flow (prot)	3200	1441		3539	3539	
Fit Permitted	0.98	1.00		1.00	1.00	
Satd. Flow (perm)	3200	1441		3539	3539	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	146	580	0	802	1717	0
RTOR Reduction (vph)	15	15	0	0	0	0
Lane Group Flow (vph)	421	275	0	802	1717	0
Turn Type	Prot	Perm		NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4				
Actuated Green, G (s)	27.1	27.1		68.8	68.8	
Effective Green, g (s)	29.1	29.1		70.8	70.8	
Actuated g/C Ratio	0.27	0.27		0.66	0.66	
Clearance Time (s)	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	4.0	4.0		5.0	5.0	
Lane Grp Cap (vph)	863	388		2322	2322	
v/s Ratio Prot	0.13			0.23	c0.49	
v/s Ratio Perm		c0.19				
v/c Ratio	0.49	0.71		0.35	0.74	
Uniform Delay, d1	33.1	35.6		8.2	12.4	
Progression Factor	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.6	6.3		0.4	2.2	
Delay (s)	33.7	41.9		8.7	14.5	
Level of Service	C	D		A	B	
Approach Delay (s)	37.0			8.7	14.5	
Approach LOS	D			A	B	

Intersection Summary			
HCM 2000 Control Delay	18.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	107.9	Sum of lost time (s)	8.0
Intersection Capacity Utilization	77.7%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
11: Argus Rd & South Service Rd

FT 2033 AM.syn
04-03-2024

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Volume (vph)	15	76	806	232	84	265
Future Volume (vph)	15	76	806	232	84	265
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Fr _t			0.970		0.897	
Fit Protected		0.992			0.988	
Satd. Flow (prot)	0	1460	1621	0	1515	0
Fit Permitted		0.992			0.988	
Satd. Flow (perm)	0	1460	1621	0	1515	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		177.7	145.7		103.5	
Travel Time (s)		12.8	10.5		7.5	
Confl. Peds. (#/hr)	1			1	5	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	100%	0%	3%	0%	0%	0%
Adj. Flow (vph)	16	83	876	252	91	288
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	99	1128	0	379	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (k/h)	24			14	24	14
Sign Control		Free	Free		Stop	
Intersection Summary						
Area Type:	CBD					
Control Type:	Unsignalized					
Intersection Capacity Utilization 92.9%				ICU Level of Service F		
Analysis Period (min) 15						

HCM Unsignalized Intersection Capacity Analysis
11: Argus Rd & South Service Rd

FT 2033 AM.syn
04-03-2024

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	↕
Traffic Volume (veh/h)	15	76	806	232	84	265
Future Volume (Veh/h)	15	76	806	232	84	265
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
Hourly flow rate (vph)	16	83	876	252	91	288
Pedestrians		1	5		1	
Lane Width (m)		3.6	3.6		3.6	
Walking Speed (m/s)		1.2	1.2		1.2	
Percent Blockage		0	0		0	
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)		358				
pX, platoon unblocked						
vC, conflicting volume	1129				1123	1004
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1129				1123	1004
tC, single (s)	5.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	3.1				3.5	3.3
p0 queue free %	96				58	3
cM capacity (veh/h)	367				218	296
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	99	1128	379			
Volume Left	16	0	91			
Volume Right	0	252	288			
eSH	367	1700	273			
Volume to Capacity	0.04	0.66	1.39			
Queue Length 95th (m)	1.1	0.0	162.5			
Control Delay (s)	3.1	0.0	232.6			
Lane LOS	A		F			
Approach Delay (s)	3.1	0.0	232.6			
Approach LOS			F			
Intersection Summary						
Average Delay			55.1			
Intersection Capacity Utilization		92.9%		ICU Level of Service		F
Analysis Period (min)		15				

Lanes, Volumes, Timings
12: Lyons Lane & South Service Road

FT 2033 AM.syn
04-03-2024

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	↕
Traffic Volume (vph)	0	5	4	36	33	1
Future Volume (vph)	0	5	4	36	33	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt			0.878		0.996	
Fit Protected					0.954	
Satd. Flow (prot)	0	1710	1501	0	1230	0
Fit Permitted					0.954	
Satd. Flow (perm)	0	1710	1501	0	1230	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		60.5	89.6		37.6	
Travel Time (s)		4.4	6.5		2.7	
Confl. Peds. (#/hr)	6			6	1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	0%	33%	0%
Adj. Flow (vph)	0	5	4	39	36	1
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	5	43	0	37	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (k/h)	24			14	24	14
Sign Control		Free	Free		Stop	
Intersection Summary						
Area Type:	CBD					
Control Type:	Unsignalized					
Intersection Capacity Utilization 15.1%				ICU Level of Service A		
Analysis Period (min) 15						

HCM Unsignalized Intersection Capacity Analysis
12: Lyons Lane & South Service Road

FT 2033 AM.syn
04-03-2024

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Volume (veh/h)	0	5	4	36	33	1
Future Volume (Veh/h)	0	5	4	36	33	1
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)	0	5	4	39	36	1
Pedestrians			1		6	
Lane Width (m)			3.6		3.6	
Walking Speed (m/s)			1.2		1.2	
Percent Blockage			0		1	
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	49				36	30
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	49				36	30
tC, single (s)	4.1				6.7	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.8	3.3
p0 queue free %	100				96	100
cM capacity (veh/h)	1563				899	1046
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	5	43	37			
Volume Left	0	0	36			
Volume Right	0	39	1			
eSH	1563	1700	902			
Volume to Capacity	0.00	0.03	0.04			
Queue Length 95th (m)	0.0	0.0	1.0			
Control Delay (s)	0.0	0.0	9.2			
Lane LOS			A			
Approach Delay (s)	0.0	0.0	9.2			
Approach LOS			A			
Intersection Summary						
Average Delay			4.0			
Intersection Capacity Utilization			15.1%		ICU Level of Service	A
Analysis Period (min)			15			

Lanes, Volumes, Timings
13: GO Bus Terminal/Argus Rd & Cross Ave

FT 2033 AM.syn
04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕
Traffic Volume (vph)	44	774	17	49	764	58	25	0	59	510	20	674
Future Volume (vph)	44	774	17	49	764	58	25	0	59	510	20	674
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6
Storage Length (m)	20.0		0.0	20.0		0.0	0.0		0.0	15.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00	1.00		1.00	1.00			0.96		0.98		0.98
Frt		0.997			0.989			0.850		0.854		
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1570	3141	0	818	3168	0	805	734	0	1570	1400	0
Fit Permitted	0.319			0.177			0.142			0.715		
Satd. Flow (perm)	527	3141	0	152	3168	0	120	734	0	1157	1400	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3			15			208				177
Link Speed (k/h)		50			50			50				50
Link Distance (m)		162.8			72.9			81.9				113.6
Travel Time (s)		11.7			5.2			5.9				8.2
Confl. Peds. (#/hr)	1		3	3		1	3		20	20		3
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
Heavy Vehicles (%)	0%	1%	100%	92%	1%	5%	95%	0%	91%	0%	93%	0%
Adj. Flow (vph)	48	841	18	53	830	63	27	0	64	554	22	733
Shared Lane Traffic (%)												
Lane Group Flow (vph)	48	859	0	53	893	0	27	64	0	554	755	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.3			3.3			3.3				3.3
Link Offset(m)		0.0			0.0			0.0				0.0
Crosswalk Width(m)		4.8			4.8			4.8				4.8
Two way Left Turn Lane												
Headway Factor	1.19	1.14	1.14	1.19	1.14	1.14	1.19	1.14	1.14	1.19	1.14	1.14
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

Lanes, Volumes, Timings
13: GO Bus Terminal/Argus Rd & Cross Ave

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases		2		6				8			4	
Detector Phase	2	2		1	6			8	8		4	4
Switch Phase												
Minimum Initial (s)	22.0	22.0		8.0	22.0			10.0	10.0		10.0	10.0
Minimum Split (s)	45.0	45.0		12.5	29.0			29.0	29.0		29.0	29.0
Total Split (s)	45.5	45.5		12.5	58.0			32.0	32.0		32.0	32.0
Total Split (%)	50.6%	50.6%		13.9%	64.4%			35.6%	35.6%		35.6%	35.6%
Maximum Green (s)	39.5	39.5		8.5	52.0			26.0	26.0		26.0	26.0
Yellow Time (s)	4.0	4.0		3.0	4.0			4.0	4.0		4.0	4.0
All-Red Time (s)	2.0	2.0		1.0	2.0			2.0	2.0		2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0		0.0	-2.0			-2.0	-2.0		-2.0	-2.0
Total Lost Time (s)	4.0	4.0		4.0	4.0			4.0	4.0		4.0	4.0
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Vehicle Extension (s)	5.0	5.0		2.5	5.0			4.0	4.0		4.0	4.0
Recall Mode	Min	Min		Min	Min			Min	Min		Min	Min
Walk Time (s)	7.0	7.0		7.0	7.0			7.0	7.0		7.0	7.0
Flash Dont Walk (s)	16.0	16.0		16.0	16.0			16.0	16.0		16.0	16.0
Pedestrian Calls (#/hr)	0	0		0	0			0	0		0	0
Act Effct Green (s)	33.0	33.0		45.3	45.3			28.2	28.2		28.2	28.2
Actuated g/C Ratio	0.40	0.40		0.56	0.56			0.35	0.35		0.35	0.35
v/c Ratio	0.23	0.67		0.35	0.51			0.66	0.16		1.39	1.26
Control Delay	18.3	22.5		14.6	11.9			96.5	0.9		215.8	152.4
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0		0.0	0.0
Total Delay	18.3	22.5		14.6	11.9			96.5	0.9		215.8	152.4
LOS	B	C		B	B			F	A		F	F
Approach Delay		22.2			12.0				29.3			179.2
Approach LOS		C			B				C			F
Queue Length 50th (m)	4.9	57.9		3.8	42.7			3.7	0.0		~121.5	~136.6
Queue Length 95th (m)	12.9	78.0		9.0	56.8			#20.8	0.0		#206.2	#230.7
Internal Link Dist (m)		138.8			48.9				57.9			89.6
Turn Bay Length (m)	20.0			20.0							15.0	
Base Capacity (vph)	270	1610		154	2116			41	389		399	599
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	0.53		0.34	0.42			0.66	0.16		1.39	1.26

Intersection Summary

Area Type:	CBD
Cycle Length:	90
Actuated Cycle Length:	81.5
Natural Cycle:	120
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	1.39
Intersection Signal Delay:	82.6
Intersection LOS:	F

Lanes, Volumes, Timings
13: GO Bus Terminal/Argus Rd & Cross Ave

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Intersection Capacity Utilization	99.7%	ICU Level of Service F
Analysis Period (min)	15	
- Volume exceeds capacity, queue is theoretically infinite.		
Queue shown is maximum after two cycles.		
# 95th percentile volume exceeds capacity, queue may be longer.		
Queue shown is maximum after two cycles.		

Splits and Phases: 13: GO Bus Terminal/Argus Rd & Cross Ave



HCM Signalized Intersection Capacity Analysis
13: GO Bus Terminal/Argus Rd & Cross Ave

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	44	774	17	49	764	58	25	0	59	510	20	674
Future Volume (vph)	44	774	17	49	764	58	25	0	59	510	20	674
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frbp, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.97		1.00	0.99	
Fpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		0.98	1.00	
Frt	1.00	1.00		1.00	0.99		1.00	0.85		1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1570	3141		818	3169		805	736		1540	1402	
Flt Permitted	0.32	1.00		0.18	1.00		0.14	1.00		0.72	1.00	
Satd. Flow (perm)	527	3141		152	3169		120	736		1159	1402	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	48	841	18	53	830	63	27	0	64	554	22	733
RTOR Reduction (vph)	0	2	0	0	7	0	0	42	0	0	116	0
Lane Group Flow (vph)	48	857	0	53	886	0	27	22	0	554	639	0
Confl. Peds. (#/hr)	1		3	3		1	3		20	20		3
Heavy Vehicles (%)	0%	1%	100%	92%	1%	5%	95%	0%	91%	0%	93%	0%
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	2	2		1	6		8	8		4	4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	31.1	31.1		43.3	43.3		26.2	26.2		26.2	26.2	
Effective Green, g (s)	33.1	33.1		43.3	45.3		28.2	28.2		28.2	28.2	
Actuated g/C Ratio	0.41	0.41		0.53	0.56		0.35	0.35		0.35	0.35	
Clearance Time (s)	6.0	6.0		4.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	5.0	5.0		2.5	5.0		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	214	1275		147	1761		41	254		401	485	
v/s Ratio Prot		c0.27		0.04	c0.28			0.03			0.46	
v/s Ratio Perm	0.09			0.15			0.22			c0.48		
v/c Ratio	0.22	0.67		0.36	0.50		0.66	0.09		1.38	1.32	
Uniform Delay, d1	15.8	19.8		11.6	11.2		22.6	18.0		26.6	26.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.1	1.8		1.1	0.5		35.1	0.2		186.6	157.1	
Delay (s)	16.9	21.6		12.7	11.6		57.7	18.2		213.3	183.8	
Level of Service	B	C		B	B		E	B		F	F	
Approach Delay (s)		21.4			11.7			29.9			196.3	
Approach LOS		C			B			C			F	

Intersection Summary			
HCM 2000 Control Delay	89.2	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	81.5	Sum of lost time (s)	12.0
Intersection Capacity Utilization	99.7%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
14: Lyons Lane/Street A & Cross Ave

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	70	279	239	267	187	7	21	4	16	20	29	50
Future Volume (vph)	70	279	239	267	187	7	21	4	16	20	29	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6
Storage Length (m)	0.0	0.0	25.0	0.0	20.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.99	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	0.99		1.00	1.00		1.00	0.99		1.00	0.99	
Frt		0.931			0.994			0.879			0.906	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1540	2827	0	1570	2727	0	1570	1484	0	1468	1506	0
Flt Permitted	0.620			0.364			0.701			0.744		
Satd. Flow (perm)	997	2827	0	601	2727	0	1155	1484	0	1145	1506	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		260			8			17			54	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		40.1			211.2			69.1			70.9	
Travel Time (s)		2.9			15.2			5.0			5.1	
Confl. Peds. (#/hr)	5		1	1		5	3		3	3		3
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
Heavy Vehicles (%)	2%	11%	0%	0%	19%	0%	0%	0%	0%	7%	0%	3%
Adj. Flow (vph)	76	303	260	290	203	8	23	4	17	22	32	54
Shared Lane Traffic (%)												
Lane Group Flow (vph)	76	563	0	290	211	0	23	21	0	22	86	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.3			3.3			3.3			3.3	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.19	1.14	1.14	1.19	1.14	1.14	1.19	1.14	1.14	1.19	1.14	1.14
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

Lanes, Volumes, Timings
14: Lyons Lane/Street A & Cross Ave

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases		2		6			8			4		
Detector Phase	2	2		1	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	35.0	35.0		8.0	35.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	41.0	41.0		12.5	41.0		28.0	28.0		28.0	28.0	
Total Split (s)	41.0	41.0		21.0	62.0		28.0	28.0		28.0	28.0	
Total Split (%)	45.6%	45.6%		23.3%	68.9%		31.1%	31.1%		31.1%	31.1%	
Maximum Green (s)	35.0	35.0		17.0	56.0		22.0	22.0		22.0	22.0	
Yellow Time (s)	4.0	4.0		3.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		1.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0		0.0	-2.0		-2.0	-2.0		-2.0	-2.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Vehicle Extension (s)	5.0	5.0		2.5	5.0		4.0	4.0		4.0	4.0	
Recall Mode	Min	Min		Min	Min		Min	Min		Min	Min	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	15.0	15.0		15.0	15.0		15.0	15.0		15.0	15.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	37.1	37.1		51.0	51.0		12.4	12.4		12.4	12.4	
Actuated g/C Ratio	0.52	0.52		0.71	0.71		0.17	0.17		0.17	0.17	
v/c Ratio	0.15	0.35		0.52	0.11		0.12	0.08		0.11	0.28	
Control Delay	10.7	6.1		7.1	3.2		27.2	14.9		27.1	15.6	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	10.7	6.1		7.1	3.2		27.2	14.9		27.1	15.6	
LOS	B	A		A	A		C	B		C	B	
Approach Delay		6.7			5.5			21.3			17.9	
Approach LOS		A			A			C			B	
Queue Length 50th (m)	5.0	10.9		11.1	3.5		2.8	0.5		2.6	3.8	
Queue Length 95th (m)	13.9	23.4		21.5	7.1		9.2	6.3		9.0	16.0	
Internal Link Dist (m)		16.1			187.2			45.1			46.9	
Turn Bay Length (m)				25.0			20.0					
Base Capacity (vph)	517	1592		660	2220		389	511		385	543	
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	0.15	0.35		0.44	0.10		0.06	0.04		0.06	0.16	

Intersection Summary

Area Type: CBD
 Cycle Length: 90
 Actuated Cycle Length: 71.4
 Natural Cycle: 85
 Control Type: Semi Act-Uncoord
 Maximum v/c Ratio: 0.52
 Intersection Signal Delay: 7.6
 Intersection LOS: A

Lanes, Volumes, Timings
14: Lyons Lane/Street A & Cross Ave

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Intersection Capacity Utilization 77.6% ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 14: Lyons Lane/Street A & Cross Ave



HCM Signalized Intersection Capacity Analysis
14: Lyons Lane/Street A & Cross Ave

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕
Traffic Volume (vph)	70	279	239	267	187	7	21	4	16	20	29	50
Future Volume (vph)	70	279	239	267	187	7	21	4	16	20	29	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	0.99	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Fr	1.00	0.93		1.00	0.99		1.00	0.88		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)	1530	2826		1570	2728		1566	1484		1463	1506	
Flt Permitted	0.62	1.00		0.36	1.00		0.70	1.00		0.74	1.00	
Satd. Flow (perm)	998	2826		602	2728		1156	1484		1146	1506	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	76	303	260	290	203	8	23	4	17	22	32	54
RTOR Reduction (vph)	0	125	0	0	2	0	0	14	0	0	45	0
Lane Group Flow (vph)	76	438	0	290	209	0	23	7	0	22	41	0
Confl. Peds. (#/hr)	5		1	1		5	3		3	3		3
Heavy Vehicles (%)	2%	11%	0%	0%	19%	0%	0%	0%	0%	7%	0%	3%
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	35.0	35.0		48.9	48.9		10.4	10.4		10.4	10.4	
Effective Green, g (s)	37.0	37.0		48.9	50.9		12.4	12.4		12.4	12.4	
Actuated g/C Ratio	0.52	0.52		0.69	0.71		0.17	0.17		0.17	0.17	
Clearance Time (s)	6.0	6.0		4.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	5.0	5.0		2.5	5.0		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	517	1466		547	1947		201	258		199	261	
v/s Ratio Prot		0.15		c0.07	0.08			0.00			c0.03	
v/s Ratio Perm	0.08			c0.29			0.02			0.02		
v/c Ratio	0.15	0.30		0.53	0.11		0.11	0.03		0.11	0.16	
Uniform Delay, d1	8.9	9.8		4.8	3.2		24.8	24.4		24.8	25.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.3	0.2		0.8	0.1		0.3	0.1		0.3	0.4	
Delay (s)	9.2	10.0		5.6	3.2		25.2	24.5		25.1	25.4	
Level of Service	A	B		A	A		C	C		C	C	
Approach Delay (s)		9.9			4.6			24.9			25.4	
Approach LOS		A			A			C			C	

Intersection Summary			
HCM 2000 Control Delay	9.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	71.3	Sum of lost time (s)	12.0
Intersection Capacity Utilization	77.6%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
15: Cross Ave & Lyons Lane

FT 2033 AM.syn
04-03-2024

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↕	↕	↕	↕	↕	↕
Traffic Volume (vph)	40	513	255	26	61	82
Future Volume (vph)	40	513	255	26	61	82
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	5.0			0.0	0.0	0.0
Storage Lanes	1			0	1	0
Taper Length (m)	7.5				7.5	
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	1.00
Ped Bike Factor			0.986		0.922	
Flt Protected	0.950				0.979	
Satd. Flow (prot)	1624	3094	2797	0	1350	0
Flt Permitted	0.950				0.979	
Satd. Flow (perm)	1624	3094	2797	0	1350	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		281.3	40.1		41.7	
Travel Time (s)		20.3	2.9		3.0	
Confl. Peds. (#/hr)	4			4	7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	5%	16%	0%	0%	25%
Adj. Flow (vph)	43	558	277	28	66	89
Shared Lane Traffic (%)						
Lane Group Flow (vph)	43	558	305	0	155	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.6	3.6		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (k/h)	25			15	25	15
Sign Control		Free	Free		Stop	

Intersection Summary	
Area Type:	CBD
Control Type:	Unsignalized
Intersection Capacity Utilization	32.0%
Analysis Period (min)	15
	ICU Level of Service A

HCM Unsignalized Intersection Capacity Analysis
15: Cross Ave & Lyons Lane

FT 2033 AM.syn
04-03-2024

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↕↕	↕↕		↕↕	
Traffic Volume (veh/h)	40	513	255	26	61	82
Future Volume (Veh/h)	40	513	255	26	61	82
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)	43	558	277	28	66	89
Pedestrians			7		4	
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)			40			
pX, platoon unblocked	1.00				1.00	1.00
vC, conflicting volume	309				667	156
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	308				666	156
tC, single (s)	4.1				6.8	7.4
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.5
p0 queue free %	97				83	89
cM capacity (veh/h)	1259				380	791
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	43	279	279	185	120	155
Volume Left	43	0	0	0	0	66
Volume Right	0	0	0	0	28	89
sSH	1259	1700	1700	1700	1700	541
Volume to Capacity	0.03	0.16	0.16	0.11	0.07	0.29
Queue Length 95th (m)	0.8	0.0	0.0	0.0	0.0	9.4
Control Delay (s)	8.0	0.0	0.0	0.0	0.0	14.3
Lane LOS	A					B
Approach Delay (s)	0.6			0.0		14.3
Approach LOS						B
Intersection Summary						
Average Delay			2.4			
Intersection Capacity Utilization			32.0%		ICU Level of Service	A
Analysis Period (min)			15			

Lanes, Volumes, Timings
16: Speers Road/Cornwall Road & Cross Avenue

FT 2033 AM.syn
04-03-2024

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↕↕	↕↕		↕↕	↕↕
Traffic Volume (vph)	248	735	687	34	22	366
Future Volume (vph)	248	735	687	34	22	366
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	75.0			0.0	55.0	0.0
Storage Lanes	1			0	1	2
Taper Length (m)	7.5				7.5	
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	0.88
Frt			0.993			0.850
Fit Protected	0.950				0.950	
Satd. Flow (prot)	1770	3539	3514	0	1770	2787
Fit Permitted	0.274				0.950	
Satd. Flow (perm)	510	3539	3514	0	1770	2787
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)			6			398
Link Speed (k/h)		50	50		50	
Link Distance (m)		228.9	275.4		183.9	
Travel Time (s)		16.5	19.8		13.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	270	799	747	37	24	398
Shared Lane Traffic (%)						
Lane Group Flow (vph)	270	799	784	0	24	398
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.6	3.6		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25			15	25	15
Number of Detectors	1	2	2		1	1
Detector Template	Left	Thru	Thru		Left	Right
Leading Detector (m)	2.0	10.0	10.0		2.0	2.0
Trailing Detector (m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Size(m)	2.0	0.6	0.6		2.0	2.0
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex		CI+Ex	CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0		0.0	0.0
Detector 2 Position(m)		9.4	9.4			
Detector 2 Size(m)		0.6	0.6			
Detector 2 Type		CI+Ex	CI+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type	pm+pt	NA	NA		pm+pt	Perm
Protected Phases	5	2	6		7	
Permitted Phases	2				4	4

Lanes, Volumes, Timings
16: Speers Road/Cornwall Road & Cross Avenue

FT 2033 AM.syn
04-03-2024



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Detector Phase	5	2	6		7	4
Switch Phase						
Minimum Initial (s)	6.0	25.0	25.0		6.0	6.0
Minimum Split (s)	12.0	35.0	35.0		29.0	29.0
Total Split (s)	26.0	61.0	35.0		29.0	29.0
Total Split (%)	28.9%	67.8%	38.9%		32.2%	32.2%
Maximum Green (s)	20.0	55.0	29.0		23.0	23.0
Yellow Time (s)	4.0	4.0	4.0		4.0	4.0
All-Red Time (s)	2.0	2.0	2.0		2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0		6.0	6.0
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?			Yes			
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	None	Max	Max		None	None
Walk Time (s)		18.0	18.0		12.0	12.0
Flash Dont Walk (s)		7.0	7.0		7.0	7.0
Pedestrian Calls (#/hr)		0	0		0	0
Act Effct Green (s)	55.1	55.1	39.5		7.2	7.2
Actuated g/C Ratio	0.74	0.74	0.53		0.10	0.10
v/c Ratio	0.50	0.30	0.42		0.14	0.63
Control Delay	6.5	3.7	12.1		32.2	8.6
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	6.5	3.7	12.1		32.2	8.6
LOS	A	A	B		C	A
Approach Delay		4.4	12.1		10.0	
Approach LOS		A	B		A	
Queue Length 50th (m)	8.8	15.0	31.8		3.3	0.0
Queue Length 95th (m)	19.5	27.2	59.1		10.0	13.2
Internal Link Dist (m)		204.9	251.4		159.9	
Turn Bay Length (m)	75.0				55.0	
Base Capacity (vph)	717	2622	1869		548	1138
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	0.38	0.30	0.42		0.04	0.35

Intersection Summary

Area Type:	Other
Cycle Length:	90
Actuated Cycle Length:	74.3
Natural Cycle:	80
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.63
Intersection Signal Delay:	8.1
Intersection Capacity Utilization:	54.6%
Analysis Period (min):	15
Intersection LOS:	A
ICU Level of Service:	A

Lanes, Volumes, Timings
16: Speers Road/Cornwall Road & Cross Avenue

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Split and Phases: 16: Speers Road/Cornwall Road & Cross Avenue



HCM Signalized Intersection Capacity Analysis
16: Speers Road/Cornwall Road & Cross Avenue

FT 2033 AM.syn
04-03-2024



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↕↕	↕↔		↔	↕↕
Traffic Volume (vph)	248	735	687	34	22	366
Future Volume (vph)	248	735	687	34	22	366
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0		6.0	6.0
Lane Util. Factor	1.00	0.95	0.95		1.00	0.88
Fr _t	1.00	1.00	0.99		1.00	0.85
Fit Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	3539	3514		1770	2787
Fit Permitted	0.27	1.00	1.00		0.95	1.00
Satd. Flow (perm)	510	3539	3514		1770	2787
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	270	799	747	37	24	398
RTOR Reduction (vph)	0	0	3	0	0	359
Lane Group Flow (vph)	270	799	781	0	24	39
Turn Type	pm+pt	NA	NA		pm+pt	Perm
Protected Phases	5	2	6		7	
Permitted Phases	2				4	4
Actuated Green, G (s)	55.0	55.0	39.4		7.2	7.2
Effective Green, g (s)	55.0	55.0	39.4		7.2	7.2
Actuated g/C Ratio	0.74	0.74	0.53		0.10	0.10
Clearance Time (s)	6.0	6.0	6.0		6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	541	2623	1865		171	270
v/s Ratio Prot	c0.06	0.23	0.22		0.01	
v/s Ratio Perm	c0.31					c0.01
v/c Ratio	0.50	0.30	0.42		0.14	0.14
Uniform Delay, d1	4.2	3.2	10.5		30.7	30.7
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.7	0.3	0.7		0.4	0.2
Delay (s)	4.9	3.5	11.2		31.0	30.9
Level of Service	A	A	B		C	C
Approach Delay (s)		3.9	11.2		30.9	
Approach LOS		A	B		C	

Intersection Summary

HCM 2000 Control Delay	11.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	74.2	Sum of lost time (s)	18.0
Intersection Capacity Utilization	54.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
17: North Access & South Service Road

FT 2033 AM.syn
04-03-2024



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔			↔	↕↕	
Traffic Volume (vph)	0	9	35	0	17	135
Future Volume (vph)	0	9	35	0	17	135
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t	0.865				0.880	
Fit Protected				0.950	0.995	
Satd. Flow (prot)	1611	0	0	1770	1631	0
Fit Permitted				0.950	0.995	
Satd. Flow (perm)	1611	0	0	1770	1631	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	130.8			104.5	72.7	
Travel Time (s)	9.4			7.5	5.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	10	38	0	18	147
Shared Lane Traffic (%)						
Lane Group Flow (vph)	10	0	0	38	165	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)		15	25		25	15
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization 24.6%	ICU Level of Service A
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis
17: North Access & South Service Road

FT 2033 AM.syn
04-03-2024

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔	↔	↔	↔	↔	↔
Traffic Volume (veh/h)	0	9	35	0	17	135
Future Volume (Veh/h)	0	9	35	0	17	135
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)	0	10	38	0	18	147
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			10		81	5
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			10		81	5
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		98	86
cM capacity (veh/h)			1610		899	1078
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	10	38	165			
Volume Left	0	38	18			
Volume Right	10	0	147			
eSH	1700	1610	1055			
Volume to Capacity	0.01	0.02	0.16			
Queue Length 95th (m)	0.0	0.6	4.4			
Control Delay (s)	0.0	7.3	9.0			
Lane LOS		A	A			
Approach Delay (s)	0.0	7.3	9.0			
Approach LOS		A				
Intersection Summary						
Average Delay			8.3			
Intersection Capacity Utilization		24.6%		ICU Level of Service		A
Analysis Period (min)			15			

Lanes, Volumes, Timings
23: GO Station West Access/Street C & Cross Ave

FT 2033 AM.syn
04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	6	325	106	887	471	70	47	0	250	253	0	11
Future Volume (vph)	6	325	106	887	471	70	47	0	250	253	0	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.0	0.0	0.0
Storage Lanes	0	0	0	0	0	0	1	0	1	0	0	0
Taper Length (m)	7.5			7.5			7.5		7.5			7.5
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.964			0.993			0.850		0.850			0.850
Fit Protected	0.999			0.970			0.950		0.950			0.950
Satd. Flow (prot)	0	3408	0	0	3409	0	1770	1583	0	1770	1583	0
Fit Permitted	0.721			0.620			0.750		0.592			0.592
Satd. Flow (perm)	0	2460	0	0	2179	0	1397	1583	0	1103	1583	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		99			12			327				187
Link Speed (k/h)		50			50			50				50
Link Distance (m)		211.2			162.8			81.1				134.3
Travel Time (s)		15.2			11.7			5.8				9.7
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
Adj. Flow (vph)	7	353	115	964	512	76	51	0	272	275	0	12
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	475	0	0	1552	0	51	272	0	275	12	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.3			3.3			3.6		3.6		3.6
Link Offset(m)		0.0			0.0			0.0		0.0		0.0
Crosswalk Width(m)		4.8			4.8			4.8		4.8		4.8
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	25	15	25	15	25	25	15	25	25	15	25
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4				9.4
Detector 2 Size(m)		0.6			0.6			0.6				0.6
Detector 2 Type		CI+Ex			CI+Ex			CI+Ex				CI+Ex
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2				6
Permitted Phases		4			8			2				6

Lanes, Volumes, Timings

23: GO Station West Access/Street C & Cross Ave

FT 2033 AM.syn

04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	24.0	24.0		24.0	24.0		24.0	24.0		24.0	24.0	
Total Split (s)	25.0	25.0		25.0	25.0		25.0	25.0		25.0	25.0	
Total Split (%)	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%		50.0%	50.0%	
Maximum Green (s)	19.0	19.0		19.0	19.0		19.0	19.0		19.0	19.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		6.0			6.0			6.0			6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		19.0			19.0			19.0			19.0	
Actuated g/C Ratio		0.38			0.38			0.38			0.38	
v/c Ratio		0.48			2.78dl			0.10	0.34		0.66	0.02
Control Delay		11.1			410.3			10.7	2.2		22.7	0.0
Queue Delay		0.0			0.0			0.0	0.0		0.0	0.0
Total Delay		11.1			410.3			10.7	2.2		22.7	0.0
LOS		B			F			B	A		C	A
Approach Delay		11.1			410.3			3.6			21.7	
Approach LOS		B			F			A			C	
Queue Length 50th (m)		13.0			~125.0			2.9	0.0		20.4	0.0
Queue Length 95th (m)		23.6			#163.2			8.4	7.6		#50.3	0.0
Internal Link Dist (m)		187.2			138.8			57.1			110.3	
Turn Bay Length (m)											15.0	
Base Capacity (vph)		996			835			530	804		419	717
Starvation Cap Reductn		0			0			0	0		0	0
Spillback Cap Reductn		0			0			0	0		0	0
Storage Cap Reductn		0			0			0	0		0	0
Reduced v/c Ratio		0.48			1.86			0.10	0.34		0.66	0.02

Intersection Summary

Area Type: Other
 Cycle Length: 50
 Actuated Cycle Length: 50
 Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
 Natural Cycle: 150
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.86
 Intersection Signal Delay: 246.3 Intersection LOS: F
 Intersection Capacity Utilization 111.2% ICU Level of Service H
 Analysis Period (min) 15
 ~ Volume exceeds capacity, queue is theoretically infinite.

Lanes, Volumes, Timings

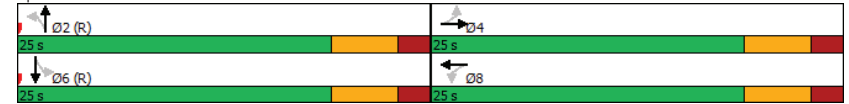
23: GO Station West Access/Street C & Cross Ave

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- Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
- Queue shown is maximum after two cycles.
- dl Defacto Left Lane. Record with 1 though lane as a left lane.

Splits and Phases: 23: GO Station West Access/Street C & Cross Ave



HCM Signalized Intersection Capacity Analysis
23: GO Station West Access/Street C & Cross Ave

FT 2033 AM.syn
04-03-2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔	↔		↔	↔		↔	↔	
Traffic Volume (vph)	6	325	106	887	471	70	47	0	250	253	0	11
Future Volume (vph)	6	325	106	887	471	70	47	0	250	253	0	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0		6.0		6.0	6.0		6.0		6.0	
Lane Util. Factor		0.95		0.95		1.00	1.00		1.00		1.00	
Fr't		0.96		0.99		1.00	0.85		1.00		0.85	
Flt Protected		1.00		0.97		0.95	1.00		0.95		1.00	
Satd. Flow (prot)		3408		3407		1770	1583		1770		1583	
Flt Permitted		0.72		0.62		0.75	1.00		0.59		1.00	
Satd. Flow (perm)		2458		2178		1397	1583		1103		1583	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	7	353	115	964	512	76	51	0	272	275	0	12
RTOR Reduction (vph)	0	61	0	0	7	0	0	169	0	0	7	0
Lane Group Flow (vph)	0	414	0	0	1545	0	51	103	0	275	5	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4		8		8	2		2		6	
Permitted Phases	4			8			2				6	
Actuated Green, G (s)		19.0			19.0		19.0	19.0		19.0	19.0	
Effective Green, g (s)		19.0			19.0		19.0	19.0		19.0	19.0	
Actuated g/C Ratio		0.38			0.38		0.38	0.38		0.38	0.38	
Clearance Time (s)		6.0			6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		934			827		530	601		419	601	
v/s Ratio Prot								0.07			0.00	
v/s Ratio Perm		0.17			c0.71		0.04			c0.25		
v/c Ratio		0.44			2.78dl		0.10	0.17		0.66	0.01	
Uniform Delay, d1		11.6			15.5		10.0	10.3		12.8	9.6	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.3			395.1		0.4	0.6		7.8	0.0	
Delay (s)		11.9			410.6		10.3	10.9		20.6	9.7	
Level of Service		B			F		B	B		C	A	
Approach Delay (s)		11.9			410.6		10.8			20.2		
Approach LOS		B			F		B			C		

Intersection Summary			
HCM 2000 Control Delay	247.3	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.26		
Actuated Cycle Length (s)	50.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	111.2%	ICU Level of Service	H
Analysis Period (min)	15		
dl Defacto Left Lane. Recode with 1 though lane as a left lane.			
c Critical Lane Group			

Lanes, Volumes, Timings
1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd

FT 2033 PM.syn
04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔	↔		↔	↔		↔	↔	
Traffic Volume (vph)	144	121	337	959	231	191	439	2062	718	145	1441	120
Future Volume (vph)	144	121	337	959	231	191	439	2062	718	145	1441	120
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0		0.0	165.0		25.0	145.0		0.0	95.0		90.0
Storage Lanes	1		1	1		1	1		1	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Ped Bike Factor	0.98					0.95			0.98			
Fr't			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1624	1710	1425	3120	1710	1425	1608	4577	1425	1608	4532	1425
Flt Permitted	0.603			0.376			0.105			0.118		
Satd. Flow (perm)	1006	1710	1425	1235	1710	1360	178	4577	1402	200	4532	1425
Right Turn on Red			Yes			Yes			Yes		Yes	
Satd. Flow (RTOR)			255			152			314		191	
Link Speed (k/h)		50			50		50			50		
Link Distance (m)		347.0			285.9		280.4			353.6		
Travel Time (s)		25.0			20.6		20.2			25.5		
Confl. Peds. (#/hr)	34					34			14	14		
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
Heavy Vehicles (%)	0%	0%	2%	1%	0%	2%	1%	2%	2%	1%	3%	2%
Adj. Flow (vph)	157	132	366	1042	251	208	477	2241	780	158	1566	130
Shared Lane Traffic (%)												
Lane Group Flow (vph)	157	132	366	1042	251	208	477	2241	780	158	1566	130
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		7.2			7.2				3.6		3.6	
Link Offset(m)		0.0			0.0				0.0		0.0	
Crosswalk Width(m)		4.8			4.8				4.8		4.8	
Two way Left Turn Lane												
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4				9.4		9.4	
Detector 2 Size(m)		0.6			0.6				0.6		0.6	
Detector 2 Type		Cl+Ex			Cl+Ex				Cl+Ex		Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0				0.0		0.0	

Lanes, Volumes, Timings

FT 2033 PM.syn

1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd

04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA	Free	pm+pt	NA	Perm	pm+pt	NA	Free	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		Free	8		8	2		Free	6		6
Detector Phase	7	4		3	8	8	5	2		1	6	6
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0	10.0	6.0	15.0		6.0	15.0	15.0
Minimum Split (s)	11.0	25.0		11.0	43.0	43.0	11.0	34.0		10.0	34.0	34.0
Total Split (s)	11.0	25.0		29.0	43.0	43.0	25.0	56.0		10.0	41.0	41.0
Total Split (%)	9.2%	20.8%		24.2%	35.8%	35.8%	20.8%	46.7%		8.3%	34.2%	34.2%
Maximum Green (s)	7.0	18.0		24.0	36.0	36.0	21.0	49.0		6.0	34.0	34.0
Yellow Time (s)	3.0	4.0		3.0	4.0	4.0	3.0	4.0		3.0	4.0	4.0
All-Red Time (s)	1.0	3.0		2.0	3.0	3.0	1.0	3.0		1.0	3.0	3.0
Lost Time Adjust (s)	0.0	-3.0		0.0	-3.0	-3.0	0.0	-3.0		0.0	-3.0	-3.0
Total Lost Time (s)	4.0	4.0		5.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	5.0		3.0	5.0	5.0	3.0	5.0		3.0	5.0	5.0
Recall Mode	None	None		None	None	None	None	C-Max		None	C-Max	C-Max
Walk Time (s)				7.0	7.0		7.0			7.0	7.0	
Flash Dont Walk (s)				29.0	29.0		20.0			20.0	20.0	
Pedestrian Calls (#/hr)				0	0		0			0	0	
Act Effct Green (s)	25.5	18.5	120.0	46.5	36.5	36.5	64.5	52.0	120.0	45.5	37.0	37.0
Actuated g/C Ratio	0.21	0.15	1.00	0.39	0.30	0.30	0.54	0.43	1.00	0.38	0.31	0.31
v/c Ratio	0.63	0.50	0.26	1.22	0.48	0.40	1.27	1.13	0.56	0.90	1.12	0.23
Control Delay	41.8	53.0	0.4	139.4	37.2	11.9	171.9	98.3	1.6	74.3	103.3	1.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	41.8	53.0	0.4	139.4	37.2	11.9	171.9	98.3	1.6	74.3	103.3	1.8
LOS	D	D	A	F	D	B	F	F	A	E	F	A
Approach Delay		20.9			104.6			86.8			93.7	
Approach LOS		C			F			F			F	
Queue Length 50th (m)	25.4	30.1	0.0	~129.2	50.2	10.0	~136.7	~236.0	0.0	22.8	~163.8	0.0
Queue Length 95th (m)	40.7	50.1	0.0	#166.1	74.8	30.0	#210.9	#266.2	0.0	#73.7	#195.0	3.3
Internal Link Dist (m)		323.0			261.9			256.4			329.6	
Turn Bay Length (m)	60.0			165.0		25.0	145.0			95.0		90.0
Base Capacity (vph)	249	299	1425	855	555	544	376	1983	1402	176	1397	571
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.63	0.44	0.26	1.22	0.45	0.38	1.27	1.13	0.56	0.90	1.12	0.23

Intersection Summary

Area Type:	CBD
Cycle Length:	120
Actuated Cycle Length:	120
Offset:	105.6 (88%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle:	140
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	1.27
Intersection Signal Delay:	86.3
Intersection LOS:	F

Lanes, Volumes, Timings

FT 2033 PM.syn

1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd

04-03-2024

Intersection Capacity Utilization	110.6%	ICU Level of Service H
Analysis Period (min)	15	
- Volume exceeds capacity, queue is theoretically infinite.		
Queue shown is maximum after two cycles.		
# 95th percentile volume exceeds capacity, queue may be longer.		
Queue shown is maximum after two cycles.		

Splits and Phases: 1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd



HCM Signalized Intersection Capacity Analysis
1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd

FT 2033 PM.syn
04-03-2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	↔	↗	↘	↔	↗	↘	↔	↗	↘	↔	↗	↘	
Traffic Volume (vph)	144	121	337	959	231	191	439	2062	718	145	1441	120	
Future Volume (vph)	144	121	337	959	231	191	439	2062	718	145	1441	120	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	4.0	4.0	1.0	5.0	4.0	4.0	4.0	4.0	1.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.98	1.00	1.00	1.00	
Flpb, ped/bikes	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1602	1710	1425	3120	1710	1360	1608	4577	1402	1608	4532	1425	
Flt Permitted	0.60	1.00	1.00	0.38	1.00	1.00	0.11	1.00	1.00	0.12	1.00	1.00	
Satd. Flow (perm)	1017	1710	1425	1236	1710	1360	178	4577	1402	199	4532	1425	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	157	132	366	1042	251	208	477	2241	780	158	1566	130	
RTOR Reduction (vph)	0	0	0	0	0	106	0	0	0	0	0	90	
Lane Group Flow (vph)	157	132	366	1042	251	102	477	2241	780	158	1566	40	
Confl. Peds. (#/hr)	34				34				14	14			
Heavy Vehicles (%)	0%	0%	2%	1%	0%	2%	1%	2%	2%	1%	3%	2%	
Turn Type	pm+pt	NA	Free	pm+pt	NA	Perm	pm+pt	NA	Free	pm+pt	NA	Perm	
Protected Phases	7	4		3	8		5	2		1	6		
Permitted Phases	4		Free	8		8	2		Free	6		6	
Actuated Green, G (s)	22.5	15.5	120.0	44.5	33.5	33.5	61.5	49.0	120.0	42.5	34.0	34.0	
Effective Green, g (s)	22.5	18.5	120.0	44.5	36.5	36.5	61.5	52.0	120.0	42.5	37.0	37.0	
Actuated g/C Ratio	0.19	0.15	1.00	0.37	0.30	0.30	0.51	0.43	1.00	0.35	0.31	0.31	
Clearance Time (s)	4.0	7.0		5.0	7.0	7.0	4.0	7.0		4.0	7.0	7.0	
Vehicle Extension (s)	3.0	5.0		3.0	5.0	5.0	3.0	5.0		3.0	5.0	5.0	
Lane Grp Cap (vph)	224	263	1425	835	520	413	371	1983	1402	170	1397	439	
v/s Ratio Prot	0.04	0.08		c0.25	0.15		c0.25	0.49		0.07	0.35		
v/s Ratio Perm	0.09		0.26	c0.21		0.08	c0.41		0.56	0.26		0.03	
v/c Ratio	0.70	0.50	0.26	1.25	0.48	0.25	1.29	1.13	0.56	0.93	1.12	0.09	
Uniform Delay, d1	44.3	46.5	0.0	34.3	34.1	31.4	37.2	34.0	0.0	31.9	41.5	29.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	9.5	3.1	0.4	121.5	1.5	0.7	147.6	65.6	1.6	48.3	64.5	0.4	
Delay (s)	53.7	49.7	0.4	155.8	35.5	32.1	184.8	99.6	1.6	80.1	106.0	29.9	
Level of Service	D	D	A	F	D	C	F	F	A	F	F	C	
Approach Delay (s)		23.1			118.5			89.4			98.5		
Approach LOS		C			F			F			F		
Intersection Summary													
HCM 2000 Control Delay		91.7			HCM 2000 Level of Service				F				
HCM 2000 Volume to Capacity ratio		1.27											
Actuated Cycle Length (s)		120.0			Sum of lost time (s)				17.0				
Intersection Capacity Utilization		110.6%			ICU Level of Service				H				
Analysis Period (min)		15											
c Critical Lane Group													

Lanes, Volumes, Timings
2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↗	↘	↔	↗	↘	↔	↗	↘	↔	↗	↘
Traffic Volume (vph)	26	0	304	635	146	369	0	2823	583	0	2789	11
Future Volume (vph)	26	0	304	635	146	369	0	2823	583	0	2789	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.5	3.3	3.6	3.5	3.6	3.6	3.6	3.6	3.6	3.5
Storage Length (m)	50.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Storage Lanes	1		1	1		1	0		1	0		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.91	1.00	1.00	0.86	0.86
Ped Bike Factor	1.00					0.99			0.97		1.00	
Frt			0.850			0.850			0.850		0.999	
Flt Protected	0.950			0.950	0.970							
Satd. Flow (prot)	1570	0	1437	1463	1551	1409	0	4577	1439	0	4780	0
Flt Permitted	0.950			0.950	0.970							
Satd. Flow (perm)	1568	0	1437	1463	1551	1391	0	4577	1400	0	4780	0
Right Turn on Red			Yes			Yes			Yes		Yes	Yes
Satd. Flow (RTOR)			31			265			160			1
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		142.1			192.6			324.8			280.4	
Travel Time (s)		10.2			13.9			23.4			20.2	
Confl. Peds. (#/hr)	2					2	14		14	14		14
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
Heavy Vehicles (%)	0%	0%	0%	2%	1%	2%	0%	2%	1%	0%	23%	0%
Adj. Flow (vph)	28	0	330	690	159	401	0	3068	634	0	3032	12
Shared Lane Traffic (%)				39%								
Lane Group Flow (vph)	28	0	330	421	428	401	0	3068	634	0	3044	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.3			3.3			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.19	1.14	1.16	1.19	1.14	1.16	1.14	1.14	1.14	1.14	1.14	1.16
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1		1	1		1	1		1	1		1
Detector Template	Left		Right	Left	Thru	Right		Thru	Right		Thru	
Leading Detector (m)	2.0		2.0	2.0	10.0	2.0		10.0	2.0		10.0	
Trailing Detector (m)	0.0		0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Detector 1 Position(m)	0.0		0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Detector 1 Size(m)	2.0		2.0	2.0	0.6	2.0		0.6	2.0		0.6	
Detector 1 Type	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Detector 1 Delay (s)	0.0		0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Detector 2 Position(m)					9.4			9.4			9.4	
Detector 2 Size(m)					0.6			0.6			0.6	
Detector 2 Type					Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

Lanes, Volumes, Timings

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2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)					0.0			0.0				0.0
Turn Type	Prot		Perm	Perm	NA	Free		NA	Free		NA	
Protected Phases	3			4	4			6			2	
Permitted Phases						Free			Free			
Detector Phase	3		8	4	4			6			2	
Switch Phase												
Minimum Initial (s)	7.0		10.0	10.0	10.0			5.0			28.0	
Minimum Split (s)	23.0		38.0	38.0	38.0			35.0			35.0	
Total Split (s)	23.0		62.0	39.0	39.0			78.0			78.0	
Total Split (%)	16.4%		44.3%	27.9%	27.9%			55.7%			55.7%	
Maximum Green (s)	18.0		55.0	32.0	32.0			71.0			71.0	
Yellow Time (s)	3.0		4.0	4.0	4.0			4.0			4.0	
All-Red Time (s)	2.0		3.0	3.0	3.0			3.0			3.0	
Lost Time Adjust (s)	-1.0		-3.0	-3.0	-3.0			-3.0			-3.0	
Total Lost Time (s)	4.0		4.0	4.0	4.0			4.0			4.0	
Lead/Lag	Lead			Lag	Lag							
Lead-Lag Optimize?	Yes			Yes	Yes							
Vehicle Extension (s)	3.0		3.0	3.0	3.0			4.5			4.5	
Recall Mode	Min		Min	Min	Min			C-Min			C-Min	
Walk Time (s)	7.0		7.0	7.0	7.0			7.0			7.0	
Flash Dont Walk (s)			24.0	24.0	24.0			21.0			21.0	
Pedestrian Calls (#/hr)			0	0	0			0			0	
Act Effct Green (s)	9.4		58.0	44.6	44.6	140.0		74.0	140.0		74.0	
Actuated g/C Ratio	0.07		0.41	0.32	0.32	1.00		0.53	1.00		0.53	
v/c Ratio	0.27		0.54	0.90	0.87	0.29		1.27	0.45		1.20	
Control Delay	67.9		31.7	69.7	63.8	0.5		153.0	0.3		127.3	
Queue Delay	0.0		0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Total Delay	67.9		31.7	69.7	63.8	0.5		153.0	0.3		127.3	
LOS	E		C	E	E	A		F	A		F	
Approach Delay		34.5			45.5			126.9			127.3	
Approach LOS		C			D			F			F	
Queue Length 50th (m)	7.9		65.0	122.9	122.8	0.0		~411.4	0.0		~314.2	
Queue Length 95th (m)	18.4		96.9	#199.2	#195.8	0.0		m#418.4	m0.0		#333.8	
Internal Link Dist (m)		118.1			168.6			300.8			256.4	
Turn Bay Length (m)	50.0											
Base Capacity (vph)	213		613	466	494	1391		2419	1400		2527	
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		0.54	0.90	0.87	0.29		1.27	0.45		1.20	

Intersection Summary

Area Type: CBD
 Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 115.4 (82%), Referenced to phase 2:SBT and 6:NBT, Start of Green
 Natural Cycle: 150
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.27

Lanes, Volumes, Timings

FT 2033 PM.syn

2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp

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Intersection Signal Delay: 110.9 Intersection LOS: F
 Intersection Capacity Utilization 100.0% ICU Level of Service F
 Analysis Period (min) 15
 ~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp



HCM Signalized Intersection Capacity Analysis
 2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp

FT 2033 PM.syn
 04-03-2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	26	0	304	635	146	369	0	2823	583	0	2789	11
Future Volume (vph)	26	0	304	635	146	369	0	2823	583	0	2789	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.5	3.3	3.6	3.5	3.6	3.5	3.6	3.6	3.6	3.5
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	1.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	0.91	1.00	0.86	0.99	1.00	0.97	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	0.99	1.00	1.00	0.97	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	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	0.85	1.00	0.85	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.95	1.00	0.95	0.97	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1570	1437	1463	1550	1391	4577	1400	4782	1400	1900	1900	1900
Flt Permitted	0.95	1.00	0.95	0.97	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (perm)	1570	1437	1463	1550	1391	4577	1400	4782	1400	1900	1900	1900
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	28	0	330	690	159	401	0	3068	634	0	3032	12
RTOR Reduction (vph)	0	0	18	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	28	0	312	421	428	401	0	3068	634	0	3044	0
Confl. Peds. (#/hr)	2					2	14		14	14		14
Heavy Vehicles (%)	0%	0%	0%	2%	1%	2%	0%	2%	1%	0%	23%	0%
Turn Type	Prot	Perm	Perm	NA	Free	NA	Free	NA	Free	NA	Free	NA
Protected Phases	3			4		6				2		
Permitted Phases		8	4		Free		Free					
Actuated Green, G (s)	8.4	55.0	41.6	41.6	140.0	71.0	140.0	71.0	140.0	71.0	140.0	71.0
Effective Green, g (s)	9.4	58.0	44.6	44.6	140.0	74.0	140.0	74.0	140.0	74.0	140.0	74.0
Actuated g/C Ratio	0.07	0.41	0.32	0.32	1.00	0.53	1.00	0.53	1.00	0.53	1.00	0.53
Clearance Time (s)	5.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lane Grp Cap (vph)	105	595	466	493	1391	2419	1400	2527	1400	1900	1900	1900
v/s Ratio Prot	0.02					c0.67		0.64				
v/s Ratio Perm		0.22	c0.29	0.28	0.29		c0.45					
v/c Ratio	0.27	0.52	0.90	0.87	0.29	1.27	0.45	1.20	0.45	1.20	0.45	1.20
Uniform Delay, d1	62.0	30.7	45.6	44.9	0.0	33.0	0.0	33.0	0.0	33.0	0.0	33.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.04	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.4	0.8	20.6	14.9	0.5	121.6	0.3	96.0	0.3	96.0	0.3	96.0
Delay (s)	63.4	31.5	66.2	59.8	0.5	156.1	0.3	129.0	0.3	129.0	0.3	129.0
Level of Service	E	C	E	E	A	F	A	F	A	F	A	F
Approach Delay (s)	34.0			43.0			129.4			129.0		
Approach LOS	C			D			F			F		

Intersection Summary			
HCM 2000 Control Delay	112.2	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.10		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	100.0%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
 3: Trafalgar Rd & QEW EB-Off Ramp

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 04-03-2024

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	1040	527	0	2349	2254	340
Future Volume (vph)	1040	527	0	2349	2254	340
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.5	3.6	3.6	3.6	3.6
Lane Util. Factor	0.97	1.00	1.00	0.91	0.91	1.00
Ped Bike Factor	0.99					
Frt	0.850			0.850		
Flt Protected	0.950					
Satd. Flow (prot)	3046	1423	0	4577	4577	1454
Flt Permitted	0.950					
Satd. Flow (perm)	3046	1402	0	4577	4577	1454
Right Turn on Red	Yes					Yes
Satd. Flow (RTOR)	2					117
Link Speed (k/h)	50		50		50	
Link Distance (m)	199.2		51.4		324.8	
Travel Time (s)	14.3		3.7		23.4	
Confl. Peds. (#/hr)	2					
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	1%	0%	2%	2%	0%
Adj. Flow (vph)	1130	573	0	2553	2450	370
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1130	573	0	2553	2450	370
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	6.6		0.0		0.0	
Link Offset(m)	0.0		0.0		0.0	
Crosswalk Width(m)	4.8		4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.19	1.16	1.14	1.14	1.14	1.14
Turning Speed (k/h)	24	14	24			14
Number of Detectors	1	1		2	2	1
Detector Template	Left	Right		Thru	Thru	Right
Leading Detector (m)	2.0	2.0		10.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	2.0	2.0		0.6	0.6	2.0
Detector 1 Type	CI+Ex	CI+Ex		CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)				9.4	9.4	
Detector 2 Size(m)				0.6	0.6	
Detector 2 Type				CI+Ex	CI+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	pm+pt	Perm		NA	NA	Free
Protected Phases	7		2		2	

Lanes, Volumes, Timings
3: Trafalgar Rd & QEW EB-Off Ramp

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Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Permitted Phases	4	4				Free
Detector Phase	7	4		2	2	
Switch Phase						
Minimum Initial (s)	10.0	10.0		29.0	29.0	
Minimum Split (s)	38.0	38.0		36.0	36.0	
Total Split (s)	58.0	58.0		82.0	82.0	
Total Split (%)	41.4%	41.4%		58.6%	58.6%	
Maximum Green (s)	51.0	51.0		75.0	75.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	
All-Red Time (s)	3.0	3.0		3.0	3.0	
Lost Time Adjust (s)	-3.0	-3.0		-3.0	-3.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Recall Mode	None	None		C-Max	C-Max	
Walk Time (s)	7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	24.0	24.0		22.0	22.0	
Pedestrian Calls (#/hr)	0	0		0	0	
Act Effct Green (s)	54.0	54.0		78.0	78.0	140.0
Actuated g/C Ratio	0.39	0.39		0.56	0.56	1.00
v/c Ratio	0.96	1.06		1.00	0.96	0.25
Control Delay	60.7	95.9		38.9	16.8	0.0
Queue Delay	0.0	0.0		0.0	0.0	0.0
Total Delay	60.7	95.9		38.9	16.8	0.0
LOS	E	F		D	B	A
Approach Delay	72.6			38.9	14.6	
Approach LOS	E			D	B	
Queue Length 50th (m)	164.7	~182.5		~271.5	172.4	0.0
Queue Length 95th (m)	#212.4	#258.0		m222.5	m112.1	m0.0
Internal Link Dist (m)	175.2			27.4	300.8	
Turn Bay Length (m)						
Base Capacity (vph)	1174	542		2550	2550	1454
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	0.96	1.06		1.00	0.96	0.25

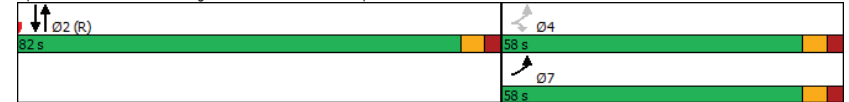
Intersection Summary	
Area Type:	CBD
Cycle Length:	140
Actuated Cycle Length:	140
Offset:	133.6 (95%), Referenced to phase 2:NBSB and 6:, Start of Green
Natural Cycle:	110
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	1.06
Intersection Signal Delay:	37.3
Intersection LOS:	D
Intersection Capacity Utilization:	91.5%
ICU Level of Service:	F
Analysis Period (min):	15

Lanes, Volumes, Timings
3: Trafalgar Rd & QEW EB-Off Ramp

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- Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Trafalgar Rd & QEW EB-Off Ramp



HCM Signalized Intersection Capacity Analysis
3: Trafalgar Rd & QEW EB-Off Ramp

FT 2033 PM.syn
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Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↖ ↗	↗		↖ ↖	↖ ↖	↗
Traffic Volume (vph)	1040	527	0	2349	2254	340
Future Volume (vph)	1040	527	0	2349	2254	340
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.5	3.6	3.6	3.6	3.6
Total Lost time (s)	4.0	4.0		4.0	4.0	1.0
Lane Util. Factor	0.97	1.00		0.91	0.91	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.85		1.00	1.00	0.85
Flt Protected	0.95	1.00		1.00	1.00	1.00
Satd. Flow (prot)	3046	1402		4577	4577	1454
Flt Permitted	0.95	1.00		1.00	1.00	1.00
Satd. Flow (perm)	3046	1402		4577	4577	1454
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1130	573	0	2553	2450	370
RTOR Reduction (vph)	0	1	0	0	0	0
Lane Group Flow (vph)	1130	572	0	2553	2450	370
Confl. Peds. (#/hr)		2				
Heavy Vehicles (%)	0%	1%	0%	2%	2%	0%
Turn Type	pm+pt	Perm		NA	NA	Free
Protected Phases	7			2	2	
Permitted Phases	4	4				Free
Actuated Green, G (s)	51.0	51.0		75.0	75.0	140.0
Effective Green, g (s)	54.0	54.0		78.0	78.0	140.0
Actuated g/C Ratio	0.39	0.39		0.56	0.56	1.00
Clearance Time (s)	7.0	7.0		7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	1174	540		2550	2550	1454
v/s Ratio Prot	0.37			0.56	0.54	
v/s Ratio Perm		c0.41				0.25
v/c Ratio	0.96	1.06		1.00	0.96	0.25
Uniform Delay, d1	42.0	43.0		31.0	29.5	0.0
Progression Factor	1.00	1.00		0.89	0.50	1.00
Incremental Delay, d2	17.9	55.2		11.2	1.4	0.0
Delay (s)	59.9	98.2		38.7	16.1	0.0
Level of Service	E	F		D	B	A
Approach Delay (s)	72.8			38.7	14.0	
Approach LOS	E			D	B	

Intersection Summary			
HCM 2000 Control Delay	37.1	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.05		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	91.5%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
4: Trafalgar Rd & Argus Rd

FT 2033 PM.syn
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Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗		↖ ↖	↖ ↖	↗
Traffic Volume (vph)	0	117	0	3204	1900	880
Future Volume (vph)	0	117	0	3204	1900	880
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.6	3.5	3.6	3.6	3.6	3.6
Lane Util. Factor	1.00	1.00	1.00	0.91	0.91	0.91
Ped Bike Factor						
Frt		0.865			0.952	
Flt Protected						
Satd. Flow (prot)	0	1354	0	4577	4344	0
Flt Permitted						
Satd. Flow (perm)	0	1354	0	4577	4344	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	145.7			270.2	51.4	
Travel Time (s)	10.5			19.5	3.7	
Confl. Peds. (#/hr)						24
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	8%	0%	2%	2%	3%
Adj. Flow (vph)	0	127	0	3483	2065	957
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	127	0	3483	3022	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			3.3	3.3	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.14	1.16	1.14	1.14	1.14	1.14
Turning Speed (k/h)	24	14	24			14
Sign Control	Stop			Free	Free	

Intersection Summary	
Area Type:	CBD
Control Type:	Unsignalized
Intersection Capacity Utilization 78.1%	ICU Level of Service D
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis
4: Trafalgar Rd & Argus Rd

FT 2033 PM.syn
04-03-2024

Movement	EBL	EBR	NBL	NBT	SBT	SBR	
Lane Configurations		↗		↖↖	↗↗		
Traffic Volume (veh/h)	0	117	0	3204	1900	880	
Future Volume (Veh/h)	0	117	0	3204	1900	880	
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	127	0	3483	2065	957	
Pedestrians	24						
Lane Width (m)	3.5						
Walking Speed (m/s)	1.2						
Percent Blockage	2						
Right turn flare (veh)							
Median type				None	None		
Median storage (veh)							
Upstream signal (m)				270	52		
pX, platoon unblocked	0.67	0.49	0.49				
vC, conflicting volume	3728	1191	3046				
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol	0	0	1515				
tC, single (s)	6.8	7.1	4.1				
tC, 2 stage (s)							
tF (s)	3.5	3.4	2.2				
pD queue free %	100	75	100				
cM capacity (veh/h)	674	509	213				
Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	127	1161	1161	1161	826	826	1370
Volume Left	0	0	0	0	0	0	0
Volume Right	127	0	0	0	0	0	957
sSH	509	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.25	0.68	0.68	0.68	0.49	0.49	0.81
Queue Length 95th (m)	7.8	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (s)	14.4	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	B						
Approach Delay (s)	14.4	0.0			0.0		
Approach LOS	B						
Intersection Summary							
Average Delay			0.3				
Intersection Capacity Utilization			78.1%		ICU Level of Service		D
Analysis Period (min)			15				

Lanes, Volumes, Timings
5: Trafalgar Rd & Cross Ave/South Service Rd

FT 2033 PM.syn
04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖↖	↖	↗	↖	↖	↗	↖↖	↖↖	↗	↖↖	↖↖	↖↖
Traffic Volume (vph)	989	55	171	80	107	199	249	1614	39	93	1502	274
Future Volume (vph)	989	55	171	80	107	199	249	1614	39	93	1502	274
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.6	3.3	3.6	3.5	3.3	3.6	3.6	3.3	3.6	3.6
Storage Length (m)	130.0		0.0	25.0		0.0	50.0		0.0	25.0		0.0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.91	0.91
Ped Bike Factor		0.96		0.98				0.99			0.99	
Ft		0.887				0.850		0.996			0.977	
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2958	1346	0	1540	1644	1423	1496	4574	0	1570	4465	0
Fit Permitted	0.950			0.606			0.078			0.085		
Satd. Flow (perm)	2958	1346	0	958	1644	1423	123	4574	0	141	4465	0
Right Turn on Red			Yes			Yes		Yes			Yes	Yes
Satd. Flow (RTOR)		145				148		3			29	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		151.2			330.4			150.2			270.2	
Travel Time (s)		10.9			23.8			10.8			19.5	
Confl. Peds. (#/hr)			15	15			18		70	70		18
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
Heavy Vehicles (%)	3%	8%	9%	2%	4%	1%	5%	1%	0%	0%	1%	3%
Adj. Flow (vph)	1075	60	186	87	116	216	271	1754	42	101	1633	298
Shared Lane Traffic (%)												
Lane Group Flow (vph)	1075	246	0	87	116	216	271	1796	0	101	1931	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		6.6			6.6			3.3			3.3	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.19	1.14	1.14	1.19	1.14	1.16	1.19	1.14	1.14	1.19	1.14	1.14
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2	1	1	2		1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

Lanes, Volumes, Timings

5: Trafalgar Rd & Cross Ave/South Service Rd

FT 2033 PM.syn

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Perm	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	7	4			8		5	2		1	6	
Permitted Phases				8		8	2			6		
Detector Phase	7	4		8	8	8	5	2		1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	7.0	27.0		7.0	27.0	
Minimum Split (s)	17.0	25.0		25.0	25.0	25.0	11.5	34.0		11.5	34.0	
Total Split (s)	42.0	67.0		25.0	25.0	25.0	19.0	61.4		11.6	54.0	
Total Split (%)	30.0%	47.9%		17.9%	17.9%	17.9%	13.6%	43.9%		8.3%	38.6%	
Maximum Green (s)	35.0	60.0		18.0	18.0	18.0	15.0	54.4		7.6	47.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	3.0	4.0		3.0	4.0	
All-Red Time (s)	3.0	3.0		3.0	3.0	3.0	1.0	3.0		1.0	3.0	
Lost Time Adjust (s)	-3.0	-3.0		0.0	-3.0	-3.0	0.0	-3.0		0.0	-3.0	
Total Lost Time (s)	4.0	4.0		7.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lead/Lag	Lead			Lag	Lag	Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes			Yes	Yes	Yes	Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	4.0		4.0	4.0	4.0	3.0	5.0		3.0	5.0	
Recall Mode	Min	Min		Min	Min	Min	C-Max			Min	C-Max	
Walk Time (s)		7.0		7.0	7.0	7.0		7.0			7.0	
Flash Dont Walk (s)		11.0		11.0	11.0	11.0		11.0			11.0	
Pedestrian Calls (#/hr)		0		0	0	0		0			0	
Act Effct Green (s)	38.0	61.3		16.3	19.3	19.3	70.7	58.8		58.0	50.0	
Actuated g/C Ratio	0.27	0.44		0.12	0.14	0.14	0.50	0.42		0.41	0.36	
v/c Ratio	1.34	0.37		0.78	0.51	0.67	1.20	0.93		0.73	1.20	
Control Delay	201.3	11.6		101.4	64.0	29.6	135.8	52.8		44.3	135.2	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	201.3	11.6		101.4	64.0	29.6	135.8	52.8		44.3	135.2	
LOS	F	B		F	E	C	F	D		D	F	
Approach Delay		166.0			54.0			63.6			130.7	
Approach LOS		F			D			E			F	
Queue Length 50th (m)	~209.9	17.2		24.7	31.4	18.0	~89.2	161.2		19.6	~244.9	
Queue Length 95th (m)	#253.2	38.4		#52.9	52.3	47.7	m#81.7	m140.4		m21.2	m#256.2	
Internal Link Dist (m)		127.2			306.4			126.2			246.2	
Turn Bay Length (m)	130.0			25.0			50.0			25.0		
Base Capacity (vph)	802	685		123	246	339	226	1921		139	1613	
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	
Reduced v/c Ratio	1.34	0.36		0.71	0.47	0.64	1.20	0.93		0.73	1.20	

Intersection Summary

Area Type: CBD
 Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 128 (91%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
 Natural Cycle: 150
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.34

Lanes, Volumes, Timings

5: Trafalgar Rd & Cross Ave/South Service Rd

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Intersection Signal Delay: 109.4 Intersection LOS: F
 Intersection Capacity Utilization 107.6% ICU Level of Service G
 Analysis Period (min) 15
 ~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Split and Phases: 5: Trafalgar Rd & Cross Ave/South Service Rd



HCM Signalized Intersection Capacity Analysis
5: Trafalgar Rd & Cross Ave/South Service Rd

FT 2033 PM.syn
04-03-2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	
Traffic Volume (vph)	989	55	171	80	107	199	249	1614	39	93	1502	274	
Future Volume (vph)	989	55	171	80	107	199	249	1614	39	93	1502	274	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (m)	3.3	3.6	3.6	3.3	3.6	3.5	3.3	3.6	3.6	3.3	3.6	3.6	
Total Lost time (s)	4.0	4.0		7.0	4.0	4.0	4.0	4.0		4.0	4.0		
Lane Util. Factor	0.97	1.00		1.00	1.00	1.00	1.00	0.91		1.00	0.91		
Frbp, ped/bikes	1.00	0.96		1.00	1.00	1.00	1.00	0.99		1.00	0.99		
Fipb, ped/bikes	1.00	1.00		0.98	1.00	1.00	1.00	1.00		1.00	1.00		
Frt	1.00	0.89		1.00	1.00	0.85	1.00	1.00		1.00	0.98		
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00		
Satd. Flow (prot)	2958	1345		1501	1644	1423	1496	4576		1570	4464		
Flt Permitted	0.95	1.00		0.61	1.00	1.00	0.08	1.00		0.09	1.00		
Satd. Flow (perm)	2958	1345		958	1644	1423	123	4576		141	4464		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	1075	60	186	87	116	216	271	1754	42	101	1633	298	
RTOR Reduction (vph)	0	82	0	0	0	128	0	2	0	0	19	0	
Lane Group Flow (vph)	1075	164	0	87	116	88	271	1794	0	101	1912	0	
Confl. Peds. (#/hr)			15	15			18		70	70		18	
Heavy Vehicles (%)	3%	8%	9%	2%	4%	1%	5%	1%	0%	0%	1%	3%	
Turn Type	Prot	NA		Perm	NA	Perm	pm+pt	NA		pm+pt	NA		
Protected Phases	7	4		8	8	5	2	1		6	6		
Permitted Phases			8		8	2		6					
Actuated Green, G (s)	35.0	58.3		16.3	16.3	16.3	67.7	55.7		55.0	47.0		
Effective Green, g (s)	38.0	61.3		16.3	19.3	19.3	67.7	58.7		55.0	50.0		
Actuated g/C Ratio	0.27	0.44		0.12	0.14	0.14	0.48	0.42		0.39	0.36		
Clearance Time (s)	7.0	7.0		7.0	7.0	7.0	4.0	7.0		4.0	7.0		
Vehicle Extension (s)	3.0	4.0		4.0	4.0	4.0	3.0	5.0		3.0	5.0		
Lane Grp Cap (vph)	802	588		111	226	196	223	1918		137	1594		
v/s Ratio Prot	c0.36	0.12		0.07			c0.14	0.39		0.04	0.43		
v/s Ratio Perm			c0.09		0.06		c0.44			0.25			
v/c Ratio	1.34	0.28		0.78	0.51	0.45	1.22	0.94		0.74	1.20		
Uniform Delay, d1	51.0	25.2		60.1	56.0	55.5	45.0	38.8		32.8	45.0		
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.25	1.33		1.28	1.16		
Incremental Delay, d2	161.6	0.4		30.9	2.6	2.2	100.8	1.2		7.6	92.3		
Delay (s)	212.6	25.6		91.0	58.6	57.7	157.1	52.9		49.5	144.6		
Level of Service	F	C		F	E	E	F	D		D	F		
Approach Delay (s)	177.7			64.9			66.5			139.9			
Approach LOS	F			E			E			F			
Intersection Summary													
HCM 2000 Control Delay		117.1		HCM 2000 Level of Service				F					
HCM 2000 Volume to Capacity ratio		1.16											
Actuated Cycle Length (s)		140.0	Sum of lost time (s)				16.0						
Intersection Capacity Utilization		107.6%	ICU Level of Service				G						
Analysis Period (min)		15											
c Critical Lane Group													

Lanes, Volumes, Timings
6: Trafalgar Rd & Cornwall Rd

FT 2033 PM.syn
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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	523	529	54	101	825	503	74	872	91	641	712	388
Future Volume (vph)	523	529	54	101	825	503	74	872	91	641	712	388
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.5
Storage Length (m)	80.0		0.0	80.0		0.0	25.0		0.0	80.0		0.0
Storage Lanes	2		0	1		1	1		0	1		1
Taper Length (m)	7.5			7.5		7.5			7.5			
Lane Util. Factor	0.97	0.95	0.95	1.00	0.95	1.00	1.00	*0.80	0.95	0.97	*0.80	1.00
Ped Bike Factor	0.99	1.00		0.99		0.98	0.99	1.00		0.99		0.97
Frt		0.986				0.850		0.986				0.850
Flt Protected	0.950			0.950		0.950		0.950		0.950		
Satd. Flow (prot)	3016	3101	0	1570	3217	1439	1540	2691	0	2987	1368	1409
Flt Permitted	0.950			0.950		0.950		0.950		0.950		
Satd. Flow (perm)	2991	3101	0	1549	3217	1413	1528	2691	0	2971	1368	1361
Right Turn on Red			Yes			Yes		Yes		Yes		Yes
Satd. Flow (RTOR)		8				328		7				280
Link Speed (k/h)		50			50			50				50
Link Distance (m)		285.8			142.3			311.4				130.3
Travel Time (s)		20.6			10.2			22.4				9.4
Confl. Peds. (#/hr)	21		14	14		21	17		10	10		17
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
Heavy Vehicles (%)	1%	3%	1%	0%	1%	1%	2%	0%	0%	2%	0%	2%
Adj. Flow (vph)	568	575	59	110	897	547	80	948	99	697	774	422
Shared Lane Traffic (%)												
Lane Group Flow (vph)	568	634	0	110	897	547	80	1047	0	697	774	422
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)	6.6				6.6			6.6				6.6
Link Offset(m)	0.0				0.0			0.0				0.0
Crosswalk Width(m)	4.8				4.8			4.8				4.8
Two way Left Turn Lane												
Headway Factor	1.19	1.14	1.14	1.19	1.14	1.14	1.19	1.14	1.14	1.19	1.14	1.16
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2	1	1	2		1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0		2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6		2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4				9.4
Detector 2 Size(m)		0.6			0.6			0.6				0.6
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex				Cl+Ex
Detector 2 Channel												

Lanes, Volumes, Timings
6: Trafalgar Rd & Cornwall Rd

FT 2033 PM.syn
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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA	Free	Prot	NA		Prot	NA	Perm
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases					Free							6
Detector Phase	3	8		7	4		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	7.0	10.0		7.0	10.0		7.0	20.0		7.0	20.0	20.0
Minimum Split (s)	12.0	37.0		12.0	37.0		12.0	39.0		12.0	39.0	39.0
Total Split (s)	23.0	44.0		17.0	38.0		12.0	51.0		28.0	67.0	67.0
Total Split (%)	16.4%	31.4%		12.1%	27.1%		8.6%	36.4%		20.0%	47.9%	47.9%
Maximum Green (s)	18.0	37.0		12.0	31.0		7.0	44.0		23.0	60.0	60.0
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	4.0
All-Red Time (s)	2.0	3.0		2.0	3.0		2.0	3.0		2.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-3.0		-1.0	-3.0		-1.0	-3.0		-1.0	-3.0	-3.0
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	0.2	0.2		0.2	0.2		0.2	0.2		0.2	0.2	0.2
Recall Mode	Max	Max		Max	Max		None	C-Max		Max	C-Max	C-Max
Walk Time (s)		7.0			7.0			7.0			7.0	7.0
Flash Dont Walk (s)		23.0			23.0			25.0			25.0	25.0
Pedestrian Calls (#/hr)		0			0			0			0	0
Act Effct Green (s)	19.0	40.0		13.0	34.0	140.0	8.0	47.0		24.0	63.0	63.0
Actuated g/C Ratio	0.14	0.29		0.09	0.24	1.00	0.06	0.34		0.17	0.45	0.45
v/c Ratio	1.39	0.71		0.76	1.15	0.39	0.91	1.15		1.36	1.26	0.55
Control Delay	232.9	49.5		92.6	128.2	0.8	137.9	123.0		220.4	144.5	4.8
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	232.9	49.5		92.6	128.2	0.8	137.9	123.0		220.4	144.5	4.8
LOS	F	D		F	F	A	F	F		F	F	A
Approach Delay		136.1			80.9			124.1				141.3
Approach LOS		F			F			F				F
Queue Length 50th (m)	~113.2	86.4		31.8	~161.1	0.0	23.6	~223.9		~141.3	~342.6	18.5
Queue Length 95th (m)	#151.2	109.5		#63.0	#204.1	0.0	#58.1	#276.8		m#116.1	m#274.6	m13.6
Internal Link Dist (m)		261.8			118.3			287.4				106.3
Turn Bay Length (m)	80.0			80.0			25.0			80.0		
Base Capacity (vph)	409	891		145	781	1413	88	908		512	615	766
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	0
Reduced v/c Ratio	1.39	0.71		0.76	1.15	0.39	0.91	1.15		1.36	1.26	0.55

Intersection Summary

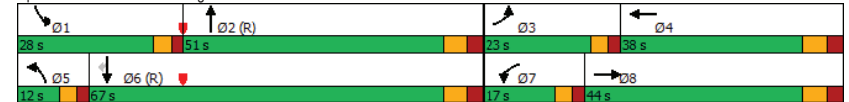
Area Type: CBD
 Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green, Master Intersection
 Natural Cycle: 150
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.39

Lanes, Volumes, Timings
6: Trafalgar Rd & Cornwall Rd

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Intersection Signal Delay: 120.6	Intersection LOS: F
Intersection Capacity Utilization 105.7%	ICU Level of Service G
Analysis Period (min) 15	
* User Entered Value	
~ Volume exceeds capacity, queue is theoretically infinite. Queue shown is maximum after two cycles.	
# 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.	
m Volume for 95th percentile queue is metered by upstream signal.	

Splits and Phases: 6: Trafalgar Rd & Cornwall Rd



HCM Signalized Intersection Capacity Analysis
6: Trafalgar Rd & Cornwall Rd

FT 2033 PM.syn
04-03-2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	523	529	54	101	825	503	74	872	91	641	712	388
Future Volume (vph)	523	529	54	101	825	503	74	872	91	641	712	388
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.5
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.97	0.95		1.00	0.95	1.00	1.00	*0.80		0.97	*0.80	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.98	1.00	1.00		1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Fr	1.00	0.99		1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3016	3101		1570	3217	1413	1540	2691		2987	1368	1361
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3016	3101		1570	3217	1413	1540	2691		2987	1368	1361
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	568	575	59	110	897	547	80	948	99	697	774	422
RTOR Reduction (vph)	0	6	0	0	0	0	0	5	0	0	0	154
Lane Group Flow (vph)	568	628	0	110	897	547	80	1042	0	697	774	268
Confl. Peds. (#/hr)	21		14	14		21	17		10	10		17
Heavy Vehicles (%)	1%	3%	1%	0%	1%	1%	2%	0%	0%	2%	0%	2%
Turn Type	Prot	NA		Prot	NA	Free	Prot	NA		Prot	NA	Perm
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases					Free							6
Actuated Green, G (s)	18.0	37.0		12.0	31.0	140.0	7.0	44.0		23.0	60.0	60.0
Effective Green, g (s)	19.0	40.0		13.0	34.0	140.0	8.0	47.0		24.0	63.0	63.0
Actuated g/C Ratio	0.14	0.29		0.09	0.24	1.00	0.06	0.34		0.17	0.45	0.45
Clearance Time (s)	5.0	7.0		5.0	7.0		5.0	7.0		5.0	7.0	7.0
Vehicle Extension (s)	0.2	0.2		0.2	0.2		0.2	0.2		0.2	0.2	0.2
Lane Grp Cap (vph)	409	886		145	781	1413	88	903		512	615	612
v/s Ratio Prot	c0.19	0.20		0.07	c0.28		0.05	0.39		c0.23	c0.57	
v/s Ratio Perm					0.39							0.20
v/c Ratio	1.39	0.71		0.76	1.15	0.39	0.91	1.15		1.36	1.26	0.44
Uniform Delay, d1	60.5	44.8		62.0	53.0	0.0	65.6	46.5		58.0	38.5	26.4
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.44	0.70	0.52
Incremental Delay, d2	189.5	4.8		30.5	81.5	0.8	64.9	82.1		163.8	117.6	0.2
Delay (s)	250.0	49.6		92.4	134.5	0.8	130.5	128.6		247.0	144.7	13.9
Level of Service	F	D		F	F	A	F	F		F	F	B
Approach Delay (s)	144.3			84.4				128.7		153.2		
Approach LOS	F			F				F		F		

Intersection Summary			
HCM 2000 Control Delay	128.1	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.29		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	105.7%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
7: South Service Road/Canadian Road & QEW EB Off-Ramp/Royal Windsor Drive

FT 2033 PM.syn
04-03-2024

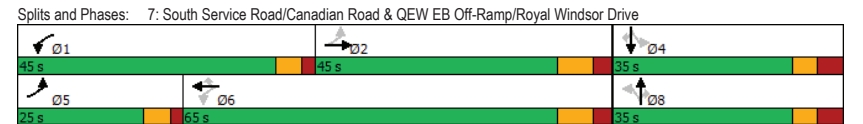
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	338	589	19	198	704	30	15	51	108	15	129	460
Future Volume (vph)	338	589	19	198	704	30	15	51	108	15	129	460
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	150.0	0.0	155.0		70.0	15.0		0.0	0.0			30.0
Storage Lanes	2		0	1		1		1	1		1	1
Taper Length (m)	7.5			7.5		7.5					7.5	
Lane Util. Factor	0.97	0.95	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr		0.995				0.850		0.850				0.850
Flt Protected	0.950			0.950			0.950		0.950			0.950
Satd. Flow (prot)	3502	3395	0	1752	3505	1615	1805	1900	1615	1805	1900	1599
Flt Permitted	0.297			0.364			0.559		0.721			
Satd. Flow (perm)	1095	3395	0	671	3505	1615	1062	1900	1615	1370	1900	1599
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3				94			152			398
Link Speed (k/h)		80			80			60				40
Link Distance (m)		324.5			247.2			158.7				215.5
Travel Time (s)		14.6			11.1			9.5				19.4
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
Heavy Vehicles (%)	0%	6%	0%	3%	3%	0%	0%	0%	0%	0%	0%	1%
Adj. Flow (vph)	367	640	21	215	765	33	16	55	117	16	140	500
Shared Lane Traffic (%)												
Lane Group Flow (vph)	367	661	0	215	765	33	16	55	117	16	140	500
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Right	Left	Right	Left	Right
Median Width(m)		7.2			7.2			3.6				3.6
Link Offset(m)		0.0			0.0			0.0				0.0
Crosswalk Width(m)		4.8			4.8			4.8				4.8
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	CI+Ex	CI+Ex		CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4				9.4
Detector 2 Size(m)		0.6			0.6			0.6				0.6
Detector 2 Type		CI+Ex			CI+Ex			CI+Ex				CI+Ex
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8				4

Lanes, Volumes, Timings
 7: South Service Road/Canadian Road & QEW EB Off-Ramp/Royal Windsor Drive 04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	2			6		6	8		8	4		4
Detector Phase	5	2		1	6	6	8	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	8.0	20.0		8.0	30.0	30.0	8.0	8.0	8.0	10.0	10.0	10.0
Minimum Split (s)	14.0	29.4		14.0	38.4	38.4	28.8	28.8	28.8	28.8	28.8	28.8
Total Split (s)	25.0	45.0		45.0	65.0	65.0	35.0	35.0	35.0	35.0	35.0	35.0
Total Split (%)	20.0%	36.0%		36.0%	52.0%	52.0%	28.0%	28.0%	28.0%	28.0%	28.0%	28.0%
Maximum Green (s)	19.0	36.6		39.0	56.6	56.6	27.2	27.2	27.2	27.2	27.2	27.2
Yellow Time (s)	4.0	5.4		4.0	5.4	5.4	3.7	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	2.0	3.0		2.0	3.0	3.0	4.1	4.1	4.1	4.1	4.1	4.1
Lost Time Adjust (s)	-2.0	-4.4		-2.0	-4.4	-4.4	-3.8	-3.8	-3.8	-3.8	-3.8	-3.8
Total Lost Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lead	Lag		Lead	Lag	Lag						
Lead-Lag Optimize?												
Vehicle Extension (s)	3.5	4.5		3.5	6.0	6.0	3.5	3.5	3.5	3.5	3.5	3.5
Recall Mode	None	Max		None	Max	Max	None	None	None	None	None	None
Walk Time (s)		10.0			10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Flash Dont Walk (s)		10.0			10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Pedestrian Calls (#/hr)		0			0	0	0	0	0	0	0	0
Act Effct Green (s)	76.6	62.8		73.8	61.4	61.4	20.6	20.6	20.6	20.6	20.6	20.6
Actuated g/C Ratio	0.71	0.58		0.68	0.57	0.57	0.19	0.19	0.19	0.19	0.19	0.19
v/c Ratio	0.34	0.33		0.37	0.38	0.03	0.08	0.15	0.27	0.06	0.39	0.80
Control Delay	5.8	13.5		7.2	14.7	0.1	36.1	36.8	4.0	35.5	41.1	19.4
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	5.8	13.5		7.2	14.7	0.1	36.1	36.8	4.0	35.5	41.1	19.4
LOS	A	B		A	B	A	D	D	A	D	D	B
Approach Delay		10.7			12.7			16.3			24.4	
Approach LOS		B			B			B			C	
Queue Length 50th (m)	10.0	35.5		11.6	44.6	0.0	2.9	10.2	0.0	2.9	27.1	19.6
Queue Length 95th (m)	21.2	65.5		27.8	78.4	0.0	9.2	21.7	7.9	9.2	46.9	63.1
Internal Link Dist (m)		300.5			223.2			134.7			191.5	
Turn Bay Length (m)	150.0			155.0		70.0	15.0					30.0
Base Capacity (vph)	1275	1976		906	1993	959	307	549	574	396	549	745
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.29	0.33		0.24	0.38	0.03	0.05	0.10	0.20	0.04	0.26	0.67

Intersection Summary	
Area Type:	Other
Cycle Length:	125
Actuated Cycle Length:	107.9
Natural Cycle:	85
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.80
Intersection Signal Delay:	14.9
Intersection LOS:	B
Intersection Capacity Utilization:	70.1%
ICU Level of Service:	C
Analysis Period (min):	15

Lanes, Volumes, Timings
 7: South Service Road/Canadian Road & QEW EB Off-Ramp/Royal Windsor Drive 04-03-2024



HCM Signalized Intersection Capacity Analysis FT 2033 PM.syn
 7: South Service Road/Canadian Road & QEW EB Off-Ramp/Royal Windsor Drive 04-03-2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↕	↔	↕	↕	↔	↕	↕
Traffic Volume (vph)	338	589	19	198	704	30	15	51	108	15	129	460
Future Volume (vph)	338	589	19	198	704	30	15	51	108	15	129	460
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	0.95		1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr	1.00	1.00		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3502	3396		1752	3505	1615	1805	1900	1615	1805	1900	1599
Flt Permitted	0.30	1.00		0.36	1.00	1.00	0.56	1.00	1.00	0.72	1.00	1.00
Satd. Flow (perm)	1095	3396		671	3505	1615	1061	1900	1615	1370	1900	1599
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	367	640	21	215	765	33	16	55	117	16	140	500
RTOR Reduction (vph)	0	1	0	0	0	14	0	0	95	0	0	322
Lane Group Flow (vph)	367	660	0	215	765	19	16	55	22	16	140	178
Heavy Vehicles (%)	0%	6%	0%	3%	3%	0%	0%	0%	0%	0%	0%	1%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6		6	8		8	4		4
Actuated Green, G (s)	70.3	58.4		67.5	57.0	57.0	16.8	16.8	16.8	16.8	16.8	16.8
Effective Green, g (s)	74.3	62.8		71.5	61.4	61.4	20.6	20.6	20.6	20.6	20.6	20.6
Actuated g/C Ratio	0.69	0.58		0.66	0.57	0.57	0.19	0.19	0.19	0.19	0.19	0.19
Clearance Time (s)	6.0	8.4		6.0	8.4	8.4	7.8	7.8	7.8	7.8	7.8	7.8
Vehicle Extension (s)	3.5	4.5		3.5	6.0	6.0	3.5	3.5	3.5	3.5	3.5	3.5
Lane Grp Cap (vph)	1064	1976		569	1994	919	202	362	308	261	362	305
v/s Ratio Prot	c0.04	0.19		0.04	c0.22			0.03			0.07	
v/s Ratio Perm	0.19			0.21		0.01	0.02		0.01	0.01		c0.11
v/c Ratio	0.34	0.33		0.38	0.38	0.02	0.08	0.15	0.07	0.06	0.39	0.58
Uniform Delay, d1	6.6	11.7		7.2	12.8	10.1	35.9	36.4	35.8	35.7	38.1	39.7
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.2	0.5		0.5	0.6	0.0	0.2	0.2	0.1	0.1	0.8	3.0
Delay (s)	6.8	12.2		7.7	13.4	10.2	36.1	36.6	35.9	35.9	38.9	42.8
Level of Service	A	B		A	B	B	D	D	D	D	D	D
Approach Delay (s)		10.3			12.1			36.1			41.8	
Approach LOS		B			B			D			D	

Intersection Summary			
HCM 2000 Control Delay	19.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	107.9	Sum of lost time (s)	12.0
Intersection Capacity Utilization	70.1%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings FT 2033 PM.syn
 8: QEW WB Off-Ramp & Kerr Street 04-03-2024

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	456	0	0	748	125	284
Future Volume (vph)	456	0	0	748	125	284
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)		0.0	0.0		0.0	140.0
Storage Lanes		0	0		1	1
Taper Length (m)			7.5		7.5	
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00
Fr						0.850
Flt Protected					0.950	
Satd. Flow (prot)	3574	0	0	3574	1805	1599
Flt Permitted					0.950	
Satd. Flow (perm)	3574	0	0	3574	1805	1599
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)						215
Link Speed (k/h)	60			60	40	
Link Distance (m)	130.3			194.2	262.1	
Travel Time (s)	7.8			11.7	23.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	0%	0%	1%	0%	1%
Adj. Flow (vph)	496	0	0	813	136	309
Shared Lane Traffic (%)						
Lane Group Flow (vph)	496	0	0	813	136	309
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)		15	25		25	15
Turn Type	NA			NA	Prot	Perm
Protected Phases	4			8	2	
Permitted Phases						2
Minimum Split (s)	22.5			22.5	22.5	22.5
Total Split (s)	22.5			22.5	22.5	22.5
Total Split (%)	50.0%			50.0%	50.0%	50.0%
Maximum Green (s)	18.0			18.0	18.0	18.0
Yellow Time (s)	3.5			3.5	3.5	3.5
All-Red Time (s)	1.0			1.0	1.0	1.0
Lost Time Adjust (s)	0.0			0.0	0.0	0.0
Total Lost Time (s)	4.5			4.5	4.5	4.5
Lead/Lag						
Lead-Lag Optimize?						
Walk Time (s)	7.0			7.0	7.0	7.0
Flash Dont Walk (s)	11.0			11.0	11.0	11.0
Pedestrian Calls (#/hr)	0			0	0	0
Act Effct Green (s)	18.0			18.0	18.0	18.0
Actuated g/C Ratio	0.40			0.40	0.40	0.40

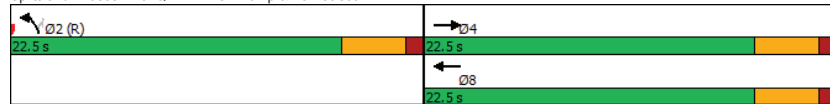
Lanes, Volumes, Timings
8: QEWSB Off-Ramp & Kerr Street

FT 2033 PM.syn
04-03-2024

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
v/c Ratio	0.35			0.57	0.19	0.40
Control Delay	10.3			12.4	9.7	5.2
Queue Delay	0.0			0.0	0.0	0.0
Total Delay	10.3			12.4	9.7	5.2
LOS	B			B	A	A
Approach Delay	10.3			12.4	6.6	
Approach LOS	B			B	A	
Queue Length 50th (m)	14.2			25.9	6.9	4.7
Queue Length 95th (m)	22.9			39.5	15.2	16.9
Internal Link Dist (m)	106.3			170.2	238.1	
Turn Bay Length (m)					140.0	
Base Capacity (vph)	1429			1429	722	768
Starvation Cap Reductn	0			0	0	0
Spillback Cap Reductn	0			0	0	0
Storage Cap Reductn	0			0	0	0
Reduced v/c Ratio	0.35			0.57	0.19	0.40

Intersection Summary	
Area Type:	Other
Cycle Length:	45
Actuated Cycle Length:	45
Offset:	0 (0%), Referenced to phase 2:NBL and 6:, Start of Green
Natural Cycle:	45
Control Type:	Pretimed
Maximum v/c Ratio:	0.57
Intersection Signal Delay:	10.3
Intersection Capacity Utilization:	37.7%
Analysis Period (min):	15
Intersection LOS:	B
ICU Level of Service A:	

Splits and Phases: 8: QEWSB Off-Ramp & Kerr Street



HCM Signalized Intersection Capacity Analysis
8: QEWSB Off-Ramp & Kerr Street

FT 2033 PM.syn
04-03-2024

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↕↕			↕↕	↕	↕
Traffic Volume (vph)	456	0	0	748	125	284
Future Volume (vph)	456	0	0	748	125	284
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5			4.5	4.5	4.5
Lane Util. Factor	0.95			0.95	1.00	1.00
Fr _t	1.00			1.00	1.00	0.85
Fit Protected	1.00			1.00	0.95	1.00
Satd. Flow (prot)	3574			3574	1805	1599
Fit Permitted	1.00			1.00	0.95	1.00
Satd. Flow (perm)	3574			3574	1805	1599
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	496	0	0	813	136	309
RTOR Reduction (vph)	0	0	0	0	0	129
Lane Group Flow (vph)	496	0	0	813	136	180
Heavy Vehicles (%)	1%	0%	0%	1%	0%	1%
Turn Type	NA			NA	Prot	Perm
Protected Phases	4			8		2
Permitted Phases						2
Actuated Green, G (s)	18.0			18.0	18.0	18.0
Effective Green, g (s)	18.0			18.0	18.0	18.0
Actuated g/C Ratio	0.40			0.40	0.40	0.40
Clearance Time (s)	4.5			4.5	4.5	4.5
Lane Grp Cap (vph)	1429			1429	722	639
v/s Ratio Prot	0.14			c0.23	0.08	
v/s Ratio Perm						c0.11
v/c Ratio	0.35			0.57	0.19	0.28
Uniform Delay, d1	9.4			10.5	8.8	9.1
Progression Factor	1.00			1.00	1.00	1.00
Incremental Delay, d2	0.7			1.6	0.6	1.1
Delay (s)	10.1			12.1	9.3	10.2
Level of Service	B			B	A	B
Approach Delay (s)	10.1			12.1	10.0	
Approach LOS	B			B	A	

Intersection Summary			
HCM 2000 Control Delay	11.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	37.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
9: Dorval Drive & QEWB WB Off-Ramp

FT 2033 PM.syn
04-03-2024

	↙	↖	↑	↗	↘	↓
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↙↖	↖	↗↘			↗↘
Traffic Volume (vph)	769	676	1080	0	0	1147
Future Volume (vph)	769	676	1080	0	0	1147
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	190.0		0.0	0.0	
Storage Lanes	2	1		0	0	
Taper Length (m)	7.5			7.5		
Lane Util. Factor	0.97	0.91	0.95	1.00	1.00	0.95
Frt	0.966	0.850				
Flt Protected	0.963					
Satd. Flow (prot)	3344	1455	3574	0	0	3539
Flt Permitted	0.963					
Satd. Flow (perm)	3344	1455	3574	0	0	3539
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)	38	62				
Link Speed (k/h)	40		60			60
Link Distance (m)	325.1		310.2			266.9
Travel Time (s)	29.3		18.6			16.0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	1%	1%	0%	0%	2%
Adj. Flow (vph)	836	735	1174	0	0	1247
Shared Lane Traffic (%)		33%				
Lane Group Flow (vph)	1079	492	1174	0	0	1247
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	7.2		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15		15	25	
Number of Detectors	1	1	2			2
Detector Template	Left	Right	Thru			Thru
Leading Detector (m)	2.0	2.0	10.0			10.0
Trailing Detector (m)	0.0	0.0	0.0			0.0
Detector 1 Position(m)	0.0	0.0	0.0			0.0
Detector 1 Size(m)	2.0	2.0	0.6			0.6
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex			CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0			0.0
Detector 1 Queue (s)	0.0	0.0	0.0			0.0
Detector 1 Delay (s)	0.0	0.0	0.0			0.0
Detector 2 Position(m)			9.4			9.4
Detector 2 Size(m)			0.6			0.6
Detector 2 Type			CI+Ex			CI+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type	Prot	Perm	NA			NA
Protected Phases	8		2			6

Lanes, Volumes, Timings
9: Dorval Drive & QEWB WB Off-Ramp

FT 2033 PM.syn
04-03-2024

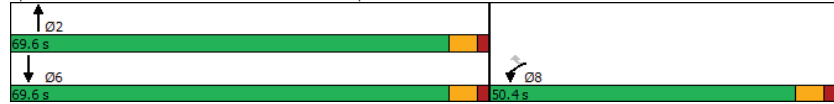
	↙	↖	↑	↗	↘	↓
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Permitted Phases		8				
Detector Phase	8	8	2			6
Switch Phase						
Minimum Initial (s)	10.0	10.0	20.0			20.0
Minimum Split (s)	24.0	24.0	26.0			26.0
Total Split (s)	50.4	50.4	69.6			69.6
Total Split (%)	42.0%	42.0%	58.0%			58.0%
Maximum Green (s)	44.4	44.4	63.6			63.6
Yellow Time (s)	4.0	4.0	4.0			4.0
All-Red Time (s)	2.0	2.0	2.0			2.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0			-2.0
Total Lost Time (s)	4.0	4.0	4.0			4.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	4.5	4.5	5.0			5.0
Recall Mode	None	None	Max			Max
Walk Time (s)	5.0	5.0	7.0			7.0
Flash Dont Walk (s)	7.0	7.0	11.0			11.0
Pedestrian Calls (#/hr)	0	0	0			0
Act Effct Green (s)	44.9	44.9	65.7			65.7
Actuated g/C Ratio	0.38	0.38	0.55			0.55
v/c Ratio	0.84	0.84	0.59			0.64
Control Delay	39.1	42.9	19.4			20.4
Queue Delay	0.0	0.0	0.0			0.0
Total Delay	39.1	42.9	19.4			20.4
LOS	D	D	B			C
Approach Delay	40.3		19.4			20.4
Approach LOS	D		B			C
Queue Length 50th (m)	118.7	105.8	99.1			109.0
Queue Length 95th (m)	147.2	#171.9	120.7			132.4
Internal Link Dist (m)	301.1		286.2			242.9
Turn Bay Length (m)		190.0				
Base Capacity (vph)	1332	607	1978			1958
Starvation Cap Reductn	0	0	0			0
Spillback Cap Reductn	0	0	0			0
Storage Cap Reductn	0	0	0			0
Reduced v/c Ratio	0.81	0.81	0.59			0.64
Intersection Summary						
Area Type:	Other					
Cycle Length:	120					
Actuated Cycle Length:	118.6					
Natural Cycle:	50					
Control Type:	Semi Act-Uncoord					
Maximum v/c Ratio:	0.84					
Intersection Signal Delay:	27.9			Intersection LOS: C		
Intersection Capacity Utilization:	67.4%			ICU Level of Service C		
Analysis Period (min)	15					
# 95th percentile volume exceeds capacity, queue may be longer.						

Lanes, Volumes, Timings
9: Dorval Drive & QEW WB Off-Ramp

FT 2033 PM.syn
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Queue shown is maximum after two cycles.

