



# 157 & 167 Cross Avenue, Oakville Transportation Impact Study

Paradigm Transportation Solutions Limited  
BA Consulting Group Ltd

2024-03  
230490



# Project Summary



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## 157 & 167 Cross Avenue, Oakville Transportation Impact Study

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# Executive Summary

## Content

Paradigm Transportation Solutions Limited (Paradigm) was retained in collaboration with BA Consulting Group Ltd. to conduct this Transportation Impact Study (TIS) for a mixed-use development located at 157 & 167 Cross Avenue in Oakville, Ontario.

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 any improvements required to mitigate the identified effects of the site-generated traffic.

The development proposal for the site envisions two towers with proposed heights of 45 and 61 storeys. The development proposes approximately 2,693 m<sup>2</sup> (28,958 sq.ft.) of rentable retail space, 1,027 m<sup>2</sup> (11,056 sq.ft.) of office space and 1,198 residential units with 819 parking spaces and 1,204 bicycle parking spaces. Vehicle access will be provided through two driveway connections to a new east-west municipal roadway (Street 1) and a north-south municipal road (Street C). It is assumed that the site will be developed in a single phase.

## Conclusions

### Proposed Development

The existing commercial office buildings will be demolished and redeveloped. The proposed site comprises 1,198 residential units, 2,693 m<sup>2</sup> of retail GFA, and 1,027 m<sup>2</sup> of office GFA located within two buildings.

On-site public realm improvements, including a privately open publicly accessible space (POPS) connection through the site, will be provided. Sidewalks will be provided along the perimeter of the site, providing convenient access to / from all areas and components of the development.

Two vehicular access points to / from the site will be provided via site driveway onto Street 1 (north side of the site) and Street C (east side of the site). Both driveways will provide access to the parking ramp connecting to / from the proposed seven levelled underground parking garage. The Street 1 driveway will provide access to the at-grade consolidated loading facilities. Access to the bicycle parking is provided via the building elevators.



## 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 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."*



## 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 1,404 spaces (984 residential, 240 visitor, and 180 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 819 total parking spaces to meet the needs of the Project. This includes 599 resident parking spaces (effective parking supply of 0.50 parking spaces per unit), 180 residential visitor parking spaces (effective ratio of 0.15 parking spaces per unit), and 40 parking spaces for the retail and day care use (1.08 parking spaces per 100 m<sup>2</sup>)

Access to the underground parking facility is proposed from driveways off Street 1 and Street C.

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 four spaces including 1 refuse collection loading space, 2 full-sized loading spaces, and 1 smaller size loading space are proposed to service the site.

Access to the consolidated loading area is proposed from the driveway off Street 1. The loading area will serve as the consolidated garbage pick up location for both Towers and has 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 1,204 bicycle parking spaces (904 long-term and 300 short-term bicycle parking spaces).

The site proposes 1,204 bicycle parking spaces, including 300 short-term spaces and 904 long-term spaces, which meets the minimum requirements specified under Zoning By-law 2014-014.

All bicycle parking is located on the ground level, mezzanine level, and level 2 of the site. Long-term bicycle parking are located within a secure, weather-protected facility.

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

## **Trip Generation**

The proposed development will generate approximately 340 new vehicle trips during the weekday AM peak hour and 401 new vehicle trips during the weekday PM peak hour.

Detailed traffic analysis was conducted for each study area intersection under Base conditions, 2027 (Full Build-Out), 2032 (5 years after Full Build-Out), and 2037 (10 years after Full Build-Out) 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 Strategy<sup>1</sup> 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."*

*"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.

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<sup>1</sup> Oakville Urban Mobility & Transportation Strategy, Steer, November 2021



## Argus Road at South Service Road

The intersection of Argus Road and South Service Road East currently operates efficiently during peak weekday hours, with individual movements performing at a level of service (LOS) C or better. Based on traffic projections for 2027, similar operations are expected. However, by 2032, the southbound approach is forecasted to operate at LOS F, with a v/c ratio exceeding 1.00. By 2037, significant delays are projected for the southbound approach due to high volumes of east-west traffic along Argus Road, which will leave limited gaps for the southbound stop-controlled movements.

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

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

## Argus Road at Cross Avenue

The intersection at Cross Avenue and Argus Road is currently functioning at an acceptable level of service during peak hours on weekdays, with most movements operating at LOS C or better. However, future projections show that the southbound shared through/right turn will operate at LOS D with a v/c ratio of 0.89 under the 2027 Background conditions and under the 2032 Background conditions, the southbound left turn and shared through right turn will operate at LOS F with a v/c ratio exceeding 1.00.

The implementation of the local road network in the study area (2037 Background Horizon) should alleviate some congestion at the intersection by providing alternative routing options. As a result, the southbound through/right turn movement is no longer considered a critical movement. However, the southbound left turn is still projected to operate at LOS F with a v/c ratio exceeding 1.00, and the eastbound shared through/right turn movement is projected to operate at LOS D with a v/c ratio of 0.99 under the 2037 Background conditions.





Regarding development traffic implications, the eastbound shared through/right turn movement is projected to operate at LOS C with a v/c ratio of 0.86, slightly exceeding the critical threshold point under the 2032 Total scenario.

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 peak hours on weekdays, the individual movements at the signalized intersection of Cross Avenue and Lyons Lane are currently operating at LOS C or better. However, it is expected that the northbound left-turn operations will deteriorate from LOS C to LOS D with a v/c ratio of 0.89 by 2037 Background conditions.

Total traffic conditions are expected to be similar to Background conditions, with only a minor increase in delay due to site-generated traffic volumes.

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 signalized intersection at Cross Avenue and GO Station West Access currently operates well, with individual movements running at LOS B, except for the westbound approach that operates at LOS F due to the high volume of left-turning traffic during the weekday AM peak hour. This creates a v/c ratio exceeding 1.00, causing increased delay for this approach, which is projected to continue under the 2027 Background horizon.

As for the 2032 Background horizon, the north leg of the intersection will be operational, but the westbound approach is still expected to operate at LOS F with a v/c ratio exceeding 1.00. Moreover, the



southbound left-turn movement is projected to operate at LOS F with a v/c ratio exceeding 1.00 under the 2037 Background horizon.

With the addition of site-generated traffic, the southbound left-turn movement under the 2037 Total conditions is expected to experience increased delay.

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

Additionally, an interim solution is also expected to be required. The Midtown EA Street network configuration contemplates the realignment of the GO Driveway on the south side of Cross Avenue from its current location towards the east, opposite the Applicant's eastern property limit where it will form a four-legged signalized intersection. This realignment results from the planned introduction of a new north-south local roadway (Street C) running along the parcel fabric to supply access to Midtown.

After reviewing various options, it is recommended that the intersection operates as a four-legged offset arrangement with split phasing for the north and south approaches and eastbound left turns prohibited for the interim.

It is also suggested that an additional access point to the GO Station be provided through an existing connection approximately 110 meters west of the main access. This connection could operate flexibly, with one-way inbound traffic for the morning peak hour and one-way outbound traffic for the afternoon peak hour, providing additional access points to the GO Station and reducing demand on the main entrance. An alternative solution if the secondary access point is not pursued is to repurpose westbound lanes to have a double left turn lane with protected phasing and a westbound shared through/right turn lane.



## Street C at Street 1

The westbound movement at the intersection of Street C and Street 1 is forecast to operate at LOS D in the 2037 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.

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

## Recommendations

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

- ▶ The Applicant be responsible for costs related to constructing a new private driveway connection to Cross Avenue during the interim conditions (i.e., before adjacent properties to the east and north of the Site are constructed).
- ▶ The Applicant be responsible for costs related to upgrading the traffic control signal at Cross Avenue and the GO Station Driveway to accommodate the north leg operating as a private driveway.
- ▶ 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

Paradigm Transportation Solutions Limited (Paradigm) was retained in collaboration with BA Consulting Group Ltd. to conduct this Transportation Impact Study (TIS) for the mixed-use development located at 157 and 167 Cross Avenue in the Town of Oakville, Ontario. **Figure 1.1** details the location of the subject development.

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 any improvements required to mitigate the identified effects of the site-generated traffic.

More specifically, the scope of this study is to:

- ▶ Review and identify potential Transportation Demand Management (TDM) measures that can be implemented for the proposed development;
- ▶ Review of the proposed vehicle, loading, and bicycle parking supply and its adequacy compared to estimated parking demands;
- ▶ Review of the proposed Site Plan concerning vehicular Site access and circulation, vehicular and cycling parking layout, and the service vehicle loading provisions of the Project;
- ▶ Forecast traffic from the proposed development;
- ▶ Assign the projected volumes to the surrounding road network based on the existing traffic patterns at the driveway connections;
- ▶ Assess total future traffic within the study area. The following horizons have been considered: Full-Build-Out (2027), five years from Full Build-Out (2032), and ten years from Full Build-Out (2037); and,
- ▶ Identify operational concerns and any mitigation measures that may be required to improve operations.

A term of reference was developed and provided to the Town of Oakville, Region of Halton and Ministry of Transportation, Ontario (MTO) in July 2023. **Appendix A** includes the MTO approved Terms of Reference.



This report adheres to the terms of reference agreed upon by the Ministry of Transportation, Ontario (MTO). It should be clarified the Region and Town did not provide any response with respect to the TOR.



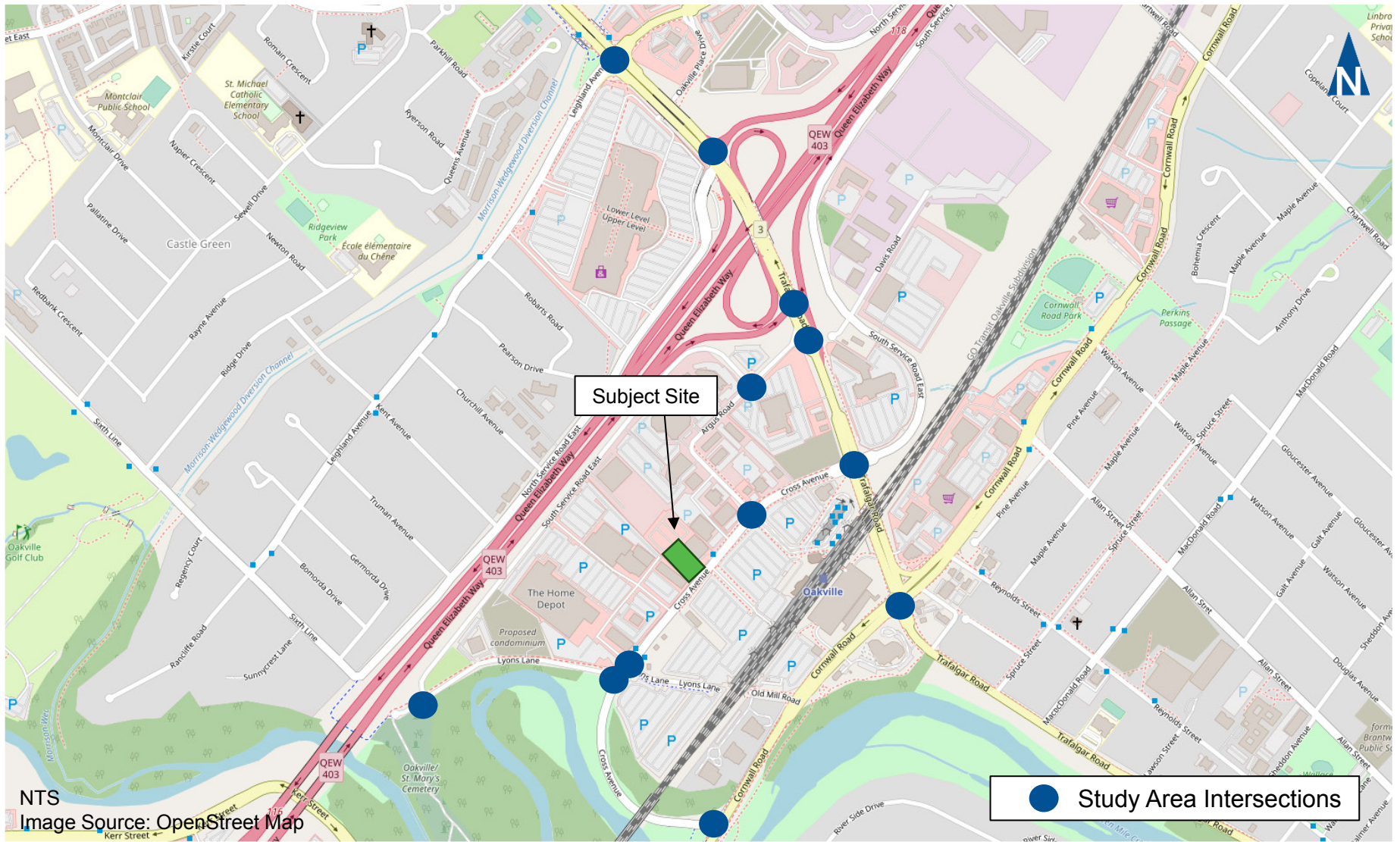
## 1.2 Study Area

The study area intersections assessed in this study include:

- ▶ Trafalgar Road and Leighland Avenue / Iroquois Shore Road (signalized)
- ▶ 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 Cross Avenue / South Service Road (Signalized);
- ▶ Trafalgar Road and Cornwall Road (Signalized);
- ▶ Argus Road and South Service Road (Unsignalized);
- ▶ Lyons Lane and South Service Road (Unsignalized);
- ▶ Cross Avenue and Argus Road / GO Station Driveway (Signalized);
- ▶ Cross Avenue and Lyons Lane/Commercial Driveway (Signalized);
- ▶ Cross Avenue and Lyons Lane (Unsignalized);
- ▶ Cross Avenue and Cornwall Road/Speers Road (Signalized)

**Figure 1.1** illustrates the study area intersections.





## 2 Existing Conditions

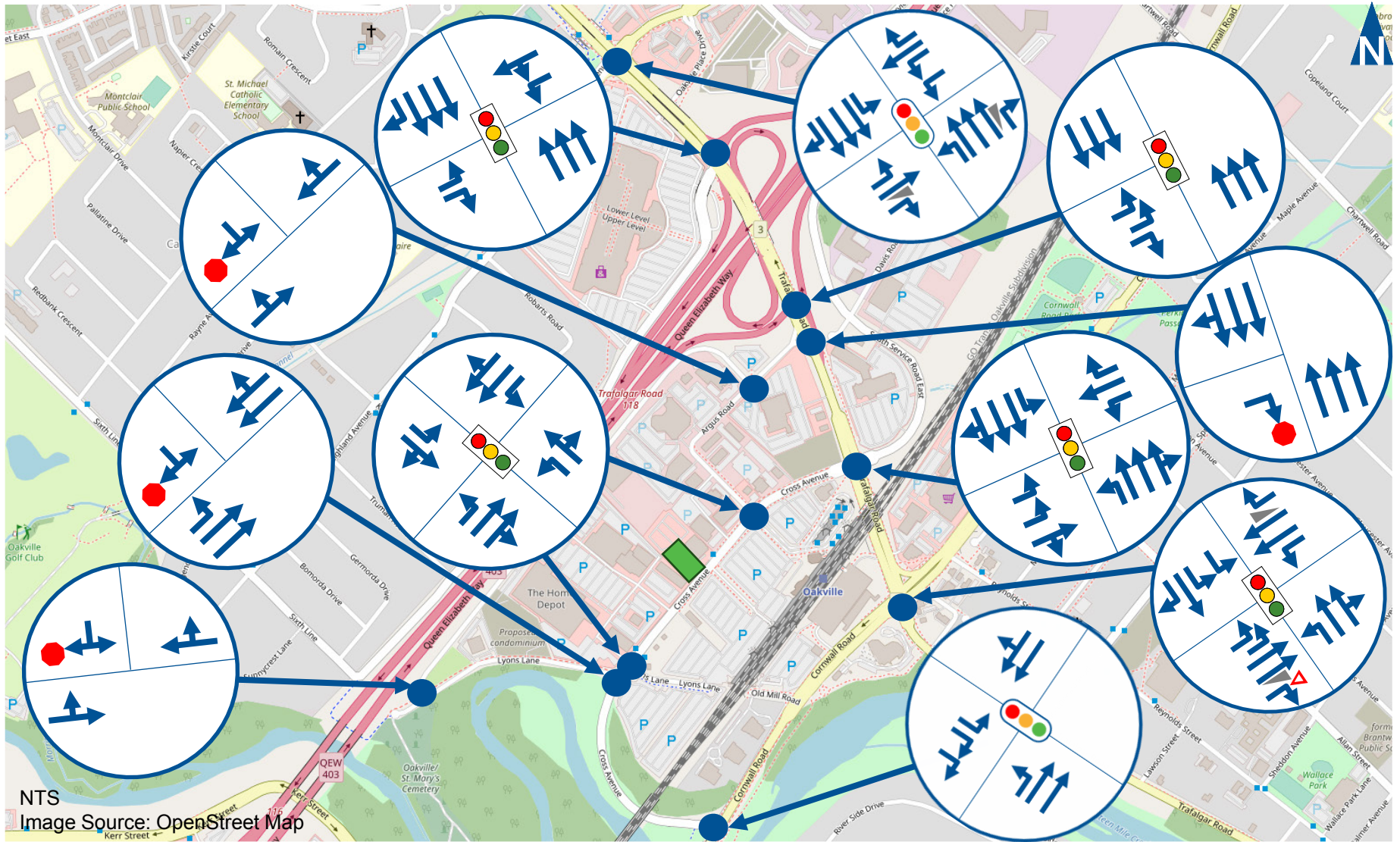
### 2.1 Roadway Characteristics

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. 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 km/h. 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. 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 km/h. 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. Lyons Lane terminates as a cul-de-sac west of its intersection with South Service Road. There is a sidewalk on the east side of Lyons Lane. The assumed speed limit of Lyons Lane is 50 km/h.
- ▶ **South Service Road East** is a two-lane local road that fronts the QEW and provides additional access to the existing built lands. 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 km/h. There are no pedestrian facilities along South Service Road.
- ▶ **Argus Road** is a two-lane local road that connects Trafalgar Road to Cross Avenue. The assumed speed limit of Argus Road is 50 km/h. 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. 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 km/h.

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







## 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 350 metres (5-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.

### 2.2.2 GO Inter-Regional Transit

The proposed development is approximately 350 metres (5-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.

**Figure 2.3** illustrates the GO Network's relation to the site.







NTS  
Image Source: GO Transit



## Existing GO Transit Network

157 & 167 Cross Avenue, Oakville  
230490

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<sup>2</sup> 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.

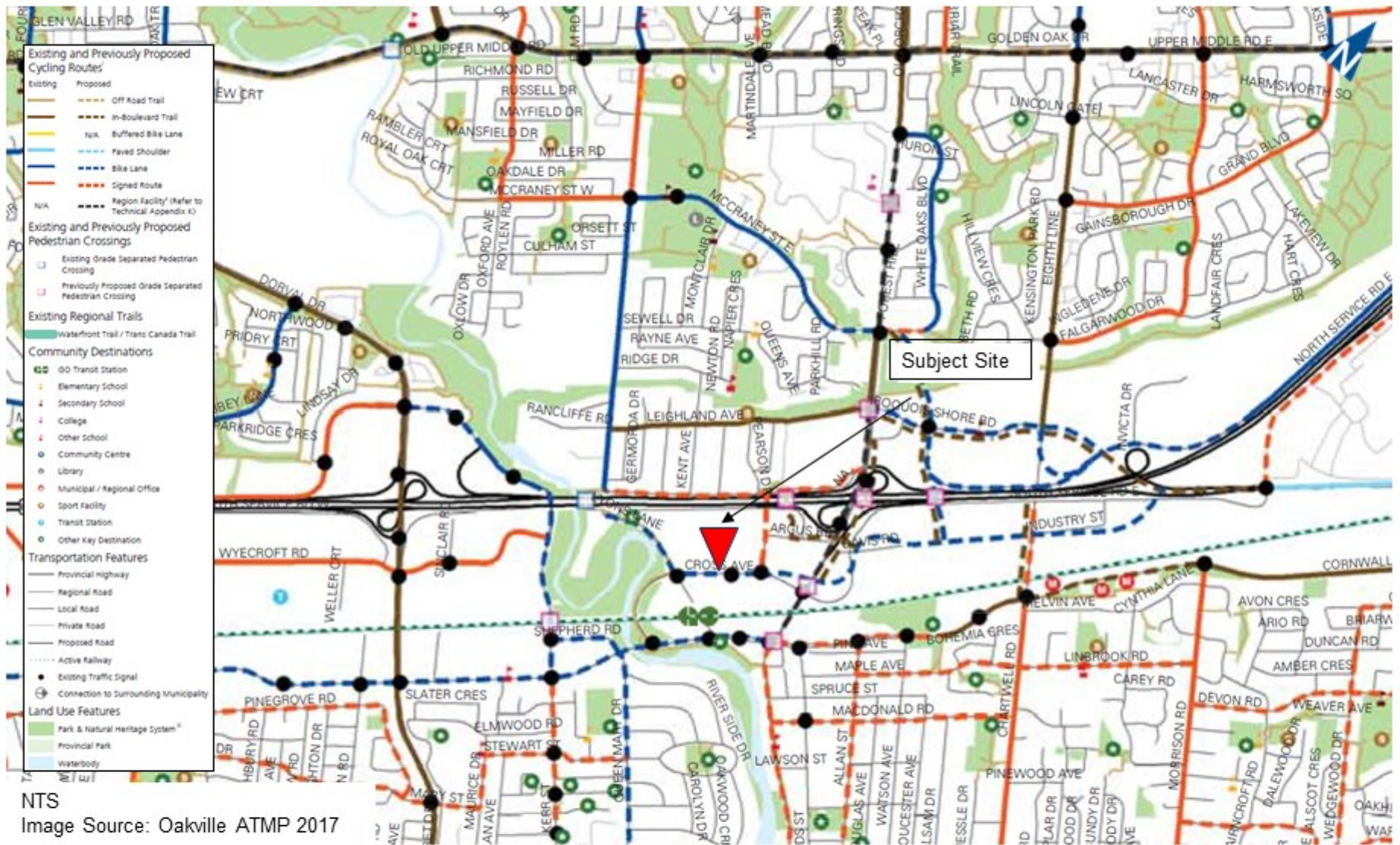
### 2.3.3 Travel Characteristics

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)<sup>3</sup>. 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.

<sup>2</sup> Active Transportation Master Plan (ATMP), Town of Oakville, November 2017

<sup>3</sup> Transportation Tomorrow Survey 2016, Regional Municipality of Halton Summary by Ward, March 2018, Malatest





NTS  
Image Source: Oakville ATMP 2017



## Proposed Cycle & Trail Network

## 2.4 Traffic Volumes

Turning movement counts (TMC) 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, Spectrum and collected by Paradigm. **Table 2.1** provides a summary of traffic count locations and sources.

**TABLE 2.1: TRAFFIC COUNT SUMMARY**

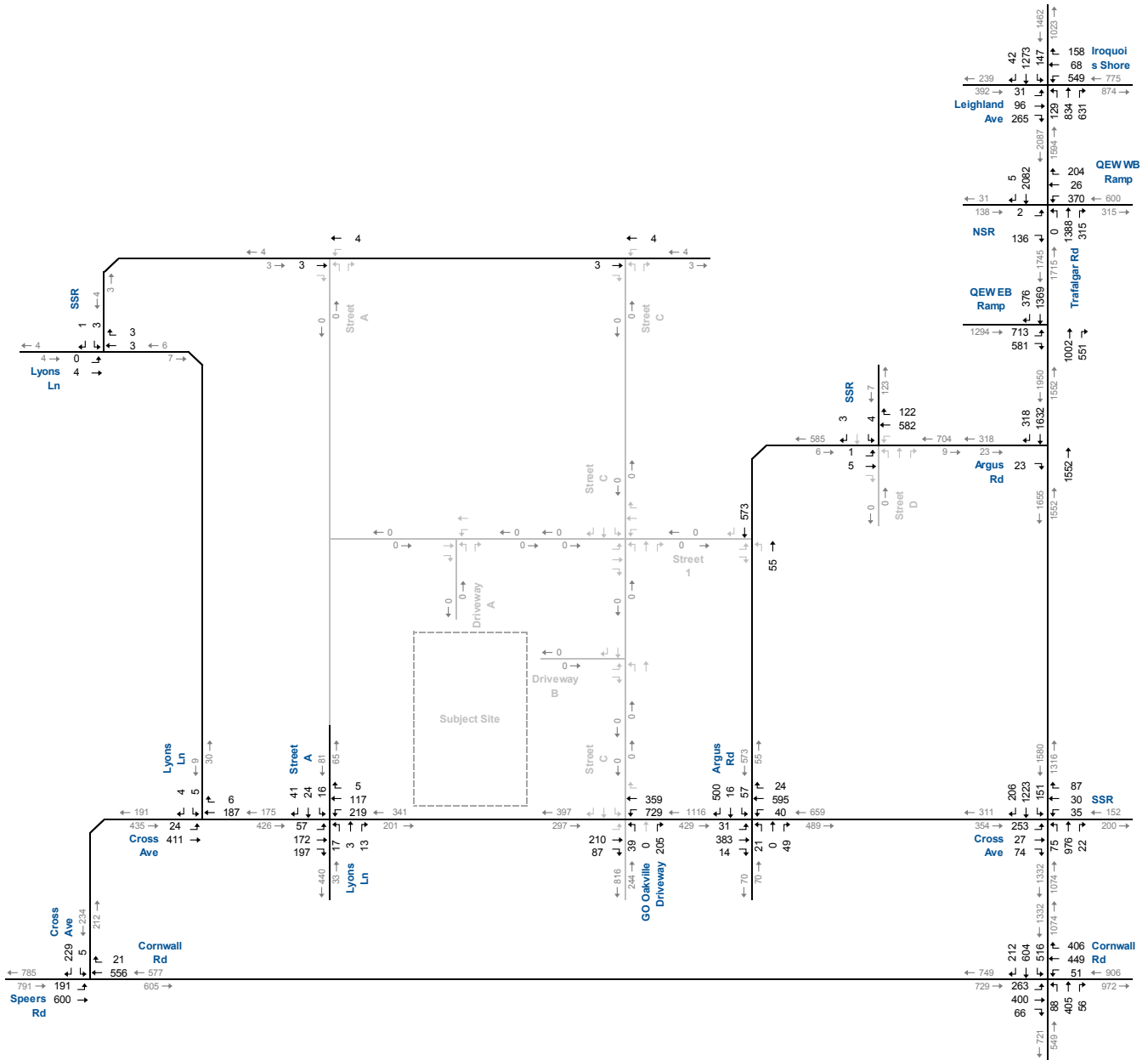
Intersection	Count Date		Provider	Weekday Peak Hour	
	Year	Month		AM	PM
Trafalgar Road and Leighland Avenue / Iroquois Shore Road	2019	December	Halton Region	7:45 - 8:45	4:30 - 5:30
Trafalgar Road and QEW Westbound Off-Ramp / North Service Road	2022	May	MTO	8:00 - 9:00	5:00 - 6:00
Trafalgar Road and 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

### 2.4.2 Volume Balancing

Volume balancing along Trafalgar Road has also been applied to ensure that the corridor maintains reasonable upstream and downstream flow. No balancing occurred on Cross Avenue west of Argus Road to account for the GO Station and commercial driveways.