Splits and Phases: 9: Dorval Drive & QEW WB Off-Ramp



HCM Signalized Intersection Capacity Analysis
9: Dorval Drive & QEW WB Off-Ramp

FT 2033 PM.syn
04-03-2024

	WBL	WBR	NBT	NBR	SBL	SBT
Movement	↔	↔	↑	↔	↔	↔
Lane Configurations	↔↔	↔	↑↑			↔↔
Traffic Volume (vph)	769	676	1080	0	0	1147
Future Volume (vph)	769	676	1080	0	0	1147
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0			4.0
Lane Util. Factor	0.97	0.91	0.95			0.95
Frt	0.97	0.85	1.00			1.00
Fit Protected	0.96	1.00	1.00			1.00
Satd. Flow (prot)	3343	1455	3574			3539
Fit Permitted	0.96	1.00	1.00			1.00
Satd. Flow (perm)	3343	1455	3574			3539
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	836	735	1174	0	0	1247
RTOR Reduction (vph)	24	39	0	0	0	0
Lane Group Flow (vph)	1055	453	1174	0	0	1247
Heavy Vehicles (%)	3%	1%	1%	0%	0%	2%
Turn Type	Prot	Perm	NA			NA
Protected Phases	8		2			6
Permitted Phases		8				
Actuated Green, G (s)	42.9	42.9	63.6			63.6
Effective Green, g (s)	44.9	44.9	65.6			65.6
Actuated g/C Ratio	0.38	0.38	0.55			0.55
Clearance Time (s)	6.0	6.0	6.0			6.0
Vehicle Extension (s)	4.5	4.5	5.0			5.0
Lane Grp Cap (vph)	1266	551	1978			1959
v/s Ratio Prot	c0.32		0.33			c0.35
v/s Ratio Perm		0.31				
v/c Ratio	0.83	0.82	0.59			0.64
Uniform Delay, d1	33.4	33.2	17.6			18.2
Progression Factor	1.00	1.00	1.00			1.00
Incremental Delay, d2	5.3	10.5	1.3			1.6
Delay (s)	38.7	43.7	18.9			19.8
Level of Service	D	D	B			B
Approach Delay (s)	40.3		18.9			19.8
Approach LOS	D		B			B
Intersection Summary						
HCM 2000 Control Delay			27.6		HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.72			
Actuated Cycle Length (s)			118.5		Sum of lost time (s)	8.0
Intersection Capacity Utilization			67.4%		ICU Level of Service	C
Analysis Period (min)			15			
c Critical Lane Group						

Lanes, Volumes, Timings
10: Dorval Drive & QEW EB Off-Ramp

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Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	299	355	0	1296	1226	0
Future Volume (vph)	299	355	0	1296	1226	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	175.0	0.0	0.0			0.0
Storage Lanes	1	1	0			0
Taper Length (m)	7.5		7.5			
Lane Util. Factor	0.97	0.91	1.00	0.95	0.95	1.00
Fr _t	0.950	0.850				
Flt Protected	0.968					
Satd. Flow (prot)	3302	1441	0	3539	3505	0
Flt Permitted	0.968					
Satd. Flow (perm)	3302	1441	0	3539	3505	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	52	52				
Link Speed (k/h)	40			60	60	
Link Distance (m)	275.5			164.3	310.2	
Travel Time (s)	24.8			9.9	18.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	2%	0%	2%	3%	0%
Adj. Flow (vph)	325	386	0	1409	1333	0
Shared Lane Traffic (%)		42%				
Lane Group Flow (vph)	487	224	0	1409	1333	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	7.2			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Number of Detectors	1	1		2	2	
Detector Template	Left	Right		Thru	Thru	
Leading Detector (m)	2.0	2.0		10.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	2.0		0.6	0.6	
Detector 1 Type	CI+Ex	CI+Ex		CI+Ex	CI+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	
Detector 2 Position(m)				9.4	9.4	
Detector 2 Size(m)				0.6	0.6	
Detector 2 Type				CI+Ex	CI+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Prot	Perm		NA	NA	
Protected Phases	4			2	6	

Lanes, Volumes, Timings
10: Dorval Drive & QEW EB Off-Ramp

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Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Permitted Phases		4				
Detector Phase	4	4		2	6	
Switch Phase						
Minimum Initial (s)	10.0	10.0		20.0	20.0	
Minimum Split (s)	24.0	24.0		26.0	26.0	
Total Split (s)	45.6	45.6		74.4	74.4	
Total Split (%)	38.0%	38.0%		62.0%	62.0%	
Maximum Green (s)	39.6	39.6		68.4	68.4	
Yellow Time (s)	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	4.0	4.0		5.0	5.0	
Recall Mode	None	None		Max	Max	
Walk Time (s)	0.0	0.0		7.0	7.0	
Flash Dont Walk (s)	7.0	7.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0	
Act Effct Green (s)	22.9	22.9		70.6	70.6	
Actuated g/C Ratio	0.23	0.23		0.70	0.70	
v/c Ratio	0.62	0.61		0.57	0.55	
Control Delay	34.8	34.2		9.6	9.3	
Queue Delay	0.0	0.0		0.0	0.0	
Total Delay	34.8	34.2		9.6	9.3	
LOS	C	C		A	A	
Approach Delay	34.6			9.6	9.3	
Approach LOS	C			A	A	
Queue Length 50th (m)	41.9	35.1		66.5	61.2	
Queue Length 95th (m)	58.2	62.5		111.2	102.6	
Internal Link Dist (m)	251.5			140.3	286.2	
Turn Bay Length (m)	175.0					
Base Capacity (vph)	1387	622		2460	2436	
Starvation Cap Reductn	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	
Storage Cap Reductn	0	0		0	0	
Reduced v/c Ratio	0.35	0.36		0.57	0.55	
Intersection Summary						
Area Type:	Other					
Cycle Length:	120					
Actuated Cycle Length:	101.5					
Natural Cycle:	55					
Control Type:	Semi Act-Uncoord					
Maximum v/c Ratio:	0.62					
Intersection Signal Delay:	14.7			Intersection LOS: B		
Intersection Capacity Utilization:	67.4%			ICU Level of Service C		
Analysis Period (min)	15					

Lanes, Volumes, Timings
10: Dorval Drive & QEW EB Off-Ramp

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Splits and Phases: 10: Dorval Drive & QEW EB Off-Ramp



HCM Signalized Intersection Capacity Analysis
10: Dorval Drive & QEW EB Off-Ramp

FT 2033 PM.syn
04-03-2024

	EBL	EBR	NBL	NBT	SBT	SBR
Movement						
Lane Configurations	↔↔	↔		↕↕	↕↕	
Traffic Volume (vph)	299	355	0	1296	1226	0
Future Volume (vph)	299	355	0	1296	1226	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	0.91		0.95	0.95	
Frt	0.95	0.85		1.00	1.00	
Fit Protected	0.97	1.00		1.00	1.00	
Satd. Flow (prot)	3301	1441		3539	3505	
Fit Permitted	0.97	1.00		1.00	1.00	
Satd. Flow (perm)	3301	1441		3539	3505	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	325	386	0	1409	1333	0
RTOR Reduction (vph)	40	40	0	0	0	0
Lane Group Flow (vph)	447	184	0	1409	1333	0
Heavy Vehicles (%)	3%	2%	0%	2%	3%	0%
Turn Type	Prot	Perm		NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4				
Actuated Green, G (s)	20.9	20.9		68.6	68.6	
Effective Green, g (s)	22.9	22.9		70.6	70.6	
Actuated g/C Ratio	0.23	0.23		0.70	0.70	
Clearance Time (s)	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	4.0	4.0		5.0	5.0	
Lane Grp Cap (vph)	744	325		2461	2437	
v/s Ratio Prot	c0.14			c0.40	0.38	
v/s Ratio Perm		0.13				
v/c Ratio	0.60	0.57		0.57	0.55	
Uniform Delay, d1	35.2	34.9		7.8	7.6	
Progression Factor	1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.6	2.7		1.0	0.9	
Delay (s)	36.8	37.6		8.8	8.5	
Level of Service	D	D		A	A	
Approach Delay (s)	37.0			8.8	8.5	
Approach LOS	D			A	A	
Intersection Summary						
HCM 2000 Control Delay			14.5		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.58			
Actuated Cycle Length (s)			101.5		Sum of lost time (s)	8.0
Intersection Capacity Utilization			67.4%		ICU Level of Service	C
Analysis Period (min)			15			
c Critical Lane Group						

Lanes, Volumes, Timings
11: Argus Rd & South Service Rd

FT 2033 PM.syn
04-03-2024

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Volume (vph)	44	36	625	358	54	154
Future Volume (vph)	44	36	625	358	54	154
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt			0.951		0.900	
Flt Protected		0.973			0.987	
Satd. Flow (prot)	0	1572	1529	0	1519	0
Flt Permitted		0.973			0.987	
Satd. Flow (perm)	0	1572	1529	0	1519	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		177.7	145.7		103.5	
Travel Time (s)		12.8	10.5		7.5	
Confl. Peds. (#/hr)					5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	13%	10%	0%	0%	0%
Adj. Flow (vph)	48	39	679	389	59	167
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	87	1068	0	226	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (k/h)	24			14	24	14
Sign Control		Free	Free		Stop	

Intersection Summary						
Area Type:	CBD					
Control Type:	Unsignalized					
Intersection Capacity Utilization	81.3%		ICU Level of Service D			
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
11: Argus Rd & South Service Rd

FT 2033 PM.syn
04-03-2024

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Volume (veh/h)	44	36	625	358	54	154
Future Volume (Veh/h)	44	36	625	358	54	154
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	48	39	679	389	59	167
Pedestrians			5			
Lane Width (m)			3.6			
Walking Speed (m/s)			1.2			
Percent Blockage			0			
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)		358				
pX, platoon unblocked					1014	874
vC, conflicting volume	1068					
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1068				1014	874
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	53
cM capacity (veh/h)	660				246	352

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	87	1068	226
Volume Left	48	0	59
Volume Right	0	389	167
eSH	660	1700	317
Volume to Capacity	0.07	0.63	0.71
Queue Length 95th (m)	1.9	0.0	41.1
Control Delay (s)	6.4	0.0	40.3
Lane LOS	A		E
Approach Delay (s)	6.4	0.0	40.3
Approach LOS			E

Intersection Summary			
Average Delay		7.0	
Intersection Capacity Utilization	81.3%	ICU Level of Service	D
Analysis Period (min)	15		

Lanes, Volumes, Timings
12: Lyons Lane & South Service Road

FT 2033 PM.syn
04-03-2024

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Volume (vph)	4	7	1	64	58	7
Future Volume (vph)	4	7	1	64	58	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt			0.867		0.985	
Flt Protected		0.984			0.958	
Satd. Flow (prot)	0	1683	1218	0	1614	0
Flt Permitted		0.984			0.958	
Satd. Flow (perm)	0	1683	1218	0	1614	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		60.5	89.6		37.6	
Travel Time (s)		4.4	6.5		2.7	
Confl. Peds. (#/hr)	7			7		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	22%	0%	0%
Adj. Flow (vph)	4	8	1	70	63	8
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	12	71	0	71	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (k/h)	24			14	24	14
Sign Control		Free	Free		Stop	

Intersection Summary						
Area Type:	CBD					
Control Type:	Unsignalized					
Intersection Capacity Utilization	17.6%		ICU Level of Service A			
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
12: Lyons Lane & South Service Road

FT 2033 PM.syn
04-03-2024

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Volume (veh/h)	4	7	1	64	58	7
Future Volume (Veh/h)	4	7	1	64	58	7
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)	4	8	1	70	63	8
Pedestrians					7	
Lane Width (m)					3.6	
Walking Speed (m/s)					1.2	
Percent Blockage					1	
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	78				59	43
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	78				59	43
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				93	99
cM capacity (veh/h)	1524				945	1027

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	12	71	71
Volume Left	4	0	63
Volume Right	0	70	8
eSH	1524	1700	954
Volume to Capacity	0.00	0.04	0.07
Queue Length 95th (m)	0.1	0.0	1.9
Control Delay (s)	2.5	0.0	9.1
Lane LOS	A		A
Approach Delay (s)	2.5	0.0	9.1
Approach LOS			A

Intersection Summary			
Average Delay		4.4	
Intersection Capacity Utilization	17.6%	ICU Level of Service	A
Analysis Period (min)	15		

Lanes, Volumes, Timings
13: GO Bus Terminal/Argus Rd & Cross Ave

FT 2033 PM.syn
04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	41	1211	20	45	590	123	18	3	57	387	24	328
Future Volume (vph)	41	1211	20	45	590	123	18	3	57	387	24	328
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6
Storage Length (m)	20.0	0.0	20.0	0.0	0.0	0.0	0.0	15.0	0.0	0.0	0.0	0.0
Storage Lanes	1	0	1	0	1	0	1	0	1	0	1	0
Taper Length (m)	7.5		7.5		7.5		7.5		7.5		7.5	
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	1.00			0.99	0.99	0.99	0.97		0.98	0.98	
Frt	0.998				0.974			0.857			0.860	
Flt Protected	0.950			0.950		0.950		0.950		0.950		
Satd. Flow (prot)	1570	3189	0	797	3144	0	785	708	0	1570	1344	0
Flt Permitted	0.358			0.090		0.279		0.715				
Satd. Flow (perm)	588	3189	0	76	3144	0	229	708	0	1157	1344	0
Right Turn on Red			Yes		Yes		Yes		Yes		Yes	
Satd. Flow (RTOR)		2		50		62		268				
Link Speed (k/h)		50		50		50		50				
Link Distance (m)		164.3		72.9		81.9		115.7				
Travel Time (s)		11.8		5.2		5.9		8.3				
Confl. Peds. (#/hr)	9		4	4		9	12		20	20		12
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
Heavy Vehicles (%)	0%	0%	100%	97%	0%	0%	100%	100%	100%	0%	100%	0%
Adj. Flow (vph)	45	1316	22	49	641	134	20	3	62	421	26	357
Shared Lane Traffic (%)												
Lane Group Flow (vph)	45	1338	0	49	775	0	20	65	0	421	383	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.3			3.3			3.3			3.3	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.19	1.14	1.14	1.19	1.14	1.14	1.19	1.14	1.14	1.19	1.14	1.14
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

Lanes, Volumes, Timings
13: GO Bus Terminal/Argus Rd & Cross Ave

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6		8		8		4	
Permitted Phases		2		6		8		4		4		
Detector Phases	2	2		1	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	22.0	22.0		8.0	22.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	45.0	45.0		12.5	29.0		29.0	29.0		29.0	29.0	
Total Split (s)	46.5	46.5		12.5	59.0		31.0	31.0		31.0	31.0	
Total Split (%)	51.7%	51.7%		13.9%	65.6%		34.4%	34.4%		34.4%	34.4%	
Maximum Green (s)	40.5	40.5		8.5	53.0		25.0	25.0		25.0	25.0	
Yellow Time (s)	4.0	4.0		3.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		1.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0		0.0	-2.0		-2.0	-2.0		-2.0	-2.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Vehicle Extension (s)	5.0	5.0		2.5	5.0		4.0	4.0		4.0	4.0	
Recall Mode	Min	Min		Min	Min		Min	Min		Min	Min	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	16.0	16.0		16.0	16.0		16.0	16.0		16.0	16.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	42.3	42.3		54.5	54.5		27.0	27.0		27.0	27.0	
Actuated g/C Ratio	0.47	0.47		0.61	0.61		0.30	0.30		0.30	0.30	
v/c Ratio	0.16	0.89		0.44	0.40		0.29	0.25		1.21	0.65	
Control Delay	15.5	30.3		23.6	9.1		37.4	9.9		147.8	14.2	
Queue Delay	0.0	2.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	15.5	32.2		23.6	9.1		37.4	9.9		147.8	14.2	
LOS	B	C		C	A		D	A		F	B	
Approach Delay		31.7			10.0			16.4			84.2	
Approach LOS		C			A			B			F	
Queue Length 50th (m)	4.4	110.4		3.4	32.2		2.8	0.4		-93.7	15.8	
Queue Length 95th (m)	11.7	#159.7		12.3	43.8		10.3	10.3		#152.0	48.3	
Internal Link Dist (m)		140.3			48.9			57.9			91.7	
Turn Bay Length (m)	20.0			20.0				15.0				
Base Capacity (vph)	279	1515		114	1950		69	256		349	592	
Starvation Cap Reductn	0	80		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	0.16	0.93		0.43	0.40		0.29	0.25		1.21	0.65	
Intersection Summary												
Area Type:	CBD											
Cycle Length:	90											
Actuated Cycle Length:	89.5											
Natural Cycle:	90											
Control Type:	Semi Act-Uncoord											
Maximum v/c Ratio:	1.21											
Intersection Signal Delay:	39.1						Intersection LOS: D					

Lanes, Volumes, Timings
13: GO Bus Terminal/Argus Rd & Cross Ave

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Intersection Capacity Utilization 78.7% ICU Level of Service D
Analysis Period (min) 15
- Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 13: GO Bus Terminal/Argus Rd & Cross Ave



HCM Signalized Intersection Capacity Analysis
13: GO Bus Terminal/Argus Rd & Cross Ave

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↖↗		↖	↖↗		↖	↖	↖	↖	↖	↖
Traffic Volume (vph)	41	1211	20	45	590	123	18	3	57	387	24	328
Future Volume (vph)	41	1211	20	45	590	123	18	3	57	387	24	328
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	0.99		1.00	0.97		1.00	0.98	
Flpb, ped/bikes	0.99	1.00		1.00	1.00		0.99	1.00		0.98	1.00	
Frt	1.00	1.00		1.00	0.97		1.00	0.86		1.00	0.86	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1561	3187		797	3144		781	708		1537	1344	
Flt Permitted	0.36	1.00		0.09	1.00		0.28	1.00		0.71	1.00	
Satd. Flow (perm)	588	3187		76	3144		230	708		1156	1344	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	45	1316	22	49	641	134	20	3	62	421	26	357
RTOR Reduction (vph)	0	1	0	0	20	0	0	43	0	0	187	0
Lane Group Flow (vph)	45	1337	0	49	755	0	20	22	0	421	196	0
Confl. Peds. (#/hr)	9		4	4		9	12		20	20		12
Heavy Vehicles (%)	0%	0%	100%	97%	0%	0%	100%	100%	100%	0%	100%	0%
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	40.3	40.3		52.5	52.5		25.0	25.0		25.0	25.0	
Effective Green, g (s)	42.3	42.3		52.5	54.5		27.0	27.0		27.0	27.0	
Actuated g/C Ratio	0.47	0.47		0.59	0.61		0.30	0.30		0.30	0.30	
Clearance Time (s)	6.0	6.0		4.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	5.0	5.0		2.5	5.0		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	277	1506		110	1914		69	213		348	405	
v/s Ratio Prot		c0.42		0.04	c0.24			0.03			0.15	
v/s Ratio Perm	0.08			0.22			0.09			c0.36		
v/c Ratio	0.16	0.89		0.45	0.39		0.29	0.10		1.21	0.48	
Uniform Delay, d1	13.5	21.4		14.6	9.0		23.9	22.5		31.2	25.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.6	7.2		2.1	0.3		3.2	0.3		118.2	1.2	
Delay (s)	14.1	28.7		16.7	9.3		27.1	22.8		149.5	26.8	
Level of Service	B	C		B	A		C	C		F	C	
Approach Delay (s)		28.2			9.7			23.8			91.0	
Approach LOS		C			A			C			F	
Intersection Summary												
HCM 2000 Control Delay				39.5			HCM 2000 Level of Service				D	
HCM 2000 Volume to Capacity ratio				0.95								
Actuated Cycle Length (s)				89.5			Sum of lost time (s)				12.0	
Intersection Capacity Utilization				78.7%			ICU Level of Service				D	
Analysis Period (min)				15								
c Critical Lane Group												

Lanes, Volumes, Timings
14: Lyons Lane/Street A & Cross Ave

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	↖	→	↘	↙	←	↖	↙	↘	↙	↘	↙	↘
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↖↗	↘	↖	↖↗	↘	↖	↖	↘	↖	↖	↘
Traffic Volume (vph)	46	252	16	17	465	14	284	5	192	18	3	76
Future Volume (vph)	46	252	16	17	465	14	284	5	192	18	3	76
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6
Storage Length (m)	0.0	0.0	25.0	0.0	20.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Storage Lanes	1	0	1	0	1	0	1	0	1	0	1	0
Taper Length (m)	7.5		7.5		7.5		7.5		7.5		7.5	
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00	1.00		1.00	1.00		1.00	0.98		1.00	0.99	
Frt		0.991			0.996			0.854			0.855	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1525	2914	0	1570	3084	0	1570	1436	0	1570	1416	0
Flt Permitted	0.460			0.508			0.701			0.542		
Satd. Flow (perm)	736	2914	0	839	3084	0	1157	1436	0	893	1416	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		9			5			209			83	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		40.1			209.8			69.1			70.9	
Travel Time (s)		2.9			15.1			5.0			5.1	
Confl. Peds. (#/hr)	3		1	1		3	1		4	4		1
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
Heavy Vehicles (%)	3%	11%	0%	0%	5%	0%	0%	0%	0%	0%	0%	2%
Adj. Flow (vph)	50	274	17	18	505	15	309	5	209	20	3	83
Shared Lane Traffic (%)												
Lane Group Flow (vph)	50	291	0	18	520	0	309	214	0	20	86	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.3			3.3			3.3			3.3	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.19	1.14	1.14	1.19	1.14	1.14	1.19	1.14	1.14	1.19	1.14	1.14
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

Lanes, Volumes, Timings
14: Lyons Lane/Street A & Cross Ave

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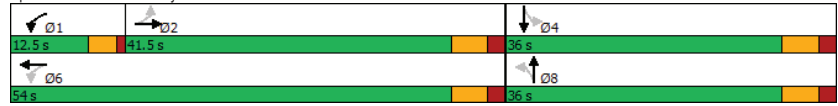
	↖	→	↘	↙	←	↖	↙	↘	↙	↘	↙	↘
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6		8		8		4	
Permitted Phases		2		6			8		8		4	
Detector Phases		2	2	1	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	35.0	35.0		8.0	35.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	41.0	41.0		12.5	41.0		28.0	28.0		28.0	28.0	
Total Split (s)	41.5	41.5		12.5	54.0		36.0	36.0		36.0	36.0	
Total Split (%)	46.1%	46.1%		13.9%	60.0%		40.0%	40.0%		40.0%	40.0%	
Maximum Green (s)	35.5	35.5		8.5	48.0		30.0	30.0		30.0	30.0	
Yellow Time (s)	4.0	4.0		3.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		1.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0		0.0	-2.0		-2.0	-2.0		-2.0	-2.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Vehicle Extension (s)	5.0	5.0		2.5	5.0		4.0	4.0		4.0	4.0	
Recall Mode	Min	Min		Min	Min		Min	Min		Min	Min	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	15.0	15.0		15.0	15.0		15.0	15.0		15.0	15.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	37.1	37.1		49.2	49.2		28.2	28.2		28.2	28.2	
Actuated g/C Ratio	0.43	0.43		0.58	0.58		0.33	0.33		0.33	0.33	
v/c Ratio	0.16	0.23		0.03	0.29		0.81	0.35		0.07	0.16	
Control Delay	17.8	16.1		9.2	10.3		43.7	5.0		19.7	5.9	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	17.8	16.1		9.2	10.3		43.7	5.0		19.7	5.9	
LOS	B	B		A	B		D	A		B	A	
Approach Delay		16.3			10.3			27.9			8.5	
Approach LOS		B			B			C			A	
Queue Length 50th (m)	5.5	16.7		1.4	24.5		47.8	0.6		2.3	0.4	
Queue Length 95th (m)	13.5	25.9		4.4	34.5		#89.2	15.0		7.3	9.9	
Internal Link Dist (m)		16.1			185.8			45.1			46.9	
Turn Bay Length (m)				25.0			20.0					
Base Capacity (vph)	324	1288		555	1813		435	670		335	584	
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	0.15	0.23		0.03	0.29		0.71	0.32		0.06	0.15	
Intersection Summary												
Area Type:	CBD											
Cycle Length:	90											
Actuated Cycle Length:	85.4											
Natural Cycle:	85											
Control Type:	Semi Act-Uncoord											
Maximum v/c Ratio:	0.81											
Intersection Signal Delay:	17.6						Intersection LOS: B					

Lanes, Volumes, Timings
14: Lyons Lane/Street A & Cross Ave

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Intersection Capacity Utilization 73.3% ICU Level of Service D
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 14: Lyons Lane/Street A & Cross Ave



HCM Signalized Intersection Capacity Analysis
14: Lyons Lane/Street A & Cross Ave

FT 2033 PM.syn
04-03-2024



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	46	252	16	17	465	14	284	5	192	18	3	76
Future Volume (vph)	46	252	16	17	465	14	284	5	192	18	3	76
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.98		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	1.00		1.00	0.85		1.00	0.86	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1520	2915		1569	3083		1569	1436		1565	1417	
Flt Permitted	0.46	1.00		0.51	1.00		0.70	1.00		0.54	1.00	
Satd. Flow (perm)	736	2915		839	3083		1158	1436		893	1417	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	50	274	17	18	505	15	309	5	209	20	3	83
RTOR Reduction (vph)	0	5	0	0	2	0	0	140	0	0	56	0
Lane Group Flow (vph)	50	286	0	18	518	0	309	74	0	20	30	0
Confl. Peds. (#/hr)	3		1	1		3	1		4	4		1
Heavy Vehicles (%)	3%	11%	0%	0%	5%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases	2			6			8					4
Actuated Green, G (s)	35.2	35.2		47.2	47.2		26.2	26.2		26.2	26.2	
Effective Green, g (s)	37.2	37.2		47.2	49.2		28.2	28.2		28.2	28.2	
Actuated g/C Ratio	0.44	0.44		0.55	0.58		0.33	0.33		0.33	0.33	
Clearance Time (s)	6.0	6.0		4.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	5.0	5.0		2.5	5.0		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	320	1269		532	1776		382	474		294	467	
v/s Ratio Prot		0.10		0.00	0.17			0.05			0.02	
v/s Ratio Perm	0.07			0.02			0.27			0.02		
v/c Ratio	0.16	0.23		0.03	0.29		0.81	0.16		0.07	0.07	
Uniform Delay, d1	14.6	15.1		8.8	9.2		26.1	20.2		19.6	19.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.5	0.2		0.0	0.2		12.5	0.2		0.1	0.1	
Delay (s)	15.1	15.3		8.8	9.4		38.7	20.4		19.7	19.7	
Level of Service	B	B		A	A		D	C		B	B	
Approach Delay (s)		15.2			9.4			31.2			19.7	
Approach LOS		B			A			C			B	

Intersection Summary			
HCM 2000 Control Delay	19.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	85.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	73.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
15: Cross Ave & Lyons Lane

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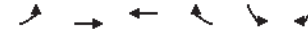
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↕↕	↕↕		↕↕	
Traffic Volume (vph)	57	267	749	72	37	68
Future Volume (vph)	57	267	749	72	37	68
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	5.0			0.0	0.0	0.0
Storage Lanes	1			0	1	0
Taper Length (m)	7.5				7.5	
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	1.00
Ped Bike Factor						
Frt			0.987		0.912	
Flt Protected	0.950				0.983	
Satd. Flow (prot)	1388	2954	3121	0	1494	0
Flt Permitted	0.950				0.983	
Satd. Flow (perm)	1388	2954	3121	0	1494	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		281.3	40.1		41.7	
Travel Time (s)		20.3	2.9		3.0	
Confl. Peds. (#/hr)	1			1	9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	17%	10%	3%	0%	0%	4%
Adj. Flow (vph)	62	290	814	78	40	74
Shared Lane Traffic (%)						
Lane Group Flow (vph)	62	290	892	0	114	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.6	3.6		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (k/h)	25			15	25	15
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type:	CBD
Control Type:	Unsignalized
Intersection Capacity Utilization	46.0%
Analysis Period (min)	15
	ICU Level of Service A

HCM Unsignalized Intersection Capacity Analysis
15: Cross Ave & Lyons Lane

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Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↕↕	↕↕		↕↕	
Traffic Volume (veh/h)	57	267	749	72	37	68
Future Volume (Veh/h)	57	267	749	72	37	68
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)	62	290	814	78	40	74
Pedestrians			9		1	
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)			40			
pX, platoon unblocked	0.92				0.92	0.92
vC, conflicting volume	893				1132	447
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	716				975	233
tC, single (s)	4.4				6.8	7.0
tC, 2 stage (s)						
tF (s)	2.4				3.5	3.3
p0 queue free %	91				81	89
cM capacity (veh/h)	726				211	704
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	62	145	145	543	349	114
Volume Left	62	0	0	0	0	40
Volume Right	0	0	0	0	78	74
eSH	726	1700	1700	1700	1700	387
Volume to Capacity	0.09	0.09	0.09	0.32	0.21	0.29
Queue Length 95th (m)	2.2	0.0	0.0	0.0	0.0	9.7
Control Delay (s)	10.4	0.0	0.0	0.0	0.0	18.1
Lane LOS	B					C
Approach Delay (s)	1.8			0.0		18.1
Approach LOS						C

Intersection Summary

Average Delay	2.0
Intersection Capacity Utilization	46.0%
Analysis Period (min)	15
	ICU Level of Service A

Lanes, Volumes, Timings
16: Speers Road/Cornwall Road & Cross Avenue

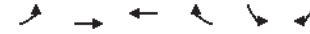
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Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↕↕	↕↔		↔	↕↕
Traffic Volume (vph)	350	844	927	50	19	532
Future Volume (vph)	350	844	927	50	19	532
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	75.0			0.0	55.0	0.0
Storage Lanes	1			0	1	2
Taper Length (m)	7.5				7.5	
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	0.88
Frt			0.992			0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1770	3539	3511	0	1770	2787
Flt Permitted	0.146				0.950	
Satd. Flow (perm)	272	3539	3511	0	1770	2787
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)			7			578
Link Speed (k/h)		50	50		50	
Link Distance (m)		189.7	274.5		184.2	
Travel Time (s)		13.7	19.8		13.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	380	917	1008	54	21	578
Shared Lane Traffic (%)						
Lane Group Flow (vph)	380	917	1062	0	21	578
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.6	3.6		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25			15	25	15
Number of Detectors	1	2	2		1	1
Detector Template	Left	Thru	Thru		Left	Right
Leading Detector (m)	2.0	10.0	10.0		2.0	2.0
Trailing Detector (m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Size(m)	2.0	0.6	0.6		2.0	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0		0.0	0.0
Detector 2 Position(m)		9.4	9.4			
Detector 2 Size(m)		0.6	0.6			
Detector 2 Type		Cl+Ex	Cl+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type	pm+pt	NA	NA		pm+pt	Perm
Protected Phases	5	2	6		7	
Permitted Phases	2				4	4

Lanes, Volumes, Timings
16: Speers Road/Cornwall Road & Cross Avenue

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Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Detector Phase	5	2	6		7	4
Switch Phase						
Minimum Initial (s)	6.0	5.0	5.0		5.0	5.0
Minimum Split (s)	12.0	33.5	33.5		27.5	27.5
Total Split (s)	22.0	62.0	40.0		28.0	28.0
Total Split (%)	24.4%	68.9%	44.4%		31.1%	31.1%
Maximum Green (s)	16.0	56.0	34.0		22.0	22.0
Yellow Time (s)	4.0	4.0	4.0		4.0	4.0
All-Red Time (s)	2.0	2.0	2.0		2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0		6.0	6.0
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?	Yes		Yes			
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	None	Max	Max		None	None
Walk Time (s)		18.0	18.0		12.0	12.0
Flash Dont Walk (s)		7.0	7.0		7.0	7.0
Pedestrian Calls (#/hr)		0	0		0	0
Act Effct Green (s)	56.1	56.1	34.4		7.5	7.5
Actuated g/C Ratio	0.74	0.74	0.46		0.10	0.10
v/c Ratio	0.74	0.35	0.66		0.12	0.73
Control Delay	22.2	4.1	18.9		31.9	8.9
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	22.2	4.1	18.9		31.9	8.9
LOS	C	A	B		C	A
Approach Delay		9.4	18.9		9.7	
Approach LOS		A	B		A	
Queue Length 50th (m)	25.5	17.8	60.6		2.9	0.0
Queue Length 95th (m)	#75.3	35.3	94.2		9.2	15.1
Internal Link Dist (m)		165.7	250.5		160.2	
Turn Bay Length (m)	75.0				55.0	
Base Capacity (vph)	519	2625	1602		515	1221
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	0.73	0.35	0.66		0.04	0.47

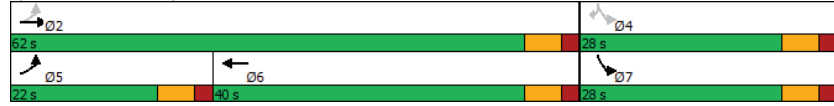
Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 75.6
 Natural Cycle: 80
 Control Type: Semi Act-Uncoord
 Maximum v/c Ratio: 0.74
 Intersection Signal Delay: 12.9
 Intersection Capacity Utilization 65.8%
 Intersection LOS: B
 ICU Level of Service C
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Lanes, Volumes, Timings
16: Speers Road/Cornwall Road & Cross Avenue

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Splits and Phases: 16: Speers Road/Cornwall Road & Cross Avenue



HCM Signalized Intersection Capacity Analysis
16: Speers Road/Cornwall Road & Cross Avenue

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Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↕	↕	↕	↔	↕
Traffic Volume (vph)	350	844	927	50	19	532
Future Volume (vph)	350	844	927	50	19	532
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0		6.0	6.0
Lane Util. Factor	1.00	0.95	0.95		1.00	0.88
Frt	1.00	1.00	0.99		1.00	0.85
Fit Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	3539	3512		1770	2787
Fit Permitted	0.15	1.00	1.00		0.95	1.00
Satd. Flow (perm)	273	3539	3512		1770	2787
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	380	917	1008	54	21	578
RTOR Reduction (vph)	0	0	4	0	0	521
Lane Group Flow (vph)	380	917	1058	0	21	57
Turn Type	pm+pt	NA	NA		pm+pt	Perm
Protected Phases	5	2	6		7	
Permitted Phases	2				4	4
Actuated Green, G (s)	56.1	56.1	34.5		7.5	7.5
Effective Green, g (s)	56.1	56.1	34.5		7.5	7.5
Actuated g/C Ratio	0.74	0.74	0.46		0.10	0.10
Clearance Time (s)	6.0	6.0	6.0		6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	511	2626	1602		175	276
v/s Ratio Prot	c0.15	0.26	0.30		0.01	
v/s Ratio Perm	c0.40					c0.02
v/c Ratio	0.74	0.35	0.66		0.12	0.21
Uniform Delay, d1	13.8	3.4	16.0		31.0	31.3
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	5.8	0.4	2.2		0.3	0.4
Delay (s)	19.6	3.8	18.1		31.3	31.7
Level of Service	B	A	B		C	C
Approach Delay (s)		8.4	18.1		31.7	
Approach LOS		A	B		C	
Intersection Summary						
HCM 2000 Control Delay		16.6		HCM 2000 Level of Service		B
HCM 2000 Volume to Capacity ratio		0.71				
Actuated Cycle Length (s)		75.6		Sum of lost time (s)		18.0
Intersection Capacity Utilization		65.8%		ICU Level of Service		C
Analysis Period (min)		15				
c Critical Lane Group						

Lanes, Volumes, Timings
17: North Access & South Service Road

FT 2033 PM.syn
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	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↘			↘	↗	↗
Traffic Volume (vph)	0	31	125	0	9	76
Future Volume (vph)	0	31	125	0	9	76
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Fit	0.865				0.880	
Fit Protected				0.950	0.995	
Satd. Flow (prot)	1611	0	0	1770	1631	0
Fit Permitted				0.950	0.995	
Satd. Flow (perm)	1611	0	0	1770	1631	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	154.2			110.2	69.4	
Travel Time (s)	11.1			7.9	5.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	34	136	0	10	83
Shared Lane Traffic (%)						
Lane Group Flow (vph)	34	0	0	136	93	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)		15	25		25	15
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	25.5%
Analysis Period (min)	15
	ICU Level of Service A

HCM Unsignalized Intersection Capacity Analysis
17: North Access & South Service Road

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	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↘			↘	↗	↗
Traffic Volume (veh/h)	0	31	125	0	9	76
Future Volume (Veh/h)	0	31	125	0	9	76
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)	0	34	136	0	10	83
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			34		289	17
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			34		289	17
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		98	92
cM capacity (veh/h)			1578		641	1062

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	34	136	93
Volume Left	0	136	10
Volume Right	34	0	83
eSH	1700	1578	992
Volume to Capacity	0.02	0.09	0.09
Queue Length 95th (m)	0.0	2.3	2.5
Control Delay (s)	0.0	7.5	9.0
Lane LOS	A	A	A
Approach Delay (s)	0.0	7.5	9.0
Approach LOS		A	

Intersection Summary

Average Delay	7.1
Intersection Capacity Utilization	25.5%
Analysis Period (min)	15
	ICU Level of Service A

Lanes, Volumes, Timings
23: GO Station West Access/Street C & Cross Ave

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔			↔			↔	↔		↔	↔	
Traffic Volume (vph)	19	587	54	294	391	218	91	0	453	157	0	7
Future Volume (vph)	19	587	54	294	391	218	91	0	453	157	0	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.0	0.0	0.0
Storage Lanes	0	0	0	0	0	0	1	0	1	0	0	0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.988				0.964		0.850				0.850	
Flt Protected	0.999				0.984		0.950				0.950	
Satd. Flow (prot)	0	3493	0	0	3357	0	1770	1583	0	1770	1583	0
Flt Permitted	0.904				0.613		0.752				0.342	
Satd. Flow (perm)	0	3161	0	0	2091	0	1401	1583	0	637	1583	0
Right Turn on Red	Yes			Yes			Yes			Yes		
Satd. Flow (RTOR)	22				102		115				249	
Link Speed (k/h)	50				50		50				50	
Link Distance (m)	209.8				164.3		55.1				132.8	
Travel Time (s)	15.1				11.8		4.0				9.6	
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
Adj. Flow (vph)	21	638	59	320	425	237	99	0	492	171	0	8
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	718	0	0	982	0	99	492	0	171	8	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)	3.3				3.3		3.6				3.6	
Link Offset(m)	0.0				0.0		0.0				0.0	
Crosswalk Width(m)	4.8				4.8		4.8				4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15		25		15		25		15	
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)	9.4				9.4		9.4				9.4	
Detector 2 Size(m)	0.6				0.6		0.6				0.6	
Detector 2 Type	Cl+Ex				Cl+Ex		Cl+Ex				Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)	0.0				0.0		0.0				0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	4				8		2				6	
Permitted Phases	4				8		2				6	

Lanes, Volumes, Timings
23: GO Station West Access/Street C & Cross Ave

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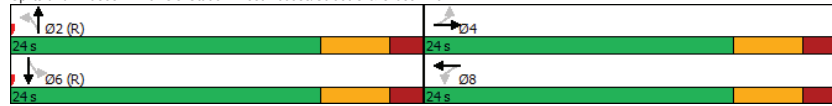
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	24.0	24.0		24.0	24.0		24.0	24.0		24.0	24.0	
Total Split (s)	24.0	24.0		24.0	24.0		24.0	24.0		24.0	24.0	
Total Split (%)	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%		50.0%	50.0%	
Maximum Green (s)	18.0	18.0		18.0	18.0		18.0	18.0		18.0	18.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0				0.0		0.0				0.0	
Total Lost Time (s)	6.0				6.0		6.0				6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	18.0				18.0		18.0				18.0	
Actuated g/C Ratio	0.38				0.38		0.38				0.38	
v/c Ratio	0.60				1.16		0.19				0.72	
Control Delay	14.2				103.2		11.3				18.8	
Queue Delay	0.0				0.0		0.0				0.0	
Total Delay	14.2				103.2		11.3				18.8	
LOS	B				F		B				A	
Approach Delay	14.2				103.2		17.6				33.4	
Approach LOS	B				F		B				C	
Queue Length 50th (m)	25.1				~54.5		5.7				26.9	
Queue Length 95th (m)	39.3				#87.1		13.7				#70.1	
Internal Link Dist (m)	185.8				140.3		31.1				108.8	
Turn Bay Length (m)											15.0	
Base Capacity (vph)	1199				847		525				665	
Starvation Cap Reductn	0				0		0				0	
Spillback Cap Reductn	0				0		0				0	
Storage Cap Reductn	0				0		0				0	
Reduced v/c Ratio	0.60				1.16		0.19				0.74	
0.72											0.01	
Intersection Summary												
Area Type:	Other											
Cycle Length:	48											
Actuated Cycle Length:	48											
Offset:	0 (0%), Referenced to phase 2:NBL and 6:SBTL, Start of Green											
Natural Cycle:	75											
Control Type:	Actuated-Coordinated											
Maximum v/c Ratio:	1.16											
Intersection Signal Delay:	51.8						Intersection LOS: D					
Intersection Capacity Utilization	101.6%						ICU Level of Service G					
Analysis Period (min)	15											
~ Volume exceeds capacity, queue is theoretically infinite.												

Lanes, Volumes, Timings
23: GO Station West Access/Street C & Cross Ave

FT 2033 PM.syn
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Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 23: GO Station West Access/Street C & Cross Ave



HCM Signalized Intersection Capacity Analysis
23: GO Station West Access/Street C & Cross Ave

FT 2033 PM.syn
04-03-2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↔			↔↔		↔	↔		↔	↔	
Traffic Volume (vph)	19	587	54	294	391	218	91	0	453	157	0	7
Future Volume (vph)	19	587	54	294	391	218	91	0	453	157	0	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0			6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor		0.95			0.95		1.00	1.00		1.00	1.00	
Flt		0.99			0.96		1.00	0.85		1.00	0.85	
Flt Protected		1.00			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		3490			3356		1770	1583		1770	1583	
Flt Permitted		0.90			0.61		0.75	1.00		0.34	1.00	
Satd. Flow (perm)		3160			2091		1402	1583		637	1583	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	21	638	59	320	425	237	99	0	492	171	0	8
RTOR Reduction (vph)	0	14	0	0	64	0	0	72	0	0	5	0
Lane Group Flow (vph)	0	704	0	0	918	0	99	420	0	171	3	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		18.0			18.0		18.0	18.0		18.0	18.0	
Effective Green, g (s)		18.0			18.0		18.0	18.0		18.0	18.0	
Actuated g/C Ratio		0.38			0.38		0.38	0.38		0.38	0.38	
Clearance Time (s)		6.0			6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		1185			784		525	593		238	593	
v/s Ratio Prot								0.27			0.00	
v/s Ratio Perm		0.22			c0.44		0.07			c0.27		
v/c Ratio		0.59			1.17		0.19	0.71		0.72	0.01	
Uniform Delay, d1		12.1			15.0		10.1	12.8		12.8	9.4	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.8			90.4		0.8	7.0		17.0	0.0	
Delay (s)		12.9			105.4		10.9	19.8		29.8	9.4	
Level of Service		B			F		B	B		C	A	
Approach Delay (s)		12.9			105.4			18.3			28.9	
Approach LOS		B			F			B			C	
Intersection Summary												
HCM 2000 Control Delay				52.1			HCM 2000 Level of Service				D	
HCM 2000 Volume to Capacity ratio				0.94								
Actuated Cycle Length (s)				48.0			Sum of lost time (s)			12.0		
Intersection Capacity Utilization				101.6%			ICU Level of Service			G		
Analysis Period (min)				15								
c Critical Lane Group												

Lanes, Volumes, Timings

FT 2038 AM PH1.syn

1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd

04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	41	127	351	728	90	208	176	1565	843	194	1809	55
Future Volume (vph)	41	127	351	728	90	208	176	1565	843	194	1809	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0		0.0	165.0			25.0	145.0		0.0	95.0	90.0
Storage Lanes	1		1	1			1	1		1	1	1
Taper Length (m)	7.5			7.5			7.5	7.5		7.5	7.5	
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Ped Bike Factor	0.99						0.98		0.99			
Frt			0.850				0.850		0.850			0.850
Fit Protected	0.950			0.950			0.950		0.950			
Satd. Flow (prot)	1624	1693	1425	3060	1676	1398	1425	4446	1398	1562	4532	1398
Fit Permitted	0.694			0.383			0.087		0.087			
Satd. Flow (perm)	1175	1693	1425	1234	1676	1366	130	4446	1377	143	4532	1398
Right Turn on Red			Yes			Yes		Yes			Yes	
Satd. Flow (RTOR)			218			226		485			155	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		285.9			293.8			275.1			252.7	
Travel Time (s)		20.6			21.2			19.8			18.2	
Confl. Peds. (#/hr)	11					11			10	10		
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
Heavy Vehicles (%)	0%	1%	2%	3%	2%	4%	14%	5%	4%	4%	3%	4%
Adj. Flow (vph)	45	138	382	791	98	226	191	1701	916	211	1966	60
Shared Lane Traffic (%)												
Lane Group Flow (vph)	45	138	382	791	98	226	191	1701	916	211	1966	60
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)				7.2				3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (k/h)	25		15	25			15	25		15	25	15
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings

FT 2038 AM PH1.syn

1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd

04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA	Free	pm+pt	NA	Perm	pm+pt	NA	Free	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		Free	8		8	2		Free	6		6
Detector Phase	7	4		3	8	8	5	2		1	6	6
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0	10.0	6.0	15.0		6.0	15.0	15.0
Minimum Split (s)	10.0	34.0		11.0	43.0	43.0	10.0	34.0		10.0	34.0	34.0
Total Split (s)	10.0	34.0		19.0	43.0	43.0	13.0	53.0		14.0	54.0	54.0
Total Split (%)	8.3%	28.3%		15.8%	35.8%	35.8%	10.8%	44.2%		11.7%	45.0%	45.0%
Maximum Green (s)	6.0	27.0		14.0	36.0	36.0	9.0	46.0		10.0	47.0	47.0
Yellow Time (s)	3.0	4.0		3.0	4.0	4.0	3.0	4.0		3.0	4.0	4.0
All-Red Time (s)	1.0	3.0		2.0	3.0	3.0	1.0	3.0		1.0	3.0	3.0
Lost Time Adjust (s)	0.0	-3.0		0.0	-3.0	-3.0	0.0	-3.0		0.0	-3.0	-3.0
Total Lost Time (s)	4.0	4.0		5.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	4.0		3.0	4.0	4.0	3.0	5.0		3.0	5.0	5.0
Recall Mode	None	None		None	None	None	None	C-Max		None	C-Max	C-Max
Walk Time (s)					7.0	7.0		7.0			7.0	7.0
Flash Dont Walk (s)					29.0	29.0		20.0			20.0	20.0
Pedestrian Calls (#/hr)					0	0		0			0	0
Act Effct Green (s)	25.0	19.0	120.0	37.0	30.0	30.0	69.8	49.8	120.0	70.2	50.0	50.0
Actuated g/C Ratio	0.21	0.16	1.00	0.31	0.25	0.25	0.58	0.42	1.00	0.58	0.42	0.42
v/c Ratio	0.17	0.51	0.27	1.33	0.23	0.44	0.66	0.92	0.67	0.66	1.04	0.09
Control Delay	29.4	52.4	0.5	193.7	37.3	7.3	38.7	42.9	2.6	36.7	67.0	0.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.4	52.4	0.5	193.7	37.3	7.3	38.7	42.9	2.6	36.7	67.0	0.3
LOS	C	D	A	F	D	A	D	D	A	D	E	A
Approach Delay		15.5			142.2			29.5			62.4	
Approach LOS		B			F			C			E	
Queue Length 50th (m)	7.8	31.7	0.0	~131.3	19.9	0.0	29.8	145.7	0.0	32.1	~193.0	0.0
Queue Length 95th (m)	15.8	50.2	0.0	#163.2	33.3	19.2	#75.4	#181.0	0.0	#76.7	#223.8	0.0
Internal Link Dist (m)		261.9			269.8			251.1			228.7	
Turn Bay Length (m)	60.0			165.0		25.0	145.0			95.0		90.0
Base Capacity (vph)	267	423	1425	593	544	596	291	1845	1377	322	1888	672
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.17	0.33	0.27	1.33	0.18	0.38	0.66	0.92	0.67	0.66	1.04	0.09
Intersection Summary												
Area Type:	CBD											
Cycle Length:	120											
Actuated Cycle Length:	120											
Offset:	33.6 (28%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green											
Natural Cycle:	140											
Control Type:	Actuated-Coordinated											
Maximum v/c Ratio:	1.33											
Intersection Signal Delay:	57.9						Intersection LOS: E					

Lanes, Volumes, Timings
1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd

FT 2038 AM PH1.syn
04-03-2024

Intersection Capacity Utilization 95.2%
ICU Level of Service F
Analysis Period (min) 15
- Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd



HCM Signalized Intersection Capacity Analysis
1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd

FT 2038 AM PH1.syn
04-03-2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↑	↗	↖	↑	↗	↖	↖	↗	↖	↗	↖
Traffic Volume (vph)	41	127	351	728	90	208	176	1565	843	194	1809	55
Future Volume (vph)	41	127	351	728	90	208	176	1565	843	194	1809	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	1.0	5.0	4.0	4.0	4.0	4.0	1.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.98	1.00	1.00	0.99	1.00	1.00	1.00
Flpb, ped/bikes	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1614	1693	1425	3060	1676	1366	1425	4446	1377	1562	4532	1398
Flt Permitted	0.69	1.00	1.00	0.38	1.00	1.00	0.09	1.00	1.00	0.09	1.00	1.00
Satd. Flow (perm)	1178	1693	1425	1233	1676	1366	130	4446	1377	142	4532	1398
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	45	138	382	791	98	226	191	1701	916	211	1966	60
RTOR Reduction (vph)	0	0	0	0	0	170	0	0	0	0	0	35
Lane Group Flow (vph)	45	138	382	791	98	57	191	1701	916	211	1966	25
Confl. Peds. (#/hr)	11					11			10	10		
Heavy Vehicles (%)	0%	1%	2%	3%	2%	4%	14%	5%	4%	4%	3%	4%
Turn Type	pm+pt	NA	Free	pm+pt	NA	Perm	pm+pt	NA	Free	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		Free	8		8	2		Free	6		6
Actuated Green, G (s)	21.6	16.8	120.0	35.8	27.0	27.0	66.0	46.0	120.0	66.4	46.2	46.2
Effective Green, g (s)	21.6	19.8	120.0	35.8	30.0	30.0	66.0	49.0	120.0	66.4	49.2	49.2
Actuated g/C Ratio	0.18	0.17	1.00	0.30	0.25	0.25	0.55	0.41	1.00	0.55	0.41	0.41
Clearance Time (s)	4.0	7.0		5.0	7.0	7.0	4.0	7.0		4.0	7.0	7.0
Vehicle Extension (s)	3.0	4.0		3.0	4.0	4.0	3.0	5.0		3.0	5.0	5.0
Lane Grp Cap (vph)	229	279	1425	580	419	341	287	1815	1377	317	1858	573
v/s Ratio Prot	0.01	0.08		c0.16	0.06		0.11	0.38		0.11	c0.43	
v/s Ratio Perm	0.03		0.27	c0.25		0.04	0.25		c0.67	0.26		0.02
v/c Ratio	0.20	0.49	0.27	1.36	0.23	0.17	0.67	0.94	0.67	0.67	1.06	0.04
Uniform Delay, d1	41.5	45.6	0.0	39.9	35.8	35.2	30.0	34.0	0.0	29.0	35.4	21.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.4	1.9	0.5	174.6	0.4	0.3	5.7	10.7	2.6	5.2	38.2	0.1
Delay (s)	41.9	47.4	0.5	214.5	36.2	35.5	35.8	44.8	2.6	34.2	73.6	21.4
Level of Service	D	D	A	F	D	D	D	D	A	C	E	C
Approach Delay (s)		15.2			162.5			30.4			68.5	
Approach LOS		B			F			C			E	
Intersection Summary												
HCM 2000 Control Delay			63.7			HCM 2000 Level of Service		E				
HCM 2000 Volume to Capacity ratio	1.12											
Actuated Cycle Length (s)			120.0			Sum of lost time (s)		17.0				
Intersection Capacity Utilization			95.2%			ICU Level of Service		F				
Analysis Period (min)	15											
c Critical Lane Group												

Lanes, Volumes, Timings

2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	3	0	179	552	34	269	0	2313	559	0	2984	7
Future Volume (vph)	3	0	179	552	34	269	0	2313	559	0	2984	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.5	3.3	3.6	3.5	3.6	3.6	3.6	3.6	3.6	3.5
Storage Length (m)	50.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Storage Lanes	1		1	1		1	0		1	0		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.91	1.00	1.00	0.86	0.86
Ped Bike Factor									0.98			1.00
Frt			0.850			0.850			0.850			
Flt Protected	0.950			0.950	0.958							
Satd. Flow (prot)	1570	0	1395	1421	1453	1356	0	4446	1384	0	5711	0
Flt Permitted	0.950			0.950	0.958							
Satd. Flow (perm)	1570	0	1395	1421	1453	1356	0	4446	1353	0	5711	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			31			259			187			
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		142.1			192.6			324.8			275.1	
Travel Time (s)		10.2			13.9			23.4			19.8	
Confl. Peds. (#/hr)							8		5	5		8
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
Heavy Vehicles (%)	0%	0%	3%	5%	23%	6%	0%	5%	5%	0%	3%	0%
Adj. Flow (vph)	3	0	195	600	37	292	0	2514	608	0	3243	8
Shared Lane Traffic (%)				47%								
Lane Group Flow (vph)	3	0	195	318	319	292	0	2514	608	0	3251	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.3			3.3			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.19	1.14	1.16	1.19	1.14	1.16	1.14	1.14	1.14	1.14	1.14	1.16
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1		1	1		1			1			2
Detector Template	Left		Right	Left	Thru	Right		Thru	Right		Thru	
Leading Detector (m)	2.0		2.0	2.0	10.0	2.0		10.0	2.0		10.0	
Trailing Detector (m)	0.0		0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Detector 1 Position(m)	0.0		0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Detector 1 Size(m)	2.0		2.0	2.0	0.6	2.0		0.6	2.0		0.6	
Detector 1 Type	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Detector 1 Delay (s)	0.0		0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Detector 2 Position(m)					9.4			9.4			9.4	
Detector 2 Size(m)					0.6			0.6			0.6	
Detector 2 Type					Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

Lanes, Volumes, Timings

2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp

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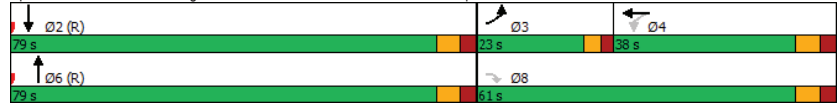
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)						0.0					0.0	0.0
Turn Type	Prot		Perm	Perm	NA	Free			NA	Free	NA	NA
Protected Phases	3				4				6			2
Permitted Phases			8	4		Free			Free			
Detector Phase	3		8	4	4				6			2
Switch Phase												
Minimum Initial (s)	7.0		10.0	10.0	10.0				5.0			28.0
Minimum Split (s)	23.0		38.0	38.0	38.0				35.0			35.0
Total Split (s)	23.0		61.0	38.0	38.0				79.0			79.0
Total Split (%)	16.4%		43.6%	27.1%	27.1%				56.4%			56.4%
Maximum Green (s)	18.0		54.0	31.0	31.0				72.0			72.0
Yellow Time (s)	3.0		4.0	4.0	4.0				4.0			4.0
All-Red Time (s)	2.0		3.0	3.0	3.0				3.0			3.0
Lost Time Adjust (s)	-1.0		-3.0	-3.0	-3.0				-3.0			-3.0
Total Lost Time (s)	4.0		4.0	4.0	4.0				4.0			4.0
Lead/Lag	Lead			Lag	Lag							
Lead-Lag Optimize?	Yes			Yes	Yes							
Vehicle Extension (s)	3.0		3.0	3.0	3.0				4.5			4.5
Recall Mode	Min		Min	Min	Min				C-Min			C-Min
Walk Time (s)			7.0	7.0	7.0				7.0			7.0
Flash Dont Walk (s)			24.0	24.0	24.0				21.0			21.0
Pedestrian Calls (#/hr)			0	0	0				0			0
Act Effct Green (s)	8.0		52.5	40.5	40.5	140.0			79.5		140.0	79.5
Actuated g/C Ratio	0.06		0.38	0.29	0.29	1.00			0.57		1.00	0.57
v/c Ratio	0.03		0.36	0.78	0.76	0.22			1.00		0.45	1.00
Control Delay	63.3		27.5	58.7	57.3	0.4			39.6		0.3	46.7
Queue Delay	0.0		0.0	0.0	0.0	0.0			0.0		0.0	0.0
Total Delay	63.3		27.5	58.7	57.3	0.4			39.6		0.3	46.7
LOS	E		C	E	E	A			D		A	D
Approach Delay		28.0			39.9				31.9			46.7
Approach LOS		C			D				C			D
Queue Length 50th (m)	0.9		33.4	88.2	87.8	0.0			~181.2		0.0	~291.8
Queue Length 95th (m)	4.2		52.8	124.1	123.4	0.0			m164.6		m0.0	#320.6
Internal Link Dist (m)			118.1		168.6				300.8			251.1
Turn Bay Length (m)	50.0											
Base Capacity (vph)	213		586	414	424	1356			2525		1353	3243
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	0.01		0.33	0.77	0.75	0.22			1.00		0.45	1.00
Intersection Summary												
Area Type:	CBD											
Cycle Length:	140											
Actuated Cycle Length:	140											
Offset:	115.4 (82%), Referenced to phase 2:SBT and 6:NBT, Start of Green											
Natural Cycle:	140											
Control Type:	Actuated-Coordinated											
Maximum v/c Ratio:	1.00											

Lanes, Volumes, Timings
2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp

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Intersection Signal Delay: 39.2	Intersection LOS: D
Intersection Capacity Utilization 88.5%	ICU Level of Service E
Analysis Period (min) 15	
~ Volume exceeds capacity, queue is theoretically infinite.	
Queue shown is maximum after two cycles.	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	
m Volume for 95th percentile queue is metered by upstream signal.	

Splits and Phases: 2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp



HCM Signalized Intersection Capacity Analysis
2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp

FT 2038 AM PH1.syn
04-03-2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	3	0	179	552	34	269	0	2313	559	0	2984	7
Future Volume (vph)	3	0	179	552	34	269	0	2313	559	0	2984	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.5	3.3	3.6	3.5	3.6	3.6	3.6	3.6	3.6	3.5
Total Lost time (s)	4.0		4.0	4.0	4.0	1.0		4.0	4.0		4.0	
Lane Util. Factor	1.00		1.00	0.95	0.95	1.00		0.91	1.00		0.86	
Frpb, ped/bikes	1.00		1.00	1.00	1.00	1.00		1.00	0.98		1.00	
Flpb, ped/bikes	1.00		1.00	1.00	1.00	1.00		1.00	1.00		1.00	
Frt	1.00		0.85	1.00	1.00	0.85		1.00	0.85		1.00	
Flt Protected	0.95		1.00	0.95	0.96	1.00		1.00	1.00		1.00	
Satd. Flow (perm)	1570		1395	1421	1453	1356		4446	1353		5709	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	3	0	195	600	37	292	0	2514	608	0	3243	8
RTOR Reduction (vph)	0	0	19	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	3	0	176	318	319	292	0	2514	608	0	3251	0
Confl. Peds. (#/hr)							8		5	5		8
Heavy Vehicles (%)	0%	0%	3%	5%	23%	6%	0%	5%	5%	0%	3%	0%
Turn Type	Prot		Perm	Perm	NA	Free		NA	Free		NA	
Protected Phases	3				4			6			2	
Permitted Phases			8	4		Free			Free			
Actuated Green, G (s)	7.0		49.5	37.5	37.5	140.0		76.5	140.0		76.5	
Effective Green, g (s)	8.0		52.5	40.5	40.5	140.0		79.5	140.0		79.5	
Actuated g/C Ratio	0.06		0.38	0.29	0.29	1.00		0.57	1.00		0.57	
Clearance Time (s)	5.0		7.0	7.0	7.0			7.0			7.0	
Vehicle Extension (s)	3.0		3.0	3.0	3.0			4.5			4.5	
Lane Grp Cap (vph)	89		523	411	420	1356		2524	1353		3241	
v/s Ratio Prot	0.00							0.57			c0.57	
v/s Ratio Perm			0.13	c0.22	0.22	0.22			c0.45			
v/c Ratio	0.03		0.34	0.77	0.76	0.22		1.00	0.45		1.00	
Uniform Delay, d1	62.3		31.3	45.6	45.3	0.0		30.1	0.0		30.2	
Progression Factor	1.00		1.00	1.00	1.00	1.00		1.05	1.00		1.00	
Incremental Delay, d2	0.2		0.4	8.8	7.7	0.4		8.0	0.3		16.5	
Delay (s)	62.5		31.7	54.3	53.0	0.4		39.6	0.3		46.8	
Level of Service	E		C	D	D	A		D	A		D	
Approach Delay (s)		32.1				36.9		31.9			46.8	
Approach LOS		C				D		C			D	
Intersection Summary												
HCM 2000 Control Delay			39.0		HCM 2000 Level of Service				D			
HCM 2000 Volume to Capacity ratio			0.91									
Actuated Cycle Length (s)			140.0		Sum of lost time (s)				12.0			
Intersection Capacity Utilization			88.5%		ICU Level of Service				E			
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
3: Trafalgar Rd & QEW EB-Off Ramp

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Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔↔	↔		↕↕↕	↕↕↕	↔
Traffic Volume (vph)	940	849	0	1957	2003	496
Future Volume (vph)	940	849	0	1957	2003	496
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.5	3.6	3.6	3.6	3.6
Lane Util. Factor	0.97	1.00	1.00	0.91	0.91	1.00
Frt		0.850				0.850
Flt Protected	0.950					
Satd. Flow (prot)	2958	1423	0	4404	4489	1454
Flt Permitted	0.950					
Satd. Flow (perm)	2958	1423	0	4404	4489	1454
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		1				191
Link Speed (k/h)	50			50	50	
Link Distance (m)	199.2			51.4	324.8	
Travel Time (s)	14.3			3.7	23.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	1%	0%	6%	4%	0%
Adj. Flow (vph)	1022	923	0	2127	2177	539
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1022	923	0	2127	2177	539
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	6.6			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.19	1.16	1.14	1.14	1.14	1.14
Turning Speed (k/h)	24	14	24			14
Number of Detectors	1	1		2	2	1
Detector Template	Left	Right		Thru	Thru	Right
Leading Detector (m)	2.0	2.0		10.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	2.0	2.0		0.6	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)				9.4	9.4	
Detector 2 Size(m)				0.6	0.6	
Detector 2 Type				Cl+Ex	Cl+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Perm	Perm		NA	NA	Free
Protected Phases				2	2	
Permitted Phases	4	4				Free
Detector Phase	4	4		2	2	

Lanes, Volumes, Timings
3: Trafalgar Rd & QEW EB-Off Ramp

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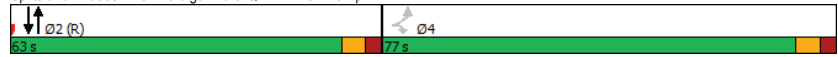
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Switch Phase						
Minimum Initial (s)	10.0	10.0		29.0	29.0	
Minimum Split (s)	38.0	38.0		36.0	36.0	
Total Split (s)	77.0	77.0		63.0	63.0	
Total Split (%)	55.0%	55.0%		45.0%	45.0%	
Maximum Green (s)	70.0	70.0		56.0	56.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	
All-Red Time (s)	3.0	3.0		3.0	3.0	
Lost Time Adjust (s)	-3.0	-3.0		-3.0	-3.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Recall Mode	None	None		C-Max	C-Max	
Walk Time (s)	7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	24.0	24.0		22.0	22.0	
Pedestrian Calls (#/hr)	0	0		0	0	
Act Effct Green (s)	73.0	73.0		59.0	59.0	140.0
Actuated g/C Ratio	0.52	0.52		0.42	0.42	1.00
v/c Ratio	0.66	1.24		1.15	1.15	0.37
Control Delay	27.1	152.0		103.0	100.9	0.3
Queue Delay	0.0	0.0		0.0	0.0	0.0
Total Delay	27.1	152.0		103.0	100.9	0.3
LOS	C	F		F	F	A
Approach Delay	86.4			103.0	81.0	
Approach LOS	F			F	F	
Queue Length 50th (m)	109.1	~335.1		~262.7	~270.7	0.0
Queue Length 95th (m)	133.3	#417.9		m152.0	m#275.4	m0.0
Internal Link Dist (m)	175.2			27.4	300.8	
Turn Bay Length (m)						
Base Capacity (vph)	1542	742		1855	1891	1454
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	0.66	1.24		1.15	1.15	0.37
Intersection Summary						
Area Type:	CBD					
Cycle Length:	140					
Actuated Cycle Length:	140					
Offset:	133.6 (95%), Referenced to phase 2.NBSB and 6.; Start of Green					
Natural Cycle:	75					
Control Type:	Actuated-Coordinated					
Maximum v/c Ratio:	1.24					
Intersection Signal Delay:	89.4					
Intersection Capacity Utilization:	108.1%					
ICU Level of Service:	G					
Analysis Period (min):	15					
~ Volume exceeds capacity, queue is theoretically infinite. Queue shown is maximum after two cycles.						

Lanes, Volumes, Timings
3: Trafalgar Rd & QEW EB-Off Ramp

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- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Trafalgar Rd & QEW EB-Off Ramp



HCM Signalized Intersection Capacity Analysis
3: Trafalgar Rd & QEW EB-Off Ramp

FT 2038 AM PH1.syn
04-03-2024



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔↔	↔		↕↕	↕↕	↔
Traffic Volume (vph)	940	849	0	1957	2003	496
Future Volume (vph)	940	849	0	1957	2003	496
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.5	3.6	3.6	3.6	3.6
Total Lost time (s)	4.0	4.0		4.0	4.0	1.0
Lane Util. Factor	0.97	1.00		0.91	0.91	1.00
Friction	1.00	0.85		1.00	1.00	0.85
Fit Protected	0.95	1.00		1.00	1.00	1.00
Satd. Flow (prot)	2958	1423		4404	4489	1454
Fit Permitted	0.95	1.00		1.00	1.00	1.00
Satd. Flow (perm)	2958	1423		4404	4489	1454
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1022	923	0	2127	2177	539
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	1022	923	0	2127	2177	539
Heavy Vehicles (%)	3%	1%	0%	6%	4%	0%
Turn Type	Perm	Perm		NA	NA	Free
Protected Phases				2	2	
Permitted Phases	4	4				Free
Actuated Green, G (s)	70.0	70.0		56.0	56.0	140.0
Effective Green, g (s)	73.0	73.0		59.0	59.0	140.0
Actuated g/C Ratio	0.52	0.52		0.42	0.42	1.00
Clearance Time (s)	7.0	7.0		7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	1542	741		1855	1891	1454
v/s Ratio Prot				0.48	0.48	
v/s Ratio Perm	0.35	0.65				0.37
v/c Ratio	0.66	1.24		1.15	1.15	0.37
Uniform Delay, d1	24.5	33.5		40.5	40.5	0.0
Progression Factor	1.00	1.00		0.96	0.77	1.00
Incremental Delay, d2	1.1	121.4		66.7	70.5	0.3
Delay (s)	25.6	154.9		105.7	101.8	0.3
Level of Service	C	F		F	F	A
Approach Delay (s)	87.0			105.7	81.6	
Approach LOS	F			F	F	

Intersection Summary			
HCM 2000 Control Delay	90.7	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.23		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	108.1%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
4: Trafalgar Rd & Argus Rd

FT 2038 AM PH1.syn
04-03-2024

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	246	0	2928	2225	629
Future Volume (vph)	0	246	0	2928	2225	629
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.6	3.5	3.6	3.6	3.6	3.6
Lane Util. Factor	1.00	1.00	1.00	0.91	0.91	0.91
Ped Bike Factor						
Frt		0.865			0.967	
Fit Protected						
Satd. Flow (prot)	0	1367	0	4363	4359	0
Fit Permitted						
Satd. Flow (perm)	0	1367	0	4363	4359	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	145.7			270.2	51.4	
Travel Time (s)	10.5			19.5	3.7	
Confl. Peds. (#/hr)						11
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	7%	0%	7%	4%	2%
Adj. Flow (vph)	0	267	0	3183	2418	684
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	267	0	3183	3102	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			3.3	3.3	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.14	1.16	1.14	1.14	1.14	1.14
Turning Speed (k/h)	24	14	24			14
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	CBD					
Control Type:	Unsignalized					
Intersection Capacity Utilization	87.2%			ICU Level of Service E		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
4: Trafalgar Rd & Argus Rd

FT 2038 AM PH1.syn
04-03-2024

Movement	EBL	EBR	NBL	NBT	SBT	SBR	
Lane Configurations							
Traffic Volume (veh/h)	0	246	0	2928	2225	629	
Future Volume (Veh/h)	0	246	0	2928	2225	629	
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	267	0	3183	2418	684	
Pedestrians	11						
Lane Width (m)	3.5						
Walking Speed (m/s)	1.2						
Percent Blockage	1						
Right turn flare (veh)							
Median type			None	None			
Median storage (veh)							
Upstream signal (m)				270	52		
pX, platoon unblocked	0.73	0.59	0.59				
vC, conflicting volume	3832	1159	3113				
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol	918	0	2131				
tC, single (s)	6.8	7.0	4.1				
tC, 2 stage (s)							
tF (s)	3.5	3.4	2.2				
p0 queue free %	100	57	100				
cM capacity (veh/h)	199	620	150				
Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	267	1061	1061	1061	967	967	1168
Volume Left	0	0	0	0	0	0	0
Volume Right	267	0	0	0	0	0	684
eSH	620	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.43	0.62	0.62	0.62	0.57	0.57	0.69
Queue Length 95th (m)	17.3	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (s)	15.1	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	C						
Approach Delay (s)	15.1	0.0			0.0		
Approach LOS	C						
Intersection Summary							
Average Delay				0.6			
Intersection Capacity Utilization	87.2%			ICU Level of Service		E	
Analysis Period (min)	15						

Lanes, Volumes, Timings

FT 2038 AM PH1.syn

5: Trafalgar Rd & Cross Ave/South Service Rd

04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1211	99	196	46	70	114	168	1323	30	241	1823	308
Future Volume (vph)	1211	99	196	46	70	114	168	1323	30	241	1823	308
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.6	3.3	3.6	3.5	3.3	3.6	3.6	3.3	3.6	3.6
Storage Length (m)	130.0	0.0	25.0	0.0	50.0	0.0	25.0	0.0	25.0	0.0	0.0	0.0
Storage Lanes	1	0	1	1	1	1	1	0	1	0	1	0
Taper Length (m)	7.5		7.5		7.5		7.5		7.5		7.5	
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.91	0.91
Ped Bike Factor	1.00	0.99		0.99		0.99		1.00		0.99		0.99
Frt	0.900					0.850		0.997		0.978		
Fit Protected	0.950			0.950		0.950		0.950		0.950		
Satd. Flow (prot)	2795	1380	0	1525	1583	1382	1428	4500	0	1525	4404	0
Fit Permitted	0.950			0.566		0.097		0.088		0.088		
Satd. Flow (perm)	2789	1380	0	903	1583	1362	146	4500	0	141	4404	0
Right Turn on Red			Yes			Yes		Yes			Yes	
Satd. Flow (RTOR)		78				179		2			27	
Link Speed (k/h)	50			50		50		50		50		50
Link Distance (m)	151.2			330.4		150.2		270.2		270.2		19.5
Travel Time (s)	10.9			23.8		10.8		19.5		19.5		19.5
Confl. Peds. (#/hr)	1		4	4		1	10		52	52		10
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
Heavy Vehicles (%)	9%	6%	12%	3%	8%	4%	10%	3%	0%	3%	3%	4%
Adj. Flow (vph)	1316	108	213	50	76	124	183	1438	33	262	1982	335
Shared Lane Traffic (%)												
Lane Group Flow (vph)	1316	321	0	50	76	124	183	1471	0	262	2317	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)	6.6			6.6		6.6		3.3		3.3		3.3
Link Offset(m)	0.0			0.0		0.0		0.0		0.0		0.0
Crosswalk Width(m)	4.8			4.8		4.8		4.8		4.8		4.8
Two way Left Turn Lane												
Headway Factor	1.19	1.14	1.14	1.19	1.14	1.16	1.19	1.14	1.14	1.19	1.14	1.14
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2	1	1	2		1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

Lanes, Volumes, Timings

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5: Trafalgar Rd & Cross Ave/South Service Rd

04-03-2024

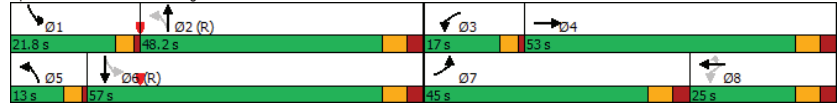
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases				8		8	2			6		
Detector Phases	7	4		3	8	8	5	2		1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		12.0	10.0	10.0	7.0	27.0		7.0	27.0	
Minimum Split (s)	17.0	25.0		17.0	25.0	25.0	11.5	34.0		11.5	34.0	
Total Split (s)	45.0	53.0		17.0	25.0	25.0	13.0	48.2		21.8	57.0	
Total Split (%)	32.1%	37.9%		12.1%	17.9%	17.9%	9.3%	34.4%		15.6%	40.7%	
Maximum Green (s)	38.0	46.0		13.0	18.0	18.0	9.0	41.2		17.8	50.0	
Yellow Time (s)	4.0	4.0		3.0	4.0	4.0	3.0	4.0		3.0	4.0	
All-Red Time (s)	3.0	3.0		1.0	3.0	3.0	1.0	3.0		1.0	3.0	
Lost Time Adjust (s)	-3.0	-3.0		0.0	-3.0	-3.0	0.0	-3.0		0.0	-3.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	4.0		3.5	4.0	4.0	3.0	5.0		3.0	5.0	
Recall Mode	Min	Min		Min	Min	Min	Min	C-Max		Min	C-Max	
Walk Time (s)		7.0			7.0	7.0		7.0			7.0	
Flash Dont Walk (s)		11.0			11.0	11.0		11.0			11.0	
Pedestrian Calls (#/hr)		0			0	0		0			0	
Act Effct Green (s)	41.0	45.4		28.4	16.4	16.4	57.8	44.2		70.6	53.0	
Actuated g/C Ratio	0.29	0.32		0.20	0.12	0.12	0.41	0.32		0.50	0.38	
v/c Ratio	1.61	0.64		0.21	0.41	0.39	0.99	1.03		0.90	1.38	
Control Delay	312.9	36.2		28.3	63.4	5.0	86.3	84.6		47.0	208.5	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	312.9	36.2		28.3	63.4	5.0	86.3	84.6		47.0	208.5	
LOS	F	D		C	E	A	F	F		D	F	
Approach Delay		258.6			27.4			84.8			192.1	
Approach LOS		F			C			F			F	
Queue Length 50th (m)	~282.6	61.3		8.4	20.9	0.0	45.1	~164.5		62.7	~322.6	
Queue Length 95th (m)	#326.5	91.5		15.8	36.8	4.1	m#66.6	m#135.5		m#56.9	m#255.8	
Internal Link Dist (m)		127.2			306.4			126.2			246.2	
Turn Bay Length (m)	130.0			25.0			50.0			25.0		
Base Capacity (vph)	818	535		247	237	356	184	1422		292	1684	
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	
Reduced v/c Ratio	1.61	0.60		0.20	0.32	0.35	0.99	1.03		0.90	1.38	
Intersection Summary												
Area Type:	CBD											
Cycle Length:	140											
Actuated Cycle Length:	140											
Offset:	128 (91%), Referenced to phase 2:NBT and 6:SBTL, Start of Green											
Natural Cycle:	150											
Control Type:	Actuated-Coordinated											
Maximum v/c Ratio:	1.61											

Lanes, Volumes, Timings
5: Trafalgar Rd & Cross Ave/South Service Rd

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Intersection Signal Delay: 174.2	Intersection LOS: F
Intersection Capacity Utilization 112.3%	ICU Level of Service H
Analysis Period (min) 15	
~ Volume exceeds capacity, queue is theoretically infinite.	
Queue shown is maximum after two cycles.	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	
m Volume for 95th percentile queue is metered by upstream signal.	

Splits and Phases: 5: Trafalgar Rd & Cross Ave/South Service Rd



HCM Signalized Intersection Capacity Analysis
5: Trafalgar Rd & Cross Ave/South Service Rd

FT 2038 AM PH1.syn
04-03-2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔		↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	1211	99	196	46	70	114	168	1323	30	241	1823	308
Future Volume (vph)	1211	99	196	46	70	114	168	1323	30	241	1823	308
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.3	3.6	3.5	3.3	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	1.00		1.00	1.00	1.00	1.00	0.91		1.00	0.91	
Frpb, ped/bikes	1.00	0.99		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	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.90		1.00	1.00	0.85	1.00	1.00		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	2795	1380		1520	1583	1362	1428	4498		1525	4405	
Flt Permitted	0.95	1.00		0.57	1.00	1.00	0.10	1.00		0.09	1.00	
Satd. Flow (perm)	2795	1380		905	1583	1362	146	4498		142	4405	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1316	108	213	50	76	124	183	1438	33	262	1982	335
RTOR Reduction (vph)	0	53	0	0	0	109	0	1	0	0	17	0
Lane Group Flow (vph)	1316	268	0	50	76	15	183	1470	0	262	2300	0
Confl. Peds. (#/hr)	1		4	4		1	10		52	52		10
Heavy Vehicles (%)	9%	6%	12%	3%	8%	4%	10%	3%	0%	3%	3%	4%
Turn Type	Prot	NA		pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases				8		8	2			6		
Actuated Green, G (s)	38.0	42.4		25.4	13.4	13.4	54.8	41.2		67.6	50.0	
Effective Green, g (s)	41.0	45.4		25.4	16.4	16.4	54.8	44.2		67.6	53.0	
Actuated g/C Ratio	0.29	0.32		0.18	0.12	0.12	0.39	0.32		0.48	0.38	
Clearance Time (s)	7.0	7.0		4.0	7.0	7.0	4.0	7.0		4.0	7.0	
Vehicle Extension (s)	3.0	4.0		3.5	4.0	4.0	3.0	5.0		3.0	5.0	
Lane Grp Cap (vph)	818	447		216	185	159	181	1420		289	1667	
v/s Ratio Prot	c0.47	c0.19		0.02	0.05		c0.10	0.33		0.14	c0.52	
v/s Ratio Perm				0.02		0.01	0.30			0.29		
v/c Ratio	1.61	0.60		0.23	0.41	0.09	1.01	1.03		0.91	1.38	
Uniform Delay, d1	49.5	39.7		48.5	57.3	55.2	40.9	47.9		42.8	43.5	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.28	1.30		1.14	1.20	
Incremental Delay, d2	279.7	2.6		0.7	2.0	0.3	46.3	25.5		4.2	171.3	
Delay (s)	329.2	42.3		49.2	59.3	55.5	98.5	87.9		52.8	223.5	
Level of Service	F	D		D	E	E	F	F		D	F	
Approach Delay (s)		272.9			55.4			89.1			206.1	
Approach LOS		F			E			F			F	
Intersection Summary												
HCM 2000 Control Delay			186.2									F
HCM 2000 Volume to Capacity ratio			1.32									
Actuated Cycle Length (s)			140.0				Sum of lost time (s)			16.0		
Intersection Capacity Utilization			112.3%				ICU Level of Service					H
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
6: Trafalgar Rd & Cornwall Rd

FT 2038 AM PH1.syn
04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	347	541	93	72	612	568	116	593	79	857	944	280
Future Volume (vph)	347	541	93	72	612	568	116	593	79	857	944	280
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.5
Storage Length (m)	80.0	0.0	80.0	0.0	25.0	0.0	80.0	0.0	80.0	0.0	0.0	0.0
Storage Lanes	2	0	1	1	1	1	0	1	0	1	1	1
Taper Length (m)	7.5		7.5		7.5		7.5		7.5		7.5	
Lane Util. Factor	0.97	0.95	0.95	1.00	0.95	1.00	1.00	*0.80	0.95	0.97	*0.80	1.00
Ped Bike Factor	0.99	0.99		0.99		0.98	1.00	1.00		0.99		0.98
Frt		0.978				0.850		0.982				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2987	3052	0	1481	3154	1411	1540	2652	0	2929	1341	1356
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2945	3052	0	1472	3154	1384	1535	2652	0	2888	1341	1324
Right Turn on Red			Yes			Yes		Yes		Yes		Yes
Satd. Flow (RTOR)		13				499		8				168
Link Speed (k/h)		50			50			50				50
Link Distance (m)		285.8			142.3			311.4				130.3
Travel Time (s)		20.6			10.2			22.4				9.4
Confl. Peds. (#/hr)	25		7	7		25	9		18	18		9
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
Heavy Vehicles (%)	2%	4%	1%	6%	3%	3%	2%	1%	0%	4%	2%	6%
Adj. Flow (vph)	377	588	101	78	665	617	126	645	86	932	1026	304
Shared Lane Traffic (%)												
Lane Group Flow (vph)	377	689	0	78	665	617	126	731	0	932	1026	304
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		6.6			6.6			6.6				6.6
Link Offset(m)		0.0			0.0			0.0				0.0
Crosswalk Width(m)		4.8			4.8			4.8				4.8
Two way Left Turn Lane												
Headway Factor	1.19	1.14	1.14	1.19	1.14	1.14	1.19	1.14	1.14	1.19	1.14	1.16
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2	1	1	2		1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0		2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6		2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4				9.4
Detector 2 Size(m)		0.6			0.6			0.6				0.6
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex				Cl+Ex
Detector 2 Channel												

Lanes, Volumes, Timings
6: Trafalgar Rd & Cornwall Rd

FT 2038 AM PH1.syn
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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA	Free	Prot	NA		Prot	NA	Perm
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases					Free							6
Detector Phases	3	8		7	4		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	7.0	10.0		7.0	10.0		7.0	20.0		7.0	20.0	20.0
Minimum Split (s)	12.0	37.0		12.0	37.0		12.0	39.0		12.0	39.0	39.0
Total Split (s)	16.0	39.0		14.0	37.0		13.0	42.0		45.0	74.0	74.0
Total Split (%)	11.4%	27.9%		10.0%	26.4%		9.3%	30.0%		32.1%	52.9%	52.9%
Maximum Green (s)	11.0	32.0		9.0	30.0		8.0	35.0		40.0	67.0	67.0
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	4.0
All-Red Time (s)	2.0	3.0		2.0	3.0		2.0	3.0		2.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-3.0		-1.0	-3.0		-1.0	-3.0		-1.0	-3.0	-3.0
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	0.2	0.2		0.2	0.2		0.2	0.2		0.2	0.2	0.2
Recall Mode	Max	Max		Max	Max		None	C-Max		Max	C-Max	C-Max
Walk Time (s)		7.0			7.0			7.0			7.0	7.0
Flash Dont Walk (s)		23.0			23.0			25.0			25.0	25.0
Pedestrian Calls (#/hr)		0			0			0			0	0
Act Effct Green (s)	12.0	35.0		10.0	33.0	140.0	9.0	38.0		41.0	70.0	70.0
Actuated g/C Ratio	0.09	0.25		0.07	0.24	1.00	0.06	0.27		0.29	0.50	0.50
v/c Ratio	1.47	0.89		0.74	0.90	0.45	1.27	1.01		1.09	1.53	0.41
Control Delay	275.3	64.7		101.2	67.5	1.0	230.5	85.2		114.7	267.3	8.5
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	275.3	64.7		101.2	67.5	1.0	230.5	85.2		114.7	267.3	8.5
LOS	F	E		F	E	A	F	F		F	F	A
Approach Delay		139.2			39.3			106.6				169.6
Approach LOS		F			D			F				F
Queue Length 50th (m)	~77.6	101.0		22.7	99.5	0.0	~46.3	~134.5		~161.3	~512.2	16.9
Queue Length 95th (m)	#111.2	#135.6		#50.9	#133.7	0.0	#89.8	#187.8		m116.1m#339.6	m10.6	
Internal Link Dist (m)		261.8			118.3			287.4			106.3	
Turn Bay Length (m)	80.0			80.0		25.0		80.0				
Base Capacity (vph)	256	772		105	743	1384	99	725		857	670	746
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	0
Reduced v/c Ratio	1.47	0.89		0.74	0.90	0.45	1.27	1.01		1.09	1.53	0.41

Intersection Summary

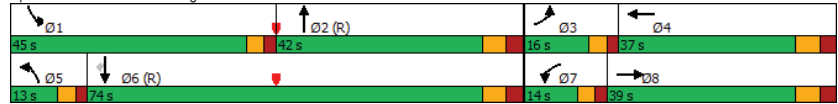
Area Type:	CBD
Cycle Length:	140
Actuated Cycle Length:	140
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green, Master Intersection	
Natural Cycle:	150
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	1.53

Lanes, Volumes, Timings
6: Trafalgar Rd & Cornwall Rd

FT 2038 AM PH1.syn
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Intersection Signal Delay: 122.1	Intersection LOS: F
Intersection Capacity Utilization 111.7%	ICU Level of Service H
Analysis Period (min) 15	
* User Entered Value	
~ Volume exceeds capacity, queue is theoretically infinite. Queue shown is maximum after two cycles.	
# 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.	
m Volume for 95th percentile queue is metered by upstream signal.	

Splits and Phases: 6: Trafalgar Rd & Cornwall Rd



HCM Signalized Intersection Capacity Analysis
6: Trafalgar Rd & Cornwall Rd

FT 2038 AM PH1.syn
04-03-2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔	↕↕	↔	↔	↕↕	↔	↔↔	↕↕	↔	↔↔	↕↕	↔
Traffic Volume (vph)	347	541	93	72	612	568	116	593	79	857	944	280
Future Volume (vph)	347	541	93	72	612	568	116	593	79	857	944	280
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.5
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.97	0.95		1.00	0.95	1.00	1.00	*0.80		0.97	*0.80	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.98	1.00	1.00		1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	2987	3052		1481	3154	1384	1540	2653		2929	1341	1324
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	2987	3052		1481	3154	1384	1540	2653		2929	1341	1324
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	377	588	101	78	665	617	126	645	86	932	1026	304
RTOR Reduction (vph)	0	10	0	0	0	0	6	0	0	0	0	84
Lane Group Flow (vph)	377	679	0	78	665	617	126	725	0	932	1026	220
Confl. Peds. (#/hr)	25		7	7		25	9		18	18		9
Heavy Vehicles (%)	2%	4%	1%	6%	3%	3%	2%	1%	0%	4%	2%	6%
Turn Type	Prot	NA		Prot	NA	Free	Prot	NA		Prot	NA	Perm
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases						Free						6
Actuated Green, G (s)	11.0	32.0		9.0	30.0	140.0	8.0	35.0		40.0	67.0	67.0
Effective Green, g (s)	12.0	35.0		10.0	33.0	140.0	9.0	38.0		41.0	70.0	70.0
Actuated g/C Ratio	0.09	0.25		0.07	0.24	1.00	0.06	0.27		0.29	0.50	0.50
Clearance Time (s)	5.0	7.0		5.0	7.0		5.0	7.0		5.0	7.0	7.0
Vehicle Extension (s)	0.2	0.2		0.2	0.2		0.2	0.2		0.2	0.2	0.2
Lane Grp Cap (vph)	256	763		105	743	1384	99	720		857	670	662
v/s Ratio Prot	c0.13	c0.22		0.05	0.21		c0.08	0.27		0.32	c0.77	
v/s Ratio Perm						c0.45						0.17
v/c Ratio	1.47	0.89		0.74	0.90	0.45	1.27	1.01		1.09	1.53	0.33
Uniform Delay, d1	64.0	50.6		63.7	51.8	0.0	65.5	51.0		49.5	35.0	21.0
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.67	0.93	0.89
Incremental Delay, d2	232.7	14.7		37.4	15.5	1.0	180.4	35.3		41.6	239.8	0.1
Delay (s)	296.7	65.4		101.2	67.4	1.0	245.9	86.3		124.4	272.3	18.9
Level of Service	F	E		F	E	A	F	F		F	F	B
Approach Delay (s)		147.2			39.2			109.8			177.3	
Approach LOS		F			D			F			F	
Intersection Summary												
HCM 2000 Control Delay		127.2									F	
HCM 2000 Volume to Capacity ratio		1.35										
Actuated Cycle Length (s)		140.0				Sum of lost time (s)		16.0				
Intersection Capacity Utilization		111.7%				ICU Level of Service		H				
Analysis Period (min)		15										
c Critical Lane Group												

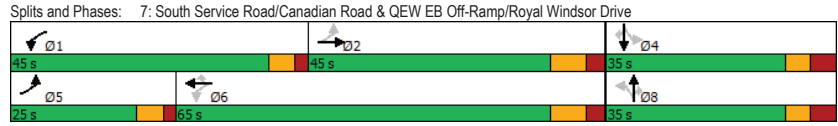
Lanes, Volumes, Timings FT 2038 AM PH1.syn
 7: South Service Road/Canadian Road & QEW EB Off-Ramp/Royal Windsor Drive 04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	50	619	34	101	609	8	3	9	57	4	22	32
Future Volume (vph)	50	619	34	101	609	8	3	9	57	4	22	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	150.0	0.0	155.0		70.0	15.0			0.0	0.0		30.0
Storage Lanes	2	0	1		1	1			1	1		1
Taper Length (m)	7.5		7.5		7.5				7.5			7.5
Lane Util. Factor	0.97	0.95	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.992				0.850			0.850			0.850
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3400	3300	0	1719	3139	1380	1805	1667	1468	1805	1792	1495
Fit Permitted	0.389			0.341			0.742			0.751		
Satd. Flow (perm)	1392	3300	0	617	3139	1380	1410	1667	1468	1427	1792	1495
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5				94			152			152
Link Speed (k/h)	80			80			60					40
Link Distance (m)	324.5			247.2			158.7					215.5
Travel Time (s)	14.6			11.1			9.5					19.4
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
Heavy Vehicles (%)	3%	9%	0%	5%	15%	17%	0%	14%	10%	0%	6%	8%
Adj. Flow (vph)	54	673	37	110	662	9	3	10	62	4	24	35
Shared Lane Traffic (%)												
Lane Group Flow (vph)	54	710	0	110	662	9	3	10	62	4	24	35
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Right	Right	Left	Left	Right
Median Width(m)	7.2			7.2			3.6					3.6
Link Offset(m)	0.0			0.0			0.0					0.0
Crosswalk Width(m)	4.8			4.8			4.8					4.8
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	CI+Ex	CI+Ex		CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4				9.4
Detector 2 Size(m)		0.6			0.6			0.6				0.6
Detector 2 Type		CI+Ex			CI+Ex			CI+Ex				CI+Ex
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8				4

Lanes, Volumes, Timings FT 2038 AM PH1.syn
 7: South Service Road/Canadian Road & QEW EB Off-Ramp/Royal Windsor Drive 04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	2			6		6	8		8	4		4
Detector Phase	5	2		1	6	6	8	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	8.0	20.0		8.0	30.0	30.0	8.0	8.0	8.0	10.0	10.0	10.0
Minimum Split (s)	14.0	34.0		14.0	38.4	38.4	28.8	28.8	28.8	35.0	35.0	35.0
Total Split (s)	25.0	45.0		45.0	65.0	65.0	35.0	35.0	35.0	35.0	35.0	35.0
Total Split (%)	20.0%	36.0%		36.0%	52.0%	52.0%	28.0%	28.0%	28.0%	28.0%	28.0%	28.0%
Maximum Green (s)	19.0	36.6		39.0	56.6	56.6	27.2	27.2	27.2	27.2	27.2	27.2
Yellow Time (s)	4.0	5.4		4.0	5.4	5.4	3.7	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	2.0	3.0		2.0	3.0	3.0	4.1	4.1	4.1	4.1	4.1	4.1
Lost Time Adjust (s)	-2.0	-4.4		-2.0	-4.4	-4.4	-3.8	-3.8	-3.8	-3.8	-3.8	-3.8
Total Lost Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lead	Lag		Lead	Lag	Lag						
Lead-Lag Optimize?												
Vehicle Extension (s)	3.5	4.5		3.5	6.0	6.0	3.5	3.5	3.5	3.5	3.5	3.5
Recall Mode	None	Max		None	Max	Max	None	None	None	None	None	None
Walk Time (s)	10.0			10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Flash Dont Walk (s)		10.0			10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Pedestrian Calls (#/hr)		0			0	0	0	0	0	0	0	0
Act Effct Green (s)	71.5	61.5		72.6	65.8	65.8	13.4	13.4	13.4	13.9	13.9	13.9
Actuated g/C Ratio	0.77	0.66		0.78	0.70	0.70	0.14	0.14	0.14	0.15	0.15	0.15
v/c Ratio	0.04	0.33		0.18	0.30	0.01	0.01	0.04	0.18	0.02	0.09	0.10
Control Delay	2.7	8.2		3.3	7.8	0.0	36.0	36.4	1.2	36.0	37.1	0.6
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	2.7	8.2		3.3	7.8	0.0	36.0	36.4	1.2	36.0	37.1	0.6
LOS	A	A		A	A	A	D	D	A	D	D	A
Approach Delay		7.8			7.1			7.3				16.7
Approach LOS		A			A			A				B
Queue Length 50th (m)	0.9	31.3		4.1	29.2	0.0	0.5	1.7	0.0	0.7	4.2	0.0
Queue Length 95th (m)	2.1	42.2		7.7	39.2	0.0	3.1	6.7	0.0	3.8	11.7	0.0
Internal Link Dist (m)		300.5			223.2			134.7				191.5
Turn Bay Length (m)	150.0			155.0		70.0	15.0					30.0
Base Capacity (vph)	1581	2173		985	2210	999	470	555	591	475	597	600
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.33		0.11	0.30	0.01	0.01	0.02	0.10	0.01	0.04	0.06
Intersection Summary												
Area Type:	Other											
Cycle Length:	125											
Actuated Cycle Length:	93.4											
Natural Cycle:	90											
Control Type:	Semi Act-Uncoord											
Maximum v/c Ratio:	0.33											
Intersection Signal Delay:	7.8											
Intersection Capacity Utilization:	50.0%											
ICU Level of Service A												
Analysis Period (min)	15											

Lanes, Volumes, Timings FT 2038 AM PH1.syn
 7: South Service Road/Canadian Road & QEW EB Off-Ramp/Royal Windsor Drive 04-03-2024



HCM Signalized Intersection Capacity Analysis FT 2038 AM PH1.syn
 7: South Service Road/Canadian Road & QEW EB Off-Ramp/Royal Windsor Drive 04-03-2024

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	↖	→	↘	↖	→	↘	↖	→	↘	↖	→	↘
Lane Configurations	↖ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗
Traffic Volume (vph)	50	619	34	101	609	8	3	9	57	4	22	32
Future Volume (vph)	50	619	34	101	609	8	3	9	57	4	22	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	0.95		1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Fit Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3400	3300		1719	3139	1380	1805	1667	1468	1805	1792	1495
Fit Permitted	0.39	1.00		0.34	1.00	1.00	0.74	1.00	1.00	0.75	1.00	1.00
Satd. Flow (perm)	1391	3300		617	3139	1380	1409	1667	1468	1427	1792	1495
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	54	673	37	110	662	9	3	10	62	4	24	35
RTOR Reduction (vph)	0	2	0	0	0	3	0	0	55	0	0	31
Lane Group Flow (vph)	54	708	0	110	662	6	3	10	7	4	24	4
Heavy Vehicles (%)	3%	9%	0%	5%	15%	17%	0%	14%	10%	0%	6%	8%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8				4
Permitted Phases	2			6		6	8		8	4		4
Actuated Green, G (s)	64.7	58.5		68.5	60.4	60.4	7.7	7.7	7.7	7.7	7.7	7.7
Effective Green, g (s)	68.7	62.9		72.5	64.8	64.8	11.5	11.5	11.5	11.5	11.5	11.5
Actuated g/C Ratio	0.71	0.65		0.75	0.67	0.67	0.12	0.12	0.12	0.12	0.12	0.12
Clearance Time (s)	6.0	8.4		6.0	8.4	8.4	7.8	7.8	7.8	7.8	7.8	7.8
Vehicle Extension (s)	3.5	4.5		3.5	6.0	6.0	3.5	3.5	3.5	3.5	3.5	3.5
Lane Grp Cap (vph)	1160	2150		578	2107	926	167	198	174	170	213	178
v/s Ratio Prot	0.00	c0.21		c0.02	0.21			0.01			c0.01	
v/s Ratio Perm	0.03			0.12		0.00	0.00		0.01	0.00		0.00
v/c Ratio	0.05	0.33		0.19	0.31	0.01	0.02	0.05	0.04	0.02	0.11	0.02
Uniform Delay, d1	4.1	7.4		3.5	6.6	5.2	37.5	37.7	37.6	37.5	37.9	37.5
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.0	0.4		0.2	0.4	0.0	0.1	0.1	0.1	0.1	0.3	0.1
Delay (s)	4.1	7.9		3.7	7.0	5.2	37.6	37.8	37.7	37.6	38.2	37.6
Level of Service	A	A		A	A	A	D	D	D	D	D	D
Approach Delay (s)		7.6			6.5			37.7				37.8
Approach LOS		A			A			D				D
Intersection Summary												
HCM 2000 Control Delay			9.6	HCM 2000 Level of Service				A				
HCM 2000 Volume to Capacity ratio			0.28									
Actuated Cycle Length (s)			96.5	Sum of lost time (s)				12.0				
Intersection Capacity Utilization			50.0%	ICU Level of Service				A				
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
8: QEW WB Off-Ramp & Kerr Street

FT 2038 AM PH1.syn
04-03-2024

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔↔			↔↔	↔↔	↔↔
Traffic Volume (vph)	530	0	0	322	282	315
Future Volume (vph)	530	0	0	322	282	315
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)		0.0	0.0		0.0	140.0
Storage Lanes		0	0		1	1
Taper Length (m)			7.5		7.5	
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00
Frt						0.850
Flt Protected					0.950	
Satd. Flow (prot)	3539	0	0	3539	1770	1583
Flt Permitted					0.950	
Satd. Flow (perm)	3539	0	0	3539	1770	1583
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)						164
Link Speed (k/h)	60			60	40	
Link Distance (m)	128.8			184.7	258.8	
Travel Time (s)	7.7			11.1	23.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	576	0	0	350	307	342
Shared Lane Traffic (%)						
Lane Group Flow (vph)	576	0	0	350	307	342
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)		15	25		25	15
Turn Type	NA			NA	Prot	Perm
Protected Phases	4			8	2	
Permitted Phases						2
Minimum Split (s)				22.5	22.5	22.5
Total Split (s)				22.5	22.5	22.5
Total Split (%)	50.0%			50.0%	50.0%	50.0%
Maximum Green (s)	18.0			18.0	18.0	18.0
Yellow Time (s)	3.5			3.5	3.5	3.5
All-Red Time (s)	1.0			1.0	1.0	1.0
Lost Time Adjust (s)	0.0			0.0	0.0	0.0
Total Lost Time (s)	4.5			4.5	4.5	4.5
Lead/Lag						
Lead-Lag Optimize?						
Walk Time (s)	7.0			7.0	7.0	7.0
Flash Dont Walk (s)	11.0			11.0	11.0	11.0
Pedestrian Calls (#/hr)	0			0	0	0
Act Effct Green (s)	18.0			18.0	18.0	18.0
Actuated g/C Ratio	0.40			0.40	0.40	0.40
v/c Ratio	0.41			0.25	0.43	0.47

Lanes, Volumes, Timings
8: QEW WB Off-Ramp & Kerr Street

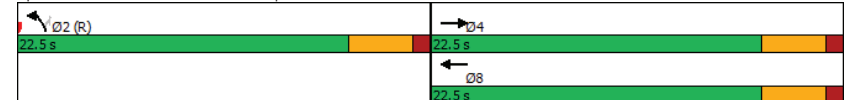
FT 2038 AM PH1.syn
04-03-2024

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Control Delay	10.8			9.6	12.2	7.7
Queue Delay	0.0			0.0	0.0	0.0
Total Delay	10.8			9.6	12.2	7.7
LOS	B			A	B	A
Approach Delay	10.8			9.6	9.8	
Approach LOS	B			A	A	
Queue Length 50th (m)	16.9			9.5	17.4	9.4
Queue Length 95th (m)	26.9			16.5	33.3	24.5
Internal Link Dist (m)	104.8			160.7	234.8	
Turn Bay Length (m)						140.0
Base Capacity (vph)	1415			1415	708	731
Starvation Cap Reductn	0			0	0	0
Spillback Cap Reductn	0			0	0	0
Storage Cap Reductn	0			0	0	0
Reduced v/c Ratio	0.41			0.25	0.43	0.47

Intersection Summary

Area Type: Other
Cycle Length: 45
Actuated Cycle Length: 45
Offset: 0 (0%), Referenced to phase 2:NBL and 6:, Start of Green
Natural Cycle: 45
Control Type: Pretimed
Maximum v/c Ratio: 0.47
Intersection Signal Delay: 10.1
Intersection Capacity Utilization 41.7%
Intersection LOS: B
ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 8: QEW WB Off-Ramp & Kerr Street



HCM Signalized Intersection Capacity Analysis
8: QEW WB Off-Ramp & Kerr Street

FT 2038 AM PH1.syn
04-03-2024

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔↔			↔↔	↔↔	↔↔
Traffic Volume (vph)	530	0	0	322	282	315
Future Volume (vph)	530	0	0	322	282	315
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5			4.5	4.5	4.5
Lane Util. Factor	0.95			0.95	1.00	1.00
Fr _t	1.00			1.00	1.00	0.85
Fl _t Protected	1.00			1.00	0.95	1.00
Satd. Flow (prot)	3539			3539	1770	1583
Fl _t Permitted	1.00			1.00	0.95	1.00
Satd. Flow (perm)	3539			3539	1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	576	0	0	350	307	342
RTOR Reduction (vph)	0	0	0	0	0	98
Lane Group Flow (vph)	576	0	0	350	307	244
Turn Type	NA			NA	Prot	Perm
Protected Phases	4			8	2	
Permitted Phases						2
Actuated Green, G (s)	18.0			18.0	18.0	18.0
Effective Green, g (s)	18.0			18.0	18.0	18.0
Actuated g/C Ratio	0.40			0.40	0.40	0.40
Clearance Time (s)	4.5			4.5	4.5	4.5
Lane Grp Cap (vph)	1415			1415	708	633
v/s Ratio Prot	c0.16			0.10	c0.17	
v/s Ratio Perm						0.15
v/c Ratio	0.41			0.25	0.43	0.38
Uniform Delay, d1	9.7			9.0	9.8	9.6
Progression Factor	1.00			1.00	1.00	1.00
Incremental Delay, d2	0.9			0.4	1.9	1.8
Delay (s)	10.5			9.4	11.7	11.3
Level of Service	B			A	B	B
Approach Delay (s)	10.5			9.4	11.5	
Approach LOS	B			A	B	
Intersection Summary						
HCM 2000 Control Delay		10.7		HCM 2000 Level of Service		B
HCM 2000 Volume to Capacity ratio		0.42				
Actuated Cycle Length (s)		45.0		Sum of lost time (s)		9.0
Intersection Capacity Utilization		41.7%		ICU Level of Service		A
Analysis Period (min)		15				
c Critical Lane Group						

Lanes, Volumes, Timings
9: Dorval Drive & QEW WB Off-Ramp

FT 2038 AM PH1.syn
04-03-2024

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔↔	↔	↔↔			↔↔
Traffic Volume (vph)	992	462	568	0	0	1583
Future Volume (vph)	992	462	568	0	0	1583
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	190.0		0.0	0.0	
Storage Lanes	2	1		0	0	
Taper Length (m)	7.5				7.5	
Lane Util. Factor	0.97	0.91	0.95	1.00	1.00	0.95
Fr _t	0.993	0.850				
Fl _t Protected	0.954					
Satd. Flow (prot)	3423	1441	3539	0	0	3539
Fl _t Permitted	0.954					
Satd. Flow (perm)	3423	1441	3539	0	0	3539
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)	4	278				
Link Speed (k/h)	40		60			60
Link Distance (m)	325.1		310.2			266.9
Travel Time (s)	29.3		18.6			16.0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1078	502	617	0	0	1721
Shared Lane Traffic (%)		10%				
Lane Group Flow (vph)	1128	452	617	0	0	1721
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	7.2		0.0		0.0	0.0
Link Offset(m)	0.0		0.0		0.0	0.0
Crosswalk Width(m)	4.8		4.8		4.8	4.8
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15		15	25	
Number of Detectors	1	1	2			2
Detector Template	Left	Right	Thru			Thru
Leading Detector (m)	2.0	2.0	10.0			10.0
Trailing Detector (m)	0.0	0.0	0.0			0.0
Detector 1 Position(m)	0.0	0.0	0.0			0.0
Detector 1 Size(m)	2.0	2.0	0.6			0.6
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex			CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0			0.0
Detector 1 Queue (s)	0.0	0.0	0.0			0.0
Detector 1 Delay (s)	0.0	0.0	0.0			0.0
Detector 2 Position(m)						
Detector 2 Position(m)			9.4			9.4
Detector 2 Size(m)			0.6			0.6
Detector 2 Type			CI+Ex			CI+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type		Prot	Perm	NA		NA
Protected Phases		8		2		6
Permitted Phases						8

Lanes, Volumes, Timings
9: Dorval Drive & QEW WB Off-Ramp

FT 2038 AM PH1.syn
04-03-2024



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Detector Phase	8	8	2			6
Switch Phase						
Minimum Initial (s)	10.0	10.0	20.0			20.0
Minimum Split (s)	24.0	24.0	26.0			26.0
Total Split (s)	45.6	45.6	74.4			74.4
Total Split (%)	38.0%	38.0%	62.0%			62.0%
Maximum Green (s)	39.6	39.6	68.4			68.4
Yellow Time (s)	4.0	4.0	4.0			4.0
All-Red Time (s)	2.0	2.0	2.0			2.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0			-2.0
Total Lost Time (s)	4.0	4.0	4.0			4.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	4.5	4.5	5.0			5.0
Recall Mode	None	None	Max			Max
Walk Time (s)	5.0	5.0	7.0			7.0
Flash Dont Walk (s)	7.0	7.0	11.0			11.0
Pedestrian Calls (#/hr)	0	0	0			0
Act Effct Green (s)	41.6	41.6	70.4			70.4
Actuated g/C Ratio	0.35	0.35	0.59			0.59
v/c Ratio	0.95	0.66	0.30			0.83
Control Delay	54.8	17.5	12.9			24.4
Queue Delay	0.0	0.0	0.0			0.0
Total Delay	54.8	17.5	12.9			24.4
LOS	D	B	B			C
Approach Delay	44.1		12.9			24.4
Approach LOS	D		B			C
Queue Length 50th (m)	139.0	38.9	38.0			171.0
Queue Length 95th (m)	#184.4	82.5	49.1			205.9
Internal Link Dist (m)	301.1		286.2			242.9
Turn Bay Length (m)		190.0				
Base Capacity (vph)	1189	681	2076			2076
Starvation Cap Reductn	0	0	0			0
Spillback Cap Reductn	0	0	0			0
Storage Cap Reductn	0	0	0			0
Reduced v/c Ratio	0.95	0.66	0.30			0.83

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Natural Cycle: 70
 Control Type: Semi Act-Uncoord
 Maximum v/c Ratio: 0.95
 Intersection Signal Delay: 30.6
 Intersection Capacity Utilization 83.6%
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Lanes, Volumes, Timings
9: Dorval Drive & QEW WB Off-Ramp

FT 2038 AM PH1.syn
04-03-2024

Splits and Phases: 9: Dorval Drive & QEW WB Off-Ramp



HCM Signalized Intersection Capacity Analysis
9: Dorval Drive & QEWB Off-Ramp

FT 2038 AM PH1.syn
04-03-2024

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔↔	↔	↕↕			↕↕
Traffic Volume (vph)	992	462	568	0	0	1583
Future Volume (vph)	992	462	568	0	0	1583
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0			4.0
Lane Util. Factor	0.97	0.91	0.95			0.95
Fr	0.99	0.85	1.00			1.00
Fit Protected	0.95	1.00	1.00			1.00
Satd. Flow (prot)	3426	1441	3539			3539
Fit Permitted	0.95	1.00	1.00			1.00
Satd. Flow (perm)	3426	1441	3539			3539
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1078	502	617	0	0	1721
RTOR Reduction (vph)	3	182	0	0	0	0
Lane Group Flow (vph)	1125	270	617	0	0	1721
Turn Type	Prot	Perm	NA			NA
Protected Phases	8		2			6
Permitted Phases	8					
Actuated Green, G (s)	39.6	39.6	68.4			68.4
Effective Green, g (s)	41.6	41.6	70.4			70.4
Actuated g/C Ratio	0.35	0.35	0.59			0.59
Clearance Time (s)	6.0	6.0	6.0			6.0
Vehicle Extension (s)	4.5	4.5	5.0			5.0
Lane Grp Cap (vph)	1187	499	2076			2076
v/s Ratio Prot	c0.33		0.17			c0.49
v/s Ratio Perm		0.19				
v/c Ratio	0.95	0.54	0.30			0.83
Uniform Delay, d1	38.1	31.5	12.4			20.0
Progression Factor	1.00	1.00	1.00			1.00
Incremental Delay, d2	15.5	1.8	0.4			4.0
Delay (s)	53.6	33.3	12.8			24.0
Level of Service	D	C	B			C
Approach Delay (s)	47.8		12.8			24.0
Approach LOS	D		B			C

Intersection Summary			
HCM 2000 Control Delay	31.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	83.6%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
10: Dorval Drive & QEWE Off-Ramp

FT 2038 AM PH1.syn
04-03-2024

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔↔	↔		↕↕	↕↕	
Traffic Volume (vph)	146	578	0	799	1711	0
Future Volume (vph)	146	578	0	799	1711	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	175.0	0.0	0.0			0.0
Storage Lanes	1	1	0			0
Taper Length (m)	7.5		7.5			
Lane Util. Factor	0.97	0.91	1.00	0.95	0.95	1.00
Fr	0.900	0.850				
Fit Protected	0.983					
Satd. Flow (prot)	3197	1441	0	3539	3539	0
Fit Permitted	0.983					
Satd. Flow (perm)	3197	1441	0	3539	3539	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	14	14				
Link Speed (k/h)	40			60	60	
Link Distance (m)	275.5			164.3	310.2	
Travel Time (s)	24.8			9.9	18.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	159	628	0	868	1860	0
Shared Lane Traffic (%)	50%					
Lane Group Flow (vph)	473	314	0	868	1860	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	7.2			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Number of Detectors	1	1		2	2	
Detector Template	Left	Right		Thru	Thru	
Leading Detector (m)	2.0	2.0		10.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	2.0		0.6	0.6	
Detector 1 Type	CI+Ex	CI+Ex		CI+Ex	CI+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	
Detector 2 Position(m)				9.4	9.4	
Detector 2 Size(m)				0.6	0.6	
Detector 2 Type				CI+Ex	CI+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Prot	Perm		NA	NA	
Protected Phases	4			2	6	
Permitted Phases	4					

Lanes, Volumes, Timings
10: Dorval Drive & QEW EB Off-Ramp

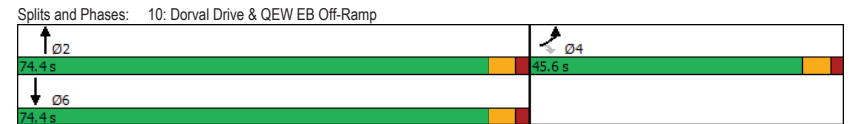
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Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Detector Phase	4	4		2	6	
Switch Phase						
Minimum Initial (s)	10.0	10.0		20.0	20.0	
Minimum Split (s)	24.0	24.0		26.0	26.0	
Total Split (s)	45.6	45.6		74.4	74.4	
Total Split (%)	38.0%	38.0%		62.0%	62.0%	
Maximum Green (s)	39.6	39.6		68.4	68.4	
Yellow Time (s)	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	4.0	4.0		5.0	5.0	
Recall Mode	None	None		Max	Max	
Walk Time (s)	0.0	0.0		7.0	7.0	
Flash Dont Walk (s)	7.0	7.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0	
Act Effct Green (s)	31.1	31.1		70.7	70.7	
Actuated g/C Ratio	0.28	0.28		0.64	0.64	
v/c Ratio	0.52	0.75		0.38	0.82	
Control Delay	33.6	45.7		10.8	20.1	
Queue Delay	0.0	0.0		0.0	0.0	
Total Delay	33.6	45.7		10.8	20.1	
LOS	C	D		B	C	
Approach Delay	38.5			10.8	20.1	
Approach LOS	D			B	C	
Queue Length 50th (m)	44.6	67.4		45.1	153.6	
Queue Length 95th (m)	59.9	103.5		73.0	241.1	
Internal Link Dist (m)	251.5			140.3	286.2	
Turn Bay Length (m)	175.0					
Base Capacity (vph)	1224	556		2277	2277	
Starvation Cap Reductn	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	
Storage Cap Reductn	0	0		0	0	
Reduced v/c Ratio	0.39	0.56		0.38	0.82	

Intersection Summary	
Area Type:	Other
Cycle Length:	120
Actuated Cycle Length:	109.9
Natural Cycle:	60
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.82
Intersection Signal Delay:	21.9
Intersection Capacity Utilization:	83.6%
Intersection LOS:	C
ICU Level of Service:	E
Analysis Period (min):	15

Lanes, Volumes, Timings
10: Dorval Drive & QEW EB Off-Ramp

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HCM Signalized Intersection Capacity Analysis
10: Dorval Drive & QEW EB Off-Ramp

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Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	146	578	0	799	1711	0
Future Volume (vph)	146	578	0	799	1711	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	0.91		0.95	0.95	
Frt	0.90	0.85		1.00	1.00	
Flt Protected	0.98	1.00		1.00	1.00	
Satd. Flow (prot)	3200	1441		3539	3539	
Flt Permitted	0.98	1.00		1.00	1.00	
Satd. Flow (perm)	3200	1441		3539	3539	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	159	628	0	868	1860	0
RTOR Reduction (vph)	10	10	0	0	0	0
Lane Group Flow (vph)	463	304	0	868	1860	0
Turn Type	Prot	Perm		NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4				
Actuated Green, G (s)	29.1	29.1		68.7	68.7	
Effective Green, g (s)	31.1	31.1		70.7	70.7	
Actuated g/C Ratio	0.28	0.28		0.64	0.64	
Clearance Time (s)	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	4.0	4.0		5.0	5.0	
Lane Grp Cap (vph)	906	408		2278	2278	
v/s Ratio Prot	0.14			0.25	c0.53	
v/s Ratio Perm		c0.21				
v/c Ratio	0.51	0.75		0.38	0.82	
Uniform Delay, d1	33.0	35.7		9.2	14.7	
Progression Factor	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.6	7.7		0.5	3.4	
Delay (s)	33.6	43.4		9.7	18.1	
Level of Service	C	D		A	B	
Approach Delay (s)	37.5			9.7	18.1	
Approach LOS	D			A	B	

Intersection Summary			
HCM 2000 Control Delay	20.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	109.8	Sum of lost time (s)	8.0
Intersection Capacity Utilization	83.6%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
11: Argus Rd & South Service Rd

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Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	21	76	865	258	136	159
Future Volume (vph)	21	76	865	258	136	159
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt			0.969		0.927	
Flt Protected		0.989			0.977	
Satd. Flow (prot)	0	1390	1620	0	1549	0
Flt Permitted		0.989			0.977	
Satd. Flow (perm)	0	1390	1620	0	1549	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		177.7	145.7		103.5	
Travel Time (s)		12.8	10.5		7.5	
Confl. Peds. (#/hr)	1			1	5	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	100%	0%	3%	0%	0%	0%
Adj. Flow (vph)	23	83	940	280	148	173
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	106	1220	0	321	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (k/h)	24		14		24	14
Sign Control		Free	Free		Stop	
Intersection Summary						
Area Type:	CBD					
Control Type:	Unsignalized					
Intersection Capacity Utilization 94.0%				ICU Level of Service F		
Analysis Period (min) 15						

HCM Unsignalized Intersection Capacity Analysis
11: Argus Rd & South Service Rd

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Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	↕
Traffic Volume (veh/h)	21	76	865	258	136	159
Future Volume (Veh/h)	21	76	865	258	136	159
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)	23	83	940	280	148	173
Pedestrians		1	5		1	
Lane Width (m)		3.6	3.6		3.6	
Walking Speed (m/s)		1.2	1.2		1.2	
Percent Blockage		0	0		0	
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)		358				
pX, platoon unblocked						
vC, conflicting volume	1221				1215	1082
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1221				1215	1082
tC, single (s)	5.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	3.1				3.5	3.3
p0 queue free %	93				21	35
cM capacity (veh/h)	333				187	266
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	106	1220	321			
Volume Left	23	0	148			
Volume Right	0	280	173			
eSH	333	1700	223			
Volume to Capacity	0.07	0.72	1.44			
Queue Length 95th (m)	1.8	0.0	149.6			
Control Delay (s)	4.6	0.0	262.5			
Lane LOS	A		F			
Approach Delay (s)	4.6	0.0	262.5			
Approach LOS			F			
Intersection Summary						
Average Delay			51.4			
Intersection Capacity Utilization			94.0%		ICU Level of Service	F
Analysis Period (min)			15			

Lanes, Volumes, Timings
13: GO Bus Terminal/Argus Rd & Cross Ave

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↕	↕		↕	↕		↕	↕		↕	↕	
Traffic Volume (vph)	46	831	19	53	834	67	27	0	64	610	21	275
Future Volume (vph)	46	831	19	53	834	67	27	0	64	610	21	275
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6
Storage Length (m)	20.0		0.0	20.0		0.0	0.0		0.0	15.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00	1.00		1.00	1.00		1.00	0.96		0.98	0.99	
Frt		0.997			0.989			0.850			0.861	
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1570	3135	0	818	3167	0	805	734	0	1570	1361	0
Fit Permitted	0.292			0.161			0.403			0.711		
Satd. Flow (perm)	482	3135	0	138	3167	0	341	734	0	1150	1361	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3			16			195			148	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		162.8			72.9			81.9			113.6	
Travel Time (s)		11.7			5.2			5.9			8.2	
Confl. Peds. (#/hr)	1		3	3		1	3		20	20		3
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
Heavy Vehicles (%)	0%	1%	100%	92%	1%	5%	95%	0%	91%	0%	93%	0%
Adj. Flow (vph)	50	903	21	58	907	73	29	0	70	663	23	299
Shared Lane Traffic (%)												
Lane Group Flow (vph)	50	924	0	58	980	0	29	70	0	663	322	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.3			3.3			3.3			3.3	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.19	1.14	1.14	1.19	1.14	1.14	1.19	1.14	1.14	1.19	1.14	1.14
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

Lanes, Volumes, Timings
13: GO Bus Terminal/Argus Rd & Cross Ave

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases		2		6				8			4	
Detector Phase	2	2		1	6			8	8		4	4
Switch Phase												
Minimum Initial (s)	22.0	22.0		8.0	22.0			10.0	10.0		10.0	10.0
Minimum Split (s)	45.0	45.0		12.5	29.0			29.0	29.0		29.0	29.0
Total Split (s)	45.5	45.5		12.5	58.0			32.0	32.0		32.0	32.0
Total Split (%)	50.6%	50.6%		13.9%	64.4%			35.6%	35.6%		35.6%	35.6%
Maximum Green (s)	39.5	39.5		8.5	52.0			26.0	26.0		26.0	26.0
Yellow Time (s)	4.0	4.0		3.0	4.0			4.0	4.0		4.0	4.0
All-Red Time (s)	2.0	2.0		1.0	2.0			2.0	2.0		2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0		0.0	-2.0			-2.0	-2.0		-2.0	-2.0
Total Lost Time (s)	4.0	4.0		4.0	4.0			4.0	4.0		4.0	4.0
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Vehicle Extension (s)	5.0	5.0		2.5	5.0			4.0	4.0		4.0	4.0
Recall Mode	Min	Min		Min	Min			Min	Min		Min	Min
Walk Time (s)	7.0	7.0		7.0	7.0			7.0	7.0		7.0	7.0
Flash Dont Walk (s)	16.0	16.0		16.0	16.0			16.0	16.0		16.0	16.0
Pedestrian Calls (#/hr)	0	0		0	0			0	0		0	0
Act Effct Green (s)	35.2	35.2		47.5	47.5			28.2	28.2		28.2	28.2
Actuated g/C Ratio	0.42	0.42		0.57	0.57			0.34	0.34		0.34	0.34
v/c Ratio	0.25	0.70		0.40	0.54			0.25	0.19		1.72	0.58
Control Delay	18.8	22.8		16.3	12.2			29.9	1.1		357.2	17.9
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0		0.0	0.0
Total Delay	18.8	22.8		16.3	12.2			29.9	1.1		357.2	17.9
LOS	B	C		B	B			C	A		F	B
Approach Delay		22.6			12.4				9.5			246.3
Approach LOS		C			B				A			F
Queue Length 50th (m)	5.2	64.1		4.2	48.8			3.6	0.0		~168.6	23.0
Queue Length 95th (m)	13.8	85.8		9.7	64.5			12.4	0.0		#252.1	55.2
Internal Link Dist (m)		138.8			48.9				57.9			89.6
Turn Bay Length (m)	20.0			20.0							15.0	
Base Capacity (vph)	240	1565		147	2061			115	376		386	556
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		0.39	0.48			0.25	0.19		1.72	0.58

Intersection Summary

Area Type:	CBD
Cycle Length:	90
Actuated Cycle Length:	83.7
Natural Cycle:	130
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	1.72
Intersection Signal Delay:	89.9
Intersection LOS:	F

Lanes, Volumes, Timings
13: GO Bus Terminal/Argus Rd & Cross Ave

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Intersection Capacity Utilization	99.8%	ICU Level of Service F
Analysis Period (min)	15	
- Volume exceeds capacity, queue is theoretically infinite.		
Queue shown is maximum after two cycles.		
# 95th percentile volume exceeds capacity, queue may be longer.		
Queue shown is maximum after two cycles.		

Splits and Phases: 13: GO Bus Terminal/Argus Rd & Cross Ave



HCM Signalized Intersection Capacity Analysis
13: GO Bus Terminal/Argus Rd & Cross Ave

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	46	831	19	53	834	67	27	0	64	610	21	275
Future Volume (vph)	46	831	19	53	834	67	27	0	64	610	21	275
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.97		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		0.98	1.00	
Fr t	1.00	1.00		1.00	0.99		1.00	0.85		1.00	0.86	
Fl t Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1570	3134		818	3166		804	736		1539	1361	
Fl t Permitted	0.29	1.00		0.16	1.00		0.40	1.00		0.71	1.00	
Satd. Flow (perm)	483	3134		138	3166		341	736		1153	1361	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	50	903	21	58	907	73	29	0	70	663	23	299
RTOR Reduction (vph)	0	2	0	0	7	0	0	46	0	0	98	0
Lane Group Flow (vph)	50	922	0	58	973	0	29	24	0	663	224	0
Confl. Peds. (#/hr)	1		3	3		1	3		20	20		3
Heavy Vehicles (%)	0%	1%	100%	92%	1%	5%	95%	0%	91%	0%	93%	0%
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	2	2		1	6		8	8		4	4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	33.2	33.2		45.4	45.4		26.1	26.1		26.1	26.1	
Effective Green, g (s)	35.2	35.2		45.4	47.4		28.1	28.1		28.1	28.1	
Actuated g/C Ratio	0.42	0.42		0.54	0.57		0.34	0.34		0.34	0.34	
Clearance Time (s)	6.0	6.0		4.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	5.0	5.0		2.5	5.0		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	203	1321		141	1797		114	247		388	458	
v/s Ratio Prot		c0.29		0.04	c0.31			0.03			0.16	
v/s Ratio Perm	0.10			0.18			0.09			c0.58		
v/c Ratio	0.25	0.70		0.41	0.54		0.25	0.10		1.71	0.49	
Uniform Delay, d1	15.6	19.8		11.8	11.3		20.1	19.0		27.7	22.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.3	2.1		1.4	0.6		1.6	0.2		329.8	1.1	
Delay (s)	16.9	21.9		13.2	11.9		21.7	19.2		357.5	23.1	
Level of Service	B	C		B	B		C	B		F	C	
Approach Delay (s)		21.6			11.9			19.9			248.2	
Approach LOS		C			B			B			F	

Intersection Summary			
HCM 2000 Control Delay	90.4	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.09		
Actuated Cycle Length (s)	83.5	Sum of lost time (s)	12.0
Intersection Capacity Utilization	99.8%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
14: Lyons Lane/Street A & Cross Ave

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	113	237	259	289	204	24	23	4	17	82	31	120
Future Volume (vph)	113	237	259	289	204	24	23	4	17	82	31	120
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6
Storage Length (m)	0.0	0.0	25.0	0.0	20.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.99	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	0.99		1.00	1.00		1.00	0.99		1.00	0.99	
Fr t		0.922			0.984			0.877			0.881	
Fl t Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1540	2813	0	1570	2724	0	1570	1481	0	1468	1453	0
Fl t Permitted	0.598			0.369			0.563			0.743		
Satd. Flow (perm)	962	2813	0	610	2724	0	928	1481	0	1144	1453	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		282			26			18			130	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		40.1			211.2			69.1			70.9	
Travel Time (s)		2.9			15.2			5.0			5.1	
Confl. Peds. (#/hr)	5		1	1		5	3		3	3		3
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
Heavy Vehicles (%)	2%	11%	0%	0%	19%	0%	0%	0%	0%	7%	0%	3%
Adj. Flow (vph)	123	258	282	314	222	26	25	4	18	89	34	130
Shared Lane Traffic (%)												
Lane Group Flow (vph)	123	540	0	314	248	0	25	22	0	89	164	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.3			3.3			3.3			3.3	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.19	1.14	1.14	1.19	1.14	1.14	1.19	1.14	1.14	1.19	1.14	1.14
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

Lanes, Volumes, Timings
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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases		2		6			8			4		
Detector Phase	2	2		1	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	35.0	35.0		8.0	35.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	41.0	41.0		12.5	41.0		28.0	28.0		28.0	28.0	
Total Split (s)	41.0	41.0		21.0	62.0		28.0	28.0		28.0	28.0	
Total Split (%)	45.6%	45.6%		23.3%	68.9%		31.1%	31.1%		31.1%	31.1%	
Maximum Green (s)	35.0	35.0		17.0	56.0		22.0	22.0		22.0	22.0	
Yellow Time (s)	4.0	4.0		3.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		1.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0		0.0	-2.0		-2.0	-2.0		-2.0	-2.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Vehicle Extension (s)	5.0	5.0		2.5	5.0		4.0	4.0		4.0	4.0	
Recall Mode	Min	Min		Min	Min		Min	Min		Min	Min	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	15.0	15.0		15.0	15.0		15.0	15.0		15.0	15.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	37.2	37.2		52.4	52.4		14.8	14.8		14.8	14.8	
Actuated g/C Ratio	0.49	0.49		0.70	0.70		0.20	0.20		0.20	0.20	
v/c Ratio	0.26	0.35		0.55	0.13		0.14	0.07		0.40	0.42	
Control Delay	14.8	6.7		8.8	3.9		27.5	14.1		32.7	11.8	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	14.8	6.7		8.8	3.9		27.5	14.1		32.7	11.8	
LOS	B	A		A	A		C	B		C	B	
Approach Delay		8.2			6.6			21.2			19.1	
Approach LOS		A			A			C			B	
Queue Length 50th (m)	9.6	10.2		14.1	4.5		3.1	0.5		11.5	4.2	
Queue Length 95th (m)	26.8	25.8		31.6	10.4		10.0	6.4		26.5	20.7	
Internal Link Dist (m)		16.1			187.2			45.1			46.9	
Turn Bay Length (m)				25.0			20.0					
Base Capacity (vph)	475	1533		642	2116		297	487		366	554	
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	0.26	0.35		0.49	0.12		0.08	0.05		0.24	0.30	

Intersection Summary

Area Type: CBD
 Cycle Length: 90
 Actuated Cycle Length: 75.3
 Natural Cycle: 85
 Control Type: Semi Act-Uncoord
 Maximum v/c Ratio: 0.55
 Intersection Signal Delay: 9.8
 Intersection LOS: A

Lanes, Volumes, Timings
14: Lyons Lane/Street A & Cross Ave

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Intersection Capacity Utilization 89.6%
 Analysis Period (min) 15
 ICU Level of Service E

Splits and Phases: 14: Lyons Lane/Street A & Cross Ave



HCM Signalized Intersection Capacity Analysis
14: Lyons Lane/Street A & Cross Ave

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	113	237	259	289	204	24	23	4	17	82	31	120
Future Volume (vph)	113	237	259	289	204	24	23	4	17	82	31	120
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	0.99	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.92		1.00	0.98		1.00	0.88		1.00	0.88	
Fit Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1530	2813		1570	2725		1567	1482		1463	1454	
Fit Permitted	0.60	1.00		0.37	1.00		0.56	1.00		0.74	1.00	
Satd. Flow (perm)	963	2813		610	2725		928	1482		1144	1454	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	123	258	282	314	222	26	25	4	18	89	34	130
RTOR Reduction (vph)	0	143	0	0	8	0	0	14	0	0	104	0
Lane Group Flow (vph)	123	398	0	314	240	0	25	8	0	89	60	0
Confl. Peds. (#/hr)	5		1	1		5	3		3	3		3
Heavy Vehicles (%)	2%	11%	0%	0%	19%	0%	0%	0%	0%	7%	0%	3%
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	2			1	6		8			4		4
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	35.2	35.2		50.4	50.4		12.8	12.8		12.8	12.8	
Effective Green, g (s)	37.2	37.2		50.4	52.4		14.8	14.8		14.8	14.8	
Actuated g/C Ratio	0.49	0.49		0.67	0.70		0.20	0.20		0.20	0.20	
Clearance Time (s)	6.0	6.0		4.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	5.0	5.0		2.5	5.0		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	476	1391		551	1898		182	291		225	286	
v/s Ratio Prot		0.14		c0.08	0.09			0.01			0.04	
v/s Ratio Perm	0.13			c0.30			0.03			c0.08		
v/c Ratio	0.26	0.29		0.57	0.13		0.14	0.03		0.40	0.21	
Uniform Delay, d1	11.0	11.2		5.7	3.8		24.9	24.4		26.3	25.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.6	0.2		1.1	0.1		0.5	0.0		1.6	0.5	
Delay (s)	11.6	11.4		6.8	3.9		25.4	24.4		27.9	25.8	
Level of Service	B	B		A	A		C	C		C	C	
Approach Delay (s)		11.5			5.5			24.9			26.5	
Approach LOS		B			A			C			C	

Intersection Summary			
HCM 2000 Control Delay	12.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	75.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	89.6%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
16: Speers Road/Cornwall Road & Cross Avenue

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Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↕	↕	↕	↕	↕
Traffic Volume (vph)	271	792	734	38	23	404
Future Volume (vph)	271	792	734	38	23	404
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	75.0			0.0	55.0	0.0
Storage Lanes	1			0	1	2
Taper Length (m)	7.5				7.5	
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	0.88
Frt			0.993			0.850
Fit Protected	0.950				0.950	
Satd. Flow (prot)	1770	3539	3514	0	1770	2787
Fit Permitted	0.246				0.950	
Satd. Flow (perm)	458	3539	3514	0	1770	2787
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)			6			439
Link Speed (k/h)		50	50		50	
Link Distance (m)		228.9	275.4		183.9	
Travel Time (s)		16.5	19.8		13.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	295	861	798	41	25	439
Shared Lane Traffic (%)						
Lane Group Flow (vph)	295	861	839	0	25	439
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.6	3.6		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)		25		15	25	15
Number of Detectors	1	2	2		1	1
Detector Template	Left	Thru	Thru		Left	Right
Leading Detector (m)	2.0	10.0	10.0		2.0	2.0
Trailing Detector (m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Size(m)	2.0	0.6	0.6		2.0	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0		0.0	0.0
Detector 2 Position(m)		9.4	9.4			
Detector 2 Size(m)		0.6	0.6			
Detector 2 Type		Cl+Ex	Cl+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type	pm+pt	NA	NA		pm+pt	Perm
Protected Phases	5	2	6		7	
Permitted Phases	2				4	4

Lanes, Volumes, Timings
16: Speers Road/Cornwall Road & Cross Avenue

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Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Detector Phase	5	2	6		7	4
Switch Phase						
Minimum Initial (s)	6.0	25.0	25.0		6.0	6.0
Minimum Split (s)	12.0	35.0	35.0		29.0	29.0
Total Split (s)	26.0	61.0	35.0		29.0	29.0
Total Split (%)	28.9%	67.8%	38.9%		32.2%	32.2%
Maximum Green (s)	20.0	55.0	29.0		23.0	23.0
Yellow Time (s)	4.0	4.0	4.0		4.0	4.0
All-Red Time (s)	2.0	2.0	2.0		2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0		6.0	6.0
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?			Yes			
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	None	Max	Max		None	None
Walk Time (s)		18.0	18.0		12.0	12.0
Flash Dont Walk (s)		7.0	7.0		7.0	7.0
Pedestrian Calls (#/hr)		0	0		0	0
Act Effct Green (s)	55.0	55.0	38.1		7.3	7.3
Actuated g/C Ratio	0.74	0.74	0.51		0.10	0.10
v/c Ratio	0.55	0.33	0.47		0.14	0.66
Control Delay	7.5	3.9	13.7		32.2	8.6
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	7.5	3.9	13.7		32.2	8.6
LOS	A	A	B		C	A
Approach Delay		4.8	13.7		9.9	
Approach LOS		A	B		A	
Queue Length 50th (m)	9.8	16.5	36.0		3.4	0.0
Queue Length 95th (m)	22.0	30.3	69.8		10.3	13.6
Internal Link Dist (m)		204.9	251.4		159.9	
Turn Bay Length (m)	75.0				55.0	
Base Capacity (vph)	691	2618	1801		547	1165
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	0.43	0.33	0.47		0.05	0.38

Intersection Summary

Area Type:	Other
Cycle Length:	90
Actuated Cycle Length:	74.4
Natural Cycle:	80
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.66
Intersection Signal Delay:	8.8
Intersection Capacity Utilization:	56.5%
Intersection LOS:	A
ICU Level of Service:	B
Analysis Period (min):	15

Lanes, Volumes, Timings
16: Speers Road/Cornwall Road & Cross Avenue

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04-03-2024

Splits and Phases: 16: Speers Road/Cornwall Road & Cross Avenue



HCM Signalized Intersection Capacity Analysis
16: Speers Road/Cornwall Road & Cross Avenue

FT 2038 AM PH1.syn
04-03-2024



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↕	↕	↔	↔	↕
Traffic Volume (vph)	271	792	734	38	23	404
Future Volume (vph)	271	792	734	38	23	404
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0		6.0	6.0
Lane Util. Factor	1.00	0.95	0.95		1.00	0.88
Fr _t	1.00	1.00	0.99		1.00	0.85
Fit Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	3539	3513		1770	2787
Fit Permitted	0.25	1.00	1.00		0.95	1.00
Satd. Flow (perm)	459	3539	3513		1770	2787
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	295	861	798	41	25	439
RTOR Reduction (vph)	0	0	3	0	0	396
Lane Group Flow (vph)	295	861	836	0	25	43
Turn Type	pm+pt	NA	NA		pm+pt	Perm
Protected Phases	5	2	6		7	
Permitted Phases	2				4	4
Actuated Green, G (s)	55.1	55.1	38.1		7.3	7.3
Effective Green, g (s)	55.1	55.1	38.1		7.3	7.3
Actuated g/C Ratio	0.74	0.74	0.51		0.10	0.10
Clearance Time (s)	6.0	6.0	6.0		6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	533	2620	1798		173	273
v/s Ratio Prot	c0.08	0.24	0.24		0.01	
v/s Ratio Perm	c0.33					c0.02
v/c Ratio	0.55	0.33	0.47		0.14	0.16
Uniform Delay, d1	4.8	3.3	11.6		30.7	30.7
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	1.2	0.3	0.9		0.4	0.3
Delay (s)	6.0	3.6	12.5		31.1	31.0
Level of Service	A	A	B		C	C
Approach Delay (s)		4.3	12.5		31.0	
Approach LOS		A	B		C	

Intersection Summary			
HCM 2000 Control Delay	12.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	74.4	Sum of lost time (s)	18.0
Intersection Capacity Utilization	56.5%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
17: North Access & South Service Road

FT 2038 AM PH1.syn
04-03-2024



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔			↕	↕	
Traffic Volume (vph)	85	0	35	33	0	14
Future Volume (vph)	85	0	35	33	0	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t					0.865	
Fit Protected				0.975		
Satd. Flow (prot)	1863	0	0	1816	1611	0
Fit Permitted				0.975		
Satd. Flow (perm)	1863	0	0	1816	1611	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	130.8			104.5	72.7	
Travel Time (s)	9.4			7.5	5.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	92	0	38	36	0	15
Shared Lane Traffic (%)						
Lane Group Flow (vph)	92	0	0	74	15	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)		15	25		25	15
Sign Control	Free			Free	Stop	

Intersection Summary	
Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization 20.3%	ICU Level of Service A
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis
17: North Access & South Service Road

FT 2038 AM PH1.syn
04-03-2024

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔			↔	↔	
Traffic Volume (veh/h)	85	0	35	33	0	14
Future Volume (Veh/h)	85	0	35	33	0	14
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	92	0	38	36	0	15
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None		None			
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			92	204	92	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			92	204	92	
tC, single (s)			4.1	6.4	6.2	
tC, 2 stage (s)						
tF (s)			2.2	3.5	3.3	
p0 queue free %			97	100	98	
cM capacity (veh/h)			1503	765	965	
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	92	74	15			
Volume Left	0	38	0			
Volume Right	0	0	15			
cSH	1700	1503	965			
Volume to Capacity	0.05	0.03	0.02			
Queue Length 95th (m)	0.0	0.6	0.4			
Control Delay (s)	0.0	3.9	8.8			
Lane LOS		A	A			
Approach Delay (s)	0.0	3.9	8.8			
Approach LOS			A			
Intersection Summary						
Average Delay			2.3			
Intersection Capacity Utilization		20.3%		ICU Level of Service		A
Analysis Period (min)			15			

Lanes, Volumes, Timings
19: Street C & South Service Road

FT 2038 AM PH1.syn
04-03-2024

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔			↔	↔	
Traffic Volume (vph)	48	51	106	62	6	10
Future Volume (vph)	48	51	106	62	6	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.931				0.917	
Fit Protected				0.969	0.981	
Satd. Flow (prot)	1734	0	0	1805	1676	0
Fit Permitted				0.969	0.981	
Satd. Flow (perm)	1734	0	0	1805	1676	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	104.5			305.2	84.1	
Travel Time (s)	7.5			22.0	6.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	52	55	115	67	7	11
Shared Lane Traffic (%)						
Lane Group Flow (vph)	107	0	0	182	18	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)		15	25		25	15
Sign Control	Free			Free	Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	25.8%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
19: Street C & South Service Road

FT 2038 AM PH1.syn
04-03-2024

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔		↔		↔	
Traffic Volume (veh/h)	48	51	106	62	6	10
Future Volume (Veh/h)	48	51	106	62	6	10
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)	52	55	115	67	7	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			107		376 80	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			107		376 80	
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		99 99	
cM capacity (veh/h)			1484		577 981	
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	107	182	18			
Volume Left	0	115	7			
Volume Right	55	0	11			
cSH	1700	1484	771			
Volume to Capacity	0.06	0.08	0.02			
Queue Length 95th (m)	0.0	2.0	0.6			
Control Delay (s)	0.0	5.0	9.8			
Lane LOS	A		A			
Approach Delay (s)	0.0	5.0	9.8			
Approach LOS	A		A			
Intersection Summary						
Average Delay			3.6			
Intersection Capacity Utilization			25.8%		ICU Level of Service A	
Analysis Period (min)	15					

Lanes, Volumes, Timings
20: Street A & South Service Road

FT 2038 AM PH1.syn
04-03-2024

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔		↔		↔	
Traffic Volume (vph)	86	114	5	28	22	0
Future Volume (vph)	86	114	5	28	22	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t	0.923					
Fit Protected			0.993		0.950	
Satd. Flow (prot)	1719		0		1850 1770 0	
Fit Permitted			0.993		0.950	
Satd. Flow (perm)	1719		0		1850 1770 0	
Link Speed (k/h)	50		50		50	
Link Distance (m)	285.4		130.8		98.8	
Travel Time (s)	20.5		9.4		7.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	93	124	5	30	24	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	217	0	0	35	24	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0		0.0		3.6	
Link Offset(m)	0.0		0.0		0.0	
Crosswalk Width(m)	4.8		4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	15		25		25 15	
Sign Control	Free		Free		Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	21.5%		ICU Level of Service A			
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
20: Street A & South Service Road

FT 2038 AM PH1.syn
04-03-2024

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔		↔		↔	
Traffic Volume (veh/h)	86	114	5	28	22	0
Future Volume (Veh/h)	86	114	5	28	22	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)	93	124	5	30	24	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			217		195	155
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			217		195	155
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	100
cM capacity (veh/h)			1353		791	891
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	217	35	24			
Volume Left	0	5	24			
Volume Right	124	0	0			
cSH	1700	1353	791			
Volume to Capacity	0.13	0.00	0.03			
Queue Length 95th (m)	0.0	0.1	0.8			
Control Delay (s)	0.0	1.1	9.7			
Lane LOS	A		A			
Approach Delay (s)	0.0	1.1	9.7			
Approach LOS	A		A			
Intersection Summary						
Average Delay			1.0			
Intersection Capacity Utilization			21.5%	ICU Level of Service	A	
Analysis Period (min)			15			

Lanes, Volumes, Timings
21: Argus Rd & Street 1

FT 2038 AM PH1.syn
04-03-2024

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔		↔		↔	
Traffic Volume (vph)	0	211	0	114	695	460
Future Volume (vph)	0	211	0	114	695	460
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t	0.865		0.946			
Fit Protected						
Satd. Flow (prot)	1611	0	0	1863	1762	0
Fit Permitted						
Satd. Flow (perm)	1611	0	0	1863	1762	0
Link Speed (k/h)	50		50			
Link Distance (m)	162.1		113.6			
Travel Time (s)	11.7		8.2			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	229	0	124	755	500
Shared Lane Traffic (%)						
Lane Group Flow (vph)	229	0	0	124	1255	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6		3.3			
Link Offset(m)	0.0		0.0			
Crosswalk Width(m)	4.8		4.8			
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25	15	
Sign Control	Stop		Free		Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	84.4%			ICU Level of Service E		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
21: Argus Rd & Street 1

FT 2038 AM PH1.syn
04-03-2024

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔	↔		↑	↑	
Traffic Volume (veh/h)	0	211	0	114	695	460
Future Volume (Veh/h)	0	211	0	114	695	460
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	229	0	124	755	500
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None	None		
Median storage (veh)						
Upstream signal (m)			114			
pX, platoon unblocked						
vC, conflicting volume	1129	1005	1255			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1129	1005	1255			
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	22	100			
cM capacity (veh/h)	226	293	554			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	229	124	1255			
Volume Left	0	0	0			
Volume Right	229	0	500			
cSH	293	554	1700			
Volume to Capacity	0.78	0.00	0.74			
Queue Length 95th (m)	48.7	0.0	0.0			
Control Delay (s)	50.2	0.0	0.0			
Lane LOS	F					
Approach Delay (s)	50.2	0.0	0.0			
Approach LOS	F					
Intersection Summary						
Average Delay		7.1				
Intersection Capacity Utilization		84.4%		ICU Level of Service	E	
Analysis Period (min)		15				

Lanes, Volumes, Timings
22: Street C & Street 1

FT 2038 AM PH1.syn
04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	0	211	53	411	49	0	27	25	0	0	295	0
Future Volume (vph)	0	211	53	411	49	0	27	25	0	0	295	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t		0.973										
Fit Protected					0.957			0.975				
Satd. Flow (prot)	0	1812	0	0	1783	0	0	1816	0	0	1863	0
Fit Permitted					0.957			0.975				
Satd. Flow (perm)	0	1812	0	0	1783	0	0	1816	0	0	1863	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		43.0			162.1			134.3			75.8	
Travel Time (s)		3.1			11.7			9.7			5.5	
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
Adj. Flow (vph)	0	229	58	447	53	0	29	27	0	0	321	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	287	0	0	500	0	0	56	0	0	321	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Right	Left	Left	Right	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	71.9%						ICU Level of Service C					
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis
22: Street C & Street 1

FT 2038 AM PH1.syn
04-03-2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↔		↔				↔			↔		
Traffic Volume (veh/h)	0	211	53	411	49	0	27	25	0	0	295	0	
Future Volume (Veh/h)	0	211	53	411	49	0	27	25	0	0	295	0	
Sign Control	Stop			Stop			Free			Free			
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)	0	229	58	447	53	0	29	27	0	0	321	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)	134												
pX, platoon unblocked													
vC, conflicting volume	432	406	321	578	406	27	321						27
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	432	406	321	578	406	27	321						27
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	56	92	0	90	100	98						100
cM capacity (veh/h)	483	522	720	253	522	1048	1239						1587
Direction, Lane #	EB 1	WB 1	NB 1	SB 1									
Volume Total	287	500	56	321									
Volume Left	0	447	29	0									
Volume Right	58	0	0	0									
eSH	552	268	1239	1587									
Volume to Capacity	0.52	1.87	0.02	0.00									
Queue Length 95th (m)	23.8	275.6	0.6	0.0									
Control Delay (s)	18.4	435.2	4.2	0.0									
Lane LOS	C	F	A										
Approach Delay (s)	18.4	435.2	4.2	0.0									
Approach LOS	C	F											
Intersection Summary													
Average Delay				191.7									
Intersection Capacity Utilization				71.9%	ICU Level of Service			C					
Analysis Period (min)				15									

Lanes, Volumes, Timings
23: GO Station West Access/Street C & Cross Ave

FT 2038 AM PH1.syn
04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔				↔			↔	
Traffic Volume (vph)	16	338	115	550	512	36	51	0	271	321	411	28
Future Volume (vph)	16	338	115	550	512	36	51	0	271	321	411	28
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.0	0.0	0.0
Storage Lanes	0	0	0	0	0	1	0	1	0	1	0	0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.963				0.995		0.850				0.991	
Fit Protected	0.998				0.976		0.950				0.950	
Satd. Flow (prot)	0	3401	0	0	3437	0	1770	1583	0	1770	1846	0
Fit Permitted	0.832				0.636		0.357				0.577	
Satd. Flow (perm)	0	2836	0	0	2240	0	665	1583	0	1075	1846	0
Right Turn on Red	Yes						Yes		Yes		Yes	
Satd. Flow (RTOR)	102				8		311				8	
Link Speed (k/h)	50				50		50				50	
Link Distance (m)	211.2				162.8		81.1				134.3	
Travel Time (s)	15.2				11.7		5.8				9.7	
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
Adj. Flow (vph)	17	367	125	598	557	39	55	0	295	349	447	30
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	509	0	0	1194	0	55	295	0	349	477	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)	3.3				3.3		3.6				3.6	
Link Offset(m)	0.0				0.0		0.0				0.0	
Crosswalk Width(m)	4.8				4.8		4.8				4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	25	15	25	25	15	25	25	15	25	25	15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)	9.4				9.4		9.4				9.4	
Detector 2 Size(m)	0.6				0.6		0.6				0.6	
Detector 2 Type	Cl+Ex				Cl+Ex		Cl+Ex				Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)	0.0				0.0		0.0				0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	4				8		2				6	
Permitted Phases	4				8		2				6	

Lanes, Volumes, Timings
23: GO Station West Access/Street C & Cross Ave

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	24.0	24.0		24.0	24.0		24.0	24.0		24.0	24.0	
Total Split (s)	25.0	25.0		25.0	25.0		25.0	25.0		25.0	25.0	
Total Split (%)	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%		50.0%	50.0%	
Maximum Green (s)	19.0	19.0		19.0	19.0		19.0	19.0		19.0	19.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		6.0			6.0			6.0			6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		19.0			19.0			19.0			19.0	
Actuated g/C Ratio		0.38			0.38			0.38			0.38	
v/c Ratio		0.45			1.79d			0.22	0.37		0.86	0.68
Control Delay		10.6			205.0			13.3	3.0		38.7	18.6
Queue Delay		0.0			0.0			0.0	0.0		0.0	0.0
Total Delay		10.6			205.0			13.3	3.0		38.7	18.6
LOS		B			F			B	A		D	B
Approach Delay		10.6			205.0			4.6			27.1	
Approach LOS		B			F			A			C	
Queue Length 50th (m)		13.9			~83.7			3.3	0.0		28.8	35.0
Queue Length 95th (m)		24.3			#119.0			10.1	10.7		#70.6	62.4
Internal Link Dist (m)		187.2			138.8			57.1			110.3	
Turn Bay Length (m)											15.0	
Base Capacity (vph)		1140			856			252	794		408	706
Starvation Cap Reductn		0			0			0	0		0	0
Spillback Cap Reductn		0			0			0	0		0	0
Storage Cap Reductn		0			0			0	0		0	0
Reduced v/c Ratio		0.45			1.39			0.22	0.37		0.86	0.68

Intersection Summary

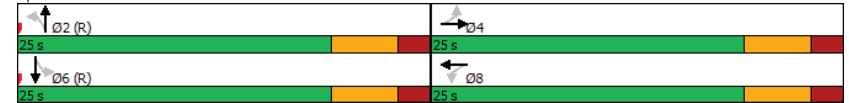
Area Type: Other
 Cycle Length: 50
 Actuated Cycle Length: 50
 Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
 Natural Cycle: 100
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.39
 Intersection Signal Delay: 95.3 Intersection LOS: F
 Intersection Capacity Utilization 99.3% ICU Level of Service F
 Analysis Period (min) 15
 ~ Volume exceeds capacity, queue is theoretically infinite.

Lanes, Volumes, Timings
23: GO Station West Access/Street C & Cross Ave

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- Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
- Queue shown is maximum after two cycles.
- di Defacto Left Lane. Record with 1 though lane as a left lane.

Splits and Phases: 23: GO Station West Access/Street C & Cross Ave



HCM Signalized Intersection Capacity Analysis
23: GO Station West Access/Street C & Cross Ave

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔			↔	↔		↔	↔	
Traffic Volume (vph)	16	338	115	550	512	36	51	0	271	321	411	28
Future Volume (vph)	16	338	115	550	512	36	51	0	271	321	411	28
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0			6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor		0.95			0.95		1.00	1.00		1.00	1.00	
Fr _t		0.96			1.00		1.00	0.85		1.00	0.99	
Fl _t Protected		1.00			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		3403			3436		1770	1583		1770	1845	
Fl _t Permitted		0.83			0.64		0.36	1.00		0.58	1.00	
Satd. Flow (perm)		2838			2238		665	1583		1075	1845	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	17	367	125	598	557	39	55	0	295	349	447	30
RTOR Reduction (vph)	0	63	0	0	5	0	0	183	0	0	5	0
Lane Group Flow (vph)	0	446	0	0	1189	0	55	112	0	349	472	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		19.0			19.0		19.0	19.0		19.0	19.0	
Effective Green, g (s)		19.0			19.0		19.0	19.0		19.0	19.0	
Actuated g/C Ratio		0.38			0.38		0.38	0.38		0.38	0.38	
Clearance Time (s)		6.0			6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		1078			850		252	601		408	701	
v/s Ratio Prot								0.07			0.26	
v/s Ratio Perm		0.16			c0.53		0.08			c0.32		
v/c Ratio		0.41			1.79dl		0.22	0.19		0.86	0.67	
Uniform Delay, d1		11.4			15.5		10.5	10.3		14.2	12.9	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.3			186.6		2.0	0.7		20.0	5.1	
Delay (s)		11.7			202.1		12.5	11.0		34.2	18.0	
Level of Service		B			F		B	B		C	B	
Approach Delay (s)		11.7			202.1		11.3			24.9		
Approach LOS		B			F		B			C		

Intersection Summary			
HCM 2000 Control Delay	94.4	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.13		
Actuated Cycle Length (s)	50.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	99.3%	ICU Level of Service	F
Analysis Period (min)	15		
dl Defacto Left Lane. Recode with 1 though lane as a left lane.			
c Critical Lane Group			

Lanes, Volumes, Timings
1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔			↔	↔		↔	↔	
Traffic Volume (vph)	156	131	365	1038	250	207	475	2273	777	157	1606	130
Future Volume (vph)	156	131	365	1038	250	207	475	2273	777	157	1606	130
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0		0.0	165.0		25.0	145.0		0.0	95.0		90.0
Storage Lanes	1		1	1		1	1		1	1		1
Taper Length (m)	7.5			7.5		7.5			7.5			7.5
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Ped Bike Factor	0.98					0.95			0.98			0.98
Fr _t			0.850			0.850			0.850			0.850
Fl _t Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1624	1710	1425	3120	1710	1425	1608	4577	1425	1608	4532	1425
Fl _t Permitted	0.592			0.369			0.103			0.114		
Satd. Flow (perm)	989	1710	1425	1212	1710	1360	174	4577	1402	193	4532	1425
Right Turn on Red			Yes			Yes			Yes		Yes	
Satd. Flow (RTOR)			255			150			308			191
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		347.0			285.9			280.4			353.6	
Travel Time (s)		25.0			20.6			20.2			25.5	
Confl. Peds. (#/hr)	34					34			14		14	
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
Heavy Vehicles (%)	0%	0%	2%	1%	0%	2%	1%	2%	2%	1%	3%	2%
Adj. Flow (vph)	170	142	397	1128	272	225	516	2471	845	171	1746	141
Shared Lane Traffic (%)												
Lane Group Flow (vph)	170	142	397	1128	272	225	516	2471	845	171	1746	141
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		7.2			7.2			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings

1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA	Free	pm+pt	NA	Perm	pm+pt	NA	Free	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		Free	8		8	2		Free	6		6
Detector Phase	7	4		3	8	8	5	2		1	6	6
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0	10.0	6.0	15.0		6.0	15.0	15.0
Minimum Split (s)	11.0	25.0		11.0	43.0	43.0	11.0	34.0		10.0	34.0	34.0
Total Split (s)	11.0	27.0		27.0	43.0	43.0	24.0	56.0		10.0	42.0	42.0
Total Split (%)	9.2%	22.5%		22.5%	35.8%	35.8%	20.0%	46.7%		8.3%	35.0%	35.0%
Maximum Green (s)	7.0	20.0		22.0	36.0	36.0	20.0	49.0		6.0	35.0	35.0
Yellow Time (s)	3.0	4.0		3.0	4.0	4.0	3.0	4.0		3.0	4.0	4.0
All-Red Time (s)	1.0	3.0		2.0	3.0	3.0	1.0	3.0		1.0	3.0	3.0
Lost Time Adjust (s)	0.0	-3.0		0.0	-3.0	-3.0	0.0	-3.0		0.0	-3.0	-3.0
Total Lost Time (s)	4.0	4.0		5.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	5.0		3.0	5.0	5.0	3.0	5.0		3.0	5.0	5.0
Recall Mode	None	None		None	None	None	None	C-Max		None	C-Max	C-Max
Walk Time (s)				7.0	7.0		7.0			7.0	7.0	
Flash Dont Walk (s)				29.0	29.0		20.0			20.0	20.0	
Pedestrian Calls (#/hr)				0	0		0			0	0	
Act Effct Green (s)	26.5	19.5	120.0	45.5	35.5	35.5	65.5	52.0	120.0	47.5	38.0	38.0
Actuated g/C Ratio	0.22	0.16	1.00	0.38	0.30	0.30	0.55	0.43	1.00	0.40	0.32	0.32
v/c Ratio	0.67	0.51	0.28	1.39	0.54	0.44	1.37	1.25	0.60	0.91	1.22	0.24
Control Delay	44.3	52.1	0.5	214.0	39.3	14.2	214.2	146.5	1.9	75.4	140.6	2.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	44.3	52.1	0.5	214.0	39.3	14.2	214.2	146.5	1.9	75.4	140.6	2.3
LOS	D	D	A	F	D	B	F	F	A	E	F	A
Approach Delay		21.3			157.1			123.8				125.7
Approach LOS		C			F			F				F
Queue Length 50th (m)	28.3	32.4	0.0	~158.0	56.1	13.8	~156.0	~279.4	0.0	25.8	~194.3	0.0
Queue Length 95th (m)	43.7	52.2	0.0	#194.6	81.2	35.5	#236.5	#308.9	0.0	#82.4	#225.2	5.5
Internal Link Dist (m)		323.0			261.9			256.4				329.6
Turn Bay Length (m)	60.0			165.0		25.0	145.0			95.0		90.0
Base Capacity (vph)	255	327	1425	809	555	543	376	1983	1402	188	1435	581
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.67	0.43	0.28	1.39	0.49	0.41	1.37	1.25	0.60	0.91	1.22	0.24

Intersection Summary

Area Type: CBD
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 105.6 (88%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 150
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.39
 Intersection Signal Delay: 122.0 Intersection LOS: F

Lanes, Volumes, Timings

1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd

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Intersection Capacity Utilization 119.1% ICU Level of Service H
 Analysis Period (min) 15
 - Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd



HCM Signalized Intersection Capacity Analysis
1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↗	↘	↔	↗	↘	↔	↗	↘	↔	↗	↘
Traffic Volume (vph)	156	131	365	1038	250	207	475	2273	777	157	1606	130
Future Volume (vph)	156	131	365	1038	250	207	475	2273	777	157	1606	130
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	1.0	5.0	4.0	4.0	4.0	4.0	1.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.98	1.00	1.00	1.00
Flpb, ped/bikes	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1603	1710	1425	3120	1710	1360	1608	4577	1402	1608	4532	1425
Flt Permitted	0.59	1.00	1.00	0.37	1.00	1.00	0.10	1.00	1.00	0.11	1.00	1.00
Satd. Flow (perm)	999	1710	1425	1211	1710	1360	174	4577	1402	193	4532	1425
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	170	142	397	1128	272	225	516	2471	845	171	1746	141
RTOR Reduction (vph)	0	0	0	0	0	106	0	0	0	0	0	96
Lane Group Flow (vph)	170	142	397	1128	272	119	516	2471	845	171	1746	45
Confl. Peds. (#/hr)	34				34				14	14		
Heavy Vehicles (%)	0%	0%	2%	1%	0%	2%	1%	2%	2%	1%	3%	2%
Turn Type	pm+pt	NA	Free	pm+pt	NA	Perm	pm+pt	NA	Free	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		Free	8		8	2		Free	6		6
Actuated Green, G (s)	23.5	16.5	120.0	43.5	32.5	32.5	62.5	49.0	120.0	44.5	35.0	35.0
Effective Green, g (s)	23.5	19.5	120.0	43.5	35.5	35.5	62.5	52.0	120.0	44.5	38.0	38.0
Actuated g/C Ratio	0.20	0.16	1.00	0.36	0.30	0.30	0.52	0.43	1.00	0.37	0.32	0.32
Clearance Time (s)	4.0	7.0		5.0	7.0	7.0	4.0	7.0		4.0	7.0	7.0
Vehicle Extension (s)	3.0	5.0		3.0	5.0	5.0	3.0	5.0		3.0	5.0	5.0
Lane Grp Cap (vph)	230	277	1425	788	505	402	371	1983	1402	183	1435	451
v/s Ratio Prot	0.04	0.08		c0.26	0.16		c0.27	0.54		0.07	0.39	
v/s Ratio Perm	0.10		0.28	c0.26		0.09	c0.45		0.60	0.27		0.03
v/c Ratio	0.74	0.51	0.28	1.43	0.54	0.30	1.39	1.25	0.60	0.93	1.22	0.10
Uniform Delay, d1	43.9	45.9	0.0	34.8	35.4	32.6	37.4	34.0	0.0	31.0	41.0	28.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	11.7	3.2	0.5	201.5	2.0	0.9	191.7	115.2	1.9	47.6	104.1	0.4
Delay (s)	55.6	49.1	0.5	236.2	37.4	33.5	229.1	149.2	1.9	78.6	145.1	29.4
Level of Service	E	D	A	F	D	C	F	F	A	E	F	C
Approach Delay (s)		23.4			174.9			127.5			131.7	
Approach LOS		C			F			F			F	
Intersection Summary												
HCM 2000 Control Delay		128.9										
HCM 2000 Volume to Capacity ratio		1.41										
Actuated Cycle Length (s)		120.0						Sum of lost time (s)		17.0		
Intersection Capacity Utilization		119.1%						ICU Level of Service		H		
Analysis Period (min)		15										
c Critical Lane Group												

Lanes, Volumes, Timings
2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↗	↘	↔	↗	↘	↔	↗	↘	↔	↗	↘
Traffic Volume (vph)	28	0	329	709	129	400	0	3097	647	0	3060	12
Future Volume (vph)	28	0	329	709	129	400	0	3097	647	0	3060	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.5	3.3	3.6	3.5	3.6	3.6	3.6	3.6	3.6	3.5
Storage Length (m)	50.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Storage Lanes	1		1	1		1	0		1	0		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.91	1.00	1.00	0.86	0.86
Ped Bike Factor	1.00					0.99			0.97		1.00	
Frt			0.850			0.850			0.850		0.999	
Flt Protected	0.950			0.950	0.967							
Satd. Flow (prot)	1570	0	1437	1463	1545	1409	0	4577	1439	0	4780	0
Flt Permitted	0.950			0.950	0.967							
Satd. Flow (perm)	1568	0	1437	1463	1545	1391	0	4577	1400	0	4780	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			31			270			161			1
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		142.1			192.6			324.8			280.4	
Travel Time (s)		10.2			13.9			23.4			20.2	
Confl. Peds. (#/hr)	2					2	14		14	14		14
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
Heavy Vehicles (%)	0%	0%	0%	2%	1%	2%	0%	2%	1%	0%	23%	0%
Adj. Flow (vph)	30	0	358	771	140	435	0	3366	703	0	3326	13
Shared Lane Traffic (%)				41%								
Lane Group Flow (vph)	30	0	358	455	456	435	0	3366	703	0	3339	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.3			3.3			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.19	1.14	1.16	1.19	1.14	1.16	1.14	1.14	1.14	1.14	1.14	1.16
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1		1	1		2	1		2	1		2
Detector Template	Left		Right	Left	Thru	Right		Thru	Right		Thru	
Leading Detector (m)	2.0		2.0	2.0	10.0	2.0		10.0	2.0		10.0	
Trailing Detector (m)	0.0		0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Detector 1 Position(m)	0.0		0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Detector 1 Size(m)	2.0		2.0	2.0	0.6	2.0		0.6	2.0		0.6	
Detector 1 Type	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Detector 1 Delay (s)	0.0		0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Detector 2 Position(m)					9.4			9.4			9.4	
Detector 2 Size(m)					0.6			0.6			0.6	
Detector 2 Type					Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

Lanes, Volumes, Timings

2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)					0.0			0.0				0.0
Turn Type	Prot		Perm	Perm	NA	Free		NA	Free			NA
Protected Phases	3			4	4			6				2
Permitted Phases						Free			Free			
Detector Phase	3		8	4	4			6				2
Switch Phase												
Minimum Initial (s)	7.0		10.0	10.0	10.0			5.0				28.0
Minimum Split (s)	23.0		38.0	38.0	38.0			35.0				35.0
Total Split (s)	23.0		64.0	41.0	41.0			76.0				76.0
Total Split (%)	16.4%		45.7%	29.3%	29.3%			54.3%				54.3%
Maximum Green (s)	18.0		57.0	34.0	34.0			69.0				69.0
Yellow Time (s)	3.0		4.0	4.0	4.0			4.0				4.0
All-Red Time (s)	2.0		3.0	3.0	3.0			3.0				3.0
Lost Time Adjust (s)	-1.0		-3.0	-3.0	-3.0			-3.0				-3.0
Total Lost Time (s)	4.0		4.0	4.0	4.0			4.0				4.0
Lead/Lag	Lead			Lag	Lag							
Lead-Lag Optimize?	Yes			Yes	Yes							
Vehicle Extension (s)	3.0		3.0	3.0	3.0			4.5				4.5
Recall Mode	Min		Min	Min	Min			C-Min				C-Min
Walk Time (s)	7.0		7.0	7.0	7.0			7.0				7.0
Flash Dont Walk (s)			24.0	24.0	24.0			21.0				21.0
Pedestrian Calls (#/hr)			0	0	0			0				0
Act Effct Green (s)	9.5		60.0	46.5	46.5	140.0		72.0	140.0			72.0
Actuated g/C Ratio	0.07		0.43	0.33	0.33	1.00		0.51	1.00			0.51
v/c Ratio	0.28		0.57	0.94	0.89	0.31		1.43	0.50			1.36
Control Delay	68.1		31.5	73.7	65.2	0.6		224.4	0.1			194.1
Queue Delay	0.0		0.0	0.0	0.0	0.0		0.0	0.0			0.0
Total Delay	68.1		31.5	73.7	65.2	0.6		224.4	0.1			194.1
LOS	E		C	E	E	A		F	A			F
Approach Delay		34.4						185.7				194.1
Approach LOS		C						F				F
Queue Length 50th (m)	8.5		71.1	134.6	131.7	0.0		~485.2	0.0			~373.0
Queue Length 95th (m)	19.2		104.6	#217.1	#209.5	0.0		m#422.1	m0.0			#390.8
Internal Link Dist (m)		118.1			168.6			300.8				256.4
Turn Bay Length (m)	50.0											
Base Capacity (vph)	213		633	485	512	1391		2353	1400			2458
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	0.14		0.57	0.94	0.89	0.31		1.43	0.50			1.36

Intersection Summary

Area Type: CBD
 Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 115.4 (82%), Referenced to phase 2:SBT and 6:NBT, Start of Green
 Natural Cycle: 150
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.43

Lanes, Volumes, Timings

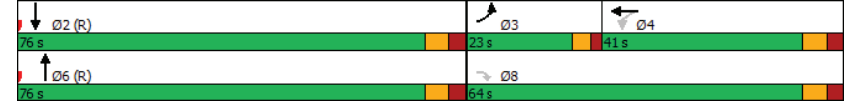
2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp

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Intersection Signal Delay: 161.9 Intersection LOS: F
 Intersection Capacity Utilization 107.7% ICU Level of Service G
 Analysis Period (min) 15
 ~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp



HCM Signalized Intersection Capacity Analysis
 2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	28	0	329	709	129	400	0	3097	647	0	3060	12
Future Volume (vph)	28	0	329	709	129	400	0	3097	647	0	3060	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.5	3.3	3.6	3.5	3.6	3.6	3.6	3.6	3.6	3.5
Total Lost time (s)	4.0		4.0	4.0	4.0	1.0		4.0	4.0		4.0	
Lane Util. Factor	1.00		1.00	0.95	0.95	1.00		0.91	1.00		0.86	
Frpb, ped/bikes	1.00		1.00	1.00	1.00	0.99		1.00	0.97		1.00	
Flpb, ped/bikes	1.00		1.00	1.00	1.00	1.00		1.00	1.00		1.00	
Frt	1.00		0.85	1.00	1.00	0.85		1.00	0.85		1.00	
Flt Protected	0.95		1.00	0.95	0.97	1.00		1.00	1.00		1.00	
Satd. Flow (prot)	1570		1437	1463	1544	1391		4577	1400		4782	
Flt Permitted	0.95		1.00	0.95	0.97	1.00		1.00	1.00		1.00	
Satd. Flow (perm)	1570		1437	1463	1544	1391		4577	1400		4782	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	30	0	358	771	140	435	0	3366	703	0	3326	13
RTOR Reduction (vph)	0	0	18	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	30	0	340	455	456	435	0	3366	703	0	3339	0
Confl. Peds. (#/hr)	2					2	14		14	14		14
Heavy Vehicles (%)	0%	0%	0%	2%	1%	2%	0%	2%	1%	0%	23%	0%
Turn Type	Prot		Perm	Perm	NA	Free		NA	Free		NA	
Protected Phases	3				4			6			2	
Permitted Phases			8	4		Free			Free			
Actuated Green, G (s)	8.5		57.0	43.5	43.5	140.0		69.0	140.0		69.0	
Effective Green, g (s)	9.5		60.0	46.5	46.5	140.0		72.0	140.0		72.0	
Actuated g/C Ratio	0.07		0.43	0.33	0.33	1.00		0.51	1.00		0.51	
Clearance Time (s)	5.0		7.0	7.0	7.0			7.0			7.0	
Vehicle Extension (s)	3.0		3.0	3.0	3.0			4.5			4.5	
Lane Grp Cap (vph)	106		615	485	512	1391		2353	1400		2459	
v/s Ratio Prot	0.02							c0.74			0.70	
v/s Ratio Perm			0.24	c0.31	0.30	0.31			c0.50			
v/c Ratio	0.28		0.55	0.94	0.89	0.31		1.43	0.50		1.36	
Uniform Delay, d1	62.0		30.0	45.4	44.3	0.0		34.0	0.0		34.0	
Progression Factor	1.00		1.00	1.00	1.00	1.00		1.08	1.00		1.00	
Incremental Delay, d2	1.5		1.1	25.9	17.4	0.6		194.0	0.1		163.7	
Delay (s)	63.5		31.0	71.2	61.8	0.6		230.5	0.1		197.7	
Level of Service	E		C	E	E	A		F	A		F	
Approach Delay (s)		33.6			45.2			190.7			197.7	
Approach LOS		C			D			F			F	

Intersection Summary			
HCM 2000 Control Delay	165.2	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.20		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	107.7%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
 3: Trafalgar Rd & QEW EB-Off Ramp

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Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	1126	605	0	2596	2477	369
Future Volume (vph)	1126	605	0	2596	2477	369
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.5	3.6	3.6	3.6	3.6
Lane Util. Factor	0.97	1.00	1.00	0.91	0.91	1.00
Ped Bike Factor		0.99				
Frt		0.850				0.850
Flt Protected	0.950					
Satd. Flow (prot)	3046	1423	0	4577	4577	1454
Flt Permitted	0.950					
Satd. Flow (perm)	3046	1402	0	4577	4577	1454
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		1				115
Link Speed (k/h)	50			50	50	
Link Distance (m)	199.2			51.4	324.8	
Travel Time (s)	14.3			3.7	23.4	
Confl. Peds. (#/hr)		2				
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	1%	0%	2%	2%	0%
Adj. Flow (vph)	1224	658	0	2822	2692	401
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1224	658	0	2822	2692	401
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	6.6			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.19	1.16	1.14	1.14	1.14	1.14
Turning Speed (k/h)	24	14	24			14
Number of Detectors	1	1		2	2	1
Detector Template	Left	Right		Thru	Thru	Right
Leading Detector (m)	2.0	2.0		10.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	2.0	2.0		0.6	0.6	2.0
Detector 1 Type	CI+Ex	CI+Ex		CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)				9.4	9.4	
Detector 2 Size(m)				0.6	0.6	
Detector 2 Type				CI+Ex	CI+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Perm	Perm		NA	NA	Free
Protected Phases				2	2	

Lanes, Volumes, Timings
3: Trafalgar Rd & QEW EB-Off Ramp

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Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Permitted Phases	4	4				Free
Detector Phase	4	4		2	2	
Switch Phase						
Minimum Initial (s)	10.0	10.0		29.0	29.0	
Minimum Split (s)	38.0	38.0		36.0	36.0	
Total Split (s)	60.0	60.0		80.0	80.0	
Total Split (%)	42.9%	42.9%		57.1%	57.1%	
Maximum Green (s)	53.0	53.0		73.0	73.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	
All-Red Time (s)	3.0	3.0		3.0	3.0	
Lost Time Adjust (s)	-3.0	-3.0		-3.0	-3.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Recall Mode	None	None		C-Max	C-Max	
Walk Time (s)	7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	24.0	24.0		22.0	22.0	
Pedestrian Calls (#/hr)	0	0		0	0	
Act Effct Green (s)	56.0	56.0		76.0	76.0	140.0
Actuated g/C Ratio	0.40	0.40		0.54	0.54	1.00
v/c Ratio	1.00	1.17		1.14	1.08	0.28
Control Delay	68.7	133.4		91.7	56.6	0.0
Queue Delay	0.0	0.0		0.0	0.0	0.0
Total Delay	68.7	133.4		91.7	56.6	0.0
LOS	E	F		F	E	A
Approach Delay	91.3			91.7	49.3	
Approach LOS	F			F	D	
Queue Length 50th (m)	~184.2	~228.8		~349.3	~318.2	0.0
Queue Length 95th (m)	#235.2	#306.7		m#281.7	m122.1	m0.0
Internal Link Dist (m)	175.2			27.4	300.8	
Turn Bay Length (m)						
Base Capacity (vph)	1218	561		2484	2484	1454
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	1.00	1.17		1.14	1.08	0.28

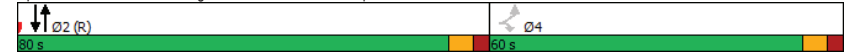
Intersection Summary	
Area Type:	CBD
Cycle Length:	140
Actuated Cycle Length:	140
Offset:	133.6 (95%), Referenced to phase 2:NBSB and 6:, Start of Green
Natural Cycle:	150
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	1.17
Intersection Signal Delay:	74.8
Intersection Capacity Utilization:	101.7%
Analysis Period (min):	15
Intersection LOS:	E
ICU Level of Service G:	

Lanes, Volumes, Timings
3: Trafalgar Rd & QEW EB-Off Ramp

FT 2038 PM PH1.syn
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- Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Trafalgar Rd & QEW EB-Off Ramp



HCM Signalized Intersection Capacity Analysis
3: Trafalgar Rd & QEW EB-Off Ramp

FT 2038 PM PH1.syn
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Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	1126	605	0	2596	2477	369
Future Volume (vph)	1126	605	0	2596	2477	369
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.5	3.6	3.6	3.6	3.6
Total Lost time (s)	4.0	4.0		4.0	4.0	1.0
Lane Util. Factor	0.97	1.00		0.91	0.91	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00
Fr	1.00	0.85		1.00	1.00	0.85
Flt Protected	0.95	1.00		1.00	1.00	1.00
Satd. Flow (prot)	3046	1402		4577	4577	1454
Flt Permitted	0.95	1.00		1.00	1.00	1.00
Satd. Flow (perm)	3046	1402		4577	4577	1454
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1224	658	0	2822	2692	401
RTOR Reduction (vph)	0	1	0	0	0	0
Lane Group Flow (vph)	1224	657	0	2822	2692	401
Confl. Peds. (#/hr)		2				
Heavy Vehicles (%)	0%	1%	0%	2%	2%	0%
Turn Type	Perm	Perm		NA	NA	Free
Protected Phases				2	2	
Permitted Phases	4	4				Free
Actuated Green, G (s)	53.0	53.0		73.0	73.0	140.0
Effective Green, g (s)	56.0	56.0		76.0	76.0	140.0
Actuated g/C Ratio	0.40	0.40		0.54	0.54	1.00
Clearance Time (s)	7.0	7.0		7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	1218	560		2484	2484	1454
v/s Ratio Prot				c0.62	0.59	
v/s Ratio Perm	0.40	c0.47				0.28
v/c Ratio	1.00	1.17		1.14	1.08	0.28
Uniform Delay, d1	42.0	42.0		32.0	32.0	0.0
Progression Factor	1.00	1.00		0.95	0.50	1.00
Incremental Delay, d2	27.0	96.0		61.8	38.5	0.0
Delay (s)	69.0	138.0		92.2	54.5	0.0
Level of Service	E	F		F	D	A
Approach Delay (s)	93.1			92.2	47.4	
Approach LOS	F			F	D	

Intersection Summary			
HCM 2000 Control Delay	74.7	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.18		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	101.7%	ICU Level of Service	G
Analysis Period (min)	15		

Lanes, Volumes, Timings
4: Trafalgar Rd & Argus Rd

FT 2038 PM PH1.syn
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Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	146	0	3511	2094	987
Future Volume (vph)	0	146	0	3511	2094	987
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.6	3.5	3.6	3.6	3.6	3.6
Lane Util. Factor	1.00	1.00	1.00	0.91	0.91	0.91
Ped Bike Factor						
Fr		0.865			0.952	
Flt Protected						
Satd. Flow (prot)	0	1354	0	4577	4343	0
Flt Permitted						
Satd. Flow (perm)	0	1354	0	4577	4343	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	145.7			270.2	51.4	
Travel Time (s)	10.5			19.5	3.7	
Confl. Peds. (#/hr)						24
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	8%	0%	2%	2%	3%
Adj. Flow (vph)	0	159	0	3816	2276	1073
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	159	0	3816	3349	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			3.3	3.3	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.14	1.16	1.14	1.14	1.14	1.14
Turning Speed (k/h)	24	14	24			14
Sign Control	Stop			Free	Free	

Intersection Summary	
Area Type:	CBD
Control Type:	Unsignalized
Intersection Capacity Utilization	86.9%
ICU Level of Service	E
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis
4: Trafalgar Rd & Argus Rd

FT 2038 PM PH1.syn
04-03-2024

Movement	EBL	EBR	NBL	NBT	SBT	SBR	
Lane Configurations		↗		↖↖	↗↗		
Traffic Volume (veh/h)	0	146	0	3511	2094	987	
Future Volume (Veh/h)	0	146	0	3511	2094	987	
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	159	0	3816	2276	1073	
Pedestrians	24						
Lane Width (m)	3.5						
Walking Speed (m/s)	1.2						
Percent Blockage	2						
Right turn flare (veh)							
Median type				None	None		
Median storage (veh)							
Upstream signal (m)				270	52		
pX, platoon unblocked	0.66	0.46	0.46				
vC, conflicting volume	4108	1319	3373				
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol	0	0	2069				
tC, single (s)	6.8	7.1	4.1				
tC, 2 stage (s)							
tF (s)	3.5	3.4	2.2				
p0 queue free %	100	67	100				
cM capacity (veh/h)	668	484	124				
Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	159	1272	1272	1272	910	910	1528
Volume Left	0	0	0	0	0	0	0
Volume Right	159	0	0	0	0	0	1073
sSH	484	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.33	0.75	0.75	0.75	0.54	0.54	0.90
Queue Length 95th (m)	11.3	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (s)	16.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	C						
Approach Delay (s)	16.0	0.0			0.0		
Approach LOS	C						
Intersection Summary							
Average Delay			0.3				
Intersection Capacity Utilization			86.9%		ICU Level of Service		E
Analysis Period (min)			15				

Lanes, Volumes, Timings
5: Trafalgar Rd & Cross Ave/South Service Rd

FT 2038 PM PH1.syn
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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖↖	↖	↗	↖	↖	↗	↖↖	↖↖	↗	↖↖	↖↖	↖↖
Traffic Volume (vph)	1119	58	193	86	118	215	313	1746	42	104	1625	338
Future Volume (vph)	1119	58	193	86	118	215	313	1746	42	104	1625	338
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.6	3.3	3.6	3.5	3.3	3.6	3.6	3.3	3.6	3.6
Storage Length (m)	130.0		0.0	25.0		0.0	50.0		0.0	25.0		0.0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.91	0.91
Ped Bike Factor		0.96		0.98				0.99			0.99	
Ft		0.885				0.850		0.996			0.974	
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2958	1342	0	1540	1644	1423	1496	4573	0	1570	4446	0
Fit Permitted	0.950			0.591			0.077			0.083		
Satd. Flow (perm)	2958	1342	0	935	1644	1423	121	4573	0	137	4446	0
Right Turn on Red			Yes			Yes		Yes		Yes		Yes
Satd. Flow (RTOR)		152				148		3			36	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		151.2			330.4			150.2			270.2	
Travel Time (s)		10.9			23.8			10.8			19.5	
Confl. Peds. (#/hr)			15	15			18		70	70		18
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
Heavy Vehicles (%)	3%	8%	9%	2%	4%	1%	5%	1%	0%	0%	1%	3%
Adj. Flow (vph)	1216	63	210	93	128	234	340	1898	46	113	1766	367
Shared Lane Traffic (%)												
Lane Group Flow (vph)	1216	273	0	93	128	234	340	1944	0	113	2133	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		6.6			6.6			3.3			3.3	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.19	1.14	1.14	1.19	1.14	1.16	1.19	1.14	1.14	1.19	1.14	1.14
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2	1	1	2		1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

Lanes, Volumes, Timings
5: Trafalgar Rd & Cross Ave/South Service Rd

FT 2038 PM PH1.syn
04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Perm	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	7	4			8		5	2		1	6	
Permitted Phases				8		8	2			6		
Detector Phase	7	4		8	8	8	5	2		1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	7.0	27.0		7.0	27.0	
Minimum Split (s)	17.0	25.0		25.0	25.0	25.0	11.5	34.0		11.5	34.0	
Total Split (s)	40.0	65.0		25.0	25.0	25.0	20.0	63.4		11.6	55.0	
Total Split (%)	28.6%	46.4%		17.9%	17.9%	17.9%	14.3%	45.3%		8.3%	39.3%	
Maximum Green (s)	33.0	58.0		18.0	18.0	18.0	16.0	56.4		7.6	48.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	3.0	4.0		3.0	4.0	
All-Red Time (s)	3.0	3.0		3.0	3.0	3.0	1.0	3.0		1.0	3.0	
Lost Time Adjust (s)	-3.0	-3.0		0.0	-3.0	-3.0	0.0	-3.0		0.0	-3.0	
Total Lost Time (s)	4.0	4.0		7.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lead/Lag	Lead			Lag	Lag	Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes			Yes	Yes	Yes	Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	4.0		4.0	4.0	4.0	3.0	5.0		3.0	5.0	
Recall Mode	Min	Min		Min	Min	Min	C-Max			Min	C-Max	
Walk Time (s)		7.0		7.0	7.0	7.0		7.0			7.0	
Flash Dont Walk (s)		11.0		11.0	11.0	11.0		11.0			11.0	
Pedestrian Calls (#/hr)		0		0	0	0		0			0	
Act Effct Green (s)	36.0	59.9		16.9	19.9	19.9	72.1	60.2		58.9	51.0	
Actuated g/C Ratio	0.26	0.43		0.12	0.14	0.14	0.52	0.43		0.42	0.36	
v/c Ratio	1.60	0.41		0.82	0.55	0.71	1.48	0.99		0.82	1.30	
Control Delay	310.5	13.4		107.2	65.0	33.8	252.0	55.1		39.0	175.6	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	310.5	13.4		107.2	65.0	33.8	252.0	55.1		39.0	175.6	
LOS	F	B		F	E	C	F	E		D	F	
Approach Delay		256.1			57.6			84.4			168.8	
Approach LOS		F			E			F			F	
Queue Length 50th (m)	~260.4	22.1		26.6	34.9	23.5	~128.3	~178.6		22.4	~286.5	
Queue Length 95th (m)	#304.1	46.0		#58.0	57.2	55.5 m#107.2	m142.8	m21.2 m#248.2				
Internal Link Dist (m)		127.2			306.4			126.2			246.2	
Turn Bay Length (m)	130.0			25.0			50.0			25.0		
Base Capacity (vph)	760	670		120	246	339	230	1968		138	1642	
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	
Reduced v/c Ratio	1.60	0.41		0.78	0.52	0.69	1.48	0.99		0.82	1.30	

Intersection Summary

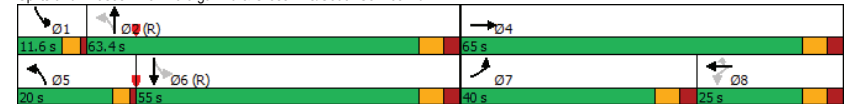
Area Type: CBD
 Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 128 (91%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
 Natural Cycle: 150
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.60

Lanes, Volumes, Timings
5: Trafalgar Rd & Cross Ave/South Service Rd

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Intersection Signal Delay: 151.3 Intersection LOS: F
 Intersection Capacity Utilization 120.0% ICU Level of Service H
 Analysis Period (min) 15
 ~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Plots and Phases: 5: Trafalgar Rd & Cross Ave/South Service Rd



HCM Signalized Intersection Capacity Analysis
5: Trafalgar Rd & Cross Ave/South Service Rd

FT 2038 PM PH1.syn
04-03-2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	1119	58	193	86	118	215	313	1746	42	104	1625	338
Future Volume (vph)	1119	58	193	86	118	215	313	1746	42	104	1625	338
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.6	3.3	3.6	3.5	3.3	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)	4.0	4.0		7.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	1.00		1.00	1.00	1.00	1.00	0.91		1.00	0.91	
Frbp, ped/bikes	1.00	0.96		1.00	1.00	1.00	1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		0.98	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.88		1.00	1.00	0.85	1.00	1.00		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	2958	1341		1503	1644	1423	1496	4575		1570	4446	
Flt Permitted	0.95	1.00		0.59	1.00	1.00	0.08	1.00		0.08	1.00	
Satd. Flow (perm)	2958	1341		936	1644	1423	121	4575		138	4446	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1216	63	210	93	128	234	340	1898	46	113	1766	367
RTOR Reduction (vph)	0	87	0	0	0	127	0	2	0	0	23	0
Lane Group Flow (vph)	1216	186	0	93	128	107	340	1942	0	113	2110	0
Confl. Peds. (#/hr)			15	15			18		70	70		18
Heavy Vehicles (%)	3%	8%	9%	2%	4%	1%	5%	1%	0%	0%	1%	3%
Turn Type	Prot	NA		Perm	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		8	8	5	2	1		6	6	
Permitted Phases			8		8	2		6				
Actuated Green, G (s)	33.0	56.9		16.9	16.9	16.9	69.1	57.2		55.9	48.0	
Effective Green, g (s)	36.0	59.9		16.9	19.9	19.9	69.1	60.2		55.9	51.0	
Actuated g/C Ratio	0.26	0.43		0.12	0.14	0.14	0.49	0.43		0.40	0.36	
Clearance Time (s)	7.0	7.0		7.0	7.0	7.0	4.0	7.0		4.0	7.0	
Vehicle Extension (s)	3.0	4.0		4.0	4.0	4.0	3.0	5.0		3.0	5.0	
Lane Grp Cap (vph)	760	573		112	233	202	227	1967		135	1619	
v/s Ratio Prot	c0.41	0.14		0.08			c0.18	0.42		0.05	0.47	
v/s Ratio Perm			c0.10		0.08		c0.55			0.29		
v/c Ratio	1.60	0.32		0.83	0.55	0.53	1.50	0.99		0.84	1.30	
Uniform Delay, d1	52.0	26.6		60.1	55.9	55.7	45.3	39.5		33.6	44.5	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.17	1.32		1.24	1.16	
Incremental Delay, d2	276.2	0.5		39.5	3.3	3.2	226.1	3.9		4.2	136.9	
Delay (s)	328.2	27.1		99.7	59.2	59.0	279.1	56.0		46.0	188.8	
Level of Service	F	C		F	E	E	F	E		D	F	
Approach Delay (s)		273.0			67.3			89.2			181.6	
Approach LOS		F			E			F			F	

Intersection Summary			
HCM 2000 Control Delay	162.0	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.39		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	120.0%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
6: Trafalgar Rd & Cornwall Rd

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	566	570	55	109	894	564	74	968	98	704	783	420
Future Volume (vph)	566	570	55	109	894	564	74	968	98	704	783	420
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.5
Storage Length (m)	80.0		0.0	80.0		0.0	25.0		0.0	80.0		0.0
Storage Lanes	2		0	1		1	1		0	1		1
Taper Length (m)	7.5			7.5		7.5				7.5		
Lane Util. Factor	0.97	0.95	0.95	1.00	0.95	1.00	1.00	*0.80	0.95	0.97	*0.80	1.00
Ped Bike Factor	0.99	1.00		0.99		0.98	0.99	1.00		1.00		0.97
Frt		0.987				0.850		0.986				0.850
Flt Protected	0.950			0.950		0.950		0.950		0.950		
Satd. Flow (prot)	3016	3104	0	1570	3217	1439	1540	2692	0	2987	1368	1409
Flt Permitted	0.950			0.950		0.950		0.950		0.950		
Satd. Flow (perm)	2993	3104	0	1550	3217	1413	1529	2692	0	2974	1368	1361
Right Turn on Red			Yes			Yes		Yes		Yes		Yes
Satd. Flow (RTOR)		7				339		7				276
Link Speed (k/h)		50			50			50				50
Link Distance (m)		285.8			142.3			311.4				130.3
Travel Time (s)		20.6			10.2			22.4				9.4
Confl. Peds. (#/hr)	21		14	14		21	17		10	10		17
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
Heavy Vehicles (%)	1%	3%	1%	0%	1%	1%	2%	0%	0%	2%	0%	2%
Adj. Flow (vph)	615	620	60	118	972	613	80	1052	107	765	851	457
Shared Lane Traffic (%)												
Lane Group Flow (vph)	615	680	0	118	972	613	80	1159	0	765	851	457
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		6.6			6.6			6.6				6.6
Link Offset(m)		0.0			0.0			0.0				0.0
Crosswalk Width(m)		4.8			4.8			4.8				4.8
Two way Left Turn Lane												
Headway Factor	1.19	1.14	1.14	1.19	1.14	1.14	1.19	1.14	1.14	1.19	1.14	1.16
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2	1	1	2		1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0		2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6		2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4				9.4
Detector 2 Size(m)		0.6			0.6			0.6				0.6
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex				Cl+Ex
Detector 2 Channel												

Lanes, Volumes, Timings
6: Trafalgar Rd & Cornwall Rd

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA	Free	Prot	NA		Prot	NA	Perm
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases					Free							6
Detector Phase	3	8		7	4		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	7.0	10.0		7.0	10.0		7.0	20.0		7.0	20.0	20.0
Minimum Split (s)	12.0	37.0		12.0	37.0		12.0	39.0		12.0	39.0	39.0
Total Split (s)	22.0	43.0		18.0	39.0		12.0	53.0		26.0	67.0	67.0
Total Split (%)	15.7%	30.7%		12.9%	27.9%		8.6%	37.9%		18.6%	47.9%	47.9%
Maximum Green (s)	17.0	36.0		13.0	32.0		7.0	46.0		21.0	60.0	60.0
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	4.0
All-Red Time (s)	2.0	3.0		2.0	3.0		2.0	3.0		2.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-3.0		-1.0	-3.0		-1.0	-3.0		-1.0	-3.0	-3.0
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	0.2	0.2		0.2	0.2		0.2	0.2		0.2	0.2	0.2
Recall Mode	Max	Max		Max	Max		None	C-Max		Max	C-Max	C-Max
Walk Time (s)		7.0			7.0			7.0			7.0	7.0
Flash Dont Walk (s)		23.0			23.0			25.0			25.0	25.0
Pedestrian Calls (#/hr)		0			0			0			0	0
Act Effct Green (s)	18.0	39.0		14.0	35.0	140.0	8.0	49.0		22.0	63.0	63.0
Actuated g/C Ratio	0.13	0.28		0.10	0.25	1.00	0.06	0.35		0.16	0.45	0.45
v/c Ratio	1.59	0.78		0.75	1.21	0.43	0.91	1.23		1.63	1.38	0.60
Control Delay	315.3	53.5		89.4	150.0	1.0	137.9	149.8		330.5	198.3	5.3
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	315.3	53.5		89.4	150.0	1.0	137.9	149.8		330.5	198.3	5.3
LOS	F	D		F	F	A	F	F		F	F	A
Approach Delay		177.8			92.1			149.1			204.5	
Approach LOS		F			F			F			F	
Queue Length 50th (m)	~131.2	95.6		34.0	~181.3	0.0	23.6	~259.3		~169.7	~401.1	18.2
Queue Length 95th (m)	#170.2	120.2		#66.2	#224.9	0.0	#58.1	#313.0		m#128.2	m#290.2	m11.0
Internal Link Dist (m)		261.8			118.3			287.4			106.3	
Turn Bay Length (m)	80.0			80.0			25.0			80.0		
Base Capacity (vph)	387	869		157	804	1413	88	946		469	615	764
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	0
Reduced v/c Ratio	1.59	0.78		0.75	1.21	0.43	0.91	1.23		1.63	1.38	0.60

Intersection Summary

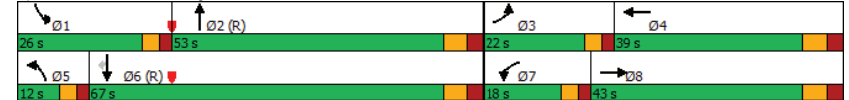
Area Type: CBD
 Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green, Master Intersection
 Natural Cycle: 150
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.63

Lanes, Volumes, Timings
6: Trafalgar Rd & Cornwall Rd

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Intersection Signal Delay: 157.8	Intersection LOS: F
Intersection Capacity Utilization 114.3%	ICU Level of Service H
Analysis Period (min) 15	
* User Entered Value	
~ Volume exceeds capacity, queue is theoretically infinite. Queue shown is maximum after two cycles.	
# 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.	
m Volume for 95th percentile queue is metered by upstream signal.	

Splits and Phases: 6: Trafalgar Rd & Cornwall Rd



HCM Signalized Intersection Capacity Analysis
6: Trafalgar Rd & Cornwall Rd

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	566	570	55	109	894	564	74	968	98	704	783	420
Future Volume (vph)	566	570	55	109	894	564	74	968	98	704	783	420
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.5
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.97	0.95		1.00	0.95	1.00	1.00	*0.80		0.97	*0.80	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.98	1.00	1.00		1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Fr	1.00	0.99		1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3016	3104		1570	3217	1413	1540	2692		2987	1368	1361
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3016	3104		1570	3217	1413	1540	2692		2987	1368	1361
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	615	620	60	118	972	613	80	1052	107	765	851	457
RTOR Reduction (vph)	0	5	0	0	0	0	0	5	0	0	0	152
Lane Group Flow (vph)	615	675	0	118	972	613	80	1154	0	765	851	305
Confl. Peds. (#/hr)	21		14	14		21	17		10	10		17
Heavy Vehicles (%)	1%	3%	1%	0%	1%	1%	2%	0%	0%	2%	0%	2%
Turn Type	Prot	NA		Prot	NA	Free	Prot	NA		Prot	NA	Perm
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases					Free							6
Actuated Green, G (s)	17.0	36.0		13.0	32.0	140.0	7.0	46.0		21.0	60.0	60.0
Effective Green, g (s)	18.0	39.0		14.0	35.0	140.0	8.0	49.0		22.0	63.0	63.0
Actuated g/C Ratio	0.13	0.28		0.10	0.25	1.00	0.06	0.35		0.16	0.45	0.45
Clearance Time (s)	5.0	7.0		5.0	7.0		5.0	7.0		5.0	7.0	7.0
Vehicle Extension (s)	0.2	0.2		0.2	0.2		0.2	0.2		0.2	0.2	0.2
Lane Grp Cap (vph)	387	864		157	804	1413	88	942		469	615	612
v/s Ratio Prot	c0.20	0.22		0.08	c0.30		0.05	0.43		c0.26	c0.62	
v/s Ratio Perm					c0.43							0.22
v/c Ratio	1.59	0.78		0.75	1.21	0.43	0.91	1.23		1.63	1.38	0.50
Uniform Delay, d1	61.0	46.6		61.3	52.5	0.0	65.6	45.5		59.0	38.5	27.3
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.41	0.63	0.47
Incremental Delay, d2	277.1	6.9		27.8	105.6	1.0	64.9	111.0		284.9	173.6	0.3
Delay (s)	338.1	53.5		89.1	158.1	1.0	130.5	156.5		368.3	197.8	13.0
Level of Service	F	D		F	F	A	F	F		F	F	B
Approach Delay (s)	188.7			96.7			154.8			220.0		
Approach LOS	F			F			F			F		

Intersection Summary			
HCM 2000 Control Delay	167.5	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.42		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	114.3%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
7: South Service Road/Canadian Road & QEW EB Off-Ramp/Royal Windsor Drive

FT 2038 PM PH1.syn
04-03-2024

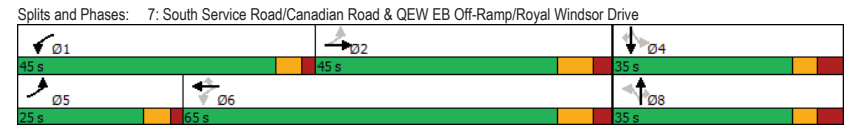
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	366	638	20	214	763	32	16	55	117	16	140	498
Future Volume (vph)	366	638	20	214	763	32	16	55	117	16	140	498
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	150.0	0.0	155.0		70.0	15.0		0.0	0.0			30.0
Storage Lanes	2		0	1		1		1	1			1
Taper Length (m)	7.5			7.5		7.5						7.5
Lane Util. Factor	0.97	0.95	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr		0.995				0.850		0.850				0.850
Flt Protected	0.950			0.950			0.950		0.950			0.950
Satd. Flow (prot)	3502	3395	0	1752	3505	1615	1805	1900	1615	1805	1900	1599
Flt Permitted	0.265			0.330			0.544		0.718			
Satd. Flow (perm)	977	3395	0	609	3505	1615	1034	1900	1615	1364	1900	1599
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3				94			152			382
Link Speed (k/h)		80			80			60				40
Link Distance (m)		324.5			247.2			158.7				215.5
Travel Time (s)		14.6			11.1			9.5				19.4
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
Heavy Vehicles (%)	0%	6%	0%	3%	3%	0%	0%	0%	0%	0%	0%	1%
Adj. Flow (vph)	398	693	22	233	829	35	17	60	127	17	152	541
Shared Lane Traffic (%)												
Lane Group Flow (vph)	398	715	0	233	829	35	17	60	127	17	152	541
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Right	Left	Right	Left	Right
Median Width(m)		7.2			7.2			3.6				3.6
Link Offset(m)		0.0			0.0			0.0				0.0
Crosswalk Width(m)		4.8			4.8			4.8				4.8
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	CI+Ex	CI+Ex		CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4				9.4
Detector 2 Size(m)		0.6			0.6			0.6				0.6
Detector 2 Type		CI+Ex			CI+Ex			CI+Ex				CI+Ex
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8				4

Lanes, Volumes, Timings
 7: South Service Road/Canadian Road & QEW EB Off-Ramp/Royal Windsor Drive 04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	2			6		6	8		8	4		4
Detector Phase	5	2		1	6	6	8	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	8.0	20.0		8.0	30.0	30.0	8.0	8.0	8.0	10.0	10.0	10.0
Minimum Split (s)	14.0	29.4		14.0	38.4	38.4	28.8	28.8	28.8	28.8	28.8	28.8
Total Split (s)	25.0	45.0		45.0	65.0	65.0	35.0	35.0	35.0	35.0	35.0	35.0
Total Split (%)	20.0%	36.0%		36.0%	52.0%	52.0%	28.0%	28.0%	28.0%	28.0%	28.0%	28.0%
Maximum Green (s)	19.0	36.6		39.0	56.6	56.6	27.2	27.2	27.2	27.2	27.2	27.2
Yellow Time (s)	4.0	5.4		4.0	5.4	5.4	3.7	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	2.0	3.0		2.0	3.0	3.0	4.1	4.1	4.1	4.1	4.1	4.1
Lost Time Adjust (s)	-2.0	-4.4		-2.0	-4.4	-4.4	-3.8	-3.8	-3.8	-3.8	-3.8	-3.8
Total Lost Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lead	Lag		Lead	Lag	Lag						
Lead-Lag Optimize?												
Vehicle Extension (s)	3.5	4.5		3.5	6.0	6.0	3.5	3.5	3.5	3.5	3.5	3.5
Recall Mode	None	Max		None	Max	Max	None	None	None	None	None	None
Walk Time (s)		10.0			10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Flash Dont Walk (s)		10.0			10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Pedestrian Calls (#/hr)		0			0	0	0	0	0	0	0	0
Act Effct Green (s)	77.2	62.5		74.9	61.4	61.4	23.5	23.5	23.5	23.5	23.5	23.5
Actuated g/C Ratio	0.69	0.56		0.67	0.55	0.55	0.21	0.21	0.21	0.21	0.21	0.21
v/c Ratio	0.40	0.38		0.43	0.43	0.04	0.08	0.15	0.28	0.06	0.38	0.85
Control Delay	7.0	15.8		8.7	17.0	0.1	35.6	36.3	4.9	35.1	40.4	25.7
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.0	15.8		8.7	17.0	0.1	35.6	36.3	4.9	35.1	40.4	25.7
LOS	A	B		A	B	A	D	D	A	D	D	C
Approach Delay		12.7			14.7			16.7			29.1	
Approach LOS		B			B			B			C	
Queue Length 50th (m)	14.0	46.7		16.2	58.6	0.0	3.1	11.3	0.0	3.1	30.1	36.2
Queue Length 95th (m)	22.9	74.7		30.1	87.0	0.0	9.7	23.3	10.4	9.6	50.8	86.5
Internal Link Dist (m)		300.5			223.2			134.7			191.5	
Turn Bay Length (m)	150.0			155.0		70.0	15.0					30.0
Base Capacity (vph)	1175	1901		858	1926	929	288	530	560	380	530	722
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.34	0.38		0.27	0.43	0.04	0.06	0.11	0.23	0.04	0.29	0.75

Intersection Summary	
Area Type:	Other
Cycle Length:	125
Actuated Cycle Length:	111.7
Natural Cycle:	85
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.85
Intersection Signal Delay:	17.4
Intersection Capacity Utilization:	72.5%
Analysis Period (min):	15
Intersection LOS:	B
ICU Level of Service:	C

Lanes, Volumes, Timings
 7: South Service Road/Canadian Road & QEW EB Off-Ramp/Royal Windsor Drive 04-03-2024



HCM Signalized Intersection Capacity Analysis FT 2038 PM PH1.syn
 7: South Service Road/Canadian Road & QEW EB Off-Ramp/Royal Windsor Drive 04-03-2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↕	↔	↕	↕	↔	↕	↕
Traffic Volume (vph)	366	638	20	214	763	32	16	55	117	16	140	498
Future Volume (vph)	366	638	20	214	763	32	16	55	117	16	140	498
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	0.95		1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr	1.00	1.00		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3502	3396		1752	3505	1615	1805	1900	1615	1805	1900	1599
Flt Permitted	0.26	1.00		0.33	1.00	1.00	0.54	1.00	1.00	0.72	1.00	1.00
Satd. Flow (perm)	976	3396		609	3505	1615	1034	1900	1615	1364	1900	1599
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	398	693	22	233	829	35	17	60	127	17	152	541
RTOR Reduction (vph)	0	1	0	0	0	16	0	0	100	0	0	302
Lane Group Flow (vph)	398	714	0	233	829	19	17	60	27	17	152	239
Heavy Vehicles (%)	0%	6%	0%	3%	3%	0%	0%	0%	0%	0%	0%	1%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6		6	8		8	4		4
Actuated Green, G (s)	70.9	58.2		68.5	57.0	57.0	19.7	19.7	19.7	19.7	19.7	19.7
Effective Green, g (s)	74.9	62.6		72.5	61.4	61.4	23.5	23.5	23.5	23.5	23.5	23.5
Actuated g/C Ratio	0.67	0.56		0.65	0.55	0.55	0.21	0.21	0.21	0.21	0.21	0.21
Clearance Time (s)	6.0	8.4		6.0	8.4	8.4	7.8	7.8	7.8	7.8	7.8	7.8
Vehicle Extension (s)	3.5	4.5		3.5	6.0	6.0	3.5	3.5	3.5	3.5	3.5	3.5
Lane Grp Cap (vph)	987	1904		533	1928	888	217	400	340	287	400	336
v/s Ratio Prot	c0.05	0.21		0.05	c0.24			0.03			0.08	
v/s Ratio Perm	0.22			0.23		0.01	0.02		0.02	0.01		c0.15
v/c Ratio	0.40	0.37		0.44	0.43	0.02	0.08	0.15	0.08	0.06	0.38	0.71
Uniform Delay, d1	8.0	13.6		8.3	14.8	11.4	35.4	35.9	35.4	35.2	37.8	40.9
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.3	0.6		0.7	0.7	0.0	0.2	0.2	0.1	0.1	0.7	7.2
Delay (s)	8.3	14.2		9.0	15.5	11.5	35.5	36.1	35.5	35.3	38.5	48.1
Level of Service	A	B		A	B	B	D	D	D	D	D	D
Approach Delay (s)		12.1			14.0			35.7			45.8	
Approach LOS		B			B			D			D	

Intersection Summary			
HCM 2000 Control Delay	21.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	111.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	72.5%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings FT 2038 PM PH1.syn
 8: QEW WB Off-Ramp & Kerr Street 04-03-2024

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔	↔	↔	↕	↕	↕
Traffic Volume (vph)	494	0	0	810	135	307
Future Volume (vph)	494	0	0	810	135	307
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)		0.0	0.0		0.0	140.0
Storage Lanes		0	0		1	1
Taper Length (m)			7.5		7.5	
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00
Fr						0.850
Flt Protected					0.950	
Satd. Flow (prot)	3574	0	0	3574	1805	1599
Flt Permitted					0.950	
Satd. Flow (perm)	3574	0	0	3574	1805	1599
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)						188
Link Speed (k/h)	60			60	40	
Link Distance (m)	130.3			194.2	262.1	
Travel Time (s)	7.8			11.7	23.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	0%	0%	1%	0%	1%
Adj. Flow (vph)	537	0	0	880	147	334
Shared Lane Traffic (%)						
Lane Group Flow (vph)	537	0	0	880	147	334
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)		15	25		25	15
Turn Type	NA			NA	Prot	Perm
Protected Phases	4			8	2	
Permitted Phases						2
Minimum Split (s)	22.5			22.5	22.5	22.5
Total Split (s)	22.5			22.5	22.5	22.5
Total Split (%)	50.0%			50.0%	50.0%	50.0%
Maximum Green (s)	18.0			18.0	18.0	18.0
Yellow Time (s)	3.5			3.5	3.5	3.5
All-Red Time (s)	1.0			1.0	1.0	1.0
Lost Time Adjust (s)	0.0			0.0	0.0	0.0
Total Lost Time (s)	4.5			4.5	4.5	4.5
Lead/Lag						
Lead-Lag Optimize?						
Walk Time (s)	7.0			7.0	7.0	7.0
Flash Dont Walk (s)	11.0			11.0	11.0	11.0
Pedestrian Calls (#/hr)	0			0	0	0
Act Effct Green (s)	18.0			18.0	18.0	18.0
Actuated g/C Ratio	0.40			0.40	0.40	0.40

Lanes, Volumes, Timings
8: QEW WB Off-Ramp & Kerr Street

FT 2038 PM PH1.syn
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Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
v/c Ratio	0.38			0.62	0.20	0.44
Control Delay	10.5			13.1	9.8	6.6
Queue Delay	0.0			0.0	0.0	0.0
Total Delay	10.5			13.1	9.8	6.6
LOS	B			B	A	A
Approach Delay	10.5			13.1	7.6	
Approach LOS	B			B	A	
Queue Length 50th (m)	15.5			28.7	7.5	7.5
Queue Length 95th (m)	24.8			43.5	16.4	21.4
Internal Link Dist (m)	106.3			170.2	238.1	
Turn Bay Length (m)					140.0	
Base Capacity (vph)	1429			1429	722	752
Starvation Cap Reductn	0			0	0	0
Spillback Cap Reductn	0			0	0	0
Storage Cap Reductn	0			0	0	0
Reduced v/c Ratio	0.38			0.62	0.20	0.44

Intersection Summary	
Area Type:	Other
Cycle Length:	45
Actuated Cycle Length:	45
Offset:	0 (0%), Referenced to phase 2:NBL and 6:, Start of Green
Natural Cycle:	45
Control Type:	Pretimed
Maximum v/c Ratio:	0.62
Intersection Signal Delay:	11.0
Intersection Capacity Utilization:	40.2%
Analysis Period (min):	15
Intersection LOS:	B
ICU Level of Service A	

Splits and Phases: 8: QEW WB Off-Ramp & Kerr Street

<p>← 02 (R) 22.5 s</p>	<p>→ 04 22.5 s</p>
<p>← 08 22.5 s</p>	

HCM Signalized Intersection Capacity Analysis
8: QEW WB Off-Ramp & Kerr Street

FT 2038 PM PH1.syn
04-03-2024

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↑	↑
Traffic Volume (vph)	494	0	0	810	135	307
Future Volume (vph)	494	0	0	810	135	307
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5			4.5	4.5	4.5
Lane Util. Factor	0.95			0.95	1.00	1.00
Fr't	1.00			1.00	1.00	0.85
Fit Protected	1.00			1.00	0.95	1.00
Satd. Flow (prot)	3574			3574	1805	1599
Fit Permitted	1.00			1.00	0.95	1.00
Satd. Flow (perm)	3574			3574	1805	1599
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	537	0	0	880	147	334
RTOR Reduction (vph)	0	0	0	0	0	113
Lane Group Flow (vph)	537	0	0	880	147	221
Heavy Vehicles (%)	1%	0%	0%	1%	0%	1%
Turn Type	NA			NA	Prot	Perm
Protected Phases	4			8	2	
Permitted Phases						2
Actuated Green, G (s)	18.0			18.0	18.0	18.0
Effective Green, g (s)	18.0			18.0	18.0	18.0
Actuated g/C Ratio	0.40			0.40	0.40	0.40
Clearance Time (s)	4.5			4.5	4.5	4.5
Lane Grp Cap (vph)	1429			1429	722	639
v/s Ratio Prot	0.15			c0.25	0.08	
v/s Ratio Perm						c0.14
v/c Ratio	0.38			0.62	0.20	0.35
Uniform Delay, d1	9.5			10.7	8.8	9.4
Progression Factor	1.00			1.00	1.00	1.00
Incremental Delay, d2	0.8			2.0	0.6	1.5
Delay (s)	10.3			12.7	9.5	10.9
Level of Service	B			B	A	B
Approach Delay (s)	10.3			12.7	10.4	
Approach LOS	B			B	B	

Intersection Summary			
HCM 2000 Control Delay	11.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	40.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
9: Dorval Drive & QEW WB Off-Ramp

FT 2038 PM PH1.syn
04-03-2024

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔↔	↗	↖↖			↖↖
Traffic Volume (vph)	833	732	1169	0	0	1242
Future Volume (vph)	833	732	1169	0	0	1242
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	190.0		0.0	0.0	
Storage Lanes	2	1		0	0	
Taper Length (m)	7.5			7.5		
Lane Util. Factor	0.97	0.91	0.95	1.00	1.00	0.95
Frt	0.966	0.850				
Flt Protected	0.963					
Satd. Flow (prot)	3344	1455	3574	0	0	3539
Flt Permitted	0.963					
Satd. Flow (perm)	3344	1455	3574	0	0	3539
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)	38	48				
Link Speed (k/h)	40		60			60
Link Distance (m)	325.1		310.2			266.9
Travel Time (s)	29.3		18.6			16.0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	1%	1%	0%	0%	2%
Adj. Flow (vph)	905	796	1271	0	0	1350
Shared Lane Traffic (%)		33%				
Lane Group Flow (vph)	1168	533	1271	0	0	1350
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	7.2		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15		15	25	
Number of Detectors	1	1	2			2
Detector Template	Left	Right	Thru			Thru
Leading Detector (m)	2.0	2.0	10.0			10.0
Trailing Detector (m)	0.0	0.0	0.0			0.0
Detector 1 Position(m)	0.0	0.0	0.0			0.0
Detector 1 Size(m)	2.0	2.0	0.6			0.6
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex			CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0			0.0
Detector 1 Queue (s)	0.0	0.0	0.0			0.0
Detector 1 Delay (s)	0.0	0.0	0.0			0.0
Detector 2 Position(m)			9.4			9.4
Detector 2 Size(m)			0.6			0.6
Detector 2 Type			CI+Ex			CI+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type	Prot	Perm	NA			NA
Protected Phases	8		2			6

Lanes, Volumes, Timings
9: Dorval Drive & QEW WB Off-Ramp

FT 2038 PM PH1.syn
04-03-2024

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Permitted Phases		8				
Detector Phase	8	8	2			6
Switch Phase						
Minimum Initial (s)	10.0	10.0	20.0			20.0
Minimum Split (s)	24.0	24.0	26.0			26.0
Total Split (s)	50.4	50.4	69.6			69.6
Total Split (%)	42.0%	42.0%	58.0%			58.0%
Maximum Green (s)	44.4	44.4	63.6			63.6
Yellow Time (s)	4.0	4.0	4.0			4.0
All-Red Time (s)	2.0	2.0	2.0			2.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0			-2.0
Total Lost Time (s)	4.0	4.0	4.0			4.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	4.5	4.5	5.0			5.0
Recall Mode	None	None	Max			Max
Walk Time (s)	5.0	5.0	7.0			7.0
Flash Dont Walk (s)	7.0	7.0	11.0			11.0
Pedestrian Calls (#/hr)	0	0	0			0
Act Effct Green (s)	46.1	46.1	65.6			65.6
Actuated g/C Ratio	0.39	0.39	0.55			0.55
v/c Ratio	0.89	0.90	0.65			0.70
Control Delay	43.2	52.1	21.0			22.2
Queue Delay	0.0	0.0	0.0			0.0
Total Delay	43.2	52.1	21.0			22.2
LOS	D	D	C			C
Approach Delay	46.0		21.0			22.2
Approach LOS	D		C			C
Queue Length 50th (m)	134.1	125.3	111.7			123.5
Queue Length 95th (m)	#168.0	#202.4	135.5			149.6
Internal Link Dist (m)	301.1		286.2			242.9
Turn Bay Length (m)		190.0				
Base Capacity (vph)	1319	593	1958			1939
Starvation Cap Reductn	0	0	0			0
Spillback Cap Reductn	0	0	0			0
Storage Cap Reductn	0	0	0			0
Reduced v/c Ratio	0.89	0.90	0.65			0.70
Intersection Summary						
Area Type:	Other					
Cycle Length:	120					
Actuated Cycle Length:	119.7					
Natural Cycle:	55					
Control Type:	Semi Act-Uncooord					
Maximum v/c Ratio:	0.90					
Intersection Signal Delay:	31.2			Intersection LOS: C		
Intersection Capacity Utilization:	72.4%			ICU Level of Service C		
Analysis Period (min)	15					
# 95th percentile volume exceeds capacity, queue may be longer.						

Lanes, Volumes, Timings
9: Dorval Drive & QEW WB Off-Ramp

FT 2038 PM PH1.syn
04-03-2024

Queue shown is maximum after two cycles.

Splits and Phases: 9: Dorval Drive & QEW WB Off-Ramp



HCM Signalized Intersection Capacity Analysis
9: Dorval Drive & QEW WB Off-Ramp

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04-03-2024



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	←←←	→	↑↑			↑↑
Traffic Volume (vph)	833	732	1169	0	0	1242
Future Volume (vph)	833	732	1169	0	0	1242
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0			4.0
Lane Util. Factor	0.97	0.91	0.95			0.95
Fr _t	0.97	0.85	1.00			1.00
Fit Protected	0.96	1.00	1.00			1.00
Satd. Flow (prot)	3343	1455	3574			3539
Fit Permitted	0.96	1.00	1.00			1.00
Satd. Flow (perm)	3343	1455	3574			3539
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	905	796	1271	0	0	1350
RTOR Reduction (vph)	23	30	0	0	0	0
Lane Group Flow (vph)	1145	503	1271	0	0	1350
Heavy Vehicles (%)	3%	1%	1%	0%	0%	2%
Turn Type	Prot	Perm	NA			NA
Protected Phases	8		2			6
Permitted Phases		8				
Actuated Green, G (s)	44.1	44.1	63.6			63.6
Effective Green, g (s)	46.1	46.1	65.6			65.6
Actuated g/C Ratio	0.39	0.39	0.55			0.55
Clearance Time (s)	6.0	6.0	6.0			6.0
Vehicle Extension (s)	4.5	4.5	5.0			5.0
Lane Grp Cap (vph)	1287	560	1958			1939
v/s Ratio Prot	0.34		0.36			c0.38
v/s Ratio Perm		c0.35				
w/c Ratio	0.89	0.90	0.65			0.70
Uniform Delay, d1	34.4	34.6	19.0			19.8
Progression Factor	1.00	1.00	1.00			1.00
Incremental Delay, d2	8.3	17.8	1.7			2.1
Delay (s)	42.7	52.5	20.7			21.9
Level of Service	D	D	C			C
Approach Delay (s)	45.7		20.7			21.9
Approach LOS	D		C			C
Intersection Summary						
HCM 2000 Control Delay			30.9		HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.78			
Actuated Cycle Length (s)			119.7		Sum of lost time (s)	8.0
Intersection Capacity Utilization			72.4%		ICU Level of Service	C
Analysis Period (min)			15			
c Critical Lane Group						

Lanes, Volumes, Timings
10: Dorval Drive & QEW EB Off-Ramp

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Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔↔	↔		↕↕	↕↕	
Traffic Volume (vph)	323	384	0	1404	1328	0
Future Volume (vph)	323	384	0	1404	1328	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	175.0	0.0	0.0			0.0
Storage Lanes	1	1	0			0
Taper Length (m)	7.5		7.5			
Lane Util. Factor	0.97	0.91	1.00	0.95	0.95	1.00
Fr't	0.950	0.850				
Flt Protected	0.968					
Satd. Flow (prot)	3302	1441	0	3539	3505	0
Flt Permitted	0.968					
Satd. Flow (perm)	3302	1441	0	3539	3505	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	40	40				
Link Speed (k/h)	40			60	60	
Link Distance (m)	275.5			164.3	310.2	
Travel Time (s)	24.8			9.9	18.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	2%	0%	2%	3%	0%
Adj. Flow (vph)	351	417	0	1526	1443	0
Shared Lane Traffic (%)		42%				
Lane Group Flow (vph)	526	242	0	1526	1443	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	7.2			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Number of Detectors	1	1		2	2	
Detector Template	Left	Right		Thru	Thru	
Leading Detector (m)	2.0	2.0		10.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	2.0		0.6	0.6	
Detector 1 Type	CI+Ex	CI+Ex		CI+Ex	CI+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	
Detector 2 Position(m)				9.4	9.4	
Detector 2 Size(m)				0.6	0.6	
Detector 2 Type				CI+Ex	CI+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Prot	Perm		NA	NA	
Protected Phases	4			2	6	

Lanes, Volumes, Timings
10: Dorval Drive & QEW EB Off-Ramp

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Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Permitted Phases		4				
Detector Phase	4	4		2	6	
Switch Phase						
Minimum Initial (s)	10.0	10.0		20.0	20.0	
Minimum Split (s)	24.0	24.0		26.0	26.0	
Total Split (s)	45.6	45.6		74.4	74.4	
Total Split (%)	38.0%	38.0%		62.0%	62.0%	
Maximum Green (s)	39.6	39.6		68.4	68.4	
Yellow Time (s)	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	4.0	4.0		5.0	5.0	
Recall Mode	None	None		Max	Max	
Walk Time (s)	0.0	0.0		7.0	7.0	
Flash Dont Walk (s)	7.0	7.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0	
Act Effct Green (s)	25.1	25.1		70.6	70.6	
Actuated g/C Ratio	0.24	0.24		0.68	0.68	
v/c Ratio	0.64	0.64		0.63	0.60	
Control Delay	35.8	37.1		11.7	11.2	
Queue Delay	0.0	0.0		0.0	0.0	
Total Delay	35.8	37.1		11.7	11.2	
LOS	D	D		B	B	
Approach Delay	36.2			11.7	11.2	
Approach LOS	D			B	B	
Queue Length 50th (m)	47.6	42.1		81.6	74.5	
Queue Length 95th (m)	64.4	70.7		141.7	130.1	
Internal Link Dist (m)	251.5			140.3	286.2	
Turn Bay Length (m)	175.0					
Base Capacity (vph)	1352	603		2410	2386	
Starvation Cap Reductn	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	
Storage Cap Reductn	0	0		0	0	
Reduced v/c Ratio	0.39	0.40		0.63	0.60	
Intersection Summary						
Area Type:	Other					
Cycle Length:	120					
Actuated Cycle Length:	103.7					
Natural Cycle:	60					
Control Type:	Semi Act-Uncoord					
Maximum v/c Ratio:	0.64					
Intersection Signal Delay:	16.5			Intersection LOS: B		
Intersection Capacity Utilization:	72.4%			ICU Level of Service C		
Analysis Period (min)	15					

Lanes, Volumes, Timings
10: Dorval Drive & QEW EB Off-Ramp

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Splits and Phases: 10: Dorval Drive & QEW EB Off-Ramp



HCM Signalized Intersection Capacity Analysis
10: Dorval Drive & QEW EB Off-Ramp

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	EBL	EBR	NBL	NBT	SBT	SBR
Movement						
Lane Configurations	↔↔	↔		↕↕	↕↕	
Traffic Volume (vph)	323	384	0	1404	1328	0
Future Volume (vph)	323	384	0	1404	1328	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	0.91		0.95	0.95	
Fr _t	0.95	0.85		1.00	1.00	
Fit Protected	0.97	1.00		1.00	1.00	
Satd. Flow (prot)	3301	1441		3539	3505	
Fit Permitted	0.97	1.00		1.00	1.00	
Satd. Flow (perm)	3301	1441		3539	3505	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	351	417	0	1526	1443	0
RTOR Reduction (vph)	30	30	0	0	0	0
Lane Group Flow (vph)	496	212	0	1526	1443	0
Heavy Vehicles (%)	3%	2%	0%	2%	3%	0%
Turn Type	Prot	Perm		NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4				
Actuated Green, G (s)	23.1	23.1		68.6	68.6	
Effective Green, g (s)	25.1	25.1		70.6	70.6	
Actuated g/C Ratio	0.24	0.24		0.68	0.68	
Clearance Time (s)	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	4.0	4.0		5.0	5.0	
Lane Grp Cap (vph)	798	348		2409	2386	
v/s Ratio Prot	c0.15			c0.43	0.41	
v/s Ratio Perm		0.15				
v/c Ratio	0.62	0.61		0.63	0.60	
Uniform Delay, d ₁	35.1	34.9		9.3	9.0	
Progression Factor	1.00	1.00		1.00	1.00	
Incremental Delay, d ₂	1.7	3.5		1.3	1.1	
Delay (s)	36.8	38.4		10.6	10.1	
Level of Service	D	D		B	B	
Approach Delay (s)	37.3			10.6	10.1	
Approach LOS	D			B	B	
Intersection Summary						
HCM 2000 Control Delay			15.9		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.63			
Actuated Cycle Length (s)			103.7		Sum of lost time (s)	8.0
Intersection Capacity Utilization			72.4%		ICU Level of Service	C
Analysis Period (min)			15			
c Critical Lane Group						

Lanes, Volumes, Timings
11: Argus Rd & South Service Rd

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Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Volume (vph)	13	11	529	444	80	89
Future Volume (vph)	13	11	529	444	80	89
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt			0.938		0.929	
Flt Protected		0.974			0.977	
Satd. Flow (prot)	0	1571	1521	0	1552	0
Flt Permitted		0.974			0.977	
Satd. Flow (perm)	0	1571	1521	0	1552	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		177.7	145.7		103.5	
Travel Time (s)		12.8	10.5		7.5	
Confl. Peds. (#/hr)					5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	13%	10%	0%	0%	0%
Adj. Flow (vph)	14	12	575	483	87	97
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	26	1058	0	184	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (k/h)	24			14	24	14
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type:	CBD
Control Type:	Unsignalized
Intersection Capacity Utilization	78.7%
Analysis Period (min)	15
	ICU Level of Service D

HCM Unsignalized Intersection Capacity Analysis
11: Argus Rd & South Service Rd

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Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Volume (veh/h)	13	11	529	444	80	89
Future Volume (Veh/h)	13	11	529	444	80	89
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)	14	12	575	483	87	97
Pedestrians			5			
Lane Width (m)			3.6			
Walking Speed (m/s)			1.2			
Percent Blockage			0			
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)		358				
pX, platoon unblocked						
vC, conflicting volume	1058				862	816
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1058				862	816
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				73	74
cM capacity (veh/h)	666				320	380

Direction, Lane #

	EB 1	WB 1	SB 1
Volume Total	26	1058	184
Volume Left	14	0	87
Volume Right	0	483	97
eSH	666	1700	349
Volume to Capacity	0.02	0.62	0.53
Queue Length 95th (m)	0.5	0.0	23.4
Control Delay (s)	5.8	0.0	26.3
Lane LOS	A		D
Approach Delay (s)	5.8	0.0	26.3
Approach LOS			D

Intersection Summary

Average Delay		3.9	
Intersection Capacity Utilization	78.7%	ICU Level of Service	D
Analysis Period (min)	15		

Lanes, Volumes, Timings
13: GO Bus Terminal/Argus Rd & Cross Ave

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	37	1252	21	48	576	161	20	3	61	462	26	78
Future Volume (vph)	37	1252	21	48	576	161	20	3	61	462	26	78
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6
Storage Length (m)	20.0	0.0	20.0	0.0	0.0	0.0	0.0	15.0	0.0	0.0	0.0	0.0
Storage Lanes	1	0	1	0	1	0	1	0	1	0	1	0
Taper Length (m)	7.5		7.5		7.5		7.5		7.5		7.5	
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	1.00			0.99	0.99	0.99	0.97	0.98	0.98		
Frt	0.998				0.967			0.857		0.887		
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1570	3188	0	797	3116	0	785	708	0	1570	1192	0
Flt Permitted	0.349			0.090			0.679			0.712		
Satd. Flow (perm)	574	3188	0	76	3116	0	554	708	0	1152	1192	0
Right Turn on Red			Yes		Yes			Yes				Yes
Satd. Flow (RTOR)		2			73			66				85
Link Speed (k/h)		50			50			50				50
Link Distance (m)		164.3			72.9			81.9				115.7
Travel Time (s)		11.8			5.2			5.9				8.3
Confl. Peds. (#/hr)	9		4	4		9	12		20	20		12
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
Heavy Vehicles (%)	0%	0%	100%	97%	0%	0%	100%	100%	100%	0%	100%	0%
Adj. Flow (vph)	40	1361	23	52	626	175	22	3	66	502	28	85
Shared Lane Traffic (%)												
Lane Group Flow (vph)	40	1384	0	52	801	0	22	69	0	502	113	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.3			3.3			3.3				3.3
Link Offset(m)		0.0			0.0			0.0				0.0
Crosswalk Width(m)		4.8			4.8			4.8				4.8
Two way Left Turn Lane												
Headway Factor	1.19	1.14	1.14	1.19	1.14	1.14	1.19	1.14	1.14	1.19	1.14	1.14
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

Lanes, Volumes, Timings
13: GO Bus Terminal/Argus Rd & Cross Ave

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0				0.0
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	NA
Protected Phases		2		1	6		8			4		4
Permitted Phases		2		6			8			4		4
Detector Phases	2	2		1	6		8	8		4		4
Switch Phase												
Minimum Initial (s)	22.0	22.0		8.0	22.0		10.0	10.0		10.0		10.0
Minimum Split (s)	45.0	45.0		12.5	29.0		29.0	29.0		29.0		29.0
Total Split (s)	46.5	46.5		12.5	59.0		31.0	31.0		31.0		31.0
Total Split (%)	51.7%	51.7%		13.9%	65.6%		34.4%	34.4%		34.4%		34.4%
Maximum Green (s)	40.5	40.5		8.5	53.0		25.0	25.0		25.0		25.0
Yellow Time (s)	4.0	4.0		3.0	4.0		4.0	4.0		4.0		4.0
All-Red Time (s)	2.0	2.0		1.0	2.0		2.0	2.0		2.0		2.0
Lost Time Adjust (s)	-2.0	-2.0		0.0	-2.0		-2.0	-2.0		-2.0		-2.0
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0		4.0
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Vehicle Extension (s)	5.0	5.0		2.5	5.0		4.0	4.0		4.0		4.0
Recall Mode	Min	Min		Min	Min		Min	Min		Min		Min
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0		7.0
Flash Dont Walk (s)	16.0	16.0		16.0	16.0		16.0	16.0		16.0		16.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0		0
Act Effct Green (s)	42.5	42.5		54.7	54.7		27.0	27.0		27.0		27.0
Actuated g/C Ratio	0.47	0.47		0.61	0.61		0.30	0.30		0.30		0.30
v/c Ratio	0.15	0.92		0.46	0.42		0.13	0.27		1.45		0.27
Control Delay	15.3	33.1		25.2	9.0		25.6	9.8		245.9		10.3
Queue Delay	0.0	3.7		0.0	0.0		0.0	0.0		0.0		0.0
Total Delay	15.3	36.8		25.2	9.0		25.6	9.8		245.9		10.3
LOS	B	D		C	A		C	A		F		B
Approach Delay		36.2			10.0			13.6				202.6
Approach LOS		D			A			B				F
Queue Length 50th (m)	3.9	117.1		3.6	32.5		2.9	0.4		~124.8		3.6
Queue Length 95th (m)	10.5	#169.5		13.2	44.5		9.2	10.6		#187.1		16.5
Internal Link Dist (m)		140.3			48.9			57.9				91.7
Turn Bay Length (m)	20.0			20.0						15.0		
Base Capacity (vph)	272	1511		114	1939		167	259		346		418
Starvation Cap Reductn	0	78		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	0.15	0.97		0.46	0.41		0.13	0.27		1.45		0.27
Intersection Summary												
Area Type:	CBD											
Cycle Length:	90											
Actuated Cycle Length:	89.7											
Natural Cycle:	140											
Control Type:	Semi Act-Uncoord											
Maximum v/c Ratio:	1.45											
Intersection Signal Delay:	62.3						Intersection LOS: E					

Lanes, Volumes, Timings
13: GO Bus Terminal/Argus Rd & Cross Ave

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Intersection Capacity Utilization 86.1% ICU Level of Service E
Analysis Period (min) 15
- Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 13: GO Bus Terminal/Argus Rd & Cross Ave



HCM Signalized Intersection Capacity Analysis
13: GO Bus Terminal/Argus Rd & Cross Ave

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	37	1252	21	48	576	161	20	3	61	462	26	78
Future Volume (vph)	37	1252	21	48	576	161	20	3	61	462	26	78
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	0.99		1.00	0.97		1.00	0.98	
Flpb, ped/bikes	0.99	1.00		1.00	1.00		0.99	1.00		0.98	1.00	
Frt	1.00	1.00		1.00	0.97		1.00	0.86		1.00	0.89	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1561	3186		797	3117		776	708		1537	1192	
Flt Permitted	0.35	1.00		0.09	1.00		0.68	1.00		0.71	1.00	
Satd. Flow (perm)	574	3186		75	3117		555	708		1152	1192	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	40	1361	23	52	626	175	22	3	66	502	28	85
RTOR Reduction (vph)	0	1	0	0	28	0	0	46	0	0	59	0
Lane Group Flow (vph)	40	1383	0	52	773	0	22	23	0	502	54	0
Confl. Peds. (#/hr)	9		4	4		9	12		20	20		12
Heavy Vehicles (%)	0%	0%	100%	97%	0%	0%	100%	100%	100%	0%	100%	0%
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	40.5	40.5		52.7	52.7		25.0	25.0		25.0	25.0	
Effective Green, g (s)	42.5	42.5		52.7	54.7		27.0	27.0		27.0	27.0	
Actuated g/C Ratio	0.47	0.47		0.59	0.61		0.30	0.30		0.30	0.30	
Clearance Time (s)	6.0	6.0		4.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	5.0	5.0		2.5	5.0		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	271	1509		110	1900		167	213		346	358	
v/s Ratio Prot		c0.43		0.04	c0.25			0.03			0.04	
v/s Ratio Perm	0.07			0.23			0.04			c0.44		
v/c Ratio	0.15	0.92		0.47	0.41		0.13	0.11		1.45	0.15	
Uniform Delay, d1	13.4	21.9		15.3	9.1		22.8	22.6		31.4	22.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.5	9.5		2.3	0.3		0.5	0.3		218.4	0.3	
Delay (s)	13.9	31.5		17.6	9.4		23.3	22.9		249.8	23.2	
Level of Service	B	C		B	A		C	C		F	C	
Approach Delay (s)		31.0			9.9			23.0			208.2	
Approach LOS		C			A			C			F	
Intersection Summary												
HCM 2000 Control Delay			61.2				HCM 2000 Level of Service				E	
HCM 2000 Volume to Capacity ratio			1.05									
Actuated Cycle Length (s)			89.7			Sum of lost time (s)				12.0		
Intersection Capacity Utilization			86.1%			ICU Level of Service				E		
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
14: Lyons Lane/Street A & Cross Ave

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	↖	→	↗	↙	←	↖	↗	↙	↘	↖	↗	↙	↘
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	↖	↖↗		↖	↖↗		↖	↖		↖	↖		
Traffic Volume (vph)	62	250	17	19	430	26	308	6	208	42	3	123	
Future Volume (vph)	62	250	17	19	430	26	308	6	208	42	3	123	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (m)	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	
Storage Length (m)	0.0	0.0	25.0		0.0	20.0		0.0	0.0			0.0	
Storage Lanes	1		0	1		0	1		0	1		0	
Taper Length (m)	7.5			7.5		7.5			7.5				
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	
Ped Bike Factor	1.00	1.00		1.00	1.00		1.00	0.98		1.00	0.99		
Frt		0.991			0.992			0.855			0.853		
Flt Protected	0.950			0.950			0.950			0.950			
Satd. Flow (prot)	1525	2915	0	1570	3073	0	1570	1438	0	1570	1412	0	
Flt Permitted	0.471			0.505			0.654			0.524			
Satd. Flow (perm)	754	2915	0	834	3073	0	1080	1438	0	863	1412	0	
Right Turn on Red			Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)		9			11			226			134		
Link Speed (k/h)		50			50			50			50		
Link Distance (m)		40.1			209.8			69.1			70.9		
Travel Time (s)		2.9			15.1			5.0			5.1		
Confl. Peds. (#/hr)	3		1	1		3	1		4	4		1	
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	
Heavy Vehicles (%)	3%	11%	0%	0%	5%	0%	0%	0%	0%	0%	0%	2%	
Adj. Flow (vph)	67	272	18	21	467	28	335	7	226	46	3	134	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	67	290	0	21	495	0	335	233	0	46	137	0	
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No	
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right	
Median Width(m)		3.3			3.3			3.3			3.3		
Link Offset(m)		0.0			0.0			0.0			0.0		
Crosswalk Width(m)		4.8			4.8			4.8			4.8		
Two way Left Turn Lane													
Headway Factor	1.19	1.14	1.14	1.19	1.14	1.14	1.19	1.14	1.14	1.19	1.14	1.14	
Turning Speed (k/h)	24		14	24		14	24		14	24		14	
Number of Detectors	1	2		1	2		1	2		1	2		
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru		
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0		
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0		
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0		
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6		
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		
Detector 1 Channel													
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0		
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0		
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0		
Detector 2 Position(m)		9.4			9.4			9.4			9.4		
Detector 2 Size(m)		0.6			0.6			0.6			0.6		
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex		
Detector 2 Channel													