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

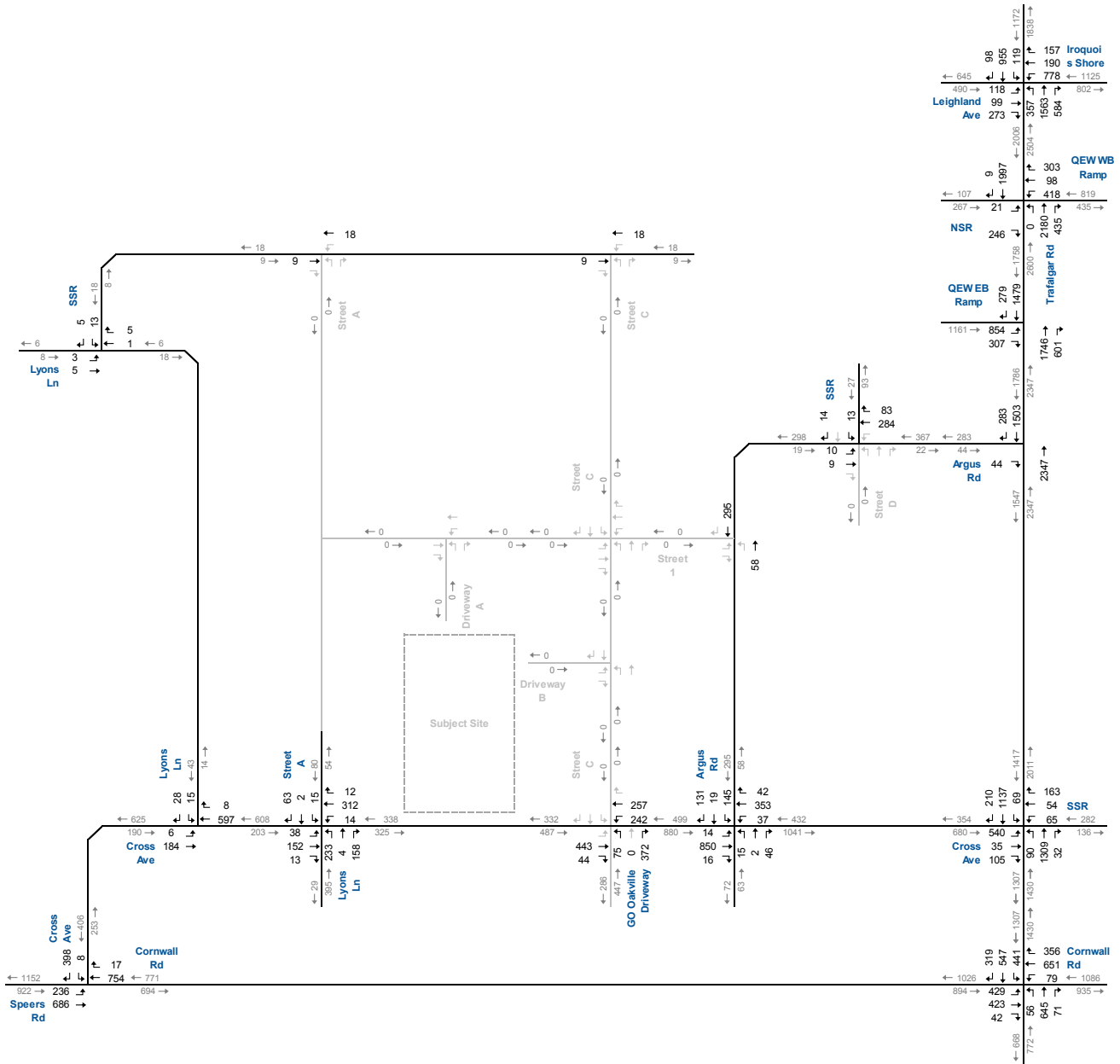




# Base Year Traffic Volumes AM Peak Hour

157 & 167 Cross Avenue, Oakville  
230490

Figure 2.5A



# Base Year Traffic Volumes PM Peak Hour

157 & 167 Cross Avenue, Oakville  
230490

Figure 2.5B



## 3 Future Roadway Network

### 3.1 Trafalgar EA

The Trafalgar Road (Regional Road 3)<sup>4</sup> 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)<sup>5</sup> 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 Plan<sup>6</sup>, the Town of Oakville Transportation Master Plan – Switching Gears<sup>7</sup>, the Midtown Parking Strategy<sup>8</sup>, and Designing Midtown Oakville<sup>9</sup>. 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.

<sup>4</sup> Trafalgar Road Improvements Class Environmental Assessment Study From Cornwall Road to Highway 407, Town of Oakville, AECOM, April 2015.

<sup>5</sup> Midtown Oakville Transportation and Stormwater Municipal Class Environmental Assessment, Cole Engineering, June 2015.

<sup>6</sup> The Road to Change – Halton Region Transportation Master Plan, Dillion Consulting/GHD, October 2011

<sup>7</sup> Town of Oakville Transportation Master Plan – Switching Gears, WSP + GLP, March 2018.

<sup>8</sup> Midtown Oakville Parking Strategy, BA Group, May 2014.

<sup>9</sup> 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.



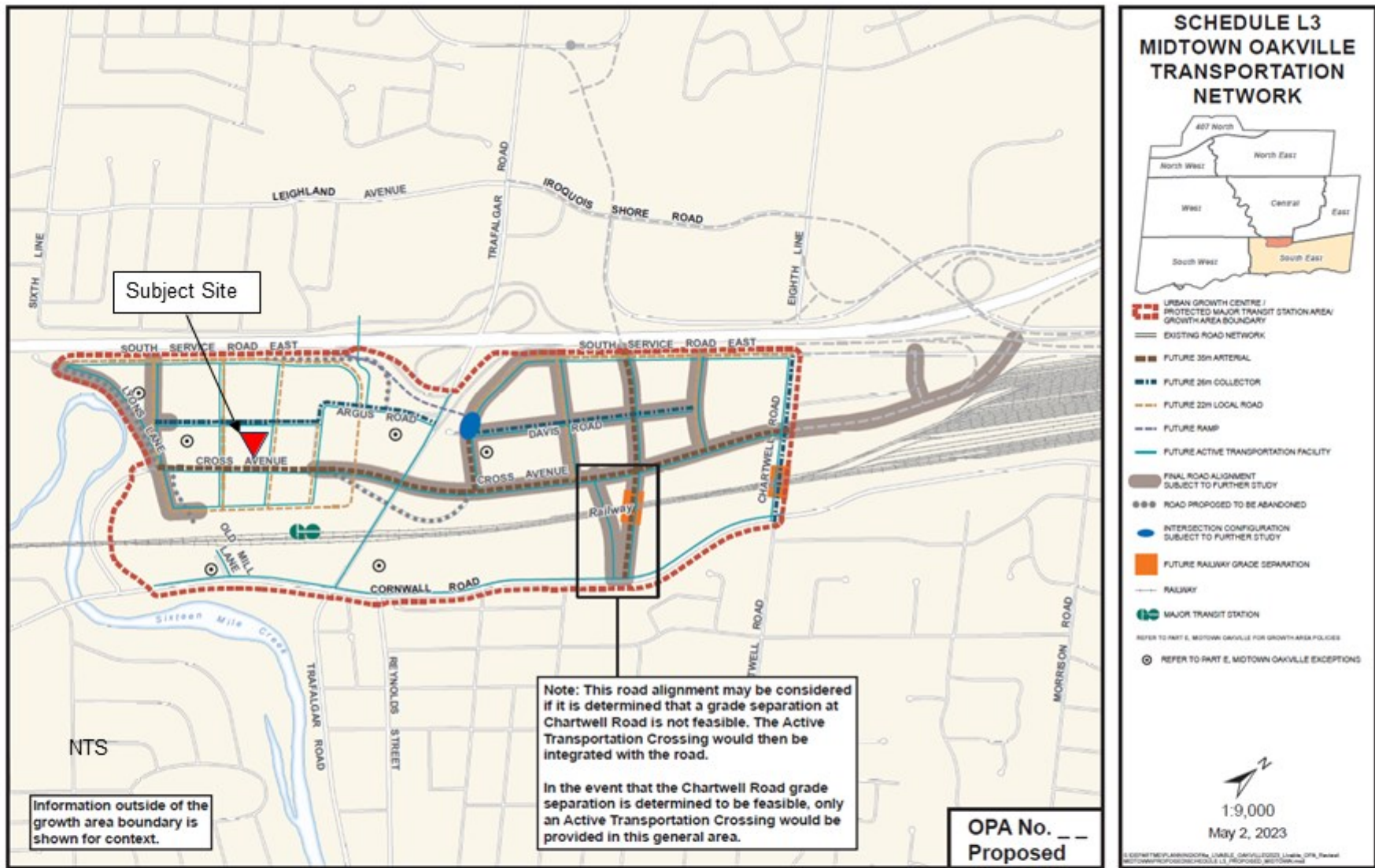
The proposed improvements are not expected to significantly impact the QEW mainline operations with the refinements to the design to accommodate weaving and merging better. The new ramps at Royal Windsor Drive and Trafalgar Road will accommodate the additional travel demand from Midtown Oakville's planned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







NTS

Image Source: Midtown Oakville Class EA



## Midtown Oakville Broader Area Improvements

157 & 167 Cross Avenue, Oakville  
230490

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

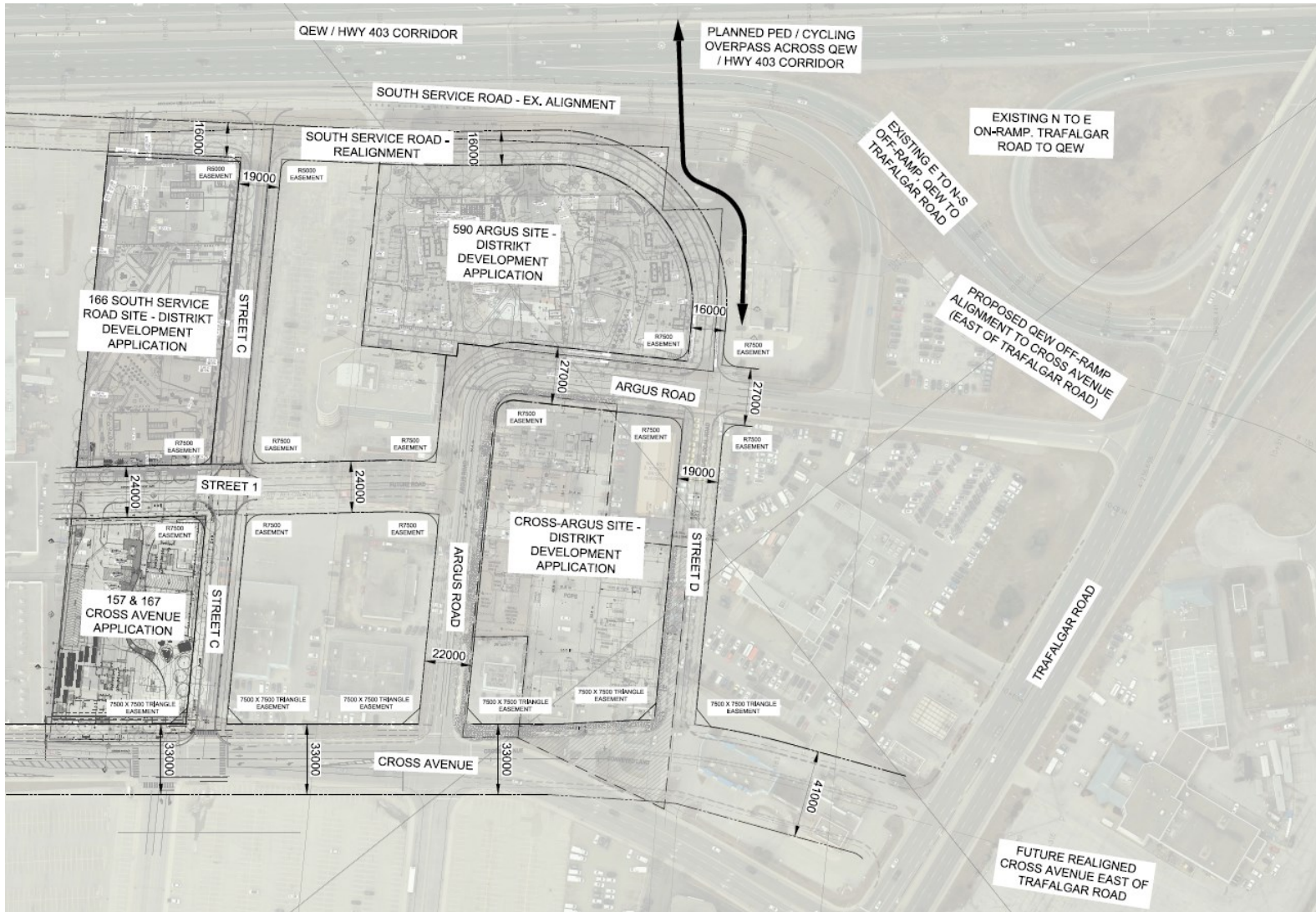
Through the Midtown Oakville Environmental Assessment Study (Midtown EA), the Town of Oakville has established a proposed street system to support intensification within the Midtown area of the Town. Central to this proposed street system, west of Trafalgar Road, are the following key components of the future Midtown street network illustrated in **Figure 3.3** (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.





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## Key Future Midtown Street Segments – West of Trafalgar Road

157 & 167 Cross Avenue, Oakville  
230490

Figure 3.3



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

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 B (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) – Alignment and ROW**

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 Cross Avenue

Cross Avenue is the major traffic thoroughfare within the Midtown area, both east and west of Trafalgar Road.

The Midtown EA street network contemplates a 7-lane travelled way on the realigned Cross Avenue at Trafalgar Road, retaining the existing eastbound dual left turn lane arrangements and median island conditions at the intersection. When accounting for an appropriately dimensions active transportation component, plus landscaping provisions, a 41 metre ROW allowance is anticipated at Trafalgar Road.

This condition transitions to a 5-lane cross-section (where left turn lanes are required) and a 4-lane cross-section (where left turn lanes are not necessary) further west at approximately Argus Road at a signalized intersection.

At this point, a minimum 33-metre ROW is anticipated, providing 5 lanes (where necessary) plus a median island at intersections. Retaining appropriate active transportation components (sidewalks and cycle tracks) and landscaping elements within the boulevards results in slight variations in the boulevard dimensions, given the presence or absence of left turn lanes on Cross Avenue.

The realignment of Cross Avenue is central to the future structure of the Midtown area. The Cross Avenue realignment permits the delivery of key elements of expended transit infrastructure east and west of Trafalgar Road. As such, the Cross Avenue realignment is anticipated to be an early component of the revised transportation network within Midtown.

Cross Avenue was also contemplated to have an urban designed “promenade” along the north side of its corridor, west of Trafalgar Road as part of the draft 2023 Midtown OPA. The applicant has been engaged relative to its land holdings in Midtown and has assessed the context of the “promenade” and how it could potentially be alternatively delivered to create an effective urban “place” at the junction of the Street C and Cross Avenue intersection, while being better integrated into the planned intensification along Cross Avenue.

The result of that consideration is instead of deploying the “promenade” as a continuous 10-metre strip of land along the length of the north side of Cross Avenue, the proposed development creates a privately open publicly accessible space (POPS) strategically located on the north-west corner of the Street C and Cross Avenue intersection to better animate the street edge and tie into future development to



create more active spaces and relationships with ‘development edges (buildings frontages).

As noted above, the land use concepts that are illustrated in the Consortium’s latest November 2023 presentation to town council do not appear to retain the 10m promenade across the site frontage. Therefore, reference to the promenade in the current application is no longer retained. However, the planned POPS through the site is consistent with animating a portion of the Cross Avenue corridor and is strategically integrated in the proposed development application.

A property widening conveyance from a range of 4.2m – 7.3m is proposed along the frontage of Cross Avenue to accommodate half of the widening of Cross Avenue to a 33m ROW.

With respect to Cross Avenue’s role in the street network relative to traffic movement, the Cross Avenue corridor would offer a balance of the traffic volume carrying capacity and the urban placemaking roles the corridor would serve.

### **3.5.5 N-S Local Roads**

There are several local roads envisioned in the Town’s Midtown May 2023 OPA Schedule L3 (Street C, Street D in **Figure 3.3**) to intersect with the E-W collector road and Cross Avenue which provide options for both active and vehicular modes to access the future development blocks within Midtown. These roads are proposed to be provided within a 22-metre ROW.

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.



### 3.5.6 Street C / Cross Avenue Intersection Design

The location where local street “Street C” intersects with Cross Avenue is offset approximately 20m from the centreline of the existing intersection of Cross Avenue and the Oakville GO station driveway. Due to the close proximity of the two roads, it is proposed to introduce an interim signalized intersection to accommodate this offset condition.

The following components are key elements taken into account for the redesign of the existing signalized intersection:

- ▶ A multi-phased traffic control system will be required to ensure all vehicle movements can be conducted safely.
- ▶ There are a large amount of vehicles that make the westbound left turn movement into the Oakville GO station driveway coming from Trafalgar Road. To mitigate queues and delays at the proposed intersection, it is proposed to introduce a dedicated left turn lane at both the proposed signalized intersection and to the existing unsignalized Metrolinx driveway further to the west.
- ▶ The western Metrolinx driveway is proposed to operate as a contra-flow intersection where only entry is permitted in the morning and only exit is permitted in the afternoon.
- ▶ It should be noted that the existing western Metrolinx driveway currently operates as outbound only. Therefore, additional discussions with Metrolinx will be required to coordinate the operations of this driveway.
- ▶ The introduction of the westbound left turn lane at the signalized intersection would remove a through lane in the eastbound direction.

A functional road plan has been prepared in **Appendix C** that illustrates the proposed signalized design.



## 4 Development Proposal

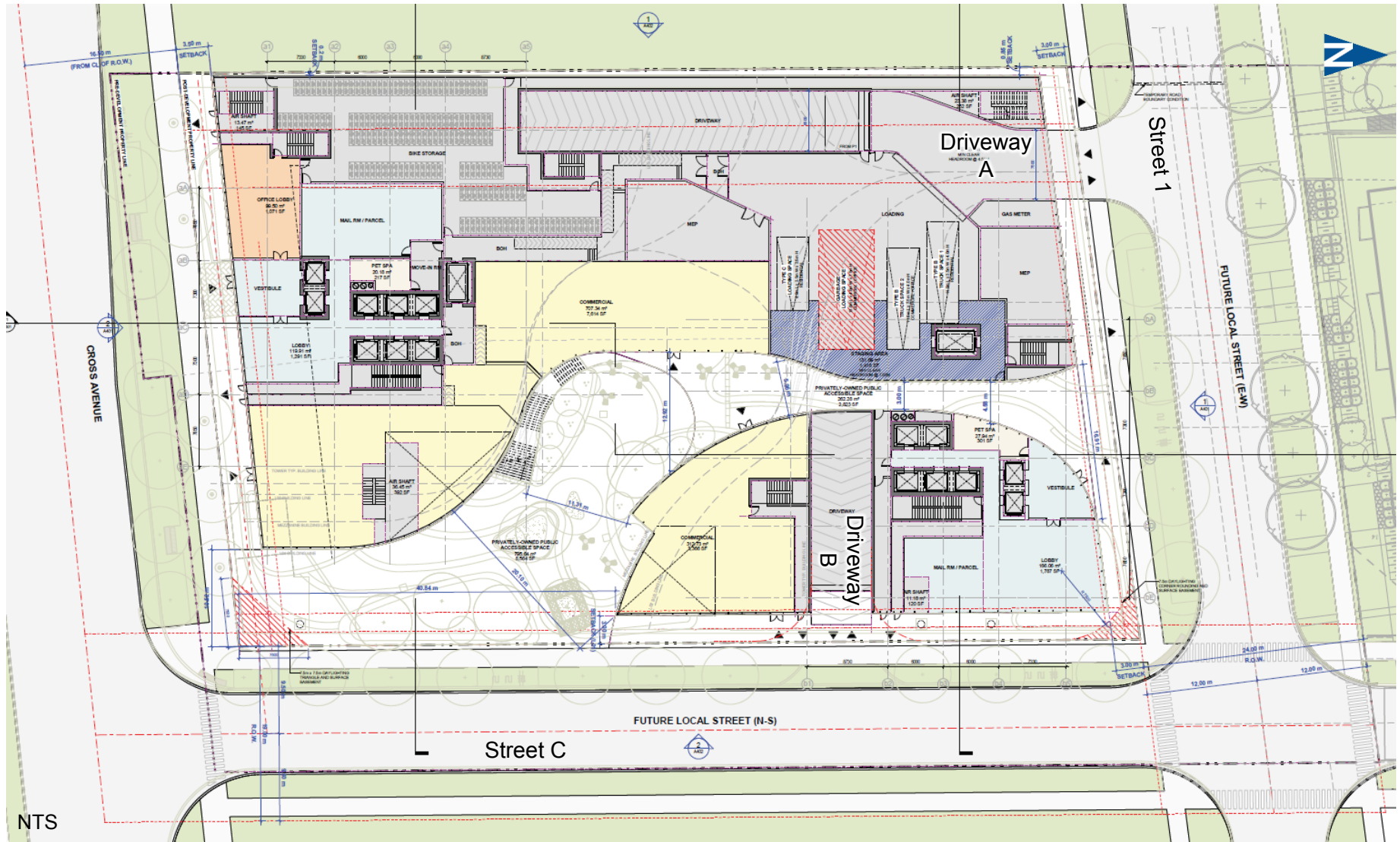
### 4.1 Development Description

The following provides an overview of the programme elements for the Proposed Development. Reduced scale architectural plans of the Proposed Development are provided in **Appendix D. Figure 4.1** illustrates the proposed concept.

The Proposed Development includes a mixed-use programme composed of 1,198 residential units, approximately 2,693 m<sup>2</sup> (28,987 sq.ft.) of retail Net Floor Area (NFA), and a 1,027 m<sup>2</sup> (11,054 sq.ft.) of office space.

The development programme is configured within two buildings across the development block: Tower A (the north tower), Tower B (the south tower). A POPS with an accessible pathway is situated between each of the towers.





## 4.2 Site Access Description

### 4.2.1 Pedestrian Access

The Proposed Development occupies the majority of an entire block within the Mid-Town area of the Town of Oakville. It is currently bounded by Cross Avenue on the south, a future north-south local roadway (Street C) to the east and a future east-west local roadway (Street 1) to the north.

Pedestrian access will be well served with pedestrian sidewalks within the municipal right-of-way (ROW) that will meet the Town's minimum standards for local public streets. Given the layout of the proposed buildings on the Site, the doors from the proposed development will have direct access to three roadways, Cross Avenue, Street 1 and Street C.

Furthermore, given the POPS configuration within the central area of the Site, access will also be afforded to residents, visitors and employees/customers of the non-residential floor space within the development. Circulation "through" the Site will also be afforded to all the aforementioned users without any vehicular conflicts, given all vehicular access is direct from the adjacent public streets to at-grade loading areas and below-grade passenger vehicle parking.

The context of the Proposed Development and its relationship to the surrounding public streets is illustrated in the drawings mentioned above in **Appendix C**.

### 4.2.2 Bicycle Access

Bicycle parking is provided above grade to facilitate centralized storage rooms and secure, weather protected bike parking. Bike parking is generally situated on the ground floor, mezzanine level, and second level accessed via the main elevator cores within Tower 1 and Tower 2.



### 4.2.3 Vehicular Access

Two (2) driveways are proposed to serve the development. One driveway is proposed from Street 1 and the second driveway is proposed from Street C. Access to the at-grade loading areas is provided solely from the north side of the development from the Street 1 driveway. Both driveways provide access to a ramp that leads to the below-grade parking garage.

These access driveways are configured in a way that minimizes the width of the driveways across the public boulevards and the sidewalks to reduce the exposure of pedestrians to crossing vehicular traffic. Sidewalks would be extended through the driveways to further emphasize the pedestrian realm and remind both pedestrians and motorists that pedestrians have the right-of-way when crossing the driveways. Once on-site, loading vehicles will immediately enter their respective enclosed loading areas separating themselves from passenger vehicles. Passenger vehicles accessing the underground parking garage would utilize the ramps on the west or east side of the site down to the P1 parking level. Since the below-grade garage is a continuous plate across the entire Site, motorists can enter and exit the garage at either driveway. This allows motorists to select the most convenient route relative to their origin or destination routings and minimize the amount of unnecessary routing across the public street network.