Lanes, Volumes, Timings
14: Lyons Lane/Street A & Cross Ave

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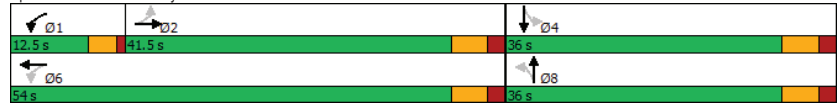
	↖	→	↗	↙	←	↖	↗	↙	↘	↖	↗	↙	↘
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Detector 2 Extend (s)		0.0			0.0			0.0			0.0		0.0
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA		NA
Protected Phases		2		1	6			8			4		4
Permitted Phases		2		6			8				4		4
Detector Phases	2	2		1	6		8	8			4		4
Switch Phase													
Minimum Initial (s)	35.0	35.0		8.0	35.0		10.0	10.0			10.0		10.0
Minimum Split (s)	41.0	41.0		12.5	41.0		28.0	28.0			28.0		28.0
Total Split (s)	41.5	41.5		12.5	54.0		36.0	36.0			36.0		36.0
Total Split (%)	46.1%	46.1%		13.9%	60.0%		40.0%	40.0%			40.0%		40.0%
Maximum Green (s)	35.5	35.5		8.5	48.0		30.0	30.0			30.0		30.0
Yellow Time (s)	4.0	4.0		3.0	4.0		4.0	4.0			4.0		4.0
All-Red Time (s)	2.0	2.0		1.0	2.0		2.0	2.0			2.0		2.0
Lost Time Adjust (s)	-2.0	-2.0		0.0	-2.0		-2.0	-2.0			-2.0		-2.0
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0		4.0
Lead/Lag	Lag	Lag		Lead									
Lead-Lag Optimize?	Yes	Yes		Yes									
Vehicle Extension (s)	5.0	5.0		2.5	5.0		4.0	4.0			4.0		4.0
Recall Mode	Min	Min		Min	Min		Min	Min			Min		Min
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0			7.0		7.0
Flash Dont Walk (s)	15.0	15.0			15.0		15.0	15.0			15.0		15.0
Pedestrian Calls (#/hr)	0	0			0		0	0			0		0
Act Effct Green (s)	37.0	37.0		49.0	49.0		30.6	30.6			30.6		30.6
Actuated g/C Ratio	0.42	0.42		0.56	0.56		0.35	0.35			0.35		0.35
v/c Ratio	0.21	0.23		0.04	0.29		0.89	0.36			0.15		0.24
Control Delay	19.0	16.7		9.4	10.7		54.3	4.9			21.0		5.0
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0			0.0		0.0
Total Delay	19.0	16.7		9.4	10.7		54.3	4.9			21.0		5.0
LOS	B	B		A	B		D	A			C		A
Approach Delay		17.1			10.6			34.1					9.1
Approach LOS		B			B			C					A
Queue Length 50th (m)	7.5	16.7		1.6	22.8		55.1	0.8			5.5		0.3
Queue Length 95th (m)	17.3	25.8		4.9	32.4		#105.4	15.9			13.6		12.1
Internal Link Dist (m)		16.1			185.8			45.1					46.9
Turn Bay Length (m)				25.0			20.0						
Base Capacity (vph)	322	1253		538	1759		394	668			315		601
Starvation Cap Reductn	0	0		0	0		0	0			0		0
Spillback Cap Reductn	0	0		0	0		0	0			0		0
Storage Cap Reductn	0	0		0	0		0	0			0		0
Reduced v/c Ratio	0.21	0.23		0.04	0.28		0.85	0.35			0.15		0.23
Intersection Summary													
Area Type:	CBD												
Cycle Length:	90												
Actuated Cycle Length:	87.6												
Natural Cycle:	85												
Control Type:	Semi Act-Uncoord												
Maximum v/c Ratio:	0.89												
Intersection Signal Delay:	20.1						Intersection LOS: C						

Lanes, Volumes, Timings
14: Lyons Lane/Street A & Cross Ave

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Intersection Capacity Utilization 95.3% ICU Level of Service F
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 14: Lyons Lane/Street A & Cross Ave



HCM Signalized Intersection Capacity Analysis
14: Lyons Lane/Street A & Cross Ave

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	62	250	17	19	430	26	308	6	208	42	3	123
Future Volume (vph)	62	250	17	19	430	26	308	6	208	42	3	123
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.98		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	0.99		1.00	0.85		1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1520	2914		1569	3072		1569	1438		1565	1413	
Flt Permitted	0.47	1.00		0.51	1.00		0.65	1.00		0.52	1.00	
Satd. Flow (perm)	753	2914		835	3072		1080	1438		863	1413	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	67	272	18	21	467	28	335	7	226	46	3	134
RTOR Reduction (vph)	0	5	0	0	5	0	0	147	0	0	87	0
Lane Group Flow (vph)	67	285	0	21	490	0	335	86	0	46	50	0
Confl. Peds. (#/hr)	3		1	1		3	1		4	4		1
Heavy Vehicles (%)	3%	11%	0%	0%	5%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	35.0	35.0		47.0	47.0		28.6	28.6		28.6	28.6	
Effective Green, g (s)	37.0	37.0		47.0	49.0		30.6	30.6		30.6	30.6	
Actuated g/C Ratio	0.42	0.42		0.54	0.56		0.35	0.35		0.35	0.35	
Clearance Time (s)	6.0	6.0		4.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	5.0	5.0		2.5	5.0		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	318	1230		515	1718		377	502		301	493	
v/s Ratio Prot		0.10		0.00	0.16			0.06			0.04	
v/s Ratio Perm	0.09			0.02			0.31			0.05		
v/c Ratio	0.21	0.23		0.04	0.29		0.89	0.17		0.15	0.10	
Uniform Delay, d1	16.0	16.2		9.7	10.1		26.9	19.7		19.6	19.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.7	0.2		0.0	0.2		22.0	0.2		0.3	0.1	
Delay (s)	16.7	16.4		9.7	10.3		48.9	19.9		19.9	19.3	
Level of Service	B	B		A	B		D	B		B	B	
Approach Delay (s)		16.5			10.3			37.0			19.5	
Approach LOS		B			B			D			B	
Intersection Summary												
HCM 2000 Control Delay				22.0			HCM 2000 Level of Service				C	
HCM 2000 Volume to Capacity ratio				0.54								
Actuated Cycle Length (s)				87.6			Sum of lost time (s)				12.0	
Intersection Capacity Utilization				95.3%			ICU Level of Service				F	
Analysis Period (min)				15								
c Critical Lane Group												

Lanes, Volumes, Timings
16: Speers Road/Cornwall Road & Cross Avenue

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Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↕↕	↕↕		↕	↕↕
Traffic Volume (vph)	351	905	995	48	14	557
Future Volume (vph)	351	905	995	48	14	557
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	75.0			0.0	55.0	0.0
Storage Lanes	1			0	1	2
Taper Length (m)	7.5				7.5	
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	0.88
Frt			0.993			0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1770	3539	3514	0	1770	2787
Flt Permitted	0.123				0.950	
Satd. Flow (perm)	229	3539	3514	0	1770	2787
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)			6			605
Link Speed (k/h)	50	50			50	
Link Distance (m)	189.7	274.5			184.2	
Travel Time (s)	13.7	19.8			13.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	382	984	1082	52	15	605
Shared Lane Traffic (%)						
Lane Group Flow (vph)	382	984	1134	0	15	605
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.6	3.6		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25			15	25	15
Number of Detectors	1	2	2		1	1
Detector Template	Left	Thru	Thru		Left	Right
Leading Detector (m)	2.0	10.0	10.0		2.0	2.0
Trailing Detector (m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Size(m)	2.0	0.6	0.6		2.0	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0		0.0	0.0
Detector 2 Position(m)		9.4	9.4			
Detector 2 Size(m)		0.6	0.6			
Detector 2 Type		Cl+Ex	Cl+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type	pm+pt	NA	NA		pm+pt	Perm
Protected Phases	5	2	6		7	
Permitted Phases	2				4	4

Lanes, Volumes, Timings
16: Speers Road/Cornwall Road & Cross Avenue

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Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Detector Phase	5	2	6		7	4
Switch Phase						
Minimum Initial (s)	6.0	5.0	5.0		5.0	5.0
Minimum Split (s)	12.0	33.5	33.5		27.5	27.5
Total Split (s)	22.0	62.0	40.0		28.0	28.0
Total Split (%)	24.4%	68.9%	44.4%		31.1%	31.1%
Maximum Green (s)	16.0	56.0	34.0		22.0	22.0
Yellow Time (s)	4.0	4.0	4.0		4.0	4.0
All-Red Time (s)	2.0	2.0	2.0		2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0		6.0	6.0
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?	Yes		Yes			
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	None	Max	Max		None	None
Walk Time (s)		18.0	18.0		12.0	12.0
Flash Dont Walk (s)		7.0	7.0		7.0	7.0
Pedestrian Calls (#/hr)		0	0		0	0
Act Effct Green (s)	56.1	56.1	34.3		7.6	7.6
Actuated g/C Ratio	0.74	0.74	0.45		0.10	0.10
v/c Ratio	0.78	0.38	0.71		0.08	0.73
Control Delay	27.4	4.3	20.2		31.0	8.9
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	27.4	4.3	20.2		31.0	8.9
LOS	C	A	C		C	A
Approach Delay		10.8	20.2		9.4	
Approach LOS		B	C		A	
Queue Length 50th (m)	30.4	19.1	66.2		2.1	0.0
Queue Length 95th (m)	#85.8	41.1	106.1		7.2	15.2
Internal Link Dist (m)		165.7	250.5		160.2	
Turn Bay Length (m)	75.0				55.0	
Base Capacity (vph)	495	2620	1595		514	1239
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	0.77	0.38	0.71		0.03	0.49

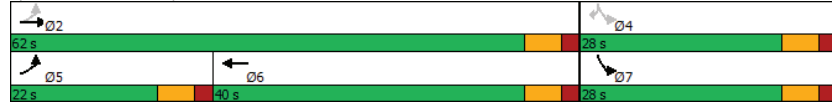
Intersection Summary

Area Type:	Other
Cycle Length:	90
Actuated Cycle Length:	75.7
Natural Cycle:	90
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.78
Intersection Signal Delay:	13.9
Intersection Capacity Utilization:	67.6%
Intersection LOS:	B
ICU Level of Service:	C
Analysis Period (min):	15
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Lanes, Volumes, Timings
16: Speers Road/Cornwall Road & Cross Avenue

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Splits and Phases: 16: Speers Road/Cornwall Road & Cross Avenue



HCM Signalized Intersection Capacity Analysis
16: Speers Road/Cornwall Road & Cross Avenue

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Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↕	↕	↔	↔	↕
Traffic Volume (vph)	351	905	995	48	14	557
Future Volume (vph)	351	905	995	48	14	557
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0		6.0	6.0
Lane Util. Factor	1.00	0.95	0.95		1.00	0.88
Frt	1.00	1.00	0.99		1.00	0.85
Fit Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	3539	3515		1770	2787
Fit Permitted	0.12	1.00	1.00		0.95	1.00
Satd. Flow (perm)	229	3539	3515		1770	2787
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	382	984	1082	52	15	605
RTOR Reduction (vph)	0	0	3	0	0	544
Lane Group Flow (vph)	382	984	1131	0	15	61
Turn Type	pm+pt	NA	NA		pm+pt	Perm
Protected Phases	5	2	6		7	
Permitted Phases	2				4	4
Actuated Green, G (s)	56.1	56.1	34.3		7.6	7.6
Effective Green, g (s)	56.1	56.1	34.3		7.6	7.6
Actuated g/C Ratio	0.74	0.74	0.45		0.10	0.10
Clearance Time (s)	6.0	6.0	6.0		6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	491	2622	1592		177	279
v/s Ratio Prot	c0.16	0.28	0.32		0.01	
v/s Ratio Perm	c0.41					c0.02
v/c Ratio	0.78	0.38	0.71		0.08	0.22
Uniform Delay, d1	16.6	3.5	16.7		30.9	31.3
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	7.6	0.4	2.7		0.2	0.4
Delay (s)	24.2	3.9	19.4		31.1	31.7
Level of Service	C	A	B		C	C
Approach Delay (s)		9.6	19.4		31.7	
Approach LOS		A	B		C	

Intersection Summary

HCM 2000 Control Delay	17.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	75.7	Sum of lost time (s)	18.0
Intersection Capacity Utilization	67.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
17: North Access & South Service Road

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	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↘			↘	↗	
Traffic Volume (vph)	50	0	125	87	0	8
Future Volume (vph)	50	0	125	87	0	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Fr					0.865	
Fit Protected				0.971		
Satd. Flow (prot)	1863	0	0	1809	1611	0
Fit Permitted				0.971		
Satd. Flow (perm)	1863	0	0	1809	1611	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	154.2			110.2	69.4	
Travel Time (s)	11.1			7.9	5.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	54	0	136	95	0	9
Shared Lane Traffic (%)						
Lane Group Flow (vph)	54	0	0	231	9	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)		15	25		25	15
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	28.2%
Analysis Period (min)	15
	ICU Level of Service A

HCM Unsignalized Intersection Capacity Analysis
17: North Access & South Service Road

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	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↘			↘	↗	
Traffic Volume (veh/h)	50	0	125	87	0	8
Future Volume (Veh/h)	50	0	125	87	0	8
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)	54	0	136	95	0	9
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			54		421	54
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			54		421	54
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		100	99
cM capacity (veh/h)			1551		537	1013

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	54	231	9
Volume Left	0	136	0
Volume Right	0	0	9
eSH	1700	1551	1013
Volume to Capacity	0.03	0.09	0.01
Queue Length 95th (m)	0.0	2.3	0.2
Control Delay (s)	0.0	4.7	8.6
Lane LOS		A	A
Approach Delay (s)	0.0	4.7	8.6
Approach LOS			A

Intersection Summary

Average Delay		4.0	
Intersection Capacity Utilization	28.2%	ICU Level of Service	A
Analysis Period (min)	15		

Lanes, Volumes, Timings
19: Street C & South Service Road

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Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	30	28	41	193	19	39
Future Volume (vph)	30	28	41	193	19	39
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.936			0.910		
Fit Protected				0.991	0.984	
Satd. Flow (prot)	1744	0	0	1846	1668	
Fit Permitted				0.991	0.984	
Satd. Flow (perm)	1744	0	0	1846	1668	
Link Speed (k/h)	50		50		50	
Link Distance (m)	110.2		306.3		76.4	
Travel Time (s)	7.9		22.1		5.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	33	30	45	210	21	42
Shared Lane Traffic (%)						
Lane Group Flow (vph)	63	0	0	255	63	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0		0.0		3.6	
Link Offset(m)	0.0		0.0		0.0	
Crosswalk Width(m)	4.8		4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	15		25		15	
Sign Control	Free		Free		Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	29.2%
Analysis Period (min)	15
	ICU Level of Service A

HCM Unsignalized Intersection Capacity Analysis
19: Street C & South Service Road

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Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	30	28	41	193	19	39
Future Volume (Veh/h)	30	28	41	193	19	39
Sign Control	Free			Free Stop		
Grade	0%					
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	33	30	45	210	21	42
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			63			348 48
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			63			348 48
tC, single (s)			4.1			6.4 6.2
tC, 2 stage (s)						
tF (s)			2.2			3.5 3.3
p0 queue free %			97			97 96
cM capacity (veh/h)			1540			630 1021
Direction, Lane #						
	EB 1	WB 1	NB 1			
Volume Total	63	255	63			
Volume Left	0	45	21			
Volume Right	30	0	42			
eSH	1700	1540	846			
Volume to Capacity	0.04	0.03	0.07			
Queue Length 95th (m)	0.0	0.7	1.9			
Control Delay (s)	0.0	1.5	9.6			
Lane LOS	A		A			
Approach Delay (s)	0.0	1.5	9.6			
Approach LOS	A		A			

Intersection Summary						
Average Delay			2.6			
Intersection Capacity Utilization	29.2%		ICU Level of Service		A	
Analysis Period (min)	15					

Lanes, Volumes, Timings
20: Street A & South Service Road

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	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↘			↘	↗	
Traffic Volume (vph)	50	4	17	70	10	0
Future Volume (vph)	50	4	17	70	10	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.991					
Fit Protected				0.991	0.950	
Satd. Flow (prot)	1846	0	0	1846	1770	0
Fit Permitted				0.991	0.950	
Satd. Flow (perm)	1846	0	0	1846	1770	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	255.1			154.2	119.8	
Travel Time (s)	18.4			11.1	8.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	54	4	18	76	11	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	58	0	0	94	11	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)		15	25		25	15
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	21.3%
Analysis Period (min)	15
	ICU Level of Service A

HCM Unsignalized Intersection Capacity Analysis
20: Street A & South Service Road

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	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↘			↘	↗	
Traffic Volume (veh/h)	50	4	17	70	10	0
Future Volume (Veh/h)	50	4	17	70	10	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)	54	4	18	76	11	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			58		168	56
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			58		168	56
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		99	100
cM capacity (veh/h)			1546		813	1011

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	58	94	11
Volume Left	0	18	11
Volume Right	4	0	0
eSH	1700	1546	813
Volume to Capacity	0.03	0.01	0.01
Queue Length 95th (m)	0.0	0.3	0.3
Control Delay (s)	0.0	1.5	9.5
Lane LOS	A	A	A
Approach Delay (s)	0.0	1.5	9.5
Approach LOS		A	

Intersection Summary

Average Delay		1.5	
Intersection Capacity Utilization	21.3%	ICU Level of Service	A
Analysis Period (min)		15	

Lanes, Volumes, Timings
21: Argus Rd & Street 1

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Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	131	0	201	436	267
Future Volume (vph)	0	131	0	201	436	267
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.865			0.949		
Fit Protected						
Satd. Flow (prot)	1611	0	0	1863	1768	0
Fit Permitted						
Satd. Flow (perm)	1611	0	0	1863	1768	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	165.4			115.7	65.0	
Travel Time (s)	11.9			8.3	4.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	142	0	218	474	290
Shared Lane Traffic (%)						
Lane Group Flow (vph)	142	0	0	218	764	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			3.3	3.3	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	54.0%
Analysis Period (min)	15
	ICU Level of Service A

HCM Unsignalized Intersection Capacity Analysis
21: Argus Rd & Street 1

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Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	131	0	201	436	267
Future Volume (Veh/h)	0	131	0	201	436	267
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	142	0	218	474	290
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)				116		
pX, platoon unblocked						
vC, conflicting volume	837	619	764			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	837	619	764			
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	71	100			
cM capacity (veh/h)	337	489	849			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	142	218	764
Volume Left	0	0	0
Volume Right	142	0	290
cSH	489	849	1700
Volume to Capacity	0.29	0.00	0.45
Queue Length 95th (m)	9.6	0.0	0.0
Control Delay (s)	15.4	0.0	0.0
Lane LOS	C		
Approach Delay (s)	15.4	0.0	0.0
Approach LOS	C		

Intersection Summary

Average Delay	1.9
Intersection Capacity Utilization	54.0%
Analysis Period (min)	15
	ICU Level of Service A

Lanes, Volumes, Timings
22: Street C & Street 1

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	↖	→	↘	↙	←	↖	↙	↑	↘	↙	↓	↘
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (vph)	0	131	33	113	154	0	83	89	0	0	146	0
Future Volume (vph)	0	131	33	113	154	0	83	89	0	0	146	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.973											
Flt Protected					0.979				0.977			
Satd. Flow (prot)	0	1812	0	0	1824	0	0	1820	0	0	1863	0
Flt Permitted	0.979											
Satd. Flow (perm)	0	1812	0	0	1824	0	0	1820	0	0	1863	0
Link Speed (k/h)	50				50				50			
Link Distance (m)	41.9				165.4				132.8			
Travel Time (s)	3.0				11.9				9.6			
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
Adj. Flow (vph)	0	142	36	123	167	0	90	97	0	0	159	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	178	0	0	290	0	0	187	0	0	159	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Right	Left	Left	Right	Right
Median Width(m)	0.0				0.0				3.6			
Link Offset(m)	0.0				0.0				0.0			
Crosswalk Width(m)	4.8				4.8				4.8			
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control	Stop		Stop				Free		Free			

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	53.6%
ICU Level of Service A	
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis
22: Street C & Street 1

FT 2038 PM PH1.syn
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	↖	→	↘	↙	←	↖	↙	↑	↘	↙	↓	↘	
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↕			↕			↕			↕		
Traffic Volume (veh/h)	0	131	33	113	154	0	83	89	0	0	146	0	
Future Volume (Veh/h)	0	131	33	113	154	0	83	89	0	0	146	0	
Sign Control	Stop				Stop				Free				
Grade	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)	0	142	36	123	167	0	90	97	0	0	159	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)	133												
pX, platoon unblocked													
vC, conflicting volume	520	436	159	543	436	97	159						97
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	520	436	159	543	436	97	159						97
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	70	96	61	65	100	94						100
cM capacity (veh/h)	326	481	886	318	481	959	1420						1496
Direction, Lane #	EB 1	WB 1	NB 1	SB 1									
Volume Total	178	290	187	159									
Volume Left	0	123	90	0									
Volume Right	36	0	0	0									
eSH	530	395	1420	1496									
Volume to Capacity	0.34	0.73	0.06	0.00									
Queue Length 95th (m)	11.7	46.0	1.6	0.0									
Control Delay (s)	15.2	35.4	4.0	0.0									
Lane LOS	C	E	A										
Approach Delay (s)	15.2	35.4	4.0	0.0									
Approach LOS	C	E											

Intersection Summary

Average Delay	16.8
Intersection Capacity Utilization	53.6%
ICU Level of Service A	
Analysis Period (min)	15

Lanes, Volumes, Timings
23: GO Station West Access/Street C & Cross Ave

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔			↔			↔	↔		↔	↔	
Traffic Volume (vph)	55	598	58	206	351	117	99	0	491	163	113	16
Future Volume (vph)	55	598	58	206	351	117	99	0	491	163	113	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.0	0.0	0.0
Storage Lanes	0	0	0	0	0	0	1	0	1	0	0	0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.988		0.974		0.850		0.982					
Flt Protected	0.996		0.985		0.950		0.950					
Satd. Flow (prot)	0	3483	0	0	3395	0	1770	1583	0	1770	1829	0
Flt Permitted	0.833		0.598		0.668		0.301					
Satd. Flow (perm)	0	2913	0	0	2061	0	1244	1583	0	561	1829	0
Right Turn on Red	Yes		Yes		Yes		Yes					
Satd. Flow (RTOR)	22		59		110		17					
Link Speed (k/h)	50		50		50		50					
Link Distance (m)	209.8		164.3		55.1		132.8					
Travel Time (s)	15.1		11.8		4.0		9.6					
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
Adj. Flow (vph)	60	650	63	224	382	127	108	0	534	177	123	17
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	773	0	0	733	0	108	534	0	177	140	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)	3.3		3.3		3.6		3.6					
Link Offset(m)	0.0		0.0		0.0		0.0					
Crosswalk Width(m)	4.8		4.8		4.8		4.8					
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15		25		15		25		15	
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)	9.4		9.4		9.4		9.4					
Detector 2 Size(m)	0.6		0.6		0.6		0.6					
Detector 2 Type	Cl+Ex		Cl+Ex		Cl+Ex		Cl+Ex					
Detector 2 Channel												
Detector 2 Extend (s)	0.0		0.0		0.0		0.0					
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	4		8		8		2		6			
Permitted Phases	4		8		2		6					

Lanes, Volumes, Timings
23: GO Station West Access/Street C & Cross Ave

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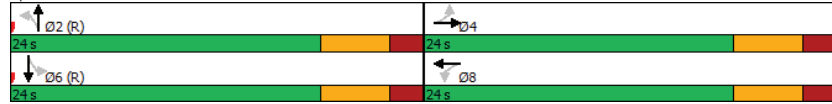
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	24.0	24.0		24.0	24.0		24.0	24.0		24.0	24.0	
Total Split (s)	24.0	24.0		24.0	24.0		24.0	24.0		24.0	24.0	
Total Split (%)	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%		50.0%	50.0%	
Maximum Green (s)	18.0	18.0		18.0	18.0		18.0	18.0		18.0	18.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0		0.0		0.0		0.0		0.0		0.0	
Total Lost Time (s)	6.0		6.0		6.0		6.0		6.0		6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	17.6		17.6		18.4		18.4		18.4		18.4	
Actuated g/C Ratio	0.37		0.37		0.38		0.38		0.38		0.38	
v/c Ratio	0.71		0.92		0.23		0.79		0.83		0.20	
Control Delay	16.9		34.4		11.9		22.3		50.4		9.9	
Queue Delay	0.0		0.0		0.0		0.0		0.0		0.0	
Total Delay	16.9		34.4		11.9		22.3		50.4		9.9	
LOS	B		C		B		C		D		A	
Approach Delay	16.9		34.4		20.6		32.5					
Approach LOS	B		C		C		C					
Queue Length 50th (m)	28.5		28.7		6.3		32.0		13.8		7.1	
Queue Length 95th (m)	45.0		#60.8		15.1		#81.0		#44.0		16.3	
Internal Link Dist (m)	185.8		140.3		31.1		108.8					
Turn Bay Length (m)			15.0									
Base Capacity (vph)	1106		809		475		673		214		710	
Starvation Cap Reductn	0		0		0		0		0		0	
Spillback Cap Reductn	0		0		0		0		0		0	
Storage Cap Reductn	0		0		0		0		0		0	
Reduced v/c Ratio	0.70		0.91		0.23		0.79		0.83		0.20	
Intersection Summary												
Area Type:	Other											
Cycle Length:	48											
Actuated Cycle Length:	48											
Offset:	0 (0%), Referenced to phase 2:NBL and 6:SBTL, Start of Green											
Natural Cycle:	50											
Control Type:	Actuated-Coordinated											
Maximum v/c Ratio:	0.92											
Intersection Signal Delay:	25.1						Intersection LOS: C					
Intersection Capacity Utilization:	98.8%						ICU Level of Service F					
Analysis Period (min):	15											
# 95th percentile volume exceeds capacity, queue may be longer.												

Lanes, Volumes, Timings
 23: GO Station West Access/Street C & Cross Ave

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Queue shown is maximum after two cycles.

Splits and Phases: 23: GO Station West Access/Street C & Cross Ave



HCM Signalized Intersection Capacity Analysis
 23: GO Station West Access/Street C & Cross Ave

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔		↔	↔		↔	↔	
Traffic Volume (vph)	55	598	58	206	351	117	99	0	491	163	113	16
Future Volume (vph)	55	598	58	206	351	117	99	0	491	163	113	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0			6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor		0.95			0.95		1.00	1.00		1.00	1.00	
Frt		0.99			0.97		1.00	0.85		1.00	0.98	
Fit Protected		1.00			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		3482			3395		1770	1583		1770	1829	
Fit Permitted		0.83			0.60		0.67	1.00		0.30	1.00	
Satd. Flow (perm)		2913			2062		1244	1583		561	1829	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	60	650	63	224	382	127	108	0	534	177	123	17
RTOR Reduction (vph)	0	14	0	0	37	0	0	68	0	0	10	0
Lane Group Flow (vph)	0	759	0	0	696	0	108	466	0	177	130	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		17.6			17.6		18.4	18.4		18.4	18.4	
Effective Green, g (s)		17.6			17.6		18.4	18.4		18.4	18.4	
Actuated g/C Ratio		0.37			0.37		0.38	0.38		0.38	0.38	
Clearance Time (s)		6.0			6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		1068			756		476	606		215	701	
v/s Ratio Prot								0.29			0.07	
v/s Ratio Perm		0.26			0.34		0.09			0.32		
v/c Ratio		0.71			0.92		0.23	0.77		0.82	0.18	
Uniform Delay, d1		13.0			14.5		10.0	12.9		13.3	9.8	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		2.3			16.4		1.1	9.1		28.7	0.6	
Delay (s)		15.3			30.9		11.1	22.0		42.0	10.4	
Level of Service		B			C		B	C		D	B	
Approach Delay (s)		15.3			30.9			20.2			28.0	
Approach LOS		B			C			C			C	

Intersection Summary

HCM 2000 Control Delay	22.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	48.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	98.8%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings

FT 2038 AM.syn

1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd

04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	41	127	352	731	90	208	185	1588	858	194	1814	55
Future Volume (vph)	41	127	352	731	90	208	185	1588	858	194	1814	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0		0.0	165.0		25.0	145.0		0.0	95.0		90.0
Storage Lanes	1		1	1		1	1		1	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Ped Bike Factor	0.99					0.98			0.99			
Frt			0.850						0.850			0.850
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1624	1693	1425	3060	1676	1398	1425	4446	1398	1562	4532	1398
Fit Permitted	0.694			0.383			0.085			0.088		
Satd. Flow (perm)	1175	1693	1425	1234	1676	1366	128	4446	1377	145	4532	1398
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			218			226			487			155
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		285.9			293.8			275.1			252.7	
Travel Time (s)		20.6			21.2			19.8			18.2	
Confl. Peds. (#/hr)	11					11			10	10		
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
Heavy Vehicles (%)	0%	1%	2%	3%	2%	4%	14%	5%	4%	4%	3%	4%
Adj. Flow (vph)	45	138	383	795	98	226	201	1726	933	211	1972	60
Shared Lane Traffic (%)												
Lane Group Flow (vph)	45	138	383	795	98	226	201	1726	933	211	1972	60
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		7.2			7.2			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings

FT 2038 AM.syn

1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd

04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA	Free	pm+pt	NA	Perm	pm+pt	NA	Free	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		Free	8		8	2		Free	6		6
Detector Phase	7	4		3	8	8	5	2		1	6	6
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0	10.0	6.0	15.0		6.0	15.0	15.0
Minimum Split (s)	10.0	34.0		11.0	43.0	43.0	10.0	34.0		10.0	34.0	34.0
Total Split (s)	10.0	34.0		19.0	43.0	43.0	14.0	52.0		15.0	53.0	53.0
Total Split (%)	8.3%	28.3%		15.8%	35.8%	35.8%	11.7%	43.3%		12.5%	44.2%	44.2%
Maximum Green (s)	6.0	27.0		14.0	36.0	36.0	10.0	45.0		11.0	46.0	46.0
Yellow Time (s)	3.0	4.0		3.0	4.0	4.0	3.0	4.0		3.0	4.0	4.0
All-Red Time (s)	1.0	3.0		2.0	3.0	3.0	1.0	3.0		1.0	3.0	3.0
Lost Time Adjust (s)	0.0	-3.0		0.0	-3.0	-3.0	0.0	-3.0		0.0	-3.0	-3.0
Total Lost Time (s)	4.0	4.0		5.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	4.0		3.0	4.0	4.0	3.0	5.0		3.0	5.0	5.0
Recall Mode	None	None		None	None	None	None	C-Max		None	C-Max	C-Max
Walk Time (s)					7.0	7.0		7.0			7.0	7.0
Flash Dont Walk (s)					29.0	29.0		20.0			20.0	20.0
Pedestrian Calls (#/hr)					0	0		0			0	0
Act Effct Green (s)	25.0	19.0	120.0	37.0	30.0	30.0	71.1	50.6	120.0	68.4	49.0	49.0
Actuated g/C Ratio	0.21	0.16	1.00	0.31	0.25	0.25	0.59	0.42	1.00	0.57	0.41	0.41
v/c Ratio	0.17	0.51	0.27	1.34	0.23	0.44	0.67	0.92	0.68	0.68	1.06	0.09
Control Delay	29.4	52.4	0.5	196.5	37.3	7.3	39.3	42.5	2.7	38.1	75.5	0.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.4	52.4	0.5	196.5	37.3	7.3	39.3	42.5	2.7	38.1	75.5	0.3
LOS	C	D	A	F	D	A	D	D	A	D	E	A
Approach Delay		15.4			144.3			29.3			69.9	
Approach LOS		B			F			C			E	
Queue Length 50th (m)	7.8	31.7	0.0	~132.4	19.9	0.0	32.1	148.5	0.0	32.4	~197.7	0.0
Queue Length 95th (m)	15.8	50.2	0.0	#164.2	33.3	19.2	#79.5	#189.0	0.0	#73.4	#228.5	0.0
Internal Link Dist (m)		261.9			269.8			251.1			228.7	
Turn Bay Length (m)	60.0			165.0		25.0	145.0			95.0		90.0
Base Capacity (vph)	267	423	1425	593	544	596	302	1874	1377	311	1852	662
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.17	0.33	0.27	1.34	0.18	0.38	0.67	0.92	0.68	0.68	1.06	0.09

Intersection Summary

Area Type:	CBD
Cycle Length:	120
Actuated Cycle Length:	120
Offset:	33.6 (28%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle:	150
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	1.34
Intersection Signal Delay:	60.5
Intersection LOS:	E

Lanes, Volumes, Timings
1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd

FT 2038 AM.syn
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Intersection Capacity Utilization 96.0% ICU Level of Service F
Analysis Period (min) 15
- Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd



HCM Signalized Intersection Capacity Analysis
1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd

FT 2038 AM.syn
04-03-2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↑	↗	↖	↑	↗	↖	↖	↗	↖	↗	↖
Traffic Volume (vph)	41	127	352	731	90	208	185	1588	858	194	1814	55
Future Volume (vph)	41	127	352	731	90	208	185	1588	858	194	1814	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	1.0	5.0	4.0	4.0	4.0	4.0	1.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.98	1.00	0.99	1.00	0.99	1.00	1.00
Flpb, ped/bikes	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1614	1693	1425	3060	1676	1366	1425	4446	1377	1562	4532	1398
Flt Permitted	0.69	1.00	1.00	0.38	1.00	1.00	0.09	1.00	1.00	0.09	1.00	1.00
Satd. Flow (perm)	1178	1693	1425	1233	1676	1366	128	4446	1377	146	4532	1398
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	45	138	383	795	98	226	98	226	201	1726	933	211
RTOR Reduction (vph)	0	0	0	0	0	170	0	0	0	0	0	36
Lane Group Flow (vph)	45	138	383	795	98	57	201	1726	933	211	1972	24
Confl. Peds. (#/hr)	11					11			10		10	
Heavy Vehicles (%)	0%	1%	2%	3%	2%	4%	14%	5%	4%	4%	3%	4%
Turn Type	pm+pt	NA	Free	pm+pt	NA	Perm	pm+pt	NA	Free	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		Free	8		8	2		Free	6		6
Actuated Green, G (s)	21.6	16.8	120.0	35.8	27.0	27.0	67.8	46.8	120.0	64.6	45.2	45.2
Effective Green, g (s)	21.6	19.8	120.0	35.8	30.0	30.0	67.8	49.8	120.0	64.6	48.2	48.2
Actuated g/C Ratio	0.18	0.17	1.00	0.30	0.25	0.25	0.56	0.41	1.00	0.54	0.40	0.40
Clearance Time (s)	4.0	7.0		5.0	7.0	7.0	4.0	7.0		4.0	7.0	7.0
Vehicle Extension (s)	3.0	4.0		3.0	4.0	4.0	3.0	5.0		3.0	5.0	5.0
Lane Grp Cap (vph)	229	279	1425	580	419	341	299	1845	1377	307	1820	561
v/s Ratio Prot	0.01	0.08		c0.16	0.06		0.12	0.39		0.11	c0.44	
v/s Ratio Perm	0.03		0.27	c0.25		0.04	0.26		c0.68	0.26		0.02
v/c Ratio	0.20	0.49	0.27	1.37	0.23	0.17	0.67	0.94	0.68	0.69	1.08	0.04
Uniform Delay, d1	41.5	45.6	0.0	39.9	35.8	35.2	30.6	33.6	0.0	29.3	35.9	21.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.4	1.9	0.5	177.6	0.4	0.3	5.8	10.4	2.7	6.3	47.7	0.1
Delay (s)	41.9	47.4	0.5	217.5	36.2	35.5	36.5	44.0	2.7	35.5	83.6	22.0
Level of Service	D	D	A	F	D	D	D	D	D	A	D	F
Approach Delay (s)		15.2			164.8			30.0			77.4	
Approach LOS		B			F			C			E	

Intersection Summary			
HCM 2000 Control Delay	66.7	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.13		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	96.0%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings

FT 2038 AM.syn

2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp

04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	3	0	180	574	34	269	0	2359	580	0	2993	7
Future Volume (vph)	3	0	180	574	34	269	0	2359	580	0	2993	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.5	3.3	3.6	3.5	3.6	3.5	3.6	3.6	3.6	3.5
Storage Length (m)	50.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Storage Lanes	1	1	1	1	1	1	0	1	0	1	0	0
Taper Length (m)	7.5		7.5		7.5		7.5		7.5		7.5	
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.91	1.00	1.00	0.86	0.86
Ped Bike Factor									0.98		1.00	
Frt			0.850			0.850			0.850			
Flt Protected	0.950			0.950	0.957							
Satd. Flow (prot)	1570	0	1395	1421	1453	1356	0	4446	1384	0	5711	0
Flt Permitted	0.950			0.950	0.957							
Satd. Flow (perm)	1570	0	1395	1421	1453	1356	0	4446	1353	0	5711	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			31			250			190			
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		142.1			192.6			324.8			275.1	
Travel Time (s)		10.2			13.9			23.4			19.8	
Confl. Peds. (#/hr)							8		5	5		8
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
Heavy Vehicles (%)	0%	0%	3%	5%	23%	6%	0%	5%	5%	0%	3%	0%
Adj. Flow (vph)	3	0	196	624	37	292	0	2564	630	0	3253	8
Shared Lane Traffic (%)				47%								
Lane Group Flow (vph)	3	0	196	331	330	292	0	2564	630	0	3261	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.3			3.3			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.19	1.14	1.16	1.19	1.14	1.16	1.14	1.14	1.14	1.14	1.14	1.16
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1		1	1		1			1			2
Detector Template	Left		Right	Left	Thru	Right		Thru	Right		Thru	
Leading Detector (m)	2.0		2.0	2.0	10.0	2.0		10.0	2.0		10.0	
Trailing Detector (m)	0.0		0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Detector 1 Position(m)	0.0		0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Detector 1 Size(m)	2.0		2.0	2.0	0.6	2.0		0.6	2.0		0.6	
Detector 1 Type	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Detector 1 Delay (s)	0.0		0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Detector 2 Position(m)					9.4			9.4			9.4	
Detector 2 Size(m)					0.6			0.6			0.6	
Detector 2 Type					Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

Lanes, Volumes, Timings

FT 2038 AM.syn

2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp

04-03-2024

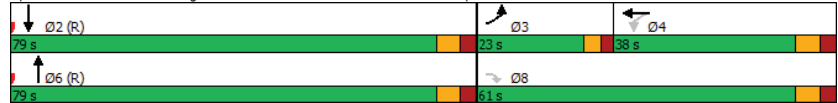
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)								0.0			0.0	0.0
Turn Type	Prot		Perm	Perm	NA	Free		NA	Free		NA	NA
Protected Phases	3				4			4			6	2
Permitted Phases						Free				Free		
Detector Phase	3		8	4	4					6		2
Switch Phase												
Minimum Initial (s)	7.0		10.0	10.0	10.0					5.0		28.0
Minimum Split (s)	23.0		38.0	38.0	38.0					35.0		35.0
Total Split (s)	23.0		61.0	38.0	38.0					79.0		79.0
Total Split (%)	16.4%		43.6%	27.1%	27.1%					56.4%		56.4%
Maximum Green (s)	18.0		54.0	31.0	31.0					72.0		72.0
Yellow Time (s)	3.0		4.0	4.0	4.0					4.0		4.0
All-Red Time (s)	2.0		3.0	3.0	3.0					3.0		3.0
Lost Time Adjust (s)	-1.0		-3.0	-3.0	-3.0					-3.0		-3.0
Total Lost Time (s)	4.0		4.0	4.0	4.0					4.0		4.0
Lead/Lag	Lead				Lag	Lag						
Lead-Lag Optimize?	Yes				Yes	Yes						
Vehicle Extension (s)	3.0		3.0	3.0	3.0					4.5		4.5
Recall Mode	Min		Min	Min	Min					C-Min		C-Min
Walk Time (s)			7.0	7.0	7.0					7.0		7.0
Flash Dont Walk (s)			24.0	24.0	24.0					21.0		21.0
Pedestrian Calls (#/hr)			0	0	0					0		0
Act Effct Green (s)	8.0		54.3	42.3	42.3	140.0				77.7	140.0	77.7
Actuated g/C Ratio	0.06		0.39	0.30	0.30	1.00				0.56	1.00	0.56
v/c Ratio	0.03		0.35	0.77	0.75	0.22				1.04	0.47	1.03
Control Delay	63.3		26.6	57.3	55.6	0.4				51.3	0.1	55.0
Queue Delay	0.0		0.0	0.0	0.0	0.0				0.0	0.0	0.0
Total Delay	63.3		26.6	57.3	55.6	0.4				51.3	0.1	55.0
LOS	E		C	E	E	A				D	A	D
Approach Delay		27.2				39.3				41.2		55.0
Approach LOS		C				D				D		D
Queue Length 50th (m)	0.9		32.4	89.8	88.9	0.0				~299.6	0.0	~303.9
Queue Length 95th (m)	4.2		53.3	130.6	128.9	0.0				m166.2	m0.0	#322.2
Internal Link Dist (m)			118.1			168.6				300.8		251.1
Turn Bay Length (m)	50.0											
Base Capacity (vph)	213		586	429	438	1356				2468	1353	3170
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	0.01		0.33	0.77	0.75	0.22				1.04	0.47	1.03
Intersection Summary												
Area Type:	CBD											
Cycle Length:	140											
Actuated Cycle Length:	140											
Offset:	115.4 (82%), Referenced to phase 2:SBT and 6:NBT, Start of Green											
Natural Cycle:	150											
Control Type:	Actuated-Coordinated											
Maximum v/c Ratio:	1.04											

Lanes, Volumes, Timings
2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp

FT 2038 AM.syn
04-03-2024

Intersection Signal Delay: 46.5 Intersection LOS: D
Intersection Capacity Utilization 89.4% ICU Level of Service E
Analysis Period (min) 15
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp



HCM Signalized Intersection Capacity Analysis
2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp

FT 2038 AM.syn
04-03-2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	3	0	180	574	34	269	0	2359	580	0	2993	7
Future Volume (vph)	3	0	180	574	34	269	0	2359	580	0	2993	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.5	3.3	3.6	3.5	3.6	3.6	3.6	3.6	3.6	3.5
Total Lost time (s)	4.0		4.0	4.0	4.0	1.0		4.0	4.0		4.0	
Lane Util. Factor	1.00		1.00	0.95	0.95	1.00		0.91	1.00		0.86	
Frpb, ped/bikes	1.00		1.00	1.00	1.00	1.00		1.00	0.98		1.00	
Flpb, ped/bikes	1.00		1.00	1.00	1.00	1.00		1.00	1.00		1.00	
Frt	1.00		0.85	1.00	1.00	0.85		1.00	0.85		1.00	
Flt Protected	0.95		1.00	0.95	0.96	1.00		1.00	1.00		1.00	
Satd. Flow (perm)	1570		1395	1421	1453	1356		4446	1353		5709	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	3	0	196	624	37	292	0	2564	630	0	3253	8
RTOR Reduction (vph)	0	0	19	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	3	0	177	331	330	292	0	2564	630	0	3261	0
Confl. Peds. (#/hr)							8		5	5		8
Heavy Vehicles (%)	0%	0%	3%	5%	23%	6%	0%	5%	5%	0%	3%	0%
Turn Type	Prot		Perm	Perm	NA	Free		NA	Free		NA	
Protected Phases	3				4			6			2	
Permitted Phases			8	4		Free			Free			
Actuated Green, G (s)	7.0		51.3	39.3	39.3	140.0		74.7	140.0		74.7	
Effective Green, g (s)	8.0		54.3	42.3	42.3	140.0		77.7	140.0		77.7	
Actuated g/C Ratio	0.06		0.39	0.30	0.30	1.00		0.56	1.00		0.56	
Clearance Time (s)	5.0		7.0	7.0	7.0			7.0			7.0	
Vehicle Extension (s)	3.0		3.0	3.0	3.0			4.5			4.5	
Lane Grp Cap (vph)	89		541	429	439	1356		2467	1353		3168	
v/s Ratio Prot	0.00							c0.58			0.57	
v/s Ratio Perm			0.13	c0.23	0.23	0.22			c0.47			
v/c Ratio	0.03		0.33	0.77	0.75	0.22		1.04	0.47		1.03	
Uniform Delay, d1	62.3		30.0	44.5	44.1	0.0		31.1	0.0		31.1	
Progression Factor	1.00		1.00	1.00	1.00	1.00		1.04	1.00		1.00	
Incremental Delay, d2	0.2		0.4	8.4	7.1	0.4		19.3	0.1		24.1	
Delay (s)	62.5		30.4	52.8	51.2	0.4		51.8	0.1		55.3	
Level of Service	E		C	D	D	A		D	A		E	
Approach Delay (s)		30.9			36.2			41.6			55.3	
Approach LOS		C			D			D			E	
Intersection Summary												
HCM 2000 Control Delay			46.5		HCM 2000 Level of Service				D			
HCM 2000 Volume to Capacity ratio			0.93									
Actuated Cycle Length (s)			140.0		Sum of lost time (s)				12.0			
Intersection Capacity Utilization			89.4%		ICU Level of Service				E			
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
3: Trafalgar Rd & QEW EB-Off Ramp

FT 2038 AM.syn
04-03-2024

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔↔	↔		↑↑↑	↑↑↑	↔
Traffic Volume (vph)	940	854	0	2025	2034	496
Future Volume (vph)	940	854	0	2025	2034	496
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.5	3.6	3.6	3.6	3.6
Lane Util. Factor	0.97	1.00	1.00	0.91	0.91	1.00
Frt		0.850				0.850
Flt Protected	0.950					
Satd. Flow (prot)	2958	1423	0	4404	4489	1454
Flt Permitted	0.950					
Satd. Flow (perm)	2958	1423	0	4404	4489	1454
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		1				188
Link Speed (k/h)	50			50	50	
Link Distance (m)	199.2			51.4	324.8	
Travel Time (s)	14.3			3.7	23.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	1%	0%	6%	4%	0%
Adj. Flow (vph)	1022	928	0	2201	2211	539
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1022	928	0	2201	2211	539
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	6.6			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.19	1.16	1.14	1.14	1.14	1.14
Turning Speed (k/h)	24	14	24			14
Number of Detectors	1	1		2	2	1
Detector Template	Left	Right		Thru	Thru	Right
Leading Detector (m)	2.0	2.0		10.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	2.0	2.0		0.6	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)				9.4	9.4	
Detector 2 Size(m)				0.6	0.6	
Detector 2 Type				Cl+Ex	Cl+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Perm	Perm		NA	NA	Free
Protected Phases				2	2	
Permitted Phases	4	4				Free
Detector Phase	4	4		2	2	

Lanes, Volumes, Timings
3: Trafalgar Rd & QEW EB-Off Ramp

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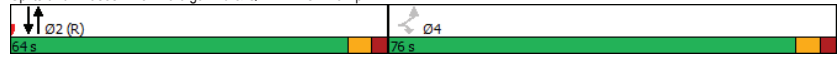
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Switch Phase						
Minimum Initial (s)	10.0	10.0		29.0	29.0	
Minimum Split (s)	38.0	38.0		36.0	36.0	
Total Split (s)	76.0	76.0		64.0	64.0	
Total Split (%)	54.3%	54.3%		45.7%	45.7%	
Maximum Green (s)	69.0	69.0		57.0	57.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	
All-Red Time (s)	3.0	3.0		3.0	3.0	
Lost Time Adjust (s)	-3.0	-3.0		-3.0	-3.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Recall Mode	None	None		C-Max	C-Max	
Walk Time (s)	7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	24.0	24.0		22.0	22.0	
Pedestrian Calls (#/hr)	0	0		0	0	
Act Effct Green (s)	72.0	72.0		60.0	60.0	140.0
Actuated g/C Ratio	0.51	0.51		0.43	0.43	1.00
v/c Ratio	0.67	1.27		1.17	1.15	0.37
Control Delay	28.0	162.3		113.2	99.4	0.2
Queue Delay	0.0	0.0		0.0	0.0	0.0
Total Delay	28.0	162.3		113.2	99.4	0.2
LOS	C	F		F	F	A
Approach Delay	91.9			113.2	80.0	
Approach LOS	F			F	E	
Queue Length 50th (m)	110.9	~341.3		~276.5	~274.3	0.0
Queue Length 95th (m)	135.4	#424.7		m169.4	m#268.8	m0.0
Internal Link Dist (m)	175.2			27.4	300.8	
Turn Bay Length (m)						
Base Capacity (vph)	1521	732		1887	1923	1454
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	0.67	1.27		1.17	1.15	0.37
Intersection Summary						
Area Type:	CBD					
Cycle Length:	140					
Actuated Cycle Length:	140					
Offset:	133.6 (95%), Referenced to phase 2:NBSB and 6.; Start of Green					
Natural Cycle:	75					
Control Type:	Actuated-Coordinated					
Maximum v/c Ratio:	1.27					
Intersection Signal Delay:	94.0			Intersection LOS: F		
Intersection Capacity Utilization	109.1%			ICU Level of Service H		
Analysis Period (min)	15					
~ Volume exceeds capacity, queue is theoretically infinite. Queue shown is maximum after two cycles.						

Lanes, Volumes, Timings
3: Trafalgar Rd & QEW EB-Off Ramp

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- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Trafalgar Rd & QEW EB-Off Ramp



HCM Signalized Intersection Capacity Analysis
3: Trafalgar Rd & QEW EB-Off Ramp

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Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔↔	↔		↕↕↕	↕↕↕	↔
Traffic Volume (vph)	940	854	0	2025	2034	496
Future Volume (vph)	940	854	0	2025	2034	496
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.5	3.6	3.6	3.6	3.6
Total Lost time (s)	4.0	4.0		4.0	4.0	1.0
Lane Util. Factor	0.97	1.00		0.91	0.91	1.00
Frt	1.00	0.85		1.00	1.00	0.85
Flt Protected	0.95	1.00		1.00	1.00	1.00
Satd. Flow (prot)	2958	1423		4404	4489	1454
Flt Permitted	0.95	1.00		1.00	1.00	1.00
Satd. Flow (perm)	2958	1423		4404	4489	1454
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1022	928	0	2201	2211	539
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	1022	928	0	2201	2211	539
Heavy Vehicles (%)	3%	1%	0%	6%	4%	0%
Turn Type	Perm	Perm		NA	NA	Free
Protected Phases				2	2	
Permitted Phases	4	4				Free
Actuated Green, G (s)	69.0	69.0		57.0	57.0	140.0
Effective Green, g (s)	72.0	72.0		60.0	60.0	140.0
Actuated g/C Ratio	0.51	0.51		0.43	0.43	1.00
Clearance Time (s)	7.0	7.0		7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	1521	731		1887	1923	1454
v/s Ratio Prot				c0.50	0.49	
v/s Ratio Perm	0.35	c0.65				0.37
v/c Ratio	0.67	1.27		1.17	1.15	0.37
Uniform Delay, d1	25.2	34.0		40.0	40.0	0.0
Progression Factor	1.00	1.00		1.04	0.76	1.00
Incremental Delay, d2	1.2	131.7		75.5	69.6	0.2
Delay (s)	26.4	165.7		116.9	100.1	0.2
Level of Service	C	F		F	F	A
Approach Delay (s)	92.7			116.9	80.5	
Approach LOS	F			F	F	

Intersection Summary

HCM 2000 Control Delay	95.5	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.25		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	109.1%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
4: Trafalgar Rd & Argus Rd

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Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	265	0	3098	2225	664
Future Volume (vph)	0	265	0	3098	2225	664
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.6	3.5	3.6	3.6	3.6	3.6
Lane Util. Factor	1.00	1.00	1.00	0.91	0.91	0.91
Ped Bike Factor						
Frt		0.865			0.966	
Fit Protected						
Satd. Flow (prot)	0	1367	0	4363	4355	0
Fit Permitted						
Satd. Flow (perm)	0	1367	0	4363	4355	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	145.7			270.2	51.4	
Travel Time (s)	10.5			19.5	3.7	
Confl. Peds. (#/hr)						11
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	7%	0%	7%	4%	2%
Adj. Flow (vph)	0	288	0	3367	2418	722
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	288	0	3367	3140	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			3.3	3.3	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.14	1.16	1.14	1.14	1.14	1.14
Turning Speed (k/h)	24	14	24			14
Sign Control	Stop			Free	Free	

Intersection Summary						
Area Type:	CBD					
Control Type:	Unsignalized					
Intersection Capacity Utilization	89.4%		ICU Level of Service E			
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
4: Trafalgar Rd & Argus Rd

FT 2038 AM.syn
04-03-2024

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	265	0	3098	2225	664
Future Volume (Veh/h)	0	265	0	3098	2225	664
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	288	0	3367	2418	722
Pedestrians	11					
Lane Width (m)	3.5					
Walking Speed (m/s)	1.2					
Percent Blockage	1					
Right turn flare (veh)						
Median type			None	None		
Median storage (veh)						
Upstream signal (m)				270	52	
pX, platoon unblocked	0.73	0.58	0.58			
vC, conflicting volume	3912	1178	3151			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	932	0	2168			
tC, single (s)	6.8	7.0	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.4	2.2			
p0 queue free %	100	53	100			
cM capacity (veh/h)	194	612	143			

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	288	1122	1122	1122	967	967	1206
Volume Left	0	0	0	0	0	0	0
Volume Right	288	0	0	0	0	0	722
eSH	612	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.47	0.66	0.66	0.66	0.57	0.57	0.71
Queue Length 95th (m)	20.1	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (s)	16.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	C						
Approach Delay (s)	16.0	0.0			0.0		
Approach LOS	C						

Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	89.4%	ICU Level of Service	E
Analysis Period (min)	15		

Lanes, Volumes, Timings

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5: Trafalgar Rd & Cross Ave/South Service Rd

04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	[Diagrammatic Lane Configurations]											
Traffic Volume (vph)	1382	99	196	46	71	114	172	1323	30	243	1840	308
Future Volume (vph)	1382	99	196	46	71	114	172	1323	30	243	1840	308
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.6	3.3	3.6	3.5	3.3	3.6	3.6	3.3	3.6	3.6
Storage Length (m)	130.0	0.0	25.0	0.0	50.0	0.0	25.0	0.0	25.0	0.0	0.0	0.0
Storage Lanes	1	0	1	1	1	1	0	1	0	1	0	0
Taper Length (m)	7.5		7.5		7.5		7.5		7.5		7.5	
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.91	0.91
Ped Bike Factor	1.00	0.99		0.99		0.99		1.00		0.99		0.99
Frt	0.900				0.850		0.997			0.978		
Flt Protected	0.950			0.950		0.950		0.950		0.950		
Satd. Flow (prot)	2795	1380	0	1525	1583	1382	1428	4500	0	1525	4404	0
Flt Permitted	0.950			0.566		0.091		0.083				
Satd. Flow (perm)	2789	1380	0	903	1583	1362	137	4500	0	133	4404	0
Right Turn on Red			Yes			Yes		Yes			Yes	
Satd. Flow (RTOR)		80				148		3			26	
Link Speed (k/h)	50			50				50			50	
Link Distance (m)	151.2			330.4				150.2			270.2	
Travel Time (s)	10.9			23.8				10.8			19.5	
Confl. Peds. (#/hr)	1		4	4		1	10		52	52		10
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
Heavy Vehicles (%)	9%	6%	12%	3%	8%	4%	10%	3%	0%	3%	3%	4%
Adj. Flow (vph)	1502	108	213	50	77	124	187	1438	33	264	2000	335
Shared Lane Traffic (%)												
Lane Group Flow (vph)	1502	321	0	50	77	124	187	1471	0	264	2335	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Right	Left	Left	Right	Right
Median Width(m)	6.6			6.6			3.3			3.3		
Link Offset(m)	0.0			0.0			0.0			0.0		
Crosswalk Width(m)	4.8			4.8			4.8			4.8		
Two way Left Turn Lane												
Headway Factor	1.19	1.14	1.14	1.19	1.14	1.16	1.19	1.14	1.14	1.19	1.14	1.14
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2	1	1	2		1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

Lanes, Volumes, Timings

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5: Trafalgar Rd & Cross Ave/South Service Rd

04-03-2024

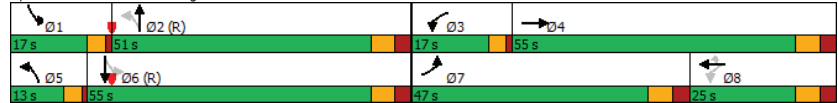
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases				8		8	2			6		
Detector Phases	7	4		3	8	8	5	2		1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		12.0	10.0	10.0	7.0	27.0		7.0	27.0	
Minimum Split (s)	17.0	25.0		17.0	25.0	25.0	11.5	34.0		11.5	34.0	
Total Split (s)	47.0	55.0		17.0	25.0	25.0	13.0	51.0		17.0	55.0	
Total Split (%)	33.6%	39.3%		12.1%	17.9%	17.9%	9.3%	36.4%		12.1%	39.3%	
Maximum Green (s)	40.0	48.0		13.0	18.0	18.0	9.0	44.0		13.0	48.0	
Yellow Time (s)	4.0	4.0		3.0	4.0	4.0	3.0	4.0		3.0	4.0	
All-Red Time (s)	3.0	3.0		1.0	3.0	3.0	1.0	3.0		1.0	3.0	
Lost Time Adjust (s)	-3.0	-3.0		0.0	-3.0	-3.0	0.0	-3.0		0.0	-3.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	4.0		3.5	4.0	4.0	3.0	5.0		3.0	5.0	
Recall Mode	Min	Min		Min	Min	Min	Min	C-Max		Min	C-Max	
Walk Time (s)		7.0			7.0	7.0		7.0			7.0	
Flash Dont Walk (s)		11.0			11.0	11.0		11.0			11.0	
Pedestrian Calls (#/hr)		0			0	0		0			0	
Act Effct Green (s)	43.0	47.5		28.5	16.5	16.5	60.5	47.0		68.5	51.0	
Actuated g/C Ratio	0.31	0.34		0.20	0.12	0.12	0.43	0.34		0.49	0.36	
v/c Ratio	1.75	0.62		0.21	0.41	0.43	1.02	0.97		1.10	1.44	
Control Delay	373.1	33.8		27.7	63.4	9.1	94.4	67.1		93.8	236.0	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	373.1	33.8		27.7	63.4	9.1	94.4	67.1		93.8	236.0	
LOS	F	C		C	E	A	F	E		F	F	
Approach Delay		313.3			29.5			70.1			221.6	
Approach LOS		F			C			E			F	
Queue Length 50th (m)	~334.3	59.3		8.2	21.2	0.0	46.5	134.7		~72.1	~333.9	
Queue Length 95th (m)	#378.2	88.7		15.4	37.0	12.2	m#69.6	m#128.8		m#72.4	m#265.7	
Internal Link Dist (m)		127.2			306.4			126.2			246.2	
Turn Bay Length (m)	130.0			25.0			50.0			25.0		
Base Capacity (vph)	858	555		247	237	330	184	1512		239	1620	
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	
Reduced v/c Ratio	1.75	0.58		0.20	0.32	0.38	1.02	0.97		1.10	1.44	
Intersection Summary												
Area Type:	CBD											
Cycle Length:	140											
Actuated Cycle Length:	140											
Offset:	128 (91%), Referenced to phase 2:NBT and 6:SBTL, Start of Green											
Natural Cycle:	150											
Control Type:	Actuated-Coordinated											
Maximum v/c Ratio:	1.75											

Lanes, Volumes, Timings
5: Trafalgar Rd & Cross Ave/South Service Rd

FT 2038 AM.syn
04-03-2024

Intersection Signal Delay: 200.7	Intersection LOS: F
Intersection Capacity Utilization 118.3%	ICU Level of Service H
Analysis Period (min) 15	
~ Volume exceeds capacity, queue is theoretically infinite.	
Queue shown is maximum after two cycles.	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	
m Volume for 95th percentile queue is metered by upstream signal.	

Splits and Phases: 5: Trafalgar Rd & Cross Ave/South Service Rd



HCM Signalized Intersection Capacity Analysis
5: Trafalgar Rd & Cross Ave/South Service Rd

FT 2038 AM.syn
04-03-2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔	↔		↔	↔	↔	↔↔↔	↔↔↔	↔	↔↔	↔↔	↔
Traffic Volume (vph)	1382	99	196	46	71	114	172	1323	30	243	1840	308
Future Volume (vph)	1382	99	196	46	71	114	172	1323	30	243	1840	308
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.3	3.6	3.5	3.3	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	1.00		1.00	1.00	1.00	1.00	0.91		1.00	0.91	
Frpb, ped/bikes	1.00	0.99		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	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.90		1.00	1.00	0.85	1.00	1.00		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	2795	1380		1520	1583	1362	1428	4498		1525	4406	
Flt Permitted	0.95	1.00		0.57	1.00	1.00	0.09	1.00		0.08	1.00	
Satd. Flow (perm)	2795	1380		905	1583	1362	137	4498		134	4406	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1502	108	213	50	77	124	187	1438	33	264	2000	335
RTOR Reduction (vph)	0	53	0	0	0	109	0	2	0	0	17	0
Lane Group Flow (vph)	1502	268	0	50	77	15	187	1469	0	264	2318	0
Confl. Peds. (#/hr)	1		4	4		1	10		52	52		10
Heavy Vehicles (%)	9%	6%	12%	3%	8%	4%	10%	3%	0%	3%	3%	4%
Turn Type	Prot	NA		pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases				8		8	2			6		
Actuated Green, G (s)	40.0	44.5		25.5	13.5	13.5	57.5	44.0		65.5	48.0	
Effective Green, g (s)	43.0	47.5		25.5	16.5	16.5	57.5	47.0		65.5	51.0	
Actuated g/C Ratio	0.31	0.34		0.18	0.12	0.12	0.41	0.34		0.47	0.36	
Clearance Time (s)	7.0	7.0		4.0	7.0	7.0	4.0	7.0		4.0	7.0	
Vehicle Extension (s)	3.0	4.0		3.5	4.0	4.0	3.0	5.0		3.0	5.0	
Lane Grp Cap (vph)	858	468		217	186	160	180	1510		236	1605	
v/s Ratio Prot	c0.54	c0.19		0.02	0.05		0.10	0.33		c0.14	c0.53	
v/s Ratio Perm				0.02		0.01	0.33			0.38		
v/c Ratio	1.75	0.57		0.23	0.41	0.09	1.04	0.97		1.12	1.44	
Uniform Delay, d1	48.5	37.9		48.4	57.3	55.1	41.5	45.9		44.3	44.5	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.38	1.26		1.15	1.16	
Incremental Delay, d2	342.6	2.0		0.6	2.0	0.3	54.1	9.9		59.2	200.4	
Delay (s)	391.1	40.0		49.1	59.3	55.4	111.3	67.9		110.1	251.8	
Level of Service	F	D		D	E	E	F	E		F	F	
Approach Delay (s)		329.3			55.3			72.8			237.4	
Approach LOS		F			E			E			F	
Intersection Summary												
HCM 2000 Control Delay			213.5									F
HCM 2000 Volume to Capacity ratio			1.43									
Actuated Cycle Length (s)			140.0								16.0	
Intersection Capacity Utilization			118.3%									H
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
6: Trafalgar Rd & Cornwall Rd

FT 2038 AM.syn
04-03-2024

	↖	→	↗	↖	←	↖	↗	↖	↗	↖	↗	↖
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖↗	↖↗		↖↗	↖↗	↖↗	↖↗	↖↗		↖↗	↖↗	↖↗
Traffic Volume (vph)	347	550	93	72	613	569	116	595	79	863	954	280
Future Volume (vph)	347	550	93	72	613	569	116	595	79	863	954	280
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.5
Storage Length (m)	80.0		0.0	80.0		0.0	25.0		0.0	80.0		0.0
Storage Lanes	2		0	1		1	1		0	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	0.97	0.95	0.95	1.00	0.95	1.00	1.00	*0.80	0.95	0.97	*0.80	1.00
Ped Bike Factor	0.99	0.99		0.99		0.98	1.00	1.00		0.99		0.98
Frt		0.978				0.850		0.982				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2987	3052	0	1481	3154	1411	1540	2652	0	2929	1341	1356
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2945	3052	0	1472	3154	1384	1535	2652	0	2888	1341	1324
Right Turn on Red			Yes			Yes		Yes			Yes	
Satd. Flow (RTOR)		13				498		8				166
Link Speed (k/h)		50			50			50				50
Link Distance (m)		285.8			142.3			311.4				130.3
Travel Time (s)		20.6			10.2			22.4				9.4
Confl. Peds. (#/hr)	25		7	7		25	9		18	18		9
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
Heavy Vehicles (%)	2%	4%	1%	6%	3%	3%	2%	1%	0%	4%	2%	6%
Adj. Flow (vph)	377	598	101	78	666	618	126	647	86	938	1037	304
Shared Lane Traffic (%)												
Lane Group Flow (vph)	377	699	0	78	666	618	126	733	0	938	1037	304
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		6.6			6.6			6.6			6.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.19	1.14	1.14	1.19	1.14	1.14	1.19	1.14	1.14	1.19	1.14	1.16
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2	1	1		1	2		1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0		2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6		2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

Lanes, Volumes, Timings
6: Trafalgar Rd & Cornwall Rd

FT 2038 AM.syn
04-03-2024

	↖	→	↗	↖	←	↖	↗	↖	↗	↖	↗	↖
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0						0.0	
Turn Type	Prot	NA		Prot	NA	Free	Prot	NA		Prot	NA	Perm
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases					Free							6
Detector Phases	3	8		7	4		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	7.0	10.0		7.0	10.0		7.0	20.0		7.0	20.0	20.0
Minimum Split (s)	12.0	37.0		12.0	37.0		12.0	39.0		12.0	39.0	39.0
Total Split (s)	16.0	39.0		14.0	37.0		13.0	42.0		45.0	74.0	74.0
Total Split (%)	11.4%	27.9%		10.0%	26.4%		9.3%	30.0%		32.1%	52.9%	52.9%
Maximum Green (s)	11.0	32.0		9.0	30.0		8.0	35.0		40.0	67.0	67.0
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	4.0
All-Red Time (s)	2.0	3.0		2.0	3.0		2.0	3.0		2.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-3.0		-1.0	-3.0		-1.0	-3.0		-1.0	-3.0	-3.0
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	0.2	0.2		0.2	0.2		0.2	0.2		0.2	0.2	0.2
Recall Mode	Max	Max		Max	Max		None	C-Max		Max	C-Max	C-Max
Walk Time (s)		7.0			7.0			7.0			7.0	7.0
Flash Dont Walk (s)		23.0			23.0			25.0			25.0	25.0
Pedestrian Calls (#/hr)		0			0			0			0	0
Act Effct Green (s)	12.0	35.0		10.0	33.0	140.0	9.0	38.0		41.0	70.0	70.0
Actuated g/C Ratio	0.09	0.25		0.07	0.24	1.00	0.06	0.27		0.29	0.50	0.50
v/c Ratio	1.47	0.91		0.74	0.90	0.45	1.27	1.01		1.09	1.55	0.41
Control Delay	275.3	66.2		101.2	67.7	1.0	230.5	85.8		114.4	276.9	11.6
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	275.3	66.2		101.2	67.7	1.0	230.5	85.8		114.4	276.9	11.6
LOS	F	E		F	E	A	F	F		F	F	B
Approach Delay		139.5			39.4			107.0			174.6	
Approach LOS		F			D			F			F	
Queue Length 50th (m)	-77.6	102.9		22.7	99.7	0.0	-46.3	-135.5		-163.4	-518.8	21.7
Queue Length 95th (m)	#111.2	#139.2		#50.9	#134.1	0.0	#89.8	#188.6		m112.0	m#322.2	m14.3
Internal Link Dist (m)		261.8			118.3			287.4			106.3	
Turn Bay Length (m)	80.0			80.0			25.0			80.0		
Base Capacity (vph)	256	772		105	743	1384	99	725		857	670	745
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	0
Reduced v/c Ratio	1.47	0.91		0.74	0.90	0.45	1.27	1.01		1.09	1.55	0.41

Intersection Summary

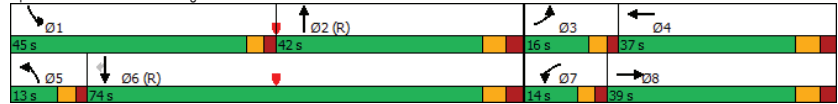
Area Type: CBD
 Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green, Master Intersection
 Natural Cycle: 150
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.55

Lanes, Volumes, Timings
6: Trafalgar Rd & Cornwall Rd

FT 2038 AM.syn
04-03-2024

Intersection Signal Delay: 124.4	Intersection LOS: F
Intersection Capacity Utilization 112.3%	ICU Level of Service H
Analysis Period (min) 15	
* User Entered Value	
~ Volume exceeds capacity, queue is theoretically infinite. Queue shown is maximum after two cycles.	
# 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.	
m Volume for 95th percentile queue is metered by upstream signal.	

Splits and Phases: 6: Trafalgar Rd & Cornwall Rd



HCM Signalized Intersection Capacity Analysis
6: Trafalgar Rd & Cornwall Rd

FT 2038 AM.syn
04-03-2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔	↕↕	↔	↔	↕↕	↔	↔↔	↕↕	↔	↔↔	↕↕	↔↔
Traffic Volume (vph)	347	550	93	72	613	569	116	595	79	863	954	280
Future Volume (vph)	347	550	93	72	613	569	116	595	79	863	954	280
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.5
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.97	0.95		1.00	0.95	1.00	1.00	*0.80		0.97	*0.80	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.98	1.00	1.00		1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	2987	3053		1481	3154	1384	1540	2653		2929	1341	1324
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	2987	3053		1481	3154	1384	1540	2653		2929	1341	1324
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	377	598	101	78	666	618	126	647	86	938	1037	304
RTOR Reduction (vph)	0	10	0	0	0	0	0	6	0	0	0	83
Lane Group Flow (vph)	377	689	0	78	666	618	126	727	0	938	1037	221
Confl. Peds. (#/hr)	25		7	7		25	9		18	18		9
Heavy Vehicles (%)	2%	4%	1%	6%	3%	3%	2%	1%	0%	4%	2%	6%
Turn Type	Prot	NA		Prot	NA	Free	Prot	NA		Prot	NA	Perm
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases						Free						6
Actuated Green, G (s)	11.0	32.0		9.0	30.0	140.0	8.0	35.0		40.0	67.0	67.0
Effective Green, g (s)	12.0	35.0		10.0	33.0	140.0	9.0	38.0		41.0	70.0	70.0
Actuated g/C Ratio	0.09	0.25		0.07	0.24	1.00	0.06	0.27		0.29	0.50	0.50
Clearance Time (s)	5.0	7.0		5.0	7.0		5.0	7.0		5.0	7.0	7.0
Vehicle Extension (s)	0.2	0.2		0.2	0.2		0.2	0.2		0.2	0.2	0.2
Lane Grp Cap (vph)	256	763		105	743	1384	99	720		857	670	662
v/s Ratio Prot	c0.13	c0.23		0.05	0.21		0.08	0.27		c0.32	c0.77	
v/s Ratio Perm						c0.45						0.17
v/c Ratio	1.47	0.90		0.74	0.90	0.45	1.27	1.01		1.09	1.55	0.33
Uniform Delay, d1	64.0	50.9		63.7	51.8	0.0	65.5	51.0		49.5	35.0	21.0
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.60	1.10	1.21
Incremental Delay, d2	232.7	16.1		37.4	15.7	1.0	180.4	36.0		44.6	247.2	0.1
Delay (s)	296.7	67.0		101.2	67.5	1.0	245.9	87.0		123.8	285.6	25.6
Level of Service	F	E		F	E	A	F	F		F	F	C
Approach Delay (s)		147.5			39.3			110.3			184.3	
Approach LOS		F			D			F			F	
Intersection Summary												
HCM 2000 Control Delay		130.4									F	
HCM 2000 Volume to Capacity ratio		1.36										
Actuated Cycle Length (s)		140.0				Sum of lost time (s)		16.0				
Intersection Capacity Utilization		112.3%				ICU Level of Service		H				
Analysis Period (min)		15										
c Critical Lane Group												

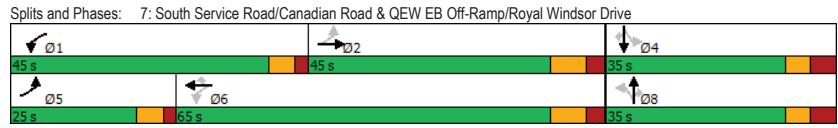
Lanes, Volumes, Timings
7: South Service Road/Canadian Road & QEW EB Off-Ramp/Royal Windsor Drive FT 2038 AM.syn 04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	50	619	34	101	609	8	3	9	57	4	22	32
Future Volume (vph)	50	619	34	101	609	8	3	9	57	4	22	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	150.0	0.0	155.0		70.0	15.0			0.0	0.0		30.0
Storage Lanes	2	0	1		1	1			1	1		1
Taper Length (m)	7.5		7.5		7.5				7.5			7.5
Lane Util. Factor	0.97	0.95	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.992				0.850			0.850			0.850
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3400	3300	0	1719	3139	1380	1805	1667	1468	1805	1792	1495
Fit Permitted	0.389			0.341			0.742			0.751		
Satd. Flow (perm)	1392	3300	0	617	3139	1380	1410	1667	1468	1427	1792	1495
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5				94			152			152
Link Speed (k/h)	80			80			60			40		
Link Distance (m)	324.5			247.2			158.7			215.5		
Travel Time (s)	14.6			11.1			9.5			19.4		
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
Heavy Vehicles (%)	3%	9%	0%	5%	15%	17%	0%	14%	10%	0%	6%	8%
Adj. Flow (vph)	54	673	37	110	662	9	3	10	62	4	24	35
Shared Lane Traffic (%)												
Lane Group Flow (vph)	54	710	0	110	662	9	3	10	62	4	24	35
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Right	Right	Left	Left	Right
Median Width(m)	7.2			7.2			3.6			3.6		
Link Offset(m)	0.0			0.0			0.0			0.0		
Crosswalk Width(m)	4.8			4.8			4.8			4.8		
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	CI+Ex	CI+Ex		CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		CI+Ex			CI+Ex			CI+Ex			CI+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	

Lanes, Volumes, Timings
7: South Service Road/Canadian Road & QEW EB Off-Ramp/Royal Windsor Drive FT 2038 AM.syn 04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	2			6		6	8		8	4		4
Detector Phase	5	2		1	6	6	8	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	8.0	20.0		8.0	30.0	30.0	8.0	8.0	8.0	10.0	10.0	10.0
Minimum Split (s)	14.0	34.0		14.0	38.4	38.4	28.8	28.8	28.8	35.0	35.0	35.0
Total Split (s)	25.0	45.0		45.0	65.0	65.0	35.0	35.0	35.0	35.0	35.0	35.0
Total Split (%)	20.0%	36.0%		36.0%	52.0%	52.0%	28.0%	28.0%	28.0%	28.0%	28.0%	28.0%
Maximum Green (s)	19.0	36.6		39.0	56.6	56.6	27.2	27.2	27.2	27.2	27.2	27.2
Yellow Time (s)	4.0	5.4		4.0	5.4	5.4	3.7	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	2.0	3.0		2.0	3.0	3.0	4.1	4.1	4.1	4.1	4.1	4.1
Lost Time Adjust (s)	-2.0	-4.4		-2.0	-4.4	-4.4	-3.8	-3.8	-3.8	-3.8	-3.8	-3.8
Total Lost Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lead	Lag		Lead	Lag	Lag						
Lead-Lag Optimize?												
Vehicle Extension (s)	3.5	4.5		3.5	6.0	6.0	3.5	3.5	3.5	3.5	3.5	3.5
Recall Mode	None	Max		None	Max	Max	None	None	None	None	None	None
Walk Time (s)	10.0			10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Flash Dont Walk (s)		10.0			10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Pedestrian Calls (#/hr)		0			0	0	0	0	0	0	0	0
Act Effct Green (s)	71.5	61.5		72.6	65.8	65.8	13.4	13.4	13.4	13.9	13.9	13.9
Actuated g/C Ratio	0.77	0.66		0.78	0.70	0.70	0.14	0.14	0.14	0.15	0.15	0.15
v/c Ratio	0.04	0.33		0.18	0.30	0.01	0.01	0.04	0.18	0.02	0.09	0.10
Control Delay	2.7	8.2		3.3	7.8	0.0	36.0	36.4	1.2	36.0	37.1	0.6
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	2.7	8.2		3.3	7.8	0.0	36.0	36.4	1.2	36.0	37.1	0.6
LOS	A	A		A	A	A	D	D	A	D	D	A
Approach Delay		7.8			7.1			7.3				16.7
Approach LOS		A			A			A				B
Queue Length 50th (m)	0.9	31.3		4.1	29.2	0.0	0.5	1.7	0.0	0.7	4.2	0.0
Queue Length 95th (m)	2.1	42.2		7.7	39.2	0.0	3.1	6.7	0.0	3.8	11.7	0.0
Internal Link Dist (m)		300.5			223.2			134.7			191.5	
Turn Bay Length (m)	150.0			155.0		70.0	15.0					30.0
Base Capacity (vph)	1581	2173		985	2210	999	470	555	591	475	597	600
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.33		0.11	0.30	0.01	0.01	0.02	0.10	0.01	0.04	0.06
Intersection Summary												
Area Type:	Other											
Cycle Length:	125											
Actuated Cycle Length:	93.4											
Natural Cycle:	90											
Control Type:	Semi Act-Uncoord											
Maximum v/c Ratio:	0.33											
Intersection Signal Delay:	7.8											
Intersection Capacity Utilization:	50.0%						Intersection LOS: A					
Analysis Period (min):	15											
ICU Level of Service:	A											

Lanes, Volumes, Timings FT 2038 AM.syn
04-03-2024
7: South Service Road/Canadian Road & QEW EB Off-Ramp/Royal Windsor Drive



HCM Signalized Intersection Capacity Analysis FT 2038 AM.syn
04-03-2024
7: South Service Road/Canadian Road & QEW EB Off-Ramp/Royal Windsor Drive

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	50	619	34	101	609	8	3	9	57	4	22	32
Future Volume (vph)	50	619	34	101	609	8	3	9	57	4	22	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	0.95		1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Fit Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3400	3300		1719	3139	1380	1805	1667	1468	1805	1792	1495
Fit Permitted	0.39	1.00		0.34	1.00	1.00	0.74	1.00	1.00	0.75	1.00	1.00
Satd. Flow (perm)	1391	3300		617	3139	1380	1409	1667	1468	1427	1792	1495
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	54	673	37	110	662	9	3	10	62	4	24	35
RTOR Reduction (vph)	0	2	0	0	0	3	0	0	55	0	0	31
Lane Group Flow (vph)	54	708	0	110	662	6	3	10	7	4	24	4
Heavy Vehicles (%)	3%	9%	0%	5%	15%	17%	0%	14%	10%	0%	6%	8%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8				4
Permitted Phases	2			6		6	8		8	4		4
Actuated Green, G (s)	64.7	58.5		68.5	60.4	60.4	7.7	7.7	7.7	7.7	7.7	7.7
Effective Green, g (s)	68.7	62.9		72.5	64.8	64.8	11.5	11.5	11.5	11.5	11.5	11.5
Actuated g/C Ratio	0.71	0.65		0.75	0.67	0.67	0.12	0.12	0.12	0.12	0.12	0.12
Clearance Time (s)	6.0	8.4		6.0	8.4	8.4	7.8	7.8	7.8	7.8	7.8	7.8
Vehicle Extension (s)	3.5	4.5		3.5	6.0	6.0	3.5	3.5	3.5	3.5	3.5	3.5
Lane Grp Cap (vph)	1160	2150		578	2107	926	167	198	174	170	213	178
v/s Ratio Prot	0.00	c0.21		c0.02	0.21			0.01			c0.01	
v/s Ratio Perm	0.03			0.12		0.00	0.00		0.01	0.00		0.00
v/c Ratio	0.05	0.33		0.19	0.31	0.01	0.02	0.05	0.04	0.02	0.11	0.02
Uniform Delay, d1	4.1	7.4		3.5	6.6	5.2	37.5	37.7	37.6	37.5	37.9	37.5
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.0	0.4		0.2	0.4	0.0	0.1	0.1	0.1	0.1	0.3	0.1
Delay (s)	4.1	7.9		3.7	7.0	5.2	37.6	37.8	37.7	37.6	38.2	37.6
Level of Service	A	A		A	A	A	D	D	D	D	D	D
Approach Delay (s)		7.6			6.5			37.7				37.8
Approach LOS		A			A			D				D
Intersection Summary												
HCM 2000 Control Delay			9.6	HCM 2000 Level of Service				A				
HCM 2000 Volume to Capacity ratio			0.28									
Actuated Cycle Length (s)			96.5	Sum of lost time (s)				12.0				
Intersection Capacity Utilization			50.0%	ICU Level of Service				A				
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
8: QEW WB Off-Ramp & Kerr Street

FT 2038 AM.syn
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Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔↔			↔↔	↔↔	↔↔
Traffic Volume (vph)	530	0	0	322	282	315
Future Volume (vph)	530	0	0	322	282	315
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)		0.0	0.0		0.0	140.0
Storage Lanes		0	0		1	1
Taper Length (m)			7.5		7.5	
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00
Fr						0.850
Flt Protected					0.950	
Satd. Flow (prot)	3539	0	0	3539	1770	1583
Flt Permitted					0.950	
Satd. Flow (perm)	3539	0	0	3539	1770	1583
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)						164
Link Speed (k/h)	60			60	40	
Link Distance (m)	128.8			184.7	258.8	
Travel Time (s)	7.7			11.1	23.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	576	0	0	350	307	342
Shared Lane Traffic (%)						
Lane Group Flow (vph)	576	0	0	350	307	342
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)		15	25		25	15
Turn Type	NA			NA	Prot	Perm
Protected Phases	4			8	2	
Permitted Phases						2
Minimum Split (s)				22.5	22.5	22.5
Total Split (s)				22.5	22.5	22.5
Total Split (%)	50.0%			50.0%	50.0%	50.0%
Maximum Green (s)	18.0			18.0	18.0	18.0
Yellow Time (s)	3.5			3.5	3.5	3.5
All-Red Time (s)	1.0			1.0	1.0	1.0
Lost Time Adjust (s)	0.0			0.0	0.0	0.0
Total Lost Time (s)	4.5			4.5	4.5	4.5
Lead/Lag						
Lead-Lag Optimize?						
Walk Time (s)	7.0			7.0	7.0	7.0
Flash Dont Walk (s)	11.0			11.0	11.0	11.0
Pedestrian Calls (#/hr)	0			0	0	0
Act Effct Green (s)	18.0			18.0	18.0	18.0
Actuated g/C Ratio	0.40			0.40	0.40	0.40
v/c Ratio	0.41			0.25	0.43	0.47

Lanes, Volumes, Timings
8: QEW WB Off-Ramp & Kerr Street

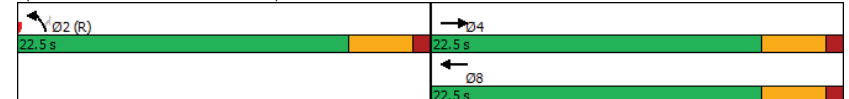
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Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Control Delay	10.8			9.6	12.2	7.7
Queue Delay	0.0			0.0	0.0	0.0
Total Delay	10.8			9.6	12.2	7.7
LOS	B			A	B	A
Approach Delay	10.8			9.6	9.8	
Approach LOS	B			A	A	
Queue Length 50th (m)	16.9			9.5	17.4	9.4
Queue Length 95th (m)	26.9			16.5	33.3	24.5
Internal Link Dist (m)	104.8			160.7	234.8	
Turn Bay Length (m)						140.0
Base Capacity (vph)	1415			1415	708	731
Starvation Cap Reductn	0			0	0	0
Spillback Cap Reductn	0			0	0	0
Storage Cap Reductn	0			0	0	0
Reduced v/c Ratio	0.41			0.25	0.43	0.47

Intersection Summary

Area Type: Other
 Cycle Length: 45
 Actuated Cycle Length: 45
 Offset: 0 (0%), Referenced to phase 2:NBL and 6:, Start of Green
 Natural Cycle: 45
 Control Type: Pretimed
 Maximum v/c Ratio: 0.47
 Intersection Signal Delay: 10.1
 Intersection Capacity Utilization 41.7%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service A

Splits and Phases: 8: QEW WB Off-Ramp & Kerr Street



HCM Signalized Intersection Capacity Analysis
8: QEW WB Off-Ramp & Kerr Street

FT 2038 AM.syn
04-03-2024

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔↔			↔↔	↔↔	↔↔
Traffic Volume (vph)	530	0	0	322	282	315
Future Volume (vph)	530	0	0	322	282	315
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5			4.5	4.5	4.5
Lane Util. Factor	0.95			0.95	1.00	1.00
Fr _t	1.00			1.00	1.00	0.85
Fl _t Protected	1.00			1.00	0.95	1.00
Satd. Flow (prot)	3539			3539	1770	1583
Fl _t Permitted	1.00			1.00	0.95	1.00
Satd. Flow (perm)	3539			3539	1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	576	0	0	350	307	342
RTOR Reduction (vph)	0	0	0	0	0	98
Lane Group Flow (vph)	576	0	0	350	307	244
Turn Type	NA			NA	Prot	Perm
Protected Phases	4			8	2	
Permitted Phases						2
Actuated Green, G (s)	18.0			18.0	18.0	18.0
Effective Green, g (s)	18.0			18.0	18.0	18.0
Actuated g/C Ratio	0.40			0.40	0.40	0.40
Clearance Time (s)	4.5			4.5	4.5	4.5
Lane Grp Cap (vph)	1415			1415	708	633
v/s Ratio Prot	c0.16			0.10	c0.17	
v/s Ratio Perm						0.15
v/c Ratio	0.41			0.25	0.43	0.38
Uniform Delay, d1	9.7			9.0	9.8	9.6
Progression Factor	1.00			1.00	1.00	1.00
Incremental Delay, d2	0.9			0.4	1.9	1.8
Delay (s)	10.5			9.4	11.7	11.3
Level of Service	B			A	B	B
Approach Delay (s)	10.5			9.4	11.5	
Approach LOS	B			A	B	
Intersection Summary						
HCM 2000 Control Delay		10.7		HCM 2000 Level of Service		B
HCM 2000 Volume to Capacity ratio		0.42				
Actuated Cycle Length (s)		45.0		Sum of lost time (s)		9.0
Intersection Capacity Utilization		41.7%		ICU Level of Service		A
Analysis Period (min)		15				
c Critical Lane Group						

Lanes, Volumes, Timings
9: Dorval Drive & QEW WB Off-Ramp

FT 2038 AM.syn
04-03-2024

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔↔	↔	↔↔			↔↔
Traffic Volume (vph)	992	462	568	0	0	1583
Future Volume (vph)	992	462	568	0	0	1583
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	190.0		0.0	0.0	
Storage Lanes	2	1		0	0	
Taper Length (m)	7.5				7.5	
Lane Util. Factor	0.97	0.91	0.95	1.00	1.00	0.95
Fr _t	0.993	0.850				
Fl _t Protected	0.954					
Satd. Flow (prot)	3423	1441	3539	0	0	3539
Fl _t Permitted	0.954					
Satd. Flow (perm)	3423	1441	3539	0	0	3539
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)	4	278				
Link Speed (k/h)	40		60			60
Link Distance (m)	325.1		310.2			266.9
Travel Time (s)	29.3		18.6			16.0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1078	502	617	0	0	1721
Shared Lane Traffic (%)		10%				
Lane Group Flow (vph)	1128	452	617	0	0	1721
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	7.2		0.0		0.0	0.0
Link Offset(m)	0.0		0.0		0.0	0.0
Crosswalk Width(m)	4.8		4.8		4.8	4.8
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15		15	25	
Number of Detectors	1	1	2			2
Detector Template	Left	Right	Thru			Thru
Leading Detector (m)	2.0	2.0	10.0			10.0
Trailing Detector (m)	0.0	0.0	0.0			0.0
Detector 1 Position(m)	0.0	0.0	0.0			0.0
Detector 1 Size(m)	2.0	2.0	0.6			0.6
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0			0.0
Detector 1 Queue (s)	0.0	0.0	0.0			0.0
Detector 1 Delay (s)	0.0	0.0	0.0			0.0
Detector 2 Position(m)			9.4			9.4
Detector 2 Size(m)			0.6			0.6
Detector 2 Type			Cl+Ex			Cl+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type		Prot	Perm	NA		NA
Protected Phases		8		2		6
Permitted Phases		8				

Lanes, Volumes, Timings
9: Dorval Drive & QEW WB Off-Ramp

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Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Detector Phase	8	8	2			6
Switch Phase						
Minimum Initial (s)	10.0	10.0	20.0			20.0
Minimum Split (s)	24.0	24.0	26.0			26.0
Total Split (s)	45.6	45.6	74.4			74.4
Total Split (%)	38.0%	38.0%	62.0%			62.0%
Maximum Green (s)	39.6	39.6	68.4			68.4
Yellow Time (s)	4.0	4.0	4.0			4.0
All-Red Time (s)	2.0	2.0	2.0			2.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0			-2.0
Total Lost Time (s)	4.0	4.0	4.0			4.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	4.5	4.5	5.0			5.0
Recall Mode	None	None	Max			Max
Walk Time (s)	5.0	5.0	7.0			7.0
Flash Dont Walk (s)	7.0	7.0	11.0			11.0
Pedestrian Calls (#/hr)	0	0	0			0
Act Effct Green (s)	41.6	41.6	70.4			70.4
Actuated g/C Ratio	0.35	0.35	0.59			0.59
v/c Ratio	0.95	0.66	0.30			0.83
Control Delay	54.8	17.5	12.9			24.4
Queue Delay	0.0	0.0	0.0			0.0
Total Delay	54.8	17.5	12.9			24.4
LOS	D	B	B			C
Approach Delay	44.1		12.9			24.4
Approach LOS	D		B			C
Queue Length 50th (m)	139.0	38.9	38.0			171.0
Queue Length 95th (m)	#184.4	82.5	49.1			205.9
Internal Link Dist (m)	301.1		286.2			242.9
Turn Bay Length (m)		190.0				
Base Capacity (vph)	1189	681	2076			2076
Starvation Cap Reductn	0	0	0			0
Spillback Cap Reductn	0	0	0			0
Storage Cap Reductn	0	0	0			0
Reduced v/c Ratio	0.95	0.66	0.30			0.83

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Natural Cycle: 70
 Control Type: Semi Act-Uncoord
 Maximum v/c Ratio: 0.95
 Intersection Signal Delay: 30.6
 Intersection Capacity Utilization 83.6%
 Intersection LOS: C
 ICU Level of Service E
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Lanes, Volumes, Timings
9: Dorval Drive & QEW WB Off-Ramp

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Signals and Phases: 9: Dorval Drive & QEW WB Off-Ramp



HCM Signalized Intersection Capacity Analysis
9: Dorval Drive & QEWB WB Off-Ramp

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Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔↔	↔	↕↕			↕↕
Traffic Volume (vph)	992	462	568	0	0	1583
Future Volume (vph)	992	462	568	0	0	1583
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0			4.0
Lane Util. Factor	0.97	0.91	0.95			0.95
Fr	0.99	0.85	1.00			1.00
Fit Protected	0.95	1.00	1.00			1.00
Satd. Flow (prot)	3426	1441	3539			3539
Fit Permitted	0.95	1.00	1.00			1.00
Satd. Flow (perm)	3426	1441	3539			3539
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1078	502	617	0	0	1721
RTOR Reduction (vph)	3	182	0	0	0	0
Lane Group Flow (vph)	1125	270	617	0	0	1721
Turn Type	Prot	Perm	NA			NA
Protected Phases	8		2			6
Permitted Phases	8					
Actuated Green, G (s)	39.6	39.6	68.4			68.4
Effective Green, g (s)	41.6	41.6	70.4			70.4
Actuated g/C Ratio	0.35	0.35	0.59			0.59
Clearance Time (s)	6.0	6.0	6.0			6.0
Vehicle Extension (s)	4.5	4.5	5.0			5.0
Lane Grp Cap (vph)	1187	499	2076			2076
v/s Ratio Prot	c0.33		0.17			c0.49
v/s Ratio Perm		0.19				
v/c Ratio	0.95	0.54	0.30			0.83
Uniform Delay, d1	38.1	31.5	12.4			20.0
Progression Factor	1.00	1.00	1.00			1.00
Incremental Delay, d2	15.5	1.8	0.4			4.0
Delay (s)	53.6	33.3	12.8			24.0
Level of Service	D	C	B			C
Approach Delay (s)	47.8		12.8			24.0
Approach LOS	D		B			C

Intersection Summary				
HCM 2000 Control Delay		31.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio		0.87		
Actuated Cycle Length (s)		120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization		83.6%	ICU Level of Service	E
Analysis Period (min)		15		

c Critical Lane Group

Lanes, Volumes, Timings
10: Dorval Drive & QEWB EB Off-Ramp

FT 2038 AM.syn
04-03-2024

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔↔	↔		↕↕	↕↕	
Traffic Volume (vph)	146	578	0	799	1711	0
Future Volume (vph)	146	578	0	799	1711	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	175.0	0.0	0.0			0.0
Storage Lanes	1	1	0			0
Taper Length (m)	7.5		7.5			
Lane Util. Factor	0.97	0.91	1.00	0.95	0.95	1.00
Fr	0.900	0.850				
Fit Protected	0.983					
Satd. Flow (prot)	3197	1441	0	3539	3539	0
Fit Permitted	0.983					
Satd. Flow (perm)	3197	1441	0	3539	3539	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	14	14				
Link Speed (k/h)	40			60	60	
Link Distance (m)	275.5			164.3	310.2	
Travel Time (s)	24.8			9.9	18.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	159	628	0	868	1860	0
Shared Lane Traffic (%)	50%					
Lane Group Flow (vph)	473	314	0	868	1860	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	7.2			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Number of Detectors	1	1		2	2	
Detector Template	Left	Right		Thru	Thru	
Leading Detector (m)	2.0	2.0		10.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	2.0		0.6	0.6	
Detector 1 Type	CI+Ex	CI+Ex		CI+Ex	CI+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	
Detector 2 Position(m)				9.4	9.4	
Detector 2 Size(m)				0.6	0.6	
Detector 2 Type				CI+Ex	CI+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Prot	Perm		NA	NA	
Protected Phases	4			2	6	
Permitted Phases	4					

Lanes, Volumes, Timings
10: Dorval Drive & QEW EB Off-Ramp

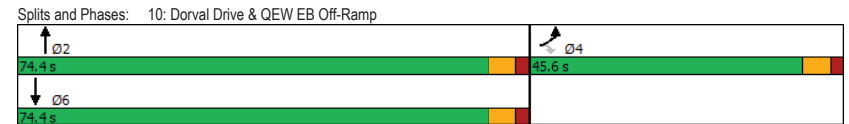
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Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Detector Phase	4	4		2	6	
Switch Phase						
Minimum Initial (s)	10.0	10.0		20.0	20.0	
Minimum Split (s)	24.0	24.0		26.0	26.0	
Total Split (s)	45.6	45.6		74.4	74.4	
Total Split (%)	38.0%	38.0%		62.0%	62.0%	
Maximum Green (s)	39.6	39.6		68.4	68.4	
Yellow Time (s)	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	4.0	4.0		5.0	5.0	
Recall Mode	None	None		Max	Max	
Walk Time (s)	0.0	0.0		7.0	7.0	
Flash Dont Walk (s)	7.0	7.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0	
Act Effct Green (s)	31.1	31.1		70.7	70.7	
Actuated g/C Ratio	0.28	0.28		0.64	0.64	
v/c Ratio	0.52	0.75		0.38	0.82	
Control Delay	33.6	45.7		10.8	20.1	
Queue Delay	0.0	0.0		0.0	0.0	
Total Delay	33.6	45.7		10.8	20.1	
LOS	C	D		B	C	
Approach Delay	38.5			10.8	20.1	
Approach LOS	D			B	C	
Queue Length 50th (m)	44.6	67.4		45.1	153.6	
Queue Length 95th (m)	59.9	103.5		73.0	241.1	
Internal Link Dist (m)	251.5			140.3	286.2	
Turn Bay Length (m)	175.0					
Base Capacity (vph)	1224	556		2277	2277	
Starvation Cap Reductn	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	
Storage Cap Reductn	0	0		0	0	
Reduced v/c Ratio	0.39	0.56		0.38	0.82	

Intersection Summary	
Area Type:	Other
Cycle Length:	120
Actuated Cycle Length:	109.9
Natural Cycle:	60
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.82
Intersection Signal Delay:	21.9
Intersection Capacity Utilization:	83.6%
Intersection LOS:	C
ICU Level of Service:	E
Analysis Period (min):	15

Lanes, Volumes, Timings
10: Dorval Drive & QEW EB Off-Ramp

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HCM Signalized Intersection Capacity Analysis
10: Dorval Drive & QEW EB Off-Ramp

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Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	146	578	0	799	1711	0
Future Volume (vph)	146	578	0	799	1711	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	0.91		0.95	0.95	
Fr _t	0.90	0.85		1.00	1.00	
Fit Protected	0.98	1.00		1.00	1.00	
Satd. Flow (prot)	3200	1441		3539	3539	
Fit Permitted	0.98	1.00		1.00	1.00	
Satd. Flow (perm)	3200	1441		3539	3539	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	159	628	0	868	1860	0
RTOR Reduction (vph)	10	10	0	0	0	0
Lane Group Flow (vph)	463	304	0	868	1860	0
Turn Type	Prot	Perm		NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4				
Actuated Green, G (s)	29.1	29.1		68.7	68.7	
Effective Green, g (s)	31.1	31.1		70.7	70.7	
Actuated g/C Ratio	0.28	0.28		0.64	0.64	
Clearance Time (s)	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	4.0	4.0		5.0	5.0	
Lane Grp Cap (vph)	906	408		2278	2278	
v/s Ratio Prot	0.14			0.25	c0.53	
v/s Ratio Perm		c0.21				
v/c Ratio	0.51	0.75		0.38	0.82	
Uniform Delay, d1	33.0	35.7		9.2	14.7	
Progression Factor	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.6	7.7		0.5	3.4	
Delay (s)	33.6	43.4		9.7	18.1	
Level of Service	C	D		A	B	
Approach Delay (s)	37.5			9.7	18.1	
Approach LOS	D			A	B	

Intersection Summary			
HCM 2000 Control Delay	20.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	109.8	Sum of lost time (s)	8.0
Intersection Capacity Utilization	83.6%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
11: Argus Rd & South Service Rd

FT 2038 AM.syn
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Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	21	76	865	293	156	159
Future Volume (vph)	21	76	865	293	156	159
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Fr _t			0.966		0.932	
Fit Protected		0.989			0.976	
Satd. Flow (prot)	0	1390	1616	0	1555	0
Fit Permitted		0.989			0.976	
Satd. Flow (perm)	0	1390	1616	0	1555	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		177.7	145.7		103.5	
Travel Time (s)		12.8	10.5		7.5	
Confl. Peds. (#/hr)	1			1	5	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	100%	0%	3%	0%	0%	0%
Adj. Flow (vph)	23	83	940	318	170	173
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	106	1258	0	343	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (k/h)	24			14	24	14
Sign Control		Free	Free		Stop	
Intersection Summary						
Area Type:	CBD					
Control Type:	Unsignalized					
Intersection Capacity Utilization 97.6%				ICU Level of Service F		
Analysis Period (min) 15						

HCM Unsignalized Intersection Capacity Analysis
11: Argus Rd & South Service Rd

FT 2038 AM.syn
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Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	↕
Traffic Volume (veh/h)	21	76	865	293	156	159
Future Volume (Veh/h)	21	76	865	293	156	159
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)	23	83	940	318	170	173
Pedestrians		1	5		1	
Lane Width (m)		3.6	3.6		3.6	
Walking Speed (m/s)		1.2	1.2		1.2	
Percent Blockage		0	0		0	
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)		358				
pX, platoon unblocked						
vC, conflicting volume	1259				1234	1101
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1259				1234	1101
tC, single (s)	5.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	3.1				3.5	3.3
p0 queue free %	93				6	33
cM capacity (veh/h)	319				182	260
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	106	1258	343			
Volume Left	23	0	170			
Volume Right	0	318	173			
eSH	319	1700	214			
Volume to Capacity	0.07	0.74	1.60			
Queue Length 95th (m)	1.9	0.0	175.7			
Control Delay (s)	4.7	0.0	331.5			
Lane LOS	A		F			
Approach Delay (s)	4.7	0.0	331.5			
Approach LOS			F			
Intersection Summary						
Average Delay			66.9			
Intersection Capacity Utilization			97.6%	ICU Level of Service		F
Analysis Period (min)			15			

Lanes, Volumes, Timings
13: GO Bus Terminal/Argus Rd & Cross Ave

FT 2038 AM.syn
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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕
Traffic Volume (vph)	46	1002	19	53	838	67	27	0	64	610	21	275
Future Volume (vph)	46	1002	19	53	838	67	27	0	64	610	21	275
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6
Storage Length (m)	20.0		0.0	20.0		0.0	0.0		0.0	15.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00	1.00			1.00		1.00	0.96		0.98		0.99
Frt		0.997			0.989			0.850				0.861
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1570	3147	0	818	3167	0	805	734	0	1570	1361	0
Fit Permitted	0.291			0.113			0.385			0.711		
Satd. Flow (perm)	481	3147	0	97	3167	0	326	734	0	1150	1361	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3			16			167			147	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		162.8			72.9			81.9			113.6	
Travel Time (s)		11.7			5.2			5.9			8.2	
Confl. Peds. (#/hr)	1		3	3		1	3		20	20		3
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
Heavy Vehicles (%)	0%	1%	100%	92%	1%	5%	95%	0%	91%	0%	93%	0%
Adj. Flow (vph)	50	1089	21	58	911	73	29	0	70	663	23	299
Shared Lane Traffic (%)												
Lane Group Flow (vph)	50	1110	0	58	984	0	29	70	0	663	322	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.3			3.3			3.3			3.3	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.19	1.14	1.14	1.19	1.14	1.14	1.19	1.14	1.14	1.19	1.14	1.14
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

Lanes, Volumes, Timings
13: GO Bus Terminal/Argus Rd & Cross Ave

FT 2038 AM.syn
04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases		2		6				8			4	
Detector Phase	2	2		1	6			8	8		4	4
Switch Phase												
Minimum Initial (s)	22.0	22.0		8.0	22.0			10.0	10.0		10.0	10.0
Minimum Split (s)	45.0	45.0		12.5	29.0			29.0	29.0		29.0	29.0
Total Split (s)	45.5	45.5		12.5	58.0			32.0	32.0		32.0	32.0
Total Split (%)	50.6%	50.6%		13.9%	64.4%			35.6%	35.6%		35.6%	35.6%
Maximum Green (s)	39.5	39.5		8.5	52.0			26.0	26.0		26.0	26.0
Yellow Time (s)	4.0	4.0		3.0	4.0			4.0	4.0		4.0	4.0
All-Red Time (s)	2.0	2.0		1.0	2.0			2.0	2.0		2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0		0.0	-2.0			-2.0	-2.0		-2.0	-2.0
Total Lost Time (s)	4.0	4.0		4.0	4.0			4.0	4.0		4.0	4.0
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Vehicle Extension (s)	5.0	5.0		2.5	5.0			4.0	4.0		4.0	4.0
Recall Mode	Min	Min		Min	Min			Min	Min		Min	Min
Walk Time (s)	7.0	7.0		7.0	7.0			7.0	7.0		7.0	7.0
Flash Dont Walk (s)	16.0	16.0		16.0	16.0			16.0	16.0		16.0	16.0
Pedestrian Calls (#/hr)	0	0		0	0			0	0		0	0
Act Effct Green (s)	39.3	39.3		51.5	51.5			28.1	28.1		28.1	28.1
Actuated g/C Ratio	0.45	0.45		0.59	0.59			0.32	0.32		0.32	0.32
v/c Ratio	0.23	0.79		0.47	0.53			0.28	0.20		1.80	0.60
Control Delay	18.1	25.2		22.8	11.7			32.1	1.3		395.8	19.1
Queue Delay	0.0	0.2		0.0	0.0			0.0	0.0		0.0	0.0
Total Delay	18.1	25.5		22.8	11.7			32.1	1.3		395.8	19.1
LOS	B	C		C	B			C	A		F	B
Approach Delay		25.1			12.3				10.3			272.6
Approach LOS		C			B				B			F
Queue Length 50th (m)	5.2	84.0		4.2	49.1			3.9	0.0		~183.7	25.8
Queue Length 95th (m)	13.8	111.3		12.8	64.8			12.6	0.0		#252.1	55.4
Internal Link Dist (m)		138.8			48.9				57.9			89.6
Turn Bay Length (m)	20.0			20.0							15.0	
Base Capacity (vph)	228	1495		127	1962			104	348		368	535
Starvation Cap Reductn	0	57		0	0			0	0		0	0
Spillback Cap Reductn	0	0		0	0			0	0		0	0
Storage Cap Reductn	0	0		0	0			0	0		0	0
Reduced v/c Ratio	0.22	0.77		0.46	0.50			0.28	0.20		1.80	0.60

Intersection Summary

Area Type:	CBD
Cycle Length:	90
Actuated Cycle Length:	87.6
Natural Cycle:	120
Control Type:	Semi Act-Uncooord
Maximum v/c Ratio:	1.80
Intersection Signal Delay:	94.8
Intersection LOS:	F

Lanes, Volumes, Timings
13: GO Bus Terminal/Argus Rd & Cross Ave

FT 2038 AM.syn
04-03-2024

Intersection Capacity Utilization 99.8%	ICU Level of Service F
Analysis Period (min) 15	
- Volume exceeds capacity, queue is theoretically infinite.	
Queue shown is maximum after two cycles.	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 13: GO Bus Terminal/Argus Rd & Cross Ave



HCM Signalized Intersection Capacity Analysis
13: GO Bus Terminal/Argus Rd & Cross Ave

FT 2038 AM.syn
04-03-2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	46	1002	19	53	838	67	27	0	64	610	21	275
Future Volume (vph)	46	1002	19	53	838	67	27	0	64	610	21	275
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.97		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		0.98	1.00	
Fr t	1.00	1.00		1.00	0.99		1.00	0.85		1.00	0.86	
Fl t Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1570	3148		818	3167		804	735		1538	1360	
Fl t Permitted	0.29	1.00		0.11	1.00		0.38	1.00		0.71	1.00	
Satd. Flow (perm)	481	3148		97	3167		325	735		1152	1360	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	50	1089	21	58	911	73	29	0	70	663	23	299
RTOR Reduction (vph)	0	2	0	0	7	0	0	48	0	0	100	0
Lane Group Flow (vph)	50	1108	0	58	977	0	29	22	0	663	222	0
Confl. Peds. (#/hr)	1		3	3		1	3		20	20		3
Heavy Vehicles (%)	0%	1%	100%	92%	1%	5%	95%	0%	91%	0%	93%	0%
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	37.3	37.3		49.5	49.5		26.0	26.0		26.0	26.0	
Effective Green, g (s)	39.3	39.3		49.5	51.5		28.0	28.0		28.0	28.0	
Actuated g/C Ratio	0.45	0.45		0.57	0.59		0.32	0.32		0.32	0.32	
Clearance Time (s)	6.0	6.0		4.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	5.0	5.0		2.5	5.0		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	216	1413		122	1864		104	235		368	435	
v/s Ratio Prot		c0.35		0.04	c0.31			0.03			0.16	
v/s Ratio Perm	0.10			0.22			0.09			c0.58		
v/c Ratio	0.23	0.78		0.48	0.52		0.28	0.10		1.80	0.51	
Uniform Delay, d1	14.8	20.5		13.0	10.7		22.2	20.9		29.8	24.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.2	3.4		2.1	0.5		2.0	0.2		371.4	1.3	
Delay (s)	16.0	23.9		15.2	11.2		24.2	21.1		401.2	25.5	
Level of Service	B	C		B	B		C	C		F	C	
Approach Delay (s)		23.6			11.4			22.0			278.4	
Approach LOS		C			B			C			F	

Intersection Summary			
HCM 2000 Control Delay	96.0	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.14		
Actuated Cycle Length (s)	87.5	Sum of lost time (s)	12.0
Intersection Capacity Utilization	99.8%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
14: Lyons Lane/Street A & Cross Ave

FT 2038 AM.syn
04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	113	237	259	289	227	24	23	4	17	82	31	120
Future Volume (vph)	113	237	259	289	227	24	23	4	17	82	31	120
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6
Storage Length (m)	0.0	0.0	25.0	0.0	20.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.99	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	0.99		1.00	1.00		1.00	0.99		1.00	0.99	
Fr t		0.922			0.986			0.877			0.881	
Fl t Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1540	2813	0	1570	2726	0	1570	1481	0	1468	1453	0
Fl t Permitted	0.584			0.369			0.563			0.743		
Satd. Flow (perm)	940	2813	0	610	2726	0	928	1481	0	1144	1453	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		282			25			18			130	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		40.1			211.2			69.1			70.9	
Travel Time (s)		2.9			15.2			5.0			5.1	
Confl. Peds. (#/hr)	5		1	1		5	3		3	3		3
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
Heavy Vehicles (%)	2%	11%	0%	0%	19%	0%	0%	0%	0%	7%	0%	3%
Adj. Flow (vph)	123	258	282	314	247	26	25	4	18	89	34	130
Shared Lane Traffic (%)												
Lane Group Flow (vph)	123	540	0	314	273	0	25	22	0	89	164	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.3			3.3			3.3			3.3	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.19	1.14	1.14	1.19	1.14	1.14	1.19	1.14	1.14	1.19	1.14	1.14
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

Lanes, Volumes, Timings
14: Lyons Lane/Street A & Cross Ave

FT 2038 AM.syn
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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases		2		6			8			4		
Detector Phase	2	2		1	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	35.0	35.0		8.0	35.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	41.0	41.0		12.5	41.0		28.0	28.0		28.0	28.0	
Total Split (s)	41.0	41.0		21.0	62.0		28.0	28.0		28.0	28.0	
Total Split (%)	45.6%	45.6%		23.3%	68.9%		31.1%	31.1%		31.1%	31.1%	
Maximum Green (s)	35.0	35.0		17.0	56.0		22.0	22.0		22.0	22.0	
Yellow Time (s)	4.0	4.0		3.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		1.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0		0.0	-2.0		-2.0	-2.0		-2.0	-2.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Vehicle Extension (s)	5.0	5.0		2.5	5.0		4.0	4.0		4.0	4.0	
Recall Mode	Min	Min		Min	Min		Min	Min		Min	Min	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	15.0	15.0		15.0	15.0		15.0	15.0		15.0	15.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	37.2	37.2		52.4	52.4		14.8	14.8		14.8	14.8	
Actuated g/C Ratio	0.49	0.49		0.70	0.70		0.20	0.20		0.20	0.20	
v/c Ratio	0.27	0.35		0.55	0.14		0.14	0.07		0.40	0.42	
Control Delay	14.9	6.7		8.8	4.0		27.5	14.1		32.7	11.8	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	14.9	6.7		8.8	4.0		27.5	14.1		32.7	11.8	
LOS	B	A		A	A		C	B		C	B	
Approach Delay		8.2			6.5			21.2			19.1	
Approach LOS		A			A			C			B	
Queue Length 50th (m)	9.7	10.2		14.1	5.1		3.1	0.5		11.5	4.2	
Queue Length 95th (m)	26.9	25.8		31.6	11.5		10.0	6.4		26.5	20.7	
Internal Link Dist (m)		16.1			187.2			45.1			46.9	
Turn Bay Length (m)				25.0			20.0					
Base Capacity (vph)	464	1533		642	2118		297	487		366	554	
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	0.27	0.35		0.49	0.13		0.08	0.05		0.24	0.30	

Intersection Summary

Area Type: CBD
 Cycle Length: 90
 Actuated Cycle Length: 75.3
 Natural Cycle: 85
 Control Type: Semi Act-Uncoord
 Maximum v/c Ratio: 0.55
 Intersection Signal Delay: 9.8
 Intersection LOS: A

Lanes, Volumes, Timings
14: Lyons Lane/Street A & Cross Ave

FT 2038 AM.syn
04-03-2024

Intersection Capacity Utilization 89.6%
 Analysis Period (min) 15
 ICU Level of Service E

Splits and Phases: 14: Lyons Lane/Street A & Cross Ave



HCM Signalized Intersection Capacity Analysis
14: Lyons Lane/Street A & Cross Ave

FT 2038 AM.syn
04-03-2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	113	237	259	289	227	24	23	4	17	82	31	120
Future Volume (vph)	113	237	259	289	227	24	23	4	17	82	31	120
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	0.99	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	0.88		1.00	0.88	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1531	2813		1570	2725		1567	1482		1463	1454	
Flt Permitted	0.58	1.00		0.37	1.00		0.56	1.00		0.74	1.00	
Satd. Flow (perm)	940	2813		610	2725		928	1482		1144	1454	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	123	258	282	314	247	26	25	4	18	89	34	130
RTOR Reduction (vph)	0	143	0	0	8	0	0	14	0	0	104	0
Lane Group Flow (vph)	123	398	0	314	265	0	25	8	0	89	60	0
Confl. Peds. (#/hr)	5		1	1		5	3		3	3		3
Heavy Vehicles (%)	2%	11%	0%	0%	19%	0%	0%	0%	0%	7%	0%	3%
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	2			1	6		8			4		4
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	35.2	35.2		50.4	50.4		12.8	12.8		12.8	12.8	
Effective Green, g (s)	37.2	37.2		50.4	52.4		14.8	14.8		14.8	14.8	
Actuated g/C Ratio	0.49	0.49		0.67	0.70		0.20	0.20		0.20	0.20	
Clearance Time (s)	6.0	6.0		4.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	5.0	5.0		2.5	5.0		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	465	1391		551	1898		182	291		225	286	
v/s Ratio Prot		0.14		c0.08	0.10			0.01			0.04	
v/s Ratio Perm	0.13			c0.30			0.03			c0.08		
v/c Ratio	0.26	0.29		0.57	0.14		0.14	0.03		0.40	0.21	
Uniform Delay, d1	11.0	11.2		5.7	3.8		24.9	24.4		26.3	25.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.6	0.2		1.1	0.1		0.5	0.0		1.6	0.5	
Delay (s)	11.7	11.4		6.8	3.9		25.4	24.4		27.9	25.8	
Level of Service	B	B		A	A		C	C		C	C	
Approach Delay (s)		11.5			5.4			24.9			26.5	
Approach LOS		B			A			C			C	

Intersection Summary			
HCM 2000 Control Delay	12.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	75.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	89.6%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
16: Speers Road/Cornwall Road & Cross Avenue

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Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↕	↕	↕	↕	↕
Traffic Volume (vph)	275	792	734	40	31	419
Future Volume (vph)	275	792	734	40	31	419
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	75.0			0.0	55.0	0.0
Storage Lanes	1			0	1	2
Taper Length (m)	7.5				7.5	
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	0.88
Frt			0.992			0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1770	3539	3511	0	1770	2787
Flt Permitted	0.244				0.950	
Satd. Flow (perm)	455	3539	3511	0	1770	2787
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)			6			455
Link Speed (k/h)		50	50		50	
Link Distance (m)		228.9	275.4		183.9	
Travel Time (s)		16.5	19.8		13.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	299	861	798	43	34	455
Shared Lane Traffic (%)						
Lane Group Flow (vph)	299	861	841	0	34	455
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.6	3.6		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25			15	25	15
Number of Detectors	1	2	2		1	1
Detector Template	Left	Thru	Thru		Left	Right
Leading Detector (m)	2.0	10.0	10.0		2.0	2.0
Trailing Detector (m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Size(m)	2.0	0.6	0.6		2.0	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0		0.0	0.0
Detector 2 Position(m)		9.4	9.4			
Detector 2 Size(m)		0.6	0.6			
Detector 2 Type		Cl+Ex	Cl+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type	pm+pt	NA	NA		pm+pt	Perm
Protected Phases	5	2	6		7	
Permitted Phases	2				4	4

Lanes, Volumes, Timings
16: Speers Road/Cornwall Road & Cross Avenue

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Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Detector Phase	5	2	6		7	4
Switch Phase						
Minimum Initial (s)	6.0	25.0	25.0		6.0	6.0
Minimum Split (s)	12.0	35.0	35.0		29.0	29.0
Total Split (s)	26.0	61.0	35.0		29.0	29.0
Total Split (%)	28.9%	67.8%	38.9%		32.2%	32.2%
Maximum Green (s)	20.0	55.0	29.0		23.0	23.0
Yellow Time (s)	4.0	4.0	4.0		4.0	4.0
All-Red Time (s)	2.0	2.0	2.0		2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0		6.0	6.0
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?			Yes			
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	None	Max	Max		None	None
Walk Time (s)		18.0	18.0		12.0	12.0
Flash Dont Walk (s)		7.0	7.0		7.0	7.0
Pedestrian Calls (#/hr)		0	0		0	0
Act Effct Green (s)	55.0	55.0	37.9		7.4	7.4
Actuated g/C Ratio	0.74	0.74	0.51		0.10	0.10
v/c Ratio	0.56	0.33	0.47		0.19	0.66
Control Delay	7.6	3.9	14.0		33.1	8.6
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	7.6	3.9	14.0		33.1	8.6
LOS	A	A	B		C	A
Approach Delay		4.9	14.0		10.3	
Approach LOS		A	B		B	
Queue Length 50th (m)	10.3	17.0	37.1		4.7	0.0
Queue Length 95th (m)	22.3	30.5	71.0		12.7	13.8
Internal Link Dist (m)		204.9	251.4		159.9	
Turn Bay Length (m)	75.0				55.0	
Base Capacity (vph)	689	2615	1787		546	1175
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	0.43	0.33	0.47		0.06	0.39

Intersection Summary

Area Type:	Other
Cycle Length:	90
Actuated Cycle Length:	74.5
Natural Cycle:	80
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.66
Intersection Signal Delay:	9.0
Intersection Capacity Utilization:	56.8%
Intersection LOS:	A
ICU Level of Service:	B
Analysis Period (min):	15

Lanes, Volumes, Timings
16: Speers Road/Cornwall Road & Cross Avenue

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Split and Phases: 16: Speers Road/Cornwall Road & Cross Avenue



HCM Signalized Intersection Capacity Analysis
16: Speers Road/Cornwall Road & Cross Avenue

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Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↕	↕	↔	↔	↕
Traffic Volume (vph)	275	792	734	40	31	419
Future Volume (vph)	275	792	734	40	31	419
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0		6.0	6.0
Lane Util. Factor	1.00	0.95	0.95		1.00	0.88
Fr _t	1.00	1.00	0.99		1.00	0.85
Fit Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	3539	3512		1770	2787
Fit Permitted	0.24	1.00	1.00		0.95	1.00
Satd. Flow (perm)	455	3539	3512		1770	2787
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	299	861	798	43	34	455
RTOR Reduction (vph)	0	0	3	0	0	410
Lane Group Flow (vph)	299	861	838	0	34	45
Turn Type	pm+pt	NA	NA		pm+pt	Perm
Protected Phases	5	2	6		7	
Permitted Phases	2				4	4
Actuated Green, G (s)	55.1	55.1	37.9		7.4	7.4
Effective Green, g (s)	55.1	55.1	37.9		7.4	7.4
Actuated g/C Ratio	0.74	0.74	0.51		0.10	0.10
Clearance Time (s)	6.0	6.0	6.0		6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	534	2617	1786		175	276
v/s Ratio Prot	c0.08	0.24	0.24		c0.02	
v/s Ratio Perm	c0.33					0.02
v/c Ratio	0.56	0.33	0.47		0.19	0.16
Uniform Delay, d1	4.9	3.3	11.8		30.8	30.7
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	1.3	0.3	0.9		0.5	0.3
Delay (s)	6.2	3.7	12.7		31.4	31.0
Level of Service	A	A	B		C	C
Approach Delay (s)		4.3	12.7		31.0	
Approach LOS		A	B		C	

Intersection Summary

HCM 2000 Control Delay	12.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	74.5	Sum of lost time (s)	18.0
Intersection Capacity Utilization	56.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
17: North Access & South Service Road

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Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔			↕	↕	
Traffic Volume (vph)	85	0	70	33	0	33
Future Volume (vph)	85	0	70	33	0	33
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t					0.865	
Fit Protected				0.967		
Satd. Flow (prot)	1863	0	0	1801	1611	0
Fit Permitted				0.967		
Satd. Flow (perm)	1863	0	0	1801	1611	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	130.8			104.5	72.7	
Travel Time (s)	9.4			7.5	5.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	92	0	76	36	0	36
Shared Lane Traffic (%)						
Lane Group Flow (vph)	92	0	0	112	36	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)		15	25		25	15
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization 22.3%	ICU Level of Service A
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis
17: North Access & South Service Road

FT 2038 AM.syn
04-03-2024

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔			↔	↔	
Traffic Volume (veh/h)	85	0	70	33	0	33
Future Volume (Veh/h)	85	0	70	33	0	33
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	92	0	76	36	0	36
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None		None			
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			92		280	92
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			92		280	92
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			95		100	96
cM capacity (veh/h)			1503		674	965
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	92	112	36			
Volume Left	0	76	0			
Volume Right	0	0	36			
cSH	1700	1503	965			
Volume to Capacity	0.05	0.05	0.04			
Queue Length 95th (m)	0.0	1.3	0.9			
Control Delay (s)	0.0	5.2	8.9			
Lane LOS		A	A			
Approach Delay (s)	0.0	5.2	8.9			
Approach LOS			A			
Intersection Summary						
Average Delay			3.8			
Intersection Capacity Utilization		22.3%		ICU Level of Service		A
Analysis Period (min)			15			

Lanes, Volumes, Timings
18: Street C & East Access

FT 2038 AM.syn
04-03-2024

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔			↔	↔	
Traffic Volume (vph)	0	332	18	16	157	0
Future Volume (vph)	0	332	18	16	157	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t	0.865					
Fit Protected				0.974		
Satd. Flow (prot)	1611	0	0	1814	1863	0
Fit Permitted				0.974		
Satd. Flow (perm)	1611	0	0	1814	1863	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	57.5			75.8	84.1	
Travel Time (s)	4.1			5.5	6.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	361	20	17	171	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	361	0	0	37	171	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	42.2%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
18: Street C & East Access

FT 2038 AM.syn
04-03-2024

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔	↔	↔	↕	↕	
Traffic Volume (veh/h)	0	332	18	16	157	0
Future Volume (Veh/h)	0	332	18	16	157	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	361	20	17	171	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)			210			
pX, platoon unblocked						
vC, conflicting volume	228	171	171			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	228	171	171			
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	59	99			
cM capacity (veh/h)	749	873	1406			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	361	37	171			
Volume Left	0	20	0			
Volume Right	361	0	0			
eSH	873	1406	1700			
Volume to Capacity	0.41	0.01	0.10			
Queue Length 95th (m)	16.4	0.3	0.0			
Control Delay (s)	12.0	4.2	0.0			
Lane LOS	B	A				
Approach Delay (s)	12.0	4.2	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay		7.9				
Intersection Capacity Utilization		42.2%		ICU Level of Service	A	
Analysis Period (min)		15				

Lanes, Volumes, Timings
19: Street C & South Service Road

FT 2038 AM.syn
04-03-2024

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔	↔	↔	↕	↕	
Traffic Volume (vph)	67	51	106	97	6	10
Future Volume (vph)	67	51	106	97	6	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t	0.942			0.917		
Fit Protected				0.975	0.981	
Satd. Flow (prot)	1755	0	0	1816	1676	0
Fit Permitted				0.975	0.981	
Satd. Flow (perm)	1755	0	0	1816	1676	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	104.5			305.2	84.1	
Travel Time (s)	7.5			22.0	6.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	73	55	115	105	7	11
Shared Lane Traffic (%)						
Lane Group Flow (vph)	128	0	0	220	18	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)		15	25		25	15
Sign Control	Free			Free	Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	27.6%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
19: Street C & South Service Road

FT 2038 AM.syn
04-03-2024

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔		↔		↔	
Traffic Volume (veh/h)	67	51	106	97	6	10
Future Volume (Veh/h)	67	51	106	97	6	10
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)	73	55	115	105	7	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			128		436	100
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			128		436	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 %			92		99	99
cM capacity (veh/h)			1458		532	955
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	128	220	18			
Volume Left	0	115	7			
Volume Right	55	0	11			
cSH	1700	1458	730			
Volume to Capacity	0.08	0.08	0.02			
Queue Length 95th (m)	0.0	2.1	0.6			
Control Delay (s)	0.0	4.3	10.1			
Lane LOS	A		B			
Approach Delay (s)	0.0	4.3	10.1			
Approach LOS	A		B			
Intersection Summary						
Average Delay			3.1			
Intersection Capacity Utilization	27.6%		ICU Level of Service	A		
Analysis Period (min)	15					

Lanes, Volumes, Timings
20: Street A & South Service Road

FT 2038 AM.syn
04-03-2024

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔		↔		↔	
Traffic Volume (vph)	86	114	5	28	22	0
Future Volume (vph)	86	114	5	28	22	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t	0.923					
Fit Protected			0.993		0.950	
Satd. Flow (prot)	1719	0	0	1850	1770	0
Fit Permitted			0.993		0.950	
Satd. Flow (perm)	1719	0	0	1850	1770	0
Link Speed (k/h)	50		50		50	
Link Distance (m)	285.4		130.8		98.8	
Travel Time (s)	20.5		9.4		7.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	93	124	5	30	24	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	217	0	0	35	24	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0		0.0		3.6	
Link Offset(m)	0.0		0.0		0.0	
Crosswalk Width(m)	4.8		4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	15		25		25	
Sign Control	Free		Free		Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	21.5%		ICU Level of Service		A	
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
20: Street A & South Service Road

FT 2038 AM.syn
04-03-2024

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔			↔	↔	
Traffic Volume (veh/h)	86	114	5	28	22	0
Future Volume (Veh/h)	86	114	5	28	22	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)	93	124	5	30	24	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			217		195	155
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			217		195	155
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	100
cM capacity (veh/h)			1353		791	891
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	217	35	24			
Volume Left	0	5	24			
Volume Right	124	0	0			
cSH	1700	1353	791			
Volume to Capacity	0.13	0.00	0.03			
Queue Length 95th (m)	0.0	0.1	0.8			
Control Delay (s)	0.0	1.1	9.7			
Lane LOS	A		A			
Approach Delay (s)	0.0	1.1	9.7			
Approach LOS	A		A			
Intersection Summary						
Average Delay			1.0			
Intersection Capacity Utilization			21.5%	ICU Level of Service	A	
Analysis Period (min)			15			

Lanes, Volumes, Timings
21: Argus Rd & Street 1

FT 2038 AM.syn
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Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔			↔	↔	
Traffic Volume (vph)	0	211	0	114	695	460
Future Volume (vph)	0	211	0	114	695	460
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t	0.865		0.946			
Fit Protected						
Satd. Flow (prot)	1611	0	0	1863	1762	0
Fit Permitted						
Satd. Flow (perm)	1611	0	0	1863	1762	0
Link Speed (k/h)	50		50			
Link Distance (m)	162.1		113.6			
Travel Time (s)	11.7		8.2			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	229	0	124	755	500
Shared Lane Traffic (%)						
Lane Group Flow (vph)	229	0	0	124	1255	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6		3.3			
Link Offset(m)	0.0		0.0			
Crosswalk Width(m)	4.8		4.8			
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25	15	
Sign Control	Stop		Free		Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	84.4%			ICU Level of Service E		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
21: Argus Rd & Street 1

FT 2038 AM.syn
04-03-2024

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔	↔		↑	↑	
Traffic Volume (veh/h)	0	211	0	114	695	460
Future Volume (Veh/h)	0	211	0	114	695	460
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	229	0	124	755	500
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None	None		
Median storage (veh)						
Upstream signal (m)				114		
pX, platoon unblocked						
vC, conflicting volume	1129	1005	1255			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1129	1005	1255			
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	22	100			
cM capacity (veh/h)	226	293	554			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	229	124	1255			
Volume Left	0	0	0			
Volume Right	229	0	500			
cSH	293	554	1700			
Volume to Capacity	0.78	0.00	0.74			
Queue Length 95th (m)	48.7	0.0	0.0			
Control Delay (s)	50.2	0.0	0.0			
Lane LOS	F					
Approach Delay (s)	50.2	0.0	0.0			
Approach LOS	F					
Intersection Summary						
Average Delay		7.1				
Intersection Capacity Utilization		84.4%		ICU Level of Service	E	
Analysis Period (min)		15				

Lanes, Volumes, Timings
22: Street C & Street 1

FT 2038 AM.syn
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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	0	211	53	411	49	0	27	34	0	0	489	0
Future Volume (vph)	0	211	53	411	49	0	27	34	0	0	489	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t		0.973										
Fit Protected					0.957			0.979				
Satd. Flow (prot)	0	1812	0	0	1783	0	0	1824	0	0	1863	0
Fit Permitted					0.957			0.979				
Satd. Flow (perm)	0	1812	0	0	1783	0	0	1824	0	0	1863	0
Link Speed (k/h)		50			50			50				50
Link Distance (m)		43.0			162.1			134.3				75.8
Travel Time (s)		3.1			11.7			9.7				5.5
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
Adj. Flow (vph)	0	229	58	447	53	0	29	37	0	0	532	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	287	0	0	500	0	0	66	0	0	532	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	75.5%						ICU Level of Service D					
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis
22: Street C & Street 1

FT 2038 AM.syn
04-03-2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔				↔			↔	
Traffic Volume (veh/h)	0	211	53	411	49	0	27	34	0	0	489	0
Future Volume (Veh/h)	0	211	53	411	49	0	27	34	0	0	489	0
Sign Control		Stop		Stop		Free		Free		Free		Free
Grade		0%		0%		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)	0	229	58	447	53	0	29	37	0	0	532	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)							134					
pX, platoon unblocked												
vC, conflicting volume	654	627	532	800	627	37	532			37		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	654	627	532	800	627	37	532			37		
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	41	89	0	86	100	97			100		
cM capacity (veh/h)	333	389	547	141	389	1035	1036			1574		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	287	500	66	532								
Volume Left	0	447	29	0								
Volume Right	58	0	0	0								
eSH	413	152	1036	1574								
Volume to Capacity	0.69	3.30	0.03	0.00								
Queue Length 95th (m)	41.2	Err	0.7	0.0								
Control Delay (s)	31.3	Err	3.9	0.0								
Lane LOS	D	F	A									
Approach Delay (s)	31.3	Err	3.9	0.0								
Approach LOS	D	F										
Intersection Summary												
Average Delay			3616.4									
Intersection Capacity Utilization			75.5%		ICU Level of Service				D			
Analysis Period (min)			15									

Lanes, Volumes, Timings
23: GO Station West Access/Street C & Cross Ave

FT 2038 AM.syn
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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔				↔		↔		↔
Traffic Volume (vph)	21	338	115	550	512	40	51	0	271	491	411	51
Future Volume (vph)	21	338	115	550	512	40	51	0	271	491	411	51
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.0	0.0	0.0
Storage Lanes	0	0	0	0	0	0	1	0	1	0	0	0
Taper Length (m)	7.5			7.5			7.5			7.5		7.5
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.964			0.995			0.850			0.984	
Fit Protected		0.998			0.976		0.950			0.950		
Satd. Flow (prot)	0	3405	0	0	3437	0	1770	1583	0	1770	1833	0
Fit Permitted		0.790			0.634		0.328			0.577		
Satd. Flow (perm)	0	2695	0	0	2233	0	611	1583	0	1075	1833	0
Right Turn on Red			Yes			Yes		Yes		Yes		Yes
Satd. Flow (RTOR)		99			8		311			14		
Link Speed (k/h)		50			50		50			50		
Link Distance (m)		211.2			162.8		81.1			134.3		
Travel Time (s)		15.2			11.7		5.8			9.7		
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
Adj. Flow (vph)	23	367	125	598	557	43	55	0	295	534	447	55
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	515	0	0	1198	0	55	295	0	534	502	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.3			3.3		3.6			3.6		3.6
Link Offset(m)		0.0			0.0		0.0			0.0		0.0
Crosswalk Width(m)		4.8			4.8		4.8			4.8		4.8
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases		4			8			2			6	

Lanes, Volumes, Timings
23: GO Station West Access/Street C & Cross Ave

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	24.0	24.0		24.0	24.0		24.0	24.0		24.0	24.0	
Total Split (s)	25.0	25.0		25.0	25.0		25.0	25.0		25.0	25.0	
Total Split (%)	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%		50.0%	50.0%	
Maximum Green (s)	19.0	19.0		19.0	19.0		19.0	19.0		19.0	19.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		6.0			6.0			6.0			6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		19.0			19.0			19.0			19.0	
Actuated g/C Ratio		0.38			0.38			0.38			0.38	
v/c Ratio		0.47			1.80dl			0.24	0.37		1.31	0.71
Control Delay		11.1			209.3			13.9	3.0		176.9	20.1
Queue Delay		0.0			0.0			0.0	0.0		0.0	0.0
Total Delay		11.1			209.3			13.9	3.0		176.9	20.1
LOS		B			F			B	A		F	C
Approach Delay		11.1			209.3			4.7			100.9	
Approach LOS		B			F			A			F	
Queue Length 50th (m)		14.4			~84.3			3.4	0.0		~67.5	37.1
Queue Length 95th (m)		25.3			#119.7			10.4	10.7		#116.0	#72.0
Internal Link Dist (m)		187.2			138.8			57.1			110.3	
Turn Bay Length (m)											15.0	
Base Capacity (vph)		1085			853			232	794		408	705
Starvation Cap Reductn		0			0			0	0		0	0
Spillback Cap Reductn		0			0			0	0		0	0
Storage Cap Reductn		0			0			0	0		0	0
Reduced v/c Ratio		0.47			1.40			0.24	0.37		1.31	0.71

Intersection Summary

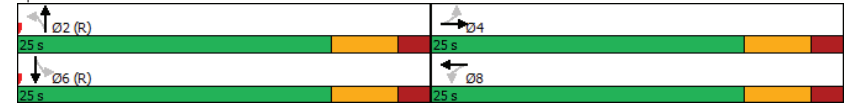
Area Type: Other
 Cycle Length: 50
 Actuated Cycle Length: 50
 Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
 Natural Cycle: 120
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.40
 Intersection Signal Delay: 117.0 Intersection LOS: F
 Intersection Capacity Utilization 109.0% ICU Level of Service H
 Analysis Period (min) 15
 ~ Volume exceeds capacity, queue is theoretically infinite.

Lanes, Volumes, Timings
23: GO Station West Access/Street C & Cross Ave

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- Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
- Queue shown is maximum after two cycles.
- dl Defacto Left Lane. Record with 1 though lane as a left lane.

Splits and Phases: 23: GO Station West Access/Street C & Cross Ave



HCM Signalized Intersection Capacity Analysis
 23: GO Station West Access/Street C & Cross Ave

FT 2038 AM.syn
 04-03-2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔			↔	↔		↔	↔	
Traffic Volume (vph)	21	338	115	550	512	40	51	0	271	491	411	51
Future Volume (vph)	21	338	115	550	512	40	51	0	271	491	411	51
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0		6.0		6.0	6.0		6.0		6.0	
Lane Util. Factor		0.95		0.95		1.00	1.00		1.00		1.00	
Fr _t		0.96		0.99		1.00	0.85		1.00		0.98	
Fl _t Protected		1.00		0.98		0.95	1.00		0.95		1.00	
Satd. Flow (prot)		3403		3434		1770	1583		1770		1832	
Fl _t Permitted		0.79		0.63		0.33	1.00		0.58		1.00	
Satd. Flow (perm)		2693		2233		611	1583		1075		1832	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	23	367	125	598	557	43	55	0	295	534	447	55
RTOR Reduction (vph)	0	61	0	0	5	0	0	183	0	0	9	0
Lane Group Flow (vph)	0	454	0	0	1193	0	55	112	0	534	493	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4		8		8	2		2		6	
Permitted Phases	4			8			2				6	
Actuated Green, G (s)		19.0			19.0		19.0	19.0		19.0	19.0	
Effective Green, g (s)		19.0			19.0		19.0	19.0		19.0	19.0	
Actuated g/C Ratio		0.38			0.38		0.38	0.38		0.38	0.38	
Clearance Time (s)		6.0			6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		1023			848		232	601		408	696	
v/s Ratio Prot								0.07			0.27	
v/s Ratio Perm		0.17			c0.53		0.09			c0.50		
v/c Ratio		0.44			1.80dl		0.24	0.19		1.31	0.71	
Uniform Delay, d1		11.6			15.5		10.6	10.3		15.5	13.2	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.3			190.2		2.4	0.7		155.7	6.0	
Delay (s)		11.9			205.7		13.0	11.0		171.2	19.2	
Level of Service		B			F		B	B		F	B	
Approach Delay (s)		11.9			205.7		11.3			97.5		
Approach LOS		B			F		B			F		

Intersection Summary			
HCM 2000 Control Delay	115.4	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.36		
Actuated Cycle Length (s)	50.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	109.0%	ICU Level of Service	H
Analysis Period (min)	15		
dl	Defacto Left Lane. Recode with 1 though lane as a left lane.		
c	Critical Lane Group		

Lanes, Volumes, Timings
 1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔			↔	↔		↔	↔	
Traffic Volume (vph)	156	131	370	1048	250	207	478	2283	783	157	1623	130
Future Volume (vph)	156	131	370	1048	250	207	478	2283	783	157	1623	130
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0		0.0	165.0		25.0	145.0		0.0	95.0		90.0
Storage Lanes	1		1	1		1	1		1	1		1
Taper Length (m)	7.5			7.5		7.5	7.5			7.5		7.5
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Ped Bike Factor	0.98					0.95			0.98			0.98
Fr _t			0.850			0.850			0.850			0.850
Fl _t Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1624	1710	1425	3120	1710	1425	1608	4577	1425	1608	4532	1425
Fl _t Permitted	0.592			0.369			0.100			0.111		
Satd. Flow (perm)	989	1710	1425	1212	1710	1360	169	4577	1402	188	4532	1425
Right Turn on Red			Yes			Yes		Yes		Yes		Yes
Satd. Flow (RTOR)			255			150		309				191
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		347.0			285.9			280.4			353.6	
Travel Time (s)		25.0			20.6			20.2			25.5	
Confl. Peds. (#/hr)	34					34		14		14		
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
Heavy Vehicles (%)	0%	0%	2%	1%	0%	2%	1%	2%	2%	1%	3%	2%
Adj. Flow (vph)	170	142	402	1139	272	225	520	2482	851	171	1764	141
Shared Lane Traffic (%)												
Lane Group Flow (vph)	170	142	402	1139	272	225	520	2482	851	171	1764	141
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		7.2			7.2			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings

FT 2038 PM.syn

1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd

04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA	Free	pm+pt	NA	Perm	pm+pt	NA	Free	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		Free	8		8	2		Free	6		6
Detector Phase	7	4		3	8	8	5	2		1	6	6
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0	10.0	6.0	15.0		6.0	15.0	15.0
Minimum Split (s)	11.0	25.0		11.0	43.0	43.0	11.0	34.0		10.0	34.0	34.0
Total Split (s)	11.0	27.0		27.0	43.0	43.0	23.0	56.0		10.0	43.0	43.0
Total Split (%)	9.2%	22.5%		22.5%	35.8%	35.8%	19.2%	46.7%		8.3%	35.8%	35.8%
Maximum Green (s)	7.0	20.0		22.0	36.0	36.0	19.0	49.0		6.0	36.0	36.0
Yellow Time (s)	3.0	4.0		3.0	4.0	4.0	3.0	4.0		3.0	4.0	4.0
All-Red Time (s)	1.0	3.0		2.0	3.0	3.0	1.0	3.0		1.0	3.0	3.0
Lost Time Adjust (s)	0.0	-3.0		0.0	-3.0	-3.0	0.0	-3.0		0.0	-3.0	-3.0
Total Lost Time (s)	4.0	4.0		5.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	5.0		3.0	5.0	5.0	3.0	5.0		3.0	5.0	5.0
Recall Mode	None	None		None	None	None	None	C-Max		None	C-Max	C-Max
Walk Time (s)				7.0	7.0		7.0			7.0	7.0	
Flash Dont Walk (s)				29.0	29.0		20.0			20.0	20.0	
Pedestrian Calls (#/hr)				0	0		0			0	0	
Act Effct Green (s)	26.5	19.5	120.0	45.5	35.5	35.5	65.5	52.0	120.0	48.5	39.0	39.0
Actuated g/C Ratio	0.22	0.16	1.00	0.38	0.30	0.30	0.55	0.43	1.00	0.40	0.32	0.32
v/c Ratio	0.67	0.51	0.28	1.41	0.54	0.44	1.44	1.25	0.61	0.91	1.20	0.24
Control Delay	44.3	52.1	0.5	219.8	39.3	14.2	240.8	148.9	2.0	75.3	132.6	2.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	44.3	52.1	0.5	219.8	39.3	14.2	240.8	148.9	2.0	75.3	132.6	2.3
LOS	D	D	A	F	D	B	F	F	A	E	F	A
Approach Delay		21.2			161.5			128.9			119.0	
Approach LOS		C			F			F			F	
Queue Length 50th (m)	28.3	32.4	0.0	~160.9	56.1	13.8	~161.9	~281.5	0.0	25.8	~194.1	0.0
Queue Length 95th (m)	43.7	52.2	0.0	#197.6	81.2	35.5	#242.4	#311.0	0.0	#82.4	#225.1	5.5
Internal Link Dist (m)		323.0			261.9			256.4			329.6	
Turn Bay Length (m)	60.0			165.0		25.0	145.0			95.0		90.0
Base Capacity (vph)	255	327	1425	809	555	543	362	1983	1402	188	1472	592
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.67	0.43	0.28	1.41	0.49	0.41	1.44	1.25	0.61	0.91	1.20	0.24

Intersection Summary

Area Type:	CBD
Cycle Length:	120
Actuated Cycle Length:	120
Offset:	105.6 (88%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle:	150
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	1.44
Intersection Signal Delay:	123.6
Intersection LOS:	F

Lanes, Volumes, Timings

FT 2038 PM.syn

1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd

04-03-2024

Intersection Capacity Utilization	120.0%	ICU Level of Service H
Analysis Period (min)	15	
- Volume exceeds capacity, queue is theoretically infinite.		
Queue shown is maximum after two cycles.		
# 95th percentile volume exceeds capacity, queue may be longer.		
Queue shown is maximum after two cycles.		

Splits and Phases: 1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd



HCM Signalized Intersection Capacity Analysis
1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd

FT 2038 PM.syn
04-03-2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↗	↘	↔	↗	↘	↔	↗	↘	↔	↗	↘
Traffic Volume (vph)	156	131	370	1048	250	207	478	2283	783	157	1623	130
Future Volume (vph)	156	131	370	1048	250	207	478	2283	783	157	1623	130
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	1.0	5.0	4.0	4.0	4.0	4.0	1.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.98	1.00	1.00	1.00
Flpb, ped/bikes	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1603	1710	1425	3120	1710	1360	1608	4577	1402	1608	4532	1425
Flt Permitted	0.59	1.00	1.00	0.37	1.00	1.00	0.10	1.00	1.00	0.11	1.00	1.00
Satd. Flow (perm)	999	1710	1425	1211	1710	1360	169	4577	1402	188	4532	1425
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	170	142	402	1139	272	225	520	2482	851	171	1764	141
RTOR Reduction (vph)	0	0	0	0	0	106	0	0	0	0	0	95
Lane Group Flow (vph)	170	142	402	1139	272	119	520	2482	851	171	1764	46
Confl. Peds. (#/hr)	34				34				14	14		
Heavy Vehicles (%)	0%	0%	2%	1%	0%	2%	1%	2%	2%	1%	3%	2%
Turn Type	pm+pt	NA	Free	pm+pt	NA	Perm	pm+pt	NA	Free	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		Free	8		8	2		Free	6		6
Actuated Green, G (s)	23.5	16.5	120.0	43.5	32.5	32.5	62.5	49.0	120.0	45.5	36.0	36.0
Effective Green, g (s)	23.5	19.5	120.0	43.5	35.5	35.5	62.5	52.0	120.0	45.5	39.0	39.0
Actuated g/C Ratio	0.20	0.16	1.00	0.36	0.30	0.30	0.52	0.43	1.00	0.38	0.32	0.32
Clearance Time (s)	4.0	7.0		5.0	7.0	7.0	4.0	7.0		4.0	7.0	7.0
Vehicle Extension (s)	3.0	5.0		3.0	5.0	5.0	3.0	5.0		3.0	5.0	5.0
Lane Grp Cap (vph)	230	277	1425	788	505	402	357	1983	1402	183	1472	463
v/s Ratio Prot	0.04	0.08		c0.26	0.16		c0.27	0.54		0.07	0.39	
v/s Ratio Perm	0.10		0.28	c0.26		0.09	c0.48		0.61	0.28		0.03
v/c Ratio	0.74	0.51	0.28	1.45	0.54	0.30	1.46	1.25	0.61	0.93	1.20	0.10
Uniform Delay, d1	43.9	45.9	0.0	34.8	35.4	32.6	37.5	34.0	0.0	30.6	40.5	28.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	11.7	3.2	0.5	207.6	2.0	0.9	220.5	117.6	2.0	47.6	96.1	0.4
Delay (s)	55.6	49.1	0.5	242.4	37.4	33.5	258.0	151.6	2.0	78.2	136.6	28.7
Level of Service	E	D	A	F	D	C	F	F	A	E	F	C
Approach Delay (s)		23.3			179.6			132.9			124.5	
Approach LOS		C			F			F			F	
Intersection Summary												
HCM 2000 Control Delay		130.6										
HCM 2000 Volume to Capacity ratio		1.45										
Actuated Cycle Length (s)		120.0			Sum of lost time (s)			17.0				
Intersection Capacity Utilization		120.0%			ICU Level of Service			H				
Analysis Period (min)		15										
c Critical Lane Group												

Lanes, Volumes, Timings
2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp

FT 2038 PM.syn
04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↗	↘	↔	↗	↘	↔	↗	↘	↔	↗	↘
Traffic Volume (vph)	28	0	330	782	129	400	0	3115	655	0	3092	12
Future Volume (vph)	28	0	330	782	129	400	0	3115	655	0	3092	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.5	3.3	3.6	3.5	3.6	3.6	3.6	3.6	3.6	3.5
Storage Length (m)	50.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		1	1		1	0		1	0		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.91	1.00	1.00	0.86	0.86
Ped Bike Factor	1.00					0.99			0.97		1.00	
Frt			0.850			0.850			0.850		0.999	
Flt Protected	0.950			0.950	0.965							
Satd. Flow (prot)	1570	0	1437	1463	1541	1409	0	4577	1439	0	4780	0
Flt Permitted	0.950			0.950	0.965							
Satd. Flow (perm)	1568	0	1437	1463	1541	1391	0	4577	1400	0	4780	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			31			248			162			1
Link Speed (k/h)		50			50		50			50		
Link Distance (m)		142.1			192.6		324.8			280.4		
Travel Time (s)		10.2			13.9		23.4			20.2		
Confl. Peds. (#/hr)	2					2	14			14	14	14
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
Heavy Vehicles (%)	0%	0%	0%	2%	1%	2%	0%	2%	1%	0%	23%	0%
Adj. Flow (vph)	30	0	359	850	140	435	0	3386	712	0	3361	13
Shared Lane Traffic (%)				42%								
Lane Group Flow (vph)	30	0	359	493	497	435	0	3386	712	0	3374	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.3			3.3				3.6			3.6
Link Offset(m)		0.0			0.0				0.0			0.0
Crosswalk Width(m)		4.8			4.8				4.8			4.8
Two way Left Turn Lane												
Headway Factor	1.19	1.14	1.16	1.19	1.14	1.16	1.14	1.14	1.14	1.14	1.14	1.16
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1		1	1		2	1		2	1		2
Detector Template	Left		Right	Left	Thru	Right			Thru	Right		Thru
Leading Detector (m)	2.0		2.0	2.0	10.0	2.0			10.0	2.0		10.0
Trailing Detector (m)	0.0		0.0	0.0	0.0	0.0			0.0	0.0		0.0
Detector 1 Position(m)	0.0		0.0	0.0	0.0	0.0			0.0	0.0		0.0
Detector 1 Size(m)	2.0		2.0	2.0	0.6	2.0			0.6	2.0		0.6
Detector 1 Type	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex		Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	0.0			0.0	0.0		0.0
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	0.0			0.0	0.0		0.0
Detector 1 Delay (s)	0.0		0.0	0.0	0.0	0.0			0.0	0.0		0.0
Detector 2 Position(m)					9.4				9.4			9.4
Detector 2 Size(m)					0.6				0.6			0.6
Detector 2 Type					Cl+Ex				Cl+Ex			Cl+Ex
Detector 2 Channel												

Lanes, Volumes, Timings

FT 2038 PM.syn

2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp

04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)					0.0			0.0				0.0
Turn Type	Prot		Perm	Perm	NA	Free		NA	Free			NA
Protected Phases	3			4	4			6			2	
Permitted Phases						Free			Free			
Detector Phase	3		8	4	4			6			2	
Switch Phase												
Minimum Initial (s)	7.0		10.0	10.0	10.0			5.0			28.0	
Minimum Split (s)	23.0		38.0	38.0	38.0			35.0			35.0	
Total Split (s)	23.0		67.0	67.0	67.0			73.0			73.0	
Total Split (%)	16.4%		47.9%	31.4%	31.4%			52.1%			52.1%	
Maximum Green (s)	18.0		60.0	37.0	37.0			66.0			66.0	
Yellow Time (s)	3.0		4.0	4.0	4.0			4.0			4.0	
All-Red Time (s)	2.0		3.0	3.0	3.0			3.0			3.0	
Lost Time Adjust (s)	-1.0		-3.0	-3.0	-3.0			-3.0			-3.0	
Total Lost Time (s)	4.0		4.0	4.0	4.0			4.0			4.0	
Lead/Lag	Lead			Lag	Lag							
Lead-Lag Optimize?	Yes			Yes	Yes							
Vehicle Extension (s)	3.0		3.0	3.0	3.0			4.5			4.5	
Recall Mode	Min		Min	Min	Min			C-Min			C-Min	
Walk Time (s)	7.0		7.0	7.0	7.0			7.0			7.0	
Flash Dont Walk (s)			24.0	24.0	24.0			21.0			21.0	
Pedestrian Calls (#/hr)			0	0	0			0			0	
Act Effct Green (s)	9.5		63.0	49.5	49.5	140.0		69.0	140.0		69.0	
Actuated g/C Ratio	0.07		0.45	0.35	0.35	1.00		0.49	1.00		0.49	
v/c Ratio	0.28		0.54	0.96	0.91	0.31		1.50	0.51		1.43	
Control Delay	68.1		29.0	74.3	66.0	0.6		256.6	0.1		226.9	
Queue Delay	0.0		0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Total Delay	68.1		29.0	74.3	66.0	0.6		256.6	0.1		226.9	
LOS	E		C	E	E	A		F	A		F	
Approach Delay		32.1						212.0			226.9	
Approach LOS		C						F			F	
Queue Length 50th (m)	8.5		68.5	146.3	144.3	0.0		~500.7	0.0		~388.5	
Queue Length 95th (m)	19.2		100.7	#232.6	#227.4	0.0		m#430.3	m0.0		#406.1	
Internal Link Dist (m)		118.1			168.6			300.8			256.4	
Turn Bay Length (m)	50.0											
Base Capacity (vph)	213		663	516	544	1391		2255	1400		2356	
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	0.14		0.54	0.96	0.91	0.31		1.50	0.51		1.43	

Intersection Summary

Area Type: CBD
 Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 115.4 (82%), Referenced to phase 2:SBT and 6:NBT, Start of Green
 Natural Cycle: 150
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.50

Lanes, Volumes, Timings

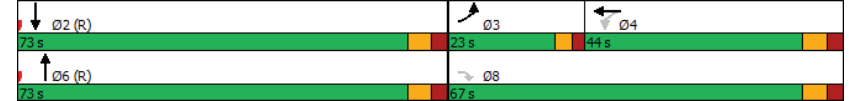
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2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp

04-03-2024

Intersection Signal Delay: 184.8 Intersection LOS: F
 Intersection Capacity Utilization 110.5% ICU Level of Service H
 Analysis Period (min) 15
 ~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp



HCM Signalized Intersection Capacity Analysis
2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp

FT 2038 PM.syn
04-03-2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	28	0	330	782	129	400	0	3115	655	0	3092	12
Future Volume (vph)	28	0	330	782	129	400	0	3115	655	0	3092	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.5	3.3	3.6	3.5	3.6	3.5	3.6	3.6	3.6	3.5
Total Lost time (s)	4.0		4.0	4.0	4.0	1.0		4.0	4.0		4.0	
Lane Util. Factor	1.00		1.00	0.95	0.95	1.00		0.91	1.00		0.86	
Frpb, ped/bikes	1.00		1.00	1.00	1.00	0.99		1.00	0.97		1.00	
Flpb, ped/bikes	1.00		1.00	1.00	1.00	1.00		1.00	1.00		1.00	
Frt	1.00		0.85	1.00	1.00	0.85		1.00	0.85		1.00	
Flt Protected	0.95		1.00	0.95	0.97	1.00		1.00	1.00		1.00	
Satd. Flow (prot)	1570		1437	1463	1542	1391		4577	1400		4782	
Flt Permitted	0.95		1.00	0.95	0.97	1.00		1.00	1.00		1.00	
Satd. Flow (perm)	1570		1437	1463	1542	1391		4577	1400		4782	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	30	0	359	850	140	435	0	3386	712	0	3361	13
RTOR Reduction (vph)	0	0	17	0	0	0	0	0	0	0	1	0
Lane Group Flow (vph)	30	0	342	493	497	435	0	3386	712	0	3373	0
Confl. Peds. (#/hr)	2					2	14		14	14		14
Heavy Vehicles (%)	0%	0%	0%	2%	1%	2%	0%	2%	1%	0%	23%	0%
Turn Type	Prot		Perm	Perm	NA	Free		NA	Free		NA	
Protected Phases	3				4			6			2	
Permitted Phases			8	4		Free			Free			
Actuated Green, G (s)	8.5		60.0	46.5	46.5	140.0		66.0	140.0		66.0	
Effective Green, g (s)	9.5		63.0	49.5	49.5	140.0		69.0	140.0		69.0	
Actuated g/C Ratio	0.07		0.45	0.35	0.35	1.00		0.49	1.00		0.49	
Clearance Time (s)	5.0		7.0	7.0	7.0			7.0			7.0	
Vehicle Extension (s)	3.0		3.0	3.0	3.0			4.5			4.5	
Lane Grp Cap (vph)	106		646	517	545	1391		2255	1400		2356	
v/s Ratio Prot	0.02							c0.74			0.71	
v/s Ratio Perm			0.24	c0.34	0.32	0.31			c0.51			
v/c Ratio	0.28		0.53	0.95	0.91	0.31		1.50	0.51		1.43	
Uniform Delay, d1	62.0		27.8	44.1	43.2	0.0		35.5	0.0		35.5	
Progression Factor	1.00		1.00	1.00	1.00	1.00		1.10	1.00		1.00	
Incremental Delay, d2	1.5		0.8	28.1	19.6	0.6		225.9	0.1		196.8	
Delay (s)	63.5		28.6	72.2	62.8	0.6		265.0	0.1		232.3	
Level of Service	E		C	E	E	A		F	A		F	
Approach Delay (s)	31.3			47.0			219.0			232.3		
Approach LOS	C			D			F			F		

Intersection Summary			
HCM 2000 Control Delay	189.6	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.23		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	110.5%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
3: Trafalgar Rd & QEW EB-Off Ramp

FT 2038 PM.syn
04-03-2024

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	1126	620	0	2623	2583	369
Future Volume (vph)	1126	620	0	2623	2583	369
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.5	3.6	3.6	3.6	3.6
Lane Util. Factor	0.97	1.00	1.00	0.91	0.91	1.00
Ped Bike Factor	0.99					
Frt	0.850			0.850		
Flt Protected	0.950					
Satd. Flow (prot)	3046	1423	0	4577	4577	1454
Flt Permitted	0.950					
Satd. Flow (perm)	3046	1402	0	4577	4577	1454
Right Turn on Red	Yes					Yes
Satd. Flow (RTOR)	1					110
Link Speed (k/h)	50		50		50	
Link Distance (m)	199.2		51.4		324.8	
Travel Time (s)	14.3		3.7		23.4	
Confl. Peds. (#/hr)	2					
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	1%	0%	2%	2%	0%
Adj. Flow (vph)	1224	674	0	2851	2808	401
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1224	674	0	2851	2808	401
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	6.6		0.0		0.0	
Link Offset(m)	0.0		0.0		0.0	
Crosswalk Width(m)	4.8		4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.19	1.16	1.14	1.14	1.14	1.14
Turning Speed (k/h)	24		14		24	
Number of Detectors	1	1		2	2	1
Detector Template	Left	Right		Thru	Thru	Right
Leading Detector (m)	2.0		2.0		10.0	
Trailing Detector (m)	0.0		0.0		0.0	
Detector 1 Position(m)	0.0		0.0		0.0	
Detector 1 Size(m)	2.0		2.0		0.6	
Detector 1 Type	CI+Ex	CI+Ex		CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0		0.0		0.0	
Detector 1 Queue (s)	0.0		0.0		0.0	
Detector 1 Delay (s)	0.0		0.0		0.0	
Detector 2 Position(m)			9.4		9.4	
Detector 2 Size(m)			0.6		0.6	
Detector 2 Type			CI+Ex		CI+Ex	
Detector 2 Channel						
Detector 2 Extend (s)			0.0		0.0	
Turn Type	Perm	Perm		NA	NA	Free
Protected Phases	2		2		2	

Lanes, Volumes, Timings
3: Trafalgar Rd & QEW EB-Off Ramp

FT 2038 PM.syn
04-03-2024

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Permitted Phases	4	4				Free
Detector Phase	4	4		2	2	
Switch Phase						
Minimum Initial (s)	10.0	10.0		29.0	29.0	
Minimum Split (s)	38.0	38.0		36.0	36.0	
Total Split (s)	61.0	61.0		79.0	79.0	
Total Split (%)	43.6%	43.6%		56.4%	56.4%	
Maximum Green (s)	54.0	54.0		72.0	72.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	
All-Red Time (s)	3.0	3.0		3.0	3.0	
Lost Time Adjust (s)	-3.0	-3.0		-3.0	-3.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Recall Mode	None	None		C-Max	C-Max	
Walk Time (s)	7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	24.0	24.0		22.0	22.0	
Pedestrian Calls (#/hr)	0	0		0	0	
Act Effct Green (s)	57.0	57.0		75.0	75.0	140.0
Actuated g/C Ratio	0.41	0.41		0.54	0.54	1.00
v/c Ratio	0.99	1.18		1.16	1.15	0.28
Control Delay	63.7	135.6		104.0	85.0	0.0
Queue Delay	0.0	0.0		0.0	0.0	0.0
Total Delay	63.7	135.6		104.0	85.0	0.0
LOS	E	F		F	F	A
Approach Delay	89.2			104.0	74.4	
Approach LOS	F			F	E	
Queue Length 50th (m)	180.5	~235.5		~357.8	~350.1	0.0
Queue Length 95th (m)	#231.8	#314.0		m#276.2	m131.8	m0.0
Internal Link Dist (m)	175.2			27.4	300.8	
Turn Bay Length (m)						
Base Capacity (vph)	1240	571		2451	2451	1454
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	0.99	1.18		1.16	1.15	0.28

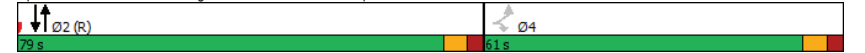
Intersection Summary	
Area Type:	CBD
Cycle Length: 140	
Actuated Cycle Length: 140	
Offset: 133.6 (95%), Referenced to phase 2:NBSB and 6:, Start of Green	
Natural Cycle: 150	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.18	
Intersection Signal Delay: 88.6	Intersection LOS: F
Intersection Capacity Utilization 105.0%	ICU Level of Service G
Analysis Period (min) 15	

Lanes, Volumes, Timings
3: Trafalgar Rd & QEW EB-Off Ramp

FT 2038 PM.syn
04-03-2024

- Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Trafalgar Rd & QEW EB-Off Ramp



HCM Signalized Intersection Capacity Analysis
3: Trafalgar Rd & QEW EB-Off Ramp

FT 2038 PM.syn
04-03-2024

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↖ ↗	↗		↖ ↗	↖ ↗	↗
Traffic Volume (vph)	1126	620	0	2623	2583	369
Future Volume (vph)	1126	620	0	2623	2583	369
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.5	3.6	3.6	3.6	3.6
Total Lost time (s)	4.0	4.0		4.0	4.0	1.0
Lane Util. Factor	0.97	1.00		0.91	0.91	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00
Fr	1.00	0.85		1.00	1.00	0.85
Fl	0.95	1.00		1.00	1.00	1.00
Satd. Flow (prot)	3046	1402		4577	4577	1454
Fl Permitted	0.95	1.00		1.00	1.00	1.00
Satd. Flow (perm)	3046	1402		4577	4577	1454
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1224	674	0	2851	2808	401
RTOR Reduction (vph)	0	1	0	0	0	0
Lane Group Flow (vph)	1224	673	0	2851	2808	401
Confl. Peds. (#/hr)		2				
Heavy Vehicles (%)	0%	1%	0%	2%	2%	0%
Turn Type	Perm	Perm		NA	NA	Free
Protected Phases				2	2	
Permitted Phases	4	4				Free
Actuated Green, G (s)	54.0	54.0		72.0	72.0	140.0
Effective Green, g (s)	57.0	57.0		75.0	75.0	140.0
Actuated g/C Ratio	0.41	0.41		0.54	0.54	1.00
Clearance Time (s)	7.0	7.0		7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	1240	570		2451	2451	1454
v/s Ratio Prot				c0.62	0.61	
v/s Ratio Perm	0.40	c0.48				0.28
v/c Ratio	0.99	1.18		1.16	1.15	0.28
Uniform Delay, d1	41.1	41.5		32.5	32.5	0.0
Progression Factor	1.00	1.00		0.95	0.50	1.00
Incremental Delay, d2	22.2	98.7		73.9	66.1	0.0
Delay (s)	63.4	140.2		104.9	82.2	0.0
Level of Service	E	F		F	F	A
Approach Delay (s)	90.6			104.9	71.9	
Approach LOS	F			F	E	

Intersection Summary			
HCM 2000 Control Delay	88.2	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.20		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	105.0%	ICU Level of Service	G
Analysis Period (min)	15		

Lanes, Volumes, Timings
4: Trafalgar Rd & Argus Rd

FT 2038 PM.syn
04-03-2024

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗		↖ ↗	↖ ↗	
Traffic Volume (vph)	0	153	0	3578	2094	1109
Future Volume (vph)	0	153	0	3578	2094	1109
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.6	3.5	3.6	3.6	3.6	3.6
Lane Util. Factor	1.00	1.00	1.00	0.91	0.91	0.91
Ped Bike Factor						
Fr		0.865			0.948	
Fl						
Satd. Flow (prot)	0	1354	0	4577	4324	0
Fl Permitted						
Satd. Flow (perm)	0	1354	0	4577	4324	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	145.7			270.2	51.4	
Travel Time (s)	10.5			19.5	3.7	
Confl. Peds. (#/hr)						24
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	8%	0%	2%	2%	3%
Adj. Flow (vph)	0	166	0	3889	2276	1205
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	166	0	3889	3481	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			3.3	3.3	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.14	1.16	1.14	1.14	1.14	1.14
Turning Speed (k/h)	24	14	24			14
Sign Control	Stop			Free	Free	

Intersection Summary	
Area Type:	CBD
Control Type:	Unsignalized
Intersection Capacity Utilization 90.5%	ICU Level of Service E
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis
4: Trafalgar Rd & Argus Rd

FT 2038 PM.syn
04-03-2024

Movement	EBL	EBR	NBL	NBT	SBT	SBR	
Lane Configurations		↗		↖↖	↗↗		
Traffic Volume (veh/h)	0	153	0	3578	2094	1109	
Future Volume (Veh/h)	0	153	0	3578	2094	1109	
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	166	0	3889	2276	1205	
Pedestrians	24						
Lane Width (m)	3.5						
Walking Speed (m/s)	1.2						
Percent Blockage	2						
Right turn flare (veh)							
Median type				None	None		
Median storage (veh)							
Upstream signal (m)				270	52		
pX, platoon unblocked	0.67	0.47	0.47				
vC, conflicting volume	4199	1385	3505				
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol	58	0	2386				
tC, single (s)	6.8	7.1	4.1				
tC, 2 stage (s)							
tF (s)	3.5	3.4	2.2				
p0 queue free %	100	66	100				
cM capacity (veh/h)	621	492	95				
Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	166	1296	1296	1296	910	910	1660
Volume Left	0	0	0	0	0	0	0
Volume Right	166	0	0	0	0	0	1205
sSH	492	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.34	0.76	0.76	0.76	0.54	0.54	0.98
Queue Length 95th (m)	11.8	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (s)	16.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	C						
Approach Delay (s)	16.0	0.0			0.0		
Approach LOS	C						
Intersection Summary							
Average Delay			0.4				
Intersection Capacity Utilization			90.5%		ICU Level of Service		E
Analysis Period (min)			15				

Lanes, Volumes, Timings
5: Trafalgar Rd & Cross Ave/South Service Rd

FT 2038 PM.syn
04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖↖	↖	↗	↖	↖	↗	↖↖	↖↖	↗	↖↖	↖↖	↖
Traffic Volume (vph)	1185	58	193	86	119	215	325	1746	42	105	1631	338
Future Volume (vph)	1185	58	193	86	119	215	325	1746	42	105	1631	338
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.6	3.3	3.6	3.5	3.3	3.6	3.6	3.3	3.6	3.6
Storage Length (m)	130.0		0.0	25.0		0.0	50.0		0.0	25.0		0.0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.91	0.91
Ped Bike Factor		0.96		0.98				0.99			0.99	
Ft		0.885				0.850		0.996			0.974	
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2958	1342	0	1540	1644	1423	1496	4573	0	1570	4446	0
Fit Permitted	0.950			0.591			0.080			0.087		
Satd. Flow (perm)	2958	1342	0	935	1644	1423	126	4573	0	144	4446	0
Right Turn on Red			Yes			Yes		Yes		Yes		Yes
Satd. Flow (RTOR)		154				148		3		35		
Link Speed (k/h)		50			50			50		50		
Link Distance (m)		151.2			330.4			150.2		270.2		
Travel Time (s)		10.9			23.8			10.8		19.5		
Confl. Peds. (#/hr)			15	15			18		70	70		18
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
Heavy Vehicles (%)	3%	8%	9%	2%	4%	1%	5%	1%	0%	0%	1%	3%
Adj. Flow (vph)	1288	63	210	93	129	234	353	1898	46	114	1773	367
Shared Lane Traffic (%)												
Lane Group Flow (vph)	1288	273	0	93	129	234	353	1944	0	114	2140	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		6.6			6.6			3.3			3.3	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.19	1.14	1.14	1.19	1.14	1.16	1.19	1.14	1.14	1.19	1.14	1.14
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2	1	1	2		1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6		2.0	0.6	
Detector 1 Type	CI+Ex	CI+Ex		CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex		CI+Ex	CI+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		CI+Ex			CI+Ex			CI+Ex			CI+Ex	
Detector 2 Channel												

Lanes, Volumes, Timings

5: Trafalgar Rd & Cross Ave/South Service Rd

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Perm	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	7	4			8		5	2		1	6	
Permitted Phases				8		8	2			6		
Detector Phase	7	4		8	8	8	5	2		1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	7.0	27.0		7.0	27.0	
Minimum Split (s)	17.0	25.0		25.0	25.0	25.0	11.5	34.0		11.5	34.0	
Total Split (s)	41.0	66.0		25.0	25.0	25.0	21.0	62.4		11.6	53.0	
Total Split (%)	29.3%	47.1%		17.9%	17.9%	17.9%	15.0%	44.6%		8.3%	37.9%	
Maximum Green (s)	34.0	59.0		18.0	18.0	18.0	17.0	55.4		7.6	46.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	3.0	4.0		3.0	4.0	
All-Red Time (s)	3.0	3.0		3.0	3.0	3.0	1.0	3.0		1.0	3.0	
Lost Time Adjust (s)	-3.0	-3.0		0.0	-3.0	-3.0	0.0	-3.0		0.0	-3.0	
Total Lost Time (s)	4.0	4.0		7.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lead/Lag	Lead			Lag	Lag	Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes			Yes	Yes	Yes	Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	4.0		4.0	4.0	4.0	3.0	5.0		3.0	5.0	
Recall Mode	Min	Min		Min	Min	Min	C-Max			Min	C-Max	
Walk Time (s)		7.0		7.0	7.0	7.0		7.0			7.0	
Flash Dont Walk (s)		11.0		11.0	11.0	11.0		11.0			11.0	
Pedestrian Calls (#/hr)		0		0	0	0		0			0	
Act Effct Green (s)	37.0	60.9		16.9	19.9	19.9	71.1	59.2		56.9	49.0	
Actuated g/C Ratio	0.26	0.44		0.12	0.14	0.14	0.51	0.42		0.41	0.35	
v/c Ratio	1.65	0.41		0.82	0.55	0.71	1.46	1.00		0.83	1.36	
Control Delay	331.1	12.9		107.2	65.2	33.8	246.1	60.0		39.8	201.0	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	331.1	12.9		107.2	65.2	33.8	246.1	60.0		39.8	201.0	
LOS	F	B		F	E	C	F	E		D	F	
Approach Delay		275.5			57.6			88.6			192.8	
Approach LOS		F			E			F			F	
Queue Length 50th (m)	~279.6	21.3		26.6	35.2	23.5	~132.4	~197.5		23.1	~295.4	
Queue Length 95th (m)	#323.2	44.9		#58.0	57.8	55.5 m#109.5	m146.4			m20.4 m#238.5		
Internal Link Dist (m)		127.2			306.4			126.2			246.2	
Turn Bay Length (m)	130.0			25.0			50.0			25.0		
Base Capacity (vph)	781	680		120	246	339	241	1935		138	1578	
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	
Reduced v/c Ratio	1.65	0.40		0.78	0.52	0.69	1.46	1.00		0.83	1.36	

Intersection Summary

Area Type: CBD
 Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 128 (91%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
 Natural Cycle: 150
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.65

Lanes, Volumes, Timings

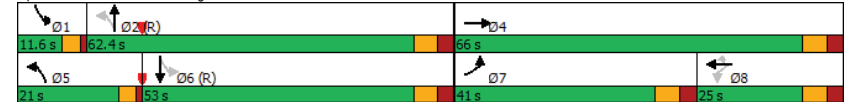
5: Trafalgar Rd & Cross Ave/South Service Rd

FT 2038 PM.syn

04-03-2024

Intersection Signal Delay: 166.6 Intersection LOS: F
 Intersection Capacity Utilization 122.9% ICU Level of Service H
 Analysis Period (min) 15
 ~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: Trafalgar Rd & Cross Ave/South Service Rd



HCM Signalized Intersection Capacity Analysis
5: Trafalgar Rd & Cross Ave/South Service Rd

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04-03-2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	1185	58	193	86	119	215	325	1746	42	105	1631	338
Future Volume (vph)	1185	58	193	86	119	215	325	1746	42	105	1631	338
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.6	3.3	3.6	3.5	3.3	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)	4.0	4.0		7.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	1.00		1.00	1.00	1.00	1.00	0.91		1.00	0.91	
Frpb, ped/bikes	1.00	0.96		1.00	1.00	1.00	1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		0.98	1.00	1.00	1.00	1.00		1.00	1.00	
Fr	1.00	0.88		1.00	1.00	0.85	1.00	1.00		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	2958	1341		1503	1644	1423	1496	4575		1570	4447	
Flt Permitted	0.95	1.00		0.59	1.00	1.00	0.08	1.00		0.09	1.00	
Satd. Flow (perm)	2958	1341		936	1644	1423	126	4575		144	4447	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1288	63	210	93	129	234	353	1898	46	114	1773	367
RTOR Reduction (vph)	0	87	0	0	0	127	0	2	0	0	23	0
Lane Group Flow (vph)	1288	186	0	93	129	107	353	1942	0	114	2117	0
Confl. Peds. (#/hr)			15	15			18		70	70		18
Heavy Vehicles (%)	3%	8%	9%	2%	4%	1%	5%	1%	0%	0%	1%	3%
Turn Type	Prot	NA		Perm	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		8		8	5	2		1	6	
Permitted Phases				8		8	2			6		
Actuated Green, G (s)	34.0	57.9		16.9	16.9	16.9	68.1	56.2		53.9	46.0	
Effective Green, g (s)	37.0	60.9		16.9	19.9	19.9	68.1	59.2		53.9	49.0	
Actuated g/C Ratio	0.26	0.43		0.12	0.14	0.14	0.49	0.42		0.38	0.35	
Clearance Time (s)	7.0	7.0		7.0	7.0	7.0	4.0	7.0		4.0	7.0	
Vehicle Extension (s)	3.0	4.0		4.0	4.0	4.0	3.0	5.0		3.0	5.0	
Lane Grp Cap (vph)	781	583		112	233	202	238	1934		135	1556	
v/s Ratio Prot	c0.44	0.14		0.08			c0.19	0.42		0.05	0.48	
v/s Ratio Perm				c0.10		0.08	c0.53			0.28		
v/c Ratio	1.65	0.32		0.83	0.55	0.53	1.48	1.00		0.84	1.36	
Uniform Delay, d1	51.5	25.9		60.1	55.9	55.7	45.3	40.4		34.7	45.5	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.16	1.34		1.27	1.19	
Incremental Delay, d2	297.9	0.4		39.5	3.5	3.2	219.5	7.2		4.6	162.7	
Delay (s)	349.4	26.4		99.7	59.4	59.0	272.2	61.4		48.5	216.7	
Level of Service	F	C		F	E	E	F	E		D	F	
Approach Delay (s)	292.9			67.4			93.8			208.2		
Approach LOS	F			E			F			F		

Intersection Summary			
HCM 2000 Control Delay	178.5	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.40		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	122.9%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
6: Trafalgar Rd & Cornwall Rd

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	566	573	55	109	900	569	74	976	98	706	787	420
Future Volume (vph)	566	573	55	109	900	569	74	976	98	706	787	420
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.5
Storage Length (m)	80.0		0.0	80.0		0.0	25.0		0.0	80.0		0.0
Storage Lanes	2		0	1		1	1		0	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	0.97	0.95	0.95	1.00	0.95	1.00	1.00	*0.80	0.95	0.97	*0.80	1.00
Ped Bike Factor	0.99	1.00		0.99		0.98	0.99	1.00		1.00		0.97
Fr		0.987				0.850		0.986				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3016	3104	0	1570	3217	1439	1540	2692	0	2987	1368	1409
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2994	3104	0	1550	3217	1413	1529	2692	0	2974	1368	1361
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		7				339		7				275
Link Speed (k/h)		50			50			50				50
Link Distance (m)		285.8			142.3			311.4				130.3
Travel Time (s)		20.6			10.2			22.4				9.4
Confl. Peds. (#/hr)	21		14	14		21	17		10	10		17
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
Heavy Vehicles (%)	1%	3%	1%	0%	1%	1%	2%	0%	0%	2%	0%	2%
Adj. Flow (vph)	615	623	60	118	978	618	80	1061	107	767	855	457
Shared Lane Traffic (%)												
Lane Group Flow (vph)	615	683	0	118	978	618	80	1168	0	767	855	457
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		6.6			6.6			6.6				6.6
Link Offset(m)		0.0			0.0			0.0				0.0
Crosswalk Width(m)		4.8			4.8			4.8				4.8
Two way Left Turn Lane												
Headway Factor	1.19	1.14	1.14	1.19	1.14	1.14	1.19	1.14	1.14	1.19	1.14	1.16
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2	1	1	2		1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0		2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6		2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4				9.4
Detector 2 Size(m)		0.6			0.6			0.6				0.6
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex				Cl+Ex
Detector 2 Channel												

Lanes, Volumes, Timings
6: Trafalgar Rd & Cornwall Rd

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA	Free	Prot	NA		Prot	NA	Perm
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases					Free							6
Detector Phase	3	8		7	4		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	7.0	10.0		7.0	10.0		7.0	20.0		7.0	20.0	20.0
Minimum Split (s)	12.0	37.0		12.0	37.0		12.0	39.0		12.0	39.0	39.0
Total Split (s)	22.0	43.0		18.0	39.0		12.0	53.0		26.0	67.0	67.0
Total Split (%)	15.7%	30.7%		12.9%	27.9%		8.6%	37.9%		18.6%	47.9%	47.9%
Maximum Green (s)	17.0	36.0		13.0	32.0		7.0	46.0		21.0	60.0	60.0
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	4.0
All-Red Time (s)	2.0	3.0		2.0	3.0		2.0	3.0		2.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-3.0		-1.0	-3.0		-1.0	-3.0		-1.0	-3.0	-3.0
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	0.2	0.2		0.2	0.2		0.2	0.2		0.2	0.2	0.2
Recall Mode	Max	Max		Max	Max		None	C-Max		Max	C-Max	C-Max
Walk Time (s)		7.0			7.0			7.0			7.0	7.0
Flash Dont Walk (s)		23.0			23.0			25.0			25.0	25.0
Pedestrian Calls (#/hr)		0			0			0			0	0
Act Effct Green (s)	18.0	39.0		14.0	35.0	140.0	8.0	49.0		22.0	63.0	63.0
Actuated g/C Ratio	0.13	0.28		0.10	0.25	1.00	0.06	0.35		0.16	0.45	0.45
v/c Ratio	1.59	0.79		0.75	1.22	0.44	0.91	1.23		1.64	1.39	0.60
Control Delay	315.3	53.7		89.4	152.9	1.0	137.9	153.7		332.6	201.7	4.8
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	315.3	53.7		89.4	152.9	1.0	137.9	153.7		332.6	201.7	4.8
LOS	F	D		F	F	A	F	F		F	F	A
Approach Delay		177.6			93.7			152.6				206.7
Approach LOS		F			F			F				F
Queue Length 50th (m)	~131.2	96.2		34.0	~183.2	0.0	23.6	~262.8		~170.6	~402.7	11.1
Queue Length 95th (m)	#170.2	120.9		#66.2	#226.8	0.0	#58.1	#316.5		m#122.0	m#273.7	m5.9
Internal Link Dist (m)		261.8			118.3			287.4				106.3
Turn Bay Length (m)	80.0			80.0			25.0			80.0		
Base Capacity (vph)	387	869		157	804	1413	88	946		469	615	763
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	0
Reduced v/c Ratio	1.59	0.79		0.75	1.22	0.44	0.91	1.23		1.64	1.39	0.60

Intersection Summary

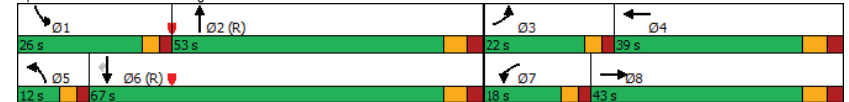
Area Type: CBD
 Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green, Master Intersection
 Natural Cycle: 150
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.64

Lanes, Volumes, Timings
6: Trafalgar Rd & Cornwall Rd

FT 2038 PM.syn
04-03-2024

Intersection Signal Delay: 159.6	Intersection LOS: F
Intersection Capacity Utilization 114.8%	ICU Level of Service H
Analysis Period (min) 15	
* User Entered Value	
~ Volume exceeds capacity, queue is theoretically infinite. Queue shown is maximum after two cycles.	
# 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.	
m Volume for 95th percentile queue is metered by upstream signal.	

Splits and Phases: 6: Trafalgar Rd & Cornwall Rd



HCM Signalized Intersection Capacity Analysis
6: Trafalgar Rd & Cornwall Rd

FT 2038 PM.syn
04-03-2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔	
Traffic Volume (vph)	566	573	55	109	900	569	74	976	98	706	787	420	
Future Volume (vph)	566	573	55	109	900	569	74	976	98	706	787	420	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.5	
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	
Lane Util. Factor	0.97	0.95		1.00	0.95	1.00	1.00	*0.80		0.97	*0.80	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.98	1.00	1.00		1.00	1.00	0.97	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	
Fr	1.00	0.99		1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	
Satd. Flow (prot)	3016	3104		1570	3217	1413	1540	2692		2987	1368	1361	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	
Satd. Flow (perm)	3016	3104		1570	3217	1413	1540	2692		2987	1368	1361	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	615	623	60	118	978	618	80	1061	107	767	855	457	
RTOR Reduction (vph)	0	5	0	0	0	0	0	5	0	0	0	151	
Lane Group Flow (vph)	615	678	0	118	978	618	80	1163	0	767	855	306	
Confl. Peds. (#/hr)	21		14	14		21	17		10	10		17	
Heavy Vehicles (%)	1%	3%	1%	0%	1%	1%	2%	0%	0%	2%	0%	2%	
Turn Type	Prot	NA		Prot	NA	Free	Prot	NA		Prot	NA	Perm	
Protected Phases	3	8		7	4		5	2		1	6		
Permitted Phases					Free							6	
Actuated Green, G (s)	17.0	36.0		13.0	32.0	140.0	7.0	46.0		21.0	60.0	60.0	
Effective Green, g (s)	18.0	39.0		14.0	35.0	140.0	8.0	49.0		22.0	63.0	63.0	
Actuated g/C Ratio	0.13	0.28		0.10	0.25	1.00	0.06	0.35		0.16	0.45	0.45	
Clearance Time (s)	5.0	7.0		5.0	7.0		5.0	7.0		5.0	7.0	7.0	
Vehicle Extension (s)	0.2	0.2		0.2	0.2		0.2	0.2		0.2	0.2	0.2	
Lane Grp Cap (vph)	387	864		157	804	1413	88	942		469	615	612	
v/s Ratio Prot	c0.20	0.22		0.08	c0.30		0.05	0.43		c0.26	c0.63		
v/s Ratio Perm					c0.44							0.22	
v/c Ratio	1.59	0.78		0.75	1.22	0.44	0.91	1.24		1.64	1.39	0.50	
Uniform Delay, d1	61.0	46.6		61.3	52.5	0.0	65.6	45.5		59.0	38.5	27.3	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.43	0.66	0.42	
Incremental Delay, d2	277.1	7.1		27.8	108.7	1.0	64.9	115.0		286.8	176.5	0.3	
Delay (s)	338.1	53.7		89.1	161.2	1.0	130.5	160.5		371.3	201.8	11.6	
Level of Service	F	D		F	F	A	F	F		F	F	B	
Approach Delay (s)	188.5			98.4				158.6			222.5		
Approach LOS	F			F				F			F		

Intersection Summary			
HCM 2000 Control Delay	169.4	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.42		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	114.8%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
7: South Service Road/Canadian Road & QEW EB Off-Ramp/Royal Windsor Drive

FT 2038 PM.syn
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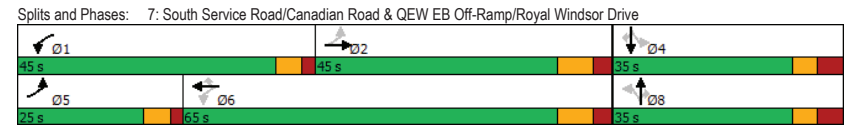
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	366	638	20	214	763	32	16	55	117	16	140	498
Future Volume (vph)	366	638	20	214	763	32	16	55	117	16	140	498
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	150.0	0.0	155.0		70.0	15.0		0.0	0.0			30.0
Storage Lanes	2	0	1		1	1		1	1			1
Taper Length (m)	7.5		7.5		7.5			7.5				7.5
Lane Util. Factor	0.97	0.95	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr		0.995				0.850		0.850				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3502	3395	0	1752	3505	1615	1805	1900	1615	1805	1900	1599
Flt Permitted	0.265			0.330			0.544			0.718		
Satd. Flow (perm)	977	3395	0	609	3505	1615	1034	1900	1615	1364	1900	1599
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3				94			152			382
Link Speed (k/h)		80			80			60				40
Link Distance (m)		324.5			247.2			158.7				215.5
Travel Time (s)		14.6			11.1			9.5				19.4
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
Heavy Vehicles (%)	0%	6%	0%	3%	3%	0%	0%	0%	0%	0%	0%	1%
Adj. Flow (vph)	398	693	22	233	829	35	17	60	127	17	152	541
Shared Lane Traffic (%)												
Lane Group Flow (vph)	398	715	0	233	829	35	17	60	127	17	152	541
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Right	Left	Right	Left	Right
Median Width(m)		7.2			7.2			3.6				3.6
Link Offset(m)		0.0			0.0			0.0				0.0
Crosswalk Width(m)		4.8			4.8			4.8				4.8
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	CI+Ex	CI+Ex		CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4				9.4
Detector 2 Size(m)		0.6			0.6			0.6				0.6
Detector 2 Type		CI+Ex			CI+Ex			CI+Ex				CI+Ex
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8				4

Lanes, Volumes, Timings
 7: South Service Road/Canadian Road & QEW EB Off-Ramp/Royal Windsor Drive 04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	2			6		6	8		8	4		4
Detector Phase	5	2		1	6	6	8	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	8.0	20.0		8.0	30.0	30.0	8.0	8.0	8.0	10.0	10.0	10.0
Minimum Split (s)	14.0	29.4		14.0	38.4	38.4	28.8	28.8	28.8	28.8	28.8	28.8
Total Split (s)	25.0	45.0		45.0	65.0	65.0	35.0	35.0	35.0	35.0	35.0	35.0
Total Split (%)	20.0%	36.0%		36.0%	52.0%	52.0%	28.0%	28.0%	28.0%	28.0%	28.0%	28.0%
Maximum Green (s)	19.0	36.6		39.0	56.6	56.6	27.2	27.2	27.2	27.2	27.2	27.2
Yellow Time (s)	4.0	5.4		4.0	5.4	5.4	3.7	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	2.0	3.0		2.0	3.0	3.0	4.1	4.1	4.1	4.1	4.1	4.1
Lost Time Adjust (s)	-2.0	-4.4		-2.0	-4.4	-4.4	-3.8	-3.8	-3.8	-3.8	-3.8	-3.8
Total Lost Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lead	Lag		Lead	Lag	Lag						
Lead-Lag Optimize?												
Vehicle Extension (s)	3.5	4.5		3.5	6.0	6.0	3.5	3.5	3.5	3.5	3.5	3.5
Recall Mode	None	Max		None	Max	Max	None	None	None	None	None	None
Walk Time (s)		10.0			10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Flash Dont Walk (s)		10.0			10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Pedestrian Calls (#/hr)		0			0	0	0	0	0	0	0	0
Act Effct Green (s)	77.2	62.5		74.9	61.4	61.4	23.5	23.5	23.5	23.5	23.5	23.5
Actuated g/C Ratio	0.69	0.56		0.67	0.55	0.55	0.21	0.21	0.21	0.21	0.21	0.21
v/c Ratio	0.40	0.38		0.43	0.43	0.04	0.08	0.15	0.28	0.06	0.38	0.85
Control Delay	7.0	15.8		8.7	17.0	0.1	35.6	36.3	4.9	35.1	40.4	25.7
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.0	15.8		8.7	17.0	0.1	35.6	36.3	4.9	35.1	40.4	25.7
LOS	A	B		A	B	A	D	D	A	D	D	C
Approach Delay		12.7			14.7			16.7			29.1	
Approach LOS		B			B			B			C	
Queue Length 50th (m)	14.0	46.7		16.2	58.6	0.0	3.1	11.3	0.0	3.1	30.1	36.2
Queue Length 95th (m)	22.9	74.7		30.1	87.0	0.0	9.7	23.3	10.4	9.6	50.8	86.5
Internal Link Dist (m)		300.5			223.2			134.7			191.5	
Turn Bay Length (m)	150.0			155.0		70.0	15.0					30.0
Base Capacity (vph)	1175	1901		858	1926	929	288	530	560	380	530	722
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.34	0.38		0.27	0.43	0.04	0.06	0.11	0.23	0.04	0.29	0.75

Intersection Summary	
Area Type:	Other
Cycle Length:	125
Actuated Cycle Length:	111.7
Natural Cycle:	85
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.85
Intersection Signal Delay:	17.4
Intersection Capacity Utilization:	72.5%
Analysis Period (min):	15
Intersection LOS:	B
ICU Level of Service:	C

Lanes, Volumes, Timings
 7: South Service Road/Canadian Road & QEW EB Off-Ramp/Royal Windsor Drive 04-03-2024



HCM Signalized Intersection Capacity Analysis FT 2038 PM.syn
 7: South Service Road/Canadian Road & QEW EB Off-Ramp/Royal Windsor Drive 04-03-2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↕	↔	↕	↕	↔	↕	↕
Traffic Volume (vph)	366	638	20	214	763	32	16	55	117	16	140	498
Future Volume (vph)	366	638	20	214	763	32	16	55	117	16	140	498
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	0.95		1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr	1.00	1.00		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3502	3396		1752	3505	1615	1805	1900	1615	1805	1900	1599
Flt Permitted	0.26	1.00		0.33	1.00	1.00	0.54	1.00	1.00	0.72	1.00	1.00
Satd. Flow (perm)	976	3396		609	3505	1615	1034	1900	1615	1364	1900	1599
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	398	693	22	233	829	35	17	60	127	17	152	541
RTOR Reduction (vph)	0	1	0	0	0	16	0	0	100	0	0	302
Lane Group Flow (vph)	398	714	0	233	829	19	17	60	27	17	152	239
Heavy Vehicles (%)	0%	6%	0%	3%	3%	0%	0%	0%	0%	0%	0%	1%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6		6	8		8	4		4
Actuated Green, G (s)	70.9	58.2		68.5	57.0	57.0	19.7	19.7	19.7	19.7	19.7	19.7
Effective Green, g (s)	74.9	62.6		72.5	61.4	61.4	23.5	23.5	23.5	23.5	23.5	23.5
Actuated g/C Ratio	0.67	0.56		0.65	0.55	0.55	0.21	0.21	0.21	0.21	0.21	0.21
Clearance Time (s)	6.0	8.4		6.0	8.4	8.4	7.8	7.8	7.8	7.8	7.8	7.8
Vehicle Extension (s)	3.5	4.5		3.5	6.0	6.0	3.5	3.5	3.5	3.5	3.5	3.5
Lane Grp Cap (vph)	987	1904		533	1928	888	217	400	340	287	400	336
v/s Ratio Prot	c0.05	0.21		0.05	c0.24			0.03			0.08	
v/s Ratio Perm	0.22			0.23		0.01	0.02		0.02	0.01		c0.15
v/c Ratio	0.40	0.37		0.44	0.43	0.02	0.08	0.15	0.08	0.06	0.38	0.71
Uniform Delay, d1	8.0	13.6		8.3	14.8	11.4	35.4	35.9	35.4	35.2	37.8	40.9
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.3	0.6		0.7	0.7	0.0	0.2	0.2	0.1	0.1	0.7	7.2
Delay (s)	8.3	14.2		9.0	15.5	11.5	35.5	36.1	35.5	35.3	38.5	48.1
Level of Service	A	B		A	B	B	D	D	D	D	D	D
Approach Delay (s)		12.1			14.0			35.7			45.8	
Approach LOS		B			B			D			D	

Intersection Summary			
HCM 2000 Control Delay	21.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	111.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	72.5%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings FT 2038 PM.syn
 8: QEW WB Off-Ramp & Kerr Street 04-03-2024

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔	↔	↔	↕	↕	↕
Traffic Volume (vph)	494	0	0	810	135	307
Future Volume (vph)	494	0	0	810	135	307
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)		0.0	0.0		0.0	140.0
Storage Lanes		0	0		1	1
Taper Length (m)			7.5		7.5	
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00
Fr						0.850
Flt Protected					0.950	
Satd. Flow (prot)	3574	0	0	3574	1805	1599
Flt Permitted					0.950	
Satd. Flow (perm)	3574	0	0	3574	1805	1599
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)						188
Link Speed (k/h)	60			60	40	
Link Distance (m)	130.3			194.2	262.1	
Travel Time (s)	7.8			11.7	23.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	0%	0%	1%	0%	1%
Adj. Flow (vph)	537	0	0	880	147	334
Shared Lane Traffic (%)						
Lane Group Flow (vph)	537	0	0	880	147	334
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)		15	25		25	15
Turn Type	NA			NA	Prot	Perm
Protected Phases	4			8	2	
Permitted Phases						2
Minimum Split (s)	22.5			22.5	22.5	22.5
Total Split (s)	22.5			22.5	22.5	22.5
Total Split (%)	50.0%			50.0%	50.0%	50.0%
Maximum Green (s)	18.0			18.0	18.0	18.0
Yellow Time (s)	3.5			3.5	3.5	3.5
All-Red Time (s)	1.0			1.0	1.0	1.0
Lost Time Adjust (s)	0.0			0.0	0.0	0.0
Total Lost Time (s)	4.5			4.5	4.5	4.5
Lead/Lag						
Lead-Lag Optimize?						
Walk Time (s)	7.0			7.0	7.0	7.0
Flash Dont Walk (s)	11.0			11.0	11.0	11.0
Pedestrian Calls (#/hr)	0			0	0	0
Act Effct Green (s)	18.0			18.0	18.0	18.0
Actuated g/C Ratio	0.40			0.40	0.40	0.40

Lanes, Volumes, Timings
8: QEW WB Off-Ramp & Kerr Street

FT 2038 PM.syn
04-03-2024

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
v/c Ratio	0.38			0.62	0.20	0.44
Control Delay	10.5			13.1	9.8	6.6
Queue Delay	0.0			0.0	0.0	0.0
Total Delay	10.5			13.1	9.8	6.6
LOS	B			B	A	A
Approach Delay	10.5			13.1	7.6	
Approach LOS	B			B	A	
Queue Length 50th (m)	15.5			28.7	7.5	7.5
Queue Length 95th (m)	24.8			43.5	16.4	21.4
Internal Link Dist (m)	106.3			170.2	238.1	
Turn Bay Length (m)					140.0	
Base Capacity (vph)	1429			1429	722	752
Starvation Cap Reductn	0			0	0	0
Spillback Cap Reductn	0			0	0	0
Storage Cap Reductn	0			0	0	0
Reduced v/c Ratio	0.38			0.62	0.20	0.44

Intersection Summary	
Area Type:	Other
Cycle Length:	45
Actuated Cycle Length:	45
Offset:	0 (0%), Referenced to phase 2:NBL and 6:, Start of Green
Natural Cycle:	45
Control Type:	Pretimed
Maximum v/c Ratio:	0.62
Intersection Signal Delay:	11.0
Intersection Capacity Utilization:	40.2%
Analysis Period (min):	15
ICU Level of Service A	
Intersection LOS: B	
ICU Level of Service A	

Splits and Phases: 8: QEW WB Off-Ramp & Kerr Street

HCM Signalized Intersection Capacity Analysis
8: QEW WB Off-Ramp & Kerr Street

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Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔↔			↔↔	↔	↔
Traffic Volume (vph)	494	0	0	810	135	307
Future Volume (vph)	494	0	0	810	135	307
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5			4.5	4.5	4.5
Lane Util. Factor	0.95			0.95	1.00	1.00
Fr't	1.00			1.00	1.00	0.85
Fit Protected	1.00			1.00	0.95	1.00
Sat'd. Flow (prot)	3574			3574	1805	1599
Fit Permitted	1.00			1.00	0.95	1.00
Sat'd. Flow (perm)	3574			3574	1805	1599
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	537	0	0	880	147	334
RTOR Reduction (vph)	0	0	0	0	0	113
Lane Group Flow (vph)	537	0	0	880	147	221
Heavy Vehicles (%)	1%	0%	0%	1%	0%	1%
Turn Type	NA			NA	Prot	Perm
Protected Phases	4			8	2	
Permitted Phases						2
Actuated Green, G (s)	18.0			18.0	18.0	18.0
Effective Green, g (s)	18.0			18.0	18.0	18.0
Actuated g/C Ratio	0.40			0.40	0.40	0.40
Clearance Time (s)	4.5			4.5	4.5	4.5
Lane Grp Cap (vph)	1429			1429	722	639
v/s Ratio Prot	0.15			c0.25	0.08	
v/s Ratio Perm						c0.14
v/c Ratio	0.38			0.62	0.20	0.35
Uniform Delay, d1	9.5			10.7	8.8	9.4
Progression Factor	1.00			1.00	1.00	1.00
Incremental Delay, d2	0.8			2.0	0.6	1.5
Delay (s)	10.3			12.7	9.5	10.9
Level of Service	B			B	A	B
Approach Delay (s)	10.3			12.7	10.4	
Approach LOS	B			B	B	

Intersection Summary			
HCM 2000 Control Delay	11.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	40.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
9: Dorval Drive & QEWB WB Off-Ramp

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Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔↔	↗	↖↖			↖↖
Traffic Volume (vph)	833	732	1169	0	0	1242
Future Volume (vph)	833	732	1169	0	0	1242
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	190.0		0.0	0.0	
Storage Lanes	2	1		0	0	
Taper Length (m)	7.5			7.5		
Lane Util. Factor	0.97	0.91	0.95	1.00	1.00	0.95
Frt	0.966	0.850				
Flt Protected	0.963					
Satd. Flow (prot)	3344	1455	3574	0	0	3539
Flt Permitted	0.963					
Satd. Flow (perm)	3344	1455	3574	0	0	3539
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)	38	48				
Link Speed (k/h)	40		60			60
Link Distance (m)	325.1		310.2			266.9
Travel Time (s)	29.3		18.6			16.0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	1%	1%	0%	0%	2%
Adj. Flow (vph)	905	796	1271	0	0	1350
Shared Lane Traffic (%)		33%				
Lane Group Flow (vph)	1168	533	1271	0	0	1350
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	7.2		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15		15	25	
Number of Detectors	1	1	2			2
Detector Template	Left	Right	Thru			Thru
Leading Detector (m)	2.0	2.0	10.0			10.0
Trailing Detector (m)	0.0	0.0	0.0			0.0
Detector 1 Position(m)	0.0	0.0	0.0			0.0
Detector 1 Size(m)	2.0	2.0	0.6			0.6
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex			CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0			0.0
Detector 1 Queue (s)	0.0	0.0	0.0			0.0
Detector 1 Delay (s)	0.0	0.0	0.0			0.0
Detector 2 Position(m)			9.4			9.4
Detector 2 Size(m)			0.6			0.6
Detector 2 Type			CI+Ex			CI+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type	Prot	Perm	NA			NA
Protected Phases	8		2			6

Lanes, Volumes, Timings
9: Dorval Drive & QEWB WB Off-Ramp

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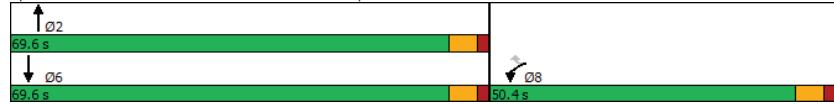
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Permitted Phases		8				
Detector Phase	8	8	2			6
Switch Phase						
Minimum Initial (s)	10.0	10.0	20.0			20.0
Minimum Split (s)	24.0	24.0	26.0			26.0
Total Split (s)	50.4	50.4	69.6			69.6
Total Split (%)	42.0%	42.0%	58.0%			58.0%
Maximum Green (s)	44.4	44.4	63.6			63.6
Yellow Time (s)	4.0	4.0	4.0			4.0
All-Red Time (s)	2.0	2.0	2.0			2.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0			-2.0
Total Lost Time (s)	4.0	4.0	4.0			4.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	4.5	4.5	5.0			5.0
Recall Mode	None	None	Max			Max
Walk Time (s)	5.0	5.0	7.0			7.0
Flash Dont Walk (s)	7.0	7.0	11.0			11.0
Pedestrian Calls (#/hr)	0	0	0			0
Act Effct Green (s)	46.1	46.1	65.6			65.6
Actuated g/C Ratio	0.39	0.39	0.55			0.55
v/c Ratio	0.89	0.90	0.65			0.70
Control Delay	43.2	52.1	21.0			22.2
Queue Delay	0.0	0.0	0.0			0.0
Total Delay	43.2	52.1	21.0			22.2
LOS	D	D	C			C
Approach Delay	46.0		21.0			22.2
Approach LOS	D		C			C
Queue Length 50th (m)	134.1	125.3	111.7			123.5
Queue Length 95th (m)	#168.0	#202.4	135.5			149.6
Internal Link Dist (m)	301.1		286.2			242.9
Turn Bay Length (m)		190.0				
Base Capacity (vph)	1319	593	1958			1939
Starvation Cap Reductn	0	0	0			0
Spillback Cap Reductn	0	0	0			0
Storage Cap Reductn	0	0	0			0
Reduced v/c Ratio	0.89	0.90	0.65			0.70
Intersection Summary						
Area Type:	Other					
Cycle Length:	120					
Actuated Cycle Length:	119.7					
Natural Cycle:	55					
Control Type:	Semi Act-Uncooord					
Maximum v/c Ratio:	0.90					
Intersection Signal Delay:	31.2			Intersection LOS: C		
Intersection Capacity Utilization:	72.4%			ICU Level of Service C		
Analysis Period (min)	15					
# 95th percentile volume exceeds capacity, queue may be longer.						

Lanes, Volumes, Timings
9: Dorval Drive & QEW WB Off-Ramp

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Queue shown is maximum after two cycles.

Splits and Phases: 9: Dorval Drive & QEW WB Off-Ramp



HCM Signalized Intersection Capacity Analysis
9: Dorval Drive & QEW WB Off-Ramp

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	WBL	WBR	NBT	NBR	SBL	SBT
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W	W	T	T	T	T
Traffic Volume (vph)	833	732	1169	0	0	1242
Future Volume (vph)	833	732	1169	0	0	1242
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0			4.0
Lane Util. Factor	0.97	0.91	0.95			0.95
Fr _t	0.97	0.85	1.00			1.00
Fit Protected	0.96	1.00	1.00			1.00
Satd. Flow (prot)	3343	1455	3574			3539
Fit Permitted	0.96	1.00	1.00			1.00
Satd. Flow (perm)	3343	1455	3574			3539
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	905	796	1271	0	0	1350
RTOR Reduction (vph)	23	30	0	0	0	0
Lane Group Flow (vph)	1145	503	1271	0	0	1350
Heavy Vehicles (%)	3%	1%	1%	0%	0%	2%
Turn Type	Prot	Perm	NA			NA
Protected Phases	8		2			6
Permitted Phases		8				
Actuated Green, G (s)	44.1	44.1	63.6			63.6
Effective Green, g (s)	46.1	46.1	65.6			65.6
Actuated g/C Ratio	0.39	0.39	0.55			0.55
Clearance Time (s)	6.0	6.0	6.0			6.0
Vehicle Extension (s)	4.5	4.5	5.0			5.0
Lane Grp Cap (vph)	1287	560	1958			1939
v/s Ratio Prot	0.34		0.36			c0.38
v/s Ratio Perm		c0.35				
w/c Ratio	0.89	0.90	0.65			0.70
Uniform Delay, d1	34.4	34.6	19.0			19.8
Progression Factor	1.00	1.00	1.00			1.00
Incremental Delay, d2	8.3	17.8	1.7			2.1
Delay (s)	42.7	52.5	20.7			21.9
Level of Service	D	D	C			C
Approach Delay (s)	45.7		20.7			21.9
Approach LOS	D		C			C
Intersection Summary						
HCM 2000 Control Delay			30.9		HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.78			
Actuated Cycle Length (s)			119.7		Sum of lost time (s)	8.0
Intersection Capacity Utilization			72.4%		ICU Level of Service	C
Analysis Period (min)			15			
c Critical Lane Group						

Lanes, Volumes, Timings
10: Dorval Drive & QEW EB Off-Ramp

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Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	323	384	0	1404	1328	0
Future Volume (vph)	323	384	0	1404	1328	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	175.0	0.0	0.0			0.0
Storage Lanes	1	1	0			0
Taper Length (m)	7.5		7.5			
Lane Util. Factor	0.97	0.91	1.00	0.95	0.95	1.00
Fr't	0.950	0.850				
Flt Protected	0.968					
Satd. Flow (prot)	3302	1441	0	3539	3505	0
Flt Permitted	0.968					
Satd. Flow (perm)	3302	1441	0	3539	3505	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	40	40				
Link Speed (k/h)	40			60	60	
Link Distance (m)	275.5			164.3	310.2	
Travel Time (s)	24.8			9.9	18.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	2%	0%	2%	3%	0%
Adj. Flow (vph)	351	417	0	1526	1443	0
Shared Lane Traffic (%)		42%				
Lane Group Flow (vph)	526	242	0	1526	1443	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	7.2			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Number of Detectors	1	1		2	2	
Detector Template	Left	Right		Thru	Thru	
Leading Detector (m)	2.0	2.0		10.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	2.0		0.6	0.6	
Detector 1 Type	CI+Ex	CI+Ex		CI+Ex	CI+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	
Detector 2 Position(m)				9.4	9.4	
Detector 2 Size(m)				0.6	0.6	
Detector 2 Type				CI+Ex	CI+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Prot	Perm		NA	NA	
Protected Phases	4			2	6	

Lanes, Volumes, Timings
10: Dorval Drive & QEW EB Off-Ramp

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Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Permitted Phases		4				
Detector Phase	4	4		2	6	
Switch Phase						
Minimum Initial (s)	10.0	10.0		20.0	20.0	
Minimum Split (s)	24.0	24.0		26.0	26.0	
Total Split (s)	45.6	45.6		74.4	74.4	
Total Split (%)	38.0%	38.0%		62.0%	62.0%	
Maximum Green (s)	39.6	39.6		68.4	68.4	
Yellow Time (s)	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	4.0	4.0		5.0	5.0	
Recall Mode	None	None		Max	Max	
Walk Time (s)	0.0	0.0		7.0	7.0	
Flash Dont Walk (s)	7.0	7.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0	
Act Effct Green (s)	25.1	25.1		70.6	70.6	
Actuated g/C Ratio	0.24	0.24		0.68	0.68	
v/c Ratio	0.64	0.64		0.63	0.60	
Control Delay	35.8	37.1		11.7	11.2	
Queue Delay	0.0	0.0		0.0	0.0	
Total Delay	35.8	37.1		11.7	11.2	
LOS	D	D		B	B	
Approach Delay	36.2			11.7	11.2	
Approach LOS	D			B	B	
Queue Length 50th (m)	47.6	42.1		81.6	74.5	
Queue Length 95th (m)	64.4	70.7		141.7	130.1	
Internal Link Dist (m)	251.5			140.3	286.2	
Turn Bay Length (m)	175.0					
Base Capacity (vph)	1352	603		2410	2386	
Starvation Cap Reductn	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	
Storage Cap Reductn	0	0		0	0	
Reduced v/c Ratio	0.39	0.40		0.63	0.60	
Intersection Summary						
Area Type:	Other					
Cycle Length:	120					
Actuated Cycle Length:	103.7					
Natural Cycle:	60					
Control Type:	Semi Act-Uncoord					
Maximum v/c Ratio:	0.64					
Intersection Signal Delay:	16.5			Intersection LOS: B		
Intersection Capacity Utilization:	72.4%			ICU Level of Service C		
Analysis Period (min)	15					

Lanes, Volumes, Timings
10: Dorval Drive & QEW EB Off-Ramp

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Splits and Phases: 10: Dorval Drive & QEW EB Off-Ramp



HCM Signalized Intersection Capacity Analysis
10: Dorval Drive & QEW EB Off-Ramp

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	EBL	EBR	NBL	NBT	SBT	SBR
Movement						
Lane Configurations	↔↔	↔		↕↕	↕↕	
Traffic Volume (vph)	323	384	0	1404	1328	0
Future Volume (vph)	323	384	0	1404	1328	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	0.91		0.95	0.95	
Fr _t	0.95	0.85		1.00	1.00	
Fit Protected	0.97	1.00		1.00	1.00	
Satd. Flow (prot)	3301	1441		3539	3505	
Fit Permitted	0.97	1.00		1.00	1.00	
Satd. Flow (perm)	3301	1441		3539	3505	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	351	417	0	1526	1443	0
RTOR Reduction (vph)	30	30	0	0	0	0
Lane Group Flow (vph)	496	212	0	1526	1443	0
Heavy Vehicles (%)	3%	2%	0%	2%	3%	0%
Turn Type	Prot	Perm		NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4				
Actuated Green, G (s)	23.1	23.1		68.6	68.6	
Effective Green, g (s)	25.1	25.1		70.6	70.6	
Actuated g/C Ratio	0.24	0.24		0.68	0.68	
Clearance Time (s)	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	4.0	4.0		5.0	5.0	
Lane Grp Cap (vph)	798	348		2409	2386	
v/s Ratio Prot	c0.15			c0.43	0.41	
v/s Ratio Perm		0.15				
v/c Ratio	0.62	0.61		0.63	0.60	
Uniform Delay, d ₁	35.1	34.9		9.3	9.0	
Progression Factor	1.00	1.00		1.00	1.00	
Incremental Delay, d ₂	1.7	3.5		1.3	1.1	
Delay (s)	36.8	38.4		10.6	10.1	
Level of Service	D	D		B	B	
Approach Delay (s)	37.3			10.6	10.1	
Approach LOS	D			B	B	
Intersection Summary						
HCM 2000 Control Delay			15.9		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.63			
Actuated Cycle Length (s)			103.7		Sum of lost time (s)	8.0
Intersection Capacity Utilization			72.4%		ICU Level of Service	C
Analysis Period (min)			15			
c Critical Lane Group						

Lanes, Volumes, Timings
11: Argus Rd & South Service Rd

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Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	↕
Traffic Volume (vph)	13	11	529	566	87	89
Future Volume (vph)	13	11	529	566	87	89
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt			0.930		0.932	
Flt Protected		0.974			0.976	
Satd. Flow (prot)	0	1571	1517	0	1555	0
Flt Permitted		0.974			0.976	
Satd. Flow (perm)	0	1571	1517	0	1555	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		177.7	145.7		103.5	
Travel Time (s)		12.8	10.5		7.5	
Confl. Peds. (#/hr)					5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	13%	10%	0%	0%	0%
Adj. Flow (vph)	14	12	575	615	95	97
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	26	1190	0	192	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (k/h)	24			14	24	14
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type: CBD
Control Type: Unsignalized
Intersection Capacity Utilization 87.5%
Analysis Period (min) 15
ICU Level of Service E

HCM Unsignalized Intersection Capacity Analysis
11: Argus Rd & South Service Rd

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Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	↕
Traffic Volume (veh/h)	13	11	529	566	87	89
Future Volume (Veh/h)	13	11	529	566	87	89
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)	14	12	575	615	95	97
Pedestrians			5			
Lane Width (m)			3.6			
Walking Speed (m/s)			1.2			
Percent Blockage			0			
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)		358				
pX, platoon unblocked						
vC, conflicting volume	1190				928	882
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1190				928	882
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				67	72
cM capacity (veh/h)	594				292	348

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	26	1190	192
Volume Left	14	0	95
Volume Right	0	615	97
eSH	594	1700	318
Volume to Capacity	0.02	0.70	0.60
Queue Length 95th (m)	0.6	0.0	29.7
Control Delay (s)	6.2	0.0	32.2
Lane LOS	A		D
Approach Delay (s)	6.2	0.0	32.2
Approach LOS			D

Intersection Summary

Average Delay
Intersection Capacity Utilization 87.5%
Analysis Period (min) 15
ICU Level of Service E

Lanes, Volumes, Timings
13: GO Bus Terminal/Argus Rd & Cross Ave

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	37	1318	21	48	590	161	20	3	61	462	26	78
Future Volume (vph)	37	1318	21	48	590	161	20	3	61	462	26	78
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6
Storage Length (m)	20.0	0.0	20.0	0.0	0.0	0.0	0.0	15.0	0.0	0.0	0.0	0.0
Storage Lanes	1	0	1	0	1	0	1	0	1	0	1	0
Taper Length (m)	7.5		7.5		7.5		7.5		7.5		7.5	
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	1.00			0.99	0.97	0.99	0.97	0.98	0.98		
Frt	0.998			0.968			0.857		0.887			
Flt Protected	0.950		0.950		0.950		0.950		0.950			
Satd. Flow (prot)	1570	3191	0	797	3120	0	785	708	0	1570	1192	0
Flt Permitted	0.344			0.090			0.679		0.712			
Satd. Flow (perm)	565	3191	0	76	3120	0	554	708	0	1152	1192	0
Right Turn on Red			Yes		Yes		Yes		Yes			Yes
Satd. Flow (RTOR)		2		71			66		85			
Link Speed (k/h)		50		50			50		50			50
Link Distance (m)		164.3		72.9			81.9		115.7			115.7
Travel Time (s)		11.8		5.2			5.9		8.3			8.3
Confl. Peds. (#/hr)	9		4	4		9	12		20	20		12
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
Heavy Vehicles (%)	0%	0%	100%	97%	0%	0%	100%	100%	100%	0%	100%	0%
Adj. Flow (vph)	40	1433	23	52	641	175	22	3	66	502	28	85
Shared Lane Traffic (%)												
Lane Group Flow (vph)	40	1456	0	52	816	0	22	69	0	502	113	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.3			3.3			3.3			3.3	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.19	1.14	1.14	1.19	1.14	1.14	1.19	1.14	1.14	1.19	1.14	1.14
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

Lanes, Volumes, Timings
13: GO Bus Terminal/Argus Rd & Cross Ave

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6		8		8		4	
Permitted Phases		2		6			8		8		4	
Detector Phases	2	2		1	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	22.0	22.0		8.0	22.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	45.0	45.0		12.5	29.0		29.0	29.0		29.0	29.0	
Total Split (s)	46.5	46.5		12.5	59.0		31.0	31.0		31.0	31.0	
Total Split (%)	51.7%	51.7%		13.9%	65.6%		34.4%	34.4%		34.4%	34.4%	
Maximum Green (s)	40.5	40.5		8.5	53.0		25.0	25.0		25.0	25.0	
Yellow Time (s)	4.0	4.0		3.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		1.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0		0.0	-2.0		-2.0	-2.0		-2.0	-2.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Vehicle Extension (s)	5.0	5.0		2.5	5.0		4.0	4.0		4.0	4.0	
Recall Mode	Min	Min		Min	Min		Min	Min		Min	Min	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	16.0	16.0		16.0	16.0		16.0	16.0		16.0	16.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	42.5	42.5		54.7	54.7		27.0	27.0		27.0	27.0	
Actuated g/C Ratio	0.47	0.47		0.61	0.61		0.30	0.30		0.30	0.30	
v/c Ratio	0.15	0.96		0.46	0.42		0.13	0.27		1.45	0.27	
Control Delay	15.4	39.8		25.2	9.1		25.6	9.8		245.9	10.3	
Queue Delay	0.0	9.8		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	15.4	49.5		25.2	9.1		25.6	9.8		245.9	10.3	
LOS	B	D		C	A		C	A		F	B	
Approach Delay		48.6			10.0			13.6			202.6	
Approach LOS		D			B			B			F	
Queue Length 50th (m)	3.9	128.3		3.6	33.6		2.9	0.4		~124.8	3.6	
Queue Length 95th (m)	10.6	#184.6		13.2	45.7		9.2	10.6		#187.1	16.5	
Internal Link Dist (m)		140.3			48.9			57.9			91.7	
Turn Bay Length (m)	20.0			20.0						15.0		
Base Capacity (vph)	267	1512		114	1940		167	259		346	418	
Starvation Cap Reductn	0	75		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	0.15	1.01		0.46	0.42		0.13	0.27		1.45	0.27	
Intersection Summary												
Area Type:	CBD											
Cycle Length:	90											
Actuated Cycle Length:	89.7											
Natural Cycle:	130											
Control Type:	Semi Act-Uncoord											
Maximum v/c Ratio:	1.45											
Intersection Signal Delay:	67.5						Intersection LOS: E					

Lanes, Volumes, Timings
13: GO Bus Terminal/Argus Rd & Cross Ave

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Intersection Capacity Utilization 86.1% ICU Level of Service E
Analysis Period (min) 15
- Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 13: GO Bus Terminal/Argus Rd & Cross Ave



HCM Signalized Intersection Capacity Analysis
13: GO Bus Terminal/Argus Rd & Cross Ave

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	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	←	→	↘	←	→	↘	←	→	↘	←	→	↘
Lane Configurations	↘	↕	↘	↘	↕	↘	↘	↕	↘	↘	↕	↘
Traffic Volume (vph)	37	1318	21	48	590	161	20	3	61	462	26	78
Future Volume (vph)	37	1318	21	48	590	161	20	3	61	462	26	78
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	0.99		1.00	0.97		1.00	0.98	
Flpb, ped/bikes	0.99	1.00		1.00	1.00		0.99	1.00		0.98	1.00	
Frt	1.00	1.00		1.00	0.97		1.00	0.86		1.00	0.89	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1561	3190		797	3119		776	708		1537	1192	
Flt Permitted	0.34	1.00		0.09	1.00		0.68	1.00		0.71	1.00	
Satd. Flow (perm)	565	3190		75	3119		555	708		1152	1192	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	40	1433	23	52	641	175	22	3	66	502	28	85
RTOR Reduction (vph)	0	1	0	0	28	0	0	46	0	0	59	0
Lane Group Flow (vph)	40	1455	0	52	788	0	22	23	0	502	54	0
Confl. Peds. (#/hr)	9		4	4		9	12		20	20		12
Heavy Vehicles (%)	0%	0%	100%	97%	0%	0%	100%	100%	100%	0%	100%	0%
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	40.5	40.5		52.7	52.7		25.0	25.0		25.0	25.0	
Effective Green, g (s)	42.5	42.5		52.7	54.7		27.0	27.0		27.0	27.0	
Actuated g/C Ratio	0.47	0.47		0.59	0.61		0.30	0.30		0.30	0.30	
Clearance Time (s)	6.0	6.0		4.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	5.0	5.0		2.5	5.0		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	267	1511		110	1901		167	213		346	358	
v/s Ratio Prot		c0.46		0.04	c0.25			0.03			0.04	
v/s Ratio Perm	0.07			0.23			0.04			c0.44		
v/c Ratio	0.15	0.96		0.47	0.41		0.13	0.11		1.45	0.15	
Uniform Delay, d1	13.4	22.8		16.2	9.1		22.8	22.6		31.4	22.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.5	15.4		2.3	0.3		0.5	0.3		218.4	0.3	
Delay (s)	13.9	38.3		18.5	9.4		23.3	22.9		249.8	23.2	
Level of Service	B	D		B	A		C	C		F	C	
Approach Delay (s)		37.6			10.0			23.0			208.2	
Approach LOS		D			A			C			F	
Intersection Summary												
HCM 2000 Control Delay				63.5			HCM 2000 Level of Service				E	
HCM 2000 Volume to Capacity ratio				1.08								
Actuated Cycle Length (s)				89.7			Sum of lost time (s)				12.0	
Intersection Capacity Utilization				86.1%			ICU Level of Service				E	
Analysis Period (min)				15								
c Critical Lane Group												

Lanes, Volumes, Timings
14: Lyons Lane/Street A & Cross Ave

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	62	267	17	19	439	26	308	6	208	42	3	123
Future Volume (vph)	62	267	17	19	439	26	308	6	208	42	3	123
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6
Storage Length (m)	0.0	0.0	25.0	0.0	20.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Storage Lanes	1	0	1	0	1	0	1	0	1	0	1	0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00	1.00		1.00	1.00		1.00	0.98		1.00	0.99	
Frt	0.991			0.992			0.855			0.853		
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1525	2914	0	1570	3073	0	1570	1438	0	1570	1412	0
Flt Permitted	0.466			0.492			0.654			0.524		
Satd. Flow (perm)	746	2914	0	812	3073	0	1080	1438	0	863	1412	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		9			11			226			134	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		40.1			209.8			69.1			70.9	
Travel Time (s)		2.9			15.1			5.0			5.1	
Confl. Peds. (#/hr)	3		1	1		3	1		4	4		1
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
Heavy Vehicles (%)	3%	11%	0%	0%	5%	0%	0%	0%	0%	0%	0%	2%
Adj. Flow (vph)	67	290	18	21	477	28	335	7	226	46	3	134
Shared Lane Traffic (%)												
Lane Group Flow (vph)	67	308	0	21	505	0	335	233	0	46	137	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.3			3.3			3.3			3.3	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.19	1.14	1.14	1.19	1.14	1.14	1.19	1.14	1.14	1.19	1.14	1.14
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

Lanes, Volumes, Timings
14: Lyons Lane/Street A & Cross Ave

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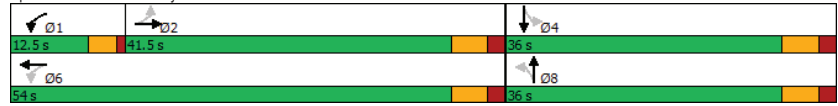
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6		8		8		4	
Permitted Phases		2		6			8		8		4	
Detector Phases		2		1	6		8		8		4	
Switch Phase												
Minimum Initial (s)	35.0	35.0		8.0	35.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	41.0	41.0		12.5	41.0		28.0	28.0		28.0	28.0	
Total Split (s)	41.5	41.5		12.5	54.0		36.0	36.0		36.0	36.0	
Total Split (%)	46.1%	46.1%		13.9%	60.0%		40.0%	40.0%		40.0%	40.0%	
Maximum Green (s)	35.5	35.5		8.5	48.0		30.0	30.0		30.0	30.0	
Yellow Time (s)	4.0	4.0		3.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		1.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0		0.0	-2.0		-2.0	-2.0		-2.0	-2.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Vehicle Extension (s)	5.0	5.0		2.5	5.0		4.0	4.0		4.0	4.0	
Recall Mode	Min	Min		Min	Min		Min	Min		Min	Min	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	15.0	15.0		15.0	15.0		15.0	15.0		15.0	15.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	37.0	37.0		49.0	49.0		30.6	30.6		30.6	30.6	
Actuated g/C Ratio	0.42	0.42		0.56	0.56		0.35	0.35		0.35	0.35	
v/c Ratio	0.21	0.25		0.04	0.29		0.89	0.36		0.15	0.24	
Control Delay	19.1	16.8		9.4	10.8		54.3	4.9		21.0	5.0	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	19.1	16.8		9.4	10.8		54.3	4.9		21.0	5.0	
LOS	B	B		A	B		D	A		C	A	
Approach Delay		17.2			10.7			34.1			9.1	
Approach LOS		B			B			C			A	
Queue Length 50th (m)	7.5	17.9		1.6	23.3		55.1	0.8		5.5	0.3	
Queue Length 95th (m)	17.3	27.4		4.9	33.1		#105.4	15.9		13.6	12.1	
Internal Link Dist (m)		16.1			185.8			45.1			46.9	
Turn Bay Length (m)				25.0			20.0					
Base Capacity (vph)	319	1253		528	1759		394	668		315	601	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.21	0.25		0.04	0.29		0.85	0.35		0.15	0.23	
Intersection Summary												
Area Type:	CBD											
Cycle Length:	90											
Actuated Cycle Length:	87.6											
Natural Cycle:	85											
Control Type:	Semi Act-Uncoord											
Maximum v/c Ratio:	0.89											
Intersection Signal Delay:	20.0						Intersection LOS: C					