The Street 1 driveway width is noted to be 7.5 metres which provides for a reasonable design to accommodate both passenger vehicles and loading vehicles while still remaining relatively narrow to reduce the exposure of pedestrians to crossing vehicular traffic.

The Ministry of Transportation's Design Supplement for the Transportation Association of Canada (TAC) Geometric Design Guide for Canadian Roads<sup>10</sup> Chapter 8.8 (Corner Clearances at Major Intersection), Section 8.8.1 (General) states, "Corner clearance is the distance from an intersection to the nearest access upstream or downstream of it. Corner clearance is measured from the nearest curb of the cross roadway to the near edge of the access throat. It consists of three components: the curb return radius at the intersection, a length of a tangent, and the curb return radius or flare dimension at the driveway. Inadequate corner clearance between accesses and intersections along a major road, such as a major arterial, can create operational issues."

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<sup>10</sup> MTO Design Supplement for TAC Geometric Design Guide for Canadian Roads, Appendix 9 for Chapter 9 Intersections, June 2017.



As Street 1 is proposed to be classified as a collector roadway, the proposed driveway connections should be at least 55 metres (curb radii to curb radii) from a signalized intersection and 25 metres from an unsignalized intersection. Based on the proposed driveway connection to Street 1, the following is noted concerning spacing:

- ▶ Driveway A is located approximately 52 metres (curb radii to curb radii) west of the Street C and Street 1 intersection and meets the minimum spacing requirement along a collector for an unsignalized intersection.

As it is envisioned that Street C and Street 1 will require signalization, the corner clearance requirement would fall short by 3 metres. However, based on the queue analysis completed as part of the sensitivity analysis (sub-section 9.2.7), the eastbound approaches 95<sup>th</sup> percentile queue length at Street C and Street 1 is projected to be 46 metres. As there is only a 5% change this queue length will be exceeded, the proposed driveway is noted to be spaced adequately as the driveway is not expected to be blocked.





## 5 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 5.1**.

### 5.1 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 5.1**.

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 5.1: SUMMARY OF SITE TDM MEASURES**

Measure	Description	TDM Plan Objective	Hard or Soft Measure
<b>Reduce Car Ownership</b>			
Reduced Vehicular Parking Supply	<p>The following parking supply is proposed for the site (1,198 units):</p> <ul style="list-style-type: none"> <li>• 599 resident parking spaces (0.50 ratio);</li> <li>• 180 visitor parking spaces (0.15 spaces per unit); and,</li> <li>• 40 non-residential parking spaces (1.08 spaces per 100m<sup>2</sup>)</li> </ul> <p>This is a reduced provision in comparison with the minimum resident parking requirements.</p> <p>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. <b>Providing less parking is a key component in reducing single occupant vehicle trips</b></p>	<ul style="list-style-type: none"> <li>• Reduce auto-oriented dependence and the need for everyday travel.</li> <li>• Promote non-auto modes of travel during peak travel periods.</li> </ul>	Hard Measure
Unbundling of Residential Unit / Vehicle parking space sales	<p>Unbundling of unit leases and parking leases will benefit potential tenants who do not need or want parking space.</p> <p>Bachelor units will not be provided an option to purchase a parking space.</p>	<ul style="list-style-type: none"> <li>• Reduce auto-oriented dependence and the need for everyday travel</li> </ul>	Soft Measure
Car Share Parking Spaces	<p>Consideration to provide 5-10 car share spaces on site through a car share provider.</p>	<ul style="list-style-type: none"> <li>• Promote alternative transportation service options besides car ownership</li> </ul>	Hard Measure
Annual Car Share Memberships	<p>Consideration to provide an optional annual car share membership per unit for the first year of occupancy.</p>	<ul style="list-style-type: none"> <li>• Promote alternative transportation service options besides car ownership</li> </ul>	Hard Measure
<b>Bicycle Use</b>			
Bicycle Parking	<p>Provide bicycle parking in accordance with the Town standards. Provide 1,204 bicycle parking spaces (900 long-term and 304 short-term) in total for the residents and visitors of the site.</p>	<ul style="list-style-type: none"> <li>• Make cycling an attractive option for travel during the peak travel periods.</li> </ul>	Hard Measure



Measure	Description	TDM Plan Objective	Hard or Soft Measure
Bike Share	Consider providing two private bike share stations supporting 25 bicycles total for residents.	<ul style="list-style-type: none"> <li>Promote alternative transportation service options besides car ownership</li> </ul>	Hard Measure
Bike Repair Station	Provide two bicycle repair stations (one for each tower) within the residential bicycle parking storage area on site.	<ul style="list-style-type: none"> <li>Make cycling an attractive option for travel during the peak travel periods.</li> </ul>	Hard Measure
<b>Micromobility Use</b>			
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	<ul style="list-style-type: none"> <li>Promote alternative transportation service options besides car ownership</li> </ul>	Hard Measure
<b>Transit Use</b>			
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.	<ul style="list-style-type: none"> <li>Reduce car dependence and the need for everyday travel.</li> <li>Promote transit travel during peak travel periods</li> </ul>	Hard Measure
Travel Mode Information Package	Implement marketing programs to ensure that new residents are aware of available modal choices in the area.	<ul style="list-style-type: none"> <li>Reduce auto-oriented dependence.</li> <li>Promote non-auto modes of travel during peak periods.</li> </ul>	Soft Measure
<b>Pedestrian Access and Walkability</b>			
Pedestrian & Cycling Connections	Provide a direct connection to Cross Avenue, which connects pedestrians and cyclists to the surrounding area’s bike lanes, Oakville Transit bus stops, and the Oakville GO Station.	<ul style="list-style-type: none"> <li>Make walking and cycling an attractive option for travel during peak travel periods</li> </ul>	Hard Measure



## 6 Vehicular Parking Considerations

### 6.1 Zoning By-law Vehicle Parking 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 1,404 parking spaces, including 984 resident spaces (effective rate of 0.82), 240 resident visitor spaces, 150 retail spaces, and 30 office spaces. The vehicular parking requirements are summarized in **Table 6.1**.

**TABLE 6.1: ZONING BY-LAW 2014-014 PARKING REQUIREMENTS**

Use	Units / GFA	Minimum Parking Rate <sup>[2]</sup>	Minimum Parking Requirement <sup>[2]</sup>
<b>Resident</b>			
1 – Bedroom	752 units	0.80 spaces / unit	602 spaces
2 – Bedroom	346 units	0.80 spaces / unit	277 spaces
3 – Bedroom	100 units	1.05 spaces / unit	105 spaces
<b>Subtotal</b>			<b>984 spaces</b>
<b>Non-Resident</b>			
Residential Visitors	1,198 units	0.20 spaces / unit	240 spaces
Retail	2,693 m <sup>2</sup> GFA	1.00 spaces / 18 m <sup>2</sup>	150 spaces
Office	1,027 m <sup>2</sup> GFA	1.00 spaces / 35 m <sup>2</sup>	30 spaces
<b>Subtotal</b>			<b>420 spaces</b>
<b>Total</b>			<b>1,404 spaces</b>

Note:

1. Site statistics are based on architectural plans prepared by Teeple Architects dated February 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. 1-Bedroom and 2-Bedroom units have a net floor area less than 75 m<sup>2</sup>.
4. Residential rates incorporate a 0.20 visitor ratio.



## 6.2 Proposed Parking Supply

It is our opinion that the above noted parking standards summarized in **Table 6.1** 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.

It is proposed to provide 819 total parking spaces to meet the needs of the Project. This includes 599 resident parking spaces (effective parking supply of 0.50 parking spaces per unit), 180 residential visitor parking spaces (effective ratio of 0.15 parking spaces per unit), and 40 parking spaces for the retail and day care use (1.08 parking spaces per 100 m<sup>2</sup>).

It is also important to note that the total supply of non-resident parking – residential visitor and retail / office land uses – could potentially be shared during certain times of the day given the favourable (compatible) temporal patterns exhibited by office/residential visitor parking demands.

Although the current plan is to sell the retail and office parking spaces to those who would be purchasing the floor area, the residential visitor parking will not be fully utilized during the daytime hours throughout the week (likely between 20% and 50% utilization or equivalent to approximately 36 to 90 vacant resident visitor vehicle parking spaces during those times of the day).

There would be an opportunity, assuming an agreement between the residential condominiums and the retail / office floor space purchasers, to share on a paid parking basis the residential visitor parking supply during daytime hours when retail / office parking demands are highest. This would create an efficient urban parking condition. 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.

Proposed minimum parking rates and requirements are summarized in **Table 6.2**.



**TABLE 6.2: PROPOSED MINIMUM PARKING REQUIREMENTS**

Use	Units / GFA	Minimum Parking Rate <sup>[2]</sup>	Minimum Parking Requirement <sup>[2]</sup>
<b>Resident</b>			
1 – Bedroom	1,198 units	0.50 spaces / unit	599 spaces
2 – Bedroom			
3 – Bedroom			
<b>Subtotal</b>			<b>599 spaces</b>
<b>Non-Resident</b>			
Residential Visitors	1,198 units	0.15 spaces / unit	180 spaces
Retail	2,693 m <sup>2</sup> GFA	1.08 spaces / 100 m <sup>2</sup>	29 spaces
Office	1,027 m <sup>2</sup> GFA	1.08 spaces / 100 m <sup>2</sup>	11 spaces
<b>Subtotal</b>			<b>220 spaces</b>
<b>Total</b>			<b>819 spaces</b>

Note:

1. Site statistics are based on architectural plans prepared by Teeple Architects dated February 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.

### 6.3 Appropriateness of the Proposed Minimum 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
- ▶ Residential Visitor: 0.15 spaces per unit
- ▶ Commercial / Retail: 1.08 spaces per 100 m<sup>2</sup>

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



### 6.3.1 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; 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.

#### 6.3.1.1 Provincial, Regional, and Local Policy

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 5.0**. 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.





### 6.3.1.2 Review of Evolving transportation context

The existing and future transportation context of the site area is supportive of alternative transportation modes, including transit and active transportation. Currently, the Site is located within a reasonable walking distance of the Oakville GO Station and various Oakville Transit bus routes, which provide connections to regional and local transit services, respectively. There are also emerging improvements to both the area transit context and active transportation context, including the Dundas and Trafalgar Bus Rapid Transit systems and new cycling and pedestrian infrastructure which connect local destinations.

#### Existing Transit Context

The site is located approximately 300 m from the Oakville GO Station and adjacent to 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)
- ▶ 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.

#### **6.3.1.3 Transit Reach Assessment**

##### **Existing Transit Travel Reach**

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 **Figure 6.1** and **Figure 6.2**. 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.

##### **Future Transit Travel Reach**

A review of projected transit travel times assumed the various public transit network improvements included in **Section 6.3.1.2** is illustrated in **Figure 6.3** and **Figure 6.4**. A comparison of areas that are reachable is provided in **Table 6.3** below.



**TABLE 6.3: EXISTING AND FUTURE TRANSIT SERVICE AREA ANALYSIS COMPARISONS**

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



Transit Scenario	15 minute reach	30 minute reach	45 minute reach
	<p>Clarkson GO Station; and West along Lakeshore West GO Line to Bronte GO Station.</p>	<p>and east along Lakeshore West GO Line to Mimico Go Station; and West along Upper Middle Rd W to past Third Line, and along Lakeshore West Go Line to Burlington GO Station.</p>	<p>Long Branch GO) to Union Station; and West along Dundas St to Walkers Line (via future Dundas BRT), and along Lakeshore West Go Line to past Aldershot GO Station.</p>
<p><b>Future Conditions</b> (Travel Towards Site) <i>with the addition of GO Expansion /RER, Trafalgar BRT, Dundas BRT, etc.</i></p>	<ul style="list-style-type: none"> <li>• North along Trafalgar Rd to before Oak Park Blvd / Postridge Dr (south of Dundas St E) via future Trafalgar BRT;</li> <li>• South along Trafalgar Rd, and Kerr St to before Rebecca St / Randall St (north of Lakeshore Rd W);</li> <li>• East along Lakeshore West GO Line to Clarkson GO Station; and West along Lakeshore West GO Line to Bronte GO Station.</li> </ul>	<ul style="list-style-type: none"> <li>• North along Trafalgar Rd to beyond Hwy 407 (via future Trafalgar BRT), and north along Erin Mills Pkwy to past Dundas St W;</li> <li>• South along Trafalgar Rd, Reynolds St, and Kerr St to the waterfront;</li> <li>• 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 West along Upper Middle Rd W to Bronte Rd, and along Lakeshore West GO Line to Burlington GO Station.</li> </ul>	<ul style="list-style-type: none"> <li>• 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;</li> <li>• South along Trafalgar Rd, Reynolds St, Kerr St, and Appleby Line to the waterfront;</li> <li>• 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 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).</li> </ul>



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.

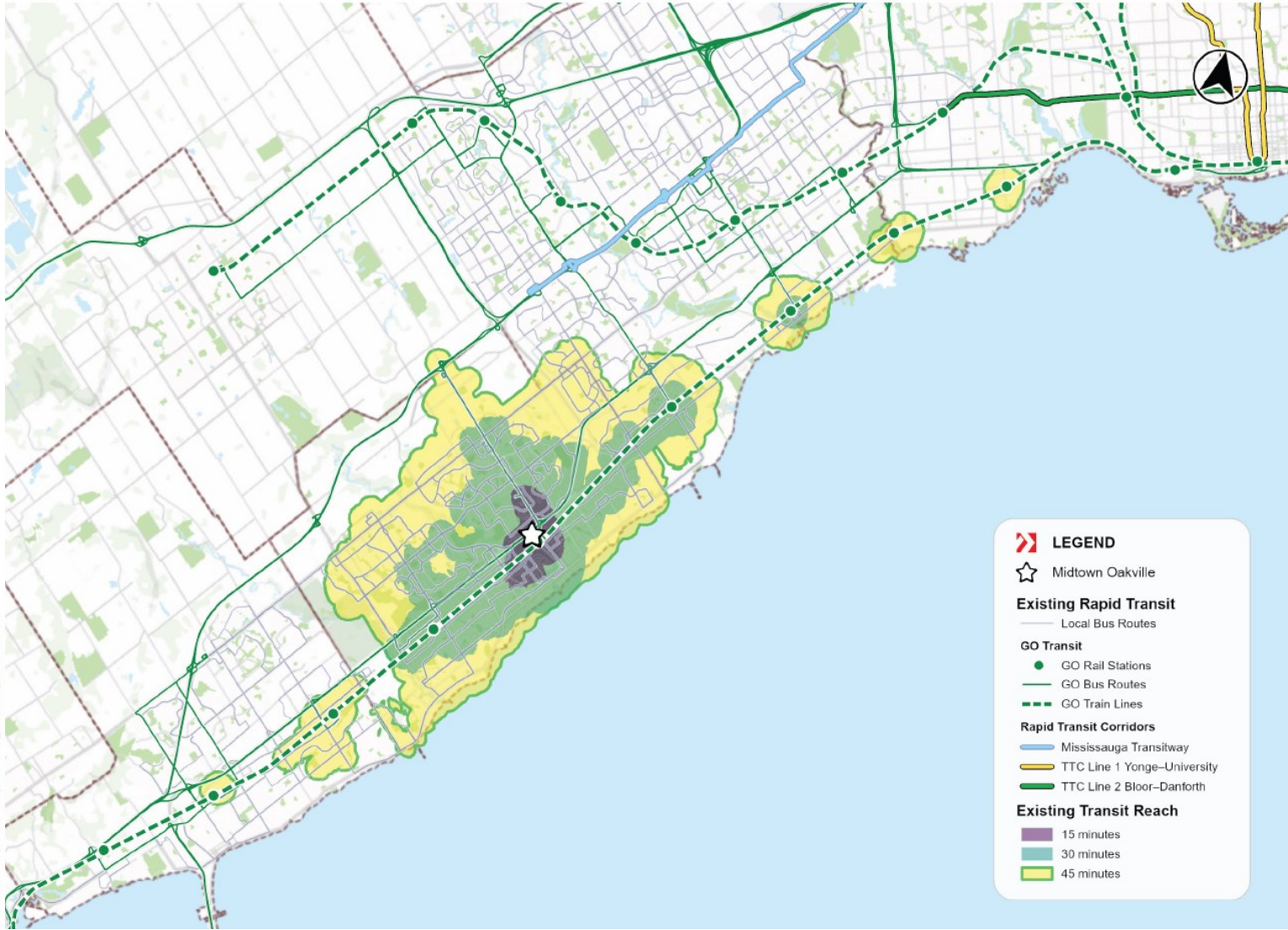


In summary, under present conditions the site of midtown Oakville is bound by the QEW corridor, limiting northwards travel to Trafalgar Rd. The nearby Oakville GO Station serves as the primary east-west route. In the future, the inclusion of Trafalgar BRT, Dundas BRT and GO Expansion greatly improves 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.

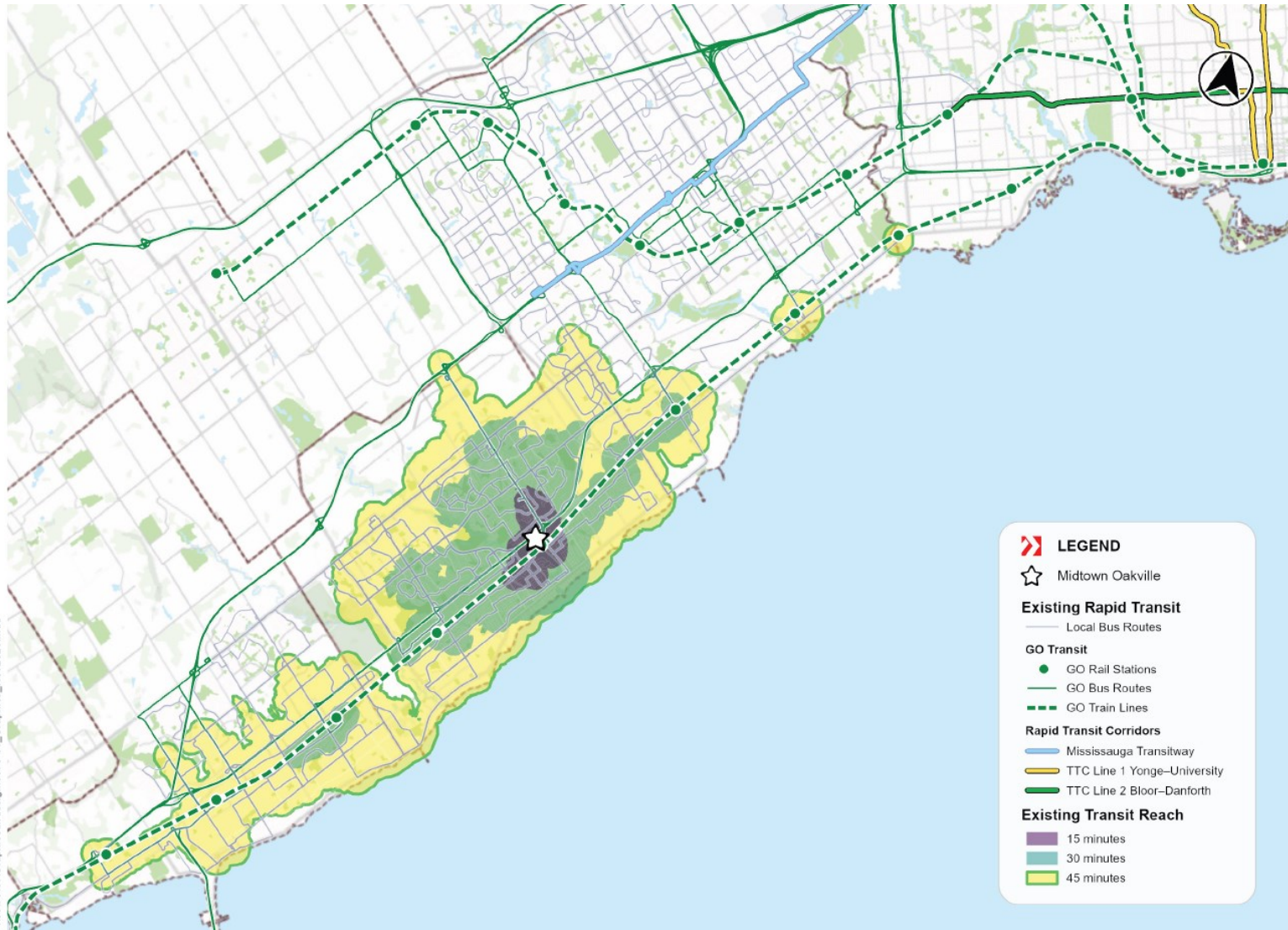
The evolving transportation context visualized in this analysis indicates that, at either local or intercity scales, there are suitable alternatives to driving or requiring a parking space for daily travel. The site is in a prime location that enables future site users to shift away from auto use and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







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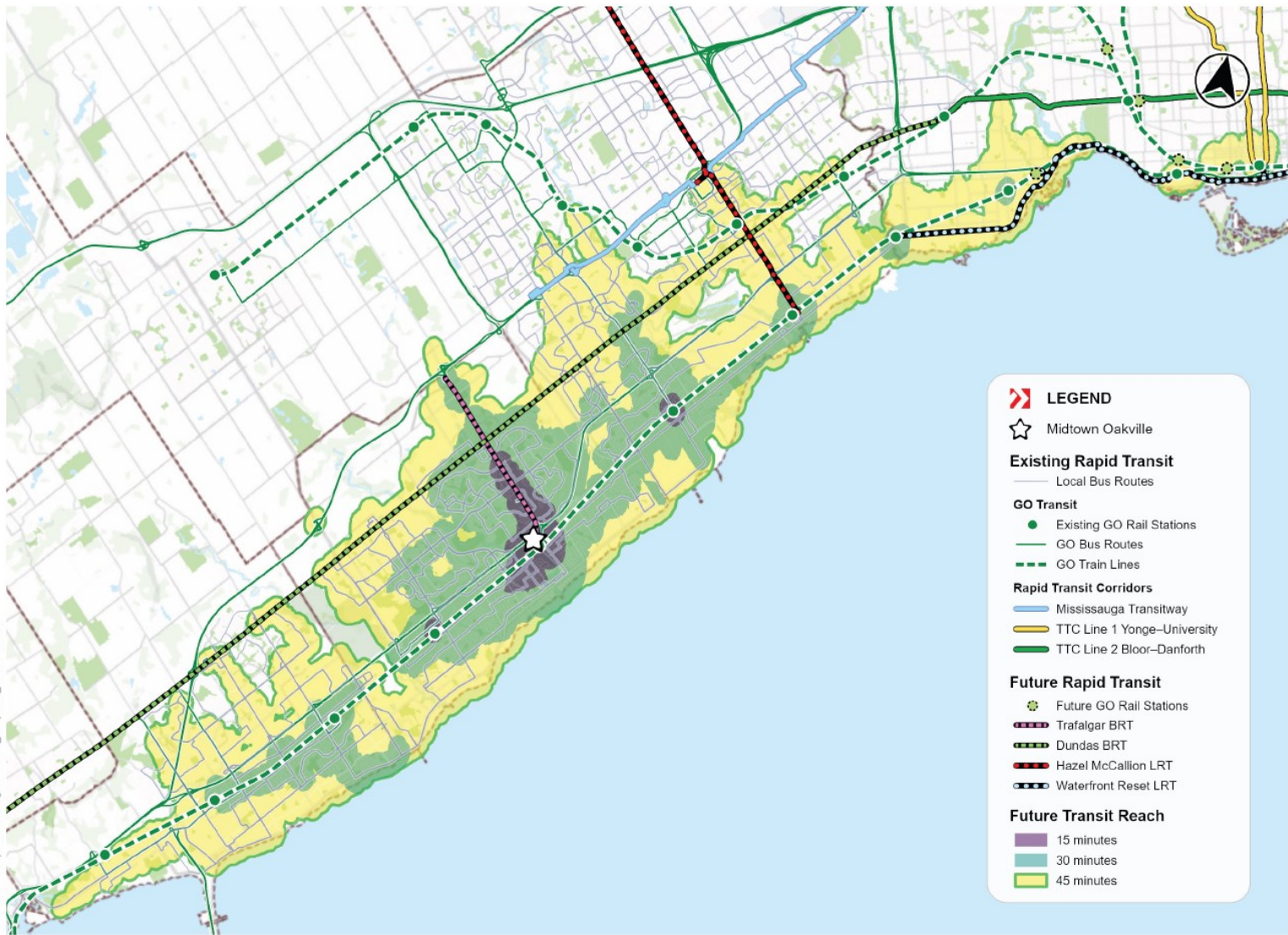


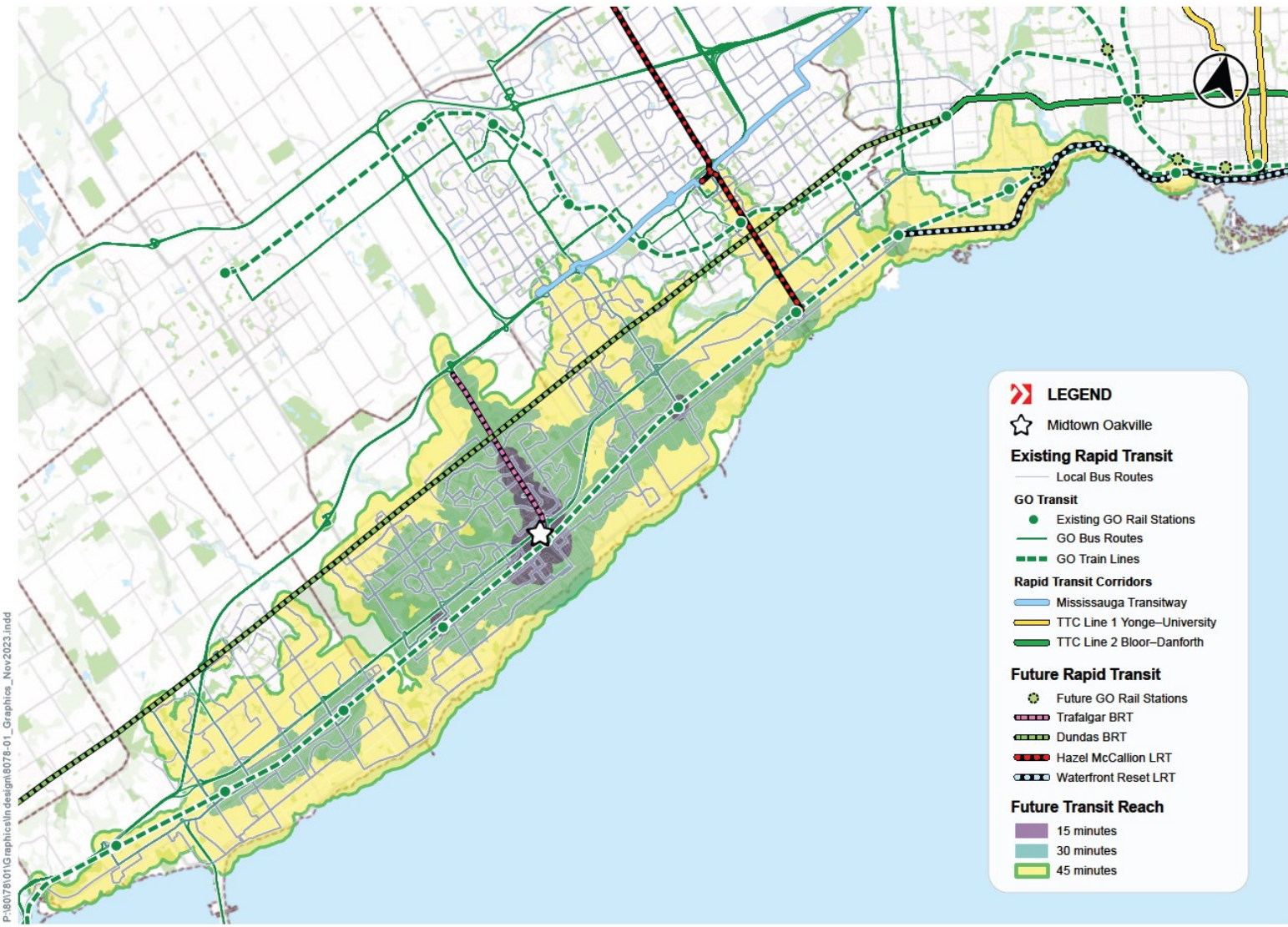
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#### **6.3.1.4 Zoning By-law Review – Resident Parking Standards**

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 6.4**.