Lanes, Volumes, Timings
14: Lyons Lane/Street A & Cross Ave

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Intersection Capacity Utilization 95.3% ICU Level of Service F
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 14: Lyons Lane/Street A & Cross Ave



HCM Signalized Intersection Capacity Analysis
14: Lyons Lane/Street A & Cross Ave

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	62	267	17	19	439	26	308	6	208	42	3	123
Future Volume (vph)	62	267	17	19	439	26	308	6	208	42	3	123
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.98		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	0.99		1.00	0.85		1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1520	2915		1570	3072		1569	1438		1565	1413	
Flt Permitted	0.47	1.00		0.49	1.00		0.65	1.00		0.52	1.00	
Satd. Flow (perm)	746	2915		813	3072		1080	1438		863	1413	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	67	290	18	21	477	28	335	7	226	46	3	134
RTOR Reduction (vph)	0	5	0	0	5	0	0	147	0	0	87	0
Lane Group Flow (vph)	67	303	0	21	500	0	335	86	0	46	50	0
Confl. Peds. (#/hr)	3		1	1		3	1		4	4		1
Heavy Vehicles (%)	3%	11%	0%	0%	5%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	35.0	35.0		47.0	47.0		28.6	28.6		28.6	28.6	
Effective Green, g (s)	37.0	37.0		47.0	49.0		30.6	30.6		30.6	30.6	
Actuated g/C Ratio	0.42	0.42		0.54	0.56		0.35	0.35		0.35	0.35	
Clearance Time (s)	6.0	6.0		4.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	5.0	5.0		2.5	5.0		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	315	1231		505	1718		377	502		301	493	
v/s Ratio Prot		0.10		0.00	c0.16			0.06			0.04	
v/s Ratio Perm	0.09			0.02			c0.31			0.05		
v/c Ratio	0.21	0.25		0.04	0.29		0.89	0.17		0.15	0.10	
Uniform Delay, d1	16.1	16.3		9.7	10.2		26.9	19.7		19.6	19.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.7	0.2		0.0	0.2		22.0	0.2		0.3	0.1	
Delay (s)	16.8	16.5		9.7	10.4		48.9	19.9		19.9	19.3	
Level of Service	B	B		A	B		D	B		B	B	
Approach Delay (s)		16.6			10.3			37.0			19.5	
Approach LOS		B			B			D			B	
Intersection Summary												
HCM 2000 Control Delay		21.9									C	
HCM 2000 Volume to Capacity ratio		0.55										
Actuated Cycle Length (s)		87.6			Sum of lost time (s)			12.0				
Intersection Capacity Utilization		95.3%			ICU Level of Service			F				
Analysis Period (min)		15										
c Critical Lane Group												

Lanes, Volumes, Timings
16: Speers Road/Cornwall Road & Cross Avenue

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Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↕↕	↕↕		↕	↕↕
Traffic Volume (vph)	362	905	995	54	18	563
Future Volume (vph)	362	905	995	54	18	563
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	75.0			0.0	55.0	0.0
Storage Lanes	1			0	1	2
Taper Length (m)	7.5				7.5	
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	0.88
Frt			0.992			0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1770	3539	3511	0	1770	2787
Flt Permitted	0.119				0.950	
Satd. Flow (perm)	222	3539	3511	0	1770	2787
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)			7			612
Link Speed (k/h)	50	50			50	
Link Distance (m)	189.7	274.5			184.2	
Travel Time (s)	13.7	19.8			13.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	393	984	1082	59	20	612
Shared Lane Traffic (%)						
Lane Group Flow (vph)	393	984	1141	0	20	612
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.6	3.6		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25			15	25	15
Number of Detectors	1	2	2		1	1
Detector Template	Left	Thru	Thru		Left	Right
Leading Detector (m)	2.0	10.0	10.0		2.0	2.0
Trailing Detector (m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Size(m)	2.0	0.6	0.6		2.0	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0		0.0	0.0
Detector 2 Position(m)		9.4	9.4			
Detector 2 Size(m)		0.6	0.6			
Detector 2 Type		Cl+Ex	Cl+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type	pm+pt	NA	NA		pm+pt	Perm
Protected Phases	5	2	6		7	
Permitted Phases	2				4	4

Lanes, Volumes, Timings
16: Speers Road/Cornwall Road & Cross Avenue

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Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Detector Phase	5	2	6		7	4
Switch Phase						
Minimum Initial (s)	6.0	5.0	5.0		5.0	5.0
Minimum Split (s)	12.0	33.5	33.5		27.5	27.5
Total Split (s)	22.0	62.0	40.0		28.0	28.0
Total Split (%)	24.4%	68.9%	44.4%		31.1%	31.1%
Maximum Green (s)	16.0	56.0	34.0		22.0	22.0
Yellow Time (s)	4.0	4.0	4.0		4.0	4.0
All-Red Time (s)	2.0	2.0	2.0		2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0		6.0	6.0
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?	Yes		Yes			
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	None	Max	Max		None	None
Walk Time (s)		18.0	18.0		12.0	12.0
Flash Dont Walk (s)		7.0	7.0		7.0	7.0
Pedestrian Calls (#/hr)		0	0		0	0
Act Effct Green (s)	56.1	56.1	34.0		7.7	7.7
Actuated g/C Ratio	0.74	0.74	0.45		0.10	0.10
v/c Ratio	0.80	0.38	0.72		0.11	0.73
Control Delay	29.6	4.3	20.6		31.5	8.8
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	29.6	4.3	20.6		31.5	8.8
LOS	C	A	C		C	A
Approach Delay		11.5	20.6		9.5	
Approach LOS		B	C		A	
Queue Length 50th (m)	33.2	19.5	67.2		2.8	0.0
Queue Length 95th (m)	#91.9	41.4	107.3		8.9	15.2
Internal Link Dist (m)		165.7	250.5		160.2	
Turn Bay Length (m)	75.0				55.0	
Base Capacity (vph)	491	2617	1580		514	1244
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	0.80	0.38	0.72		0.04	0.49

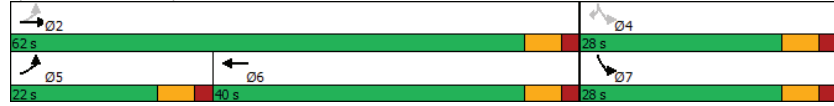
Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 75.8
 Natural Cycle: 90
 Control Type: Semi Act-Uncoord
 Maximum v/c Ratio: 0.80
 Intersection Signal Delay: 14.4
 Intersection Capacity Utilization 68.4%
 Intersection LOS: B
 ICU Level of Service C
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Lanes, Volumes, Timings
16: Speers Road/Cornwall Road & Cross Avenue

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Splits and Phases: 16: Speers Road/Cornwall Road & Cross Avenue




HCM Signalized Intersection Capacity Analysis
16: Speers Road/Cornwall Road & Cross Avenue

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Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↕	↕	↔	↔	↕
Traffic Volume (vph)	362	905	995	54	18	563
Future Volume (vph)	362	905	995	54	18	563
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0		6.0	6.0
Lane Util. Factor	1.00	0.95	0.95		1.00	0.88
Frt	1.00	1.00	0.99		1.00	0.85
Fit Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	3539	3512		1770	2787
Fit Permitted	0.12	1.00	1.00		0.95	1.00
Satd. Flow (perm)	222	3539	3512		1770	2787
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	393	984	1082	59	20	612
RTOR Reduction (vph)	0	0	4	0	0	550
Lane Group Flow (vph)	393	984	1137	0	20	62
Turn Type	pm+pt	NA	NA		pm+pt	Perm
Protected Phases	5	2	6		7	
Permitted Phases	2				4	4
Actuated Green, G (s)	56.1	56.1	34.1		7.7	7.7
Effective Green, g (s)	56.1	56.1	34.1		7.7	7.7
Actuated g/C Ratio	0.74	0.74	0.45		0.10	0.10
Clearance Time (s)	6.0	6.0	6.0		6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	491	2619	1579		179	283
v/s Ratio Prot	c0.17	0.28	0.32		0.01	
v/s Ratio Perm	c0.42					c0.02
v/c Ratio	0.80	0.38	0.72		0.11	0.22
Uniform Delay, d1	17.4	3.5	17.0		30.9	31.3
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	9.1	0.4	2.9		0.3	0.4
Delay (s)	26.5	4.0	19.8		31.2	31.7
Level of Service	C	A	B		C	C
Approach Delay (s)		10.4	19.8		31.7	
Approach LOS		B	B		C	
Intersection Summary						
HCM 2000 Control Delay		18.1		HCM 2000 Level of Service		B
HCM 2000 Volume to Capacity ratio		0.76				
Actuated Cycle Length (s)		75.8		Sum of lost time (s)		18.0
Intersection Capacity Utilization		68.4%		ICU Level of Service		C
Analysis Period (min)		15				
c Critical Lane Group						

Lanes, Volumes, Timings
17: North Access & South Service Road

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Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↩			↩	↩	↩
Traffic Volume (vph)	50	0	246	87	0	15
Future Volume (vph)	50	0	246	87	0	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t					0.865	
Fit Protected				0.964		
Satd. Flow (prot)	1863	0	0	1796	1611	0
Fit Permitted				0.964		
Satd. Flow (perm)	1863	0	0	1796	1611	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	154.2			110.2	69.4	
Travel Time (s)	11.1			7.9	5.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	54	0	267	95	0	16
Shared Lane Traffic (%)						
Lane Group Flow (vph)	54	0	0	362	16	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)		15	25		25	15
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	34.9%
Analysis Period (min)	15
	ICU Level of Service A

HCM Unsignalized Intersection Capacity Analysis
17: North Access & South Service Road

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Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↩			↩	↩	↩
Traffic Volume (veh/h)	50	0	246	87	0	15
Future Volume (Veh/h)	50	0	246	87	0	15
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)	54	0	267	95	0	16
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			54		683	54
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			54		683	54
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			83		100	98
cM capacity (veh/h)			1551		343	1013

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	54	362	16
Volume Left	0	267	0
Volume Right	0	0	16
eSH	1700	1551	1013
Volume to Capacity	0.03	0.17	0.02
Queue Length 95th (m)	0.0	5.0	0.4
Control Delay (s)	0.0	6.1	8.6
Lane LOS	A	A	A
Approach Delay (s)	0.0	6.1	8.6
Approach LOS		A	

Intersection Summary

Average Delay		5.5	
Intersection Capacity Utilization	34.9%	ICU Level of Service	A
Analysis Period (min)		15	

Lanes, Volumes, Timings
18: Street C & East Access

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Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	153	62	58	69	0
Future Volume (vph)	0	153	62	58	69	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.865					
Fit Protected				0.975		
Satd. Flow (prot)	1611	0	0	1816	1863	0
Fit Permitted	0.975					
Satd. Flow (perm)	1611	0	0	1816	1863	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	69.0			87.9	76.4	
Travel Time (s)	5.0			6.3	5.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	166	67	63	75	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	166	0	0	130	75	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25	15		
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	29.3%
Analysis Period (min)	15
	ICU Level of Service A

HCM Unsignalized Intersection Capacity Analysis
18: Street C & East Access

FT 2038 PM.syn
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Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	153	62	58	69	0
Future Volume (Veh/h)	0	153	62	58	69	0
Sign Control	Stop			Free	Free	
Grade	0%					
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	166	67	63	75	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)	221					
pX, platoon unblocked						
vC, conflicting volume	272	75	75			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	272	75	75			
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	83	96			
cM capacity (veh/h)	686	986	1524			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	166	130	75
Volume Left	0	67	0
Volume Right	166	0	0
cSH	986	1524	1700
Volume to Capacity	0.17	0.04	0.04
Queue Length 95th (m)	4.8	1.1	0.0
Control Delay (s)	9.4	4.0	0.0
Lane LOS	A	A	
Approach Delay (s)	9.4	4.0	0.0
Approach LOS	A		

Intersection Summary

Average Delay	5.6
Intersection Capacity Utilization	29.3%
Analysis Period (min)	15
	ICU Level of Service A

Lanes, Volumes, Timings
19: Street C & South Service Road

FT 2038 PM.syn
04-03-2024

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↘			↘	↗	↗
Traffic Volume (vph)	38	28	41	315	19	39
Future Volume (vph)	38	28	41	315	19	39
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.943			0.910		
Flt Protected				0.994	0.984	
Satd. Flow (prot)	1757	0	0	1852	1668	0
Flt Permitted				0.994	0.984	
Satd. Flow (perm)	1757	0	0	1852	1668	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	110.2			306.3	76.4	
Travel Time (s)	7.9			22.1	5.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	41	30	45	342	21	42
Shared Lane Traffic (%)						
Lane Group Flow (vph)	71	0	0	387	63	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)		15	25		25	15
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	35.6%
Analysis Period (min)	15
	ICU Level of Service A

HCM Unsignalized Intersection Capacity Analysis
19: Street C & South Service Road

FT 2038 PM.syn
04-03-2024

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↘			↘	↗	↗
Traffic Volume (veh/h)	38	28	41	315	19	39
Future Volume (Veh/h)	38	28	41	315	19	39
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)	41	30	45	342	21	42
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			71		488	56
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			71		488	56
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			97		96	96
cM capacity (veh/h)			1529		523	1011

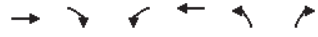

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	71	387	63
Volume Left	0	45	21
Volume Right	30	0	42
eSH	1700	1529	771
Volume to Capacity	0.04	0.03	0.08
Queue Length 95th (m)	0.0	0.7	2.1
Control Delay (s)	0.0	1.1	10.1
Lane LOS		A	B
Approach Delay (s)	0.0	1.1	10.1
Approach LOS			B

Intersection Summary

Average Delay		2.0	
Intersection Capacity Utilization	35.6%	ICU Level of Service	A
Analysis Period (min)	15		

Lanes, Volumes, Timings
20: Street A & South Service Road

FT 2038 PM.syn
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Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	50	4	17	70	10	0
Future Volume (vph)	50	4	17	70	10	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.991					
Fit Protected			0.991		0.950	
Satd. Flow (prot)	1846	0	0	1846	1770	0
Fit Permitted			0.991		0.950	
Satd. Flow (perm)	1846	0	0	1846	1770	0
Link Speed (k/h)	50		50		50	
Link Distance (m)	255.1		154.2		119.8	
Travel Time (s)	18.4		11.1		8.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	54	4	18	76	11	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	58	0	0	94	11	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0		0.0		3.6	
Link Offset(m)	0.0		0.0		0.0	
Crosswalk Width(m)	4.8		4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	15		25		15	
Sign Control	Free		Free		Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	21.3%
Analysis Period (min)	15
	ICU Level of Service A

HCM Unsignalized Intersection Capacity Analysis
20: Street A & South Service Road

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Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	50	4	17	70	10	0
Future Volume (Veh/h)	50	4	17	70	10	0
Sign Control	Free		Free		Stop	
Grade	0%					
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	54	4	18	76	11	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			58		168 56	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			58		168 56	
tC, single (s)			4.1		6.4 6.2	
tC, 2 stage (s)						
tF (s)			2.2		3.5 3.3	
p0 queue free %			99		99 100	
cM capacity (veh/h)			1546		813 1011	
Direction, Lane #						
	EB 1	WB 1	NB 1			
Volume Total	58	94	11			
Volume Left	0	18	11			
Volume Right	4	0	0			
eSH	1700	1546	813			
Volume to Capacity	0.03	0.01	0.01			
Queue Length 95th (m)	0.0	0.3	0.3			
Control Delay (s)	0.0	1.5	9.5			
Lane LOS	A		A			
Approach Delay (s)	0.0	1.5	9.5			
Approach LOS	A		A			

Intersection Summary						
Average Delay			1.5			
Intersection Capacity Utilization			21.3%		ICU Level of Service A	
Analysis Period (min)			15			

Lanes, Volumes, Timings
21: Argus Rd & Street 1

FT 2038 PM.syn
04-03-2024

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	131	0	201	436	267
Future Volume (vph)	0	131	0	201	436	267
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.865				0.949	
Fit Protected						
Satd. Flow (prot)	1611	0	0	1863	1768	0
Fit Permitted						
Satd. Flow (perm)	1611	0	0	1863	1768	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	165.4			115.7	65.0	
Travel Time (s)	11.9			8.3	4.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	142	0	218	474	290
Shared Lane Traffic (%)						
Lane Group Flow (vph)	142	0	0	218	764	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			3.3	3.3	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	54.0%
Analysis Period (min)	15
	ICU Level of Service A

HCM Unsignalized Intersection Capacity Analysis
21: Argus Rd & Street 1

FT 2038 PM.syn
04-03-2024

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	131	0	201	436	267
Future Volume (Veh/h)	0	131	0	201	436	267
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	142	0	218	474	290
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)				116		
pX, platoon unblocked						
vC, conflicting volume	837	619	764			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	837	619	764			
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	71	100			
cM capacity (veh/h)	337	489	849			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	142	218	764
Volume Left	0	0	0
Volume Right	142	0	290
cSH	489	849	1700
Volume to Capacity	0.29	0.00	0.45
Queue Length 95th (m)	9.6	0.0	0.0
Control Delay (s)	15.4	0.0	0.0
Lane LOS	C		
Approach Delay (s)	15.4	0.0	0.0
Approach LOS	C		

Intersection Summary

Average Delay	1.9
Intersection Capacity Utilization	54.0%
Analysis Period (min)	15
	ICU Level of Service A

Lanes, Volumes, Timings
22: Street C & Street 1

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	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	0	131	33	113	154	0	83	120	0	0	222	0
Future Volume (vph)	0	131	33	113	154	0	83	120	0	0	222	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr	0.973											
Flt Protected					0.979			0.980				
Satd. Flow (prot)	0	1812	0	0	1824	0	0	1825	0	0	1863	0
Flt Permitted					0.979			0.980				
Satd. Flow (perm)	0	1812	0	0	1824	0	0	1825	0	0	1863	0
Link Speed (k/h)	50		50		50		50		50		50	
Link Distance (m)	41.9		165.4		132.8		87.9					
Travel Time (s)	3.0		11.9		9.6		6.3					
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
Adj. Flow (vph)	0	142	36	123	167	0	90	130	0	0	241	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	178	0	0	290	0	0	220	0	0	241	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Right	Left	Left	Right	Right
Median Width(m)	0.0		0.0		3.6		3.6					
Link Offset(m)	0.0		0.0		0.0		0.0					
Crosswalk Width(m)	4.8		4.8		4.8		4.8					
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25	25	15	25	25	15	25	15	25	15
Sign Control	Stop		Stop		Free		Free					

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	59.2%
Analysis Period (min)	15
ICU Level of Service	B

HCM Unsignalized Intersection Capacity Analysis
22: Street C & Street 1

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	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (veh/h)	0	131	33	113	154	0	83	120	0	0	222	0
Future Volume (Veh/h)	0	131	33	113	154	0	83	120	0	0	222	0
Sign Control	Stop		Stop		Free		Free					
Grade	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)	0	142	36	123	167	0	90	130	0	0	241	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)	133											
pX, platoon unblocked												
vC, conflicting volume	634	551	241	658	551	130	241				130	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	634	551	241	658	551	130	241				130	
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	66	95	51	59	100	93				100	
cM capacity (veh/h)	255	412	798	251	412	920	1326				1455	
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	178	290	220	241								
Volume Left	0	123	90	0								
Volume Right	36	0	0	0								
eSH	457	324	1326	1455								
Volume to Capacity	0.39	0.89	0.07	0.00								
Queue Length 95th (m)	14.6	68.1	1.7	0.0								
Control Delay (s)	17.8	63.4	3.6	0.0								
Lane LOS	C	F	A									
Approach Delay (s)	17.8	63.4	3.6	0.0								
Approach LOS	C	F										

Intersection Summary

Average Delay	24.0
Intersection Capacity Utilization	59.2%
Analysis Period (min)	15
ICU Level of Service	B

Lanes, Volumes, Timings
23: GO Station West Access/Street C & Cross Ave

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔			↔			↔	↔		↔	↔	
Traffic Volume (vph)	72	598	58	206	351	131	99	0	491	229	113	25
Future Volume (vph)	72	598	58	206	351	131	99	0	491	229	113	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.0	0.0	0.0
Storage Lanes	0	0	0	0	0	0	1	0	1	0	0	0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.988				0.972		0.850				0.973	
Flt Protected	0.995				0.985		0.950				0.950	
Satd. Flow (prot)	0	3479	0	0	3389	0	1770	1583	0	1770	1812	0
Flt Permitted	0.767				0.595		0.662				0.297	
Satd. Flow (perm)	0	2682	0	0	2047	0	1233	1583	0	553	1812	0
Right Turn on Red	Yes			Yes			Yes			Yes		
Satd. Flow (RTOR)	21				68		110				26	
Link Speed (k/h)	50				50		50				50	
Link Distance (m)	209.8				164.3		55.1				132.8	
Travel Time (s)	15.1				11.8		4.0				9.6	
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
Adj. Flow (vph)	78	650	63	224	382	142	108	0	534	249	123	27
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	791	0	0	748	0	108	534	0	249	150	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)	3.3				3.3		3.6				3.6	
Link Offset(m)	0.0				0.0		0.0				0.0	
Crosswalk Width(m)	4.8				4.8		4.8				4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15		25		15		25		15	
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)	9.4				9.4		9.4				9.4	
Detector 2 Size(m)	0.6				0.6		0.6				0.6	
Detector 2 Type	Cl+Ex				Cl+Ex		Cl+Ex				Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)	0.0				0.0		0.0				0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	4				8		2				6	
Permitted Phases	4				8		2				6	

Lanes, Volumes, Timings
23: GO Station West Access/Street C & Cross Ave

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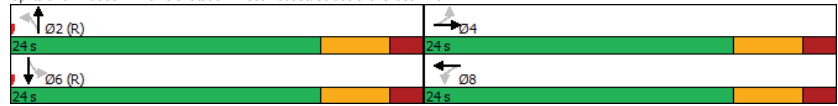
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	24.0	24.0		24.0	24.0		24.0	24.0		24.0	24.0	
Total Split (s)	24.0	24.0		24.0	24.0		24.0	24.0		24.0	24.0	
Total Split (%)	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%		50.0%	50.0%	
Maximum Green (s)	18.0	18.0		18.0	18.0		18.0	18.0		18.0	18.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0				0.0		0.0				0.0	
Total Lost Time (s)	6.0				6.0		6.0				6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	17.8				17.8		18.2				18.2	
Actuated g/C Ratio	0.37				0.37		0.38				0.38	
v/c Ratio	0.79				0.93		0.23				0.80	
Control Delay	20.4				35.7		12.0				22.7	
Queue Delay	0.0				0.0		0.0				0.0	
Total Delay	20.4				35.7		12.0				22.7	
LOS	C				D		B				C	
Approach Delay	20.4				35.7		20.9				95.1	
Approach LOS	C				D		C				F	
Queue Length 50th (m)	30.4				29.4		6.3				32.0	
Queue Length 95th (m)	#57.5				#62.3		15.1				#81.0	
Internal Link Dist (m)	185.8				140.3		31.1				108.8	
Turn Bay Length (m)											15.0	
Base Capacity (vph)	1018				810		467				668	
Starvation Cap Reductn	0				0		0				0	
Spillback Cap Reductn	0				0		0				0	
Storage Cap Reductn	0				0		0				0	
Reduced v/c Ratio	0.78				0.92		0.23				0.80	
Reduced v/c Ratio											1.19	
Reduced v/c Ratio											0.21	
Intersection Summary												
Area Type:	Other											
Cycle Length:	48											
Actuated Cycle Length:	48											
Offset:	0 (0%), Referenced to phase 2:NBL and 6:SBTL, Start of Green											
Natural Cycle:	75											
Control Type:	Actuated-Coordinated											
Maximum v/c Ratio:	1.19											
Intersection Signal Delay:	36.5						Intersection LOS: D					
Intersection Capacity Utilization:	103.4%						ICU Level of Service G					
Analysis Period (min):	15											
~	Volume exceeds capacity, queue is theoretically infinite.											

Lanes, Volumes, Timings
 23: GO Station West Access/Street C & Cross Ave

FT 2038 PM.syn
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Queue shown is maximum after two cycles.
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 23: GO Station West Access/Street C & Cross Ave



HCM Signalized Intersection Capacity Analysis
 23: GO Station West Access/Street C & Cross Ave

FT 2038 PM.syn
 04-03-2024



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔		↔	↔		↔	↔	
Traffic Volume (vph)	72	598	58	206	351	131	99	0	491	229	113	25
Future Volume (vph)	72	598	58	206	351	131	99	0	491	229	113	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0			6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor		0.95			0.95		1.00	1.00		1.00	1.00	
Fr _t		0.99			0.97		1.00	0.85		1.00	0.97	
Fit Protected		1.00			0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		3480			3388		1770	1583		1770	1812	
Fit Permitted		0.77			0.59		0.66	1.00		0.30	1.00	
Satd. Flow (perm)		2684			2044		1232	1583		554	1812	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	78	650	63	224	382	142	108	0	534	249	123	27
RTOR Reduction (vph)	0	13	0	0	43	0	0	68	0	0	16	0
Lane Group Flow (vph)	0	778	0	0	705	0	108	466	0	249	134	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		17.8			17.8		18.2	18.2		18.2	18.2	
Effective Green, g (s)		17.8			17.8		18.2	18.2		18.2	18.2	
Actuated g/C Ratio		0.37			0.37		0.38	0.38		0.38	0.38	
Clearance Time (s)		6.0			6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		995			757		467	600		210	687	
v/s Ratio Prot								0.29			0.07	
v/s Ratio Perm		0.29			0.34		0.09			0.45		
v/c Ratio		0.78			0.93		0.23	0.78		1.19	0.19	
Uniform Delay, d1		13.4			14.5		10.1	13.1		14.9	10.0	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		4.1			18.1		1.2	9.5		121.3	0.6	
Delay (s)		17.4			32.6		11.3	22.6		136.2	10.6	
Level of Service		B			C		B	C		F	B	
Approach Delay (s)		17.4			32.6		20.7			89.0		
Approach LOS		B			C		C			F		

Intersection Summary			
HCM 2000 Control Delay	33.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	1.06		
Actuated Cycle Length (s)	48.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	103.4%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings

FT 2043 AM.syn

1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd

04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	45	140	389	806	100	230	202	1749	944	214	2002	61
Future Volume (vph)	45	140	389	806	100	230	202	1749	944	214	2002	61
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0		0.0	165.0		25.0	145.0		0.0	95.0		90.0
Storage Lanes	1		1	1		1	1		1	1		1
Taper Length (m)	7.5			7.5		7.5			7.5			7.5
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Ped Bike Factor	0.99					0.98			0.99			
Frt			0.850			0.850			0.850			0.850
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1624	1693	1425	3060	1676	1398	1425	4446	1398	1562	4532	1398
Fit Permitted	0.687			0.366			0.088			0.085		
Satd. Flow (perm)	1164	1693	1425	1179	1676	1366	132	4446	1377	140	4532	1398
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			218			230			486			155
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		285.9			293.8			275.1			252.7	
Travel Time (s)		20.6			21.2			19.8			18.2	
Confl. Peds. (#/hr)	11					11			10	10		
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
Heavy Vehicles (%)	0%	1%	2%	3%	2%	4%	14%	5%	4%	4%	3%	4%
Adj. Flow (vph)	49	152	423	876	109	250	220	1901	1026	233	2176	66
Shared Lane Traffic (%)												
Lane Group Flow (vph)	49	152	423	876	109	250	220	1901	1026	233	2176	66
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		7.2			7.2			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings

FT 2043 AM.syn

1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd

04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA	Free	pm+pt	NA	Perm	pm+pt	NA	Free	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		Free	8		8	2		Free	6		6
Detector Phase	7	4		3	8	8	5	2		1	6	6
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0	10.0	6.0	15.0		6.0	15.0	15.0
Minimum Split (s)	10.0	34.0		11.0	43.0	43.0	10.0	34.0		10.0	34.0	34.0
Total Split (s)	10.0	34.0		19.0	43.0	43.0	12.0	53.0		14.0	55.0	55.0
Total Split (%)	8.3%	28.3%		15.8%	35.8%	35.8%	10.0%	44.2%		11.7%	45.8%	45.8%
Maximum Green (s)	6.0	27.0		14.0	36.0	36.0	8.0	46.0		10.0	48.0	48.0
Yellow Time (s)	3.0	4.0		3.0	4.0	4.0	3.0	4.0		3.0	4.0	4.0
All-Red Time (s)	1.0	3.0		2.0	3.0	3.0	1.0	3.0		1.0	3.0	3.0
Lost Time Adjust (s)	0.0	-3.0		0.0	-3.0	-3.0	0.0	-3.0		0.0	-3.0	-3.0
Total Lost Time (s)	4.0	4.0		5.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	4.0		3.0	4.0	4.0	3.0	5.0		3.0	5.0	5.0
Recall Mode	None	None		None	None	None	None	C-Max		None	C-Max	C-Max
Walk Time (s)					7.0	7.0		7.0			7.0	7.0
Flash Dont Walk (s)					29.0	29.0		20.0			20.0	20.0
Pedestrian Calls (#/hr)					0	0		0			0	0
Act Effct Green (s)	26.0	20.0	120.0	38.0	31.0	31.0	67.0	49.0	120.0	71.0	51.0	51.0
Actuated g/C Ratio	0.22	0.17	1.00	0.32	0.26	0.26	0.56	0.41	1.00	0.59	0.42	0.42
v/c Ratio	0.18	0.54	0.30	1.48	0.25	0.48	0.82	1.05	0.75	0.73	1.13	0.10
Control Delay	28.8	52.3	0.5	254.9	36.8	9.0	55.5	69.8	3.7	42.4	98.8	0.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.8	52.3	0.5	254.9	36.8	9.0	55.5	69.8	3.7	42.4	98.8	0.3
LOS	C	D	A	F	D	A	E	E	A	D	F	A
Approach Delay		15.4			185.9			47.3			90.8	
Approach LOS		B			F			D			F	
Queue Length 50th (m)	8.4	34.9	0.0	~154.1	22.0	3.8	38.5	~187.6	0.0	38.6	~229.1	0.0
Queue Length 95th (m)	16.5	53.9	0.0	#186.9	36.1	25.0	#100.6	#218.6	0.0	#94.9	#259.4	0.0
Internal Link Dist (m)		261.9			269.8			251.1			228.7	
Turn Bay Length (m)	60.0			165.0		25.0	145.0			95.0		90.0
Base Capacity (vph)	274	423	1425	592	544	599	268	1815	1377	320	1926	683
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.18	0.36	0.30	1.48	0.20	0.42	0.82	1.05	0.75	0.73	1.13	0.10
Intersection Summary												
Area Type:	CBD											
Cycle Length:	120											
Actuated Cycle Length:	120											
Offset:	33.6 (28%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green											
Natural Cycle:	150											
Control Type:	Actuated-Coordinated											
Maximum v/c Ratio:	1.48											
Intersection Signal Delay:	81.9						Intersection LOS: F					

Lanes, Volumes, Timings
1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd

FT 2043 AM.syn
04-03-2024

Intersection Capacity Utilization 103.5% ICU Level of Service G
Analysis Period (min) 15
- Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd



HCM Signalized Intersection Capacity Analysis
1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd

FT 2043 AM.syn
04-03-2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↑	↗	↖	↑	↗	↖	↑	↗	↖	↑	↗
Traffic Volume (vph)	45	140	389	806	100	230	202	1749	944	214	2002	61
Future Volume (vph)	45	140	389	806	100	230	202	1749	944	214	2002	61
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	1.0	5.0	4.0	4.0	4.0	4.0	1.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.98	1.00	1.00	0.99	1.00	1.00	1.00
Flpb, ped/bikes	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1614	1693	1425	3060	1676	1366	1425	4446	1377	1562	4532	1398
Flt Permitted	0.69	1.00	1.00	0.37	1.00	1.00	0.09	1.00	1.00	0.08	1.00	1.00
Satd. Flow (perm)	1167	1693	1425	1180	1676	1366	133	4446	1377	139	4532	1398
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	49	152	423	876	109	250	220	1901	1026	233	2176	66
RTOR Reduction (vph)	0	0	0	0	0	171	0	0	0	0	0	38
Lane Group Flow (vph)	49	152	423	876	109	79	220	1901	1026	233	2176	28
Confl. Peds. (#/hr)	11				11				10		10	
Heavy Vehicles (%)	0%	1%	2%	3%	2%	4%	14%	5%	4%	4%	3%	4%
Turn Type	pm+pt	NA	Free	pm+pt	NA	Perm	pm+pt	NA	Free	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		Free	8		8	2		Free	6		6
Actuated Green, G (s)	22.6	17.8	120.0	36.8	28.0	28.0	63.2	45.2	120.0	67.2	47.2	47.2
Effective Green, g (s)	22.6	20.8	120.0	36.8	31.0	31.0	63.2	48.2	120.0	67.2	50.2	50.2
Actuated g/C Ratio	0.19	0.17	1.00	0.31	0.26	0.26	0.53	0.40	1.00	0.56	0.42	0.42
Clearance Time (s)	4.0	7.0		5.0	7.0	7.0	4.0	7.0		4.0	7.0	7.0
Vehicle Extension (s)	3.0	4.0		3.0	4.0	4.0	3.0	5.0		3.0	5.0	5.0
Lane Grp Cap (vph)	237	293	1425	581	432	352	263	1785	1377	315	1895	584
v/s Ratio Prot	0.01	0.09		c0.18	0.07		0.13	0.43		0.12	c0.48	
v/s Ratio Perm	0.03		0.30	c0.29		0.06	0.31		c0.75	0.29		0.02
v/c Ratio	0.21	0.52	0.30	1.51	0.25	0.23	0.84	1.06	0.75	0.74	1.15	0.05
Uniform Delay, d1	40.8	45.1	0.0	39.2	35.3	35.0	34.2	35.9	0.0	32.5	34.9	20.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.4	2.1	0.5	237.3	0.4	0.4	20.0	41.0	3.7	8.8	73.4	0.2
Delay (s)	41.2	47.1	0.5	276.6	35.7	35.5	54.3	76.9	3.7	41.3	108.3	20.9
Level of Service	D	D	A	F	D	D	D	E	A	D	F	C
Approach Delay (s)		15.1			206.5			51.5			99.7	
Approach LOS		B			F			D			F	

Intersection Summary			
HCM 2000 Control Delay	90.0	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.25		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	103.5%	ICU Level of Service	G
Analysis Period (min)	15		
c	Critical Lane Group		

Lanes, Volumes, Timings

FT 2043 AM.syn

2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp

04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	3	0	198	629	37	297	0	2596	637	0	3303	7
Future Volume (vph)	3	0	198	629	37	297	0	2596	637	0	3303	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.5	3.3	3.6	3.5	3.6	3.5	3.6	3.6	3.6	3.5
Storage Length (m)	50.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Storage Lanes	1		1	1		1	0		1	0		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.91	1.00	1.00	0.86	0.86
Ped Bike Factor									0.98		1.00	
Frt			0.850			0.850			0.850			
Flt Protected	0.950			0.950	0.957							
Satd. Flow (prot)	1570	0	1395	1421	1453	1356	0	4446	1384	0	5711	0
Flt Permitted	0.950			0.950	0.957							
Satd. Flow (perm)	1570	0	1395	1421	1453	1356	0	4446	1353	0	5711	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			31			253			189			
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		142.1			192.6			324.8			275.1	
Travel Time (s)		10.2			13.9			23.4			19.8	
Confl. Peds. (#/hr)							8		5	5		8
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
Heavy Vehicles (%)	0%	0%	3%	5%	23%	6%	0%	5%	5%	0%	3%	0%
Adj. Flow (vph)	3	0	215	684	40	323	0	2822	692	0	3590	8
Shared Lane Traffic (%)				47%								
Lane Group Flow (vph)	3	0	215	363	361	323	0	2822	692	0	3598	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.3			3.3			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.19	1.14	1.16	1.19	1.14	1.16	1.14	1.14	1.14	1.14	1.14	1.16
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1		1	1		1			1			2
Detector Template	Left		Right	Left	Thru	Right		Thru	Right		Thru	
Leading Detector (m)	2.0		2.0	2.0	10.0	2.0		10.0	2.0		10.0	
Trailing Detector (m)	0.0		0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Detector 1 Position(m)	0.0		0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Detector 1 Size(m)	2.0		2.0	2.0	0.6	2.0		0.6	2.0		0.6	
Detector 1 Type	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Detector 1 Delay (s)	0.0		0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Detector 2 Position(m)					9.4			9.4			9.4	
Detector 2 Size(m)					0.6			0.6			0.6	
Detector 2 Type					Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

Lanes, Volumes, Timings

FT 2043 AM.syn

2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)								0.0			0.0	0.0
Turn Type	Prot		Perm	Perm	NA	Free		NA	Free		NA	NA
Protected Phases	3				4			6			2	
Permitted Phases						Free			Free			
Detector Phase	3		8	4	4			6			2	
Switch Phase												
Minimum Initial (s)	7.0		10.0	10.0	10.0			5.0			28.0	
Minimum Split (s)	23.0		38.0	38.0	38.0			35.0			35.0	
Total Split (s)	23.0		61.0	38.0	38.0			79.0			79.0	
Total Split (%)	16.4%		43.6%	27.1%	27.1%			56.4%			56.4%	
Maximum Green (s)	18.0		54.0	31.0	31.0			72.0			72.0	
Yellow Time (s)	3.0		4.0	4.0	4.0			4.0			4.0	
All-Red Time (s)	2.0		3.0	3.0	3.0			3.0			3.0	
Lost Time Adjust (s)	-1.0		-3.0	-3.0	-3.0			-3.0			-3.0	
Total Lost Time (s)	4.0		4.0	4.0	4.0			4.0			4.0	
Lead/Lag	Lead			Lag	Lag							
Lead-Lag Optimize?	Yes			Yes	Yes							
Vehicle Extension (s)	3.0		3.0	3.0	3.0			4.5			4.5	
Recall Mode	Min		Min	Min	Min			C-Min			C-Min	
Walk Time (s)			7.0	7.0	7.0			7.0			7.0	
Flash Dont Walk (s)			24.0	24.0	24.0			21.0			21.0	
Pedestrian Calls (#/hr)			0	0	0			0			0	
Act Effct Green (s)	8.0		57.0	45.0	45.0	140.0		75.0	140.0		75.0	
Actuated g/C Ratio	0.06		0.41	0.32	0.32	1.00		0.54	1.00		0.54	
v/c Ratio	0.03		0.37	0.80	0.77	0.24		1.19	0.51		1.18	
Control Delay	63.3		26.6	57.6	55.6	0.4		114.8	0.3		114.2	
Queue Delay	0.0		0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Total Delay	63.3		26.6	57.6	55.6	0.4		114.8	0.3		114.2	
LOS	E		C	E	E	A		F	A		F	
Approach Delay		27.2			39.3			92.2			114.2	
Approach LOS		C			D			F			F	
Queue Length 50th (m)	0.9		36.7	101.4	100.0	0.0		~357.4	0.0		~363.5	
Queue Length 95th (m)	4.2		59.0	#153.7	143.2	0.0		m#177.2	m0.0		#379.3	
Internal Link Dist (m)		118.1			168.6			300.8			251.1	
Turn Bay Length (m)	50.0											
Base Capacity (vph)	213		586	456	467	1356		2381	1353		3059	
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	0.01		0.37	0.80	0.77	0.24		1.19	0.51		1.18	
Intersection Summary												
Area Type:	CBD											
Cycle Length:	140											
Actuated Cycle Length:	140											
Offset:	115.4 (82%), Referenced to phase 2:SBT and 6:NBT, Start of Green											
Natural Cycle:	150											
Control Type:	Actuated-Coordinated											
Maximum v/c Ratio:	1.19											

Lanes, Volumes, Timings
2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp

FT 2043 AM.syn
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Intersection Signal Delay: 93.3	Intersection LOS: F
Intersection Capacity Utilization 97.4%	ICU Level of Service F
Analysis Period (min) 15	
~ Volume exceeds capacity, queue is theoretically infinite.	
Queue shown is maximum after two cycles.	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	
m Volume for 95th percentile queue is metered by upstream signal.	

Splits and Phases: 2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp



HCM Signalized Intersection Capacity Analysis
2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp

FT 2043 AM.syn
04-03-2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↘		↘	↘	↘	↘	↘	↘	↘	↘	↘	↘
Traffic Volume (vph)	3	0	198	629	37	297	0	2596	637	0	3303	7
Future Volume (vph)	3	0	198	629	37	297	0	2596	637	0	3303	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.5	3.3	3.6	3.5	3.6	3.6	3.6	3.6	3.6	3.5
Total Lost time (s)	4.0		4.0	4.0	4.0	1.0		4.0	4.0		4.0	
Lane Util. Factor	1.00		1.00	0.95	0.95	1.00		0.91	1.00		0.86	
Frpb, ped/bikes	1.00		1.00	1.00	1.00	1.00		1.00	0.98		1.00	
Flpb, ped/bikes	1.00		1.00	1.00	1.00	1.00		1.00	1.00		1.00	
Frt	1.00		0.85	1.00	1.00	0.85		1.00	0.85		1.00	
Flt Protected	0.95		1.00	0.95	0.96	1.00		1.00	1.00		1.00	
Flt Permitted	0.95		1.00	0.95	0.96	1.00		1.00	1.00		1.00	
Satd. Flow (perm)	1570		1395	1421	1454	1356		4446	1353		5709	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	3	0	215	684	40	323	0	2822	692	0	3590	8
RTOR Reduction (vph)	0	0	18	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	3	0	197	363	361	323	0	2822	692	0	3598	0
Confl. Peds. (#/hr)							8		5	5		8
Heavy Vehicles (%)	0%	0%	3%	5%	23%	6%	0%	5%	5%	0%	3%	0%
Turn Type	Prot		Perm	Perm	NA	Free		NA	Free		NA	
Protected Phases	3				4			6			2	
Permitted Phases			8	4		Free			Free			
Actuated Green, G (s)	7.0		54.0	42.0	42.0	140.0		72.0	140.0		72.0	
Effective Green, g (s)	8.0		57.0	45.0	45.0	140.0		75.0	140.0		75.0	
Actuated g/C Ratio	0.06		0.41	0.32	0.32	1.00		0.54	1.00		0.54	
Clearance Time (s)	5.0		7.0	7.0	7.0			7.0			7.0	
Vehicle Extension (s)	3.0		3.0	3.0	3.0			4.5			4.5	
Lane Grp Cap (vph)	89		567	456	467	1356		2381	1353		3058	
v/s Ratio Prot	0.00							c0.63			0.63	
v/s Ratio Perm			0.14	c0.26	0.25	0.24			c0.51			
v/c Ratio	0.03		0.35	0.80	0.77	0.24		1.19	0.51		1.18	
Uniform Delay, d1	62.3		28.6	43.3	42.9	0.0		32.5	0.0		32.5	
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	9.3	7.8	0.4		83.8	0.1		83.2	
Delay (s)	62.5		29.0	52.6	50.7	0.4		116.3	0.1		115.7	
Level of Service	E		C	D	D	A		F	A		F	
Approach Delay (s)		29.5			35.8			93.4			115.7	
Approach LOS		C			D			F			F	
Intersection Summary												
HCM 2000 Control Delay		94.1						HCM 2000 Level of Service			F	
HCM 2000 Volume to Capacity ratio		1.02										
Actuated Cycle Length (s)		140.0						Sum of lost time (s)		12.0		
Intersection Capacity Utilization		97.4%						ICU Level of Service		F		
Analysis Period (min)		15										
c Critical Lane Group												

Lanes, Volumes, Timings
3: Trafalgar Rd & QEW EB-Off Ramp

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Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔↔	↔		↑↑↑	↑↑↑	↔
Traffic Volume (vph)	1038	942	0	2223	2239	548
Future Volume (vph)	1038	942	0	2223	2239	548
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.5	3.6	3.6	3.6	3.6
Lane Util. Factor	0.97	1.00	1.00	0.91	0.91	1.00
Frt		0.850				0.850
Flt Protected	0.950					
Satd. Flow (prot)	2958	1423	0	4404	4489	1454
Flt Permitted	0.950					
Satd. Flow (perm)	2958	1423	0	4404	4489	1454
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)						189
Link Speed (k/h)	50			50	50	
Link Distance (m)	199.2			51.4	324.8	
Travel Time (s)	14.3			3.7	23.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	1%	0%	6%	4%	0%
Adj. Flow (vph)	1128	1024	0	2416	2434	596
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1128	1024	0	2416	2434	596
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	6.6			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.19	1.16	1.14	1.14	1.14	1.14
Turning Speed (k/h)	24	14	24			14
Number of Detectors	1	1		2	2	1
Detector Template	Left	Right		Thru	Thru	Right
Leading Detector (m)	2.0	2.0		10.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	2.0	2.0		0.6	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)				9.4	9.4	
Detector 2 Size(m)				0.6	0.6	
Detector 2 Type				Cl+Ex	Cl+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Perm	Perm		NA	NA	Free
Protected Phases				2	2	
Permitted Phases	4	4				Free
Detector Phase	4	4		2	2	

Lanes, Volumes, Timings
3: Trafalgar Rd & QEW EB-Off Ramp

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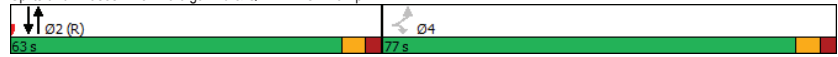
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Switch Phase						
Minimum Initial (s)	10.0	10.0		29.0	29.0	
Minimum Split (s)	38.0	38.0		36.0	36.0	
Total Split (s)	77.0	77.0		63.0	63.0	
Total Split (%)	55.0%	55.0%		45.0%	45.0%	
Maximum Green (s)	70.0	70.0		56.0	56.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	
All-Red Time (s)	3.0	3.0		3.0	3.0	
Lost Time Adjust (s)	-3.0	-3.0		-3.0	-3.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Recall Mode	None	None		C-Max	C-Max	
Walk Time (s)	7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	24.0	24.0		22.0	22.0	
Pedestrian Calls (#/hr)	0	0		0	0	
Act Effct Green (s)	73.0	73.0		59.0	59.0	140.0
Actuated g/C Ratio	0.52	0.52		0.42	0.42	1.00
v/c Ratio	0.73	1.38		1.30	1.29	0.41
Control Delay	29.5	209.7		172.7	159.7	0.1
Queue Delay	0.0	0.0		0.0	0.0	0.0
Total Delay	29.5	209.7		172.7	159.7	0.1
LOS	C	F		F	F	A
Approach Delay	115.2			172.7	128.3	
Approach LOS	F			F	F	
Queue Length 50th (m)	127.4	~394.9		~329.0	~327.6	0.0
Queue Length 95th (m)	154.9	#478.3		m#212.8	m#268.2	m0.0
Internal Link Dist (m)	175.2			27.4	300.8	
Turn Bay Length (m)						
Base Capacity (vph)	1542	741		1855	1891	1454
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	0.73	1.38		1.30	1.29	0.41
Intersection Summary						
Area Type:	CBD					
Cycle Length:	140					
Actuated Cycle Length:	140					
Offset:	133.6 (95%), Referenced to phase 2:NBSB and 6.; Start of Green					
Natural Cycle:	75					
Control Type:	Actuated-Coordinated					
Maximum v/c Ratio:	1.38					
Intersection Signal Delay:	138.7					
Intersection Capacity Utilization:	119.5%					
ICU Level of Service:	H					
Analysis Period (min):	15					
~	Volume exceeds capacity, queue is theoretically infinite.					
	Queue shown is maximum after two cycles.					

Lanes, Volumes, Timings
3: Trafalgar Rd & QEW EB-Off Ramp

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- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Trafalgar Rd & QEW EB-Off Ramp



HCM Signalized Intersection Capacity Analysis
3: Trafalgar Rd & QEW EB-Off Ramp

FT 2043 AM.syn
04-03-2024



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔↔	↔		↕↕↕	↕↕↕	↔
Traffic Volume (vph)	1038	942	0	2223	2239	548
Future Volume (vph)	1038	942	0	2223	2239	548
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.5	3.6	3.6	3.6	3.6
Total Lost time (s)	4.0	4.0		4.0	4.0	1.0
Lane Util. Factor	0.97	1.00		0.91	0.91	1.00
Friction	1.00	0.85		1.00	1.00	0.85
Fit Protected	0.95	1.00		1.00	1.00	1.00
Satd. Flow (prot)	2958	1423		4404	4489	1454
Fit Permitted	0.95	1.00		1.00	1.00	1.00
Satd. Flow (perm)	2958	1423		4404	4489	1454
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1128	1024	0	2416	2434	596
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	1128	1024	0	2416	2434	596
Heavy Vehicles (%)	3%	1%	0%	6%	4%	0%
Turn Type	Perm	Perm		NA	NA	Free
Protected Phases				2	2	
Permitted Phases	4	4				Free
Actuated Green, G (s)	70.0	70.0		56.0	56.0	140.0
Effective Green, g (s)	73.0	73.0		59.0	59.0	140.0
Actuated g/C Ratio	0.52	0.52		0.42	0.42	1.00
Clearance Time (s)	7.0	7.0		7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	1542	741		1855	1891	1454
v/s Ratio Prot				c0.55	0.54	
v/s Ratio Perm	0.38	c0.72				0.41
v/c Ratio	0.73	1.38		1.30	1.29	0.41
Uniform Delay, d1	25.9	33.5		40.5	40.5	0.0
Progression Factor	1.00	1.00		1.07	0.81	1.00
Incremental Delay, d2	1.8	180.2		136.5	129.6	0.1
Delay (s)	27.7	213.7		179.8	162.2	0.1
Level of Service	C	F		F	F	A
Approach Delay (s)	116.2			179.8	130.3	
Approach LOS	F			F	F	

Intersection Summary			
HCM 2000 Control Delay	142.1	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.38		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	119.5%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
4: Trafalgar Rd & Argus Rd

FT 2043 AM.syn
04-03-2024

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	290	0	3390	2456	726
Future Volume (vph)	0	290	0	3390	2456	726
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.6	3.5	3.6	3.6	3.6	3.6
Lane Util. Factor	1.00	1.00	1.00	0.91	0.91	0.91
Ped Bike Factor						
Frt		0.865			0.966	
Fit Protected						
Satd. Flow (prot)	0	1367	0	4363	4355	0
Fit Permitted						
Satd. Flow (perm)	0	1367	0	4363	4355	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	145.7			270.2	51.4	
Travel Time (s)	10.5			19.5	3.7	
Confl. Peds. (#/hr)						11
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	7%	0%	7%	4%	2%
Adj. Flow (vph)	0	315	0	3685	2670	789
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	315	0	3685	3459	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			3.3	3.3	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.14	1.16	1.14	1.14	1.14	1.14
Turning Speed (k/h)	24	14	24			14
Sign Control	Stop			Free	Free	

Intersection Summary						
Area Type:	CBD					
Control Type:	Unsignalized					
Intersection Capacity Utilization	97.6%			ICU Level of Service F		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
4: Trafalgar Rd & Argus Rd

FT 2043 AM.syn
04-03-2024

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	290	0	3390	2456	726
Future Volume (Veh/h)	0	290	0	3390	2456	726
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	315	0	3685	2670	789
Pedestrians	11					
Lane Width (m)	3.5					
Walking Speed (m/s)	1.2					
Percent Blockage	1					
Right turn flare (veh)						
Median type			None	None		
Median storage (veh)						
Upstream signal (m)				270	52	
pX, platoon unblocked	0.75	0.59	0.59			
vC, conflicting volume	4304	1296	3470			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1283	0	2741			
tC, single (s)	6.8	7.0	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.4	2.2			
p0 queue free %	100	49	100			
cM capacity (veh/h)	118	620	86			

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	315	1228	1228	1228	1068	1068	1323
Volume Left	0	0	0	0	0	0	0
Volume Right	315	0	0	0	0	0	789
eSH	620	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.51	0.72	0.72	0.72	0.63	0.63	0.78
Queue Length 95th (m)	23.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (s)	16.7	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	C						
Approach Delay (s)	16.7	0.0			0.0		
Approach LOS	C						

Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	97.6%	ICU Level of Service	F
Analysis Period (min)	15		

Lanes, Volumes, Timings

FT 2043 AM.syn

5: Trafalgar Rd & Cross Ave/South Service Rd

04-03-2024

	↖	→	↗	↙	←	↖	↙	↘	↗	↘	↖	↙	↘	↗	↘	↖	↙	↘
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR						
Lane Configurations	↖↗	↖	↗	↖	↗	↖	↖↗↘	↖↗↘	↖↗↘	↖↗↘	↖↗↘	↖↗↘						
Traffic Volume (vph)	1495	109	217	51	78	126	189	1460	33	268	2029	340						
Future Volume (vph)	1495	109	217	51	78	126	189	1460	33	268	2029	340						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900						
Lane Width (m)	3.3	3.6	3.6	3.3	3.6	3.5	3.3	3.6	3.6	3.3	3.6	3.6						
Storage Length (m)	130.0	0.0	25.0	0.0	50.0	0.0	25.0	0.0	25.0	0.0	25.0	0.0						
Storage Lanes	1	0	1	1	1	1	1	0	1	0	1	0						
Taper Length (m)	7.5		7.5		7.5		7.5		7.5		7.5							
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.91	0.91						
Ped Bike Factor	1.00	0.99		0.99		0.99		1.00		0.99		0.99						
Frt	0.900					0.850		0.997		0.978								
Fit Protected	0.950			0.950		0.950		0.950		0.950								
Satd. Flow (prot)	2795	1379	0	1525	1583	1382	1428	4500	0	1525	4404	0						
Fit Permitted	0.950			0.549		0.085		0.080		0.080								
Satd. Flow (perm)	2789	1379	0	876	1583	1362	128	4500	0	128	4404	0						
Right Turn on Red			Yes			Yes		Yes		Yes		Yes						
Satd. Flow (RTOR)		79				148		3		27								
Link Speed (k/h)	50			50		50		50		50								
Link Distance (m)	151.2			330.4		150.2		270.2		19.5								
Travel Time (s)	10.9			23.8		10.8		19.5										
Confl. Peds. (#/hr)	1		4	4		1	10		52	52		10						
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						
Heavy Vehicles (%)	9%	6%	12%	3%	8%	4%	10%	3%	0%	3%	3%	4%						
Adj. Flow (vph)	1625	118	236	55	85	137	205	1587	36	291	2205	370						
Shared Lane Traffic (%)																		
Lane Group Flow (vph)	1625	354	0	55	85	137	205	1623	0	291	2575	0						
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No						
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right						
Median Width(m)	6.6			6.6		3.3		3.3		3.3								
Link Offset(m)	0.0			0.0		0.0		0.0		0.0								
Crosswalk Width(m)	4.8			4.8		4.8		4.8		4.8								
Two way Left Turn Lane																		
Headway Factor	1.19	1.14	1.14	1.19	1.14	1.16	1.19	1.14	1.14	1.19	1.14	1.14						
Turning Speed (k/h)	24		14	24		14		24		24		14						
Number of Detectors	1	2		1	2	1	1	2		1	2							
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru							
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0		2.0	10.0							
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0							
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0							
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6		2.0	0.6							
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex							
Detector 1 Channel																		
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0							
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0							
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0							
Detector 2 Position(m)		9.4			9.4			9.4			9.4							
Detector 2 Size(m)		0.6			0.6			0.6			0.6							
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex							
Detector 2 Channel																		

Lanes, Volumes, Timings

FT 2043 AM.syn

5: Trafalgar Rd & Cross Ave/South Service Rd

04-03-2024

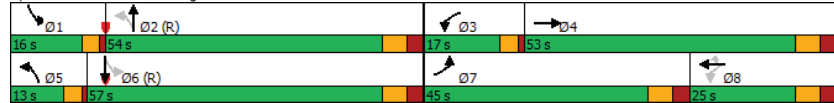
	↖	→	↗	↙	←	↖	↙	↘	↗	↘	↖	↙	↘	↗	↘	↖	↙	↘
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR						
Detector 2 Extend (s)		0.0			0.0			0.0				0.0						
Turn Type	Prot	NA		pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA							
Protected Phases	7	4		3	8		5	2		1	6							
Permitted Phases				8		8	2			6								
Detector Phases	7	4		3	8		8	2		1	6							
Switch Phase																		
Minimum Initial (s)	10.0	10.0		12.0	10.0	10.0	7.0	27.0		7.0	27.0							
Minimum Split (s)	17.0	25.0		17.0	25.0	25.0	11.5	34.0		11.5	34.0							
Total Split (s)	45.0	53.0		17.0	25.0	25.0	13.0	54.0		16.0	57.0							
Total Split (%)	32.1%	37.9%		12.1%	17.9%	17.9%	9.3%	38.6%		11.4%	40.7%							
Maximum Green (s)	38.0	46.0		13.0	18.0	18.0	9.0	47.0		12.0	50.0							
Yellow Time (s)	4.0	4.0		3.0	4.0	4.0	3.0	4.0		3.0	4.0							
All-Red Time (s)	3.0	3.0		1.0	3.0	3.0	1.0	3.0		1.0	3.0							
Lost Time Adjust (s)	-3.0	-3.0		0.0	-3.0	-3.0	0.0	-3.0		0.0	-3.0							
Total Lost Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0							
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes		Yes	Yes							
Vehicle Extension (s)	3.0	4.0		3.5	4.0	4.0	3.0	5.0		3.0	5.0							
Recall Mode	Min	Min		Min	Min	Min	Min	C-Max		Min	C-Max							
Walk Time (s)		7.0			7.0	7.0		7.0			7.0							
Flash Dont Walk (s)		11.0			11.0	11.0		11.0			11.0							
Pedestrian Calls (#/hr)		0			0	0		0			0							
Act Effct Green (s)	41.0	45.9		28.9	16.9	16.9	63.1	50.0		69.1	53.0							
Actuated g/C Ratio	0.29	0.33		0.21	0.12	0.12	0.45	0.36		0.49	0.38							
v/c Ratio	1.99	0.70		0.23	0.45	0.47	1.15	1.01		1.30	1.53							
Control Delay	475.9	39.4		28.5	64.1	11.9	130.6	69.5		174.3	272.4							
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0							
Total Delay	475.9	39.4		28.5	64.1	11.9	130.6	69.5		174.3	272.4							
LOS	F	D		C	E	B	F	E		F	F							
Approach Delay		397.8			31.2			76.3			262.4							
Approach LOS		F			C			E			F							
Queue Length 50th (m)	~378.9	71.1		9.2	23.4	0.0	~57.0	~158.5		~94.8	~380.0							
Queue Length 95th (m)	#422.5	105.2		17.1	40.4	16.9	m#9											

Lanes, Volumes, Timings
5: Trafalgar Rd & Cross Ave/South Service Rd

FT 2043 AM.syn
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Intersection Signal Delay: 242.8	Intersection LOS: F
Intersection Capacity Utilization 127.8%	ICU Level of Service H
Analysis Period (min) 15	
~ Volume exceeds capacity, queue is theoretically infinite.	
Queue shown is maximum after two cycles.	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	
m Volume for 95th percentile queue is metered by upstream signal.	

Splits and Phases: 5: Trafalgar Rd & Cross Ave/South Service Rd



HCM Signalized Intersection Capacity Analysis
5: Trafalgar Rd & Cross Ave/South Service Rd

FT 2043 AM.syn
04-03-2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔	↔		↔	↔	↔	↔↔↔	↔↔↔		↔↔↔	↔↔↔	
Traffic Volume (vph)	1495	109	217	51	78	126	189	1460	33	268	2029	340
Future Volume (vph)	1495	109	217	51	78	126	189	1460	33	268	2029	340
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.3	3.6	3.5	3.3	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	1.00		1.00	1.00	1.00	1.00	0.91		1.00	0.91	
Frpb, ped/bikes	1.00	0.99		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	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.90		1.00	1.00	0.85	1.00	1.00		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	2795	1379		1520	1583	1362	1428	4498		1525	4406	
Flt Permitted	0.95	1.00		0.55	1.00	1.00	0.09	1.00		0.08	1.00	
Satd. Flow (perm)	2795	1379		879	1583	1362	128	4498		128	4406	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1625	118	236	55	85	137	205	1587	36	291	2205	370
RTOR Reduction (vph)	0	53	0	0	0	120	0	2	0	0	17	0
Lane Group Flow (vph)	1625	301	0	55	85	17	205	1621	0	291	2558	0
Confl. Peds. (#/hr)	1		4	4		1	10		52	52		10
Heavy Vehicles (%)	9%	6%	12%	3%	8%	4%	10%	3%	0%	3%	3%	4%
Turn Type	Prot	NA		pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases				8		8	2			6		
Actuated Green, G (s)	38.0	42.9		25.9	13.9	13.9	60.1	47.0		66.1	50.0	
Effective Green, g (s)	41.0	45.9		25.9	16.9	16.9	60.1	50.0		66.1	53.0	
Actuated g/C Ratio	0.29	0.33		0.18	0.12	0.12	0.43	0.36		0.47	0.38	
Clearance Time (s)	7.0	7.0		4.0	7.0	7.0	4.0	7.0		4.0	7.0	
Vehicle Extension (s)	3.0	4.0		3.5	4.0	4.0	3.0	5.0		3.0	5.0	
Lane Grp Cap (vph)	818	452		217	191	164	176	1606		221	1667	
v/s Ratio Prot	c0.58	c0.22		0.02	0.05		0.11	0.36		c0.15	c0.58	
v/s Ratio Perm				0.03		0.01	0.39			0.47		
v/c Ratio	1.99	0.67		0.25	0.45	0.10	1.16	1.01		1.32	1.53	
Uniform Delay, d1	49.5	40.5		48.2	57.2	54.8	41.9	45.0		44.3	43.5	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.21	1.18		1.13	1.12	
Incremental Delay, d2	448.3	4.0		0.7	2.2	0.4	99.9	17.9		145.5	240.9	
Delay (s)	497.8	44.5		49.0	59.4	55.2	150.5	70.9		195.6	289.5	
Level of Service	F	D		D	E	E	F	E		F	F	
Approach Delay (s)		416.7			55.2			79.8			279.9	
Approach LOS		F			E			E			F	
Intersection Summary												
HCM 2000 Control Delay		257.3									F	
HCM 2000 Volume to Capacity ratio		1.58										
Actuated Cycle Length (s)		140.0			Sum of lost time (s)			16.0				
Intersection Capacity Utilization		127.8%			ICU Level of Service			H				
Analysis Period (min)		15										
c Critical Lane Group												

Lanes, Volumes, Timings
6: Trafalgar Rd & Cornwall Rd

FT 2043 AM.syn
04-03-2024

	↖	→	↗	↙	←	↖	↙	↑	↗	↘	↓	↘
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖↗	↖↗		↖↗	↖↗	↖↗	↖↗	↖↗	↖↗	↖↗	↖↗	↖↗
Traffic Volume (vph)	383	606	103	80	677	628	128	656	87	952	1052	309
Future Volume (vph)	383	606	103	80	677	628	128	656	87	952	1052	309
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.5
Storage Length (m)	80.0	0.0	80.0	0.0	25.0	0.0	80.0	0.0	80.0	0.0	0.0	0.0
Storage Lanes	2	0	1		1	1	0	1		1		1
Taper Length (m)	7.5		7.5		7.5		7.5		7.5		7.5	
Lane Util. Factor	0.97	0.95	0.95	1.00	0.95	1.00	1.00	*0.80	0.95	0.97	*0.80	1.00
Ped Bike Factor	0.99	0.99		0.99		0.98	1.00	1.00		0.99		0.98
Frt		0.978				0.850		0.982				0.850
Flt Protected	0.950		0.950		0.950		0.950		0.950		0.950	
Satd. Flow (prot)	2987	3052	0	1481	3154	1411	1540	2652	0	2929	1341	1356
Flt Permitted	0.950		0.950		0.950		0.950		0.950		0.950	
Satd. Flow (perm)	2949	3052	0	1473	3154	1384	1536	2652	0	2892	1341	1324
Right Turn on Red			Yes		Yes		Yes		Yes		Yes	
Satd. Flow (RTOR)		13			499		10				166	
Link Speed (k/h)		50			50		50				50	
Link Distance (m)		285.8			142.3		311.4				130.3	
Travel Time (s)		20.6			10.2		22.4				9.4	
Confl. Peds. (#/hr)	25		7	7		25	9		18	18		9
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
Heavy Vehicles (%)	2%	4%	1%	6%	3%	3%	2%	1%	0%	4%	2%	6%
Adj. Flow (vph)	416	659	112	87	736	683	139	713	95	1035	1143	336
Shared Lane Traffic (%)												
Lane Group Flow (vph)	416	771	0	87	736	683	139	808	0	1035	1143	336
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		6.6			6.6			6.6			6.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.19	1.14	1.14	1.19	1.14	1.14	1.19	1.14	1.14	1.19	1.14	1.16
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2	1	1		1	2		1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0		2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6		2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

Lanes, Volumes, Timings
6: Trafalgar Rd & Cornwall Rd

FT 2043 AM.syn
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	↖	→	↗	↙	←	↖	↙	↑	↗	↘	↓	↘
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA	Free	Prot	NA		Prot	NA	Perm
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases					Free							6
Detector Phases	3	8		7	4		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	7.0	10.0		7.0	10.0		7.0	20.0		7.0	20.0	20.0
Minimum Split (s)	12.0	37.0		12.0	37.0		12.0	39.0		12.0	39.0	39.0
Total Split (s)	16.0	40.0		13.0	37.0		13.0	58.0		29.0	74.0	74.0
Total Split (%)	11.4%	28.6%		9.3%	26.4%		9.3%	41.4%		20.7%	52.9%	52.9%
Maximum Green (s)	11.0	33.0		8.0	30.0		8.0	51.0		24.0	67.0	67.0
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	4.0
All-Red Time (s)	2.0	3.0		2.0	3.0		2.0	3.0		2.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-3.0		-1.0	-3.0		-1.0	-3.0		-1.0	-3.0	-3.0
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	0.2	0.2		0.2	0.2		0.2	0.2		0.2	0.2	0.2
Recall Mode	Max	Max		Max	Max		None	C-Max		Max	C-Max	C-Max
Walk Time (s)		7.0			7.0			7.0			7.0	7.0
Flash Dont Walk (s)		23.0			23.0			25.0			25.0	25.0
Pedestrian Calls (#/hr)		0			0			0			0	0
Act Effct Green (s)	12.0	36.0		9.0	33.0	140.0	9.0	54.0		25.0	70.0	70.0
Actuated g/C Ratio	0.09	0.26		0.06	0.24	1.00	0.06	0.39		0.18	0.50	0.50
v/c Ratio	1.62	0.97		0.92	0.99	0.49	1.40	0.79		1.98	1.71	0.45
Control Delay	336.9	76.0		135.5	83.8	1.3	276.7	44.0		477.8	340.5	1.2
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	336.9	76.0		135.5	83.8	1.3	276.7	44.0		477.8	340.5	1.2
LOS	F	E		F	F	A	F	D		F	F	A
Approach Delay		167.4			49.3			78.1			351.7	
Approach LOS		F			D			E			F	
Queue Length 50th (m)	-89.7	116.1		25.7	113.4	0.0	-54.1	127.5		-248.0	-599.3	0.0
Queue Length 95th (m)	#124.3	#159.8		#61.3	#157.3	0.0	#98.9	160.1		m#152.7	m#351.5	m0.0
Internal Link Dist (m)		261.8			118.3			287.4			106.3	
Turn Bay Length (m)	80.0			80.0			25.0			80.0		
Base Capacity (vph)	256	794		95	743	1384	99	1029		523	670	745
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	0
Reduced v/c Ratio	1.63	0.97		0.92	0.99	0.49	1.40	0.79		1.98	1.71	0.45

Intersection Summary

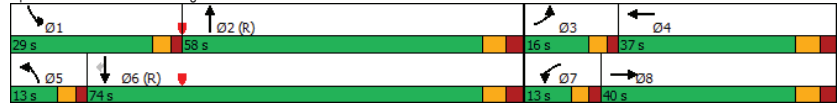
Area Type:	CBD
Cycle Length:	140
Actuated Cycle Length:	140
Offset:	0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green, Master Intersection
Natural Cycle:	150
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	1.98

Lanes, Volumes, Timings
6: Trafalgar Rd & Cornwall Rd

FT 2043 AM.syn
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Intersection Signal Delay: 200.1	Intersection LOS: F
Intersection Capacity Utilization 119.9%	ICU Level of Service H
Analysis Period (min) 15	
* User Entered Value	
~ Volume exceeds capacity, queue is theoretically infinite. Queue shown is maximum after two cycles.	
# 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.	
m Volume for 95th percentile queue is metered by upstream signal.	

Splits and Phases: 6: Trafalgar Rd & Cornwall Rd



HCM Signalized Intersection Capacity Analysis
6: Trafalgar Rd & Cornwall Rd

FT 2043 AM.syn
04-03-2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔	↕↕		↔↔	↕↕	↔↔	↔↔	↕↕		↔↔	↕↕	↔↔
Traffic Volume (vph)	383	606	103	80	677	628	128	656	87	952	1052	309
Future Volume (vph)	383	606	103	80	677	628	128	656	87	952	1052	309
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.5
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.97	0.95		1.00	0.95	1.00	1.00	*0.80		0.97	*0.80	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.98	1.00	1.00		1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	2987	3053		1481	3154	1384	1540	2653		2929	1341	1324
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	2987	3053		1481	3154	1384	1540	2653		2929	1341	1324
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	416	659	112	87	736	683	139	713	95	1035	1143	336
RTOR Reduction (vph)	0	10	0	0	0	0	0	6	0	0	0	83
Lane Group Flow (vph)	416	761	0	87	736	683	139	802	0	1035	1143	253
Confl. Peds. (#/hr)	25		7	7		25	9		18	18		9
Heavy Vehicles (%)	2%	4%	1%	6%	3%	3%	2%	1%	0%	4%	2%	6%
Turn Type	Prot	NA		Prot	NA	Free	Prot	NA		Prot	NA	Perm
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases						Free						6
Actuated Green, G (s)	11.0	33.0		8.0	30.0	140.0	8.0	51.0		24.0	67.0	67.0
Effective Green, g (s)	12.0	36.0		9.0	33.0	140.0	9.0	54.0		25.0	70.0	70.0
Actuated g/C Ratio	0.09	0.26		0.06	0.24	1.00	0.06	0.39		0.18	0.50	0.50
Clearance Time (s)	5.0	7.0		5.0	7.0		5.0	7.0		5.0	7.0	7.0
Vehicle Extension (s)	0.2	0.2		0.2	0.2		0.2	0.2		0.2	0.2	0.2
Lane Grp Cap (vph)	256	785		95	743	1384	99	1023		523	670	662
v/s Ratio Prot	c0.14	c0.25		0.06	0.23		0.09	0.30		c0.35	c0.85	
v/s Ratio Perm						c0.49						0.19
v/c Ratio	1.62	0.97		0.92	0.99	0.49	1.40	0.78		1.98	1.71	0.38
Uniform Delay, d1	64.0	51.5		65.1	53.3	0.0	65.5	37.9		57.5	35.0	21.6
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.47	0.64	0.09
Incremental Delay, d2	298.5	25.6		71.4	30.8	1.3	231.5	6.0		441.2	318.3	0.2
Delay (s)	362.5	77.0		136.5	84.2	1.3	297.0	43.9		526.0	340.5	2.1
Level of Service	F	E		F	F	A	F	D		F	F	A
Approach Delay (s)		177.1			49.6			81.0			371.6	
Approach LOS		F			D			F			F	
Intersection Summary												
HCM 2000 Control Delay		210.6									F	
HCM 2000 Volume to Capacity ratio		1.60										
Actuated Cycle Length (s)		140.0				Sum of lost time (s)		16.0				
Intersection Capacity Utilization		119.9%				ICU Level of Service		H				
Analysis Period (min)		15										
c Critical Lane Group												

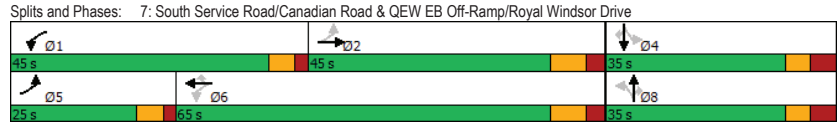
Lanes, Volumes, Timings
 7: South Service Road/Canadian Road & QEW EB Off-Ramp/Royal Windsor Drive FT 2043 AM.syn
 04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	55	683	37	111	673	9	3	10	62	4	24	36
Future Volume (vph)	55	683	37	111	673	9	3	10	62	4	24	36
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	150.0	0.0	155.0		70.0	15.0		0.0	0.0			30.0
Storage Lanes	2	0	1		1	1		1	1			1
Taper Length (m)	7.5		7.5		7.5			7.5				7.5
Lane Util. Factor	0.97	0.95	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.992				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3400	3299	0	1719	3139	1380	1805	1667	1468	1805	1792	1495
Flt Permitted	0.357			0.310			0.740			0.750		
Satd. Flow (perm)	1278	3299	0	561	3139	1380	1406	1667	1468	1425	1792	1495
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5				94			152			152
Link Speed (k/h)	80			80			60			40		
Link Distance (m)	324.5			247.2			158.7			215.5		
Travel Time (s)	14.6			11.1			9.5			19.4		
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
Heavy Vehicles (%)	3%	9%	0%	5%	15%	17%	0%	14%	10%	0%	6%	8%
Adj. Flow (vph)	60	742	40	121	732	10	3	11	67	4	26	39
Shared Lane Traffic (%)												
Lane Group Flow (vph)	60	782	0	121	732	10	3	11	67	4	26	39
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Right	Left	Left	Right	Right
Median Width(m)	7.2			7.2			3.6			3.6		
Link Offset(m)	0.0			0.0			0.0			0.0		
Crosswalk Width(m)	4.8			4.8			4.8			4.8		
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	CI+Ex	CI+Ex		CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		CI+Ex			CI+Ex			CI+Ex			CI+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	

Lanes, Volumes, Timings
 7: South Service Road/Canadian Road & QEW EB Off-Ramp/Royal Windsor Drive FT 2043 AM.syn
 04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	2			6		6	8	8	8	4		4
Detector Phase	5	2		1	6	6	8	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	8.0	20.0		8.0	30.0	30.0	8.0	8.0	8.0	10.0	10.0	10.0
Minimum Split (s)	14.0	34.0		14.0	38.4	38.4	28.8	28.8	28.8	35.0	35.0	35.0
Total Split (s)	25.0	45.0		45.0	65.0	65.0	35.0	35.0	35.0	35.0	35.0	35.0
Total Split (%)	20.0%	36.0%		36.0%	52.0%	52.0%	28.0%	28.0%	28.0%	28.0%	28.0%	28.0%
Maximum Green (s)	19.0	36.6		39.0	56.6	56.6	27.2	27.2	27.2	27.2	27.2	27.2
Yellow Time (s)	4.0	5.4		4.0	5.4	5.4	3.7	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	2.0	3.0		2.0	3.0	3.0	4.1	4.1	4.1	4.1	4.1	4.1
Lost Time Adjust (s)	-2.0	-4.4		-2.0	-4.4	-4.4	-3.8	-3.8	-3.8	-3.8	-3.8	-3.8
Total Lost Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lead	Lag		Lead	Lag	Lag						
Lead-Lag Optimize?												
Vehicle Extension (s)	3.5	4.5		3.5	6.0	6.0	3.5	3.5	3.5	3.5	3.5	3.5
Recall Mode	None	Max		None	Max	Max	None	None	None	None	None	None
Walk Time (s)	10.0			10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Flash Dont Walk (s)		10.0			10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Pedestrian Calls (#/hr)		0			0	0	0	0	0	0	0	0
Act Effct Green (s)	71.4	61.4		72.7	65.8	65.8	13.4	13.4	13.4	13.9	13.9	13.9
Actuated g/C Ratio	0.76	0.66		0.78	0.70	0.70	0.14	0.14	0.14	0.15	0.15	0.15
v/c Ratio	0.05	0.36		0.21	0.33	0.01	0.01	0.05	0.20	0.02	0.10	0.11
Control Delay	2.7	8.6		3.5	8.1	0.0	36.0	36.5	1.3	36.0	37.3	0.6
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	2.7	8.6		3.5	8.1	0.0	36.0	36.5	1.3	36.0	37.3	0.6
LOS	A	A		A	A	A	D	D	A	D	D	A
Approach Delay		8.1			7.3			7.4				16.5
Approach LOS		A			A			A				B
Queue Length 50th (m)	1.0	35.5		4.6	33.2	0.0	0.5	1.9	0.0	0.7	4.5	0.0
Queue Length 95th (m)	2.3	47.9		8.4	44.2	0.0	3.1	7.0	0.0	3.8	12.3	0.0
Internal Link Dist (m)		300.5			223.2			134.7			191.5	
Turn Bay Length (m)	150.0			155.0		70.0	15.0					30.0
Base Capacity (vph)	1514	2169		965	2210	999	469	555	591	475	597	600
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.04	0.36		0.13	0.33	0.01	0.01	0.02	0.11	0.01	0.04	0.07
Intersection Summary												
Area Type:	Other											
Cycle Length:	125											
Actuated Cycle Length:	93.4											
Natural Cycle:	90											
Control Type:	Semi Act-Uncoord											
Maximum v/c Ratio:	0.36											
Intersection Signal Delay:	8.0											
Intersection Capacity Utilization:	50.0%						Intersection LOS: A					
Analysis Period (min):	15											
ICU Level of Service A												

Lanes, Volumes, Timings FT 2043 AM.syn
04-03-2024
7: South Service Road/Canadian Road & QEW EB Off-Ramp/Royal Windsor Drive



HCM Signalized Intersection Capacity Analysis FT 2043 AM.syn
04-03-2024
7: South Service Road/Canadian Road & QEW EB Off-Ramp/Royal Windsor Drive

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕		↔	↕	↔	↔	↕	↔	↕	↔	↕
Traffic Volume (vph)	55	683	37	111	673	9	3	10	62	4	24	36
Future Volume (vph)	55	683	37	111	673	9	3	10	62	4	24	36
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	0.95		1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Fit Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3400	3300		1719	3139	1380	1805	1667	1468	1805	1792	1495
Fit Permitted	0.36	1.00		0.31	1.00	1.00	0.74	1.00	1.00	0.75	1.00	1.00
Satd. Flow (perm)	1279	3300		561	3139	1380	1407	1667	1468	1426	1792	1495
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	60	742	40	121	732	10	3	11	67	4	26	39
RTOR Reduction (vph)	0	2	0	0	0	3	0	0	59	0	0	34
Lane Group Flow (vph)	60	780	0	121	732	7	3	11	8	4	26	5
Heavy Vehicles (%)	3%	9%	0%	5%	15%	17%	0%	14%	10%	0%	6%	8%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6		6	8		8	4		4
Actuated Green, G (s)	64.6	58.4		68.6	60.4	60.4	7.7	7.7	7.7	7.7	7.7	7.7
Effective Green, g (s)	68.6	62.8		72.6	64.8	64.8	11.5	11.5	11.5	11.5	11.5	11.5
Actuated g/C Ratio	0.71	0.65		0.75	0.67	0.67	0.12	0.12	0.12	0.12	0.12	0.12
Clearance Time (s)	6.0	8.4		6.0	8.4	8.4	7.8	7.8	7.8	7.8	7.8	7.8
Vehicle Extension (s)	3.5	4.5		3.5	6.0	6.0	3.5	3.5	3.5	3.5	3.5	3.5
Lane Grp Cap (vph)	1089	2147		544	2107	926	167	198	174	169	213	178
v/s Ratio Prot	0.00	c0.24		c0.02	0.23			0.01			c0.01	
v/s Ratio Perm	0.03			0.14		0.00	0.00		0.01	0.00		0.00
v/c Ratio	0.06	0.36		0.22	0.35	0.01	0.02	0.06	0.05	0.02	0.12	0.03
Uniform Delay, d1	4.1	7.7		3.6	6.8	5.2	37.5	37.7	37.6	37.5	38.0	37.6
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.0	0.5		0.2	0.5	0.0	0.1	0.1	0.1	0.1	0.3	0.1
Delay (s)	4.2	8.2		3.8	7.2	5.2	37.6	37.8	37.8	37.6	38.3	37.6
Level of Service	A	A		A	A	A	D	D	D	D	D	D
Approach Delay (s)		7.9			6.7			37.8				37.9
Approach LOS		A			A			D				D
Intersection Summary												
HCM 2000 Control Delay		9.8										A
HCM 2000 Volume to Capacity ratio		0.31										
Actuated Cycle Length (s)		96.5							12.0			
Intersection Capacity Utilization		50.0%										A
Analysis Period (min)		15										
c Critical Lane Group												

Lanes, Volumes, Timings
8: QEW WB Off-Ramp & Kerr Street

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Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔↔			↔↔	↔	↔
Traffic Volume (vph)	585	0	0	355	312	347
Future Volume (vph)	585	0	0	355	312	347
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)		0.0	0.0		0.0	140.0
Storage Lanes		0	0		1	1
Taper Length (m)			7.5		7.5	
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00
Fr						0.850
Flt Protected					0.950	
Satd. Flow (prot)	3539	0	0	3539	1770	1583
Flt Permitted					0.950	
Satd. Flow (perm)	3539	0	0	3539	1770	1583
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)						134
Link Speed (k/h)	60			60	40	
Link Distance (m)	128.8			184.7	258.8	
Travel Time (s)	7.7			11.1	23.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	636	0	0	386	339	377
Shared Lane Traffic (%)						
Lane Group Flow (vph)	636	0	0	386	339	377
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)		15	25		25	15
Turn Type	NA			NA	Prot	Perm
Protected Phases	4			8	2	
Permitted Phases						2
Minimum Split (s)				22.5	22.5	22.5
Total Split (s)				22.5	22.5	22.5
Total Split (%)	50.0%			50.0%	50.0%	50.0%
Maximum Green (s)	18.0			18.0	18.0	18.0
Yellow Time (s)	3.5			3.5	3.5	3.5
All-Red Time (s)	1.0			1.0	1.0	1.0
Lost Time Adjust (s)	0.0			0.0	0.0	0.0
Total Lost Time (s)	4.5			4.5	4.5	4.5
Lead/Lag						
Lead-Lag Optimize?						
Walk Time (s)	7.0			7.0	7.0	7.0
Flash Dont Walk (s)	11.0			11.0	11.0	11.0
Pedestrian Calls (#/hr)	0			0	0	0
Act Effct Green (s)	18.0			18.0	18.0	18.0
Actuated g/C Ratio	0.40			0.40	0.40	0.40
v/c Ratio	0.45			0.27	0.48	0.53

Lanes, Volumes, Timings
8: QEW WB Off-Ramp & Kerr Street

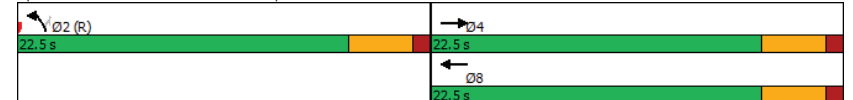
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Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Control Delay	11.2			9.8	12.9	9.7
Queue Delay	0.0			0.0	0.0	0.0
Total Delay	11.2			9.8	12.9	9.7
LOS	B			A	B	A
Approach Delay	11.2			9.8	11.2	
Approach LOS	B			A	B	
Queue Length 50th (m)	19.1			10.6	19.6	13.4
Queue Length 95th (m)	29.9			18.1	37.3	31.8
Internal Link Dist (m)	104.8			160.7	234.8	
Turn Bay Length (m)						140.0
Base Capacity (vph)	1415			1415	708	713
Starvation Cap Reductn	0			0	0	0
Spillback Cap Reductn	0			0	0	0
Storage Cap Reductn	0			0	0	0
Reduced v/c Ratio	0.45			0.27	0.48	0.53

Intersection Summary

Area Type: Other
 Cycle Length: 45
 Actuated Cycle Length: 45
 Offset: 0 (0%), Referenced to phase 2:NBL and 6: Start of Green
 Natural Cycle: 45
 Control Type: Pretimed
 Maximum v/c Ratio: 0.53
 Intersection Signal Delay: 10.9
 Intersection Capacity Utilization 45.2%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service A

Splits and Phases: 8: QEW WB Off-Ramp & Kerr Street



HCM Signalized Intersection Capacity Analysis
8: QEW WB Off-Ramp & Kerr Street

FT 2043 AM.syn
04-03-2024

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔↔			↔↔	↔↔	↔↔
Traffic Volume (vph)	585	0	0	355	312	347
Future Volume (vph)	585	0	0	355	312	347
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5			4.5	4.5	4.5
Lane Util. Factor	0.95			0.95	1.00	1.00
Fr _t	1.00			1.00	1.00	0.85
Fl _t Protected	1.00			1.00	0.95	1.00
Satd. Flow (prot)	3539			3539	1770	1583
Fl _t Permitted	1.00			1.00	0.95	1.00
Satd. Flow (perm)	3539			3539	1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	636	0	0	386	339	377
RTOR Reduction (vph)	0	0	0	0	0	80
Lane Group Flow (vph)	636	0	0	386	339	297
Turn Type	NA			NA	Prot	Perm
Protected Phases	4			8	2	
Permitted Phases						2
Actuated Green, G (s)	18.0			18.0	18.0	18.0
Effective Green, g (s)	18.0			18.0	18.0	18.0
Actuated g/C Ratio	0.40			0.40	0.40	0.40
Clearance Time (s)	4.5			4.5	4.5	4.5
Lane Grp Cap (vph)	1415			1415	708	633
v/s Ratio Prot	c0.18			0.11	c0.19	
v/s Ratio Perm						0.19
v/c Ratio	0.45			0.27	0.48	0.47
Uniform Delay, d1	9.9			9.1	10.0	10.0
Progression Factor	1.00			1.00	1.00	1.00
Incremental Delay, d2	1.0			0.5	2.3	2.5
Delay (s)	10.9			9.6	12.3	12.4
Level of Service	B			A	B	B
Approach Delay (s)	10.9			9.6	12.4	
Approach LOS	B			A	B	
Intersection Summary						
HCM 2000 Control Delay			11.2		HCM 2000 Level of Service B	
HCM 2000 Volume to Capacity ratio			0.46			
Actuated Cycle Length (s)			45.0		Sum of lost time (s) 9.0	
Intersection Capacity Utilization			45.2%		ICU Level of Service A	
Analysis Period (min)			15			
c Critical Lane Group						

Lanes, Volumes, Timings
9: Dorval Drive & QEW WB Off-Ramp

FT 2043 AM.syn
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Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔↔	↔	↔↔			↔↔
Traffic Volume (vph)	1095	510	627	0	0	1747
Future Volume (vph)	1095	510	627	0	0	1747
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	190.0		0.0	0.0	
Storage Lanes	2	1		0	0	
Taper Length (m)	7.5				7.5	
Lane Util. Factor	0.97	0.91	0.95	1.00	1.00	0.95
Fr _t	0.993	0.850				
Fl _t Protected	0.954					
Satd. Flow (prot)	3423	1441	3539	0	0	3539
Fl _t Permitted	0.954					
Satd. Flow (perm)	3423	1441	3539	0	0	3539
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)	4	239				
Link Speed (k/h)	40		60			60
Link Distance (m)	325.1		310.2			266.9
Travel Time (s)	29.3		18.6			16.0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1190	554	682	0	0	1899
Shared Lane Traffic (%)		10%				
Lane Group Flow (vph)	1245	499	682	0	0	1899
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	7.2		0.0		0.0	
Link Offset(m)	0.0		0.0		0.0	
Crosswalk Width(m)	4.8		4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15		15	25	
Number of Detectors	1	1	2			2
Detector Template	Left	Right	Thru			Thru
Leading Detector (m)	2.0	2.0	10.0			10.0
Trailing Detector (m)	0.0	0.0	0.0			0.0
Detector 1 Position(m)	0.0	0.0	0.0			0.0
Detector 1 Size(m)	2.0	2.0	0.6			0.6
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0			0.0
Detector 1 Queue (s)	0.0	0.0	0.0			0.0
Detector 1 Delay (s)	0.0	0.0	0.0			0.0
Detector 2 Position(m)			9.4			9.4
Detector 2 Size(m)			0.6			0.6
Detector 2 Type			Cl+Ex			Cl+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type		Prot Perm	NA			NA
Protected Phases		8	2			6
Permitted Phases			8			

Lanes, Volumes, Timings
9: Dorval Drive & QEW WB Off-Ramp

FT 2043 AM.syn
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Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Detector Phase	8	8	2			6
Switch Phase						
Minimum Initial (s)	10.0	10.0	20.0			20.0
Minimum Split (s)	24.0	24.0	26.0			26.0
Total Split (s)	45.6	45.6	74.4			74.4
Total Split (%)	38.0%	38.0%	62.0%			62.0%
Maximum Green (s)	39.6	39.6	68.4			68.4
Yellow Time (s)	4.0	4.0	4.0			4.0
All-Red Time (s)	2.0	2.0	2.0			2.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0			-2.0
Total Lost Time (s)	4.0	4.0	4.0			4.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	4.5	4.5	5.0			5.0
Recall Mode	None	None	Max			Max
Walk Time (s)	5.0	5.0	7.0			7.0
Flash Dont Walk (s)	7.0	7.0	11.0			11.0
Pedestrian Calls (#/hr)	0	0	0			0
Act Effct Green (s)	41.6	41.6	70.4			70.4
Actuated g/C Ratio	0.35	0.35	0.59			0.59
v/c Ratio	1.05	0.76	0.33			0.91
Control Delay	77.7	26.2	13.2			30.5
Queue Delay	0.0	0.0	0.0			0.0
Total Delay	77.7	26.2	13.2			30.5
LOS	E	C	B			C
Approach Delay	62.9		13.2			30.5
Approach LOS	E		B			C
Queue Length 50th (m)	~172.8	64.9	43.1			209.1
Queue Length 95th (m)	#216.5	116.5	54.8			252.7
Internal Link Dist (m)	301.1		286.2			242.9
Turn Bay Length (m)		190.0				
Base Capacity (vph)	1189	655	2076			2076
Starvation Cap Reductn	0	0	0			0
Spillback Cap Reductn	0	0	0			0
Storage Cap Reductn	0	0	0			0
Reduced v/c Ratio	1.05	0.76	0.33			0.91

Intersection Summary

Area Type:	Other
Cycle Length:	120
Actuated Cycle Length:	120
Natural Cycle:	90
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	1.05
Intersection Signal Delay:	40.8
Intersection Capacity Utilization:	91.5%
Analysis Period (min):	15
~ Volume exceeds capacity, queue is theoretically infinite. Queue shown is maximum after two cycles.	

Lanes, Volumes, Timings
9: Dorval Drive & QEW WB Off-Ramp

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

Splits and Phases: 9: Dorval Drive & QEW WB Off-Ramp



HCM Signalized Intersection Capacity Analysis
9: Dorval Drive & QEWB Off-Ramp

FT 2043 AM.syn
04-03-2024

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔↔	↔	↕↕			↕↕
Traffic Volume (vph)	1095	510	627	0	0	1747
Future Volume (vph)	1095	510	627	0	0	1747
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0			4.0
Lane Util. Factor	0.97	0.91	0.95			0.95
Fr _t	0.99	0.85	1.00			1.00
Fit Protected	0.95	1.00	1.00			1.00
Satd. Flow (prot)	3426	1441	3539			3539
Fit Permitted	0.95	1.00	1.00			1.00
Satd. Flow (perm)	3426	1441	3539			3539
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1190	554	682	0	0	1899
RTOR Reduction (vph)	3	156	0	0	0	0
Lane Group Flow (vph)	1242	343	682	0	0	1899
Turn Type	Prot	Perm	NA			NA
Protected Phases	8		2			6
Permitted Phases	8					
Actuated Green, G (s)	39.6	39.6	68.4			68.4
Effective Green, g (s)	41.6	41.6	70.4			70.4
Actuated g/C Ratio	0.35	0.35	0.59			0.59
Clearance Time (s)	6.0	6.0	6.0			6.0
Vehicle Extension (s)	4.5	4.5	5.0			5.0
Lane Grp Cap (vph)	1187	499	2076			2076
v/s Ratio Prot	c0.36		0.19			c0.54
v/s Ratio Perm		0.24				
v/c Ratio	1.05	0.69	0.33			0.91
Uniform Delay, d1	39.2	33.6	12.7			22.1
Progression Factor	1.00	1.00	1.00			1.00
Incremental Delay, d2	39.2	4.6	0.4			7.7
Delay (s)	78.4	38.2	13.1			29.9
Level of Service	E	D	B			C
Approach Delay (s)	66.9		13.1			29.9
Approach LOS	E		B			C

Intersection Summary			
HCM 2000 Control Delay	42.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	91.5%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
10: Dorval Drive & QEWB Off-Ramp

FT 2043 AM.syn
04-03-2024

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔↔	↔		↕↕	↕↕	
Traffic Volume (vph)	161	638	0	883	1889	0
Future Volume (vph)	161	638	0	883	1889	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	175.0	0.0	0.0			0.0
Storage Lanes	1	1	0			0
Taper Length (m)	7.5		7.5			
Lane Util. Factor	0.97	0.91	1.00	0.95	0.95	1.00
Fr _t	0.900	0.850				
Fit Protected	0.984					
Satd. Flow (prot)	3200	1441	0	3539	3539	0
Fit Permitted	0.984					
Satd. Flow (perm)	3200	1441	0	3539	3539	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	9	9				
Link Speed (k/h)	40			60	60	
Link Distance (m)	275.5			164.3	310.2	
Travel Time (s)	24.8			9.9	18.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	175	693	0	960	2053	0
Shared Lane Traffic (%)	50%					
Lane Group Flow (vph)	522	346	0	960	2053	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	7.2			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Number of Detectors	1	1		2	2	
Detector Template	Left	Right		Thru	Thru	
Leading Detector (m)	2.0	2.0		10.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	2.0		0.6	0.6	
Detector 1 Type	CI+Ex	CI+Ex		CI+Ex	CI+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	
Detector 2 Position(m)				9.4	9.4	
Detector 2 Size(m)				0.6	0.6	
Detector 2 Type				CI+Ex	CI+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Prot	Perm		NA	NA	
Protected Phases	4			2	6	
Permitted Phases	4					

Lanes, Volumes, Timings
10: Dorval Drive & QEW EB Off-Ramp

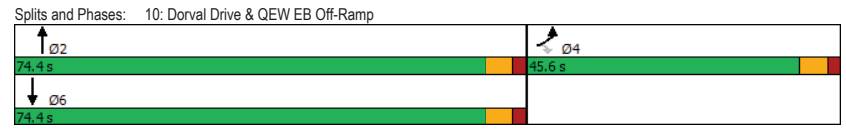
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Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Detector Phase	4	4		2	6	
Switch Phase						
Minimum Initial (s)	10.0	10.0		20.0	20.0	
Minimum Split (s)	24.0	24.0		26.0	26.0	
Total Split (s)	45.6	45.6		74.4	74.4	
Total Split (%)	38.0%	38.0%		62.0%	62.0%	
Maximum Green (s)	39.6	39.6		68.4	68.4	
Yellow Time (s)	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	4.0	4.0		5.0	5.0	
Recall Mode	None	None		Max	Max	
Walk Time (s)	0.0	0.0		7.0	7.0	
Flash Dont Walk (s)	7.0	7.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0	
Act Effct Green (s)	34.0	34.0		70.7	70.7	
Actuated g/C Ratio	0.30	0.30		0.63	0.63	
v/c Ratio	0.54	0.79		0.43	0.92	
Control Delay	34.0	48.3		12.4	28.7	
Queue Delay	0.0	0.0		0.0	0.0	
Total Delay	34.0	48.3		12.4	28.7	
LOS	C	D		B	C	
Approach Delay	39.7			12.4	28.7	
Approach LOS	D			B	C	
Queue Length 50th (m)	50.7	78.2		58.5	217.4	
Queue Length 95th (m)	67.3	118.0		83.1	#319.4	
Internal Link Dist (m)	251.5			140.3	286.2	
Turn Bay Length (m)	175.0					
Base Capacity (vph)	1192	539		2220	2220	
Starvation Cap Reductn	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	
Storage Cap Reductn	0	0		0	0	
Reduced v/c Ratio	0.44	0.64		0.43	0.92	

Intersection Summary
 Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 112.7
 Natural Cycle: 80
 Control Type: Semi Act-Uncoord
 Maximum v/c Ratio: 0.92
 Intersection Signal Delay: 27.1 Intersection LOS: C
 Intersection Capacity Utilization 91.5% ICU Level of Service F
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Lanes, Volumes, Timings
10: Dorval Drive & QEW EB Off-Ramp

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HCM Signalized Intersection Capacity Analysis
10: Dorval Drive & QEW EB Off-Ramp

FT 2043 AM.syn
04-03-2024

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔↔	↗		↕↕	↕↕	
Traffic Volume (vph)	161	638	0	883	1889	0
Future Volume (vph)	161	638	0	883	1889	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	0.91		0.95	0.95	
Flt	0.90	0.85		1.00	1.00	
Flt Protected	0.98	1.00		1.00	1.00	
Satd. Flow (prot)	3200	1441		3539	3539	
Flt Permitted	0.98	1.00		1.00	1.00	
Satd. Flow (perm)	3200	1441		3539	3539	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	175	693	0	960	2053	0
RTOR Reduction (vph)	6	6	0	0	0	0
Lane Group Flow (vph)	516	340	0	960	2053	0
Turn Type	Prot	Perm		NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4				
Actuated Green, G (s)	31.9	31.9		68.7	68.7	
Effective Green, g (s)	33.9	33.9		70.7	70.7	
Actuated g/C Ratio	0.30	0.30		0.63	0.63	
Clearance Time (s)	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	4.0	4.0		5.0	5.0	
Lane Grp Cap (vph)	963	433		2222	2222	
v/s Ratio Prot	0.16			0.27	c0.58	
v/s Ratio Perm		c0.24				
v/c Ratio	0.54	0.78		0.43	0.92	
Uniform Delay, d1	32.8	36.0		10.7	18.6	
Progression Factor	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.7	9.5		0.6	8.0	
Delay (s)	33.5	45.5		11.3	26.5	
Level of Service	C	D		B	C	
Approach Delay (s)	38.3			11.3	26.5	
Approach LOS	D			B	C	

Intersection Summary			
HCM 2000 Control Delay	25.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	112.6	Sum of lost time (s)	8.0
Intersection Capacity Utilization	91.5%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
11: Argus Rd & South Service Rd

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Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Volume (vph)	24	84	955	317	168	176
Future Volume (vph)	24	84	955	317	168	176
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Flt			0.966		0.931	
Flt Protected		0.989			0.976	
Satd. Flow (prot)	0	1384	1615	0	1554	0
Flt Permitted		0.989			0.976	
Satd. Flow (perm)	0	1384	1615	0	1554	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		177.7	145.7		103.5	
Travel Time (s)		12.8	10.5		7.5	
Confl. Peds. (#/hr)	1			1	5	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	100%	0%	3%	0%	0%	0%
Adj. Flow (vph)	26	91	1038	345	183	191
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	117	1383	0	374	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (k/h)	24		14		24	14
Sign Control		Free	Free		Stop	
Intersection Summary						
Area Type:	CBD					
Control Type:	Unsignalized					
Intersection Capacity Utilization	106.4%			ICU Level of Service G		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
11: Argus Rd & South Service Rd

FT 2043 AM.syn
04-03-2024

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	↕
Traffic Volume (veh/h)	24	84	955	317	168	176
Future Volume (Veh/h)	24	84	955	317	168	176
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)	26	91	1038	345	183	191
Pedestrians		1	5		1	
Lane Width (m)		3.6	3.6		3.6	
Walking Speed (m/s)		1.2	1.2		1.2	
Percent Blockage		0	0		0	
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)		358				
pX, platoon unblocked						
vC, conflicting volume	1384				1360	1212
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1384				1360	1212
tC, single (s)	5.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	3.1				3.5	3.3
p0 queue free %	91				0	15
cM capacity (veh/h)	280				149	224
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	117	1383	374			
Volume Left	26	0	183			
Volume Right	0	345	191			
cSH	280	1700	180			
Volume to Capacity	0.09	0.81	2.08			
Queue Length 95th (m)	2.4	0.0	232.8			
Control Delay (s)	5.7	0.0	547.2			
Lane LOS	A		F			
Approach Delay (s)	5.7	0.0	547.2			
Approach LOS			F			
Intersection Summary						
Average Delay			109.6			
Intersection Capacity Utilization			106.4%		ICU Level of Service	G
Analysis Period (min)			15			

Lanes, Volumes, Timings
13: GO Bus Terminal/Argus Rd & Cross Ave

FT 2043 AM.syn
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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↕	↕		↕	↕		↕	↕		↕	↕	↕
Traffic Volume (vph)	51	1076	20	58	924	74	30	0	71	674	24	303
Future Volume (vph)	51	1076	20	58	924	74	30	0	71	674	24	303
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6
Storage Length (m)	20.0		0.0	20.0		0.0	0.0		0.0	15.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00	1.00			1.00		1.00	0.96		0.98		0.99
Frt		0.997			0.989			0.850				0.861
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1570	3149	0	818	3167	0	805	734	0	1570	1359	0
Fit Permitted	0.260			0.095			0.336			0.707		
Satd. Flow (perm)	430	3149	0	82	3167	0	284	734	0	1144	1359	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3			16			159			119	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		162.8			72.9			81.9			113.6	
Travel Time (s)		11.7			5.2			5.9			8.2	
Confl. Peds. (#/hr)	1		3	3		1	3		20	20		3
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
Heavy Vehicles (%)	0%	1%	100%	92%	1%	5%	95%	0%	91%	0%	93%	0%
Adj. Flow (vph)	55	1170	22	63	1004	80	33	0	77	733	26	329
Shared Lane Traffic (%)												
Lane Group Flow (vph)	55	1192	0	63	1084	0	33	77	0	733	355	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.3			3.3			3.3			3.3	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.19	1.14	1.14	1.19	1.14	1.14	1.19	1.14	1.14	1.19	1.14	1.14
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

Lanes, Volumes, Timings
13: GO Bus Terminal/Argus Rd & Cross Ave

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases		2		6				8			4	
Detector Phase	2	2		1	6			8	8		4	4
Switch Phase												
Minimum Initial (s)	22.0	22.0		8.0	22.0			10.0	10.0		10.0	10.0
Minimum Split (s)	45.0	45.0		12.5	29.0			29.0	29.0		29.0	29.0
Total Split (s)	45.5	45.5		12.5	58.0			32.0	32.0		32.0	32.0
Total Split (%)	50.6%	50.6%		13.9%	64.4%			35.6%	35.6%		35.6%	35.6%
Maximum Green (s)	39.5	39.5		8.5	52.0			26.0	26.0		26.0	26.0
Yellow Time (s)	4.0	4.0		3.0	4.0			4.0	4.0		4.0	4.0
All-Red Time (s)	2.0	2.0		1.0	2.0			2.0	2.0		2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0		0.0	-2.0			-2.0	-2.0		-2.0	-2.0
Total Lost Time (s)	4.0	4.0		4.0	4.0			4.0	4.0		4.0	4.0
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Vehicle Extension (s)	5.0	5.0		2.5	5.0			4.0	4.0		4.0	4.0
Recall Mode	Min	Min		Min	Min			Min	Min		Min	Min
Walk Time (s)	7.0	7.0		7.0	7.0			7.0	7.0		7.0	7.0
Flash Dont Walk (s)	16.0	16.0		16.0	16.0			16.0	16.0		16.0	16.0
Pedestrian Calls (#/hr)	0	0		0	0			0	0		0	0
Act Effct Green (s)	40.1	40.1		52.4	52.4			28.0	28.0		28.0	28.0
Actuated g/C Ratio	0.45	0.45		0.59	0.59			0.32	0.32		0.32	0.32
v/c Ratio	0.28	0.83		0.54	0.58			0.37	0.23		2.02	0.69
Control Delay	19.9	27.4		30.9	12.4			38.4	1.5		493.6	25.9
Queue Delay	0.0	0.4		0.0	0.0			0.0	0.0		0.0	0.0
Total Delay	19.9	27.8		30.9	12.4			38.4	1.5		493.6	25.9
LOS	B	C		C	B			D	A		F	C
Approach Delay		27.5			13.4				12.6			341.0
Approach LOS		C			B				B			F
Queue Length 50th (m)	5.9	94.4		4.6	56.8			4.6	0.0		-211.3	37.5
Queue Length 95th (m)	15.5	124.3		#19.2	74.7			14.9	0.0		#281.5	71.4
Internal Link Dist (m)		138.8			48.9				57.9			89.6
Turn Bay Length (m)	20.0			20.0							15.0	
Base Capacity (vph)	202	1480		119	1941			89	340		362	511
Starvation Cap Reductn	0	53		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	0.27	0.84		0.53	0.56			0.37	0.23		2.02	0.69

Intersection Summary

Area Type: CBD
 Cycle Length: 90
 Actuated Cycle Length: 88.4
 Natural Cycle: 110
 Control Type: Semi Act-Uncoord
 Maximum v/c Ratio: 2.02
 Intersection Signal Delay: 117.5
 Intersection LOS: F

Lanes, Volumes, Timings
13: GO Bus Terminal/Argus Rd & Cross Ave

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Intersection Capacity Utilization 107.5%
 Analysis Period (min) 15
 - Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 13: GO Bus Terminal/Argus Rd & Cross Ave



HCM Signalized Intersection Capacity Analysis
13: GO Bus Terminal/Argus Rd & Cross Ave

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	51	1076	20	58	924	74	30	0	71	674	24	303
Future Volume (vph)	51	1076	20	58	924	74	30	0	71	674	24	303
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.97		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		0.98	1.00	
Fr t	1.00	1.00		1.00	0.99		1.00	0.85		1.00	0.86	
Fl t Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1570	3149		818	3167		804	735		1538	1359	
Fl t Permitted	0.26	1.00		0.09	1.00		0.34	1.00		0.71	1.00	
Satd. Flow (perm)	430	3149		82	3167		285	735		1144	1359	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	55	1170	22	63	1004	80	33	0	77	733	26	329
RTOR Reduction (vph)	0	2	0	0	7	0	0	53	0	0	81	0
Lane Group Flow (vph)	55	1190	0	63	1077	0	33	24	0	733	274	0
Confl. Peds. (#/hr)	1		3	3		1	3		20	20		3
Heavy Vehicles (%)	0%	1%	100%	92%	1%	5%	95%	0%	91%	0%	93%	0%
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	2	2		1	6		8	8		4	4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	38.2	38.2		50.4	50.4		26.0	26.0		26.0	26.0	
Effective Green, g (s)	40.2	40.2		50.4	52.4		28.0	28.0		28.0	28.0	
Actuated g/C Ratio	0.45	0.45		0.57	0.59		0.32	0.32		0.32	0.32	
Clearance Time (s)	6.0	6.0		4.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	5.0	5.0		2.5	5.0		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	195	1432		115	1877		90	232		362	430	
v/s Ratio Prot		c0.38		0.05	c0.34			0.03			0.20	
v/s Ratio Perm	0.13			0.26			0.12			c0.64		
v/c Ratio	0.28	0.83		0.55	0.57		0.37	0.11		2.02	0.64	
Uniform Delay, d1	15.1	21.1		14.2	11.1		23.3	21.3		30.2	25.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.7	4.8		4.2	0.7		3.4	0.3		470.8	3.5	
Delay (s)	16.7	25.9		18.4	11.8		26.8	21.6		501.0	29.3	
Level of Service	B	C		B	B		C	C		F	C	
Approach Delay (s)		25.5			12.2			23.2			347.1	
Approach LOS		C			B			C			F	

Intersection Summary			
HCM 2000 Control Delay	118.6	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.25		
Actuated Cycle Length (s)	88.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	107.5%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
14: Lyons Lane/Street A & Cross Ave

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	125	262	286	319	246	27	25	5	19	91	35	133
Future Volume (vph)	125	262	286	319	246	27	25	5	19	91	35	133
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6
Storage Length (m)	0.0	0.0	25.0	0.0	20.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	0.99		1.00	1.00		1.00	0.99		1.00	0.99	
Fr t		0.922			0.985			0.879			0.881	
Fl t Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1540	2813	0	1570	2724	0	1570	1484	0	1468	1453	0
Fl t Permitted	0.571			0.337			0.521			0.740		
Satd. Flow (perm)	919	2813	0	557	2724	0	859	1484	0	1139	1453	0
Right Turn on Red			Yes		Yes			Yes			Yes	
Satd. Flow (RTOR)		311			26			21			145	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		40.1			211.2			69.1			70.9	
Travel Time (s)		2.9			15.2			5.0			5.1	
Confl. Peds. (#/hr)	5		1	1		5	3		3	3		3
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
Heavy Vehicles (%)	2%	11%	0%	0%	19%	0%	0%	0%	0%	7%	0%	3%
Adj. Flow (vph)	136	285	311	347	267	29	27	5	21	99	38	145
Shared Lane Traffic (%)												
Lane Group Flow (vph)	136	596	0	347	296	0	27	26	0	99	183	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.3			3.3			3.3			3.3	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.19	1.14	1.14	1.19	1.14	1.14	1.19	1.14	1.14	1.19	1.14	1.14
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

Lanes, Volumes, Timings
14: Lyons Lane/Street A & Cross Ave

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases		2		6			8			4		
Detector Phase	2	2		1	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	35.0	35.0		8.0	35.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	41.0	41.0		12.5	41.0		28.0	28.0		28.0	28.0	
Total Split (s)	41.0	41.0		21.0	62.0		28.0	28.0		28.0	28.0	
Total Split (%)	45.6%	45.6%		23.3%	68.9%		31.1%	31.1%		31.1%	31.1%	
Maximum Green (s)	35.0	35.0		17.0	56.0		22.0	22.0		22.0	22.0	
Yellow Time (s)	4.0	4.0		3.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		1.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0		0.0	-2.0		-2.0	-2.0		-2.0	-2.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Vehicle Extension (s)	5.0	5.0		2.5	5.0		4.0	4.0		4.0	4.0	
Recall Mode	Min	Min		Min	Min		Min	Min		Min	Min	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	15.0	15.0		15.0	15.0		15.0	15.0		15.0	15.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	37.3	37.3		53.2	53.2		15.6	15.6		15.6	15.6	
Actuated g/C Ratio	0.49	0.49		0.69	0.69		0.20	0.20		0.20	0.20	
v/c Ratio	0.30	0.39		0.64	0.16		0.16	0.08		0.43	0.45	
Control Delay	16.4	7.3		11.0	4.3		28.1	13.6		33.6	11.7	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	16.4	7.3		11.0	4.3		28.1	13.6		33.6	11.7	
LOS	B	A		B	A		C	B		C	B	
Approach Delay		9.0			7.9			21.0			19.4	
Approach LOS		A			A			C			B	
Queue Length 50th (m)	11.5	12.0		16.7	5.9		3.4	0.6		13.1	4.8	
Queue Length 95th (m)	31.0	29.9		37.5	13.1		10.8	7.0		29.3	22.3	
Internal Link Dist (m)		16.1			187.2			45.1			46.9	
Turn Bay Length (m)				25.0			20.0					
Base Capacity (vph)	446	1526		611	2079		270	481		358	556	
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	0.30	0.39		0.57	0.14		0.10	0.05		0.28	0.33	

Intersection Summary

Area Type: CBD
 Cycle Length: 90
 Actuated Cycle Length: 76.8
 Natural Cycle: 85
 Control Type: Semi Act-Uncoord
 Maximum v/c Ratio: 0.64
 Intersection Signal Delay: 10.7
 Intersection LOS: B

Lanes, Volumes, Timings
14: Lyons Lane/Street A & Cross Ave

FT 2043 AM.syn
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Intersection Capacity Utilization 91.4%
 Analysis Period (min) 15