**TABLE 6.4: RESIDENTIAL PARKING SUPPLY RATIO REQUIREMENTS – COMPARABLE ONTARIO MUNICIPALITIES**

Municipality	Zoning By-law	City Area	Land Use Category	Nearby Transit Service	Minimum Resident Parking Requirement
157 & 167 Cross Avenue, Oakville (Proposed)	--	Midtown	Mixed-Use Building	<ul style="list-style-type: none"> <li>Oakville Local Bus Routes</li> <li>GO Train (Lakeshore West Line)</li> <li>Future Dundas and Trafalgar BRT</li> </ul>	0.50 spaces / unit
Mississauga	By-law 0225-2007	Precinct 1	Condo / Rental Apartment	<ul style="list-style-type: none"> <li>MiWay Bus</li> <li>Mississauga Transitway</li> <li>MiWay Express Bus</li> <li>GO Bus</li> <li>Future Hazel McCallion LRT</li> </ul>	0.80 spaces / unit
	Undergoing City staff investigation	Along 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	<ul style="list-style-type: none"> <li>TTC Bus / Subway</li> <li>GO Bus / Train</li> <li>YRT Bus</li> <li>YRT Viva BRT</li> </ul>	0.40 spaces / unit
Toronto	By-law 569-2013	Parking Zone B	Mixed-Use Building	<ul style="list-style-type: none"> <li>TTC Bus / Subway / Streetcar</li> <li>GO Bus / Train</li> <li>Miway Bus</li> <li>Future TTC Subway</li> <li>Future TTC Streetcar</li> <li>Future TTC BRT</li> </ul>	No Minimum



Municipality	Zoning By-law	City Area	Land Use Category	Nearby Transit Service	Minimum Resident Parking Requirement
Brampton	By-law 270-2004	Central Area / Downtown	Apartment Dwelling	<ul style="list-style-type: none"> <li>GO Bus / Train</li> <li>Brampton Bus</li> <li>Brampton ZUM BRT</li> <li>Future Hazel McCallion LRT</li> </ul>	<b>No minimum</b>
Ottawa <sup>2</sup>	By-law 2008-250	Area "X"	Mixed-Use Building (within 300 metres of a rapid transit station)	<ul style="list-style-type: none"> <li>O-Train LRT</li> <li>OC Transpo Rapid Bus</li> <li>OC Transpo Frequent Bus</li> </ul>	<b>0.0 to 0.5 spaces / unit</b>
Kingston	By-law 2022-62	Parking Area 1 (Downtown)	Mixed-Use Building	<ul style="list-style-type: none"> <li>Kingston Transit Express Bus</li> <li>Kingston Transit Bus</li> </ul>	<b>0.40 spaces / unit</b>
Kitchener	By-law 2019-051	Urban Growth Centre	Multiple Residential Buildings	<ul style="list-style-type: none"> <li>GO Bus / Train</li> <li>GRT bus</li> <li>GRT Ixpress Bus</li> <li>GRT ION LRT</li> </ul>	<b>No Minimum</b>

## 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 6.4** 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.

### 6.3.1.5 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 6.5**.





**TABLE 6.5: APPROVED GTHA WIDE RESIDENT PARKING SUPPLY REDUCTIONS**

Address	Nearest Major Transit Station	Approved Minimum Resident Parking Rate	Permission Through	Year of Approval
<b>Proposed Development</b>				
157 & 167 Cross Avenue	Oakville GO Station (~300 m from site)	0.50 spaces / unit (proposed)	--	--
<b>City of Mississauga</b>				
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
Block 8 Mississauga City Centre	City Centre Transit Terminal (~300m from site)	0.67 spaces / unit	CoA File A323.23 (December 2023)	2023
<b>City of Hamilton</b>				
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



Address	Nearest Major Transit Station	Approved Minimum Resident Parking Rate	Permission Through	Year of Approval
<b>City of Pickering</b>				
Universal City 2 & 3 (Bayly Street & Liverpool Road)	Pickering GO Station (~550 m from site)	0.74 spaces / unit	CoA File P/CA 60/19	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
<b>City of Vaughan</b>				
Transit City 3 <sup>1</sup> (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 <sup>1</sup> (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 <sup>1</sup> (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 and 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 6.5** 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 minimum 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.



### 6.3.1.6 Proposed Resident Based Transportation Demand Management Strategies

As discussed in detail in **Section 5.0**, 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 share 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 5.0**. As such, the proposed resident parking reduction can be appropriately accommodated through the proposed resident-based TDM strategies.



### 6.3.1.7 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 6.6**.

**TABLE 6.6: SUMMARY OF RESIDENT PARKING RATIONALE**

Theme/Initiative	Brief Description
<b>Proposed Resident Parking Rate: 0.50 spaces per unit</b>	
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. <b>Resident Zoning By-law Range Observed: 0.00 - 0.80 spaces per unit</b>
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. <b>Resident Reduction Approval Range Observed: 0.18 - 0.74 spaces per unit</b>
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.



### 6.3.2 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.

#### 6.3.2.1 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 6.3.1.1**, 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 100m<sup>2</sup> 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.

### 6.3.2.2 Review of Evolving Transportation Context

As described in **Section 6.3.1.2**, the site is within 300 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.

### 6.3.2.3 Transit Reach Assessment

As described in **Section 6.3.1.3**, 15, 30, and 45 minute transit reach to and from the Site during the weekday morning and afternoon travel periods were analysed 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.

### 6.3.2.4 Review of Residential Visitor Zoning By-law Standards

In addition to the resident parking standards reviewed in **Section 6.3.1.4**, 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 6.7**. 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 6.7: RESIDENTIAL VISITOR PARKING SUPPLY RATIO REQUIREMENTS – COMPARABLE ONTARIO MUNICIPALITIES**

Municipality	Zoning By-law	Centre Area	Land Use Category	Nearby Transit Service	Minimum Visitor Parking Requirements (spaces per unit)
157 & 167 Cross Avenue, Oakville (Proposed)	-	Midtown Oakville	Mixed-Use Building	<ul style="list-style-type: none"> <li>GO Train</li> <li>Oakville Transit</li> </ul>	0.15
Barrie	Draft Zoning By-law (June 2023)	District 1 District 2	Any Dwelling Unit	<ul style="list-style-type: none"> <li>GO Train</li> <li>Barrie Transit Bus</li> </ul>	0.10
Mississauga	By-law 0225-2007	Precinct 1	Condo / Rental Apartment	<ul style="list-style-type: none"> <li>MiWay Bus</li> <li>MiWay Express Bus</li> <li>Mississauga Transitway</li> <li>GO Bus / Train</li> <li>Future Hurontario LRT</li> <li>Future Lakeshore BRT</li> </ul>	0.20
Mississauga	By-law 0225-2007	City Centre	Apartment Dwelling	<ul style="list-style-type: none"> <li>MiWay Bus</li> <li>MiWay Express Bus</li> <li>Mississauga Transitway</li> <li>GO Bus / Train</li> <li>Future Hurontario LRT</li> <li>Future Lakeshore BRT</li> </ul>	0.15
Pickering	By-law 7553-17	City Centre	Apartment Dwelling	<ul style="list-style-type: none"> <li>Durham Region Transit Bus</li> <li>GO Train</li> <li>Future Durham-Scarborough BRT</li> </ul>	0.15
Waterloo	By-law 2018-050	Residential Mixed-Use Zones (Parking Area A)	Residential	<ul style="list-style-type: none"> <li>Grand River Bus</li> <li>Grand River ION LRT</li> <li>GO Bus / Train</li> </ul>	0.10 <sup>1</sup>
Vaughan	By-law 001-2021	VMC	Apartment Dwelling	<ul style="list-style-type: none"> <li>YRT Bus</li> <li>YRT Viva BRT</li> <li>GO Bus / Train</li> <li>TTC Bus / Subway</li> </ul>	0.15
Vaughan	Yonge-Steeles Secondary Plan (OLT)	Yonge-Steeles	Apartment Dwelling	<ul style="list-style-type: none"> <li>YRT Bus</li> <li>YRT Viva BRT</li> <li>GO Bus</li> </ul>	0.15



Municipality	Zoning By-law	Centre Area	Land Use Category	Nearby Transit Service	Minimum Visitor Parking Requirements (spaces per unit)
				<ul style="list-style-type: none"> <li>TTC Bus / Subway</li> <li>Future Yonge North Subway Extension</li> </ul>	
Toronto	By-law 569-2013	Parking Zone B	All non-residential uses	<ul style="list-style-type: none"> <li>TTC Bus / Subway / Streetcar</li> <li>GO Bus / Train</li> <li>Miway Bus</li> <li>Future TTC Subway</li> <li>Future TTC Streetcar</li> <li>Future TTC BRT</li> </ul>	2 spaces + 0.05
Kingston	By-law 2022-62	Parking Area 1 (Downtown) & Parking Area 2 (Main Street Corridor)	Mixed-Use Building	<ul style="list-style-type: none"> <li>Kingston Transit Bus</li> <li>Kingston Transit Express Bus</li> </ul>	0.10
Hamilton	By-law 05-200	Downtown Zone	Multiple Dwelling	<ul style="list-style-type: none"> <li>HSR Bus</li> <li>Future B-Line LRT</li> <li>Future A-Line BRT</li> <li>GO Bus / Train</li> </ul>	Inclusive of minimum resident rate
Kitchener	By-law 2019-051	Urban Growth Centre / Downtown	Multiple Residential Buildings	<ul style="list-style-type: none"> <li>Grand River Bus</li> <li>Grand River ION LRT</li> <li>GO Bus / Train</li> </ul>	No minimum
Brampton	By-law 270-2004	Central Area / Downtown	Apartment Dwelling	<ul style="list-style-type: none"> <li>Brampton Bus</li> <li>Brampton ZUM BRT</li> <li>GO Bus / Train</li> <li>Future Hurontario LRT</li> </ul>	0.20

## 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.



### 6.3.2.5 Observed Residential Visitor Parking Reduction 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 6.8**.



**TABLE 6.8: APPROVED GTHA WIDE RESIDENTIAL VISITOR PARKING SUPPLY REDUCTIONS**

Address	Nearest Major Transit Station	Approved Minimum Residential Visitor Parking Rate	Permission Through	Year of Approval
<b>Proposed Development</b>				
157 & 167 Cross Avenue	Oakville GO Station (~300 m from site)	0.15 spaces / unit (proposed)	--	--
<b>City of Mississauga</b>				
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 Site-Specific Zoning By-law 0054-2020	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
<b>City of Brampton</b>				
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



### 6.3.2.6 Review of Non-Residential Zoning By-law Standards

A comprehensive Zoning By-law comparison review for non-residential parking standards was also undertaken and is summarized in **Table 6.9**.

Similar to **Section 6.3.2.4**, 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 100m<sup>2</sup> of non-residential GFA. As such, the proposed rate of 1.08 spaces per 100m<sup>2</sup> 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 6.9: COMPARABLE NON-RESIDENTIAL PARKING SUPPLY RATIO REQUIREMENTS**

Municipality	Zoning By-law	Centre Area	Land Use	Nearby Transit Service	Minimum Parking Requirements (spaces per 100m <sup>2</sup> )
157 & 167 Cross Avenue, Oakville (Proposed)	-	Midtown Oakville	Retail & Office	<ul style="list-style-type: none"> <li>GO Bus / Train</li> <li>Oakville Transit</li> </ul>	1.08 (for all non-residential uses)
Barrie	Draft Zoning By-law (June 2023)	District 1 District 2	All non-residential uses	<ul style="list-style-type: none"> <li>GO Train</li> <li>Barrie Transit Bus</li> </ul>	No minimum
Mississauga	By-law 0225-2007	Precinct 1 <sup>1</sup>	Retail	<ul style="list-style-type: none"> <li>MiWay Bus</li> <li>MiWay Express Bus</li> <li>Mississauga Transitway</li> <li>GO Bus / Train</li> <li>Future Hurontario LRT</li> <li>Future Lakeshore BRT</li> </ul>	3.00
			Recreational Establishment		4.50
Pickering	By-law 7553-17	City Centre	Retail	<ul style="list-style-type: none"> <li>Durham Region Transit Bus</li> <li>GO Train</li> <li>Future Durham-Scarborough BRT</li> </ul>	3.50
			Commercial Fitness		4.50
Vaughan	By-law 001-2021	VMC	Retail <sup>2</sup>	<ul style="list-style-type: none"> <li>YRT Bus</li> <li>YRT Viva BRT</li> <li>GO Bus / Train</li> <li>TTC Bus / Subway</li> </ul>	0.70
			Health and Fitness Centre		0.90
Toronto	By-law 569-2013	Parking Zone B	All non-residential uses	<ul style="list-style-type: none"> <li>TTC Bus / Subway / Streetcar</li> <li>GO Bus / Train</li> <li>Miway Bus</li> <li>Future TTC Subway</li> <li>Future TTC Streetcar</li> <li>Future TTC BRT</li> </ul>	No minimum
Kingston	By-law 2022-62	Parking Area 1 (Downtown) & Parking Area 2 (Main Street Corridor)	Retail & Commercial	<ul style="list-style-type: none"> <li>Kingston Transit Bus</li> <li>Kingston Transit Express Bus</li> </ul>	No minimum



Municipality	Zoning By-law	Centre Area	Land Use	Nearby Transit Service	Minimum Parking Requirements (spaces per 100m <sup>2</sup> )
Hamilton	By-law 05-200	Downtown Zone	Retail & Commercial	<ul style="list-style-type: none"> <li>• HSR Bus</li> <li>• Future B-Line LRT</li> <li>• Future A-Line BRT</li> <li>• GO Bus / Train</li> </ul>	No minimum
Kitchener	By-law 2019-051	Urban Growth Centre / Downtown	Retail	<ul style="list-style-type: none"> <li>• Grand River Bus</li> <li>• Grand River ION LRT</li> <li>• GO Bus / Train</li> </ul>	No minimum
			Fitness Centre		No minimum
Brampton	By-law 270-2004	Central Area / Downtown	Retail	<ul style="list-style-type: none"> <li>• Brampton Bus</li> <li>• Brampton ZUM BRT</li> <li>• GO Bus / Train</li> <li>• Future Hurontario LRT</li> </ul>	4.50
			Fitness Centre		4.50

## Notes:

1. Shared parking calculations allow for visitor parking to accommodate non-residential uses as an option for providing non-residential parking
2. Retail parking rate applies to establishments less than 5,000m<sup>2</sup> GFA





### 6.3.2.7 Proposed Non-Residential Based TDM Strategies

As discussed in detail in **Section 5.0**, 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.



### 6.3.2.8 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 6.10**.

**TABLE 6.10: SUMMARY OF REDUCED NON-RESIDENT PARKING RATIONALE**

Theme/Initiative	Brief Description
<b>Proposed Residential Visitor and Retail Parking Rate: No Minimum Requirement</b>	
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. <b>Residential Visitor Zoning By-law Range Observed: 0.00 - 0.20 spaces per unit</b> <b>Non-Residential Zoning By-law Range Observed: 0.00 - 4.50 spaces per 100 m<sup>2</sup> GFA</b>
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. <b>Resident Reduction Approval Range Observed: 0.10 - 0.15 spaces per unit</b>
Residential Visitor-Based TDM Strategies	The proposed visitor-based TDM strategies, including the provision of short-term bicycle parking supply and meeting the Zoning By-law standards to encourage the use of active and sustainable transportation modes, reducing reliance on private automobile ownership and usage.



## 6.4 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 6.11**.

**TABLE 6.11: SUMMARY PARKING RATIONALE**

Theme/Initiative	Brief Description	
	Resident	Non-Resident
	Proposed Resident Rate: 0.50 spaces per unit	Proposed Residential Visitor Rate: 0.15 spaces per unit Proposed Non-Residential Rate: 1.08 spaces per 100 m <sup>2</sup>
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: <b>0.00 - 0.80 spaces / unit</b>	Residential Visitor Zoning By-law Range: <b>0.00 - 0.20 spaces / unit</b> Non-Residential Zoning By-law Range: <b>0.00 - 4.50 spaces / 100 m<sup>2</sup> GFA</b>
Parking Requirement Reduction Approvals across the GTHA	Resident Approval Range: <b>0.18 to 0.74 spaces / unit</b>	Residential Visitor Approval Range: <b>0.10 to 0.15 spaces / unit</b>
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.	



## 7 Loading Considerations

### 7.1 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.

### 7.2 Proposed Loading Supply

It is proposed to provide 4 loading spaces within a consolidated loading area for the two (2) towers within the site. The proposed loading spaces are configured as follows:

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

Access to the consolidated loading area is proposed from the driveway off Street 1. The loading area will serve as the consolidated garbage pick up location for both Towers and has the requisite internal manoeuvring area and refuse bin staging area. The area around the loading entrance would be equipped with a signaling and signage system to ensure that when loading vehicles are manoeuvring into or out of the loading area, vehicles entering or exiting the parking garage and using the driveway in the vicinity of the loading area would be aware of the potential for truck manoeuvring occurring.



### 7.3 Operations and Manoeuvring

The proposed access and driveway configuration associated with the two Towers within the Project combined with the loading area layouts can appropriately accommodate forward in and forward out manoeuvring for each loading area.

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 the 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), and a heavy single unit truck (TAC HSU).

Vehicular Manoeuvring Diagrams (VMD's) illustrating the service vehicle manoeuvring characteristics across the various loading areas are found in **Appendix E**. 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.

### 7.4 Height Clearances

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

### 7.5 Loading Summary

The proposed development incorporates a total of 4 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.



## 8 Bicycle Parking Considerations

### 8.1 Zoning By-law Bicycle Parking Requirements

Application of the bicycle parking standards outlined in underlying Town of Oakville Zoning By-law 2014-014 requires a minimum of 1,204 bicycle parking spaces (904 long-term and 300 short-term bicycle parking spaces). A detailed summary of these requirements is provided in **Table 8.1**

**TABLE 8.1: ZONING BY-LAW 2014-014 BICYCLE PARKING REQUIREMENTS**

Land Use		Units / NFA <sup>[1]</sup>	Minimum Parking Rate <sup>[2]</sup>	Minimum Parking Requirement <sup>[2]</sup>
Residential	Long-term	1,198 units	0.75 spaces / unit	899 spaces
	Short-term		0.25 spaces / unit	300 spaces
	<b>Subtotal</b>	<b>1,198 units</b>	--	<b>1,199 spaces</b>
Non-Residential	Retail Long-term	2,693 m <sup>2</sup> GFA	Greater of 2 or 1 space / 1000 m <sup>2</sup> GFA	3 spaces
	Office Long-term	1,027 m <sup>2</sup> GFA	Greater of 2 or 1 space / 1000 m <sup>2</sup> GFA	2 spaces
	<b>Subtotal</b>	--	--	<b>5 spaces</b>
<b>Long-Term</b>				<b>904 spaces</b>
<b>Short-Term</b>				<b>300 spaces</b>
<b>Total</b>				<b>1,204 spaces</b>

Notes:

1. Based upon site statistics provided by Teeple Architects dated February 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.



## 8.2 Proposed Bicycle Parking Supply

A total of 1,204 bicycle parking spaces are proposed across the Project on the ground floor, mezzanine level, and second level. This includes 899 resident long term bike parking spaces, 300 residential visitor short term bike parking spaces and 5 long term bike parking spaces for the retail and office 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 via the main elevator cores from either Tower.

A bicycle repair station will be provided for each Tower within a secure room.

## 8.3 Proposed Bicycle Parking Supply

The proposed bicycle parking supply of 1,204 bicycle parking spaces are considered appropriate and will accommodate the bicycle parking demands of the proposed development.



## 9 Development Trip Generation

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

- ▶ Multifamily Housing (High-Rise) (LUC 222);
- ▶ General Office Building (LUC 710); and
- ▶ Strip Retail Plaza (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 estimate. As such, no mode share reductions were applied to the trip generation.

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<sup>11</sup> Trip Generation Manual 11th Edition + Supplement Institute of Transportation Engineers Washington DC 2020





## 9.1 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 without travelling off-site is an internal capture.

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

ITE data suggests an internal capture rate of 2% - 14% for the respective peak hours.

## 9.2 Net Trip Generations Estimates

**Table 9.1** summarizes 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 345 new trips are forecasted to be generated during the AM peak hour and 356 new trips during the PM peak hour.

**TABLE 9.1: TRIP GENERATION**

Tower	ITE Land Use Code / Number of Units	Trips	AM Peak Hour				PM Peak Hour			
			Rate	In	Out	Sum	Rate	In	Out	Sum
A	222 - Multifamily Housing (High-Rise) 743 Units	Total	0.22	18	145	163	0.19	97	44	141
		Internal	2%	1	3	4	14%	14	6	20
		New	98%	17	142	159	86%	83	38	121
	822 - Strip Retail Plaza 14,362 sq.ft	Total	2.36	20	14	34	6.59	47	48	95
		Internal	9%	2	1	3	25%	8	16	24
		New	91%	18	13	31	75%	39	32	71
	710 - Office 15,209 sq.ft	Total	0.84	11	2	13	0.87	2	11	13
		Internal	0%	0	1	1	0%	1	2	3
		New	100%	11	1	12	100%	1	9	10
B	222 - Multifamily Housing (High-Rise) 547 Units	Total	0.22	13	107	120	0.19	72	32	104
		Internal	0%	0	0	0	11%	8	3	11
		New	100%	13	107	120	89%	64	29	93
	822 - Strip Retail Plaza 10,421 sq.ft	Total	2.36	15	10	25	6.59	34	35	69
		Internal	8%	2	0	2	12%	2	6	8
		New	92%	13	10	23	88%	32	29	61
<b>Full-Build Out Total</b>		<b>Total</b>	-	<b>77</b>	<b>278</b>	<b>355</b>	-	<b>252</b>	<b>170</b>	<b>422</b>
		<b>Internal</b>	3%	<b>5</b>	<b>5</b>	<b>10</b>	16%	<b>33</b>	<b>33</b>	<b>66</b>
		<b>New</b>	97%	<b>72</b>	<b>273</b>	<b>345</b>	84%	<b>219</b>	<b>137</b>	<b>356</b>



### 9.3 Trip Distribution and Assignment

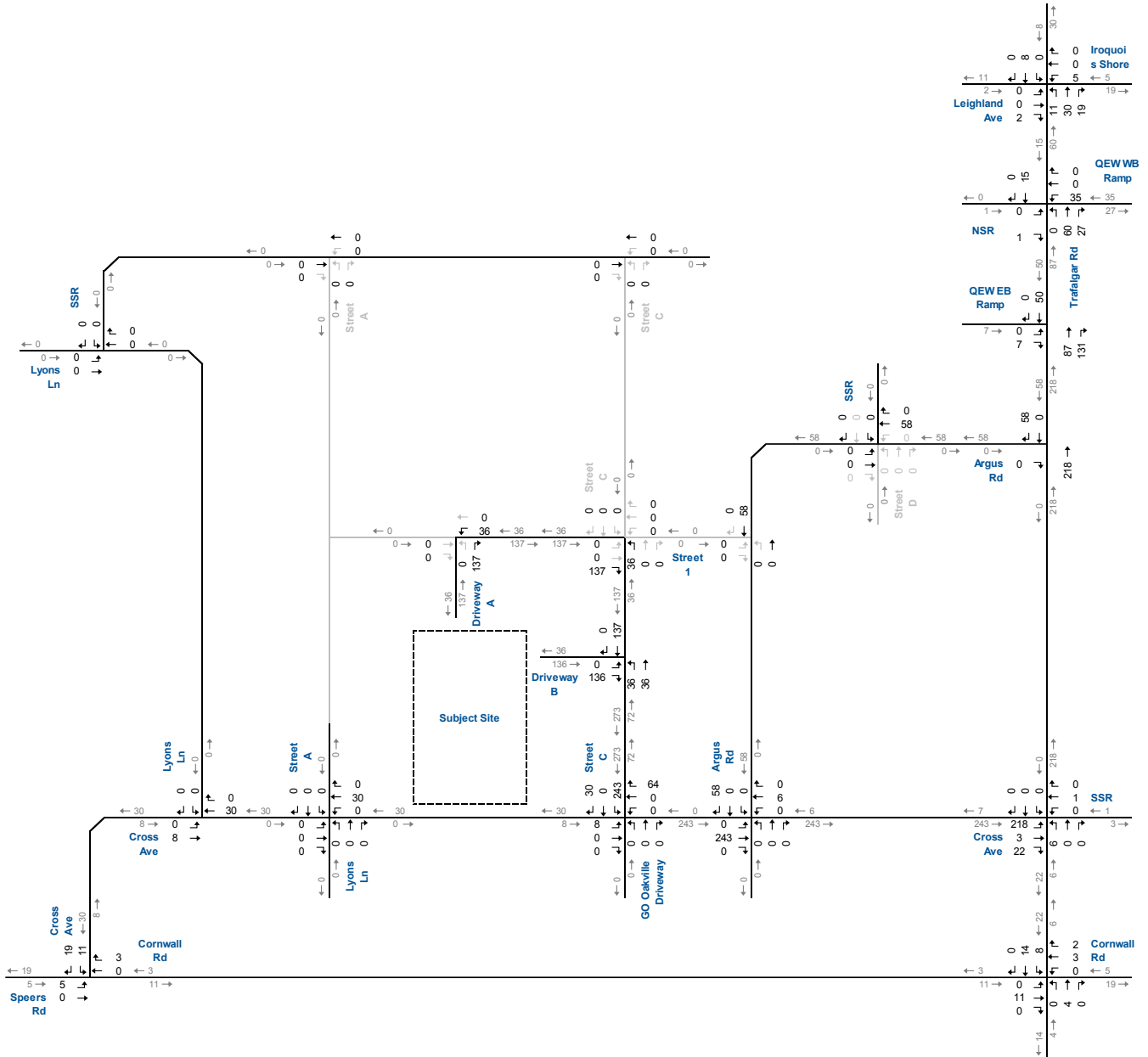
The area lends itself to commuter travel patterns, given the presence of a GO Station on the south side of Cross Avenue, similar to what the development would exhibit. The site-generated trips were assigned to the road network based on the existing distribution of traffic at the study area intersections. The distribution is summarized in **Table 9.2**.

**Figure 9.1** displays the site trip assignment under full-build out.

**TABLE 9.2: TRIP DISTRIBUTION**

Direction	Route	AM Peak Hour	PM Peak Hour
North	Trafalgar Road	39%	39%
South	Trafalgar Road	7%	7%
East	QEW	6%	6%
	South Service Road	5%	5%
	Cross Avenue	19%	19%
West	QEW	20%	20%
	Cross Avenue/Speers Road	4%	4%
<b>Total</b>		<b>100%</b>	<b>100%</b>

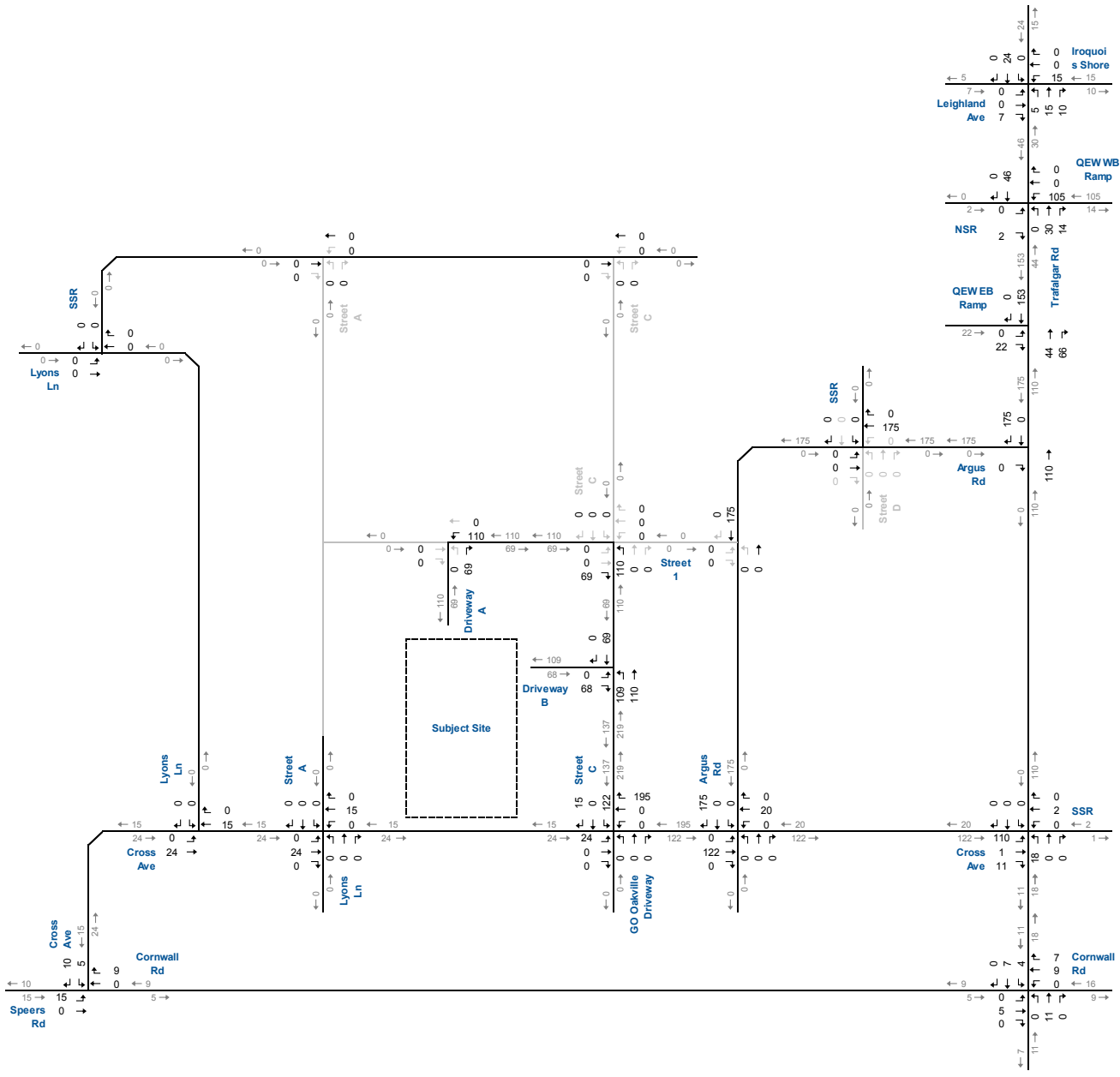




# Site Generated AM Peak Hour

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Figure 9.1A



# Site Generated PM Peak Hour

Figure 9.1B

## 10 Future Conditions

To remain consistent with MTO and Region traffic impact study guidelines, horizon years of 2027 (Opening Date), 2032 (Full Build-Out) and 2037 (5 years after Full Build-Out) have been utilized for analysis of future traffic conditions.

### 10.1 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 MTO 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 2032 and 2037 horizons. The developments included in the redevelopment of Midtown Oakville are outlined in the following section.

In the 2037 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.



### 10.1.1 Background Developments

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

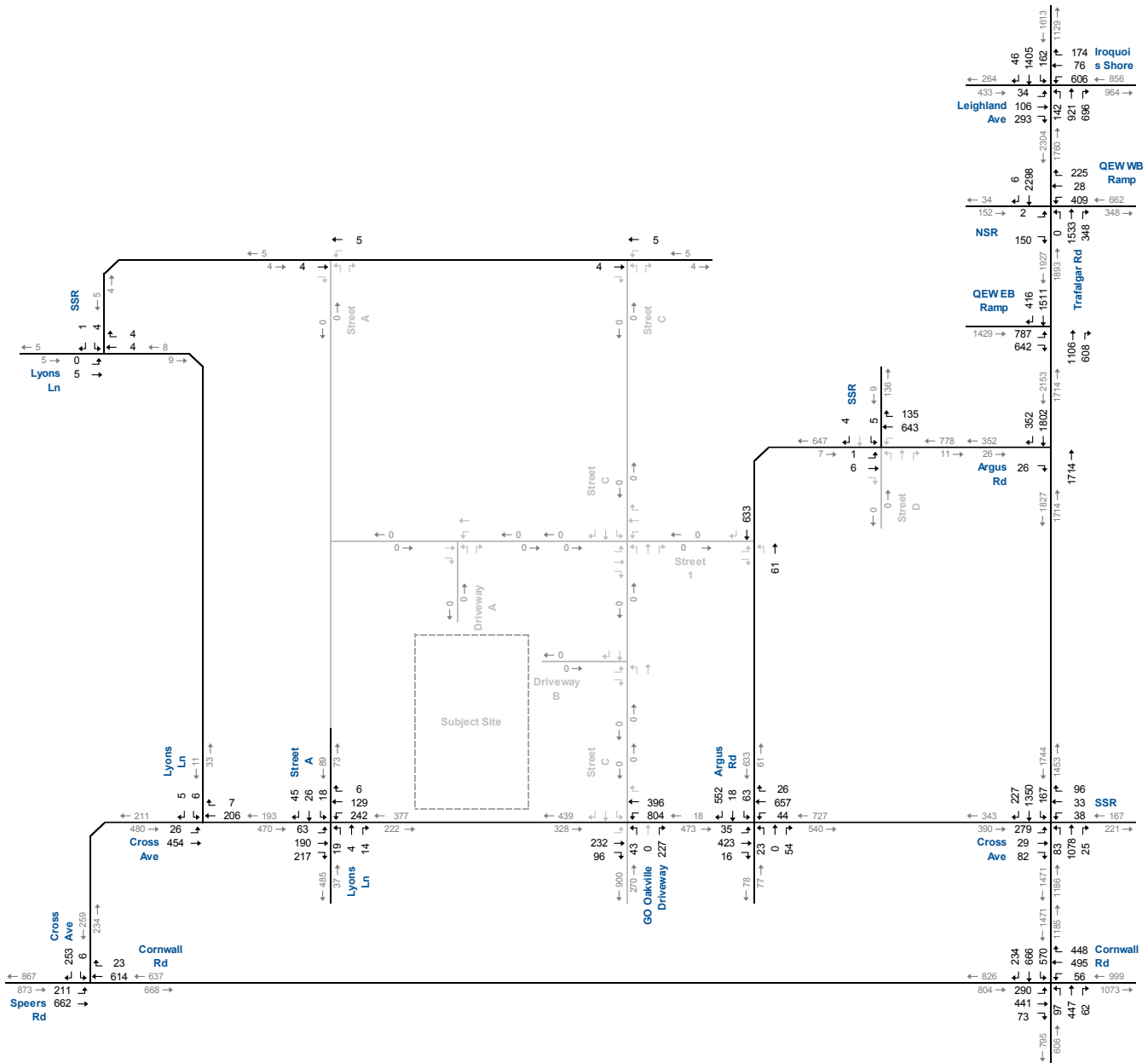
- ▶ 166 South Service Road – Located west of the subject site, the proposed development has three mixed-use towers with residential, commercial, and office uses.
- ▶ 271 Cornwall Road – Located east of Trafalgar Road at Cornwall Road, the proposed development is two-mixed use towers with residential, 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.
- ▶ 320 Davis Road – Located south of David Road and east of South Service Road, the proposed development is a pumping station expansion.

The Background traffic volumes for 2027 (Opening Date), 2032 (Full Build-Out) and 2037 (5 years after Full Build-Out) are illustrated in **Figures 10.1 to 10.13**.

### 10.1.2 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 2027 (Opening Date), 2032 (Full Build-Out) and 2037 (5 years after Full Build-Out) are illustrated in **Figures 10.4 to 10.6**.

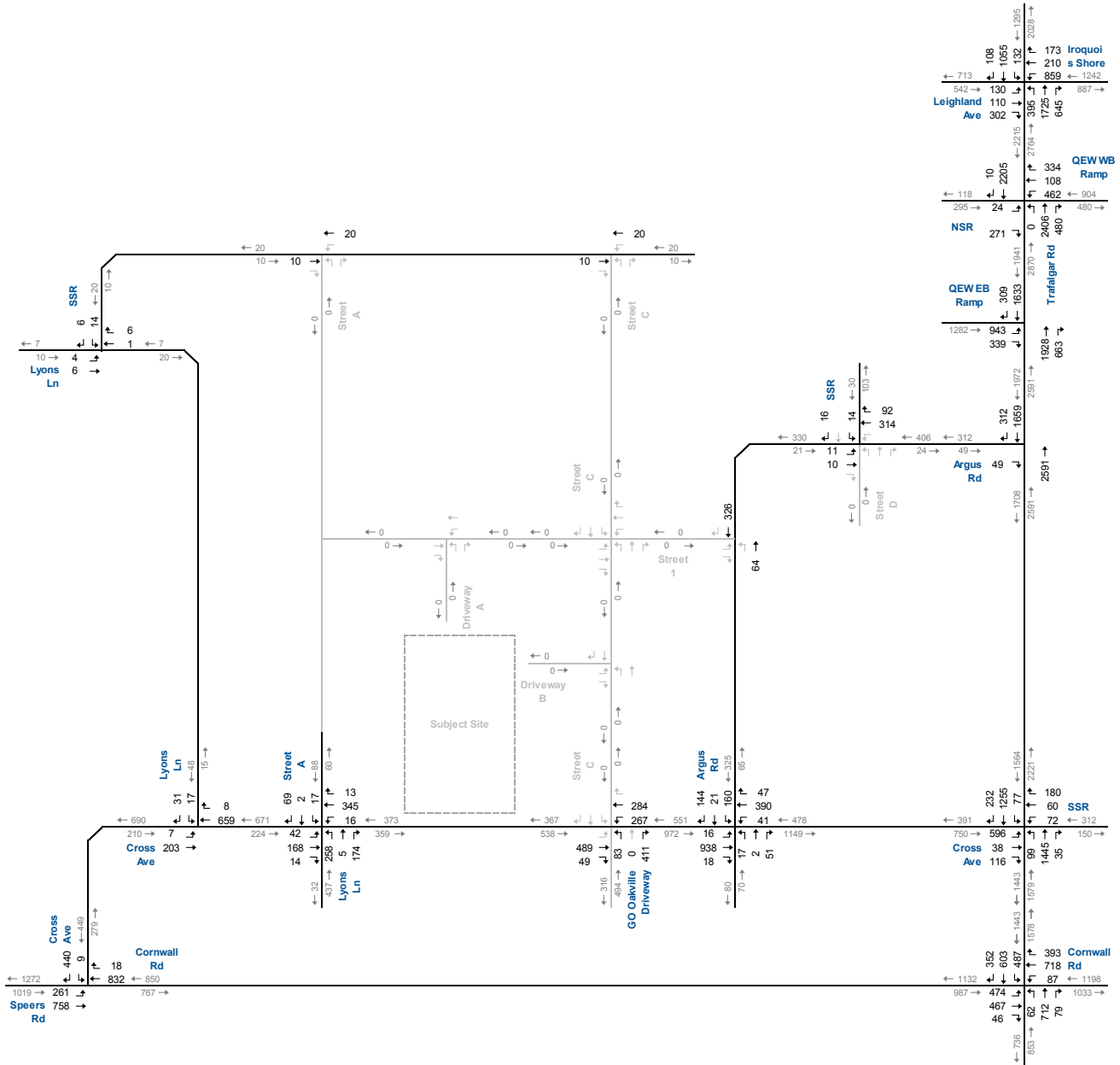




# 2027 Background AM Peak Hour

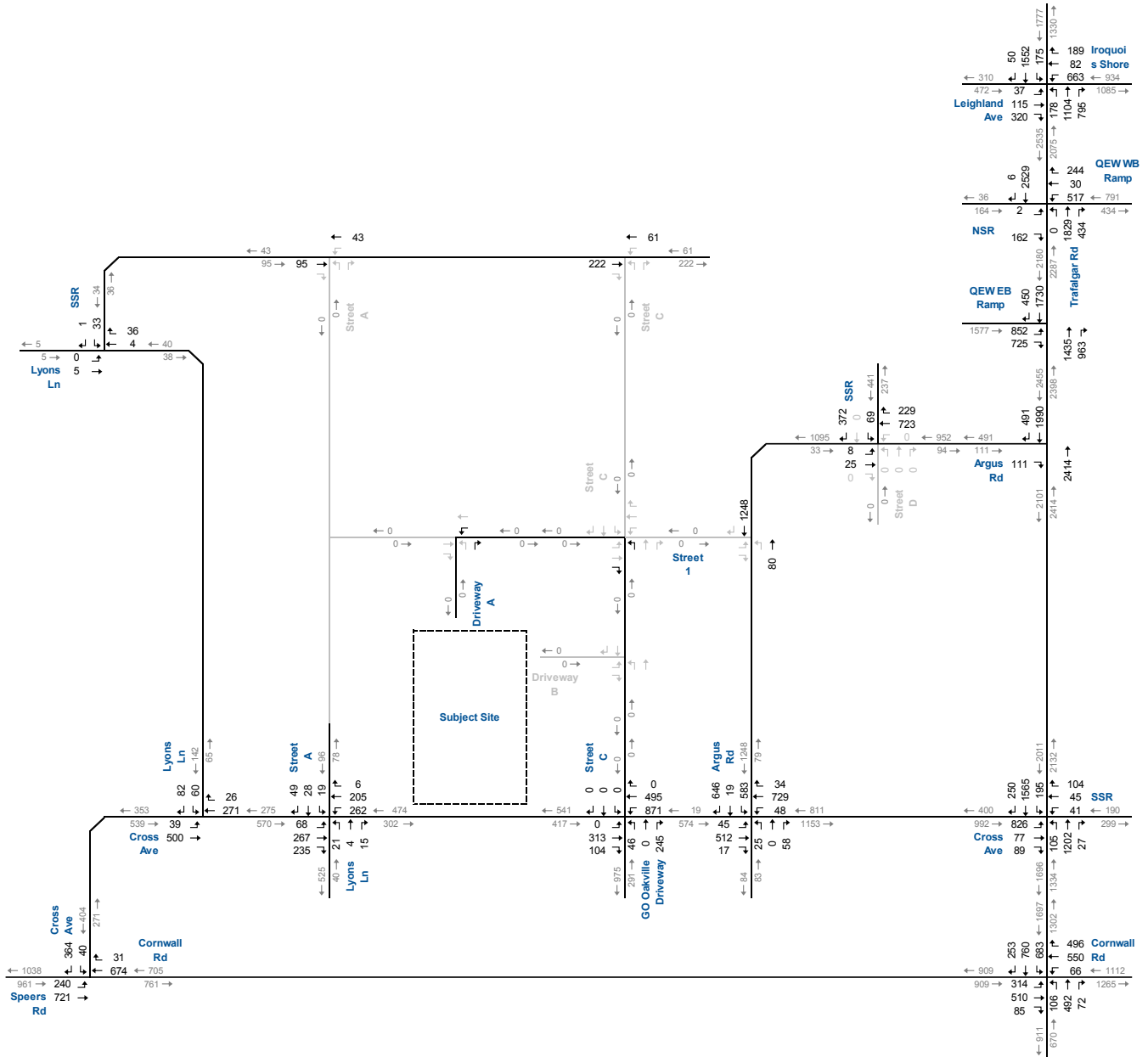
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Figure 10.1A



# 2027 Background PM Peak Hour

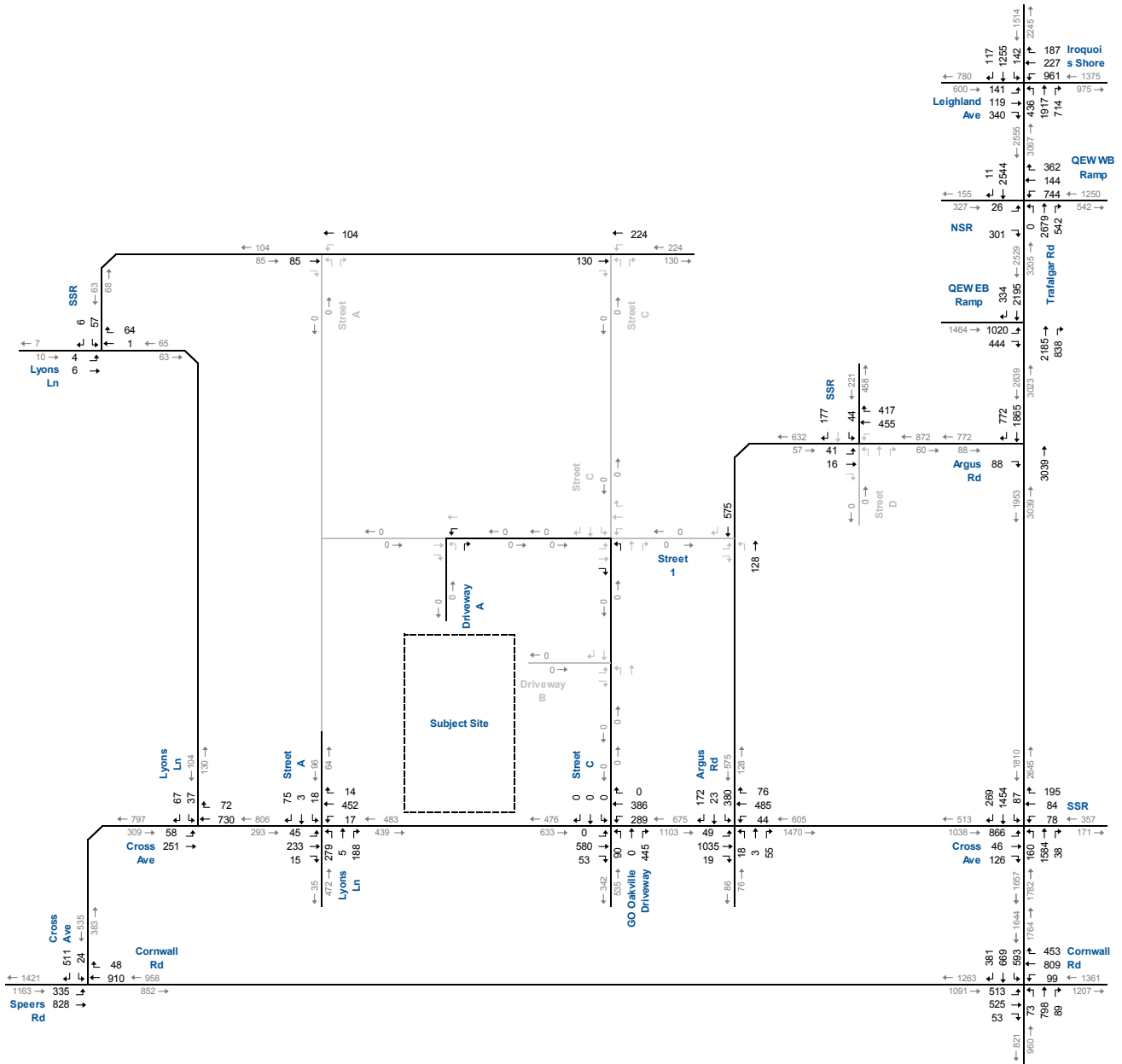




# 2032 Background AM Peak Hour

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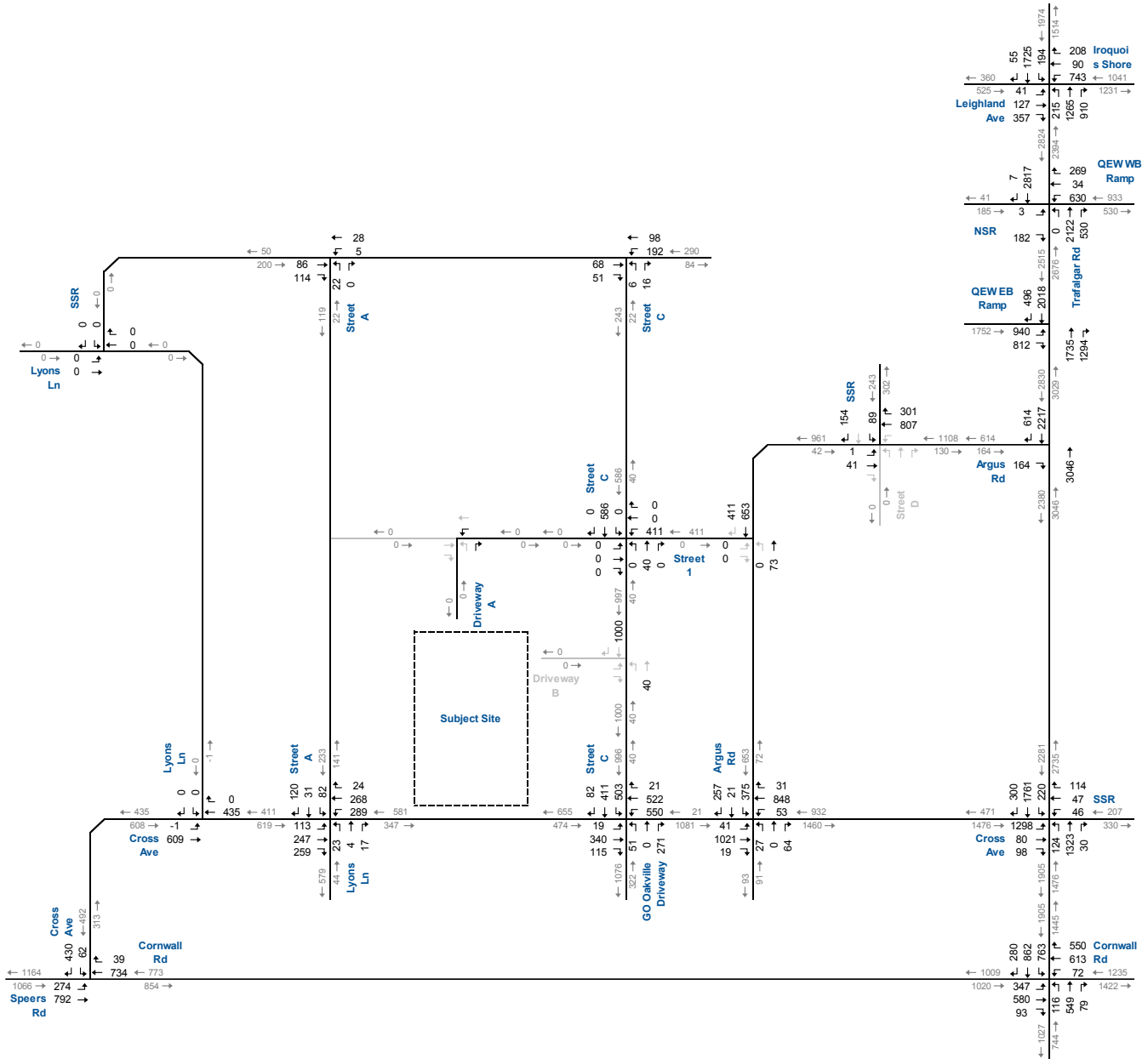
Figure 10.2A