ICU Level of Service F

Splits and Phases: 14: Lyons Lane/Street A & Cross Ave



HCM Signalized Intersection Capacity Analysis
14: Lyons Lane/Street A & Cross Ave

FT 2043 AM.syn
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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕
Traffic Volume (vph)	125	262	286	319	246	27	25	5	19	91	35	133
Future Volume (vph)	125	262	286	319	246	27	25	5	19	91	35	133
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.3	3.6	3.6	3.6
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	0.99	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	0.88		1.00	0.88	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1531	2813		1570	2725		1567	1485		1463	1454	
Flt Permitted	0.57	1.00		0.34	1.00		0.52	1.00		0.74	1.00	
Satd. Flow (perm)	920	2813		556	2725		860	1485		1140	1454	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	136	285	311	347	267	29	27	5	21	99	38	145
RTOR Reduction (vph)	0	160	0	0	8	0	0	17	0	0	116	0
Lane Group Flow (vph)	136	436	0	347	288	0	27	9	0	99	67	0
Confl. Peds. (#/hr)	5		1	1		5	3		3	3		3
Heavy Vehicles (%)	2%	11%	0%	0%	19%	0%	0%	0%	0%	7%	0%	3%
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	2	2		1	6		8	8		4	4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	35.3	35.3		51.1	51.1		13.5	13.5		13.5	13.5	
Effective Green, g (s)	37.3	37.3		51.1	53.1		15.5	15.5		15.5	15.5	
Actuated g/C Ratio	0.49	0.49		0.67	0.69		0.20	0.20		0.20	0.20	
Clearance Time (s)	6.0	6.0		4.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	5.0	5.0		2.5	5.0		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	447	1369		527	1889		174	300		230	294	
v/s Ratio Prot		0.16		c0.10	0.11			0.01			0.05	
v/s Ratio Perm	0.15			c0.34			0.03			c0.09		
v/c Ratio	0.30	0.32		0.66	0.15		0.16	0.03		0.43	0.23	
Uniform Delay, d1	11.8	11.9		6.3	4.0		25.2	24.5		26.7	25.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.8	0.3		2.7	0.1		0.6	0.1		1.8	0.5	
Delay (s)	12.6	12.2		9.0	4.1		25.7	24.6		28.5	26.1	
Level of Service	B	B		A	A		C	C		C	C	
Approach Delay (s)		12.3			6.7			25.2			26.9	
Approach LOS		B			A			C			C	

Intersection Summary			
HCM 2000 Control Delay	13.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	76.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	91.4%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
16: Speers Road/Cornwall Road & Cross Avenue

FT 2043 AM.syn
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Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↕	↕	↕	↕	↕	↕
Traffic Volume (vph)	302	874	810	44	33	460
Future Volume (vph)	302	874	810	44	33	460
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	75.0			0.0	55.0	0.0
Storage Lanes	1			0	1	2
Taper Length (m)	7.5				7.5	
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	0.88
Frt			0.992			0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1770	3539	3511	0	1770	2787
Flt Permitted	0.201				0.950	
Satd. Flow (perm)	374	3539	3511	0	1770	2787
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)			6			500
Link Speed (k/h)		50	50		50	
Link Distance (m)		228.9	275.4		183.9	
Travel Time (s)		16.5	19.8		13.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	328	950	880	48	36	500
Shared Lane Traffic (%)						
Lane Group Flow (vph)	328	950	928	0	36	500
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.6	3.6		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25			15	25	15
Number of Detectors	1	2	2		1	1
Detector Template	Left	Thru	Thru		Left	Right
Leading Detector (m)	2.0	10.0	10.0		2.0	2.0
Trailing Detector (m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Size(m)	2.0	0.6	0.6		2.0	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0		0.0	0.0
Detector 2 Position(m)		9.4	9.4			
Detector 2 Size(m)		0.6	0.6			
Detector 2 Type		Cl+Ex	Cl+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type	pm+pt	NA	NA		pm+pt	Perm
Protected Phases	5	2	6		7	
Permitted Phases	2				4	4

Lanes, Volumes, Timings
16: Speers Road/Cornwall Road & Cross Avenue

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Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Detector Phase	5	2	6		7	4
Switch Phase						
Minimum Initial (s)	6.0	25.0	25.0		6.0	6.0
Minimum Split (s)	12.0	35.0	35.0		29.0	29.0
Total Split (s)	26.0	61.0	35.0		29.0	29.0
Total Split (%)	28.9%	67.8%	38.9%		32.2%	32.2%
Maximum Green (s)	20.0	55.0	29.0		23.0	23.0
Yellow Time (s)	4.0	4.0	4.0		4.0	4.0
All-Red Time (s)	2.0	2.0	2.0		2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0		6.0	6.0
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?			Yes			
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	None	Max	Max		None	None
Walk Time (s)		18.0	18.0		12.0	12.0
Flash Dont Walk (s)		7.0	7.0		7.0	7.0
Pedestrian Calls (#/hr)		0	0		0	0
Act Effct Green (s)	55.0	55.0	35.8		7.6	7.6
Actuated g/C Ratio	0.74	0.74	0.48		0.10	0.10
v/c Ratio	0.63	0.36	0.55		0.20	0.68
Control Delay	11.0	4.2	16.6		33.1	8.6
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	11.0	4.2	16.6		33.1	8.6
LOS	B	A	B		C	A
Approach Delay		5.9	16.6		10.2	
Approach LOS		A	B		B	
Queue Length 50th (m)	11.6	19.6	46.7		5.0	0.0
Queue Length 95th (m)	36.3	35.3	85.4		13.3	14.3
Internal Link Dist (m)		204.9	251.4		159.9	
Turn Bay Length (m)	75.0				55.0	
Base Capacity (vph)	650	2609	1687		545	1205
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	0.50	0.36	0.55		0.07	0.41

Intersection Summary

Area Type:	Other
Cycle Length:	90
Actuated Cycle Length:	74.6
Natural Cycle:	80
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.68
Intersection Signal Delay:	10.4
Intersection Capacity Utilization:	60.5%
Intersection LOS:	B
ICU Level of Service:	B
Analysis Period (min):	15

Lanes, Volumes, Timings
16: Speers Road/Cornwall Road & Cross Avenue

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Splits and Phases: 16: Speers Road/Cornwall Road & Cross Avenue



HCM Signalized Intersection Capacity Analysis
16: Speers Road/Cornwall Road & Cross Avenue

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Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↕↕	↕↔		↔	↕↕
Traffic Volume (vph)	302	874	810	44	33	460
Future Volume (vph)	302	874	810	44	33	460
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0		6.0	6.0
Lane Util. Factor	1.00	0.95	0.95		1.00	0.88
Frt	1.00	1.00	0.99		1.00	0.85
Fit Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	3539	3512		1770	2787
Fit Permitted	0.20	1.00	1.00		0.95	1.00
Satd. Flow (perm)	375	3539	3512		1770	2787
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	328	950	880	48	36	500
RTOR Reduction (vph)	0	0	3	0	0	449
Lane Group Flow (vph)	328	950	925	0	36	51
Turn Type	pm+pt	NA	NA		pm+pt	Perm
Protected Phases	5	2	6		7	
Permitted Phases	2				4	4
Actuated Green, G (s)	55.0	55.0	35.8		7.6	7.6
Effective Green, g (s)	55.0	55.0	35.8		7.6	7.6
Actuated g/C Ratio	0.74	0.74	0.48		0.10	0.10
Clearance Time (s)	6.0	6.0	6.0		6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	523	2609	1685		180	283
v/s Ratio Prot	c0.11	0.27	0.26		c0.02	
v/s Ratio Perm	c0.35					0.02
v/c Ratio	0.63	0.36	0.55		0.20	0.18
Uniform Delay, d1	6.4	3.5	13.7		30.7	30.6
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	2.4	0.4	1.3		0.5	0.3
Delay (s)	8.8	3.9	15.0		31.3	31.0
Level of Service	A	A	B		C	C
Approach Delay (s)		5.2	15.0		31.0	
Approach LOS		A	B		C	

Intersection Summary			
HCM 2000 Control Delay	13.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	74.6	Sum of lost time (s)	18.0
Intersection Capacity Utilization	60.5%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
17: North Access & South Service Road

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Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔			↔	↕	↕
Traffic Volume (vph)	94	0	70	36	0	33
Future Volume (vph)	94	0	70	36	0	33
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.865	
Fit Protected				0.968		
Satd. Flow (prot)	1863	0	0	1803	1611	0
Fit Permitted				0.968		
Satd. Flow (perm)	1863	0	0	1803	1611	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	130.8			104.5	72.7	
Travel Time (s)	9.4			7.5	5.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	102	0	76	39	0	36
Shared Lane Traffic (%)						
Lane Group Flow (vph)	102	0	0	115	36	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)		15	25		25	15
Sign Control	Free			Free	Stop	

Intersection Summary	
Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization 22.4%	ICU Level of Service A
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis
17: North Access & South Service Road

FT 2043 AM.syn
04-03-2024

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔		↔		↔	
Traffic Volume (veh/h)	94	0	70	36	0	33
Future Volume (Veh/h)	94	0	70	36	0	33
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)	102	0	76	39	0	36
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			102		293	102
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			102		293	102
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		100	96
cM capacity (veh/h)			1490		662	953
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	102	115	36			
Volume Left	0	76	0			
Volume Right	0	0	36			
cSH	1700	1490	953			
Volume to Capacity	0.06	0.05	0.04			
Queue Length 95th (m)	0.0	1.3	0.9			
Control Delay (s)	0.0	5.1	8.9			
Lane LOS	A		A			
Approach Delay (s)	0.0	5.1	8.9			
Approach LOS	A		A			
Intersection Summary						
Average Delay			3.6			
Intersection Capacity Utilization	22.4%		ICU Level of Service	A		
Analysis Period (min)	15					

Lanes, Volumes, Timings
18: Street C & East Access

FT 2043 AM.syn
04-03-2024

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔		↔		↔	
Traffic Volume (vph)	0	332	18	18	173	0
Future Volume (vph)	0	332	18	18	173	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t	0.865					
Fit Protected			0.976			
Satd. Flow (prot)	1611	0	0	1818	1863	0
Fit Permitted	0.976					
Satd. Flow (perm)	1611	0	0	1818	1863	0
Link Speed (k/h)	50		50		50	
Link Distance (m)	57.5		75.8		84.1	
Travel Time (s)	4.1		5.5		6.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	361	20	20	188	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	361	0	0	40	188	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6		0.0		0.0	
Link Offset(m)	0.0		0.0		0.0	
Crosswalk Width(m)	4.8		4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15		25	
Sign Control	Stop		Free		Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	43.0%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
18: Street C & East Access

FT 2043 AM.syn
04-03-2024

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔	↔	↔	↕	↕	
Traffic Volume (veh/h)	0	332	18	18	173	0
Future Volume (Veh/h)	0	332	18	18	173	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	361	20	20	188	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)			210			
pX, platoon unblocked						
vC, conflicting volume	248	188	188			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	248	188	188			
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	58	99			
cM capacity (veh/h)	730	854	1386			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	361	40	188			
Volume Left	0	20	0			
Volume Right	361	0	0			
cSH	854	1386	1700			
Volume to Capacity	0.42	0.01	0.11			
Queue Length 95th (m)	17.0	0.4	0.0			
Control Delay (s)	12.3	3.9	0.0			
Lane LOS	B	A				
Approach Delay (s)	12.3	3.9	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay		7.8				
Intersection Capacity Utilization		43.0%		ICU Level of Service	A	
Analysis Period (min)		15				

Lanes, Volumes, Timings
19: Street C & South Service Road

FT 2043 AM.syn
04-03-2024

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	71	56	117	100	7	11
Future Volume (vph)	71	56	117	100	7	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.940				0.919	
Fit Protected				0.974	0.980	
Satd. Flow (prot)	1751	0	0	1814	1678	0
Fit Permitted				0.974	0.980	
Satd. Flow (perm)	1751	0	0	1814	1678	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	104.5			305.2	84.1	
Travel Time (s)	7.5			22.0	6.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	77	61	127	109	8	12
Shared Lane Traffic (%)						
Lane Group Flow (vph)	138	0	0	236	20	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)		15	25		25	15
Sign Control	Free			Free	Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	32.2%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
19: Street C & South Service Road

FT 2043 AM.syn
04-03-2024

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔		↔		↔	
Traffic Volume (veh/h)	71	56	117	100	7	11
Future Volume (Veh/h)	71	56	117	100	7	11
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)	77	61	127	109	8	12
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			138		470	108
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			138		470	108
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		98	99
cM capacity (veh/h)			1446		503	946
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	138	236	20			
Volume Left	0	127	8			
Volume Right	61	0	12			
cSH	1700	1446	700			
Volume to Capacity	0.08	0.09	0.03			
Queue Length 95th (m)	0.0	2.3	0.7			
Control Delay (s)	0.0	4.5	10.3			
Lane LOS	A		B			
Approach Delay (s)	0.0	4.5	10.3			
Approach LOS	A		B			
Intersection Summary						
Average Delay			3.2			
Intersection Capacity Utilization			32.2%	ICU Level of Service	A	
Analysis Period (min)			15			

Lanes, Volumes, Timings
20: Street A & South Service Road

FT 2043 AM.syn
04-03-2024

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔		↔		↔	
Traffic Volume (vph)	95	126	6	31	24	0
Future Volume (vph)	95	126	6	31	24	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t	0.923					
Fit Protected			0.992		0.950	
Satd. Flow (prot)	1719	0	0	1848	1770	0
Fit Permitted			0.992		0.950	
Satd. Flow (perm)	1719	0	0	1848	1770	0
Link Speed (k/h)	50		50		50	
Link Distance (m)	285.4		130.8		98.8	
Travel Time (s)	20.5		9.4		7.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	103	137	7	34	26	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	240	0	0	41	26	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0		0.0		3.6	
Link Offset(m)	0.0		0.0		0.0	
Crosswalk Width(m)	4.8		4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	15		25		25	
Sign Control	Free		Free		Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization 22.7%					ICU Level of Service A	
Analysis Period (min) 15						

HCM Unsignalized Intersection Capacity Analysis
20: Street A & South Service Road

FT 2043 AM.syn
04-03-2024

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔		↔		↔	
Traffic Volume (veh/h)	95	126	6	31	24	0
Future Volume (Veh/h)	95	126	6	31	24	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)	103	137	7	34	26	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			240		220	172
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			240		220	172
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		97	100
cM capacity (veh/h)			1327		765	872
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	240	41	26			
Volume Left	0	7	26			
Volume Right	137	0	0			
eSH	1700	1327	765			
Volume to Capacity	0.14	0.01	0.03			
Queue Length 95th (m)	0.0	0.1	0.8			
Control Delay (s)	0.0	1.4	9.9			
Lane LOS	A		A			
Approach Delay (s)	0.0	1.4	9.9			
Approach LOS	A		A			
Intersection Summary						
Average Delay			1.0			
Intersection Capacity Utilization			22.7%	ICU Level of Service	A	
Analysis Period (min)			15			

Lanes, Volumes, Timings
21: Argus Rd & Street 1

FT 2043 AM.syn
04-03-2024

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔		↔		↔	
Traffic Volume (vph)	0	233	0	125	768	508
Future Volume (vph)	0	233	0	125	768	508
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t	0.865		0.946			
Fit Protected						
Satd. Flow (prot)	1611	0	0	1863	1762	0
Fit Permitted						
Satd. Flow (perm)	1611	0	0	1863	1762	0
Link Speed (k/h)	50		50			
Link Distance (m)	162.1		113.6			
Travel Time (s)	11.7		8.2			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	253	0	136	835	552
Shared Lane Traffic (%)						
Lane Group Flow (vph)	253	0	0	136	1387	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6		3.3			
Link Offset(m)	0.0		0.0			
Crosswalk Width(m)	4.8		4.8			
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15		25	
Sign Control	Stop		Free		Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	92.5%			ICU Level of Service F		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
21: Argus Rd & Street 1

FT 2043 AM.syn
04-03-2024

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔	↔		↑	↑	
Traffic Volume (veh/h)	0	233	0	125	768	508
Future Volume (Veh/h)	0	233	0	125	768	508
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	253	0	136	835	552
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None	None		
Median storage (veh)						
Upstream signal (m)			114			
pX, platoon unblocked						
vC, conflicting volume	1247	1111	1387			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1247	1111	1387			
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	1	100			
cM capacity (veh/h)	192	254	494			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	253	136	1387			
Volume Left	0	0	0			
Volume Right	253	0	552			
cSH	254	494	1700			
Volume to Capacity	0.99	0.00	0.82			
Queue Length 95th (m)	77.3	0.0	0.0			
Control Delay (s)	97.6	0.0	0.0			
Lane LOS	F					
Approach Delay (s)	97.6	0.0	0.0			
Approach LOS	F					
Intersection Summary						
Average Delay		13.9				
Intersection Capacity Utilization		92.5%		ICU Level of Service	F	
Analysis Period (min)		15				

Lanes, Volumes, Timings
22: Street C & Street 1

FT 2043 AM.syn
04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	0	233	59	454	54	0	30	35	0	0	505	0
Future Volume (vph)	0	233	59	454	54	0	30	35	0	0	505	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t		0.973										
Fit Protected					0.957			0.977				
Satd. Flow (prot)	0	1812	0	0	1783	0	0	1820	0	0	1863	0
Fit Permitted					0.957			0.977				
Satd. Flow (perm)	0	1812	0	0	1783	0	0	1820	0	0	1863	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		43.0			162.1			134.3			75.8	
Travel Time (s)		3.1			11.7			9.7			5.5	
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
Adj. Flow (vph)	0	253	64	493	59	0	33	38	0	0	549	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	317	0	0	552	0	0	71	0	0	549	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Right	Left	Left	Right	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	82.4%						ICU Level of Service E					
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis
22: Street C & Street 1

FT 2043 AM.syn
04-03-2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔				↔			↔	
Traffic Volume (veh/h)	0	233	59	454	54	0	30	35	0	0	505	0
Future Volume (Veh/h)	0	233	59	454	54	0	30	35	0	0	505	0
Sign Control	Stop			Stop			Free			Free		
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)	0	253	64	493	59	0	33	38	0	0	549	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)	134											
pX, platoon unblocked												
vC, conflicting volume	682	653	549	844	653	38	549			38		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	682	653	549	844	653	38	549			38		
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	32	88	0	84	100	97			100		
cM capacity (veh/h)	312	374	535	111	374	1034	1021			1572		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	317	552	71	549								
Volume Left	0	493	33	0								
Volume Right	64	0	0	0								
eSH	398	120	1021	1572								
Volume to Capacity	0.80	4.60	0.03	0.00								
Queue Length 95th (m)	55.5	Err	0.8	0.0								
Control Delay (s)	41.2	Err	4.2	0.0								
Lane LOS	E	F	A									
Approach Delay (s)	41.2	Err	4.2	0.0								
Approach LOS	E	F										
Intersection Summary												
Average Delay	3715.8											
Intersection Capacity Utilization	82.4%			ICU Level of Service			E					
Analysis Period (min)	15											

Lanes, Volumes, Timings
23: GO Station West Access/Street C & Cross Ave

FT 2043 AM.syn
04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔				↔			↔	
Traffic Volume (vph)	22	373	127	607	566	43	56	0	299	512	454	52
Future Volume (vph)	22	373	127	607	566	43	56	0	299	512	454	52
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.0	0.0	0.0
Storage Lanes	0	0	0	0	0	1	0	1	0	1	0	0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.963				0.995		0.850				0.984	
Fit Protected	0.998				0.976		0.950				0.950	
Satd. Flow (prot)	0	3401	0	0	3437	0	1770	1583	0	1770	1833	0
Fit Permitted	0.729				0.620		0.274				0.539	
Satd. Flow (perm)	0	2485	0	0	2183	0	510	1583	0	1004	1833	0
Right Turn on Red	Yes						Yes		Yes		Yes	
Satd. Flow (RTOR)	100				8		273				13	
Link Speed (k/h)	50				50		50				50	
Link Distance (m)	211.2				162.8		81.1				134.3	
Travel Time (s)	15.2				11.7		5.8				9.7	
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
Adj. Flow (vph)	24	405	138	660	615	47	61	0	325	557	493	57
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	567	0	0	1322	0	61	325	0	557	550	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)	3.3				3.3		3.6				3.6	
Link Offset(m)	0.0				0.0		0.0				0.0	
Crosswalk Width(m)	4.8				4.8		4.8				4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15		25		15		25		15	
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)	9.4				9.4		9.4				9.4	
Detector 2 Size(m)	0.6				0.6		0.6				0.6	
Detector 2 Type	Cl+Ex				Cl+Ex		Cl+Ex				Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)	0.0				0.0		0.0				0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	4				8		2				6	
Permitted Phases	4				8		2				6	

Lanes, Volumes, Timings

FT 2043 AM.syn

23: GO Station West Access/Street C & Cross Ave

04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	24.0	24.0		24.0	24.0		24.0	24.0		24.0	24.0	
Total Split (s)	25.0	25.0		25.0	25.0		25.0	25.0		25.0	25.0	
Total Split (%)	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%		50.0%	50.0%	
Maximum Green (s)	19.0	19.0		19.0	19.0		19.0	19.0		19.0	19.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		6.0			6.0			6.0			6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		19.0			19.0			19.0			19.0	
Actuated g/C Ratio		0.38			0.38			0.38			0.38	
v/c Ratio		0.56			2.12dl			0.32	0.42		1.46	0.78
Control Delay		12.6			289.1			16.5	4.7		242.8	23.8
Queue Delay		0.0			0.0			0.0	0.0		0.0	0.0
Total Delay		12.6			289.1			16.5	4.7		242.8	23.8
LOS		B			F			B	A		F	C
Approach Delay		12.6			289.1			6.6			134.0	
Approach LOS		B			F			A			F	
Queue Length 50th (m)		16.8			~99.4			3.9	3.0		~75.0	42.4
Queue Length 95th (m)		29.7			#135.9			12.2	16.2		#124.1	#89.2
Internal Link Dist (m)		187.2			138.8			57.1			110.3	
Turn Bay Length (m)											15.0	
Base Capacity (vph)		1006			834			193	770		381	704
Starvation Cap Reductn		0			0			0	0		0	0
Spillback Cap Reductn		0			0			0	0		0	0
Storage Cap Reductn		0			0			0	0		0	0
Reduced v/c Ratio		0.56			1.59			0.32	0.42		1.46	0.78

Intersection Summary

Area Type: Other
 Cycle Length: 50
 Actuated Cycle Length: 50
 Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
 Natural Cycle: 140
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.59
 Intersection Signal Delay: 159.7 Intersection LOS: F
 Intersection Capacity Utilization 116.5% ICU Level of Service H
 Analysis Period (min) 15
 ~ Volume exceeds capacity, queue is theoretically infinite.

Lanes, Volumes, Timings

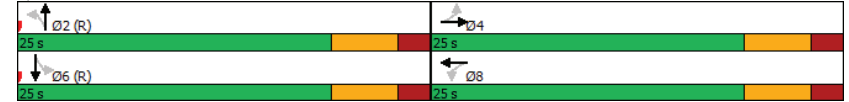
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23: GO Station West Access/Street C & Cross Ave

04-03-2024

- Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
- Queue shown is maximum after two cycles.
- dl Defacto Left Lane. Record with 1 though lane as a left lane.

Splits and Phases: 23: GO Station West Access/Street C & Cross Ave



HCM Signalized Intersection Capacity Analysis
23: GO Station West Access/Street C & Cross Ave

FT 2043 AM.syn
04-03-2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔	↔		↔	↔		↔	↔	
Traffic Volume (vph)	22	373	127	607	566	43	56	0	299	512	454	52
Future Volume (vph)	22	373	127	607	566	43	56	0	299	512	454	52
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0		6.0		6.0		6.0		6.0		6.0
Lane Util. Factor		0.95		0.95		1.00		1.00		1.00		1.00
Fr _t		0.96		0.99		1.00		0.85		1.00		0.98
Fl _t Protected		1.00		0.98		0.95		1.00		0.95		1.00
Satd. Flow (prot)		3403		3435		1770		1583		1770		1834
Fl _t Permitted		0.73		0.62		0.27		1.00		0.54		1.00
Satd. Flow (perm)		2485		2183		511		1583		1005		1834
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	24	405	138	660	615	47	61	0	325	557	493	57
RTOR Reduction (vph)	0	62	0	0	5	0	0	169	0	0	8	0
Lane Group Flow (vph)	0	505	0	0	1317	0	61	156	0	557	542	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4		8		8		2		6		6
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		19.0			19.0		19.0	19.0		19.0		19.0
Effective Green, g (s)		19.0			19.0		19.0	19.0		19.0		19.0
Actuated g/C Ratio		0.38			0.38		0.38	0.38		0.38		0.38
Clearance Time (s)		6.0			6.0		6.0	6.0		6.0		6.0
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0		3.0
Lane Grp Cap (vph)		944			829		194	601		381		696
v/s Ratio Prot								0.10				0.30
v/s Ratio Perm		0.20			c0.60		0.12			c0.55		
v/c Ratio		0.53			2.12dl		0.31	0.26		1.46		0.78
Uniform Delay, d1		12.1			15.5		10.9	10.7		15.5		13.6
Progression Factor		1.00			1.00		1.00	1.00		1.00		1.00
Incremental Delay, d2		0.6			270.7		4.2	1.0		221.9		8.4
Delay (s)		12.6			286.2		15.1	11.7		237.4		22.0
Level of Service		B			F		B	B		F		C
Approach Delay (s)		12.6			286.2			12.2				130.4
Approach LOS		B			F			B				F

Intersection Summary			
HCM 2000 Control Delay	158.1	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.52		
Actuated Cycle Length (s)	50.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	116.5%	ICU Level of Service	H
Analysis Period (min)	15		
dl Defacto Left Lane. Recode with 1 though lane as a left lane.			
c Critical Lane Group			

Lanes, Volumes, Timings
1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd

FT 2043 PM.syn
04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔	↔		↔	↔		↔	↔	
Traffic Volume (vph)	172	145	407	1155	277	228	527	2518	863	174	1788	143
Future Volume (vph)	172	145	407	1155	277	228	527	2518	863	174	1788	143
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0		0.0	165.0		25.0	145.0		0.0	95.0		90.0
Storage Lanes	1		1	1		1	1		1	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		7.5
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Ped Bike Factor	0.98					0.95			0.98			0.98
Fr _t			0.850			0.850			0.850			0.850
Fl _t Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1624	1710	1425	3120	1710	1425	1608	4577	1425	1608	4532	1425
Fl _t Permitted	0.577			0.348			0.098			0.108		
Satd. Flow (perm)	965	1710	1425	1143	1710	1360	166	4577	1402	183	4532	1425
Right Turn on Red			Yes			Yes			Yes		Yes	
Satd. Flow (RTOR)			255			146			309		191	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		347.0			285.9			280.4			353.6	
Travel Time (s)		25.0			20.6			20.2			25.5	
Confl. Peds. (#/hr)	34					34			14		14	
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
Heavy Vehicles (%)	0%	0%	2%	1%	0%	2%	1%	2%	2%	1%	3%	2%
Adj. Flow (vph)	187	158	442	1255	301	248	573	2737	938	189	1943	155
Shared Lane Traffic (%)												
Lane Group Flow (vph)	187	158	442	1255	301	248	573	2737	938	189	1943	155
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		7.2			7.2			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings

FT 2043 PM.syn

1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd

04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA	Free	pm+pt	NA	Perm	pm+pt	NA	Free	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		Free	8		8	2		Free	6		6
Detector Phase	7	4		3	8	8	5	2		1	6	6
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0	10.0	6.0	15.0		6.0	15.0	15.0
Minimum Split (s)	11.0	25.0		11.0	43.0	43.0	11.0	34.0		10.0	34.0	34.0
Total Split (s)	11.0	28.0		26.0	43.0	43.0	22.0	56.0		10.0	44.0	44.0
Total Split (%)	9.2%	23.3%		21.7%	35.8%	35.8%	18.3%	46.7%		8.3%	36.7%	36.7%
Maximum Green (s)	7.0	21.0		21.0	36.0	36.0	18.0	49.0		6.0	37.0	37.0
Yellow Time (s)	3.0	4.0		3.0	4.0	4.0	3.0	4.0		3.0	4.0	4.0
All-Red Time (s)	1.0	3.0		2.0	3.0	3.0	1.0	3.0		1.0	3.0	3.0
Lost Time Adjust (s)	0.0	-3.0		0.0	-3.0	-3.0	0.0	-3.0		0.0	-3.0	-3.0
Total Lost Time (s)	4.0	4.0		5.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	5.0		3.0	5.0	5.0	3.0	5.0		3.0	5.0	5.0
Recall Mode	None	None		None	None	None	None	C-Max		None	C-Max	C-Max
Walk Time (s)				7.0	7.0		7.0			7.0	7.0	
Flash Dont Walk (s)				29.0	29.0		20.0			20.0	20.0	
Pedestrian Calls (#/hr)				0	0		0			0	0	
Act Effct Green (s)	27.5	20.5	120.0	45.5	35.5	35.5	65.5	52.0	120.0	49.5	40.0	40.0
Actuated g/C Ratio	0.23	0.17	1.00	0.38	0.30	0.30	0.55	0.43	1.00	0.41	0.33	0.33
v/c Ratio	0.72	0.54	0.31	1.61	0.60	0.49	1.65	1.38	0.67	1.01	1.29	0.26
Control Delay	48.3	52.1	0.6	307.5	41.1	16.9	329.5	204.1	2.6	98.7	168.7	2.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	48.3	52.1	0.6	307.5	41.1	16.9	329.5	204.1	2.6	98.7	168.7	2.9
LOS	D	D	A	F	D	B	F	F	A	F	F	A
Approach Delay		22.2			223.1			176.5				151.7
Approach LOS		C			F			F				F
Queue Length 50th (m)	31.4	35.9	0.0	~198.5	63.2	19.2	~193.4	~329.7	0.0	~34.8	~224.3	0.0
Queue Length 95th (m)	48.0	56.9	0.0	#234.7	90.2	43.4	#275.7	#358.0	0.0	#94.0	#255.1	8.4
Internal Link Dist (m)		323.0			261.9			256.4				329.6
Turn Bay Length (m)	60.0			165.0		25.0	145.0			95.0		90.0
Base Capacity (vph)	259	342	1425	779	555	540	348	1983	1402	188	1510	602
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.72	0.46	0.31	1.61	0.54	0.46	1.65	1.38	0.67	1.01	1.29	0.26

Intersection Summary

Area Type: CBD
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 105.6 (88%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
 Natural Cycle: 150
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.65
 Intersection Signal Delay: 166.2
 Intersection LOS: F

Lanes, Volumes, Timings

FT 2043 PM.syn

1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd

04-03-2024

Intersection Capacity Utilization 130.1% ICU Level of Service H
 Analysis Period (min) 15
 - Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd



HCM Signalized Intersection Capacity Analysis
1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd

FT 2043 PM.syn
04-03-2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	↔	↗	↘	↔	↗	↘	↔	↗	↘	↔	↗	↘	
Traffic Volume (vph)	172	145	407	1155	277	228	527	2518	863	174	1788	143	
Future Volume (vph)	172	145	407	1155	277	228	527	2518	863	174	1788	143	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	4.0	4.0	1.0	5.0	4.0	4.0	4.0	4.0	1.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.98	1.00	1.00	1.00	
Flpb, ped/bikes	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1604	1710	1425	3120	1710	1360	1608	4577	1402	1608	4532	1425	
Flt Permitted	0.58	1.00	1.00	0.35	1.00	1.00	0.10	1.00	1.00	0.11	1.00	1.00	
Satd. Flow (perm)	974	1710	1425	1143	1710	1360	165	4577	1402	183	4532	1425	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	187	158	442	1255	301	248	573	2737	938	189	1943	155	
RTOR Reduction (vph)	0	0	0	0	0	103	0	0	0	0	0	103	
Lane Group Flow (vph)	187	158	442	1255	301	145	573	2737	938	189	1943	52	
Confl. Peds. (#/hr)	34				34				14	14			
Heavy Vehicles (%)	0%	0%	2%	1%	0%	2%	1%	2%	2%	1%	3%	2%	
Turn Type	pm+pt	NA	Free	pm+pt	NA	Perm	pm+pt	NA	Free	pm+pt	NA	Perm	
Protected Phases	7	4		3	8		5	2		1	6		
Permitted Phases	4		Free	8		8	2		Free	6		6	
Actuated Green, G (s)	24.5	17.5	120.0	43.5	32.5	32.5	62.5	49.0	120.0	46.5	37.0	37.0	
Effective Green, g (s)	24.5	20.5	120.0	43.5	35.5	35.5	62.5	52.0	120.0	46.5	40.0	40.0	
Actuated g/C Ratio	0.20	0.17	1.00	0.36	0.30	0.30	0.52	0.43	1.00	0.39	0.33	0.33	
Clearance Time (s)	4.0	7.0		5.0	7.0	7.0	4.0	7.0		4.0	7.0	7.0	
Vehicle Extension (s)	3.0	5.0		3.0	5.0	5.0	3.0	5.0		3.0	5.0	5.0	
Lane Grp Cap (vph)	235	292	1425	760	505	402	344	1983	1402	183	1510	475	
v/s Ratio Prot	0.05	0.09		c0.29	0.18		c0.30	0.60		0.08	0.43		
v/s Ratio Perm	0.12		0.31	c0.31		0.11	c0.57		0.67	0.32		0.04	
v/c Ratio	0.80	0.54	0.31	1.65	0.60	0.36	1.67	1.38	0.67	1.03	1.29	0.11	
Uniform Delay, d1	43.8	45.5	0.0	34.6	36.1	33.3	37.7	34.0	0.0	30.5	40.0	27.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	16.8	3.6	0.6	299.0	2.8	1.2	312.1	174.3	2.6	75.4	134.2	0.5	
Delay (s)	60.6	49.0	0.6	333.6	39.0	34.5	349.8	208.3	2.6	105.9	174.2	28.1	
Level of Service	E	D	A	F	D	C	F	F	A	F	F	C	
Approach Delay (s)		24.6			243.3			182.0			158.6		
Approach LOS		C			F			F			F		
Intersection Summary													
HCM 2000 Control Delay		174.7			HCM 2000 Level of Service				F				
HCM 2000 Volume to Capacity ratio		1.66											
Actuated Cycle Length (s)		120.0			Sum of lost time (s)				17.0				
Intersection Capacity Utilization		130.1%			ICU Level of Service				H				
Analysis Period (min)		15											
c Critical Lane Group													

Lanes, Volumes, Timings
2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↗	↘	↔	↗	↘	↔	↗	↘	↔	↗	↘
Traffic Volume (vph)	31	0	364	848	143	441	0	3435	721	0	3407	13
Future Volume (vph)	31	0	364	848	143	441	0	3435	721	0	3407	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.5	3.3	3.6	3.5	3.6	3.5	3.6	3.6	3.6	3.5
Storage Length (m)	50.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		1	1		1	0		1	0		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.91	1.00	1.00	0.86	0.86
Ped Bike Factor	1.00					0.99			0.97		1.00	
Frt			0.850			0.850			0.850		0.999	
Flt Protected	0.950			0.950	0.966							
Satd. Flow (prot)	1570	0	1437	1463	1543	1409	0	4577	1439	0	4780	0
Flt Permitted	0.950			0.950	0.966							
Satd. Flow (perm)	1568	0	1437	1463	1543	1391	0	4577	1400	0	4780	0
Right Turn on Red			Yes			Yes			Yes		Yes	Yes
Satd. Flow (RTOR)			31			250			162		1	
Link Speed (k/h)		50			50		50		50		50	
Link Distance (m)		142.1			192.6		324.8		280.4		280.4	
Travel Time (s)		10.2			13.9		23.4		20.2		20.2	
Confl. Peds. (#/hr)	2					2	14		14	14	14	14
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
Heavy Vehicles (%)	0%	0%	0%	2%	1%	2%	0%	2%	1%	0%	23%	0%
Adj. Flow (vph)	34	0	396	922	155	479	0	3734	784	0	3703	14
Shared Lane Traffic (%)				42%								
Lane Group Flow (vph)	34	0	396	535	542	479	0	3734	784	0	3717	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.3			3.3			3.6		3.6		3.6
Link Offset(m)		0.0			0.0			0.0		0.0		0.0
Crosswalk Width(m)		4.8			4.8			4.8		4.8		4.8
Two way Left Turn Lane												
Headway Factor	1.19	1.14	1.16	1.19	1.14	1.16	1.14	1.14	1.14	1.14	1.14	1.16
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1		1	1		1	2		1	2		2
Detector Template	Left		Right	Left	Thru	Right		Thru	Right		Thru	
Leading Detector (m)	2.0		2.0	2.0	10.0	2.0		10.0	2.0		10.0	
Trailing Detector (m)	0.0		0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Detector 1 Position(m)	0.0		0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Detector 1 Size(m)	2.0		2.0	2.0	0.6	2.0		0.6	2.0		0.6	
Detector 1 Type	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Detector 1 Delay (s)	0.0		0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Detector 2 Position(m)					9.4			9.4			9.4	
Detector 2 Size(m)					0.6			0.6			0.6	
Detector 2 Type					Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

Lanes, Volumes, Timings

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2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)					0.0			0.0			0.0	
Turn Type	Prot		Perm	Perm	NA	Free	NA	NA	Free	NA	NA	
Protected Phases	3			4	4			6			2	
Permitted Phases						Free			Free			
Detector Phase	3		8	4	4			6			2	
Switch Phase												
Minimum Initial (s)	7.0		10.0	10.0	10.0			5.0			28.0	
Minimum Split (s)	23.0		38.0	38.0	38.0			35.0			35.0	
Total Split (s)	23.0		68.0	45.0	45.0			72.0			72.0	
Total Split (%)	16.4%		48.6%	32.1%	32.1%			51.4%			51.4%	
Maximum Green (s)	18.0		61.0	38.0	38.0			65.0			65.0	
Yellow Time (s)	3.0		4.0	4.0	4.0			4.0			4.0	
All-Red Time (s)	2.0		3.0	3.0	3.0			3.0			3.0	
Lost Time Adjust (s)	-1.0		-3.0	-3.0	-3.0			-3.0			-3.0	
Total Lost Time (s)	4.0		4.0	4.0	4.0			4.0			4.0	
Lead/Lag	Lead			Lag	Lag							
Lead-Lag Optimize?	Yes			Yes	Yes							
Vehicle Extension (s)	3.0		3.0	3.0	3.0			4.5			4.5	
Recall Mode	Min		Min	Min	Min			C-Min			C-Min	
Walk Time (s)	7.0		7.0	7.0	7.0			7.0			7.0	
Flash Dont Walk (s)			24.0	24.0	24.0			21.0			21.0	
Pedestrian Calls (#/hr)			0	0	0			0			0	
Act Effct Green (s)	9.8		64.0	50.2	50.2	140.0		68.0	140.0		68.0	
Actuated g/C Ratio	0.07		0.46	0.36	0.36	1.00		0.49	1.00		0.49	
v/c Ratio	0.31		0.59	1.02	0.98	0.34		1.68	0.56		1.60	
Control Delay	68.7		30.1	88.7	78.1	0.7		334.5	0.1		300.5	
Queue Delay	0.0		0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Total Delay	68.7		30.1	88.7	78.1	0.7		334.5	0.1		300.5	
LOS	E		C	F	E	A		F	A		F	
Approach Delay		33.2						276.5			300.5	
Approach LOS		C						F			F	
Queue Length 50th (m)	9.6		77.8	~167.6	163.1	0.0		~582.2	0.0		~452.7	
Queue Length 95th (m)	21.2		113.5	#259.8	#255.7	0.0		m#432.1	m0.0		#468.1	
Internal Link Dist (m)		118.1			168.6			300.8			256.4	
Turn Bay Length (m)	50.0											
Base Capacity (vph)	213		673	524	553	1391		2223	1400		2322	
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	0.16		0.59	1.02	0.98	0.34		1.68	0.56		1.60	

Intersection Summary

Area Type: CBD
 Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 115.4 (82%), Referenced to phase 2:SBT and 6:NBT, Start of Green
 Natural Cycle: 150
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.68

Lanes, Volumes, Timings

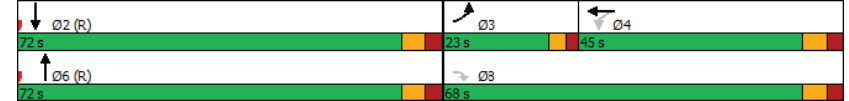
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2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp

04-03-2024

Intersection Signal Delay: 241.7 Intersection LOS: F
 Intersection Capacity Utilization 120.4% ICU Level of Service H
 Analysis Period (min) 15
 ~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp



HCM Signalized Intersection Capacity Analysis
 2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp

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 04-03-2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	31	0	364	848	143	441	0	3435	721	0	3407	13
Future Volume (vph)	31	0	364	848	143	441	0	3435	721	0	3407	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.5	3.3	3.6	3.5	3.6	3.5	3.6	3.6	3.6	3.5
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	1.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	0.91	1.00	0.86	0.99	1.00	0.97	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	0.99	1.00	1.00	0.97	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	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	0.85	1.00	0.85	1.00	1.00	1.00	1.00	1.00
Fit Protected	0.95	1.00	0.95	0.97	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1570	1437	1463	1542	1391	4577	1400	4782	1.00	1.00	1.00	1.00
Fit Permitted	0.95	1.00	0.95	0.97	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (perm)	1570	1437	1463	1542	1391	4577	1400	4782	1.00	1.00	1.00	1.00
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	34	0	396	922	155	479	0	3734	784	0	3703	14
RTOR Reduction (vph)	0	0	17	0	0	0	0	0	0	0	1	0
Lane Group Flow (vph)	34	0	379	535	542	479	0	3734	784	0	3716	0
Confl. Peds. (#/hr)	2					2	14		14	14		14
Heavy Vehicles (%)	0%	0%	0%	2%	1%	2%	0%	2%	1%	0%	23%	0%
Turn Type	Prot	Perm	Perm	NA	Free	NA	Free	NA	Free	NA	Free	NA
Protected Phases	3			4		6				2		
Permitted Phases		8	4		Free		Free					
Actuated Green, G (s)	8.8	61.0	47.2	47.2	140.0	65.0	140.0	65.0	140.0	65.0	140.0	65.0
Effective Green, g (s)	9.8	64.0	50.2	50.2	140.0	68.0	140.0	68.0	140.0	68.0	140.0	68.0
Actuated g/C Ratio	0.07	0.46	0.36	0.36	1.00	0.49	1.00	0.49	1.00	0.49	1.00	0.49
Clearance Time (s)	5.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lane Grp Cap (vph)	109	656	524	552	1391	2223	1400	2322	1400	2322	1400	2322
v/s Ratio Prot	0.02					0.82		0.78				
v/s Ratio Perm		0.26	0.37	0.35	0.34		0.56					
v/c Ratio	0.31	0.58	1.02	0.98	0.34	1.68	0.56	1.60	1.60	0.56	1.60	1.60
Uniform Delay, d1	61.9	28.0	44.9	44.4	0.0	36.0	0.0	36.0	0.0	36.0	0.0	36.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.10	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.6	1.2	44.7	33.5	0.7	306.1	0.1	272.3	0.1	272.3	0.1	272.3
Delay (s)	63.5	29.3	89.6	77.9	0.7	345.7	0.1	308.3	0.1	308.3	0.1	308.3
Level of Service	E	C	F	E	A	F	A	F	A	F	A	F
Approach Delay (s)	32.0			58.2			285.7			308.3		
Approach LOS	C			E			F			F		

Intersection Summary			
HCM 2000 Control Delay	248.6	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.35		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	120.4%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
 3: Trafalgar Rd & QEW EB-Off Ramp

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Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	1243	681	0	2890	2830	407
Future Volume (vph)	1243	681	0	2890	2830	407
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.5	3.6	3.6	3.6	3.6
Lane Util. Factor	0.97	1.00	1.00	0.91	0.91	1.00
Ped Bike Factor	0.99					
Frt	0.850			0.850		
Fit Protected	0.950					
Satd. Flow (prot)	3046	1423	0	4577	4577	1454
Fit Permitted	0.950					
Satd. Flow (perm)	3046	1402	0	4577	4577	1454
Right Turn on Red	Yes					Yes
Satd. Flow (RTOR)						111
Link Speed (k/h)	50		50		50	
Link Distance (m)	199.2		51.4		324.8	
Travel Time (s)	14.3		3.7		23.4	
Confl. Peds. (#/hr)	2					
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	1%	0%	2%	2%	0%
Adj. Flow (vph)	1351	740	0	3141	3076	442
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1351	740	0	3141	3076	442
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	6.6		0.0		0.0	
Link Offset(m)	0.0		0.0		0.0	
Crosswalk Width(m)	4.8		4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.19	1.16	1.14	1.14	1.14	1.14
Turning Speed (k/h)	24	14	24			14
Number of Detectors	1	1		2	2	1
Detector Template	Left	Right		Thru	Thru	Right
Leading Detector (m)	2.0	2.0		10.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	2.0	2.0		0.6	0.6	2.0
Detector 1 Type	CI+Ex	CI+Ex		CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)				9.4	9.4	
Detector 2 Size(m)				0.6	0.6	
Detector 2 Type				CI+Ex	CI+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Perm	Perm		NA	NA	Free
Protected Phases	2		2		2	

Lanes, Volumes, Timings
3: Trafalgar Rd & QEW EB-Off Ramp

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Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Permitted Phases	4	4				Free
Detector Phase	4	4		2	2	
Switch Phase						
Minimum Initial (s)	10.0	10.0		29.0	29.0	
Minimum Split (s)	38.0	38.0		36.0	36.0	
Total Split (s)	62.0	62.0		78.0	78.0	
Total Split (%)	44.3%	44.3%		55.7%	55.7%	
Maximum Green (s)	55.0	55.0		71.0	71.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	
All-Red Time (s)	3.0	3.0		3.0	3.0	
Lost Time Adjust (s)	-3.0	-3.0		-3.0	-3.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Recall Mode	None	None		C-Max	C-Max	
Walk Time (s)	7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	24.0	24.0		22.0	22.0	
Pedestrian Calls (#/hr)	0	0		0	0	
Act Effct Green (s)	58.0	58.0		74.0	74.0	140.0
Actuated g/C Ratio	0.41	0.41		0.53	0.53	1.00
v/c Ratio	1.07	1.28		1.30	1.27	0.30
Control Delay	86.1	172.4		164.0	142.4	0.0
Queue Delay	0.0	0.0		0.0	0.0	0.0
Total Delay	86.1	172.4		164.0	142.4	0.0
LOS	F	F		F	F	A
Approach Delay	116.7			164.0	124.5	
Approach LOS	F			F	F	
Queue Length 50th (m)	~224.4	~271.9		~431.3	~413.9	0.0
Queue Length 95th (m)	#268.3	#350.5		m#295.2	m137.8	m0.0
Internal Link Dist (m)	175.2			27.4	300.8	
Turn Bay Length (m)						
Base Capacity (vph)	1261	580		2419	2419	1454
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	1.07	1.28		1.30	1.27	0.30

Intersection Summary	
Area Type:	CBD
Cycle Length:	140
Actuated Cycle Length:	140
Offset:	133.6 (95%), Referenced to phase 2:NBSB and 6:, Start of Green
Natural Cycle:	150
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	1.30
Intersection Signal Delay:	136.8
Intersection LOS:	F
Intersection Capacity Utilization:	114.5%
ICU Level of Service:	H
Analysis Period (min):	15

Lanes, Volumes, Timings
3: Trafalgar Rd & QEW EB-Off Ramp

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- Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Trafalgar Rd & QEW EB-Off Ramp



HCM Signalized Intersection Capacity Analysis
3: Trafalgar Rd & QEW EB-Off Ramp

FT 2043 PM.syn
04-03-2024

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↖ ↗	↗		↖ ↗	↖ ↗	↗
Traffic Volume (vph)	1243	681	0	2890	2830	407
Future Volume (vph)	1243	681	0	2890	2830	407
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.5	3.6	3.6	3.6	3.6
Total Lost time (s)	4.0	4.0		4.0	4.0	1.0
Lane Util. Factor	0.97	1.00		0.91	0.91	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.85		1.00	1.00	0.85
Flt Protected	0.95	1.00		1.00	1.00	1.00
Satd. Flow (prot)	3046	1402		4577	4577	1454
Flt Permitted	0.95	1.00		1.00	1.00	1.00
Satd. Flow (perm)	3046	1402		4577	4577	1454
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1351	740	0	3141	3076	442
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	1351	740	0	3141	3076	442
Confl. Peds. (#/hr)		2				
Heavy Vehicles (%)	0%	1%	0%	2%	2%	0%
Turn Type	Perm	Perm		NA	NA	Free
Protected Phases				2	2	
Permitted Phases	4	4				Free
Actuated Green, G (s)	55.0	55.0		71.0	71.0	140.0
Effective Green, g (s)	58.0	58.0		74.0	74.0	140.0
Actuated g/C Ratio	0.41	0.41		0.53	0.53	1.00
Clearance Time (s)	7.0	7.0		7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	1261	580		2419	2419	1454
v/s Ratio Prot				c0.69	0.67	
v/s Ratio Perm	0.44	c0.53				0.30
v/c Ratio	1.07	1.28		1.30	1.27	0.30
Uniform Delay, d1	41.0	41.0		33.0	33.0	0.0
Progression Factor	1.00	1.00		0.96	0.48	1.00
Incremental Delay, d2	46.8	137.1		134.6	122.5	0.0
Delay (s)	87.8	178.1		166.2	138.4	0.0
Level of Service	F	F		F	F	A
Approach Delay (s)	119.8			166.2	121.0	
Approach LOS	F			F	F	

Intersection Summary			
HCM 2000 Control Delay	136.9	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.32		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	114.5%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
4: Trafalgar Rd & Argus Rd

FT 2043 PM.syn
04-03-2024

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗		↖ ↗	↖ ↗	
Traffic Volume (vph)	0	168	0	3936	2312	1198
Future Volume (vph)	0	168	0	3936	2312	1198
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.6	3.5	3.6	3.6	3.6	3.6
Lane Util. Factor	1.00	1.00	1.00	0.91	0.91	0.91
Ped Bike Factor						
Frt		0.865			0.949	
Flt Protected						
Satd. Flow (prot)	0	1354	0	4577	4329	0
Flt Permitted						
Satd. Flow (perm)	0	1354	0	4577	4329	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	145.7			270.2	51.4	
Travel Time (s)	10.5			19.5	3.7	
Confl. Peds. (#/hr)						24
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	8%	0%	2%	2%	3%
Adj. Flow (vph)	0	183	0	4278	2513	1302
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	183	0	4278	3815	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			3.3	3.3	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.14	1.16	1.14	1.14	1.14	1.14
Turning Speed (k/h)	24	14	24			14
Sign Control	Stop			Free	Free	

Intersection Summary	
Area Type:	CBD
Control Type:	Unsignalized
Intersection Capacity Utilization 98.4%	ICU Level of Service F
Analysis Period (min) 15	

HCM Unsignalized Intersection Capacity Analysis
4: Trafalgar Rd & Argus Rd

FT 2043 PM.syn
04-03-2024

Movement	EBL	EBR	NBL	NBT	SBT	SBR	
Lane Configurations		↗		↖↖	↗↗		
Traffic Volume (veh/h)	0	168	0	3936	2312	1198	
Future Volume (Veh/h)	0	168	0	3936	2312	1198	
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	183	0	4278	2513	1302	
Pedestrians	24						
Lane Width (m)	3.5						
Walking Speed (m/s)	1.2						
Percent Blockage	2						
Right turn flare (veh)							
Median type				None	None		
Median storage (veh)							
Upstream signal (m)				270	52		
pX, platoon unblocked	0.67	0.48	0.48				
vC, conflicting volume	4614	1513	3839				
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol	739	0	3117				
tC, single (s)	6.8	7.1	4.1				
tC, 2 stage (s)							
tF (s)	3.5	3.4	2.2				
p0 queue free %	100	63	100				
cM capacity (veh/h)	236	499	49				
Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	183	1426	1426	1426	1005	1005	1805
Volume Left	0	0	0	0	0	0	0
Volume Right	183	0	0	0	0	0	1302
sSH	499	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.37	0.84	0.84	0.84	0.59	0.59	1.06
Queue Length 95th (m)	13.3	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (s)	16.3	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	C						
Approach Delay (s)	16.3	0.0			0.0		
Approach LOS	C						
Intersection Summary							
Average Delay			0.4				
Intersection Capacity Utilization			98.4%		ICU Level of Service		F
Analysis Period (min)			15				

Lanes, Volumes, Timings
5: Trafalgar Rd & Cross Ave/South Service Rd

FT 2043 PM.syn
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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖↖	↖	↗	↖	↖	↗	↖↖	↖↖	↗	↖↖	↖↖	↖↖
Traffic Volume (vph)	1294	64	213	95	131	238	356	1928	46	116	1800	373
Future Volume (vph)	1294	64	213	95	131	238	356	1928	46	116	1800	373
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.6	3.3	3.6	3.5	3.3	3.6	3.6	3.3	3.6	3.6
Storage Length (m)	130.0		0.0	25.0		0.0	50.0		0.0	25.0		0.0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.91	0.91
Ped Bike Factor		0.96		0.98				0.99				0.99
Ft		0.885				0.850		0.997				0.974
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2958	1342	0	1540	1644	1423	1496	4578	0	1570	4446	0
Fit Permitted	0.950			0.576			0.078			0.085		
Satd. Flow (perm)	2958	1342	0	912	1644	1423	123	4578	0	141	4446	0
Right Turn on Red			Yes			Yes		Yes		Yes		Yes
Satd. Flow (RTOR)		153				148		3			35	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		151.2			330.4			150.2			270.2	
Travel Time (s)		10.9			23.8			10.8			19.5	
Confl. Peds. (#/hr)			15	15			18		70	70		18
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
Heavy Vehicles (%)	3%	8%	9%	2%	4%	1%	5%	1%	0%	0%	1%	3%
Adj. Flow (vph)	1407	70	232	103	142	259	387	2096	50	126	1957	405
Shared Lane Traffic (%)												
Lane Group Flow (vph)	1407	302	0	103	142	259	387	2146	0	126	2362	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		6.6			6.6			3.3			3.3	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.19	1.14	1.14	1.19	1.14	1.16	1.19	1.14	1.14	1.19	1.14	1.14
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2	1	1	2		1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	0.6	2.0		0.6	2.0	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

Lanes, Volumes, Timings
5: Trafalgar Rd & Cross Ave/South Service Rd

FT 2043 PM.syn
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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Perm	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	7	4			8		5	2		1	6	
Permitted Phases				8		8	2			6		
Detector Phase	7	4		8	8	8	5	2		1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	7.0	27.0		7.0	27.0	
Minimum Split (s)	17.0	25.0		25.0	25.0	25.0	11.5	34.0		11.5	34.0	
Total Split (s)	41.0	66.0		25.0	25.0	25.0	20.0	62.5		11.5	54.0	
Total Split (%)	29.3%	47.1%		17.9%	17.9%	17.9%	14.3%	44.6%		8.2%	38.6%	
Maximum Green (s)	34.0	59.0		18.0	18.0	18.0	16.0	55.5		7.5	47.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	3.0	4.0		3.0	4.0	
All-Red Time (s)	3.0	3.0		3.0	3.0	3.0	1.0	3.0		1.0	3.0	
Lost Time Adjust (s)	-3.0	-3.0		0.0	-3.0	-3.0	0.0	-3.0		0.0	-3.0	
Total Lost Time (s)	4.0	4.0		7.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lead/Lag	Lead			Lag	Lag	Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes			Yes	Yes	Yes	Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	4.0		4.0	4.0	4.0	3.0	5.0		3.0	5.0	
Recall Mode	Min	Min		Min	Min	Min	C-Max			Min	C-Max	
Walk Time (s)		7.0		7.0	7.0	7.0		7.0			7.0	
Flash Dont Walk (s)		11.0		11.0	11.0	11.0		11.0			11.0	
Pedestrian Calls (#/hr)		0		0	0	0		0			0	
Act Effct Green (s)	37.0	61.6		17.6	20.6	20.6	70.4	58.5		57.9	50.0	
Actuated g/C Ratio	0.26	0.44		0.13	0.15	0.15	0.50	0.42		0.41	0.36	
v/c Ratio	1.80	0.45		0.90	0.59	0.77	1.74	1.12		0.91	1.47	
Control Delay	396.5	15.0		120.8	66.4	40.4	364.6	103.5		46.1	247.6	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	396.5	15.0		120.8	66.4	40.4	364.6	103.5		46.1	247.6	
LOS	F	B		F	E	D	F	F		D	F	
Approach Delay		329.1			64.2			143.4			237.4	
Approach LOS		F			E			F			F	
Queue Length 50th (m)	~316.7	28.1		29.9	39.0	31.7	~157.0	~260.4		26.5	~341.0	
Queue Length 95th (m)	#360.6	54.0		#66.7	62.8	#72.5 m#117.8	m150.2	m20.6 m#237.8				
Internal Link Dist (m)		127.2			306.4			126.2			246.2	
Turn Bay Length (m)	130.0			25.0			50.0			25.0		
Base Capacity (vph)	781	679		117	246	339	222	1914		139	1610	
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	
Reduced v/c Ratio	1.80	0.44		0.88	0.58	0.76	1.74	1.12		0.91	1.47	

Intersection Summary

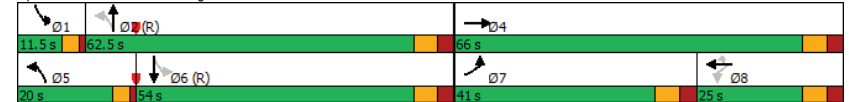
Area Type: CBD
 Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 128 (91%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
 Natural Cycle: 150
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.80

Lanes, Volumes, Timings
5: Trafalgar Rd & Cross Ave/South Service Rd

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Intersection Signal Delay: 214.1
 Intersection Capacity Utilization 132.8%
 Intersection LOS: F
 ICU Level of Service H
 Analysis Period (min) 15
 ~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Split and Phases: 5: Trafalgar Rd & Cross Ave/South Service Rd



HCM Signalized Intersection Capacity Analysis
5: Trafalgar Rd & Cross Ave/South Service Rd

FT 2043 PM.syn
04-03-2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	1294	64	213	95	131	238	356	1928	46	116	1800	373
Future Volume (vph)	1294	64	213	95	131	238	356	1928	46	116	1800	373
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.3	3.6	3.5	3.3	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)	4.0	4.0		7.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	1.00		1.00	1.00	1.00	1.00	0.91		1.00	0.91	
Frpb, ped/bikes	1.00	0.96		1.00	1.00	1.00	1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		0.98	1.00	1.00	1.00	1.00		1.00	1.00	
Fr	1.00	0.88		1.00	1.00	0.85	1.00	1.00		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	2958	1342		1504	1644	1423	1496	4576		1570	4447	
Flt Permitted	0.95	1.00		0.58	1.00	1.00	0.08	1.00		0.09	1.00	
Satd. Flow (perm)	2958	1342		912	1644	1423	123	4576		141	4447	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1407	70	232	103	142	259	387	2096	50	126	1957	405
RTOR Reduction (vph)	0	86	0	0	0	126	0	2	0	0	23	0
Lane Group Flow (vph)	1407	216	0	103	142	133	387	2144	0	126	2340	0
Confl. Peds. (#/hr)			15	15			18		70	70		18
Heavy Vehicles (%)	3%	8%	9%	2%	4%	1%	5%	1%	0%	0%	1%	3%
Turn Type	Prot	NA		Perm	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		8	8	5	2	1		6	6	
Permitted Phases			8		8	2		6				
Actuated Green, G (s)	34.0	58.6		17.6	17.6	17.6	67.4	55.5		54.9	47.0	
Effective Green, g (s)	37.0	61.6		17.6	20.6	20.6	67.4	58.5		54.9	50.0	
Actuated g/C Ratio	0.26	0.44		0.13	0.15	0.15	0.48	0.42		0.39	0.36	
Clearance Time (s)	7.0	7.0		7.0	7.0	7.0	4.0	7.0		4.0	7.0	
Vehicle Extension (s)	3.0	4.0		4.0	4.0	4.0	3.0	5.0		3.0	5.0	
Lane Grp Cap (vph)	781	590		114	241	209	220	1912		135	1588	
v/s Ratio Prot	c0.48	0.16		0.09			c0.21	0.47		0.05	0.53	
v/s Ratio Perm			c0.11		0.09		c0.64			0.31		
v/c Ratio	1.80	0.37		0.90	0.59	0.64	1.76	1.12		0.93	1.47	
Uniform Delay, d1	51.5	26.2		60.4	55.7	56.2	44.9	40.8		35.3	45.0	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.17	1.32		1.27	1.18	
Incremental Delay, d2	365.8	0.5		55.7	4.3	6.9	343.3	55.4		10.9	213.3	
Delay (s)	417.3	26.7		116.1	60.1	63.1	395.7	109.1		55.8	266.3	
Level of Service	F	C		F	E	E	F	F		E	F	
Approach Delay (s)	348.3			73.1			152.8			255.6		
Approach LOS	F			E			F			F		

Intersection Summary			
HCM 2000 Control Delay	228.8	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.60		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	132.8%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
6: Trafalgar Rd & Cornwall Rd

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	625	632	61	120	992	627	82	1076	108	779	868	464
Future Volume (vph)	625	632	61	120	992	627	82	1076	108	779	868	464
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.5
Storage Length (m)	80.0		0.0	80.0		0.0	25.0		0.0	80.0		0.0
Storage Lanes	2		0	1		1	1		0	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	0.97	0.95	0.95	1.00	0.95	1.00	1.00	*0.80	0.95	0.97	*0.80	1.00
Ped Bike Factor	0.99	1.00		0.99		0.98	0.99	1.00		1.00		0.97
Fr		0.987				0.850		0.986				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3016	3104	0	1570	3217	1439	1540	2692	0	2987	1368	1409
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2996	3104	0	1552	3217	1413	1530	2692	0	2976	1368	1361
Right Turn on Red			Yes			Yes		Yes		Yes		Yes
Satd. Flow (RTOR)		7				340		7				271
Link Speed (k/h)		50			50			50				50
Link Distance (m)		285.8			142.3			311.4				130.3
Travel Time (s)		20.6			10.2			22.4				9.4
Confl. Peds. (#/hr)	21		14	14		21	17		10	10		17
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
Heavy Vehicles (%)	1%	3%	1%	0%	1%	1%	2%	0%	0%	2%	0%	2%
Adj. Flow (vph)	679	687	66	130	1078	682	89	1170	117	847	943	504
Shared Lane Traffic (%)												
Lane Group Flow (vph)	679	753	0	130	1078	682	89	1287	0	847	943	504
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		6.6			6.6			6.6		6.6		6.6
Link Offset(m)		0.0			0.0			0.0		0.0		0.0
Crosswalk Width(m)		4.8			4.8			4.8		4.8		4.8
Two way Left Turn Lane												
Headway Factor	1.19	1.14	1.14	1.19	1.14	1.14	1.19	1.14	1.14	1.19	1.14	1.16
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2	1	1	2		1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0		2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6		2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4				9.4
Detector 2 Size(m)		0.6			0.6			0.6				0.6
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex				Cl+Ex
Detector 2 Channel												

Lanes, Volumes, Timings
6: Trafalgar Rd & Cornwall Rd

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA	Free	Prot	NA		Prot	NA	Perm
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases					Free							6
Detector Phase	3	8		7	4		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	7.0	10.0		7.0	10.0		7.0	20.0		7.0	20.0	20.0
Minimum Split (s)	12.0	37.0		12.0	37.0		12.0	39.0		12.0	39.0	39.0
Total Split (s)	21.0	43.0		19.0	41.0		12.0	54.0		24.0	66.0	66.0
Total Split (%)	15.0%	30.7%		13.6%	29.3%		8.6%	38.6%		17.1%	47.1%	47.1%
Maximum Green (s)	16.0	36.0		14.0	34.0		7.0	47.0		19.0	59.0	59.0
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	4.0
All-Red Time (s)	2.0	3.0		2.0	3.0		2.0	3.0		2.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-3.0		-1.0	-3.0		-1.0	-3.0		-1.0	-3.0	-3.0
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	0.2	0.2		0.2	0.2		0.2	0.2		0.2	0.2	0.2
Recall Mode	Max	Max		Max	Max		None	C-Max		Max	C-Max	C-Max
Walk Time (s)		7.0			7.0			7.0			7.0	7.0
Flash Dont Walk (s)		23.0			23.0			25.0			25.0	25.0
Pedestrian Calls (#/hr)		0			0			0			0	0
Act Effct Green (s)	17.0	39.0		15.0	37.0	140.0	8.0	50.0		20.0	62.0	62.0
Actuated g/C Ratio	0.12	0.28		0.11	0.26	1.00	0.06	0.36		0.14	0.44	0.44
v/c Ratio	1.86	0.87		0.77	1.27	0.48	1.01	1.33		1.99	1.56	0.67
Control Delay	428.0	59.2		89.7	172.0	1.2	162.8	193.6		481.9	275.2	6.8
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	428.0	59.2		89.7	172.0	1.2	162.8	193.6		481.9	275.2	6.8
LOS	F	E		F	F	A	F	F		F	F	A
Approach Delay		234.1			104.7			191.6				292.5
Approach LOS		F			F			F				F
Queue Length 50th (m)	~154.5	109.3		37.5	~207.7	0.0	~26.8	~304.7		~203.3	~473.3	15.0
Queue Length 95th (m)	#194.1	#142.1		#71.9	#252.0	0.0	#64.7	#358.4		m#135.4	m#295.3	m#6.1
Internal Link Dist (m)		261.8			118.3			287.4			106.3	
Turn Bay Length (m)	80.0			80.0			25.0			80.0		
Base Capacity (vph)	366	869		168	850	1413	88	965		426	605	753
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	0
Reduced v/c Ratio	1.86	0.87		0.77	1.27	0.48	1.01	1.33		1.99	1.56	0.67

Intersection Summary

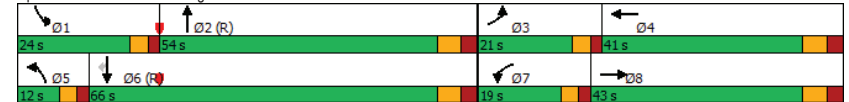
Area Type: CBD
 Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green, Master Intersection
 Natural Cycle: 150
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.99

Lanes, Volumes, Timings
6: Trafalgar Rd & Cornwall Rd

FT 2043 PM.syn
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Intersection Signal Delay: 209.9	Intersection LOS: F
Intersection Capacity Utilization 125.3%	ICU Level of Service H
Analysis Period (min) 15	
* User Entered Value	
~ Volume exceeds capacity, queue is theoretically infinite. Queue shown is maximum after two cycles.	
# 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.	
m Volume for 95th percentile queue is metered by upstream signal.	

Splits and Phases: 6: Trafalgar Rd & Cornwall Rd



HCM Signalized Intersection Capacity Analysis
6: Trafalgar Rd & Cornwall Rd

FT 2043 PM.syn
04-03-2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↕	↔	↕	↔	↔	↕	↕
Traffic Volume (vph)	625	632	61	120	992	627	82	1076	108	779	868	464
Future Volume (vph)	625	632	61	120	992	627	82	1076	108	779	868	464
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.5
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.97	0.95		1.00	0.95	1.00	1.00	*0.80		0.97	*0.80	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.98	1.00	1.00		1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Fr	1.00	0.99		1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3016	3104		1570	3217	1413	1540	2693		2987	1368	1361
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3016	3104		1570	3217	1413	1540	2693		2987	1368	1361
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	679	687	66	130	1078	682	89	1170	117	847	943	504
RTOR Reduction (vph)	0	5	0	0	0	0	0	5	0	0	0	151
Lane Group Flow (vph)	679	748	0	130	1078	682	89	1283	0	847	943	353
Confl. Peds. (#/hr)	21		14	14		21	17		10	10		17
Heavy Vehicles (%)	1%	3%	1%	0%	1%	1%	2%	0%	0%	2%	0%	2%
Turn Type	Prot	NA		Prot	NA	Free	Prot	NA		Prot	NA	Perm
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases						Free						6
Actuated Green, G (s)	16.0	36.0		14.0	34.0	140.0	7.0	47.0		19.0	59.0	59.0
Effective Green, g (s)	17.0	39.0		15.0	37.0	140.0	8.0	50.0		20.0	62.0	62.0
Actuated g/C Ratio	0.12	0.28		0.11	0.26	1.00	0.06	0.36		0.14	0.44	0.44
Clearance Time (s)	5.0	7.0		5.0	7.0		5.0	7.0		5.0	7.0	7.0
Vehicle Extension (s)	0.2	0.2		0.2	0.2		0.2	0.2		0.2	0.2	0.2
Lane Grp Cap (vph)	366	864		168	850	1413	88	961		426	605	602
v/s Ratio Prot	c0.23	0.24		0.08	c0.34		0.06	0.48		c0.28	c0.69	
v/s Ratio Perm					c0.48							0.26
v/c Ratio	1.86	0.87		0.77	1.27	0.48	1.01	1.33		1.99	1.56	0.59
Uniform Delay, d1	61.5	48.0		60.8	51.5	0.0	66.0	45.0		60.0	39.0	29.4
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.41	0.57	0.47
Incremental Delay, d2	395.2	11.3		28.6	130.0	1.2	99.1	157.7		445.5	252.1	0.4
Delay (s)	456.7	59.3		89.5	181.5	1.2	165.1	202.7		530.3	274.5	14.1
Level of Service	F	E		F	F	A	F	F		F	F	B
Approach Delay (s)	247.8			110.1			200.2			311.7		
Approach LOS	F			F			F			F		

Intersection Summary			
HCM 2000 Control Delay	222.2	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.61		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	125.3%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings

7: South Service Road/Canadian Road & QEW EB Off-Ramp/Royal Windsor Drive
04-03-2024

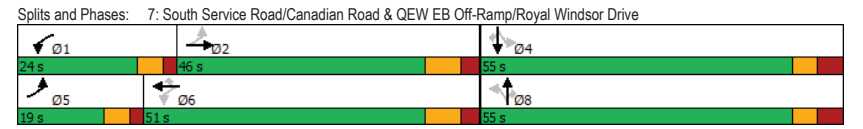
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↕	↔	↕	↔	↔	↕	↕
Traffic Volume (vph)	404	704	22	236	842	36	18	61	129	18	154	550
Future Volume (vph)	404	704	22	236	842	36	18	61	129	18	154	550
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	150.0	0.0	155.0		70.0	15.0		0.0	0.0			30.0
Storage Lanes	2	0	1		1	1		1	1			1
Taper Length (m)	7.5		7.5		7.5			7.5				7.5
Lane Util. Factor	0.97	0.95	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr		0.995				0.850		0.850				0.850
Flt Protected	0.950			0.950			0.950		0.950			0.950
Satd. Flow (prot)	3502	3394	0	1752	3505	1615	1805	1900	1615	1805	1900	1599
Flt Permitted	0.197			0.229			0.583		0.714			0.714
Satd. Flow (perm)	726	3394	0	422	3505	1615	1108	1900	1615	1357	1900	1599
Right Turn on Red			Yes			Yes		Yes		Yes		Yes
Satd. Flow (RTOR)		3				94		140				311
Link Speed (k/h)	80			80			60					40
Link Distance (m)	324.5			247.2			158.7					215.5
Travel Time (s)	14.6			11.1			9.5					19.4
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
Heavy Vehicles (%)	0%	6%	0%	3%	3%	0%	0%	0%	0%	0%	0%	1%
Adj. Flow (vph)	439	765	24	257	915	39	20	66	140	20	167	598
Shared Lane Traffic (%)												
Lane Group Flow (vph)	439	789	0	257	915	39	20	66	140	20	167	598
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)	7.2			7.2			3.6			3.6		3.6
Link Offset(m)	0.0			0.0			0.0			0.0		0.0
Crosswalk Width(m)	4.8			4.8			4.8			4.8		4.8
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	CI+Ex	CI+Ex		CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4				9.4
Detector 2 Size(m)		0.6			0.6			0.6				0.6
Detector 2 Type		CI+Ex			CI+Ex			CI+Ex				CI+Ex
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8				4

Lanes, Volumes, Timings
 7: South Service Road/Canadian Road & QEW EB Off-Ramp/Royal Windsor Drive FT 2043 PM.syn 04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	2			6		6	8		8	4		4
Detector Phase	5	2		1	6	6	8	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	8.0	20.0		8.0	30.0	30.0	8.0	8.0	8.0	10.0	10.0	10.0
Minimum Split (s)	14.0	29.4		14.0	38.4	38.4	28.8	28.8	28.8	28.8	28.8	28.8
Total Split (s)	19.0	46.0		24.0	51.0	51.0	55.0	55.0	55.0	55.0	55.0	55.0
Total Split (%)	15.2%	36.8%		19.2%	40.8%	40.8%	44.0%	44.0%	44.0%	44.0%	44.0%	44.0%
Maximum Green (s)	13.0	37.6		18.0	42.6	42.6	47.2	47.2	47.2	47.2	47.2	47.2
Yellow Time (s)	4.0	5.4		4.0	5.4	5.4	3.7	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	2.0	3.0		2.0	3.0	3.0	4.1	4.1	4.1	4.1	4.1	4.1
Lost Time Adjust (s)	-2.0	-4.4		-2.0	-4.4	-4.4	-3.8	-3.8	-3.8	-3.8	-3.8	-3.8
Total Lost Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lead	Lag		Lead	Lag	Lag						
Lead-Lag Optimize?												
Vehicle Extension (s)	3.5	4.5		3.5	6.0	6.0	3.5	3.5	3.5	3.5	3.5	3.5
Recall Mode	None	Max		None	Max	Max	None	None	None	None	None	None
Walk Time (s)		10.0			10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Flash Dont Walk (s)		10.0			10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Pedestrian Calls (#/hr)		0			0	0	0	0	0	0	0	0
Act Effct Green (s)	59.9	46.1		62.8	47.7	47.7	33.7	33.7	33.7	33.7	33.7	33.7
Actuated g/C Ratio	0.56	0.43		0.58	0.44	0.44	0.31	0.31	0.31	0.31	0.31	0.31
v/c Ratio	0.58	0.54		0.59	0.59	0.05	0.06	0.11	0.23	0.05	0.28	0.84
Control Delay	15.1	27.5		17.6	26.7	0.1	24.3	25.1	4.9	24.0	27.9	26.6
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.1	27.5		17.6	26.7	0.1	24.3	25.1	4.9	24.0	27.9	26.6
LOS	B	C		B	C	A	C	C	A	C	C	C
Approach Delay		23.1			23.9			12.5			26.8	
Approach LOS		C			C			B			C	
Queue Length 50th (m)	21.1	67.3		24.7	80.4	0.0	3.1	10.3	0.0	3.1	27.6	62.4
Queue Length 95th (m)	40.6	115.4		53.3	128.6	0.0	8.4	20.1	12.7	8.4	44.1	110.2
Internal Link Dist (m)		300.5			223.2			134.7			191.5	
Turn Bay Length (m)	150.0			155.0		70.0	15.0					30.0
Base Capacity (vph)	806	1457		508	1557	769	534	916	851	654	916	932
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.54	0.54		0.51	0.59	0.05	0.04	0.07	0.16	0.03	0.18	0.64

Intersection Summary	
Area Type:	Other
Cycle Length:	125
Actuated Cycle Length:	107.4
Natural Cycle:	85
Control Type:	Semi Act-Uncooord
Maximum v/c Ratio:	0.84
Intersection Signal Delay:	23.5
Intersection LOS:	C
Intersection Capacity Utilization:	75.7%
ICU Level of Service:	D
Analysis Period (min):	15

Lanes, Volumes, Timings
 7: South Service Road/Canadian Road & QEW EB Off-Ramp/Royal Windsor Drive FT 2043 PM.syn 04-03-2024



HCM Signalized Intersection Capacity Analysis FT 2043 PM.syn
 7: South Service Road/Canadian Road & QEW EB Off-Ramp/Royal Windsor Drive 04-03-2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↕	↔	↕	↕	↔	↕	↕
Traffic Volume (vph)	404	704	22	236	842	36	18	61	129	18	154	550
Future Volume (vph)	404	704	22	236	842	36	18	61	129	18	154	550
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	0.95		1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr	1.00	1.00		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3502	3396		1752	3505	1615	1805	1900	1615	1805	1900	1599
Flt Permitted	0.20	1.00		0.23	1.00	1.00	0.58	1.00	1.00	0.71	1.00	1.00
Satd. Flow (perm)	725	3396		422	3505	1615	1109	1900	1615	1357	1900	1599
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	439	765	24	257	915	39	20	66	140	20	167	598
RTOR Reduction (vph)	0	2	0	0	0	22	0	0	96	0	0	213
Lane Group Flow (vph)	439	787	0	257	915	17	20	66	44	20	167	385
Heavy Vehicles (%)	0%	6%	0%	3%	3%	0%	0%	0%	0%	0%	0%	1%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6		6	8		8	4		4
Actuated Green, G (s)	53.4	41.6		56.6	43.2	43.2	29.8	29.8	29.8	29.8	29.8	29.8
Effective Green, g (s)	57.4	46.0		60.6	47.6	47.6	33.6	33.6	33.6	33.6	33.6	33.6
Actuated g/C Ratio	0.54	0.43		0.57	0.44	0.44	0.31	0.31	0.31	0.31	0.31	0.31
Clearance Time (s)	6.0	8.4		6.0	8.4	8.4	7.8	7.8	7.8	7.8	7.8	7.8
Vehicle Extension (s)	3.5	4.5		3.5	6.0	6.0	3.5	3.5	3.5	3.5	3.5	3.5
Lane Grp Cap (vph)	747	1459		430	1559	718	348	596	507	426	596	502
v/s Ratio Prot	0.08	0.23		c0.09	c0.26			0.03			0.09	
v/s Ratio Perm	0.24			0.25		0.01	0.02		0.03	0.01		c0.24
v/c Ratio	0.59	0.54		0.60	0.59	0.02	0.06	0.11	0.09	0.05	0.28	0.77
Uniform Delay, d1	15.1	22.6		13.7	22.3	16.7	25.6	26.1	25.9	25.6	27.6	33.2
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.3	1.4		2.4	1.6	0.1	0.1	0.1	0.1	0.1	0.3	7.1
Delay (s)	16.4	24.1		16.1	23.9	16.7	25.7	26.2	26.0	25.6	27.9	40.2
Level of Service	B	C		B	C	B	C	C	C	C	C	D
Approach Delay (s)		21.3			22.0			26.0			37.2	
Approach LOS		C			C			C			D	

Intersection Summary			
HCM 2000 Control Delay	25.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	107.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	75.7%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings FT 2043 PM.syn
 8: QEW WB Off-Ramp & Kerr Street 04-03-2024

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔	↔	↔	↕	↕	↕
Traffic Volume (vph)	545	0	0	894	150	339
Future Volume (vph)	545	0	0	894	150	339
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)		0.0	0.0		0.0	140.0
Storage Lanes		0	0		1	1
Taper Length (m)			7.5		7.5	
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00
Fr						0.850
Flt Protected					0.950	
Satd. Flow (prot)	3574	0	0	3574	1805	1599
Flt Permitted					0.950	
Satd. Flow (perm)	3574	0	0	3574	1805	1599
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)						156
Link Speed (k/h)	60			60	40	
Link Distance (m)	130.3			194.2	262.1	
Travel Time (s)	7.8			11.7	23.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	0%	0%	1%	0%	1%
Adj. Flow (vph)	592	0	0	972	163	368
Shared Lane Traffic (%)						
Lane Group Flow (vph)	592	0	0	972	163	368
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)		15	25		25	15
Turn Type	NA			NA	Prot	Perm
Protected Phases	4			8	2	
Permitted Phases						2
Minimum Split (s)	22.5			22.5	22.5	22.5
Total Split (s)	22.5			22.5	22.5	22.5
Total Split (%)	50.0%			50.0%	50.0%	50.0%
Maximum Green (s)	18.0			18.0	18.0	18.0
Yellow Time (s)	3.5			3.5	3.5	3.5
All-Red Time (s)	1.0			1.0	1.0	1.0
Lost Time Adjust (s)	0.0			0.0	0.0	0.0
Total Lost Time (s)	4.5			4.5	4.5	4.5
Lead/Lag						
Lead-Lag Optimize?						
Walk Time (s)	7.0			7.0	7.0	7.0
Flash Dont Walk (s)	11.0			11.0	11.0	11.0
Pedestrian Calls (#/hr)	0			0	0	0
Act Effct Green (s)	18.0			18.0	18.0	18.0
Actuated g/C Ratio	0.40			0.40	0.40	0.40

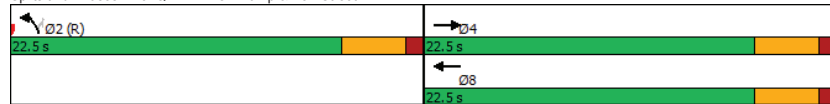
Lanes, Volumes, Timings
8: QEW WB Off-Ramp & Kerr Street

FT 2043 PM.syn
04-03-2024

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
v/c Ratio	0.41			0.68	0.23	0.50
Control Delay	10.8			14.1	10.0	8.5
Queue Delay	0.0			0.0	0.0	0.0
Total Delay	10.8			14.1	10.0	8.5
LOS	B			B	A	A
Approach Delay	10.8			14.1	9.0	
Approach LOS	B			B	A	
Queue Length 50th (m)	17.4			32.7	8.4	11.4
Queue Length 95th (m)	27.6			49.4	18.0	28.4
Internal Link Dist (m)	106.3			170.2	238.1	
Turn Bay Length (m)					140.0	
Base Capacity (vph)	1429			1429	722	733
Starvation Cap Reductn	0			0	0	0
Spillback Cap Reductn	0			0	0	0
Storage Cap Reductn	0			0	0	0
Reduced v/c Ratio	0.41			0.68	0.23	0.50

Intersection Summary	
Area Type:	Other
Cycle Length:	45
Actuated Cycle Length:	45
Offset:	0 (0%), Referenced to phase 2:NBL and 6:, Start of Green
Natural Cycle:	45
Control Type:	Pretimed
Maximum v/c Ratio:	0.68
Intersection Signal Delay:	11.9
Intersection Capacity Utilization:	43.6%
Analysis Period (min):	15
Intersection LOS:	B
ICU Level of Service A:	

Splits and Phases: 8: QEW WB Off-Ramp & Kerr Street



HCM Signalized Intersection Capacity Analysis
8: QEW WB Off-Ramp & Kerr Street

FT 2043 PM.syn
04-03-2024

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↓	↓
Traffic Volume (vph)	545	0	0	894	150	339
Future Volume (vph)	545	0	0	894	150	339
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5			4.5	4.5	4.5
Lane Util. Factor	0.95			0.95	1.00	1.00
Fr't	1.00			1.00	1.00	0.85
Fit Protected	1.00			1.00	0.95	1.00
Satd. Flow (prot)	3574			3574	1805	1599
Fit Permitted	1.00			1.00	0.95	1.00
Satd. Flow (perm)	3574			3574	1805	1599
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	592	0	0	972	163	368
RTOR Reduction (vph)	0	0	0	0	0	94
Lane Group Flow (vph)	592	0	0	972	163	274
Heavy Vehicles (%)	1%	0%	0%	1%	0%	1%
Turn Type	NA			NA	Prot	Perm
Protected Phases	4			8	2	
Permitted Phases						2
Actuated Green, G (s)	18.0			18.0	18.0	18.0
Effective Green, g (s)	18.0			18.0	18.0	18.0
Actuated g/C Ratio	0.40			0.40	0.40	0.40
Clearance Time (s)	4.5			4.5	4.5	4.5
Lane Grp Cap (vph)	1429			1429	722	639
v/s Ratio Prot	0.17			c0.27	0.09	
v/s Ratio Perm						c0.17
v/c Ratio	0.41			0.68	0.23	0.43
Uniform Delay, d1	9.7			11.1	8.9	9.8
Progression Factor	1.00			1.00	1.00	1.00
Incremental Delay, d2	0.9			2.6	0.7	2.1
Delay (s)	10.6			13.8	9.6	11.9
Level of Service	B			B	A	B
Approach Delay (s)	10.6			13.8	11.2	
Approach LOS	B			B	B	

Intersection Summary			
HCM 2000 Control Delay	12.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	43.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
9: Dorval Drive & QEWB WB Off-Ramp

FT 2043 PM.syn
04-03-2024

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔↔	↗	↖↖			↖↖
Traffic Volume (vph)	920	809	1291	0	0	1371
Future Volume (vph)	920	809	1291	0	0	1371
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	190.0		0.0	0.0	
Storage Lanes	2	1		0	0	
Taper Length (m)	7.5			7.5		
Lane Util. Factor	0.97	0.91	0.95	1.00	1.00	0.95
Frt	0.966	0.850				
Flt Protected	0.963					
Satd. Flow (prot)	3344	1455	3574	0	0	3539
Flt Permitted	0.963					
Satd. Flow (perm)	3344	1455	3574	0	0	3539
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)	34	34				
Link Speed (k/h)	40		60			60
Link Distance (m)	325.1		310.2			266.9
Travel Time (s)	29.3		18.6			16.0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	1%	1%	0%	0%	2%
Adj. Flow (vph)	1000	879	1403	0	0	1490
Shared Lane Traffic (%)		33%				
Lane Group Flow (vph)	1290	589	1403	0	0	1490
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	7.2		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15		15	25	
Number of Detectors	1	1	2			2
Detector Template	Left	Right	Thru			Thru
Leading Detector (m)	2.0	2.0	10.0			10.0
Trailing Detector (m)	0.0	0.0	0.0			0.0
Detector 1 Position(m)	0.0	0.0	0.0			0.0
Detector 1 Size(m)	2.0	2.0	0.6			0.6
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex			CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0			0.0
Detector 1 Queue (s)	0.0	0.0	0.0			0.0
Detector 1 Delay (s)	0.0	0.0	0.0			0.0
Detector 2 Position(m)			9.4			9.4
Detector 2 Size(m)			0.6			0.6
Detector 2 Type			CI+Ex			CI+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type	Prot	Perm	NA			NA
Protected Phases	8		2			6

Lanes, Volumes, Timings
9: Dorval Drive & QEWB WB Off-Ramp

FT 2043 PM.syn
04-03-2024

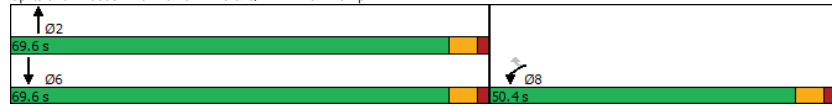
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Permitted Phases		8				
Detector Phase	8	8	2			6
Switch Phase						
Minimum Initial (s)	10.0	10.0	20.0			20.0
Minimum Split (s)	24.0	24.0	26.0			26.0
Total Split (s)	50.4	50.4	69.6			69.6
Total Split (%)	42.0%	42.0%	58.0%			58.0%
Maximum Green (s)	44.4	44.4	63.6			63.6
Yellow Time (s)	4.0	4.0	4.0			4.0
All-Red Time (s)	2.0	2.0	2.0			2.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0			-2.0
Total Lost Time (s)	4.0	4.0	4.0			4.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	4.5	4.5	5.0			5.0
Recall Mode	None	None	Max			Max
Walk Time (s)	5.0	5.0	7.0			7.0
Flash Dont Walk (s)	7.0	7.0	11.0			11.0
Pedestrian Calls (#/hr)	0	0	0			0
Act Effct Green (s)	46.4	46.4	65.6			65.6
Actuated g/C Ratio	0.39	0.39	0.55			0.55
v/c Ratio	0.98	1.01	0.72			0.77
Control Delay	56.8	75.0	23.0			24.7
Queue Delay	0.0	0.0	0.0			0.0
Total Delay	56.8	75.0	23.0			24.7
LOS	E	E	C			C
Approach Delay	62.5		23.0			24.7
Approach LOS	E		C			C
Queue Length 50th (m)	158.1	~155.9	130.7			145.7
Queue Length 95th (m)	#209.4	#241.9	158.0			175.7
Internal Link Dist (m)	301.1		286.2			242.9
Turn Bay Length (m)		190.0				
Base Capacity (vph)	1313	583	1953			1934
Starvation Cap Reductn	0	0	0			0
Spillback Cap Reductn	0	0	0			0
Storage Cap Reductn	0	0	0			0
Reduced v/c Ratio	0.98	1.01	0.72			0.77
Intersection Summary						
Area Type:	Other					
Cycle Length:	120					
Actuated Cycle Length:	120					
Natural Cycle:	65					
Control Type:	Semi Act-Uncoord					
Maximum v/c Ratio:	1.01					
Intersection Signal Delay:	39.1			Intersection LOS: D		
Intersection Capacity Utilization:	79.3%			ICU Level of Service D		
Analysis Period (min):	15					
~ Volume exceeds capacity, queue is theoretically infinite.						

Lanes, Volumes, Timings
9: Dorval Drive & QEW WB Off-Ramp

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

Splits and Phases: 9: Dorval Drive & QEW WB Off-Ramp



HCM Signalized Intersection Capacity Analysis
9: Dorval Drive & QEW WB Off-Ramp

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	WBL	WBR	NBT	NBR	SBL	SBT
Movement	↙	↘	↑	↗	↖	↓
Lane Configurations	↙↘	↗	↑↑			↓↙
Traffic Volume (vph)	920	809	1291	0	0	1371
Future Volume (vph)	920	809	1291	0	0	1371
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0			4.0
Lane Util. Factor	0.97	0.91	0.95			0.95
Flt	0.97	0.85	1.00			1.00
Flt Protected	0.96	1.00	1.00			1.00
Satd. Flow (prot)	3344	1455	3574			3539
Flt Permitted	0.96	1.00	1.00			1.00
Satd. Flow (perm)	3344	1455	3574			3539
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1000	879	1403	0	0	1490
RTOR Reduction (vph)	21	21	0	0	0	0
Lane Group Flow (vph)	1269	568	1403	0	0	1490
Heavy Vehicles (%)	3%	1%	1%	0%	0%	2%
Turn Type	Prot	Perm	NA			NA
Protected Phases	8		2			6
Permitted Phases		8				
Actuated Green, G (s)	44.4	44.4	63.6			63.6
Effective Green, g (s)	46.4	46.4	65.6			65.6
Actuated g/C Ratio	0.39	0.39	0.55			0.55
Clearance Time (s)	6.0	6.0	6.0			6.0
Vehicle Extension (s)	4.5	4.5	5.0			5.0
Lane Grp Cap (vph)	1293	562	1953			1934
v/s Ratio Prot	0.38		0.39			c0.42
v/s Ratio Perm		c0.39				
v/c Ratio	0.98	1.01	0.72			0.77
Uniform Delay, d1	36.4	36.8	20.3			21.3
Progression Factor	1.00	1.00	1.00			1.00
Incremental Delay, d2	20.7	40.7	2.3			3.0
Delay (s)	57.1	77.5	22.6			24.3
Level of Service	E	E	C			C
Approach Delay (s)	63.5		22.6			24.3
Approach LOS	E		C			C
Intersection Summary						
HCM 2000 Control Delay			39.2		HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio			0.87			
Actuated Cycle Length (s)			120.0		Sum of lost time (s)	8.0
Intersection Capacity Utilization			79.3%		ICU Level of Service	D
Analysis Period (min)			15			
c Critical Lane Group						

Lanes, Volumes, Timings
10: Dorval Drive & QEW EB Off-Ramp

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Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔↔	↔		↕↕	↕↕	
Traffic Volume (vph)	357	424	0	1550	1466	0
Future Volume (vph)	357	424	0	1550	1466	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	175.0	0.0	0.0			0.0
Storage Lanes	1	1	0			0
Taper Length (m)	7.5		7.5			
Lane Util. Factor	0.97	0.91	1.00	0.95	0.95	1.00
Frnt	0.950	0.850				
Flt Protected	0.968					
Satd. Flow (prot)	3302	1441	0	3539	3505	0
Flt Permitted	0.968					
Satd. Flow (perm)	3302	1441	0	3539	3505	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	28	28				
Link Speed (k/h)	40			60	60	
Link Distance (m)	275.5			164.3	310.2	
Travel Time (s)	24.8			9.9	18.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	2%	0%	2%	3%	0%
Adj. Flow (vph)	388	461	0	1685	1593	0
Shared Lane Traffic (%)		42%				
Lane Group Flow (vph)	582	267	0	1685	1593	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	7.2			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Number of Detectors	1	1		2	2	
Detector Template	Left	Right		Thru	Thru	
Leading Detector (m)	2.0	2.0		10.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	2.0		0.6	0.6	
Detector 1 Type	CI+Ex	CI+Ex		CI+Ex	CI+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	
Detector 2 Position(m)				9.4	9.4	
Detector 2 Size(m)				0.6	0.6	
Detector 2 Type				CI+Ex	CI+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Prot	Perm		NA	NA	
Protected Phases	4			2	6	

Lanes, Volumes, Timings
10: Dorval Drive & QEW EB Off-Ramp

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Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Permitted Phases		4				
Detector Phase	4	4		2	6	
Switch Phase						
Minimum Initial (s)	10.0	10.0		20.0	20.0	
Minimum Split (s)	24.0	24.0		26.0	26.0	
Total Split (s)	45.6	45.6		74.4	74.4	
Total Split (%)	38.0%	38.0%		62.0%	62.0%	
Maximum Green (s)	39.6	39.6		68.4	68.4	
Yellow Time (s)	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	4.0	4.0		5.0	5.0	
Recall Mode	None	None		Max	Max	
Walk Time (s)	0.0	0.0		7.0	7.0	
Flash Dont Walk (s)	7.0	7.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0	
Act Effct Green (s)	28.0	28.0		70.7	70.7	
Actuated g/C Ratio	0.26	0.26		0.66	0.66	
v/c Ratio	0.66	0.67		0.72	0.69	
Control Delay	36.7	39.8		15.0	14.2	
Queue Delay	0.0	0.0		0.0	0.0	
Total Delay	36.7	39.8		15.0	14.2	
LOS	D	D		B	B	
Approach Delay	37.7			15.0	14.2	
Approach LOS	D			B	B	
Queue Length 50th (m)	55.5	51.4		110.2	100.1	
Queue Length 95th (m)	73.3	82.0		187.3	170.5	
Internal Link Dist (m)	251.5			140.3	286.2	
Turn Bay Length (m)	175.0					
Base Capacity (vph)	1309	581		2344	2322	
Starvation Cap Reductn	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	
Storage Cap Reductn	0	0		0	0	
Reduced v/c Ratio	0.44	0.46		0.72	0.69	
Intersection Summary						
Area Type:	Other					
Cycle Length:	120					
Actuated Cycle Length:	106.7					
Natural Cycle:	60					
Control Type:	Semi Act-Uncoord					
Maximum v/c Ratio:	0.72					
Intersection Signal Delay:	19.4			Intersection LOS: B		
Intersection Capacity Utilization:	79.3%			ICU Level of Service D		
Analysis Period (min)	15					

Lanes, Volumes, Timings
10: Dorval Drive & QEW EB Off-Ramp

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Splits and Phases: 10: Dorval Drive & QEW EB Off-Ramp

↑ Ø2	Ø4
74.4 s	45.6 s
↓ Ø6	
74.4 s	

HCM Signalized Intersection Capacity Analysis
10: Dorval Drive & QEW EB Off-Ramp

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	EBL	EBR	NBL	NBT	SBT	SBR
Movement						
Lane Configurations	↔↔	↔		↕↕	↕↕	
Traffic Volume (vph)	357	424	0	1550	1466	0
Future Volume (vph)	357	424	0	1550	1466	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	0.91		0.95	0.95	
Frt	0.95	0.85		1.00	1.00	
Fit Protected	0.97	1.00		1.00	1.00	
Satd. Flow (prot)	3301	1441		3539	3505	
Fit Permitted	0.97	1.00		1.00	1.00	
Satd. Flow (perm)	3301	1441		3539	3505	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	388	461	0	1685	1593	0
RTOR Reduction (vph)	21	21	0	0	0	0
Lane Group Flow (vph)	561	246	0	1685	1593	0
Heavy Vehicles (%)	3%	2%	0%	2%	3%	0%
Turn Type	Prot	Perm		NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4				
Actuated Green, G (s)	26.0	26.0		68.7	68.7	
Effective Green, g (s)	28.0	28.0		70.7	70.7	
Actuated g/C Ratio	0.26	0.26		0.66	0.66	
Clearance Time (s)	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	4.0	4.0		5.0	5.0	
Lane Grp Cap (vph)	866	378		2344	2322	
v/s Ratio Prot	0.17			c0.48	0.45	
v/s Ratio Perm		c0.17				
v/c Ratio	0.65	0.65		0.72	0.69	
Uniform Delay, d1	35.0	35.0		11.6	11.1	
Progression Factor	1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.9	4.4		1.9	1.7	
Delay (s)	36.9	39.4		13.5	12.8	
Level of Service	D	D		B	B	
Approach Delay (s)	37.7			13.5	12.8	
Approach LOS	D			B	B	
Intersection Summary						
HCM 2000 Control Delay			18.2	HCM 2000 Level of Service		B
HCM 2000 Volume to Capacity ratio			0.70			
Actuated Cycle Length (s)			106.7	Sum of lost time (s)		8.0
Intersection Capacity Utilization			79.3%	ICU Level of Service		D
Analysis Period (min)			15			
c Critical Lane Group						

Lanes, Volumes, Timings
11: Argus Rd & South Service Rd

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Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Volume (vph)	14	13	584	599	95	98
Future Volume (vph)	14	13	584	599	95	98
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt			0.932		0.931	
Flt Protected		0.975			0.976	
Satd. Flow (prot)	0	1569	1519	0	1554	0
Flt Permitted		0.975			0.976	
Satd. Flow (perm)	0	1569	1519	0	1554	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		177.7	145.7		103.5	
Travel Time (s)		12.8	10.5		7.5	
Confl. Peds. (#/hr)					5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	13%	10%	0%	0%	0%
Adj. Flow (vph)	15	14	635	651	103	107
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	29	1286	0	210	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (k/h)	24			14	24	14
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type:	CBD
Control Type:	Unsignalized
Intersection Capacity Utilization	94.1%
Analysis Period (min)	15
	ICU Level of Service F

HCM Unsignalized Intersection Capacity Analysis
11: Argus Rd & South Service Rd

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Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Volume (veh/h)	14	13	584	599	95	98
Future Volume (Veh/h)	14	13	584	599	95	98
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)	15	14	635	651	103	107
Pedestrians			5			
Lane Width (m)			3.6			
Walking Speed (m/s)			1.2			
Percent Blockage			0			
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)		358				
pX, platoon unblocked						
vC, conflicting volume	1286				1010	960
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1286				1010	960
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	97				60	66
cM capacity (veh/h)	546				260	314

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	29	1286	210
Volume Left	15	0	103
Volume Right	0	651	107
eSH	546	1700	285
Volume to Capacity	0.03	0.76	0.74
Queue Length 95th (m)	0.7	0.0	42.8
Control Delay (s)	6.2	0.0	46.2
Lane LOS	A		E
Approach Delay (s)	6.2	0.0	46.2
Approach LOS			E

Intersection Summary

Average Delay		6.5	
Intersection Capacity Utilization	94.1%	ICU Level of Service	F
Analysis Period (min)	15		

Lanes, Volumes, Timings
13: GO Bus Terminal/Argus Rd & Cross Ave

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	40	1442	24	53	648	177	22	3	68	510	28	87
Future Volume (vph)	40	1442	24	53	648	177	22	3	68	510	28	87
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6
Storage Length (m)	20.0	0.0	20.0	0.0	0.0	0.0	0.0	15.0	0.0	0.0	0.0	0.0
Storage Lanes	1	0	1	0	1	0	1	0	1	0	1	0
Taper Length (m)	7.5		7.5		7.5		7.5		7.5		7.5	
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	1.00			0.99	0.99	0.99	0.97	0.98	0.98	0.98	
Frt	0.998				0.968			0.856		0.886		
Flt Protected	0.950			0.950		0.950		0.950		0.950		
Satd. Flow (prot)	1570	3189	0	797	3120	0	785	707	0	1570	1198	0
Flt Permitted	0.318			0.090		0.660		0.707		0.707		
Satd. Flow (perm)	523	3189	0	76	3120	0	539	707	0	1144	1198	0
Right Turn on Red			Yes		Yes		Yes		Yes			Yes
Satd. Flow (RTOR)		2		71			74		95			
Link Speed (k/h)		50		50			50		50			50
Link Distance (m)		164.3		72.9			81.9		115.7			115.7
Travel Time (s)		11.8		5.2			5.9		8.3			8.3
Confl. Peds. (#/hr)	9		4	4		9	12		20	20		12
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
Heavy Vehicles (%)	0%	0%	100%	97%	0%	0%	100%	100%	100%	0%	100%	0%
Adj. Flow (vph)	43	1567	26	58	704	192	24	3	74	554	30	95
Shared Lane Traffic (%)												
Lane Group Flow (vph)	43	1593	0	58	896	0	24	77	0	554	125	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.3			3.3			3.3			3.3	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.19	1.14	1.14	1.19	1.14	1.14	1.19	1.14	1.14	1.19	1.14	1.14
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

Lanes, Volumes, Timings
13: GO Bus Terminal/Argus Rd & Cross Ave

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases		2		6			8			4		
Detector Phases	2	2		1	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	22.0	22.0		8.0	22.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	45.0	45.0		12.5	29.0		29.0	29.0		29.0	29.0	
Total Split (s)	46.5	46.5		12.5	59.0		31.0	31.0		31.0	31.0	
Total Split (%)	51.7%	51.7%		13.9%	65.6%		34.4%	34.4%		34.4%	34.4%	
Maximum Green (s)	40.5	40.5		8.5	53.0		25.0	25.0		25.0	25.0	
Yellow Time (s)	4.0	4.0		3.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		1.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0		0.0	-2.0		-2.0	-2.0		-2.0	-2.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Vehicle Extension (s)	5.0	5.0		2.5	5.0		4.0	4.0		4.0	4.0	
Recall Mode	Min	Min		Min	Min		Min	Min		Min	Min	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	16.0	16.0		16.0	16.0		16.0	16.0		16.0	16.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	42.5	42.5		54.7	54.7		27.0	27.0		27.0	27.0	
Actuated g/C Ratio	0.47	0.47		0.61	0.61		0.30	0.30		0.30	0.30	
v/c Ratio	0.17	1.05		0.52	0.46		0.15	0.29		1.61	0.29	
Control Delay	16.0	63.7		30.1	9.6		26.0	9.7		313.7	10.1	
Queue Delay	0.0	18.7		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	16.0	82.4		30.1	9.6		26.0	9.7		313.7	10.1	
LOS	B	F		C	A		C	A		F	B	
Approach Delay		80.7			10.8			13.6			257.8	
Approach LOS		F			B			B			F	
Queue Length 50th (m)	4.3	~167.4		4.0	38.5		3.2	0.4		~145.0	3.9	
Queue Length 95th (m)	11.4	#213.3		#17.4	52.1		9.9	11.2		#209.4	17.4	
Internal Link Dist (m)		140.3			48.9			57.9			91.7	
Turn Bay Length (m)	20.0			20.0						15.0		
Base Capacity (vph)	247	1511		114	1940		162	264		344	426	
Starvation Cap Reductn	0	68		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	0.17	1.10		0.51	0.46		0.15	0.29		1.61	0.29	

Intersection Summary

Area Type: CBD
 Cycle Length: 90
 Actuated Cycle Length: 89.7
 Natural Cycle: 130
 Control Type: Semi Act-Uncoord
 Maximum v/c Ratio: 1.61
 Intersection Signal Delay: 94.6
 Intersection LOS: F

Lanes, Volumes, Timings
13: GO Bus Terminal/Argus Rd & Cross Ave

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Intersection Capacity Utilization 93.7% ICU Level of Service F
Analysis Period (min) 15
- Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 13: GO Bus Terminal/Argus Rd & Cross Ave



HCM Signalized Intersection Capacity Analysis
13: GO Bus Terminal/Argus Rd & Cross Ave

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	40	1442	24	53	648	177	22	3	68	510	28	87
Future Volume (vph)	40	1442	24	53	648	177	22	3	68	510	28	87
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frbp, ped/bikes	1.00	1.00		1.00	0.99		1.00	0.97		1.00	0.98	
Flpb, ped/bikes	0.99	1.00		1.00	1.00		0.99	1.00		0.98	1.00	
Frt	1.00	1.00		1.00	0.97		1.00	0.86		1.00	0.89	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1562	3188		797	3120		776	707		1537	1198	
Flt Permitted	0.32	1.00		0.09	1.00		0.66	1.00		0.71	1.00	
Satd. Flow (perm)	523	3188		75	3120		539	707		1144	1198	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	43	1567	26	58	704	192	24	3	74	554	30	95
RTOR Reduction (vph)	0	1	0	0	28	0	0	52	0	0	66	0
Lane Group Flow (vph)	43	1592	0	58	868	0	24	25	0	554	59	0
Confl. Peds. (#/hr)	9		4	4		9	12		20	20		12
Heavy Vehicles (%)	0%	0%	100%	97%	0%	0%	100%	100%	100%	0%	100%	0%
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	40.5	40.5		52.7	52.7		25.0	25.0		25.0	25.0	
Effective Green, g (s)	42.5	42.5		52.7	54.7		27.0	27.0		27.0	27.0	
Actuated g/C Ratio	0.47	0.47		0.59	0.61		0.30	0.30		0.30	0.30	
Clearance Time (s)	6.0	6.0		4.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	5.0	5.0		2.5	5.0		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	247	1510		110	1902		162	212		344	360	
v/s Ratio Prot		c0.50		0.05	c0.28			0.04			0.05	
v/s Ratio Perm	0.08			0.26			0.04			c0.48		
v/c Ratio	0.17	1.05		0.53	0.46		0.15	0.12		1.61	0.16	
Uniform Delay, d1	13.5	23.6		18.1	9.5		22.9	22.7		31.4	23.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.7	38.9		3.4	0.4		0.6	0.3		287.9	0.3	
Delay (s)	14.2	62.5		21.5	9.8		23.5	23.1		319.2	23.3	
Level of Service	B	E		C	A		C	C		F	C	
Approach Delay (s)		61.3			10.5			23.2			264.8	
Approach LOS		E			B			C			F	
Intersection Summary												
HCM 2000 Control Delay		86.8									F	
HCM 2000 Volume to Capacity ratio		1.19										
Actuated Cycle Length (s)		89.7			Sum of lost time (s)			12.0				
Intersection Capacity Utilization		93.7%			ICU Level of Service			F				
Analysis Period (min)		15										
c Critical Lane Group												

Lanes, Volumes, Timings
14: Lyons Lane/Street A & Cross Ave

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	↖	→	↗	↖	←	↖	↗	↖	↗	↖	↗	↖
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↖↗	↖	↖	↖↗	↖	↖	↖	↖	↖	↖	↖
Traffic Volume (vph)	68	291	19	20	483	28	340	6	230	46	3	135
Future Volume (vph)	68	291	19	20	483	28	340	6	230	46	3	135
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6
Storage Length (m)	0.0	0.0	25.0	0.0	20.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Storage Lanes	1	0	1	0	1	0	1	0	1	0	1	0
Taper Length (m)	7.5		7.5		7.5		7.5		7.5		7.5	
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00	1.00		1.00	1.00		1.00	0.98		1.00	0.99	
Frt		0.991			0.992			0.854			0.853	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1525	2915	0	1570	3073	0	1570	1436	0	1570	1412	0
Flt Permitted	0.444			0.469			0.637			0.497		
Satd. Flow (perm)	711	2915	0	774	3073	0	1052	1436	0	819	1412	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		9			10			250			147	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		40.1			209.8			69.1			70.9	
Travel Time (s)		2.9			15.1			5.0			5.1	
Confl. Peds. (#/hr)	3		1	1		3	1		4	4		1
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
Heavy Vehicles (%)	3%	11%	0%	0%	5%	0%	0%	0%	0%	0%	0%	2%
Adj. Flow (vph)	74	316	21	22	525	30	370	7	250	50	3	147
Shared Lane Traffic (%)												
Lane Group Flow (vph)	74	337	0	22	555	0	370	257	0	50	150	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.3			3.3			3.3			3.3	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.19	1.14	1.14	1.19	1.14	1.14	1.19	1.14	1.14	1.19	1.14	1.14
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

Lanes, Volumes, Timings
14: Lyons Lane/Street A & Cross Ave

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	↖	→	↗	↖	←	↖	↗	↖	↗	↖	↗	↖
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6		8		8		4	
Permitted Phases		2		6			8		8		4	
Detector Phases	2	2		1	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	35.0	35.0		8.0	35.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	41.0	41.0		12.5	41.0		28.0	28.0		28.0	28.0	
Total Split (s)	41.5	41.5		12.5	54.0		36.0	36.0		36.0	36.0	
Total Split (%)	46.1%	46.1%		13.9%	60.0%		40.0%	40.0%		40.0%	40.0%	
Maximum Green (s)	35.5	35.5		8.5	48.0		30.0	30.0		30.0	30.0	
Yellow Time (s)	4.0	4.0		3.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		1.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0		0.0	-2.0		-2.0	-2.0		-2.0	-2.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Vehicle Extension (s)	5.0	5.0		2.5	5.0		4.0	4.0		4.0	4.0	
Recall Mode	Min	Min		Min	Min		Min	Min		Min	Min	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	15.0	15.0		15.0	15.0		15.0	15.0		15.0	15.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	37.0	37.0		49.0	49.0		32.0	32.0		32.0	32.0	
Actuated g/C Ratio	0.42	0.42		0.55	0.55		0.36	0.36		0.36	0.36	
v/c Ratio	0.25	0.28		0.04	0.33		0.98	0.38		0.17	0.25	
Control Delay	19.9	17.5		9.4	11.4		72.1	4.9		21.5	4.9	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	19.9	17.5		9.4	11.4		72.1	4.9		21.5	4.9	
LOS	B	B		A	B		E	A		C	A	
Approach Delay		17.9			11.3			44.5			9.0	
Approach LOS		B			B			D			A	
Queue Length 50th (m)	8.4	19.8		1.7	26.3		64.8	0.8		6.1	0.3	
Queue Length 95th (m)	19.1	29.9		5.0	36.8		#122.8	16.6		14.7	12.6	
Internal Link Dist (m)		16.1			185.8			45.1			46.9	
Turn Bay Length (m)				25.0			20.0					
Base Capacity (vph)	299	1233		502	1730		378	676		294	601	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.25	0.27		0.04	0.32		0.98	0.38		0.17	0.25	
Intersection Summary												
Area Type:	CBD											
Cycle Length:	90											
Actuated Cycle Length:	89											
Natural Cycle:	85											
Control Type:	Semi Act-Uncoord											
Maximum v/c Ratio:	0.98											
Intersection Signal Delay:	24.0						Intersection LOS: C					

Lanes, Volumes, Timings
14: Lyons Lane/Street A & Cross Ave

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Intersection Capacity Utilization 102.4% ICU Level of Service G
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 14: Lyons Lane/Street A & Cross Ave



HCM Signalized Intersection Capacity Analysis
14: Lyons Lane/Street A & Cross Ave