# 2032 Background PM Peak Hour

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Figure 10.2B

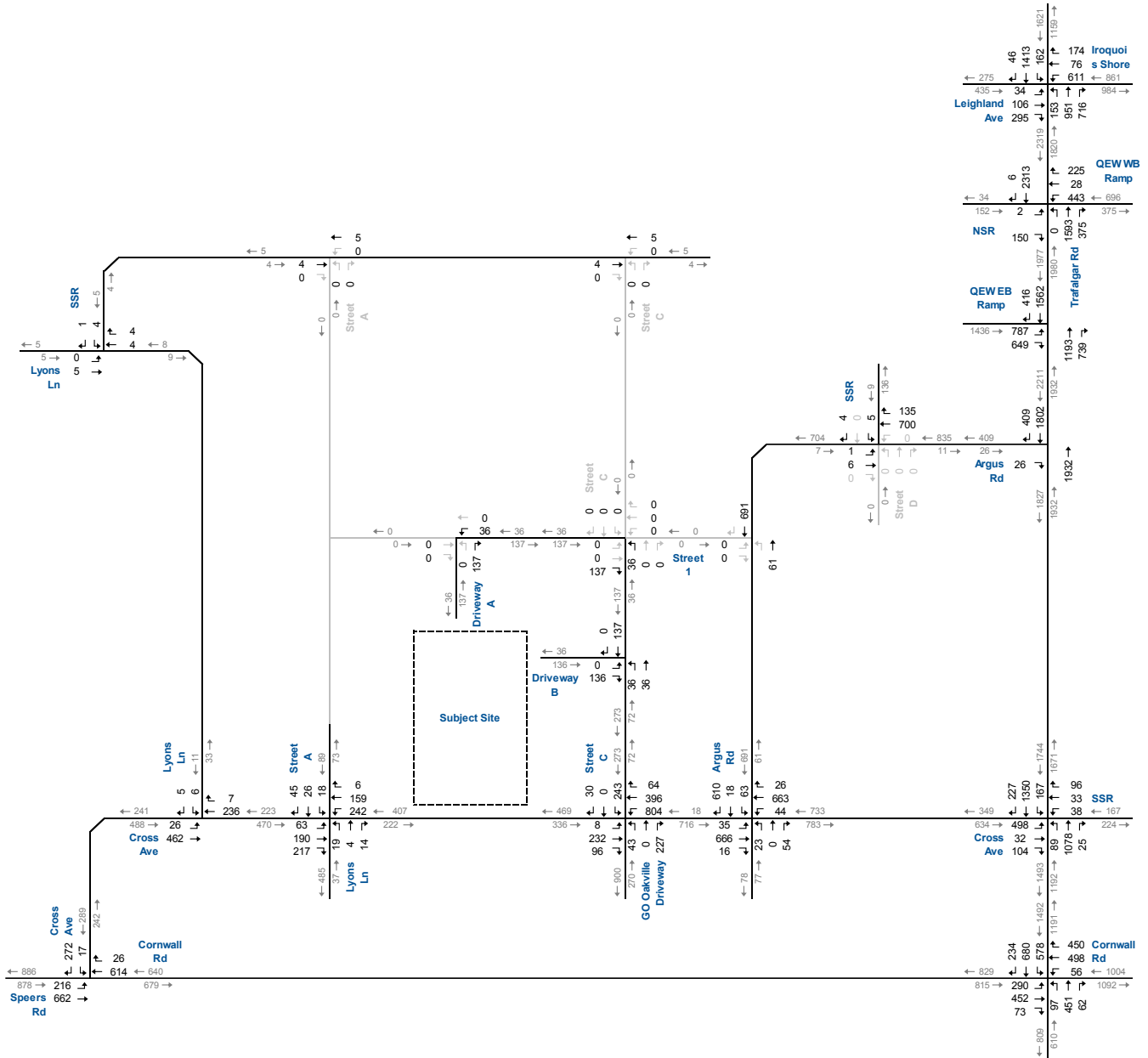


# 2037 Background AM Peak Hour

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Figure 10.3A

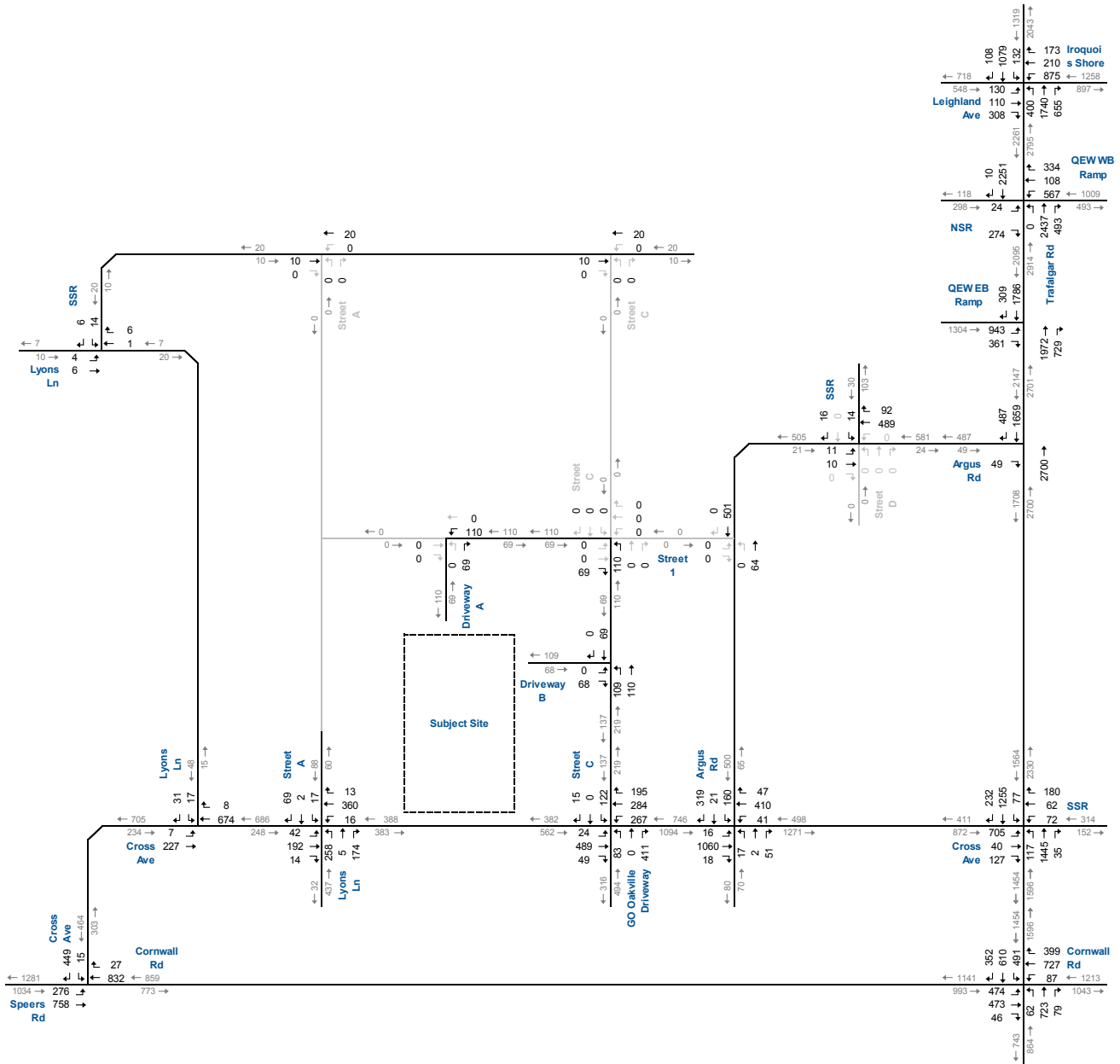




# 2027 Total AM Peak Hour

## Figure 10.4A

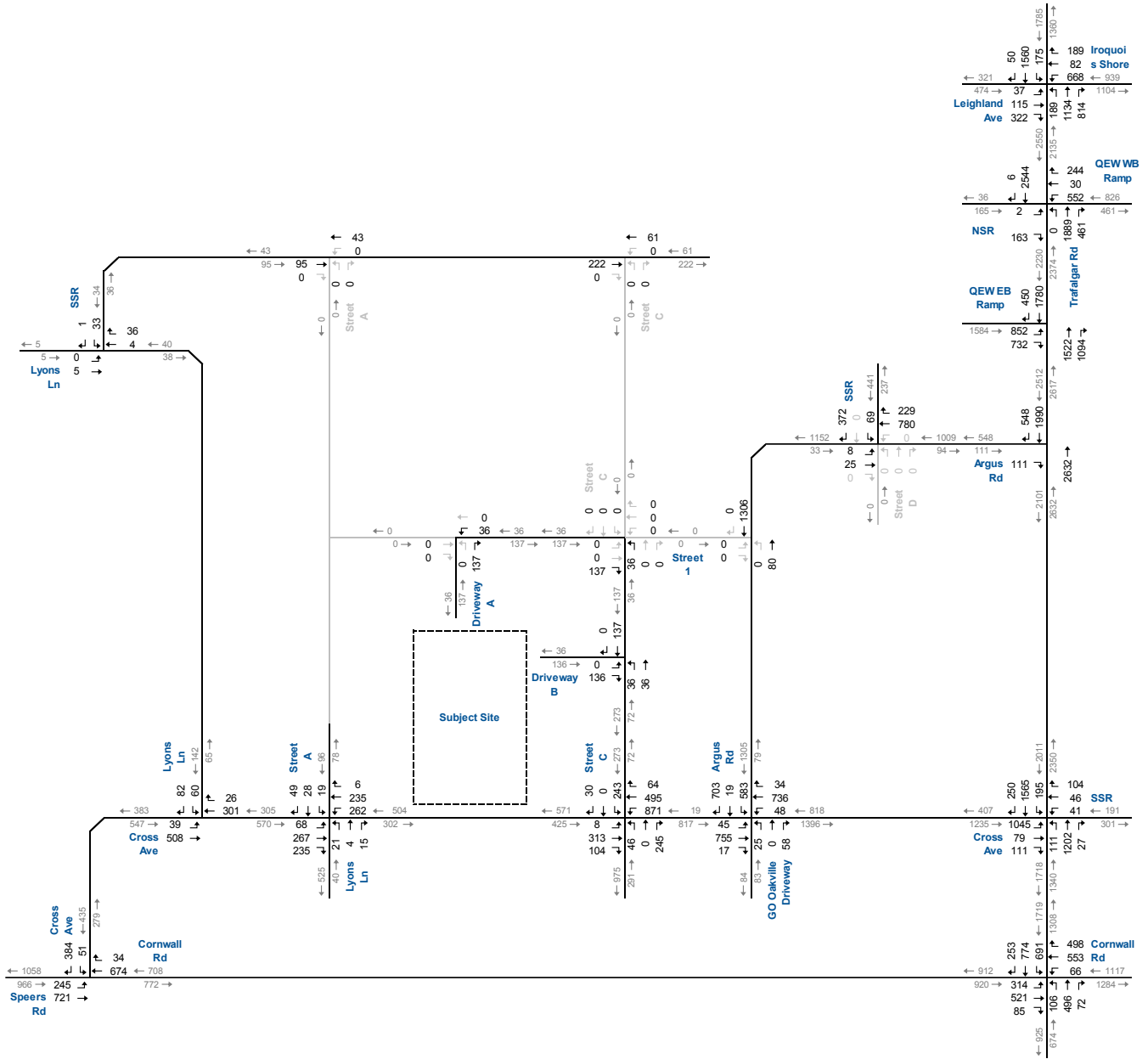
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# 2027 Total PM Peak Hour

Figure 10.4B

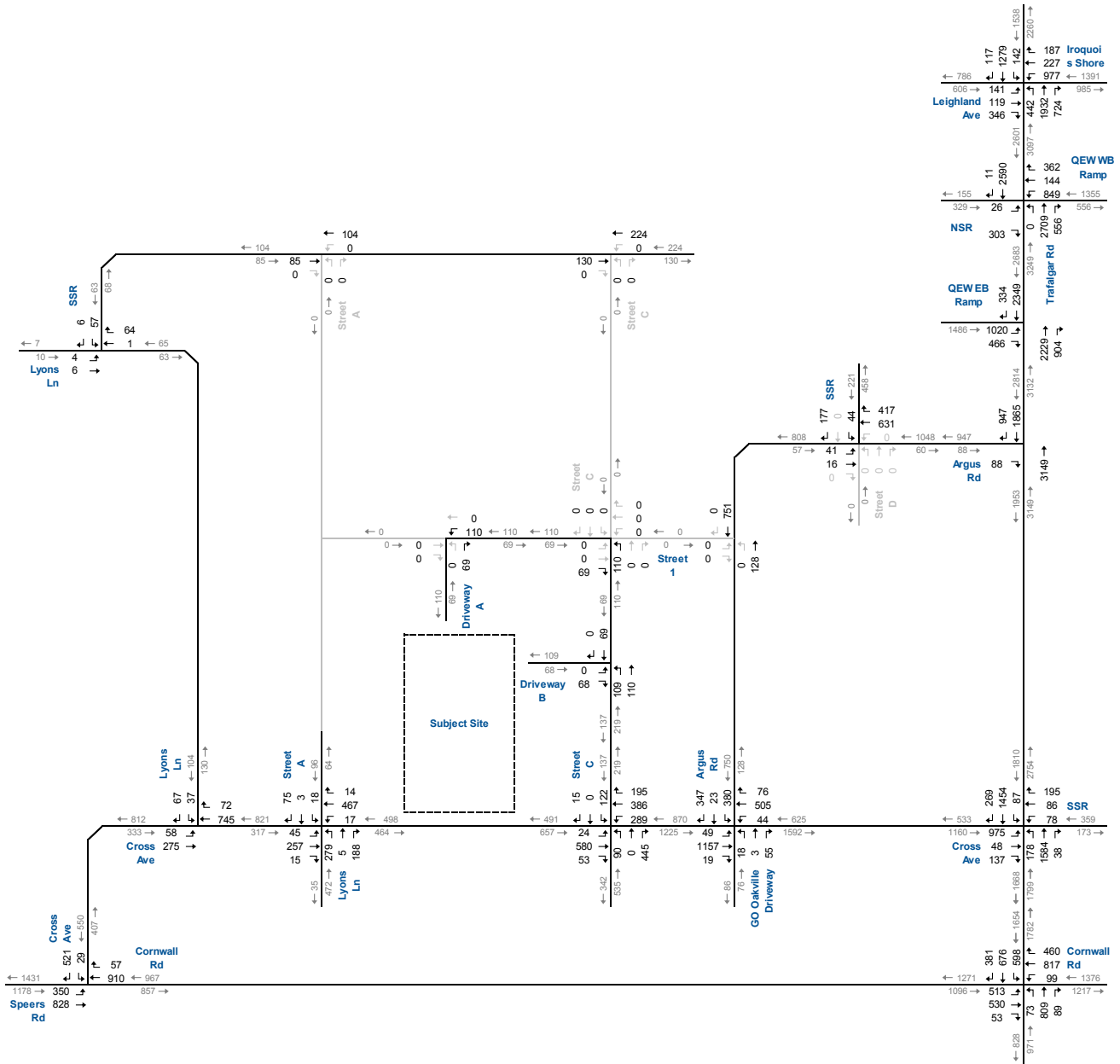
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# 2032 Total AM Peak Hour

Figure 10.5A

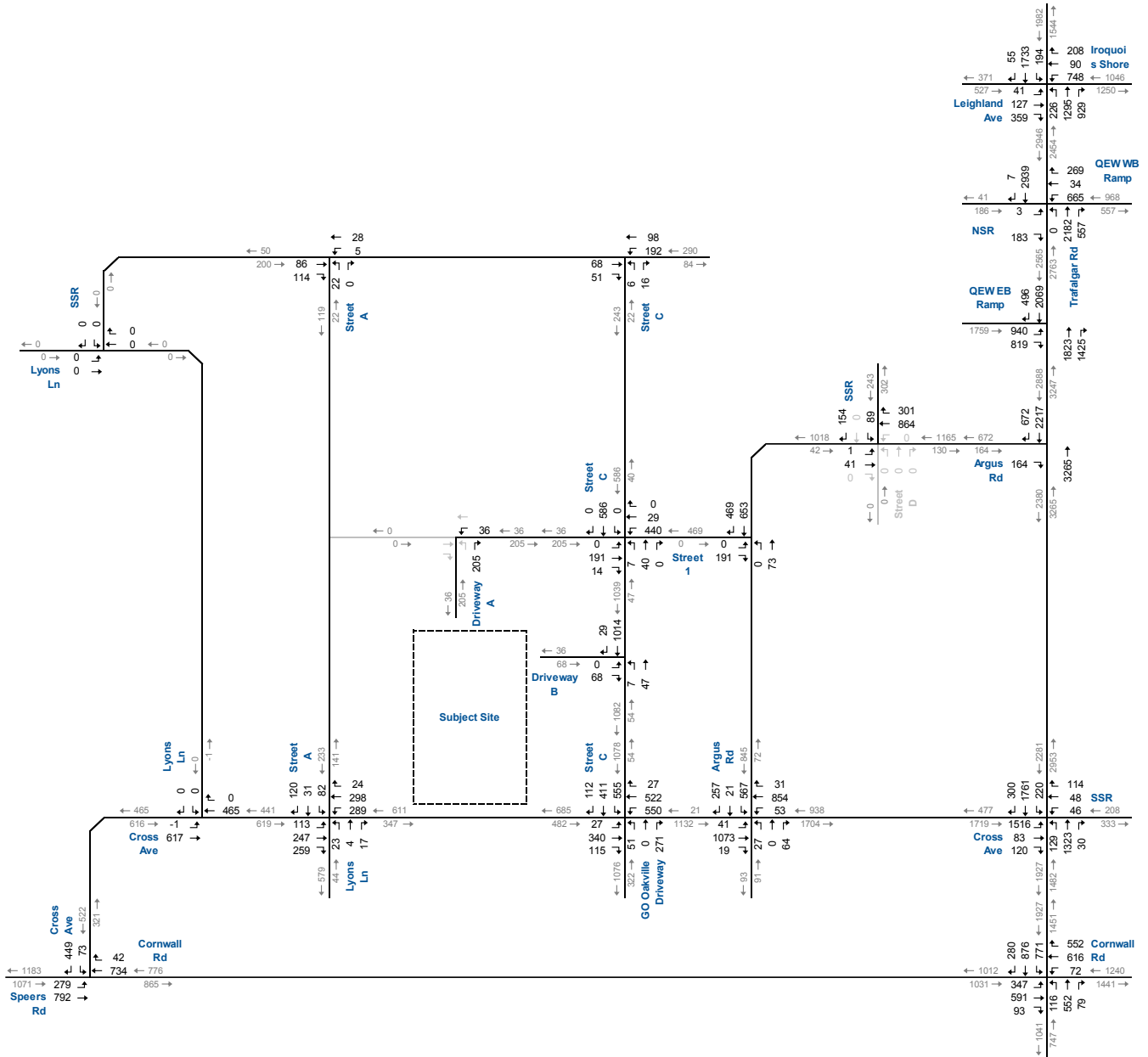
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# 2032 Total PM Peak Hour

Figure 10.5B

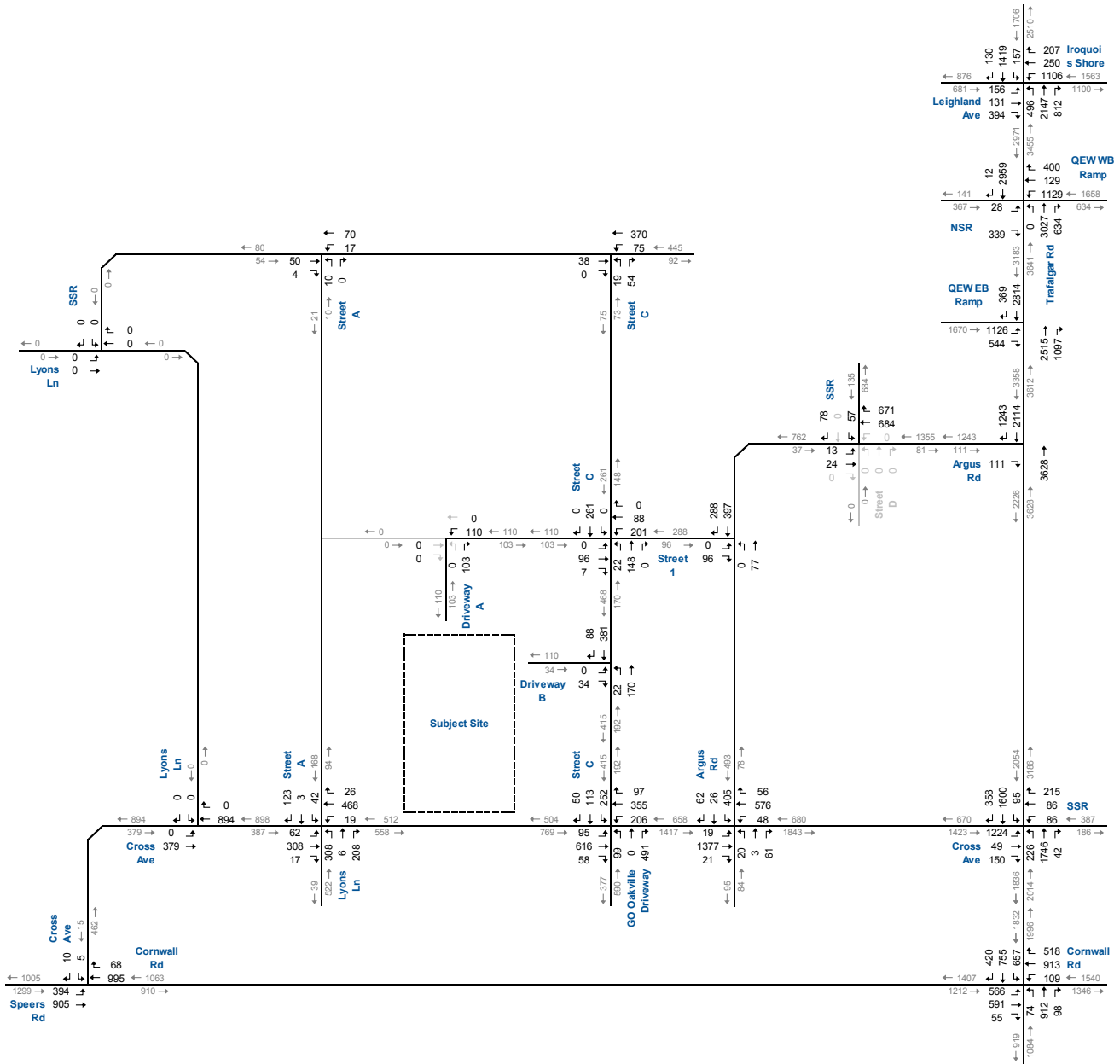




# 2037 Total AM Peak Hour

Figure 10.6A

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# 2037 Total PM Peak Hour

Figure 10.6B

# 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)<sup>12</sup>.

## 11.2 Intersection Capacity Analysis

Intersection capacity analyses were conducted at all intersections in the study area. Analyses were conducted for the Base Conditions as well as the Opening (2027), Full Build-Out (2032) and 5-Year after Full Build-Out (2037) Background and Total Conditions.

**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.

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<sup>12</sup> 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	●
2027 Background Operations	Exceeding Capacity	●
2027 Total Operations	Exceeding Capacity	●
2032 Background Operations	Exceeding Capacity	●
2032 Total Operations	Exceeding Capacity	●
2037 Background Operations	Exceeding Capacity	●
2037 Total Operations	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 2027 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 2032 Background conditions, the northbound and southbound through movements are projected to operate at LOS F with a v/c ratio exceeding 1.00 for the northbound approach. By the 2037 background horizon, the southbound through movement is projected to operate with a v/c ratio exceeding 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 (2027 Background)
- ▶ Southbound Through (2027 Background)



### 11.2.2 Trafalgar Road at QEW Westbound Ramp

2023 Base Year Operations	Approaching Capacity	●
2027 Background Operations	Exceeding Capacity	●
2027 Total Operations	Exceeding Capacity	●
2032 Background Operations	Exceeding Capacity	●
2032 Total Operations	Exceeding Capacity	●
2037 Background Operations	Exceeding Capacity	●
2037 Total Operations	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 2027 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 2032 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 2037 Background 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/Right (2027 Background)
- ▶ Westbound Left (2032 Background)
- ▶ Westbound Through (2032 Background)



**TABLE 11.1A: AM PEAK HOUR OPERATIONS (1 OF 9)**

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 & Leighland 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 18	C 25	C 32 0.76
		2027 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
		2027 Total	TCS	LOS Delay V/C Q	D 43 0.18 14	D 47 0.43 44	A 0 0.23 0	B 15	F 109 1.10 117	D 35 0.19 30	C 35 0.14 18	F 88	D 41 0.74 50	C 22 0.49 88	A 2 0.56 0	B 16	B 18 0.56 31	C 29 0.74 148	B 18 0.04 0	C 27	C 33 0.87
		2032 Background	TCS	LOS Delay V/C Q	D 42 0.18 15	D 48 0.47 46	A 0 0.24 0	B 15	F 161 1.24 138	D 37 0.22 31	C 36 0.15 19	F 125	C 35 0.65 75	C 25 0.58 104	A 2 0.63 0	B 17	B 23 0.65 36	D 41 0.91 163	C 21 0.04 0	D 39	D 43 0.99
		2032 Total	TCS	LOS Delay V/C Q	D 42 0.18 15	D 48 0.47 46	A 0 0.25 0	B 15	F 165 1.25 140	D 37 0.22 31	C 36 0.15 19	F 128	D 38 0.69 83	C 26 0.60 108	A 2 0.64 0	B 18	B 23 0.65 39	D 42 0.91 165	C 21 0.04 0	D 39	D 44 1
		2037 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 227 1.39 168	D 36 0.23 33	C 36 0.17 19	F 172	D 50 0.82 103	C 33 0.75 126	A 3 0.72 0	C 23	B 32 0.68 71	E 59 1.01 207	C 21 0.04 0	D 55	E 59 1.11
		2037 Total	TCS	LOS Delay V/C Q	D 42 0.20 16	D 47 0.49 50	A 1 0.27 0	B 15	F 231 1.40 169	D 36 0.23 33	C 36 0.17 19	F 175	E 57 0.86 110	C 33 0.76 131	A 4 0.73 0	C 24	B 34 0.69 73	E 60 1.01 209	C 21 0.04 0	E 56	E 60 1.12
	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 65	A 0 0.21 0	D 37	B 10 0.53 94	A 9	B 10 0.64 151	B 16 0.64 151	B 16	B 18 0.69 174	B 18 0.69 174	B 18	B 18	B 17 0.64
		2027 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 0.18 0	D 39	B 13 0.59 111	B 10	B 18 0.69 174	B 18 0.69 174	B 18	B 18 0.69 174	B 18	B 18	B 18	B 18 0.69
		2027 Total	TCS	LOS Delay V/C Q	E 62 0.02 4	D 36 0.32 44	D 37	E 60 0.76 99	E 58 0.75 99	A 0 0.18 0	D 40	B 15 0.63 122	B 12	B 19 0.71 181	B 19 0.71 181	B 19	B 19 0.71 181	B 19	B 19	B 20 0.71	
		2032 Background	TCS	LOS Delay V/C Q	E 56 0.01 3	E 64 0.60 52	E 64	E 72 0.87 143	E 69 0.85 140	A 0 0.20 0	D 49	C 24 0.79 154	B 19	C 28 0.85 221	C 28 0.85 221	C 28	C 28 0.85 221	C 28	C 28	C 28	C 29 0.83
		2032 Total	TCS	LOS Delay V/C Q	E 62 0.02 4	C 30 0.29 44	C 31	E 56 0.79 120	E 54 0.76 118	A 0 0.20 0	D 39	C 27 0.81 167	C 22	C 28 0.85 234	C 28 0.85 234	C 28	C 28 0.85 234	C 28	C 28	C 27	C 27 0.81
		2037 Background	TCS	LOS Delay V/C Q	E 63 0.03 4	C 29 0.32 54	C 29	D 53 0.80 154	D 50 0.77 142	A 0 0.22 0	D 37	D 39 0.97 168	C 31	D 50 1.00 290	D 50 1.00 290	D 50	D 50 1.00 290	D 50	D 50	D 40 0.91	
		2037 Total	TCS	LOS Delay V/C Q	E 63 0.03 4	C 29 0.32 54	C 29	E 55 0.82 163	E 55 0.82 164	A 0 0.22 0	D 40	D 43 1.00 165	C 35	E 63 1.05 313	E 63 1.05 313	E 63	E 63 1.05 313	E 63	E 63	D 47 0.94	

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 9)**

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 0.57 35	D 49 0.43 41	A 0 0.21 0	C 21	F 96 1.09 138	D 38 0.44 63	C 34 0.17 20	E 77	E 72 0.98 156	C 33 0.83 159	A 1 0.45 0	C 31	C 34 0.66 50	D 37 0.69 98	C 28 0.08 0	D 36	D 41 1.02
		2027 Background	TCS	LOS Delay V/C Q	D 49 0.63 37	D 49 0.46 46	A 0 0.23 0	C 22	F 112 1.14 133	D 36 0.46 68	C 32 0.20 25	F 88	E 58 0.93 162	D 43 0.94 198	A 1 0.50 0	D 36	D 50 0.77 62	E 63 0.97 136	C 34 0.08 0	E 60	D 51 1.05
		2027 Total	TCS	LOS Delay V/C Q	D 49 0.63 37	D 49 0.46 46	A 0 0.24 0	C 22	F 121 1.16 137	D 36 0.46 68	C 32 0.20 25	F 94	E 58 0.93 165	D 44 0.95 201	A 1 0.51 0	D 36	D 50 0.77 62	E 71 1.00 141	C 34 0.08 0	E 66	D 54 1.06
		2032 Background	TCS	LOS Delay V/C Q	D 53 0.68 40	D 50 0.49 49	A 0 0.26 0	C 22	F 156 1.25 166	D 36 0.48 73	C 32 0.24 29	F 119	F 180 1.27 209	E 69 1.05 237	A 2 0.55 0	E 69	E 73 0.90 71	E 60 0.98 156	C 30 0.09 3	E 59	E 73 1.26
		2032 Total	TCS	LOS Delay V/C Q	D 53 0.68 40	D 50 0.49 49	A 1 0.26 0	C 22	F 165 1.27 170	D 36 0.48 73	C 32 0.24 29	F 126	F 187 1.29 212	E 72 1.06 240	A 2 0.56 0	E 72	E 73 0.90 71	E 64 0.99 161	C 30 0.09 3	E 63	E 77 1.28
		2037 Background	TCS	LOS Delay V/C Q	E 56 0.74 44	D 49 0.51 52	A 1 0.30 0	C 23	F 269 1.51 210	D 37 0.54 81	C 34 0.30 35	F 200	F 274 1.49 250	F 116 1.17 280	A 2 0.62 0	F 112	E 78 0.93 82	E 72 1.03 178	C 29 0.10 6	E 69	F 112 1.5
		2037 Total	TCS	LOS Delay V/C Q	E 56 0.74 44	D 49 0.51 52	A 1 0.30 0	C 23	F 278 1.53 215	D 37 0.54 81	C 34 0.30 35	F 207	F 281 1.51 253	F 119 1.18 283	A 2 0.63 0	F 115	E 78 0.93 82	E 78 1.05 183	C 29 0.10 6	E 74	F 116 1.52
	2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp	2023 Existing	TCS	LOS Delay V/C Q	E 63 0.23 16	D 38 0.51 76	D 40	D 40	E 59 0.77 108	D 57 0.75 110	A 0 0.24 0	D 37		C 20 0.86 252		B 17		C 22 0.76 171	C 22 0.76 171	C 22	C 23 0.82
		2027 Background	TCS	LOS Delay V/C Q	E 63 0.25 18	D 36 0.53 85	D 39	D 39	E 58 0.78 122	D 55 0.76 123	A 1 0.26 0	D 36		C 35 0.98 333		C 29		C 29 0.87 206	C 29 0.87 206	C 29	C 30 0.9
		2027 Total	TCS	LOS Delay V/C Q	E 63 0.25 18	D 31 0.48 86	C 34	C 34	D 53 0.79 161	D 51 0.77 158	A 1 0.26 0	C 35		E 69 1.08 340		E 58		D 42 0.96 219	D 42 0.96 219	D 42	D 48 0.94
		2032 Background	TCS	LOS Delay V/C Q	D 54 0.13 17	F 178 1.18 151	F 169	F 169	F 225 1.34 264	F 208 1.30 266	A 1 0.28 0	F 154		F 119 1.19 398		F 99		E 78 1.08 285	E 78 1.08 285	E 78	F 104 1.24
		2032 Total	TCS	LOS Delay V/C Q	D 54 0.13 17	F 182 1.19 153	F 172	F 172	F 295 1.51 304	F 273 1.46 305	A 1 0.28 0	F 209		F 125 1.20 404		F 104		F 86 1.10 293	F 86 1.10 293	F 86	F 119 1.29
		2037 Background	TCS	LOS Delay V/C Q	E 64 0.28 19	C 34 0.59 112	D 36	D 36	F 229 1.37 340	F 207 1.32 338	A 1 0.31 0	F 162		F 182 1.33 414		F 151		F 135 1.22 344	F 135 1.22 344	F 135	F 143 1.3
		2037 Total	TCS	LOS Delay V/C Q	E 64 0.28 19	C 34 0.60 113	D 36	D 36	F 279 1.49 375	F 264 1.45 380	A 1 0.31 0	F 206		F 188 1.34 412		F 156		F 153 1.26 363	F 153 1.26 363	F 153	F 159 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  
 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	●
2027 Background Operations	Approaching Capacity	●
2027 Total Operations	Approaching Capacity	●
2032 Background Operations	Exceeding Capacity	●
2032 Total Operations	Exceeding Capacity	●
2037 Background Operations	Exceeding Capacity	●
2037 Total Operations	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 2027 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 2032 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 0.92. The northbound and southbound through movements are also projected to operate with a v/c ratio exceeding 0.95.

Under the 2037 Background conditions, the northbound and southbound movements are projected to operate with a v/c ratio exceeding 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 Ramp V/C over 0.75)**

- ▶ Eastbound Left (2023 Base)
- ▶ Eastbound Right (2023 Base)
- ▶ Southbound Through (2027 Background)
- ▶ Northbound Through (2027 Total)





### 11.2.4 Trafalgar Road at Argus Road

2023 Base Year Operations	Tolerable Delays	●
2027 Background Operations	Tolerable Delays	●
2027 Total Operations	Tolerable Delays	●
2032 Background Operations	Tolerable Delays	●
2032 Total Operations	Tolerable Delays	●
2037 Background Operations	Tolerable Delays	●
2037 Total Operations	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 2027-2043 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 9)**

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				C 22	C 27 0.84 0	
		2027 Background	TCS	LOS Delay V/C Q	C 23 0.55 100	D 49 0.93 268	C 35								C 35				C 26	C 31 0.93	
		2027 Total	TCS	LOS Delay V/C Q	C 23 0.55 100	D 50 0.94 273	D 35								D 39				C 27	C 33 0.95	
		2032 Background	TCS	LOS Delay V/C Q	C 24 0.60 116	F 84 1.06 333	D 52								D 38				C 33	D 40 1.05	
		2032 Total	TCS	LOS Delay V/C Q	C 24 0.60 116	F 88 1.07 338	D 54								D 41				D 39	D 44 1.07	
		2037 Background	TCS	LOS Delay V/C Q	C 26 0.66 133	F 133 1.19 393	E 75								D 53				F 85	E 73 1.2	
		2037 Total	TCS	LOS Delay V/C Q	C 26 0.66 133	F 136 1.20 398	E 77								E 77				F 96	F 85 1.22	
	4: Trafalgar Rd & Argus Rd	2023 Existing	TWSC	LOS Delay V/C Q		A 10 0.06 1	A 10								A 0				A 0		
		2027 Background	TWSC	LOS Delay V/C Q		B 10 0.04 1	B 10								A 0				A 0		
		2027 Total	TWSC	LOS Delay V/C Q		B 11 0.04 1	B 11								A 0				A 0		
		2032 Background	TWSC	LOS Delay V/C Q		B 12 0.19 6	B 12								A 0				A 0		
		2032 Total	TWSC	LOS Delay V/C Q		B 12 0.20 6	B 12								A 0				A 0		
		2037 Background	TWSC	LOS Delay V/C Q		B 13 0.29 10	B 13								A 0				A 0		
		2037 Total	TWSC	LOS Delay V/C Q		B 13 0.29 10	B 13								A 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 9)**

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			
		2027 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			
		2027 Total	TCS	LOS Delay V/C Q	D 43 0.84 157	D 38 0.69 125	D 42						C 24 0.86 230	C 24	B 17 0.78 148	A 0 0.23 0	B 15	C 25 0.87			
		2032 Background	TCS	LOS Delay V/C Q	D 52 0.92 199	D 53 0.87 192	D 53						C 31 0.95 211	C 31	B 18 0.95 134	A 0 0.25 0	B 16	C 30 0.96			
		2032 Total	TCS	LOS Delay V/C Q	D 52 0.92 199	E 60 0.92 209	D 55						C 34 0.97 203	C 34	C 29 1.02 152	A 0 0.25 0	B 26	D 35 1			
		2037 Background	TCS	LOS Delay V/C Q	E 75 1.02 239	F 89 1.03 251	E 79						E 61 1.07 227	E 61	F 115 1.15 195	A 0 0.28 0	E 78	E 72 1.12			
		2037 Total	TCS	LOS Delay V/C Q	E 75 1.02 239	F 102 1.07 266	F 84						E 71 1.09 220	E 71	F 119 1.22 205	A 0 0.28 0	F 105	F 88 1.18			
	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				
		2027 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				
		2027 Total	TWSC	LOS Delay V/C Q		B 11 0.08 2	B 11						A 0 0.58 0	A 0	A 0 0.42 0	A 0 0.52 0	A 0				
		2032 Background	TWSC	LOS Delay V/C Q		B 13 0.18 5	B 13						A 0 0.65 0	A 0	A 0 0.48 0	A 0 0.73 0	A 0				
		2032 Total	TWSC	LOS Delay V/C Q		B 14 0.20 6	B 14						A 0 0.67 0	A 0	A 0 0.48 0	A 0 0.84 0	A 0				
		2037 Background	TWSC	LOS Delay V/C Q		C 15 0.25 8	C 15						A 0 0.75 0	A 0	A 0 0.54 0	A 0 0.95 0	A 0				
		2037 Total	TWSC	LOS Delay V/C Q		C 15 0.25 8	C 15						A 0 0.77 0	A 0	A 0 0.54 0	A 0 1.07 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



### 11.2.5 Trafalgar Road at Cross Avenue/South Service Road

2023 Base Year Operations	Withing Capacity	●
2027 Background Operations	Approaching Capacity	●
2027 Total Operations	Exceeding Capacity	●
2032 Background Operations	Exceeding Capacity	●
2032 Total Operations	Exceeding Capacity	●
2037 Background Operations	Exceeding Capacity	●
2037 Total Operations	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 0.79.

Under 2027 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 2032 Background traffic conditions, the eastbound left turn movement is projected to operate at LOS F with a v/c ratio over 1.00. The northbound shared through/right turn movement is projected to operate with a v/c ratio of 0.89 and the northbound left turn movement will operate at LOS E with a v/c ratio of 0.87. Under the 2037 Background traffic conditions, increased delay is projected, however no new critical movements are identified.

Regarding development traffic implications, under the 2027 Total scenario, the eastbound left turn movement is projected to operate at LOS F with a v/c ratio over 1.00 while the northbound shared through/right turn movement will operate at LOS E with a v/c ratio of 0.88. With respect to the southbound approach, this leg of the intersection 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 (2027 Background)
- ▶ Northbound Through/Right (2032 Background/2027 Total)
- ▶ Eastbound Left (2032 Background/2027 Total)
- ▶ Northbound Left (2032 Background)



### 11.2.6 Trafalgar Road at Cornwall Road

2023 Base Year Operations	Exceeding Capacity	●
2027 Background Operations	Exceeding Capacity	●
2027 Total Operations	Exceeding Capacity	●
2032 Background Operations	Exceeding Capacity	●
2032 Total Operations	Exceeding Capacity	●
2037 Background Operations	Exceeding Capacity	●
2037 Total Operations	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 2027 Background traffic conditions, the westbound through movement is projected to operate at LOS F with a v/c ratio exceeding 1.00.

Under 2032 Background conditions, increased delay is projected, however no new critical movements are identified. Under 2037 Background conditions, the eastbound through/right will operate at LOS E with a v/c ratio of 0.95.

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)
- ▶ Westbound Through (2023 Base)
- ▶ Northbound Left (2023 Base)
- ▶ Northbound Through/Right (2023 Base)
- ▶ Southbound Through/Right (2023 Base)



**TABLE 11.3A: AM PEAK HOUR OPERATIONS (3 OF 9)**

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	E 58	D 50	D 50	E 55	D 51	E 59	E 58	E 57	C 27	C 30	C 30	C 30	B 18	C 26	C 26	C 26	C 32		
				V/C	0.64	0.23	0.23		0.21	0.25	0.08		0.57	0.49	0.49	0.49	0.58	0.70	0.70	0.70	0.64		
				Q	53	19	19		16	19	0		27	106	106	106	25	125	125				
		2027 Background	TCS	LOS Delay	E 61	D 51	D 51	E 58	D 51	E 59	E 58	E 56	C 27	C 25	C 25	C 25	C 29	C 23	C 23	C 24	C 29		
				V/C	0.70	0.21	0.21		0.19	0.23	0.08		0.55	0.50	0.50	0.50	0.62	0.69	0.69	0.69	0.65		
				Q	60	27	27		18	21	0		26	91	91	91	35	130	130				
		2027 Total	TCS	LOS Delay	F 160	D 50	D 50	F 136	D 51	E 59	E 58	E 56	C 28	C 26	C 26	C 26	C 30	C 25	C 25	C 25	D 46		
			V/C	1.18	0.25	0.25		0.19	0.23	0.08		0.59	0.51	0.51	0.51	0.63	0.70	0.70	0.70	0.75			
			Q	135	32	32		18	21	0		29	91	91	91	33	130	130					
	2032 Background	TCS	LOS Delay	F 176	D 42	D 42	F 154	D 51	E 60	E 57	E 56	D 44	D 48	D 48	D 48	D 50	E 59	E 59	E 59	E 76			
			V/C	1.25	0.38	0.38		0.21	0.30	0.08		0.69	0.78	0.78	0.78	0.80	1.01	1.01	1.01	1			
			Q	210	55	55		16	27	1		33	119	119	119	49	232	232					
	2032 Total	TCS	LOS Delay	F 321	D 43	D 43	F 278	D 51	E 59	E 57	E 56	D 45	D 48	D 48	D 48	D 50	E 63	E 63	E 61	F 113			
			V/C	1.58	0.44	0.44		0.21	0.30	0.08		0.71	0.78	0.78	0.78	0.80	1.02	1.02	1.02	1.11			
		Q	285	62	62		16	27	1		35	119	119	119	49	222	222						
2037 Background	TCS	LOS Delay	F 422	D 40	D 40	F 376	D 51	E 60	E 57	E 56	D 45	E 68	E 68	E 66	D 48	F 172	F 172	F 160	F 189				
		V/C	1.81	0.38	0.38		0.23	0.31	0.09		0.70	0.97	0.97	0.97	0.81	1.27	1.27	1.27	1.3				
		Q	362	56	56		17	28	4		38	138	138	138	50	233	233						
2037 Total	TCS	LOS Delay	F 558	D 41	D 41	F 497	D 51	E 60	E 57	E 56	D 46	E 68	E 68	E 66	D 48	F 179	F 179	F 167	F 236				
		V/C	2.12	0.43	0.43		0.23	0.31	0.09		0.71	0.97	0.97	0.97	0.81	1.28	1.28	1.28	1.4				
		Q	436	64	64		17	28	4		39	137	137	137	49	225	225						
6: Trafalgar Rd & Cornwall Rd	2023 Existing	TCS	LOS Delay	F 81	D 38	D 38	D 52	F 121	D 45	D 45	D 50	F 330	D 52	D 52	F 111	F 114	F 157	B 12	F 116	F 86			
			V/C	0.83	0.50	0.50		0.81	0.57	0.42		1.48	0.73	0.73	1.11	1.05	1.26	0.29	1.16	0.99			
			Q	66	82	82		37	83	48		60	109	109	109	124	384	18					
	2027 Background	TCS	LOS Delay	F 160	E 56	E 56	F 93	E 74	E 55	A 1	C 32	F 223	D 46	D 46	E 74	F 79	F 83	C 20	E 72	E 66			
			V/C	1.14	0.74	0.74		0.48	0.72	0.35		1.19	0.66	0.66	0.66	0.87	1.08	0.23	0.66	1.01			
			Q	87	100	100		33	98	0		77	111	111	111	123	389	17					
	2027 Total	TCS	LOS Delay	F 160	E 56	E 56	F 93	E 74	E 56	A 1	C 32	F 223	D 46	D 46	E 74	F 82	F 90	B 19	E 76	E 68			
		V/C	1.14	0.76	0.76		0.48	0.73	0.35		1.19	0.66	0.66	0.66	0.88	1.10	0.24	0.66	1.03				
		Q	87	103	103		33	99	0		77	113	113	113	127	401	17						
2032 Background	TCS	LOS Delay	F 238	E 60	E 60	F 122	F 94	E 60	A 1	D 35	F 265	E 57	E 57	F 90	F 84	F 130	C 25	F 96	F 85				
		V/C	1.33	0.83	0.83		0.69	0.80	0.39		1.31	0.82	0.82	0.82	0.89	1.21	0.27	0.82	1.14				
		Q	99	118	118		46	111	0		85	133	133	133	119	358	19						
2032 Total	TCS	LOS Delay	F 238	E 62	E 62	F 122	F 94	E 60	A 1	D 36	F 265	E 58	E 58	F 90	F 85	F 140	C 25	F 101	F 87				
		V/C	1.33	0.85	0.85		0.69	0.81	0.39		1.31	0.83	0.83	0.83	0.90	1.24	0.27	0.83	1.16				
		Q	99	125	125		46	111	0		85	134	134	134	120	365	19						
2037 Background	TCS	LOS Delay	F 297	E 73	E 73	F 149	F 101	E 68	A 1	D 40	F 246	E 67	E 67	F 95	F 93	F 212	C 20	F 136	F 109				
		V/C	1.47	0.95	0.95		0.74	0.90	0.43		1.27	0.92	0.92	0.92	0.99	1.40	0.32	0.92	1.29				
		Q	111	150	150		51	134	0		90	165	165	165	109	315	12						
2037 Total	TCS	LOS Delay	F 297	E 76	E 76	F 150	F 101	E 68	A 1	D 40	F 246	E 68	E 68	F 95	F 95	F 223	C 20	F 142	F 111				
		V/C	1.47	0.96	0.96		0.74	0.90	0.43		1.27	0.92	0.92	0.92	1.00	1.42	0.32	0.92	1.31				
		Q	111	154	154		51	135	0		90	166	166	166	109	321	12						

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 9)**

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
		2027 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	D 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
		2027 Total	TCS	LOS Delay V/C Q	E 67 0.94 151	C 23 0.17 20	C 23 0.17 20	E 59	E 69 0.63 38	D 54 0.28 31	E 55 0.34 37	E 58	D 55 0.75 38	E 59 0.88 157	E 59 0.88 157	E 59	D 50 0.58 27	D 60 0.94 230	D 60 0.94 230	E 60	E 59 0.85
		2032 Background	TCS	LOS Delay V/C Q	F 156 1.20 214	C 25 0.20 27	C 25 0.20 27	F 134	F 84 0.75 49	E 57 0.41 43	E 58 0.44 46	E 64	E 65 0.87 46	D 52 0.89 144	D 52 0.89 144	D 53	D 47 0.71 22	F 95 1.09 255	F 95 1.09 255	F 93 0	F 85 1.03
		2032 Total	TCS	LOS Delay V/C Q	F 221 1.36 252	C 26 0.22 29	C 26 0.22 29	F 190	F 86 0.75 50	E 57 0.42 43	E 58 0.44 46	E 64	D 70 0.91 51	D 52 0.89 143	D 52 0.89 143	D 54	D 46 0.71 20	F 104 1.11 232	F 104 1.11 232	F 101	F 102 1.09
		2037 Background	TCS	LOS Delay V/C Q	F 326 1.59 303	C 26 0.22 30	C 26 0.22 30	F 283	F 92 0.79 56	E 57 0.40 43	E 60 0.54 56	E 66	E 69 0.98 56	E 55 0.98 145	E 55 0.98 145	E 56	D 46 0.76 19	F 189 1.30 235	F 189 1.30 235	F 183	F 154 1.24
		2037 Total	TCS	LOS Delay V/C Q	F 395 1.75 340	C 26 0.24 32	C 26 0.24 32	F 343	F 94 0.81 56	E 57 0.41 43	E 60 0.54 56	E 67	F 94 1.06 64	D 55 0.98 145	D 55 0.98 145	E 59	D 46 0.76 17	F 189 1.30 214	F 189 1.30 214	F 183	F 172 1.3
	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	
	2027 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	E 75 1.08	
	2027 Total	TCS	LOS Delay V/C Q	F 127 1.09 124	D 48 0.65 97	D 48 0.65 97	F 86	E 69 0.53 46	F 98 1.04 173	A 1 0.31 0	E 64	F 94 0.76 47	F 86 1.03 220	F 86 1.03 220	F 86	F 114 1.00 100	F 84 1.11 302	A 9 0.37 7	E 76	E 77 1.09	
	2032 Background	TCS	LOS Delay V/C Q	F 240 1.36 148	D 49 0.70 108	D 49 0.70 108	F 139	F 91 0.74 62	F 126 1.13 198	A 1 0.35 0	F 82	F 127 0.90 57	F 95 1.06 245	F 95 1.06 245	F 97	F 204 1.26 116	F 108 1.18 281	B 13 0.41 16	F 121	F 110 1.23	
	2032 Total	TCS	LOS Delay V/C Q	F 240 1.36 148	D 50 0.71 110	D 50 0.71 110	F 139	F 91 0.74 62	F 130 1.14 201	A 1 0.35 0	F 84	F 127 0.90 57	F 99 1.08 249	F 99 1.08 249	F 102	F 208 1.27 114	F 115 1.20 279	B 13 0.42 15	F 125	F 112 1.24	
	2037 Background	TCS	LOS Delay V/C Q	F 338 1.59 170	D 55 0.80 124	D 55 0.80 124	F 188	F 89 0.75 66	F 164 1.22 229	A 1 0.39 0	F 104	F 131 0.91 58	F 136 1.17 289	F 136 1.17 289	F 136	F 287 1.45 108	F 172 1.32 262	B 15 0.49 13	F 177	F 152 1.36	
	2037 Total	TCS	LOS Delay V/C Q	F 338 1.59 170	E 55 0.81 125	E 55 0.81 125	F 187	F 89 0.75 66	F 168 1.23 232	A 1 0.40 0	F 106	F 131 0.91 58	F 141 1.19 293	F 141 1.19 293	F 141	F 291 1.46 110	F 178 1.33 267	B 15 0.49 13	F 181	F 154 1.37	

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 Argus Road at South Service Road East

2023 Base Year Operations	Tolerable Delays	●
2027 Background Operations	Tolerable Delays	●
2027 Total Operations	Tolerable Delays	●
2032 Background Operations	Significant Delays	●
2032 Total Operations	Significant Delays	●
2037 Background Operations	Significant Delays	●
2037 Total Operations	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 2027 Background traffic conditions, similar operations are projected. Under the 2032 background conditions, the southbound approach is forecast to operate at LOS F with a v/c ratio exceeding 1.00. By 2037 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, similar levels of operation are expected under the Total conditions with site-generated traffic volumes.