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	68	291	19	20	483	28	340	6	230	46	3	135
Future Volume (vph)	68	291	19	20	483	28	340	6	230	46	3	135
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.98		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	0.99		1.00	0.85		1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1520	2914		1570	3073		1569	1437		1566	1412	
Flt Permitted	0.44	1.00		0.47	1.00		0.64	1.00		0.50	1.00	
Satd. Flow (perm)	711	2914		775	3073		1052	1437		819	1412	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	74	316	21	22	525	30	370	7	250	50	3	147
RTOR Reduction (vph)	0	5	0	0	4	0	0	160	0	0	94	0
Lane Group Flow (vph)	74	332	0	22	551	0	370	97	0	50	56	0
Confl. Peds. (#/hr)	3		1	1		3	1		4	4		1
Heavy Vehicles (%)	3%	11%	0%	0%	5%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	35.0	35.0		47.0	47.0		30.0	30.0		30.0	30.0	
Effective Green, g (s)	37.0	37.0		47.0	49.0		32.0	32.0		32.0	32.0	
Actuated g/C Ratio	0.42	0.42		0.53	0.55		0.36	0.36		0.36	0.36	
Clearance Time (s)	6.0	6.0		4.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	5.0	5.0		2.5	5.0		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	295	1211		480	1691		378	516		294	507	
v/s Ratio Prot		0.11		0.00	0.18			0.07			0.04	
v/s Ratio Perm	0.10			0.02			0.35			0.06		
v/c Ratio	0.25	0.27		0.05	0.33		0.98	0.19		0.17	0.11	
Uniform Delay, d1	17.0	17.1		10.2	11.0		28.2	19.6		19.4	19.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.9	0.3		0.0	0.2		40.3	0.2		0.4	0.1	
Delay (s)	17.9	17.4		10.3	11.2		68.5	19.8		19.8	19.1	
Level of Service	B	B		B	B		E	B		B	B	
Approach Delay (s)		17.5			11.2			48.5			19.3	
Approach LOS		B			B			D			B	
Intersection Summary												
HCM 2000 Control Delay		26.4									C	
HCM 2000 Volume to Capacity ratio		0.61										
Actuated Cycle Length (s)		89.0			Sum of lost time (s)			12.0				
Intersection Capacity Utilization		102.4%			ICU Level of Service			G				
Analysis Period (min)		15										
c Critical Lane Group												

Lanes, Volumes, Timings
16: Speers Road/Cornwall Road & Cross Avenue

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Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↕↕	↕↕		↕	↕↕
Traffic Volume (vph)	397	1000	1098	59	19	620
Future Volume (vph)	397	1000	1098	59	19	620
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	75.0			0.0	55.0	0.0
Storage Lanes	1			0	1	2
Taper Length (m)	7.5				7.5	
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	0.88
Frt			0.992			0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1770	3539	3511	0	1770	2787
Flt Permitted	0.100				0.950	
Satd. Flow (perm)	186	3539	3511	0	1770	2787
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)			7			632
Link Speed (k/h)		50	50		50	
Link Distance (m)		189.7	274.5		184.2	
Travel Time (s)		13.7	19.8		13.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	432	1087	1193	64	21	674
Shared Lane Traffic (%)						
Lane Group Flow (vph)	432	1087	1257	0	21	674
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.6	3.6		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25			15	25	15
Number of Detectors	1	2	2		1	1
Detector Template	Left	Thru	Thru		Left	Right
Leading Detector (m)	2.0	10.0	10.0		2.0	2.0
Trailing Detector (m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Size(m)	2.0	0.6	0.6		2.0	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0		0.0	0.0
Detector 2 Position(m)		9.4	9.4			
Detector 2 Size(m)		0.6	0.6			
Detector 2 Type		Cl+Ex	Cl+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type	pm+pt	NA	NA		pm+pt	Perm
Protected Phases	5	2	6		7	
Permitted Phases	2				4	4

Lanes, Volumes, Timings
16: Speers Road/Cornwall Road & Cross Avenue

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Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Detector Phase	5	2	6		7	4
Switch Phase						
Minimum Initial (s)	6.0	5.0	5.0		5.0	5.0
Minimum Split (s)	12.0	33.5	33.5		27.5	27.5
Total Split (s)	22.0	62.0	40.0		28.0	28.0
Total Split (%)	24.4%	68.9%	44.4%		31.1%	31.1%
Maximum Green (s)	16.0	56.0	34.0		22.0	22.0
Yellow Time (s)	4.0	4.0	4.0		4.0	4.0
All-Red Time (s)	2.0	2.0	2.0		2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0		6.0	6.0
Lead/Lag	Lead	Lag	Lag		Lag	Lag
Lead-Lag Optimize?	Yes		Yes			
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	None	Max	Max		None	None
Walk Time (s)		18.0	18.0		12.0	12.0
Flash Dont Walk (s)		7.0	7.0		7.0	7.0
Pedestrian Calls (#/hr)		0	0		0	0
Act Effct Green (s)	56.2	56.2	34.1		8.6	8.6
Actuated g/C Ratio	0.73	0.73	0.44		0.11	0.11
v/c Ratio	0.93	0.42	0.80		0.11	0.77
Control Delay	48.8	5.0	24.3		30.7	10.7
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	48.8	5.0	24.3		30.7	10.7
LOS	D	A	C		C	B
Approach Delay		17.5	24.3		11.3	
Approach LOS		B	C		B	
Queue Length 50th (m)	45.3	23.7	79.4		2.9	3.3
Queue Length 95th (m)	#118.6	52.4	#141.8		9.0	19.3
Internal Link Dist (m)		165.7	250.5		160.2	
Turn Bay Length (m)	75.0				55.0	
Base Capacity (vph)	467	2588	1562		508	1251
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	0.93	0.42	0.80		0.04	0.54

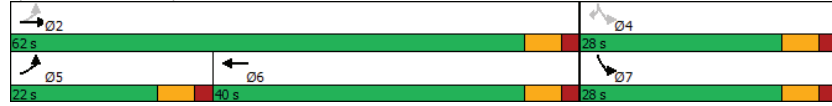
Intersection Summary

Area Type:	Other
Cycle Length:	90
Actuated Cycle Length:	76.8
Natural Cycle:	90
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.93
Intersection Signal Delay:	18.7
Intersection Capacity Utilization:	73.4%
Analysis Period (min):	15
Intersection LOS:	B
ICU Level of Service:	D
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Lanes, Volumes, Timings
16: Speers Road/Cornwall Road & Cross Avenue

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Splits and Phases: 16: Speers Road/Cornwall Road & Cross Avenue



HCM Signalized Intersection Capacity Analysis
16: Speers Road/Cornwall Road & Cross Avenue

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Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↕	↕	↔	↔	↕
Traffic Volume (vph)	397	1000	1098	59	19	620
Future Volume (vph)	397	1000	1098	59	19	620
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0		6.0	6.0
Lane Util. Factor	1.00	0.95	0.95		1.00	0.88
Frt	1.00	1.00	0.99		1.00	0.85
Fit Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	3539	3512		1770	2787
Fit Permitted	0.10	1.00	1.00		0.95	1.00
Satd. Flow (perm)	186	3539	3512		1770	2787
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	432	1087	1193	64	21	674
RTOR Reduction (vph)	0	0	4	0	0	561
Lane Group Flow (vph)	432	1087	1253	0	21	113
Turn Type	pm+pt	NA	NA		pm+pt	Perm
Protected Phases	5	2	6		7	
Permitted Phases	2				4	4
Actuated Green, G (s)	56.1	56.1	34.1		8.6	8.6
Effective Green, g (s)	56.1	56.1	34.1		8.6	8.6
Actuated g/C Ratio	0.73	0.73	0.44		0.11	0.11
Clearance Time (s)	6.0	6.0	6.0		6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	466	2588	1561		198	312
v/s Ratio Prot	c0.19	0.31	0.36		0.01	
v/s Ratio Perm	c0.48					c0.04
v/c Ratio	0.93	0.42	0.80		0.11	0.36
Uniform Delay, d1	21.6	4.0	18.4		30.6	31.5
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	24.5	0.5	4.5		0.2	0.7
Delay (s)	46.1	4.5	22.9		30.8	32.2
Level of Service	D	A	C		C	C
Approach Delay (s)		16.3	22.9		32.2	
Approach LOS		B	C		C	
Intersection Summary						
HCM 2000 Control Delay		21.9		HCM 2000 Level of Service		C
HCM 2000 Volume to Capacity ratio		0.89				
Actuated Cycle Length (s)		76.7		Sum of lost time (s)		18.0
Intersection Capacity Utilization		73.4%		ICU Level of Service		D
Analysis Period (min)		15				

c Critical Lane Group

Lanes, Volumes, Timings
17: North Access & South Service Road

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	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↘			↘	↗	↗
Traffic Volume (vph)	55	0	246	96	0	15
Future Volume (vph)	55	0	246	96	0	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Fr					0.865	
Fit Protected				0.965		
Satd. Flow (prot)	1863	0	0	1798	1611	0
Fit Permitted				0.965		
Satd. Flow (perm)	1863	0	0	1798	1611	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	154.2			110.2	69.4	
Travel Time (s)	11.1			7.9	5.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	60	0	267	104	0	16
Shared Lane Traffic (%)						
Lane Group Flow (vph)	60	0	0	371	16	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)		15	25		25	15
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	35.3%
Analysis Period (min)	15
	ICU Level of Service A

HCM Unsignalized Intersection Capacity Analysis
17: North Access & South Service Road

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	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↘			↘	↗	↗
Traffic Volume (veh/h)	55	0	246	96	0	15
Future Volume (Veh/h)	55	0	246	96	0	15
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)	60	0	267	104	0	16
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			60		698	60
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			60		698	60
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			83		100	98
cM capacity (veh/h)			1544		336	1005

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	60	371	16
Volume Left	0	267	0
Volume Right	0	0	16
eSH	1700	1544	1005
Volume to Capacity	0.04	0.17	0.02
Queue Length 95th (m)	0.0	5.0	0.4
Control Delay (s)	0.0	6.0	8.6
Lane LOS		A	A
Approach Delay (s)	0.0	6.0	8.6
Approach LOS			A

Intersection Summary

Average Delay		5.3	
Intersection Capacity Utilization	35.3%		ICU Level of Service A
Analysis Period (min)		15	

Lanes, Volumes, Timings
18: Street C & East Access

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Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	153	62	64	76	0
Future Volume (vph)	0	153	62	64	76	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Fr	0.865					
Fit Protected				0.976		
Satd. Flow (prot)	1611	0	0	1818	1863	0
Fit Permitted	0.976					
Satd. Flow (perm)	1611	0	0	1818	1863	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	69.0			87.9	76.4	
Travel Time (s)	5.0			6.3	5.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	166	67	70	83	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	166	0	0	137	83	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	29.6%
Analysis Period (min)	15
	ICU Level of Service A

HCM Unsignalized Intersection Capacity Analysis
18: Street C & East Access

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Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	153	62	64	76	0
Future Volume (Veh/h)	0	153	62	64	76	0
Sign Control	Stop			Free	Free	
Grade	0%					
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	166	67	70	83	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)	221					
pX, platoon unblocked						
vC, conflicting volume	287	83	83			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	287	83	83			
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	83	96			
cM capacity (veh/h)	672	976	1514			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	166	137	83
Volume Left	0	67	0
Volume Right	166	0	0
cSH	976	1514	1700
Volume to Capacity	0.17	0.04	0.05
Queue Length 95th (m)	4.9	1.1	0.0
Control Delay (s)	9.4	3.8	0.0
Lane LOS	A	A	
Approach Delay (s)	9.4	3.8	0.0
Approach LOS	A		

Intersection Summary

Average Delay	5.4
Intersection Capacity Utilization	29.6%
Analysis Period (min)	15
	ICU Level of Service A

Lanes, Volumes, Timings
19: Street C & South Service Road

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	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↘			↘	↗	↗
Traffic Volume (vph)	40	31	45	322	21	43
Future Volume (vph)	40	31	45	322	21	43
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.940			0.909		
Fit Protected				0.994	0.984	
Satd. Flow (prot)	1751	0	0	1852	1666	0
Fit Permitted				0.994	0.984	
Satd. Flow (perm)	1751	0	0	1852	1666	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	110.2			306.3	76.4	
Travel Time (s)	7.9			22.1	5.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	43	34	49	350	23	47
Shared Lane Traffic (%)						
Lane Group Flow (vph)	77	0	0	399	70	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)		15	25		25	15
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	36.6%
Analysis Period (min)	15
	ICU Level of Service A

HCM Unsignalized Intersection Capacity Analysis
19: Street C & South Service Road

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	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↘			↘	↗	↗
Traffic Volume (veh/h)	40	31	45	322	21	43
Future Volume (Veh/h)	40	31	45	322	21	43
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)	43	34	49	350	23	47
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			77		508	60
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			77		508	60
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			97		95	95
cM capacity (veh/h)			1522		508	1005



Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	77	399	70
Volume Left	0	49	23
Volume Right	34	0	47
eSH	1700	1522	761
Volume to Capacity	0.05	0.03	0.09
Queue Length 95th (m)	0.0	0.8	2.4
Control Delay (s)	0.0	1.2	10.2
Lane LOS		A	B
Approach Delay (s)	0.0	1.2	10.2
Approach LOS			B

Intersection Summary

Average Delay		2.2	
Intersection Capacity Utilization	36.6%	ICU Level of Service	A
Analysis Period (min)	15		

Lanes, Volumes, Timings
20: Street A & South Service Road

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Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	56	4	19	78	11	0
Future Volume (vph)	56	4	19	78	11	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.992					
Fit Protected			0.990		0.950	
Satd. Flow (prot)	1848		0		0	
Fit Permitted			0.990		0.950	
Satd. Flow (perm)	1848		0		0	
Link Speed (k/h)	50		50		50	
Link Distance (m)	255.1		154.2		119.8	
Travel Time (s)	18.4		11.1		8.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	61	4	21	85	12	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	65	0	0	106	12	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0		0.0		3.6	
Link Offset(m)	0.0		0.0		0.0	
Crosswalk Width(m)	4.8		4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	15		25		15	
Sign Control	Free		Free		Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	21.8%
ICU Level of Service A	
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis
20: Street A & South Service Road

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Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	56	4	19	78	11	0
Future Volume (Veh/h)	56	4	19	78	11	0
Sign Control	Free			Free Stop		
Grade	0%					
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	61	4	21	85	12	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			65		190	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			65		190	
tC, single (s)			4.1		6.4	
tC, 2 stage (s)						
tF (s)			2.2		3.5	
p0 queue free %			99		98	
cM capacity (veh/h)			1537		788	
Direction, Lane #						
	EB 1	WB 1	NB 1			
Volume Total	65	106	12			
Volume Left	0	21	12			
Volume Right	4	0	0			
eSH	1700	1537	788			
Volume to Capacity	0.04	0.01	0.02			
Queue Length 95th (m)	0.0	0.3	0.4			
Control Delay (s)	0.0	1.5	9.6			
Lane LOS	A			A		
Approach Delay (s)	0.0	1.5	9.6			
Approach LOS	A			A		

Intersection Summary						
Average Delay			1.5			
Intersection Capacity Utilization	21.8%		ICU Level of Service		A	
Analysis Period (min)	15					

Lanes, Volumes, Timings
21: Argus Rd & Street 1

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Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	145	0	222	481	295
Future Volume (vph)	0	145	0	222	481	295
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Fr	0.865				0.949	
Fit Protected						
Satd. Flow (prot)	1611	0	0	1863	1768	0
Fit Permitted						
Satd. Flow (perm)	1611	0	0	1863	1768	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	165.4			115.7	65.0	
Travel Time (s)	11.9			8.3	4.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	158	0	241	523	321
Shared Lane Traffic (%)						
Lane Group Flow (vph)	158	0	0	241	844	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			3.3	3.3	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	59.0%
Analysis Period (min)	15
	ICU Level of Service B

HCM Unsignalized Intersection Capacity Analysis
21: Argus Rd & Street 1

FT 2043 PM.syn
04-03-2024

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	145	0	222	481	295
Future Volume (Veh/h)	0	145	0	222	481	295
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	158	0	241	523	321
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)				116		
pX, platoon unblocked						
vC, conflicting volume	924	684	844			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	924	684	844			
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	65	100			
cM capacity (veh/h)	299	449	792			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	158	241	844
Volume Left	0	0	0
Volume Right	158	0	321
eSH	449	792	1700
Volume to Capacity	0.35	0.00	0.50
Queue Length 95th (m)	12.5	0.0	0.0
Control Delay (s)	17.3	0.0	0.0
Lane LOS	C		
Approach Delay (s)	17.3	0.0	0.0
Approach LOS	C		

Intersection Summary

Average Delay	2.2
Intersection Capacity Utilization	59.0%
Analysis Period (min)	15
	ICU Level of Service B

Lanes, Volumes, Timings
22: Street C & Street 1

FT 2043 PM.syn
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	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	0	145	36	125	170	0	92	126	0	0	229	0
Future Volume (vph)	0	145	36	125	170	0	92	126	0	0	229	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.973											
Flt Protected					0.979				0.979			
Satd. Flow (prot)	0	1812	0	0	1824	0	0	1824	0	0	1863	0
Flt Permitted	0.979											
Satd. Flow (perm)	0	1812	0	0	1824	0	0	1824	0	0	1863	0
Link Speed (k/h)	50			50			50			50		
Link Distance (m)	41.9			165.4			132.8			87.9		
Travel Time (s)	3.0			11.9			9.6			6.3		
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
Adj. Flow (vph)	0	158	39	136	185	0	100	137	0	0	249	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	197	0	0	321	0	0	237	0	0	249	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Right	Left	Left	Right	Right
Median Width(m)	0.0			0.0			3.6			3.6		
Link Offset(m)	0.0			0.0			0.0			0.0		
Crosswalk Width(m)	4.8			4.8			4.8			4.8		
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control	Stop				Stop		Free				Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	62.8%
ICU Level of Service	B
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis
22: Street C & Street 1

FT 2043 PM.syn
04-03-2024

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (veh/h)	0	145	36	125	170	0	92	126	0	0	229	0
Future Volume (Veh/h)	0	145	36	125	170	0	92	126	0	0	229	0
Sign Control	Stop			Stop			Free			Free		
Grade	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)	0	158	39	136	185	0	100	137	0	0	249	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)	133											
pX, platoon unblocked												
vC, conflicting volume	678	586	249	704	586	137	249				137	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	678	586	249	704	586	137	249				137	
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	60	95	37	53	100	92				100	
cM capacity (veh/h)	218	390	790	216	390	911	1317				1447	

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	197	321	237	249
Volume Left	0	136	100	0
Volume Right	39	0	0	0
eSH	434	291	1317	1447
Volume to Capacity	0.45	1.10	0.08	0.00
Queue Length 95th (m)	18.5	103.9	2.0	0.0
Control Delay (s)	20.0	122.0	3.7	0.0
Lane LOS	C	F	A	
Approach Delay (s)	20.0	122.0	3.7	0.0
Approach LOS	C	F		

Intersection Summary

Average Delay	43.8
Intersection Capacity Utilization	62.8%
ICU Level of Service	B
Analysis Period (min)	15

Lanes, Volumes, Timings
23: GO Station West Access/Street C & Cross Ave

FT 2043 PM.syn
04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔			↔			↔	↔		↔	↔	
Traffic Volume (vph)	76	660	64	227	388	141	109	0	542	239	125	26
Future Volume (vph)	76	660	64	227	388	141	109	0	542	239	125	26
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.0	0.0	0.0
Storage Lanes	0	0	0	0	0	0	1	0	1	0	0	0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.988		0.972		0.850		0.974					
Flt Protected	0.995		0.985		0.950		0.950					
Satd. Flow (prot)	0	3479	0	0	3389	0	1770	1583	0	1770	1814	0
Flt Permitted	0.730		0.570		0.653		0.231					
Satd. Flow (perm)	0	2553	0	0	1961	0	1216	1583	0	430	1814	0
Right Turn on Red	Yes			Yes			Yes			Yes		
Satd. Flow (RTOR)	22		66		86		25					
Link Speed (k/h)	50		50		50		50					
Link Distance (m)	209.8		164.3		55.1		132.8					
Travel Time (s)	15.1		11.8		4.0		9.6					
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
Adj. Flow (vph)	83	717	70	247	422	153	118	0	589	260	136	28
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	870	0	0	822	0	118	589	0	260	164	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)	3.3		3.3		3.6		3.6					
Link Offset(m)	0.0		0.0		0.0		0.0					
Crosswalk Width(m)	4.8		4.8		4.8		4.8					
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15		25		15		25		15	
Number of Detectors	1	2	1	2	1	2	1	2	1	2	1	2
Detector Template	Left	Thru	Left	Thru	Left	Thru	Left	Thru	Left	Thru	Left	Thru
Leading Detector (m)	2.0	10.0	2.0	10.0	2.0	10.0	2.0	10.0	2.0	10.0	2.0	10.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6	2.0	0.6	2.0	0.6	2.0	0.6	2.0	0.6	2.0	0.6
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)	9.4		9.4		9.4		9.4					
Detector 2 Size(m)	0.6		0.6		0.6		0.6					
Detector 2 Type	Cl+Ex		Cl+Ex		Cl+Ex		Cl+Ex					
Detector 2 Channel												
Detector 2 Extend (s)	0.0		0.0		0.0		0.0					
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	4		8		2		6					
Permitted Phases	4		8		2		6					

Lanes, Volumes, Timings
23: GO Station West Access/Street C & Cross Ave

FT 2043 PM.syn
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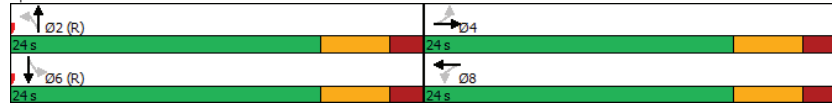
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	24.0	24.0		24.0	24.0		24.0	24.0		24.0	24.0	
Total Split (s)	24.0	24.0		24.0	24.0		24.0	24.0		24.0	24.0	
Total Split (%)	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%		50.0%	50.0%	
Maximum Green (s)	18.0	18.0		18.0	18.0		18.0	18.0		18.0	18.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0		0.0		0.0		0.0		0.0		0.0	
Total Lost Time (s)	6.0		6.0		6.0		6.0		6.0		6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	18.0		18.0		18.0		18.0		18.0		18.0	
Actuated g/C Ratio	0.38		0.38		0.38		0.38		0.38		0.38	
v/c Ratio	0.90		1.15dl		0.26		0.91		1.61		0.24	
Control Delay	29.0		67.8		12.3		35.2		324.9		9.8	
Queue Delay	0.0		0.0		0.0		0.0		0.0		0.0	
Total Delay	29.0		67.8		12.3		35.2		324.9		9.8	
LOS	C		E		B		D		F		A	
Approach Delay	29.0		67.8		31.4		203.1					
Approach LOS	C		E		C		F					
Queue Length 50th (m)	35.8		~42.5		7.0		40.9		~35.1		8.1	
Queue Length 95th (m)	#69.6		#73.2		16.5		#97.5		#59.6		18.2	
Internal Link Dist (m)	185.8		140.3		31.1		108.8					
Turn Bay Length (m)			15.0									
Base Capacity (vph)	971		776		456		647		161		695	
Starvation Cap Reductn	0		0		0		0		0		0	
Spillback Cap Reductn	0		0		0		0		0		0	
Storage Cap Reductn	0		0		0		0		0		0	
Reduced v/c Ratio	0.90		1.06		0.26		0.91		1.61		0.24	
Intersection Summary												
Area Type:	Other											
Cycle Length:	48											
Actuated Cycle Length:	48											
Offset:	0 (0%), Referenced to phase 2:NBL and 6:SBTL, Start of Green											
Natural Cycle:	100											
Control Type:	Actuated-Coordinated											
Maximum v/c Ratio:	1.61											
Intersection Signal Delay:	67.0						Intersection LOS: E					
Intersection Capacity Utilization	111.1%						ICU Level of Service H					
Analysis Period (min)	15											
~	Volume exceeds capacity, queue is theoretically infinite.											

Lanes, Volumes, Timings
 23: GO Station West Access/Street C & Cross Ave

FT 2043 PM.syn
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- Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
- Queue shown is maximum after two cycles.
- dl Defacto Left Lane. Recode with 1 though lane as a left lane.

Splits and Phases: 23: GO Station West Access/Street C & Cross Ave



HCM Signalized Intersection Capacity Analysis
 23: GO Station West Access/Street C & Cross Ave

FT 2043 PM.syn
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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔		↔	↔		↔	↔	
Traffic Volume (vph)	76	660	64	227	388	141	109	0	542	239	125	26
Future Volume (vph)	76	660	64	227	388	141	109	0	542	239	125	26
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0			6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor		0.95			0.95		1.00	1.00		1.00	1.00	
Fr _t		0.99			0.97		1.00	0.85		1.00	0.97	
Fit Protected		1.00			0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		3480			3389		1770	1583		1770	1815	
Fit Permitted		0.73			0.57		0.65	1.00		0.23	1.00	
Satd. Flow (perm)		2553			1959		1217	1583		431	1815	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	83	717	70	247	422	153	118	0	589	260	136	28
RTOR Reduction (vph)	0	14	0	0	41	0	54	0	0	0	16	0
Lane Group Flow (vph)	0	856	0	0	781	0	118	535	0	260	148	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		18.0			18.0		18.0	18.0		18.0	18.0	
Effective Green, g (s)		18.0			18.0		18.0	18.0		18.0	18.0	
Actuated g/C Ratio		0.38			0.38		0.38	0.38		0.38	0.38	
Clearance Time (s)		6.0			6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		957			734		456	593		161	680	
v/s Ratio Prot							0.34				0.08	
v/s Ratio Perm		0.34			c0.40		0.10			c0.60		
v/c Ratio		0.89			1.15dl		0.26	0.90		1.61	0.22	
Uniform Delay, d1		14.1			15.0		10.4	14.2		15.0	10.2	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		10.7			51.5		1.4	19.5		303.5	0.7	
Delay (s)		24.8			66.5		11.8	33.6		318.5	10.9	
Level of Service		C			E		B	C		F	B	
Approach Delay (s)		24.8			66.5		30.0			199.5		
Approach LOS		C			E		C			F		

Intersection Summary

HCM 2000 Control Delay	64.5	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.34		
Actuated Cycle Length (s)	48.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	111.1%	ICU Level of Service	H
Analysis Period (min)	15		

- dl Defacto Left Lane. Recode with 1 though lane as a left lane.

c Critical Lane Group

Appendix H

Synchro Sensitivity Analysis



Lanes, Volumes, Timings
11: Argus Rd & South Service Road

ST 2038 AM.syn
04-03-2024

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↕	↕↔		↕	↕
Traffic Volume (vph)	21	76	865	293	156	159
Future Volume (vph)	21	76	865	293	156	159
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	30.0			0.0	0.0	0.0
Storage Lanes	1			0	1	1
Taper Length (m)	7.5				7.5	
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	1.00
Ped Bike Factor	1.00		0.99		0.99	0.99
Frt			0.962			0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	902	1900	3378	0	1805	1615
Flt Permitted	0.140				0.950	
Satd. Flow (perm)	133	1900	3378	0	1790	1594
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)			119			106
Link Speed (k/h)		50	50		50	
Link Distance (m)		184.1	139.4		100.5	
Travel Time (s)		13.3	10.0		7.2	
Confl. Peds. (#/hr)	1			1	5	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	100%	0%	3%	0%	0%	0%
Adj. Flow (vph)	23	83	940	318	170	173
Shared Lane Traffic (%)						
Lane Group Flow (vph)	23	83	1258	0	170	173
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.6	3.6		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)		25		15	25	15
Turn Type	Perm	NA	NA		Perm	Perm
Protected Phases		4	8			
Permitted Phases	4				6	6
Minimum Split (s)	22.5	22.5	22.5		22.5	22.5
Total Split (s)	36.6	36.6	36.6		23.4	23.4
Total Split (%)	61.0%	61.0%	61.0%		39.0%	39.0%
Maximum Green (s)	32.1	32.1	32.1		18.9	18.9
Yellow Time (s)	3.5	3.5	3.5		3.5	3.5
All-Red Time (s)	1.0	1.0	1.0		1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5		4.5	4.5
Lead/Lag						
Lead-Lag Optimize?						
Walk Time (s)	7.0	7.0	7.0		7.0	7.0
Flash Dont Walk (s)	11.0	11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)	0	0	0		0	0

Lanes, Volumes, Timings
11: Argus Rd & South Service Road

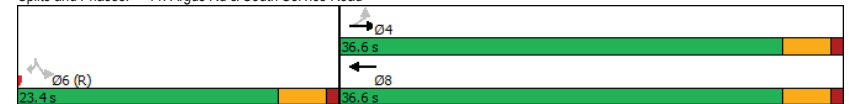
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Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Act Effct Green (s)	32.1	32.1	32.1		18.9	18.9
Actuated g/C Ratio	0.54	0.54	0.54		0.32	0.32
v/c Ratio	0.32	0.08	0.68		0.30	0.30
Control Delay	23.1	7.1	11.3		17.4	8.6
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	23.1	7.1	11.3		17.4	8.6
LOS	C	A	B		B	A
Approach Delay		10.6	11.3		12.9	
Approach LOS		B	B		B	
Queue Length 50th (m)	1.4	4.2	45.2		14.7	5.5
Queue Length 95th (m)	#10.1	9.7	65.3		28.4	18.0
Internal Link Dist (m)		160.1	115.4		76.5	
Turn Bay Length (m)	30.0					
Base Capacity (vph)	71	1016	1862		563	574
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	0.32	0.08	0.68		0.30	0.30

Intersection Summary

Area Type:	Other
Cycle Length:	60
Actuated Cycle Length:	60
Offset: 0 (0%), Referenced to phase 2: and 6:SBL, Start of Green	
Natural Cycle:	60
Control Type:	Pretimed
Maximum v/c Ratio:	0.68
Intersection Signal Delay:	11.6
Intersection LOS:	B
Intersection Capacity Utilization:	55.8%
ICU Level of Service:	B
Analysis Period (min):	15
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 11: Argus Rd & South Service Road



HCM Signalized Intersection Capacity Analysis
11: Argus Rd & South Service Road

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Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↕	↕↔		↕	↕
Traffic Volume (vph)	21	76	865	293	156	159
Future Volume (vph)	21	76	865	293	156	159
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5		4.5	4.5
Lane Util. Factor	1.00	1.00	0.95		1.00	1.00
Frbp, ped/bikes	1.00	1.00	0.99		1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00		0.99	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)	902	1900	3378		1790	1594
Flt Permitted	0.14	1.00	1.00		0.95	1.00
Satd. Flow (perm)	133	1900	3378		1790	1594
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	23	83	940	318	170	173
RTOR Reduction (vph)	0	0	55	0	0	73
Lane Group Flow (vph)	23	83	1203	0	170	100
Confl. Peds. (#/hr)	1			1	5	1
Heavy Vehicles (%)	100%	0%	3%	0%	0%	0%
Turn Type	Perm	NA	NA		Perm	Perm
Protected Phases		4	8			
Permitted Phases	4				6	6
Actuated Green, G (s)	32.1	32.1	32.1		18.9	18.9
Effective Green, g (s)	32.1	32.1	32.1		18.9	18.9
Actuated g/C Ratio	0.54	0.54	0.54		0.31	0.31
Clearance Time (s)	4.5	4.5	4.5		4.5	4.5
Lane Grp Cap (vph)	71	1016	1807		563	502
v/s Ratio Prot		0.04	c0.36			
v/s Ratio Perm	0.17				c0.09	0.06
v/c Ratio	0.32	0.08	0.67		0.30	0.20
Uniform Delay, d1	7.8	6.8	10.1		15.6	15.0
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	11.7	0.2	2.0		1.4	0.9
Delay (s)	19.5	6.9	12.0		16.9	15.9
Level of Service	B	A	B		B	B
Approach Delay (s)		9.7	12.0		16.4	
Approach LOS		A	B		B	
Intersection Summary						
HCM 2000 Control Delay		12.8			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)	9.0
Intersection Capacity Utilization		55.8%			ICU Level of Service	B
Analysis Period (min)		15				
c Critical Lane Group						

Lanes, Volumes, Timings
13: GO Bus Terminal/Argus Rd & Cross Ave

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕	↕	↕	↕↕	↕	↕	↕	↕	↕↕	↕	↕
Traffic Volume (vph)	0	1002	19	53	838	67	27	0	64	610	21	275
Future Volume (vph)	0	1002	19	53	838	67	27	0	64	610	21	275
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6
Storage Length (m)	20.0		15.0	20.0		0.0	0.0		0.0	50.0		20.0
Storage Lanes	0		1	1		0	1		0	1		0
Taper Length (m)	7.5		7.5			7.5			7.5			7.5
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Ped Bike Factor			0.97		1.00		1.00	0.96		0.97		0.98
Frt			0.850		0.989		0.850			0.861		
Flt Protected				0.950		0.950				0.950		
Satd. Flow (prot)	0	3217	727	818	3167	0	805	729	0	3046	1359	0
Flt Permitted				0.092		0.566				0.950		
Satd. Flow (perm)	0	3217	707	79	3167	0	478	729	0	2960	1359	0
Right Turn on Red			Yes		Yes		Yes		Yes			Yes
Satd. Flow (RTOR)			145		9		145			211		
Link Speed (k/h)		50			50		50			50		
Link Distance (m)		162.8			72.9		81.9			113.6		
Travel Time (s)		11.7			5.2		5.9			8.2		
Confl. Peds. (#/hr)	1		3	3		1	3		20	20		3
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
Heavy Vehicles (%)	0%	1%	100%	92%	1%	5%	95%	0%	91%	0%	93%	0%
Adj. Flow (vph)	0	1089	21	58	911	73	29	0	70	663	23	299
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1089	21	58	984	0	29	70	0	663	322	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6		6.6		6.6			6.6
Link Offset(m)		0.0			0.0		0.0		0.0			0.0
Crosswalk Width(m)		4.8			4.8		4.8		4.8			4.8
Two way Left Turn Lane												
Headway Factor	1.19	1.14	1.14	1.19	1.14	1.14	1.19	1.14	1.14	1.19	1.14	1.14
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors		2	1	1	2		1	2		1	2	
Detector Template		Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)		10.0	2.0	2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)		0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)		0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)		0.6	2.0	2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)		0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)		0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)		0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4		9.4			9.4		
Detector 2 Size(m)		0.6			0.6		0.6			0.6		
Detector 2 Type		Cl+Ex			Cl+Ex		Cl+Ex			Cl+Ex		
Detector 2 Channel												

Lanes, Volumes, Timings
13: GO Bus Terminal/Argus Rd & Cross Ave

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)	0.0				0.0			0.0				0.0
Turn Type	NA	Perm	pm+pt	NA	NA	pm+pt	NA	NA	Prot	NA		
Protected Phases	2		1	6		3	8		7	4		
Permitted Phases		2	6			8						
Detector Phase	2	2	1	6	3	8			7	4		
Switch Phase												
Minimum Initial (s)	22.0	22.0	8.0	22.0		5.0	10.0		5.0	10.0		
Minimum Split (s)	45.0	45.0	12.5	29.0		9.5	29.0		9.5	29.0		
Total Split (s)	45.5	45.5	12.5	58.0		13.8	29.0		33.0	48.2		
Total Split (%)	37.9%	37.9%	10.4%	48.3%		11.5%	24.2%		27.5%	40.2%		
Maximum Green (s)	39.5	39.5	8.5	52.0		9.3	23.0		28.5	42.2		
Yellow Time (s)	4.0	4.0	3.0	4.0		3.5	4.0		3.5	4.0		
All-Red Time (s)	2.0	2.0	1.0	2.0		1.0	2.0		1.0	2.0		
Lost Time Adjust (s)	-2.0	-2.0	0.0	-2.0		-2.0	-2.0		-2.0	-2.0		
Total Lost Time (s)	4.0	4.0	4.0	4.0		2.5	4.0		2.5	4.0		
Lead/Lag	Lag	Lag	Lead			Lead	Lag		Lead	Lag		
Lead-Lag Optimize?	Yes	Yes	Yes			Yes	Yes		Yes	Yes		
Vehicle Extension (s)	5.0	5.0	2.5	5.0		3.0	4.0		3.0	4.0		
Recall Mode	Min	Min	Min	Min		None	Min		None	Min		
Walk Time (s)	7.0	7.0	7.0	7.0		7.0	7.0		7.0	7.0		
Flash Dont Walk (s)	16.0	16.0		16.0		16.0	16.0		16.0	16.0		
Pedestrian Calls (#/hr)	0	0		0		0	0		0	0		
Act Effct Green (s)	41.5	41.5	53.9	53.9		23.1	12.0		28.5	35.3		
Actuated g/C Ratio	0.40	0.40	0.51	0.51		0.22	0.11		0.27	0.34		
v/c Ratio	0.86	0.06	0.59	0.60		0.22	0.33		0.80	0.54		
Control Delay	37.4	0.3	42.7	20.0		24.4	4.2		43.9	14.5		
Queue Delay	1.4	0.0	0.0	0.0		0.0	0.0		0.0	0.0		
Total Delay	38.8	0.3	42.7	20.0		24.4	4.2		43.9	14.5		
LOS	D	A	D	C		C	A		D	B		
Approach Delay	38.1			21.3		10.1			34.3			
Approach LOS	D			C		B			C			
Queue Length 50th (m)	114.6	0.0	6.5	77.6		3.7	0.0		68.4	18.4		
Queue Length 95th (m)	#148.1	0.0	#23.7	99.1		9.6	0.0		90.3	49.6		
Internal Link Dist (m)	138.8			48.9		57.9			89.6			
Turn Bay Length (m)		15.0	20.0						50.0			
Base Capacity (vph)	1273	367	100	1636		148	284		886	695		
Starvation Cap Reductn	67	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	0.90	0.06	0.58	0.60		0.20	0.25		0.75	0.46		

Intersection Summary

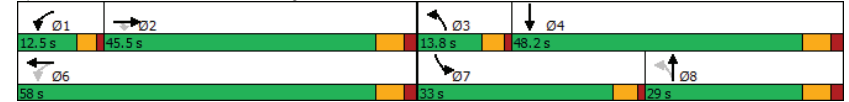
Area Type: CBD
 Cycle Length: 120
 Actuated Cycle Length: 104.9
 Natural Cycle: 110
 Control Type: Semi Act-Uncoord
 Maximum v/c Ratio: 0.86
 Intersection Signal Delay: 30.7
 Intersection LOS: C

Lanes, Volumes, Timings
13: GO Bus Terminal/Argus Rd & Cross Ave

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Intersection Capacity Utilization 73.4%
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 13: GO Bus Terminal/Argus Rd & Cross Ave



HCM Signalized Intersection Capacity Analysis
13: GO Bus Terminal/Argus Rd & Cross Ave

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↑	↑	↑↑		↑	↑		↑↑	↑	↑
Traffic Volume (vph)	0	1002	19	53	838	67	27	0	64	610	21	275
Future Volume (vph)	0	1002	19	53	838	67	27	0	64	610	21	275
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	2.5	4.0	2.5	4.0	4.0	4.0	4.0
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00	1.00	0.97	1.00	0.97	1.00	1.00
Frbp, ped/bikes	1.00	0.97	1.00	1.00	1.00	1.00	0.96	1.00	0.99	1.00	0.99	1.00
Fipb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.99	1.00	0.85	1.00	0.86	1.00	0.86	1.00	0.86
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3217	707	818	3166	804	731	3046	1360	1360	1360	1360	1360
Flt Permitted	1.00	1.00	0.09	1.00	0.57	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	3217	707	79	3166	479	731	3046	1360	1360	1360	1360	1360
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	1089	21	58	911	73	29	0	70	663	23	299
RTOR Reduction (vph)	0	0	13	0	4	0	0	61	0	0	141	0
Lane Group Flow (vph)	0	1089	8	58	980	0	29	9	0	663	181	0
Confl. Peds. (#/hr)	1	3	3	3	1	3	20	20	3	3	3	3
Heavy Vehicles (%)	0%	1%	100%	92%	1%	5%	95%	0%	91%	0%	93%	0%
Turn Type	NA	Perm	pm+pt	NA	pm+pt	NA	Prot	NA	Prot	NA	Prot	NA
Protected Phases	2	1	6	3	8	7	4					
Permitted Phases	2	6	8									
Actuated Green, G (s)	39.5	39.5	51.9	51.9	16.9	11.8	26.5	33.2				
Effective Green, g (s)	41.5	41.5	51.9	53.9	20.9	13.8	28.5	35.2				
Actuated g/C Ratio	0.39	0.39	0.49	0.51	0.20	0.13	0.27	0.33				
Clearance Time (s)	6.0	6.0	4.0	6.0	4.5	6.0	4.5	6.0				
Vehicle Extension (s)	5.0	5.0	2.5	5.0	3.0	4.0	3.0	4.0				
Lane Grp Cap (vph)	1251	274	96	1599	115	94	813	448				
v/s Ratio Prot	c0.34		0.05	c0.31	0.02	0.01	c0.22	c0.13				
v/s Ratio Perm		0.01	0.24		0.03							
v/c Ratio	0.87	0.03	0.60	0.61	0.25	0.10	0.82	0.40				
Uniform Delay, d1	30.1	20.2	20.7	18.9	35.8	41.0	36.6	27.6				
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00				
Incremental Delay, d2	7.4	0.1	8.7	1.0	1.2	0.6	6.3	0.8				
Delay (s)	37.5	20.2	29.4	19.9	36.9	41.6	43.0	28.4				
Level of Service	D	C	C	B	D	D	D	C				
Approach Delay (s)	37.2		20.5		40.2		38.2					
Approach LOS	D		C		D		D					

Intersection Summary			
HCM 2000 Control Delay	32.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	106.7	Sum of lost time (s)	14.5
Intersection Capacity Utilization	73.4%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
14: Lyons Lane/Street A & Cross Ave

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑	↑	↑	↑↑		↑	↑		↑↑	↑	↑
Traffic Volume (vph)	113	237	259	289	227	24	23	4	17	82	31	120
Future Volume (vph)	113	237	259	289	227	24	23	4	17	82	31	120
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6
Storage Length (m)	0.0	0.0	25.0	0.0	20.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Storage Lanes	1	0	1	0	1	0	1	0	1	0	1	0
Taper Length (m)	7.5		7.5		7.5		7.5		7.5		7.5	
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.99	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	0.99	1.00	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00
Frt	0.922			0.986			0.877		0.881			
Flt Protected	0.950		0.950		0.950		0.950		0.950		0.950	
Satd. Flow (prot)	1540	2813	0	1570	2726	0	1570	1481	0	1468	1453	0
Flt Permitted	0.584		0.369		0.563		0.743		0.743		0.743	
Satd. Flow (perm)	940	2813	0	610	2726	0	928	1481	0	1144	1453	0
Right Turn on Red		Yes		Yes		Yes		Yes		Yes		Yes
Satd. Flow (RTOR)	282		25		18		130					
Link Speed (k/h)	50		50		50		50					
Link Distance (m)	40.1		211.2		69.1		70.9					
Travel Time (s)	2.9		15.2		5.0		5.1					
Confl. Peds. (#/hr)	5	1	1	5	3	3	3	3	3	3	3	3
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
Heavy Vehicles (%)	2%	11%	0%	19%	0%	0%	0%	7%	0%	3%	0%	3%
Adj. Flow (vph)	123	258	282	314	247	26	25	4	18	89	34	130
Shared Lane Traffic (%)												
Lane Group Flow (vph)	123	540	0	314	273	0	25	22	0	89	164	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)	3.3		3.3		3.3		3.3		3.3		3.3	
Link Offset(m)	0.0		0.0		0.0		0.0		0.0		0.0	
Crosswalk Width(m)	4.8		4.8		4.8		4.8		4.8		4.8	
Two way Left Turn Lane												
Headway Factor	1.19	1.14	1.14	1.19	1.14	1.14	1.19	1.14	1.14	1.19	1.14	1.14
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)	9.4			9.4			9.4			9.4		
Detector 2 Size(m)	0.6			0.6			0.6			0.6		
Detector 2 Type	Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex		
Detector 2 Channel												

Lanes, Volumes, Timings
14: Lyons Lane/Street A & Cross Ave

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases		2		6			8			4		
Detector Phase	2	2		1	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	35.0	35.0		8.0	35.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	41.0	41.0		12.5	41.0		28.0	28.0		28.0	28.0	
Total Split (s)	41.0	41.0		21.0	62.0		28.0	28.0		28.0	28.0	
Total Split (%)	45.6%	45.6%		23.3%	68.9%		31.1%	31.1%		31.1%	31.1%	
Maximum Green (s)	35.0	35.0		17.0	56.0		22.0	22.0		22.0	22.0	
Yellow Time (s)	4.0	4.0		3.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		1.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0		0.0	-2.0		-2.0	-2.0		-2.0	-2.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Vehicle Extension (s)	5.0	5.0		2.5	5.0		4.0	4.0		4.0	4.0	
Recall Mode	Min	Min		Min	Min		Min	Min		Min	Min	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	15.0	15.0		15.0	15.0		15.0	15.0		15.0	15.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	37.2	37.2		52.4	52.4		14.8	14.8		14.8	14.8	
Actuated g/C Ratio	0.49	0.49		0.70	0.70		0.20	0.20		0.20	0.20	
v/c Ratio	0.27	0.35		0.55	0.14		0.14	0.07		0.40	0.42	
Control Delay	14.9	6.7		8.8	4.0		27.5	14.1		32.7	11.8	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	14.9	6.7		8.8	4.0		27.5	14.1		32.7	11.8	
LOS	B	A		A	A		C	B		C	B	
Approach Delay		8.2			6.5			21.2			19.1	
Approach LOS		A			A			C			B	
Queue Length 50th (m)	9.7	10.2		14.1	5.1		3.1	0.5		11.5	4.2	
Queue Length 95th (m)	26.9	25.8		31.6	11.5		10.0	6.4		26.5	20.7	
Internal Link Dist (m)		16.1			187.2			45.1			46.9	
Turn Bay Length (m)				25.0			20.0					
Base Capacity (vph)	464	1533		642	2118		297	487		366	554	
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	0.27	0.35		0.49	0.13		0.08	0.05		0.24	0.30	

Intersection Summary

Area Type: CBD
 Cycle Length: 90
 Actuated Cycle Length: 75.3
 Natural Cycle: 85
 Control Type: Semi Act-Uncoord
 Maximum v/c Ratio: 0.55
 Intersection Signal Delay: 9.8
 Intersection LOS: A

Lanes, Volumes, Timings
14: Lyons Lane/Street A & Cross Ave

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Intersection Capacity Utilization 89.6%
 Analysis Period (min) 15
 ICU Level of Service E

Splits and Phases: 14: Lyons Lane/Street A & Cross Ave



HCM Signalized Intersection Capacity Analysis
14: Lyons Lane/Street A & Cross Ave

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	113	237	259	289	227	24	23	4	17	82	31	120
Future Volume (vph)	113	237	259	289	227	24	23	4	17	82	31	120
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	0.99	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	0.88		1.00	0.88	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1531	2813		1570	2725		1567	1482		1463	1454	
Flt Permitted	0.58	1.00		0.37	1.00		0.56	1.00		0.74	1.00	
Satd. Flow (perm)	940	2813		610	2725		928	1482		1144	1454	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	123	258	282	314	247	26	25	4	18	89	34	130
RTOR Reduction (vph)	0	143	0	0	8	0	0	14	0	0	104	0
Lane Group Flow (vph)	123	398	0	314	265	0	25	8	0	89	60	0
Confl. Peds. (#/hr)	5		1	1		5	3		3	3		3
Heavy Vehicles (%)	2%	11%	0%	0%	19%	0%	0%	0%	0%	7%	0%	3%
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	2			1	6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	35.2	35.2		50.4	50.4		12.8	12.8		12.8	12.8	
Effective Green, g (s)	37.2	37.2		50.4	52.4		14.8	14.8		14.8	14.8	
Actuated g/C Ratio	0.49	0.49		0.67	0.70		0.20	0.20		0.20	0.20	
Clearance Time (s)	6.0	6.0		4.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	5.0	5.0		2.5	5.0		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	465	1391		551	1898		182	291		225	286	
v/s Ratio Prot		0.14		c0.08	0.10			0.01			0.04	
v/s Ratio Perm	0.13			c0.30			0.03			c0.08		
v/c Ratio	0.26	0.29		0.57	0.14		0.14	0.03		0.40	0.21	
Uniform Delay, d1	11.0	11.2		5.7	3.8		24.9	24.4		26.3	25.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.6	0.2		1.1	0.1		0.5	0.0		1.6	0.5	
Delay (s)	11.7	11.4		6.8	3.9		25.4	24.4		27.9	25.8	
Level of Service	B	B		A	A		C	C		C	C	
Approach Delay (s)		11.5			5.4			24.9			26.5	
Approach LOS		B			A			C			C	

Intersection Summary			
HCM 2000 Control Delay	12.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	75.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	89.6%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
22: Street C & Street 1

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	0	211	53	411	49	0	27	34	0	0	489	0
Future Volume (vph)	0	211	53	411	49	0	27	34	0	0	489	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0		0.0	60.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	7.5			7.5			7.5			7.5		7.5
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.970										
Flt Protected				0.950				0.979				
Satd. Flow (prot)	1863	1807	0	1770	1863	0	0	1824	0	0	1863	0
Flt Permitted				0.321				0.613				
Satd. Flow (perm)	1863	1807	0	598	1863	0	0	1142	0	0	1863	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			22									
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		85.9			162.1			134.3			159.9	
Travel Time (s)		6.2			11.7			9.7			11.5	
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
Adj. Flow (vph)	0	229	58	447	53	0	29	37	0	0	532	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	287	0	447	53	0	66	0	0	532	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	4			3	8			2			2	
Permitted Phases	4			8			2				6	

Lanes, Volumes, Timings
22: Street C & Street 1

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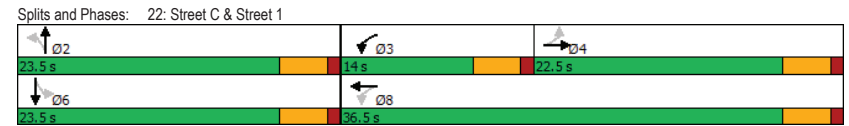
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4		3	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	22.5	22.5		9.5	22.5		22.5	22.5		22.5	22.5	
Total Split (s)	22.5	22.5		14.0	36.5		23.5	23.5		23.5	23.5	
Total Split (%)	37.5%	37.5%		23.3%	60.8%		39.2%	39.2%		39.2%	39.2%	
Maximum Green (s)	18.0	18.0		9.5	32.0		19.0	19.0		19.0	19.0	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Min	Min		Min	Min	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	12.9			27.0	27.0		18.2			18.2		
Actuated g/C Ratio	0.24			0.50	0.50		0.34			0.34		
v/c Ratio	0.64			0.89	0.06		0.17			0.85		
Control Delay	24.3			33.8	7.2		15.4			34.2		
Queue Delay	0.0			0.0	0.0		0.0			0.0		
Total Delay	24.3			33.8	7.2		15.4			34.2		
LOS	C			C	A		B			C		
Approach Delay	24.3				31.0		15.4			34.2		
Approach LOS	C				C		B			C		
Queue Length 50th (m)	24.9			29.3	2.7		4.7			50.0		
Queue Length 95th (m)	45.6			#72.5	6.9		13.8			#111.6		
Internal Link Dist (m)	61.9				138.1		110.3			135.9		
Turn Bay Length (m)				60.0								
Base Capacity (vph)	618			504	1107		403			657		
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	0.46			0.89	0.05		0.16			0.81		

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 54.3
 Natural Cycle: 70
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.89
 Intersection Signal Delay: 30.1
 Intersection Capacity Utilization 74.2%
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Lanes, Volumes, Timings
22: Street C & Street 1

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HCM Signalized Intersection Capacity Analysis
22: Street C & Street 1

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	0	211	53	411	49	0	27	34	0	0	489	0
Future Volume (vph)	0	211	53	411	49	0	27	34	0	0	489	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5		4.5	4.5			4.5			4.5	
Lane Util. Factor		1.00		1.00	1.00			1.00			1.00	
Fr _t		0.97		1.00	1.00			1.00			1.00	
Fl _t Protected		1.00		0.95	1.00			0.98			1.00	
Satd. Flow (prot)		1806		1770	1863			1823			1863	
Fl _t Permitted		1.00		0.32	1.00			0.61			1.00	
Satd. Flow (perm)		1806		598	1863			1142			1863	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	229	58	447	53	0	29	37	0	0	532	0
RTOR Reduction (vph)	0	17	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	270	0	447	53	0	0	66	0	0	532	0
Turn Type	Perm	NA		pm+pt	NA		Perm	NA			NA	
Protected Phases		4		3	8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		12.9		27.0	27.0			18.2			18.2	
Effective Green, g (s)		12.9		27.0	27.0			18.2			18.2	
Actuated g/C Ratio		0.24		0.50	0.50			0.34			0.34	
Clearance Time (s)		4.5		4.5	4.5			4.5			4.5	
Vehicle Extension (s)		3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)		429		505	928			383			625	
v/s Ratio Prot		0.15		c0.16	0.03						c0.29	
v/s Ratio Perm				c0.28				0.06				
v/c Ratio		0.63		0.89	0.06			0.17			0.85	
Uniform Delay, d1		18.5		10.1	7.0			12.7			16.7	
Progression Factor		1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2		2.9		16.8	0.0			0.2			10.8	
Delay (s)		21.4		26.9	7.1			12.9			27.5	
Level of Service		C		C	A			B			C	
Approach Delay (s)		21.4			24.8			12.9			27.5	
Approach LOS		C			C			B			C	

Intersection Summary			
HCM 2000 Control Delay	24.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	54.2	Sum of lost time (s)	13.5
Intersection Capacity Utilization	74.2%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
23: GO Station West Access/Street C & Cross Ave

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	21	338	115	550	512	40	51	0	271	491	411	51
Future Volume (vph)	21	338	115	550	512	40	51	0	271	491	411	51
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	0.0	70.0	0.0	0.0	0.0	0.0	0.0	15.0	0.0	0.0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		7.5
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t			0.850		0.989			0.850			0.984	
Fl _t Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1863	1583	3433	1842	0	1770	1583	0	1770	1833	0
Fl _t Permitted	0.950			0.950			0.479			0.175		
Satd. Flow (perm)	1770	1863	1583	3433	1842	0	892	1583	0	326	1833	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			152		4		336			7		
Link Speed (k/h)		50			50		50			50		
Link Distance (m)		211.2			162.8		81.1			134.3		
Travel Time (s)		15.2			11.7		5.8			9.7		
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
Adj. Flow (vph)	23	367	125	598	557	43	55	0	295	534	447	55
Shared Lane Traffic (%)												
Lane Group Flow (vph)	23	367	125	598	600	0	55	295	0	534	502	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		7.2			7.2			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA	Perm	Prot	NA		Perm	NA		pm+pt	NA	
Protected Phases	7	4		3	8		2	2		1	6	
Permitted Phases			4				2			6		

Lanes, Volumes, Timings
23: GO Station West Access/Street C & Cross Ave

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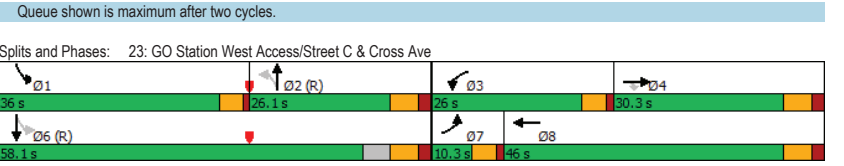
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4	4	3	8		2	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	24.0	24.0	9.5	24.0		24.0	24.0		9.5	24.0	
Total Split (s)	10.3	30.3	30.3	26.0	46.0		26.1	26.1		36.0	58.1	
Total Split (%)	8.7%	25.6%	25.6%	22.0%	38.9%		22.0%	22.0%		30.4%	49.1%	
Maximum Green (s)	5.8	24.3	24.3	21.5	40.0		20.1	20.1		31.5	52.1	
Yellow Time (s)	3.5	4.0	4.0	3.5	4.0		4.0	4.0		3.5	4.0	
All-Red Time (s)	1.0	2.0	2.0	1.0	2.0		2.0	2.0		1.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	6.0	6.0	4.5	6.0		6.0	6.0		4.5	6.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lag	Lag		Lead	Lead	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None		C-Max	C-Max		None	C-Max	
Walk Time (s)		7.0	7.0		7.0		7.0	7.0			7.0	
Flash Dont Walk (s)		11.0	11.0		11.0		11.0	11.0			11.0	
Pedestrian Calls (#/hr)		0	0		0		0	0			0	
Act Effct Green (s)	5.7	24.3	24.3	21.5	44.1		20.1	20.1		57.6	56.1	
Actuated g/C Ratio	0.05	0.21	0.21	0.18	0.37		0.17	0.17		0.49	0.47	
v/c Ratio	0.27	0.96	0.28	0.96	0.87		0.36	0.54		0.99	0.58	
Control Delay	62.4	84.3	5.1	75.8	50.4		51.4	6.4		66.9	25.5	
Queue Delay	0.0	0.0	0.0	0.0	8.3		0.0	0.0		32.2	8.8	
Total Delay	62.4	84.3	5.1	75.8	58.8		51.4	6.4		99.1	34.3	
LOS	E	F	A	E	E		D	A		F	C	
Approach Delay		64.1			67.3			13.5			67.7	
Approach LOS		E			E			B			E	
Queue Length 50th (m)	5.5	89.5	0.0	75.4	142.2		12.0	0.0		110.4	85.2	
Queue Length 95th (m)	14.7	#150.5	10.3	#111.8	#217.8		25.8	15.0		#185.0	120.0	
Internal Link Dist (m)		187.2			138.8			57.1			110.3	
Turn Bay Length (m)				70.0						15.0		
Base Capacity (vph)	86	382	445	623	688		151	547		542	872	
Starvation Cap Reductn	0	0	0	0	67		0	0		51	330	
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	
Reduced v/c Ratio	0.27	0.96	0.28	0.96	0.97		0.36	0.54		1.09	0.93	

Intersection Summary

Area Type: Other
 Cycle Length: 118.4
 Actuated Cycle Length: 118.4
 Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.99
 Intersection Signal Delay: 60.8 Intersection LOS: E
 Intersection Capacity Utilization 95.0% ICU Level of Service F
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.

Lanes, Volumes, Timings
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HCM Signalized Intersection Capacity Analysis
23: GO Station West Access/Street C & Cross Ave

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↗	↘	↔	↗	↘	↔	↗	↘	↔	↗	↘
Traffic Volume (vph)	21	338	115	550	512	40	51	0	271	491	411	51
Future Volume (vph)	21	338	115	550	512	40	51	0	271	491	411	51
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	6.0	6.0	4.5	6.0		6.0	6.0		4.5	6.0	
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	0.85		1.00	0.98	
Fit Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1863	1583	3433	1843		1770	1583		1770	1832	
Fit Permitted	0.95	1.00	1.00	0.95	1.00		0.48	1.00		0.18	1.00	
Satd. Flow (perm)	1770	1863	1583	3433	1843		893	1583		327	1832	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	23	367	125	598	557	43	55	0	295	534	447	55
RTOR Reduction (vph)	0	0	97	0	3	0	0	249	0	0	4	0
Lane Group Flow (vph)	23	367	28	598	597	0	55	46	0	534	498	0
Turn Type	Prot	NA	Perm	Prot	NA		Perm	NA		pm+pt	NA	
Protected Phases	7	4		3	8		2	2		1	6	
Permitted Phases			4				2			6		
Actuated Green, G (s)	3.5	26.1	26.1	21.5	44.1		18.3	18.3		54.3	54.3	
Effective Green, g (s)	3.5	26.1	26.1	21.5	44.1		18.3	18.3		54.3	54.3	
Actuated g/C Ratio	0.03	0.22	0.22	0.18	0.37		0.15	0.15		0.46	0.46	
Clearance Time (s)	4.5	6.0	6.0	4.5	6.0		6.0	6.0		4.5	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	52	410	348	623	686		138	244		533	840	
v/s Ratio Prot	0.01	0.20		c0.17	c0.32			0.03		c0.27	0.27	
v/s Ratio Perm			0.02				0.06			c0.19		
v/c Ratio	0.44	0.90	0.08	0.96	0.87		0.40	0.19		1.00	0.59	
Uniform Delay, d1	56.5	44.8	36.6	48.0	34.5		45.1	43.6		33.7	23.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	5.9	21.3	0.1	26.0	11.7		8.4	1.7		39.4	3.1	
Delay (s)	62.4	66.1	36.7	74.1	46.2		53.5	45.3		73.2	26.9	
Level of Service	E	E	D	E	D		D	D		E	C	
Approach Delay (s)		58.8			60.1			46.6			50.8	
Approach LOS		E			E			D			D	

Intersection Summary			
HCM 2000 Control Delay	55.2	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.01		
Actuated Cycle Length (s)	118.4	Sum of lost time (s)	21.0
Intersection Capacity Utilization	95.0%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
11: Argus Rd & South Service Rd

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Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↗	↗	↘	↗	↘
Traffic Volume (vph)	13	11	529	566	87	89
Future Volume (vph)	13	11	529	566	87	89
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	1.00
Ped Bike Factor					0.99	
Frt			0.922			0.850
Fit Protected	0.950				0.950	
Satd. Flow (prot)	1624	1513	2858	0	1624	1454
Fit Permitted	0.256				0.950	
Satd. Flow (perm)	438	1513	2858	0	1611	1454
Right Turn on Red			Yes		Yes	
Satd. Flow (RTOR)			615			97
Link Speed (k/h)		50	50		50	
Link Distance (m)		177.7	145.7		103.5	
Travel Time (s)		12.8	10.5		7.5	
Conf. Peds. (#/hr)					5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	13%	10%	0%	0%	0%
Adj. Flow (vph)	14	12	575	615	95	97
Shared Lane Traffic (%)						
Lane Group Flow (vph)	14	12	1190	0	95	97
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.6	3.6		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (k/h)	24			14	24	14
Number of Detectors	1	2	2		1	1
Detector Template	Left	Thru	Thru		Left	Right
Leading Detector (m)	2.0	10.0	10.0		2.0	2.0
Trailing Detector (m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Size(m)	2.0	0.6	0.6		2.0	2.0
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex		CI+Ex	CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0		0.0	0.0
Detector 2 Position(m)		9.4	9.4			
Detector 2 Size(m)		0.6	0.6			
Detector 2 Type		CI+Ex	CI+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type	Perm	NA	NA		Perm	Perm
Protected Phases		4	8			
Permitted Phases		4			6	6

Lanes, Volumes, Timings
11: Argus Rd & South Service Rd

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Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Detector Phase	4	4	8		6	6
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0		5.0	5.0
Minimum Split (s)	22.5	22.5	22.5		22.5	22.5
Total Split (s)	35.0	35.0	35.0		25.0	25.0
Total Split (%)	58.3%	58.3%	58.3%		41.7%	41.7%
Maximum Green (s)	30.5	30.5	30.5		20.5	20.5
Yellow Time (s)	3.5	3.5	3.5		3.5	3.5
All-Red Time (s)	1.0	1.0	1.0		1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5		4.5	4.5
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	None	None	None		Min	Min
Walk Time (s)	7.0	7.0	7.0		7.0	7.0
Flash Dont Walk (s)	11.0	11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)	0	0	0		0	0
Act Effct Green (s)	15.6	15.6	15.6		7.8	7.8
Actuated g/C Ratio	0.47	0.47	0.47		0.24	0.24
v/c Ratio	0.07	0.02	0.71		0.25	0.23
Control Delay	5.4	4.5	5.7		14.1	5.6
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	5.4	4.5	5.7		14.1	5.6
LOS	A	A	A		B	A
Approach Delay		5.0	5.7		9.8	
Approach LOS		A	A		A	
Queue Length 50th (m)	0.3	0.3	8.7		4.1	0.0
Queue Length 95th (m)	2.2	1.8	22.8		15.9	8.4
Internal Link Dist (m)		153.7	121.7		79.5	
Turn Bay Length (m)						
Base Capacity (vph)	390	1347	2612		1061	990
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	0.01	0.46		0.09	0.10

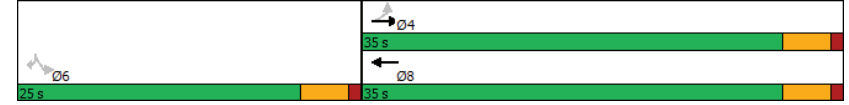
Intersection Summary

Area Type: CBD
 Cycle Length: 60
 Actuated Cycle Length: 33
 Natural Cycle: 50
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.71
 Intersection Signal Delay: 6.2
 Intersection Capacity Utilization 50.1%
 Analysis Period (min) 15
 Intersection LOS: A
 ICU Level of Service A

Lanes, Volumes, Timings
11: Argus Rd & South Service Rd

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Splits and Phases: 11: Argus Rd & South Service Rd



HCM Signalized Intersection Capacity Analysis
11: Argus Rd & South Service Rd

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Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↑	↔	↔	↔	↔
Traffic Volume (vph)	13	11	529	566	87	89
Future Volume (vph)	13	11	529	566	87	89
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5		4.5	4.5
Lane Util. Factor	1.00	1.00	0.95		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	0.92		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1624	1513	2859		1617	1454
Flt Permitted	0.26	1.00	1.00		0.95	1.00
Satd. Flow (perm)	438	1513	2859		1617	1454
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	14	12	575	615	95	97
RTOR Reduction (vph)	0	0	319	0	0	74
Lane Group Flow (vph)	14	12	871	0	95	23
Confl. Peds. (#/hr)	5					
Heavy Vehicles (%)	0%	13%	10%	0%	0%	0%
Turn Type	Perm	NA	NA		Perm	Perm
Protected Phases	4		8			
Permitted Phases	4				6	
Actuated Green, G (s)	15.6	15.6	15.6		7.8	7.8
Effective Green, g (s)	15.6	15.6	15.6		7.8	7.8
Actuated g/C Ratio	0.48	0.48	0.48		0.24	0.24
Clearance Time (s)	4.5	4.5	4.5		4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	210	728	1376		389	350
v/s Ratio Prot	0.01		c0.30			
v/s Ratio Perm	0.03				c0.06	
v/c Ratio	0.07	0.02	0.63		0.24	0.07
Uniform Delay, d1	4.5	4.4	6.3		9.9	9.5
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.1	0.0	1.0		0.3	0.1
Delay (s)	4.6	4.4	7.2		10.3	9.6
Level of Service	A	A	A		B	A
Approach Delay (s)	4.5		7.2		9.9	
Approach LOS	A		A		A	
Intersection Summary						
HCM 2000 Control Delay	7.5		HCM 2000 Level of Service		A	
HCM 2000 Volume to Capacity ratio	0.50					
Actuated Cycle Length (s)	32.4					
Intersection Capacity Utilization	50.1%		ICU Level of Service		A	
Analysis Period (min)	15					
c Critical Lane Group						

Lanes, Volumes, Timings
13: GO Bus Terminal/Argus Rd & Cross Ave

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	0	1318	21	48	590	161	20	3	61	462	26	78
Future Volume (vph)	0	1318	21	48	590	161	20	3	61	462	26	78
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6
Storage Length (m)	20.0	0.0	20.0		0.0	0.0		0.0	15.0		0.0	0.0
Storage Lanes	0	1	1		0	1		0	2		0	0
Taper Length (m)	7.5		7.5		7.5			7.5			7.5	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	0.97	1.00	1.00
Ped Bike Factor		0.97		0.99	0.99	0.98	0.95	0.95	0.94	0.97		
Frt		0.850		0.968		0.857		0.887				
Flt Protected			0.950		0.950		0.950		0.950			
Satd. Flow (prot)	0	3249	727	797	3112	0	785	697	0	3046	1184	0
Flt Permitted			0.058		0.684		0.950		0.950			
Satd. Flow (perm)	0	3249	703	49	3112	0	554	697	0	2866	1184	0
Right Turn on Red			Yes		Yes		Yes		Yes			Yes
Satd. Flow (RTOR)			116		39		66		85			85
Link Speed (k/h)		50		50		50		50		50		50
Link Distance (m)		164.3		72.9		81.9		115.7		115.7		115.7
Travel Time (s)		11.8		5.2		5.9		8.3		8.3		8.3
Confl. Peds. (#/hr)	9		4	4		9	12		20	20		12
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
Heavy Vehicles (%)	0%	0%	100%	97%	0%	0%	100%	100%	100%	0%	100%	0%
Adj. Flow (vph)	0	1433	23	52	641	175	22	3	66	502	28	85
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1433	23	52	816	0	22	69	0	502	113	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.3			3.3			6.6		6.6		6.6
Link Offset(m)		0.0			0.0			0.0		0.0		0.0
Crosswalk Width(m)		4.8			4.8			4.8		4.8		4.8
Two way Left Turn Lane												
Headway Factor	1.19	1.14	1.14	1.19	1.14	1.14	1.19	1.14	1.14	1.19	1.14	1.14
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors		2	1	1	2		1	2		1	2	
Detector Template		Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)		10.0	2.0	2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)		0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)		0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)		0.6	2.0	2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)		0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)		0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)		0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4		9.4			9.4		9.4
Detector 2 Size(m)		0.6			0.6		0.6			0.6		0.6
Detector 2 Type		Cl+Ex			Cl+Ex		Cl+Ex			Cl+Ex		Cl+Ex
Detector 2 Channel												

Lanes, Volumes, Timings
13: GO Bus Terminal/Argus Rd & Cross Ave

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)	0.0				0.0			0.0			0.0	
Turn Type	NA	Perm	pm+pt	NA	pm+pt	NA	pm+pt	NA	Prot	NA		
Protected Phases	2		1	6		3	8		7	4		
Permitted Phases		2	6			8						
Detector Phase	2	2	1	6		3	8		7	4		
Switch Phase												
Minimum Initial (s)	22.0	22.0	8.0	22.0		5.0	10.0		5.0	10.0		
Minimum Split (s)	45.0	45.0	12.5	29.0		9.5	29.0		9.5	29.0		
Total Split (s)	75.0	75.0	14.8	89.8		9.5	29.0		31.2	50.7		
Total Split (%)	50.0%	50.0%	9.9%	59.9%		6.3%	19.3%		20.8%	33.8%		
Maximum Green (s)	69.0	69.0	10.8	83.8		5.0	23.0		26.7	44.7		
Yellow Time (s)	4.0	4.0	3.0	4.0		3.5	4.0		3.5	4.0		
All-Red Time (s)	2.0	2.0	1.0	2.0		1.0	2.0		1.0	2.0		
Lost Time Adjust (s)	-2.0	-2.0	0.0	-2.0		-2.0	-2.0		-2.0	-2.0		
Total Lost Time (s)	4.0	4.0	4.0	4.0		2.5	4.0		2.5	4.0		
Lead/Lag	Lag	Lag	Lead		Lead	Lag	Lead	Lag		Lag		
Lead-Lag Optimize?	Yes	Yes	Yes		Yes	Yes	Yes	Yes		Yes	Yes	
Vehicle Extension (s)	5.0	5.0	2.5	5.0		3.0	4.0		3.0	4.0		
Recall Mode	Min	Min	Min	Min		None	Min	None		Min		
Walk Time (s)	7.0	7.0	7.0	7.0		7.0	7.0		7.0	7.0		
Flash Dont Walk (s)	16.0	16.0		16.0		16.0			16.0	16.0		
Pedestrian Calls (#/hr)	0	0		0		0			0	0		
Act Effct Green (s)	68.4	68.4	81.9	81.9		22.6	14.0		27.2	38.3		
Actuated g/C Ratio	0.51	0.51	0.61	0.61		0.17	0.10		0.20	0.29		
v/c Ratio	0.86	0.06	0.63	0.42		0.21	0.52		0.81	0.28		
Control Delay	35.7	0.2	58.2	13.9		38.2	28.8		62.9	14.8		
Queue Delay	41.7	0.0	0.0	0.0		0.0	0.0		0.0	0.0		
Total Delay	77.4	0.2	58.2	13.9		38.2	28.8		62.9	14.8		
LOS	E	A	E	B		D	C		E	B		
Approach Delay	76.2			16.6		31.0			54.0			
Approach LOS	E			B		C			D			
Queue Length 50th (m)	177.5	0.0	6.1	55.3		4.3	0.8		69.8	6.2		
Queue Length 95th (m)	244.0	0.0	#28.5	81.6		11.1	17.2		#103.0	22.9		
Internal Link Dist (m)	140.3			48.9		57.9			91.7			
Turn Bay Length (m)			20.0						15.0			
Base Capacity (vph)	1736	429	90	2023		105	184		657	471		
Starvation Cap Reductn	416	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	1.09	0.05	0.58	0.40		0.21	0.38		0.76	0.24		

Intersection Summary

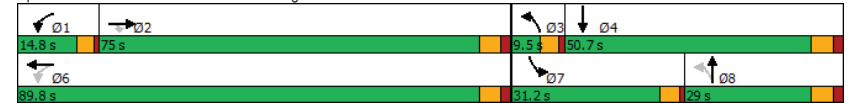
Area Type: CBD
 Cycle Length: 150
 Actuated Cycle Length: 133.7
 Natural Cycle: 120
 Control Type: Semi Act-Uncoord
 Maximum v/c Ratio: 0.86
 Intersection Signal Delay: 53.3
 Intersection LOS: D

Lanes, Volumes, Timings
13: GO Bus Terminal/Argus Rd & Cross Ave

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Intersection Capacity Utilization 72.3%
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 13: GO Bus Terminal/Argus Rd & Cross Ave



HCM Signalized Intersection Capacity Analysis
13: GO Bus Terminal/Argus Rd & Cross Ave

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↑	↑	↑↑		↑	↑		↑↑	↑	↑
Traffic Volume (vph)	0	1318	21	48	590	161	20	3	61	462	26	78
Future Volume (vph)	0	1318	21	48	590	161	20	3	61	462	26	78
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)	4.0	4.0	4.0	4.0	2.5	4.0	2.5	4.0				
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00	0.97	1.00				
Frbp, ped/bikes	1.00	0.97	1.00	0.99	1.00	0.96	1.00	0.98				
Ftbp, ped/bikes	1.00	1.00	1.00	1.00	0.99	1.00	1.00	1.00				
Frt	1.00	0.85	1.00	0.97	1.00	0.86	1.00	0.89				
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00				
Satd. Flow (prot)	3249	704	797	3113	776	700	3046	1186				
Flt Permitted	1.00	1.00	0.06	1.00	0.68	1.00	0.95	1.00				
Satd. Flow (perm)	3249	704	49	3113	559	700	3046	1186				
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	1433	23	52	641	175	22	3	66	502	28	85
RTOR Reduction (vph)	0	0	11	0	15	0	58	0	0	61	0	0
Lane Group Flow (vph)	0	1433	12	52	801	0	22	11	0	502	52	0
Confl. Peds. (#/hr)	9		4	4		9	12		20	20		12
Heavy Vehicles (%)	0%	0%	100%	97%	0%	0%	100%	100%	100%	0%	100%	0%
Turn Type	NA	Perm	pm+pt	NA	pm+pt	NA	Prot	NA				
Protected Phases	2		1	6	3	8	7	4				
Permitted Phases		2	6		8							
Actuated Green, G (s)	66.4	66.4	79.9	79.9	16.9	14.0	25.2	36.3				
Effective Green, g (s)	68.4	68.4	79.9	81.9	20.9	16.0	27.2	38.3				
Actuated g/C Ratio	0.50	0.50	0.59	0.60	0.15	0.12	0.20	0.28				
Clearance Time (s)	6.0	6.0	4.0	6.0	4.5	6.0	4.5	6.0				
Vehicle Extension (s)	5.0	5.0	2.5	5.0	3.0	4.0	3.0	4.0				
Lane Grp Cap (vph)	1638	355	81	1880	94	82	610	334				
v/s Ratio Prot	c0.44		c0.04	0.26	0.01	0.02	c0.16	0.04				
v/s Ratio Perm		0.02	0.34		c0.03							
v/c Ratio	0.87	0.03	0.64	0.43	0.23	0.13	0.82	0.16				
Uniform Delay, d1	29.8	16.9	27.3	14.3	49.9	53.6	51.9	36.5				
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00				
Incremental Delay, d2	6.0	0.1	14.3	0.3	1.3	1.0	8.8	0.3				
Delay (s)	35.8	17.0	41.6	14.6	51.2	54.6	60.7	36.8				
Level of Service	D	B	D	B	D	D	E	D				
Approach Delay (s)	35.5		16.3		53.8		56.3					
Approach LOS	D		B		D		E					

Intersection Summary			
HCM 2000 Control Delay	34.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	135.6	Sum of lost time (s)	14.5
Intersection Capacity Utilization	72.3%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
14: Lyons Lane/Street A & Cross Ave

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑	↑	↑	↑↑		↑	↑		↑↑	↑	↑
Traffic Volume (vph)	62	267	17	19	439	26	308	6	208	42	3	123
Future Volume (vph)	62	267	17	19	439	26	308	6	208	42	3	123
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6
Storage Length (m)	0.0	0.0	25.0	0.0	20.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Storage Lanes	1	0	1	0	1	0	1	0	1	0	1	0
Taper Length (m)	7.5		7.5		7.5		7.5		7.5		7.5	
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00	1.00		1.00	1.00	0.98	1.00	0.98	1.00	0.99		
Frt	0.991			0.992		0.855		0.853				
Flt Protected	0.950		0.950		0.950		0.950		0.950			
Satd. Flow (prot)	1525	2914	0	1570	3073	0	1570	1438	0	1570	1412	0
Flt Permitted	0.428		0.564		0.507		0.613					
Satd. Flow (perm)	685	2914	0	931	3073	0	837	1438	0	1010	1412	0
Right Turn on Red		Yes		Yes		Yes			Yes			Yes
Satd. Flow (RTOR)		9		8		226		134				
Link Speed (k/h)		50		50		50		50				
Link Distance (m)		40.1		209.8		69.1		70.9				
Travel Time (s)		2.9		15.1		5.0		5.1				
Confl. Peds. (#/hr)	3		1	1		3	1		4	4		1
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
Heavy Vehicles (%)	3%	11%	0%	0%	5%	0%	0%	0%	0%	0%	0%	2%
Adj. Flow (vph)	67	290	18	21	477	28	335	7	226	46	3	134
Shared Lane Traffic (%)												
Lane Group Flow (vph)	67	308	0	21	505	0	335	233	0	46	137	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.3			3.3			3.3				3.3
Link Offset(m)		0.0			0.0			0.0				0.0
Crosswalk Width(m)		4.8			4.8			4.8				4.8
Two way Left Turn Lane												
Headway Factor	1.19	1.14	1.14	1.19	1.14	1.14	1.19	1.14	1.14	1.19	1.14	1.14
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

Lanes, Volumes, Timings
14: Lyons Lane/Street A & Cross Ave

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0				0.0
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases		2			6			3	8			4
Permitted Phases		2			6			8			4	
Detector Phase		2	2		6	6		3	8		4	4
Switch Phase												
Minimum Initial (s)	35.0	35.0		35.0	35.0		5.0	10.0		10.0	10.0	
Minimum Split (s)	41.0	41.0		41.0	41.0		9.5	28.0		28.0	28.0	
Total Split (s)	41.2	41.2		41.2	41.2		20.8	48.8		28.0	28.0	
Total Split (%)	45.8%	45.8%		45.8%	45.8%		23.1%	54.2%		31.1%	31.1%	
Maximum Green (s)	35.2	35.2		35.2	35.2		16.3	42.8		22.0	22.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		3.5	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		1.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0		0.0	-2.0		-2.0	-2.0		-2.0	-2.0	
Total Lost Time (s)	4.0	4.0		6.0	4.0		2.5	4.0		4.0	4.0	
Lead/Lag							Lead			Lag	Lag	
Lead-Lag Optimize?							Yes			Yes	Yes	
Vehicle Extension (s)	5.0	5.0		5.0	5.0		3.0	4.0		4.0	4.0	
Recall Mode	Min	Min		Min	Min		None	Min		Min	Min	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	15.0	15.0		15.0	15.0		15.0	15.0		15.0	15.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	37.0	37.0		35.0	37.0		34.1	32.5		13.1	13.1	
Actuated g/C Ratio	0.48	0.48		0.45	0.48		0.44	0.42		0.17	0.17	
v/c Ratio	0.20	0.22		0.05	0.34		0.64	0.32		0.27	0.39	
Control Delay	15.0	12.6		13.7	13.8		21.6	3.6		33.0	9.5	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	15.0	12.6		13.7	13.8		21.6	3.6		33.0	9.5	
LOS	B	B		B	B		C	A		C	A	
Approach Delay		13.0			13.8			14.2			15.4	
Approach LOS		B			B			B			B	
Queue Length 50th (m)	5.8	13.5		1.8	24.1		35.5	0.6		6.4	0.4	
Queue Length 95th (m)	15.3	23.7		6.3	39.0		57.9	12.7		16.1	14.9	
Internal Link Dist (m)		16.1			185.8			45.1			46.9	
Turn Bay Length (m)				25.0			20.0					
Base Capacity (vph)	328	1403		422	1478		540	926		312	529	
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	0.22		0.05	0.34		0.62	0.25		0.15	0.26	

Intersection Summary

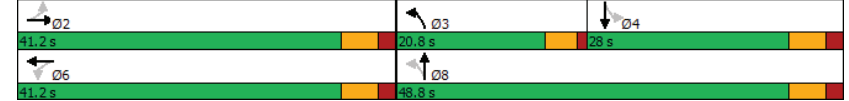
Area Type:	CBD
Cycle Length:	90
Actuated Cycle Length:	77.6
Natural Cycle:	80
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.64
Intersection Signal Delay:	13.9
Intersection LOS:	B

Lanes, Volumes, Timings
14: Lyons Lane/Street A & Cross Ave

ST 2038 PM.syn
04-03-2024

Intersection Capacity Utilization 95.3% ICU Level of Service F
Analysis Period (min) 15

Splits and Phases: 14: Lyons Lane/Street A & Cross Ave



HCM Signalized Intersection Capacity Analysis
14: Lyons Lane/Street A & Cross Ave

ST 2038 PM.syn
04-03-2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	62	267	17	19	439	26	308	6	208	42	3	123
Future Volume (vph)	62	267	17	19	439	26	308	6	208	42	3	123
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)	4.0	4.0		6.0	4.0		2.5	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frbp, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.98		1.00	0.99	
Fipb, 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	0.99		1.00	0.85		1.00	0.85	
Fit Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1521	2915		1569	3072		1570	1438		1566	1413	
Fit Permitted	0.43	1.00		0.56	1.00		0.51	1.00		0.61	1.00	
Satd. Flow (perm)	686	2915		931	3072		838	1438		1011	1413	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	67	290	18	21	477	28	335	7	226	46	3	134
RTOR Reduction (vph)	0	5	0	0	4	0	0	131	0	0	111	0
Lane Group Flow (vph)	67	303	0	21	501	0	335	102	0	46	26	0
Confl. Peds. (#/hr)	3		1	1		3	1		4	4		1
Heavy Vehicles (%)	3%	11%	0%	0%	5%	0%	0%	0%	0%	0%	0%	2%
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases		2			6		3	8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	35.1	35.1		35.1	35.1		30.6	30.6		11.2	11.2	
Effective Green, g (s)	37.1	37.1		35.1	37.1		32.6	32.6		13.2	13.2	
Actuated g/C Ratio	0.48	0.48		0.45	0.48		0.42	0.42		0.17	0.17	
Clearance Time (s)	6.0	6.0		6.0	6.0		4.5	6.0		6.0	6.0	
Vehicle Extension (s)	5.0	5.0		5.0	5.0		3.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	327	1391		420	1466		510	603		171	240	
v/s Ratio Prot		0.10			c0.16		c0.14	0.07			0.02	
v/s Ratio Perm	0.10			0.02			c0.13			0.05		
v/c Ratio	0.20	0.22		0.05	0.34		0.66	0.17		0.27	0.11	
Uniform Delay, d1	11.8	11.8		11.9	12.7		16.8	14.1		28.1	27.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.7	0.2		0.1	0.3		3.0	0.2		1.2	0.3	
Delay (s)	12.4	12.0		12.1	13.0		19.8	14.3		29.2	27.5	
Level of Service	B	B		B	B		B	B		C	C	
Approach Delay (s)		12.1			12.9			17.5			28.0	
Approach LOS		B			B			B			C	

Intersection Summary			
HCM 2000 Control Delay	16.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	77.7	Sum of lost time (s)	10.5
Intersection Capacity Utilization	95.3%	ICU Level of Service	F
Analysis Period (min)	15		

Lanes, Volumes, Timings
21: Argus Rd & Street 1

ST 2038 PM.syn
04-03-2024

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔	↕		↕	↕	↕
Traffic Volume (vph)	0	131	0	201	436	267
Future Volume (vph)	0	131	0	201	436	267
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850				0.850
Fit Protected						
Satd. Flow (prot)	1863	1583	0	1863	1863	1583
Fit Permitted						
Satd. Flow (perm)	1863	1583	0	1863	1863	1583
Link Speed (k/h)	50			50	50	
Link Distance (m)	165.4			115.7	65.0	
Travel Time (s)	11.9			8.3	4.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	142	0	218	474	290
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	142	0	218	474	290
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			6.6	6.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	

Intersection Summary	
Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	37.7%
Analysis Period (min)	15
	ICU Level of Service A

HCM Unsignalized Intersection Capacity Analysis
21: Argus Rd & Street 1

ST 2038 PM.syn
04-03-2024

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔	↔		↕	↕	↕
Traffic Volume (veh/h)	0	131	0	201	436	267
Future Volume (Veh/h)	0	131	0	201	436	267
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	142	0	218	474	290
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None	None		
Median storage (veh)						
Upstream signal (m)			116	243		
pX, platoon unblocked						
vC, conflicting volume	692	474	764			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	692	474	764			
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	76	100			
cM capacity (veh/h)	410	590	849			
Direction, Lane #	EB 1	EB 2	NB 1	SB 1	SB 2	
Volume Total	0	142	218	474	290	
Volume Left	0	0	0	0	0	
Volume Right	0	142	0	0	290	
cSH	1700	590	849	1700	1700	
Volume to Capacity	0.00	0.24	0.00	0.28	0.17	
Queue Length 95th (m)	0.0	7.5	0.0	0.0	0.0	
Control Delay (s)	0.0	13.0	0.0	0.0	0.0	
Lane LOS	A	B				
Approach Delay (s)	13.0		0.0	0.0		
Approach LOS	B					
Intersection Summary						
Average Delay			1.6			
Intersection Capacity Utilization			37.7%	ICU Level of Service	A	
Analysis Period (min)			15			

Lanes, Volumes, Timings
22: Street C & Street 1

ST 2038 PM.syn
04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↕	↕	↕	↕	↕	↕
Traffic Volume (vph)	0	131	33	113	154	0	83	120	0	0	222	0
Future Volume (vph)	0	131	33	113	154	0	83	120	0	0	222	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frnt	0.970											
Fit Protected	0.950											
Satd. Flow (prot)	1863	1807	0	1770	1863	0	0	1825	0	0	1863	0
Fit Permitted	0.645											
Satd. Flow (perm)	1863	1807	0	1201	1863	0	0	1479	0	0	1863	0
Right Turn on Red	Yes Yes Yes Yes											
Satd. Flow (RTOR)	24											
Link Speed (k/h)	50											
Link Distance (m)	83.7 165.4 132.8 164.3											
Travel Time (s)	6.0 11.9 9.6 11.8											
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
Adj. Flow (vph)	0	142	36	123	167	0	90	130	0	0	241	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	178	0	123	167	0	0	220	0	0	241	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)	3.6 3.6 3.6 3.6											
Link Offset(m)	0.0 0.0 0.0 0.0											
Crosswalk Width(m)	4.8 4.8 4.8 4.8											
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25 15 25 15 25 15 25 15											
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)	9.4 9.4 9.4 9.4											
Detector 2 Size(m)	0.6 0.6 0.6 0.6											
Detector 2 Type	Cl+Ex Cl+Ex Cl+Ex Cl+Ex											
Detector 2 Channel												
Detector 2 Extend (s)	0.0 0.0 0.0 0.0											
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	4 8 2 6											
Permitted Phases	4 4 8 8 2 2 6 6											
Detector Phase	4 4 8 8 2 2 6 6											
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	

Lanes, Volumes, Timings
22: Street C & Street 1

ST 2038 PM.syn
04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (s)	26.0	26.0		26.0	26.0		34.0	34.0		34.0	34.0	
Total Split (%)	43.3%	43.3%		43.3%	43.3%		56.7%	56.7%		56.7%	56.7%	
Maximum Green (s)	21.5	21.5		21.5	21.5		29.5	29.5		29.5	29.5	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Min	Min		Min	Min	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		8.3		8.4	8.4		13.7	13.7		13.7	13.7	
Actuated g/C Ratio	0.30			0.30	0.30		0.49	0.49		0.49	0.49	
v/c Ratio	0.32			0.34	0.30		0.30	0.26		0.26	0.26	
Control Delay	8.5			10.9	9.3		8.2	7.5		7.5	7.5	
Queue Delay	0.0			0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	8.5			10.9	9.3		8.2	7.5		7.5	7.5	
LOS	A			B	A		A	A		A	A	
Approach Delay	8.5			10.0			8.2	7.5		7.5		
Approach LOS	A			B			A	A		A		
Queue Length 50th (m)	4.6			3.7	5.0		6.4	6.8		6.8		
Queue Length 95th (m)	15.0			13.1	15.5		18.8	19.1		19.1		
Internal Link Dist (m)	59.7			141.4			108.8	140.3		140.3		
Turn Bay Length (m)												
Base Capacity (vph)	1420			940	1459		1430	1802		1802		
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	0.13			0.13	0.11		0.15	0.13		0.13	0.13	

Intersection Summary

Area Type:	Other
Cycle Length:	60
Actuated Cycle Length:	28
Natural Cycle:	45
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.34
Intersection Signal Delay:	8.7
Intersection Capacity Utilization:	52.8%
Intersection LOS:	A
ICU Level of Service:	A
Analysis Period (min):	15

Splits and Phases: 22: Street C & Street 1



HCM Signalized Intersection Capacity Analysis
22: Street C & Street 1

ST 2038 PM.syn
04-03-2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	131	33	113	154	0	83	120	0	0	222	0
Future Volume (vph)	0	131	33	113	154	0	83	120	0	0	222	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lane Util. Factor		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Fr't		0.97		1.00	1.00		1.00	1.00		1.00	1.00	
Fit Protected		1.00		0.95	1.00		0.98	1.00		1.00	1.00	
Satd. Flow (prot)		1806		1770	1863		1825	1863		1863	1863	
Fit Permitted		1.00		0.64	1.00		0.79	1.00		1.00	1.00	
Satd. Flow (perm)		1806		1201	1863		1480	1863		1863	1863	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	142	36	123	167	0	90	130	0	0	241	0
RTOR Reduction (vph)	0	18	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	160	0	123	167	0	220	0	0	241	0	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		NA	NA	
Protected Phases		4			8		2	2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		7.1		7.1	7.1		12.7	12.7		12.7	12.7	
Effective Green, g (s)		7.1		7.1	7.1		12.7	12.7		12.7	12.7	
Actuated g/C Ratio		0.25		0.25	0.25		0.44	0.44		0.44	0.44	
Clearance Time (s)		4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		445		296	459		652	821		821	821	
v/s Ratio Prot		0.09			0.09						0.13	
v/s Ratio Perm				c0.10			c0.15					
v/c Ratio		0.36		0.42	0.36		0.34	0.29		0.29	0.29	
Uniform Delay, d1		9.0		9.1	9.0		5.3	5.2		5.2	5.2	
Progression Factor		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.5		0.9	0.5		0.3	0.2		0.2	0.2	
Delay (s)		9.5		10.1	9.5		5.6	5.4		5.4	5.4	
Level of Service		A		B	A		A	A		A	A	
Approach Delay (s)		9.5			9.7		5.6	5.4		5.4	5.4	
Approach LOS		A			A		A	A		A	A	

Intersection Summary

HCM 2000 Control Delay	7.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.37		
Actuated Cycle Length (s)	28.8	Sum of lost time (s)	9.0
Intersection Capacity Utilization	52.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
23: GO Station West Access/Street C & Cross Ave

ST 2038 PM.syn
04-03-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	72	598	58	206	351	131	99	0	491	229	113	25
Future Volume (vph)	72	598	58	206	351	131	99	0	491	229	113	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.0	0.0	0.0
Storage Lanes	1	1	2	0	1	0	1	0	1	0	1	0
Taper Length (m)	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850		0.959		0.850		0.973				
Flt Protected	0.950		0.950		0.950		0.950		0.950			
Satd. Flow (prot)	1770	1863	1583	3433	1786	0	1770	1583	0	1770	1812	0
Flt Permitted	0.950		0.950		0.662		0.159					
Satd. Flow (perm)	1770	1863	1583	3433	1786	0	1233	1583	0	296	1812	0
Right Turn on Red		Yes		Yes		Yes		Yes		Yes		Yes
Satd. Flow (RTOR)		145		23		245		14				
Link Speed (k/h)	50		50		50		50		50		50	
Link Distance (m)	209.8		164.3		55.1		132.8					
Travel Time (s)	15.1		11.8		4.0		9.6					
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
Adj. Flow (vph)	78	650	63	224	382	142	108	0	534	249	123	27
Shared Lane Traffic (%)												
Lane Group Flow (vph)	78	650	63	224	524	0	108	534	0	249	150	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)	7.2		7.2		3.6		3.6		3.6		3.6	
Link Offset(m)	0.0		0.0		0.0		0.0		0.0		0.0	
Crosswalk Width(m)	4.8		4.8		4.8		4.8		4.8		4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25	15	25	15	25	15	25	15	25	15
Number of Detectors	1	2	1	1	2	1	2	1	2	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Left	Thru	Left	Thru	Left	Thru	Right
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0	2.0	10.0	2.0	10.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6	2.0	0.6	2.0	0.6	2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)	9.4		9.4		9.4		9.4		9.4		9.4	
Detector 2 Size(m)	0.6		0.6		0.6		0.6		0.6		0.6	
Detector 2 Type	Cl+Ex		Cl+Ex		Cl+Ex		Cl+Ex		Cl+Ex		Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)	0.0		0.0		0.0		0.0		0.0		0.0	
Turn Type	Prot	NA	Perm	Prot	NA	Perm	NA	pm+pt	NA		NA	
Protected Phases	7	4		3	8		2		1		6	
Permitted Phases			4				2			6		

Lanes, Volumes, Timings
23: GO Station West Access/Street C & Cross Ave

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4	4	3	8		2	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	24.0	24.0	9.5	24.0		24.0	24.0		9.5	24.0	
Total Split (s)	11.6	38.0	38.0	11.4	37.8		27.6	27.6		13.0	40.6	
Total Split (%)	12.9%	42.2%	42.2%	12.7%	42.0%		30.7%	30.7%		14.4%	45.1%	
Maximum Green (s)	7.1	32.0	32.0	6.9	31.8		21.6	21.6		8.5	34.6	
Yellow Time (s)	3.5	4.0	4.0	3.5	4.0		4.0	4.0		3.5	4.0	
All-Red Time (s)	1.0	2.0	2.0	1.0	2.0		2.0	2.0		1.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	6.0	6.0	4.5	6.0		6.0	6.0		4.5	6.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lag	Lag		Lead	Lead	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None		C-Max	C-Max		None	C-Max	
Walk Time (s)		7.0	7.0		7.0		7.0	7.0			7.0	
Flash Dont Walk (s)		11.0	11.0		11.0		11.0	11.0			11.0	
Pedestrian Calls (#/hr)		0	0		0		0	0			0	
Act Effct Green (s)	6.9	32.0	32.0	6.9	34.1		21.6	21.6		36.1	34.6	
Actuated g/C Ratio	0.08	0.36	0.36	0.08	0.38		0.24	0.24		0.40	0.38	
v/c Ratio	0.58	0.98	0.10	0.85	0.76		0.37	0.94		0.97	0.21	
Control Delay	58.1	61.3	0.3	70.4	33.0		32.8	46.0		72.9	17.8	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	58.1	61.3	0.3	70.4	33.0		32.8	46.0		72.9	17.8	
LOS	E	E	A	E	C		C	D		E	B	
Approach Delay		56.1			44.2			43.8			52.2	
Approach LOS		E			D			D			D	
Queue Length 50th (m)	14.0	115.4	0.0	21.1	81.9		16.4	55.6		30.9	16.2	
Queue Length 95th (m)	#31.8	#188.5	0.0	#41.4	#136.2		31.9	#122.2		#75.8	29.7	
Internal Link Dist (m)		185.8			140.3			31.1			108.8	
Turn Bay Length (m)											15.0	
Base Capacity (vph)	139	662	656	263	691		295	566		257	705	
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	
Reduced v/c Ratio	0.56	0.98	0.10	0.85	0.76		0.37	0.94		0.97	0.21	

Intersection Summary

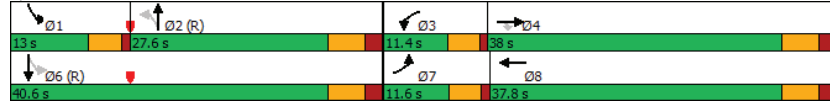
Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 0 (0%), Referenced to phase 2:NBL and 6:SBTL, Start of Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.98
 Intersection Signal Delay: 49.0
 Intersection LOS: D
 Intersection Capacity Utilization 97.9%
 ICU Level of Service F
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.

Lanes, Volumes, Timings
23: GO Station West Access/Street C & Cross Ave

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Queue shown is maximum after two cycles.

Splits and Phases: 23: GO Station West Access/Street C & Cross Ave



HCM Signalized Intersection Capacity Analysis
23: GO Station West Access/Street C & Cross Ave

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	72	598	58	206	351	131	99	0	491	229	113	25
Future Volume (vph)	72	598	58	206	351	131	99	0	491	229	113	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	6.0	6.0	4.5	6.0		6.0	6.0		4.5	6.0	
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.96		1.00	0.85		1.00	0.97	
Fit Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1863	1583	3433	1787		1770	1583		1770	1812	
Fit Permitted	0.95	1.00	1.00	0.95	1.00		0.66	1.00		0.16	1.00	
Satd. Flow (perm)	1770	1863	1583	3433	1787		1232	1583		296	1812	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	78	650	63	224	382	142	108	0	534	249	123	27
RTOR Reduction (vph)	0	0	40	0	14	0	0	189	0	0	9	0
Lane Group Flow (vph)	78	650	23	224	510	0	108	345	0	249	141	0
Turn Type	Prot	NA	Perm	Prot	NA		Perm	NA		pm+pt	NA	
Protected Phases	7	4		3	8			2		1	6	
Permitted Phases			4				2			6		
Actuated Green, G (s)	5.7	32.9	32.9	6.9	34.1		20.7	20.7		33.7	33.7	
Effective Green, g (s)	5.7	32.9	32.9	6.9	34.1		20.7	20.7		33.7	33.7	
Actuated g/C Ratio	0.06	0.37	0.37	0.08	0.38		0.23	0.23		0.37	0.37	
Clearance Time (s)	4.5	6.0	6.0	4.5	6.0		6.0	6.0		4.5	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	112	681	578	263	677		283	364		250	678	
v/s Ratio Prot	0.04	c0.35		c0.07	0.29			0.22		c0.09	0.08	
v/s Ratio Perm			0.01				0.09			c0.28		
v/c Ratio	0.70	0.95	0.04	0.85	0.75		0.38	0.95		1.00	0.21	
Uniform Delay, d1	41.3	27.8	18.4	41.0	24.3		29.2	34.1		24.6	19.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	17.2	23.7	0.0	22.4	4.7		3.9	35.8		55.5	0.7	
Delay (s)	58.5	51.5	18.4	63.4	29.0		33.1	70.0		80.0	19.8	
Level of Service	E	D	B	E	C		C	E		F	B	
Approach Delay (s)		49.5			39.3			63.8			57.4	
Approach LOS		D			D			E			E	
Intersection Summary												
HCM 2000 Control Delay			51.3				HCM 2000 Level of Service				D	
HCM 2000 Volume to Capacity ratio			1.00									
Actuated Cycle Length (s)			90.0			Sum of lost time (s)				21.0		
Intersection Capacity Utilization			97.9%			ICU Level of Service				F		
Analysis Period (min)			15									

c Critical Lane Group

Appendix I

Synchro Interim Analysis



Lanes, Volumes, Timings
11: Argus Rd & South Service Road

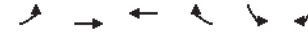
IT 2033 AM.syn
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Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕	↕	↕	↕
Traffic Volume (vph)	15	76	806	232	84	265
Future Volume (vph)	15	76	806	232	84	265
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	30.0			0.0	0.0	0.0
Storage Lanes	0			1	1	0
Taper Length (m)	7.5				7.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor				0.98	0.99	
Frt				0.850	0.897	
Flt Protected		0.992			0.988	
Satd. Flow (prot)	0	1623	1845	1615	1667	0
Flt Permitted		0.824			0.988	
Satd. Flow (perm)	0	1348	1845	1579	1662	0
Right Turn on Red				Yes	Yes	
Satd. Flow (RTOR)				252	162	
Link Speed (k/h)		50	50		50	
Link Distance (m)		184.1	139.4		100.5	
Travel Time (s)		13.3	10.0		7.2	
Confl. Peds. (#/hr)	1			1	5	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	100%	0%	3%	0%	0%	0%
Adj. Flow (vph)	16	83	876	252	91	288
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	99	876	252	379	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25			15	25	15
Number of Detectors	1	2	2	1	1	
Detector Template	Left	Thru	Thru	Right	Left	
Leading Detector (m)	2.0	10.0	10.0	2.0	2.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	2.0	0.6	0.6	2.0	2.0	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		9.4	9.4			
Detector 2 Size(m)		0.6	0.6			
Detector 2 Type		Cl+Ex	Cl+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			

Lanes, Volumes, Timings
11: Argus Rd & South Service Road

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Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Turn Type	Perm	NA	NA	Perm	Perm	
Protected Phases		4	8			
Permitted Phases	4			8	6	
Detector Phase	4	4	8	8	6	
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	22.5	22.5	22.5	22.5	22.5	
Total Split (s)	66.0	66.0	66.0	66.0	24.0	
Total Split (%)	73.3%	73.3%	73.3%	73.3%	26.7%	
Maximum Green (s)	61.5	61.5	61.5	61.5	19.5	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)		0.0	0.0	0.0	0.0	
Total Lost Time (s)		4.5	4.5	4.5	4.5	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None	None	None	Max	
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0	
Pedestrian Calls (#/hr)	0	0	0	0	0	
Act Effct Green (s)		37.0	37.0	37.0	20.1	
Actuated g/C Ratio		0.56	0.56	0.56	0.30	
v/c Ratio		0.13	0.85	0.25	0.62	
Control Delay		6.5	20.9	1.5	18.9	
Queue Delay		0.0	0.0	0.0	0.0	
Total Delay		6.5	20.9	1.5	18.9	
LOS		A	C	A	B	
Approach Delay		6.5	16.5		18.9	
Approach LOS		A	B		B	
Queue Length 50th (m)		5.4	83.4	0.0	21.4	
Queue Length 95th (m)		10.8	127.9	6.9	#77.6	
Internal Link Dist (m)		160.1	115.4		76.5	
Turn Bay Length (m)						
Base Capacity (vph)		1221	1672	1454	616	
Starvation Cap Reductn		0	0	0	0	
Spillback Cap Reductn		0	0	0	0	
Storage Cap Reductn		0	0	0	0	
Reduced v/c Ratio		0.08	0.52	0.17	0.62	

Intersection Summary

Area Type:	Other
Cycle Length:	90
Actuated Cycle Length:	66.4
Natural Cycle:	60
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.85
Intersection Signal Delay:	16.5
Intersection Capacity Utilization:	71.0%
Intersection LOS:	B
ICU Level of Service:	C

Lanes, Volumes, Timings
11: Argus Rd & South Service Road

IT 2033 AM.syn
04-03-2024

Analysis Period (min) 15

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

Splits and Phases: 11: Argus Rd & South Service Road



HCM Signalized Intersection Capacity Analysis
11: Argus Rd & South Service Road

IT 2033 AM.syn
04-03-2024



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕	↕	↕	↕
Traffic Volume (vph)	15	76	806	232	84	265
Future Volume (vph)	15	76	806	232	84	265
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5	4.5	4.5	4.5	
Lane Util. Factor		1.00	1.00	1.00	1.00	
Frpb, ped/bikes		1.00	1.00	0.98	0.99	
Flpb, ped/bikes		1.00	1.00	1.00	1.00	
Frt		1.00	1.00	0.85	0.90	
Flt Protected		0.99	1.00	1.00	0.99	
Satd. Flow (prot)		1623	1845	1580	1664	
Flt Permitted		0.82	1.00	1.00	0.99	
Satd. Flow (perm)		1347	1845	1580	1664	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	16	83	876	252	91	288
RTOR Reduction (vph)	0	0	0	111	113	0
Lane Group Flow (vph)	0	99	876	141	266	0
Confl. Peds. (#/hr)		1		1	5	1
Heavy Vehicles (%)	100%	0%	3%	0%	0%	0%
Turn Type	Perm	NA	NA	Perm	Perm	
Protected Phases		4	8			
Permitted Phases	4			8	6	
Actuated Green, G (s)		37.0	37.0	37.0	20.1	
Effective Green, g (s)		37.0	37.0	37.0	20.1	
Actuated g/C Ratio		0.56	0.56	0.56	0.30	
Clearance Time (s)		4.5	4.5	4.5	4.5	
Vehicle Extension (s)		3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		753	1032	884	505	
v/s Ratio Prot			c0.47			
v/s Ratio Perm		0.07		0.09	c0.16	
v/c Ratio		0.13	0.85	0.16	0.53	
Uniform Delay, d1		6.9	12.2	7.0	19.1	
Progression Factor		1.00	1.00	1.00	1.00	
Incremental Delay, d2		0.1	6.6	0.1	3.9	
Delay (s)		7.0	18.8	7.1	23.0	
Level of Service		A	B	A	C	
Approach Delay (s)		7.0	16.2		23.0	
Approach LOS		A	B		C	

Intersection Summary			
HCM 2000 Control Delay	17.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	66.1	Sum of lost time (s)	9.0
Intersection Capacity Utilization	71.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
11: Argus Rd & South Service Rd

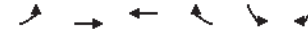
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Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕	↕	↕	↕
Traffic Volume (vph)	44	36	625	358	54	154
Future Volume (vph)	44	36	625	358	54	154
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor					1.00	
Frt			0.850	0.900		
Flt Protected		0.973			0.987	
Satd. Flow (prot)	0	1572	1555	1454	1519	0
Flt Permitted		0.689			0.987	
Satd. Flow (perm)	0	1113	1555	1454	1516	0
Right Turn on Red			Yes	Yes	Yes	
Satd. Flow (RTOR)			389	167		
Link Speed (k/h)		50	50		50	
Link Distance (m)		177.7	145.7		103.5	
Travel Time (s)		12.8	10.5		7.5	
Confl. Peds. (#/hr)					5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	13%	10%	0%	0%	0%
Adj. Flow (vph)	48	39	679	389	59	167
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	87	679	389	226	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (k/h)	24			14	24	14
Number of Detectors	1	2	2	1	1	
Detector Template	Left	Thru	Thru	Right	Left	
Leading Detector (m)	2.0	10.0	10.0	2.0	2.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	2.0	0.6	0.6	2.0	2.0	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		9.4	9.4			
Detector 2 Size(m)		0.6	0.6			
Detector 2 Type		Cl+Ex	Cl+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type	Perm	NA	NA	Perm	Perm	
Protected Phases		4	8			
Permitted Phases	4			8	6	

Lanes, Volumes, Timings
11: Argus Rd & South Service Rd

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Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Detector Phase	4	4	8	8	6	
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	22.5	22.5	22.5	22.5	22.5	
Total Split (s)	37.0	37.0	37.0	37.0	23.0	
Total Split (%)	61.7%	61.7%	61.7%	61.7%	38.3%	
Maximum Green (s)	32.5	32.5	32.5	32.5	18.5	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)		0.0	0.0	0.0	0.0	
Total Lost Time (s)		4.5	4.5	4.5	4.5	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None	None	None	Min	
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0	
Pedestrian Calls (#/hr)	0	0	0	0	0	
Act Effct Green (s)		23.3	23.3	23.3	8.2	
Actuated g/C Ratio		0.57	0.57	0.57	0.20	
v/c Ratio		0.14	0.77	0.39	0.52	
Control Delay		4.9	14.4	1.9	10.9	
Queue Delay		0.0	0.0	0.0	0.0	
Total Delay		4.9	14.4	1.9	10.9	
LOS		A	B	A	B	
Approach Delay		4.9	9.8		10.9	
Approach LOS		A	A		B	
Queue Length 50th (m)		2.2	28.3	0.0	3.7	
Queue Length 95th (m)		8.4	#84.4	8.4	19.9	
Internal Link Dist (m)		153.7	121.7		79.5	
Turn Bay Length (m)						
Base Capacity (vph)		899	1256	1249	816	
Starvation Cap Reductn		0	0	0	0	
Spillback Cap Reductn		0	0	0	0	
Storage Cap Reductn		0	0	0	0	
Reduced v/c Ratio		0.10	0.54	0.31	0.28	

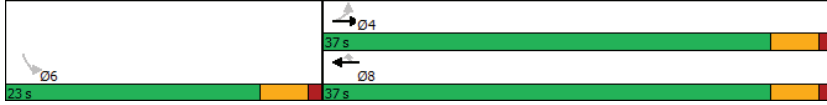
Intersection Summary

Area Type: CBD
 Cycle Length: 60
 Actuated Cycle Length: 41.1
 Natural Cycle: 60
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.77
 Intersection Signal Delay: 9.7
 Intersection Capacity Utilization 66.5%
 Analysis Period (min) 15
 Intersection LOS: A
 ICU Level of Service C
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Lanes, Volumes, Timings
11: Argus Rd & South Service Rd

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Splits and Phases: 11: Argus Rd & South Service Rd



HCM Signalized Intersection Capacity Analysis
11: Argus Rd & South Service Rd

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Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕	↕	↕	↕
Traffic Volume (vph)	44	36	625	358	54	154
Future Volume (vph)	44	36	625	358	54	154
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5	4.5	4.5	4.5	
Lane Util. Factor		1.00	1.00	1.00	1.00	
Frbp, ped/bikes		1.00	1.00	1.00	1.00	
Flpb, ped/bikes		1.00	1.00	1.00	1.00	
Frt		1.00	1.00	0.85	0.90	
Flt Protected		0.97	1.00	1.00	0.99	
Satd. Flow (prot)		1572	1555	1454	1517	
Flt Permitted		0.69	1.00	1.00	0.99	
Satd. Flow (perm)		1113	1555	1454	1517	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	48	39	679	389	59	167
RTOR Reduction (vph)	0	0	0	165	133	0
Lane Group Flow (vph)	0	87	679	224	93	0
Confl. Peds. (#/hr)					5	
Heavy Vehicles (%)	0%	13%	10%	0%	0%	0%
Turn Type	Perm	NA	NA	Perm	Perm	
Protected Phases		4	8			
Permitted Phases	4			8	6	
Actuated Green, G (s)		23.3	23.3	23.3	8.2	
Effective Green, g (s)		23.3	23.3	23.3	8.2	
Actuated g/C Ratio		0.58	0.58	0.58	0.20	
Clearance Time (s)		4.5	4.5	4.5	4.5	
Vehicle Extension (s)		3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		640	894	836	307	
v/s Ratio Prot			c0.44			
v/s Ratio Perm		0.08		0.15	c0.06	
v/c Ratio		0.14	0.76	0.27	0.30	
Uniform Delay, d1		4.0	6.5	4.3	13.7	
Progression Factor		1.00	1.00	1.00	1.00	
Incremental Delay, d2		0.1	3.7	0.2	0.6	
Delay (s)		4.1	10.2	4.5	14.3	
Level of Service		A	B	A	B	
Approach Delay (s)		4.1	8.1		14.3	
Approach LOS		A	A		B	

Intersection Summary			
HCM 2000 Control Delay	8.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	40.5	Sum of lost time (s)	9.0
Intersection Capacity Utilization	66.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group