#### **Critical Movements (LOS E/F)**

- ▶ Southbound Left (2032 Background)
- ▶ Southbound Right (2032 Background)





### 11.2.8 South Service Road at Lyons Lane

2023 Base Year Operations	Tolerable Delays	●
2027 Background Operations	Tolerable Delays	●
2027 Total Operations	Tolerable Delays	●
2032 Background Operations	Tolerable Delays	●
2032 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 11.4A: AM PEAK HOUR OPERATIONS (4 OF 9)**

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 0 0.50 0	A 0 0.50 0	A 0 0.50 0	A 0 0.50 0	A 0 0.50 0	C 15 0.07 2	C 15 0.07 2	C 15 0.07 2	C 15 0.07 2				
		2027 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 0.50 0	A 0 0.50 0	A 0 0.50 0	A 0 0.50 0	A 0 0.50 0	B 15 0.02 1	B 15 0.02 1	B 15 0.02 1	B 15 0.02 1				
		2027 Total	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 0.53 0	A 0 0.53 0	A 0 0.53 0	A 0 0.53 0	A 0 0.53 0	C 16 0.03 1	C 16 0.03 1	C 16 0.03 1	C 16 0.03 1				
		2032 Background	TWSC	LOS Delay V/C Q	A 4 0.02 1	A 4 0.02 1	A 4 0.02 1	A 4 0.02 1	A 0 0.61 0	A 0 0.61 0	A 0 0.61 0	A 0 0.61 0	A 0 0.61 0	F 262 1.48 210	F 262 1.48 210	F 262 1.48 210	F 262 1.48 210				
		2032 Total	TWSC	LOS Delay V/C Q	A 4 0.02 1	A 4 0.02 1	A 4 0.02 1	A 4 0.02 1	A 0 0.65 0	A 0 0.65 0	A 0 0.65 0	A 0 0.65 0	A 0 0.65 0	F 319 1.61 231	F 319 1.61 231	F 319 1.61 231	F 319 1.61 231				
		2037 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 0.71 0	A 0 0.71 0	A 0 0.71 0	A 0 0.71 0	A 0 0.71 0	F 98 1.00 80	F 98 1.00 80	F 98 1.00 80	F 98 1.00 80				
		2037 Total	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 0.74 0	A 0 0.74 0	A 0 0.74 0	A 0 0.74 0	A 0 0.74 0	F 129 1.09 91	F 129 1.09 91	F 129 1.09 91	F 129 1.09 91				
	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 9 0.01 0	A 9 0.01 0	A 9 0.01 0	A 9 0.01 0				
		2027 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 9 0.01 0	A 9 0.01 0	A 9 0.01 0	A 9 0.01 0				
		2027 Total	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 9 0.01 0	A 9 0.01 0	A 9 0.01 0	A 9 0.01 0				
		2032 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 0.03 0	A 0 0.03 0	A 0 0.03 0	A 0 0.03 0	A 0 0.03 0	A 9 0.04 1	A 9 0.04 1	A 9 0.04 1	A 9 0.04 1				
		2032 Total	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 0.03 0	A 0 0.03 0	A 0 0.03 0	A 0 0.03 0	A 0 0.03 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 11.4B: PM PEAK HOUR OPERATIONS (4 OF 9)**

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	A 0.23 0	A 0.23 0	A 0				B 11 0.04 1	B 11 0.04 1	B 11					
		2027 Background	TWSC	LOS Delay V/C Q	A 4 0.01 0	A 4 0.01 0	A 4	A 0.26 0	A 0.26 0	A 0				B 11 0.05 1	B 11 0.05 1	B 11					
		2027 Total	TWSC	LOS Delay V/C Q	A 5 0.01 0	A 5 0.01 0	A 5	A 0.37 0	A 0.37 0	A 0				B 13 0.07 2	B 13 0.07 2	B 13					
		2032 Background	TWSC	LOS Delay V/C Q	A 8 0.06 2	A 8 0.06 2	A 8	A 0.56 0	A 0.56 0	A 0				D 26 0.60 30	D 26 0.60 30	D 26					
		2032 Total	TWSC	LOS Delay V/C Q	A 8 0.07 2	A 8 0.07 2	A 8	A 0.67 0	A 0.67 0	A 0				E 47 0.77 48	E 47 0.77 48	E 47					
		2037 Background	TWSC	LOS Delay V/C Q	A 4 0.03 1	A 4 0.03 1	A 4	A 0.75 0	A 0.75 0	A 0				D 27 0.48 20	D 27 0.48 20	D 27					
		2037 Total	TWSC	LOS Delay V/C Q	A 5 0.03 1	A 5 0.03 1	A 5	A 0.87 0	A 0.87 0	A 0				E 43 0.63 30	E 43 0.63 30	E 43					
	12: Lyons Lane & South Service Road	2023 Existing	TCS	LOS Delay V/C Q	A 3 0.00 0	A 3 0.00 0	A 3	A 0.00 0	A 0.00 0	A 0				A 9 0.02 1	A 9 0.02 1	A 9					
		2027 Background	TWSC	LOS Delay V/C Q	A 3 0.00 0	A 3 0.00 0	A 3	A 0.00 0	A 0.00 0	A 0				A 9 0.02 1	A 9 0.02 1	A 9					
		2027 Total	TWSC	LOS Delay V/C Q	A 3 0.00 0	A 3 0.00 0	A 3	A 0.00 0	A 0.00 0	A 0				A 9 0.02 1	A 9 0.02 1	A 9					
		2032 Background	TWSC	LOS Delay V/C Q	A 3 0.00 0	A 3 0.00 0	A 3	A 0.04 0	A 0.04 0	A 0				A 9 0.07 2	A 9 0.07 2	A 9					
		2032 Total	TWSC	LOS Delay V/C Q	A 3 0.00 0	A 3 0.00 0	A 3	A 0.04 0	A 0.04 0	A 0				A 9 0.07 2	A 9 0.07 2	A 9					

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 Cross Avenue at Argus Road/GO Station Driveway

2023 Base Year Operations	Within Capacity	●
2027 Background Operations	Approaching Capacity	●
2027 Total Operations	Approaching Capacity	●
2032 Background Operations	Exceeding Capacity	●
2032 Total Operations	Exceeding Capacity	●
2037 Background Operations	Exceeding Capacity	●
2037 Total Operations	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 2027 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 2032 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 2037 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. In addition, the eastbound shared through/right turn movement is projected to operate at LOS D with a v/c ratio of 0.99.

Regarding development traffic implications, under the 2032 Total scenario, the eastbound shared through/right turn movement is projected to operate at LOS C with a v/c ratio of 0.86, slightly exceeding the critical threshold point.

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

- ▶ \*Southbound Through/Right (2027 Background)
- ▶ Southbound Left (2032 Background)
- ▶ Eastbound Through/Right (2037 Background/2032 Total)

\*Critical movement alleviated in 2037 with new internal road network



**11.2.10 Cross Avenue at Lyons Lane/Driveway (Four Leg)**

2023 Base Year Operations	Within Capacity	●
2027 Background Operations	Approaching Capacity	●
2027 Total Operations	Approaching Capacity	●
2032 Background Operations	Approaching Capacity	●
2032 Total Operations	Approaching Capacity	●
2037 Background Operations	Exceeding Capacity	●
2037 Total Operations	Exceeding 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 D with a v/c ratio of 0.89 under the 2037 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 (2037 Background)



**TABLE 11.5A: AM PEAK HOUR OPERATIONS (5 OF 9)**

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 0.45 38	B 12 0.24 8	B 12 0.44 43	B 12 0.44 43	B 12 0.44 43	E 67 0.75 11	B 15 0.09 0	B 15 0.09 0	C 34 0.34 14	B 15 0.16 14	C 30 0.81 37	C 30 0.81 37	C 28 0.81 37	C 20 0.64 37	
		2027 Background	TCS	LOS Delay V/C Q	B 18 0.19 11	B 20 0.46 41	B 20 0.46 41	B 19 0.46 41	B 12 0.24 9	B 12 0.46 47	B 12 0.46 47	B 12 0.46 47	C 33 0.54 16	B 33 0.08 0	B 14 0.08 0	B 14 0.08 0	B 20 0.20 15	B 15 0.15 15	D 38 0.89 129	D 38 0.89 129	D 35 1.07 129	C 22 0.69 129
		2027 Total	TCS	LOS Delay V/C Q	B 17 0.17 10	C 21 0.62 65	C 21 0.62 65	C 21 0.62 65	B 12 0.30 8	B 11 0.44 46	B 11 0.44 46	B 11 0.44 46	C 42 0.58 19	B 17 0.08 0	B 17 0.08 0	C 24 0.24 19	D 17 0.16 19	B 84 1.07 181	F 84 1.07 181	F 84 1.07 181	E 78 1.07 181	D 36 0.8 181
		2032 Background	TCS	LOS Delay V/C Q	B 19 0.25 14	C 20 0.53 49	C 20 0.53 49	C 20 0.53 49	B 12 0.29 9	B 12 0.50 53	B 12 0.50 53	B 12 0.50 53	D 41 0.60 19	B 15 0.09 0	B 15 0.09 0	C 23 0.23 207	F 234 1.44 207	F 106 1.14 185	F 106 1.14 185	F 106 1.14 185	F 166 1.14 185	F 85 0.96 185
		2032 Total	TCS	LOS Delay V/C Q	B 17 0.22 13	C 22 0.66 76	C 22 0.66 76	C 22 0.66 76	B 13 0.35 9	B 11 0.47 53	B 11 0.47 53	B 11 0.47 53	C 57 0.66 21	B 18 0.09 0	B 18 0.09 0	C 30 0.30 239	F 294 1.57 239	F 199 1.35 239	F 199 1.35 239	F 199 1.35 239	F 241 1.35 239	F 114 1.02 239
		2037 Background	TCS	LOS Delay V/C Q	B 16 0.20 13	C 24 0.80 115	C 24 0.80 115	C 24 0.80 115	B 16 0.48 13	B 11 0.51 63	B 11 0.51 63	B 11 0.51 63	C 24 0.26 12	C 21 0.10 0	C 21 0.10 0	C 22 0.22 144	F 111 1.11 144	C 25 0.47 51	C 25 0.47 51	C 25 0.47 51	E 74 0.47 51	C 32 0.89 51
		2037 Total	TCS	LOS Delay V/C Q	B 15 0.20 13	C 26 0.83 124	C 26 0.83 124	C 26 0.83 124	B 17 0.50 16	B 11 0.51 63	B 11 0.51 63	B 11 0.51 63	C 24 0.27 12	C 22 0.10 0	C 22 0.10 0	C 22 0.22 233	F 353 1.69 233	F 25 0.48 51	F 25 0.48 51	F 25 0.48 51	F 246 0.48 51	E 62 1.07 51
	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 0.24 14	A 6 0.56 16	A 3 0.08 4	A 3 0.08 4	A 3 0.08 4	C 26 0.11 8	C 25 0.03 5	C 25 0.03 5	C 25 0.03 5	C 26 0.13 7	C 26 0.13 15	C 26 0.13 15	C 26 0.13 15	C 26 0.13 15	A 10 0.48 15	
	2027 Background	TCS	LOS Delay V/C Q	A 9 0.12 12	A 9 0.22 16	A 9 0.22 16	A 9 0.22 16	A 5 0.44 19	A 3 0.07 5	A 3 0.07 5	A 3 0.07 5	C 25 0.10 9	C 24 0.03 6	C 24 0.03 6	C 25 0.03 6	C 25 0.10 8	C 25 0.15 15	C 25 0.15 15	C 25 0.15 15	C 25 0.15 15	A 9 0.38 15	
	2027 Total	TCS	LOS Delay V/C Q	A 9 0.13 12	A 9 0.22 16	A 9 0.22 16	A 9 0.22 16	A 5 0.44 19	A 3 0.09 6	A 3 0.09 6	A 3 0.09 6	C 25 0.10 9	C 24 0.03 6	C 24 0.03 6	C 25 0.03 6	C 25 0.10 8	C 25 0.14 15	C 25 0.14 15	C 25 0.14 15	C 25 0.14 15	A 9 0.38 15	
	2032 Background	TCS	LOS Delay V/C Q	A 9 0.15 13	A 10 0.29 22	A 10 0.29 22	A 10 0.29 22	A 5 0.51 21	A 3 0.12 8	A 3 0.12 8	A 3 0.12 8	C 25 0.11 9	C 25 0.03 6	C 25 0.03 6	C 25 0.03 6	C 25 0.11 9	C 25 0.15 15	C 25 0.15 15	C 25 0.15 15	C 25 0.15 15	A 9 0.45 15	
	2032 Total	TCS	LOS Delay V/C Q	A 9 0.15 13	A 10 0.29 22	A 10 0.29 22	A 10 0.29 22	A 5 0.51 21	A 3 0.13 9	A 3 0.13 9	A 3 0.13 9	C 25 0.11 9	C 25 0.03 6	C 25 0.03 6	C 25 0.03 6	C 25 0.11 9	C 25 0.15 15	C 25 0.15 15	C 25 0.15 15	C 25 0.15 15	A 9 0.45 15	
	2037 Background	TCS	LOS Delay V/C Q	B 12 0.28 27	B 12 0.29 27	B 12 0.29 27	B 12 0.29 27	A 7 0.57 32	A 4 0.16 14	A 4 0.16 14	A 4 0.16 14	C 25 0.14 10	C 24 0.03 6	C 24 0.03 6	C 25 0.03 6	C 28 0.40 27	C 26 0.21 21	C 26 0.21 21	C 26 0.21 21	C 27 0.21 21	B 12 0.54 21	
	2037 Total	TCS	LOS Delay V/C Q	B 12 0.28 28	B 12 0.29 27	B 12 0.29 27	B 12 0.29 27	A 7 0.57 32	A 4 0.18 15	A 4 0.18 15	A 4 0.18 15	C 25 0.14 10	C 24 0.03 6	C 24 0.03 6	C 25 0.03 6	C 28 0.40 27	C 26 0.21 21	C 26 0.21 21	C 26 0.21 21	C 27 0.21 21	F 83 1.12 21	

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 9)**

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 8 0.24 7	A 6 0.21 23	A 6 0.21 23	A 6	C 21 0.13 7	C 21 0.21 9	C 21 0.08 9	C 21	C 25 0.53 42	C 21 0.17 18	C 23 0.17 18	C 23	B 15 0.55	
		2027 Background	TCS	LOS Delay V/C Q	B 11 0.05 5	B 17 0.69 98	B 17 0.69 98	B 17	A 9 0.30 8	A 6 0.23 25	A 6 0.23 25	A 6	C 22 0.15 8	C 22 0.09 9	C 22 0.09 9	C 22	C 25 0.58 47	C 22 0.19 19	C 25 0.19 19	C 25	B 16 0.61	
		2027 Total	TCS	LOS Delay V/C Q	B 11 0.05 5	B 19 0.75 117	B 19 0.75 117	B 19	B 11 0.34 9	A 6 0.24 27	A 6 0.24 27	A 6	C 25 0.37 10	C 23 0.09 9	C 23 0.09 9	C 25	C 26 0.59 47	C 25 0.32 27	C 26 0.32 27	C 26	B 18 0.65	
		2032 Background	TCS	LOS Delay V/C Q	B 14 0.17 13	C 23 0.79 113	C 23 0.79 113	C 23	B 14 0.41 10	A 9 0.31 33	A 9 0.31 33	A 9	C 22 0.15 9	C 22 0.10 10	C 22 0.10 10	C 22	F 125 1.15 149	C 23 0.21 20	C 23 0.21 20	C 23 0.21 20	F 90	D 36 0.88
		2032 Total	TCS	LOS Delay V/C Q	B 14 0.17 13	C 27 0.86 135	C 27 0.86 135	C 26	B 16 0.43 12	A 9 0.32 35	A 9 0.32 35	A 9	C 24 0.31 11	C 22 0.10 10	C 22 0.10 10	C 24	F 135 1.17 149	C 26 0.42 40	C 26 0.42 40	C 26 0.42 40	F 81	D 37 0.92
		2037 Background	TCS	LOS Delay V/C Q	B 13 0.07 6	D 43 0.99 192	D 43 0.99 192	D 43	B 19 0.47 13	A 9 0.34 37	A 9 0.34 37	A 10	C 23 0.13 9	C 23 0.11 11	C 23 0.11 11	C 23	E 72 0.97 115	C 23 0.14 15	C 23 0.14 15	C 23 0.14 15	E 61	D 36 0.93
		2037 Total	TCS	LOS Delay V/C Q	B 13 0.07 6	D 48 1.00 198	D 48 1.00 198	D 47	B 19 0.47 13	A 9 0.35 39	A 9 0.35 39	A 10	C 23 0.13 9	C 23 0.11 11	C 23 0.11 11	C 23	F 174 1.27 160	C 23 0.14 15	C 23 0.14 15	C 23 0.14 15	F 148	D 52 1.02
	14: Lyons Lane/Street A & Cross Ave	2023 Existing	TCS	LOS Delay V/C Q	B 13 0.10 11	B 13 0.13 16	B 13 0.13 16	B 13	A 8 0.02 4	A 8 0.19 23	A 8 0.19 23	A 8	C 28 0.71 63	C 21 0.13 14	C 21 0.13 14	C 28	C 20 0.05 6	C 20 0.05 9	C 20 0.05 9	C 20	B 18 0.38	
		2027 Background	TCS	LOS Delay V/C Q	B 14 0.12 12	B 14 0.15 18	B 14 0.15 18	B 14	A 8 0.03 4	A 8 0.21 25	A 8 0.21 25	A 8	D 36 0.77 72	C 21 0.14 15	C 21 0.14 15	C 30	C 20 0.06 7	C 20 0.06 9	C 20 0.06 9	C 20	B 19 0.43	
		2027 Total	TCS	LOS Delay V/C Q	B 14 0.13 12	B 14 0.17 20	B 14 0.17 20	B 14	A 8 0.03 4	A 8 0.22 27	A 8 0.22 27	A 8	D 36 0.77 72	C 21 0.14 15	C 21 0.14 15	C 30	C 20 0.06 7	C 20 0.06 9	C 20 0.06 9	C 20	B 18 0.43	
		2032 Background	TCS	LOS Delay V/C Q	B 15 0.15 13	B 15 0.21 24	B 15 0.21 24	B 15	A 9 0.03 4	A 9 0.28 34	A 9 0.28 34	A 9	D 38 0.80 86	C 21 0.15 15	C 21 0.15 15	C 31	B 20 0.07 7	B 20 0.06 10	B 20 0.06 10	B 20	B 19 0.49	
		2032 Total	TCS	LOS Delay V/C Q	B 15 0.15 13	B 15 0.23 26	B 15 0.23 26	B 15	A 9 0.03 4	A 9 0.29 35	A 9 0.29 35	A 9	D 38 0.80 86	C 21 0.15 15	C 21 0.15 15	C 31	B 20 0.07 7	B 20 0.06 10	B 20 0.06 10	B 20	B 19 0.5	
		2037 Background	TCS	LOS Delay V/C Q	B 17 0.22 17	B 17 0.26 29	B 17 0.26 29	B 17	A 10 0.04 5	B 10 0.30 34	B 10 0.30 34	B 10	D 49 0.89 105	B 20 0.17 16	B 20 0.17 16	D 37	B 20 0.15 14	B 19 0.10 12	B 19 0.10 12	B 20	C 22 0.55	
		2037 Total	TCS	LOS Delay V/C Q	B 17 0.22 17	B 17 0.28 32	B 17 0.28 32	B 17	A 10 0.04 5	B 11 0.31 35	B 11 0.31 35	B 11	D 49 0.89 105	B 20 0.17 16	B 20 0.17 16	D 37	B 20 0.15 14	B 19 0.10 12	B 19 0.10 12	B 20	E 56 1.04	

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 Cross Avenue at Lyons Lane (Three Leg)**

2023 Base Year Operations	Tolerable Delays	●
2027 Background Operations	Tolerable Delays	●
2027 Total Operations	Tolerable Delays	●
2032 Background Operations	Tolerable Delays	●
2032 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 2027, 2032 and 2037 Background conditions.

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

**Critical Movements (LOS E/F)**

- ▶ None

**11.2.12 Cross Avenue at Cornwall Road/Speers Road**

2023 Base Year Operations	Within Capacity	●
2027 Background Operations	Within Capacity	●
2027 Total Operations	Within Capacity	●
2032 Background Operations	Within Capacity	●
2032 Total Operations	Within Capacity	●
2037 Background Operations	Within Capacity	●
2037 Total Operations	Within Capacity	●

Individual movements at the signalized intersection of Cross Avenue and Cornwall Road/Speers Road presently operate at LOS C or better during the weekday peak hours. Similar operations are expected under then 2027, 2032 and 2037 Background conditions.

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

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

- ▶ None





**TABLE 11.6A: AM PEAK HOUR OPERATIONS (6 OF 9)**

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	A	A	A	0	A	A	A					B	B	B	12			
				V/C	0.03	0.21			0.08	0.05	0					0.03	0.03					
				Q	1	0			0	0	0					1	1					
		2027 Background	TWSC	LOS Delay	A	A	A	0	A	A	A					B	B	B	12			
				V/C	0.02	0.14			0.09	0.05	0					0.02	0.02					
			Q	1	0			0	0	0					1	1						
	2027 Total	TWSC	LOS Delay	A	A	A	0	A	A	A					B	B	B	12				
			V/C	0.02	0.15			0.10	0.06	0					0.02	0.02						
			Q	1	0			0	0	0					1	1						
	2032 Background	TWSC	LOS Delay	A	A	A	1	A	A	A					B	B	B	14				
			V/C	0.03	0.16			0.12	0.07	0					0.28	0.28						
			Q	1	0			0	0	0					9	9						
	2032 Total	TWSC	LOS Delay	A	A	A	1	A	A	A					B	B	B	15				
			V/C	0.03	0.16			0.13	0.08	0					0.29	0.29						
		Q	1	0			0	0	0					10	10							
16: Speers Road/Cornwall Road & Cross Avenue	2023 Existing	TCS	LOS Delay	A	A	A	3	A	A	A				C	C	A	A	10	A			
			V/C	0.34	0.25			0.32	0.32	9				0.03	0.09			0	0.34			
			Q	14	20			39	39	9				4	11							
	2027 Background	TCS	LOS Delay	A	A	A	3	A	A	A				C	C	A	A	10	A			
			V/C	0.40	0.27			0.36	0.36	10				0.04	0.10			0	0.39			
			Q	16	22			45	45	10				5	11							
	2027 Total	TCS	LOS Delay	A	A	A	4	A	A	A				C	C	A	A	10	B			
		V/C	0.41	0.27			0.36	0.36	10				0.11	0.11			0	0.4				
		Q	16	23			45	45	10				8	12								
2032 Background	TCS	LOS Delay	A	A	B	4	B	B	B				C	C	A	B	12	B				
		V/C	0.48	0.30			0.41	0.41	11				0.24	0.14			0	0.48				
		Q	19	27			57	57	11				15	13				0				
2032 Total	TCS	LOS Delay	A	A	B	4	B	B	B				C	C	A	B	12	B				
		V/C	0.49	0.30			0.41	0.41	11				0.30	0.15			0	0.49				
		Q	20	27			58	58	11				18	13				0				
2037 Background	TCS	LOS Delay	A	A	B	5	B	B	B				C	C	A	B	13	B				
		V/C	0.57	0.33			0.47	0.47	13				0.34	0.17			0	0.57				
		Q	22	31			71	71	13				21	14				0				
2037 Total	TCS	LOS Delay	A	A	B	5	B	B	B				C	C	A	B	14	B				
		V/C	0.58	0.33			0.48	0.48	14				0.39	0.18			0	0.58				
		Q	24	32			73	73	14				24	14								

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 9)**

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	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 0.06 0	A 0 0.06 0	A 0 0.25 0	A 0 0.13 0	A 0 0.13 0	A 0 0.13 0	A 0 0.13 0	B 12 0.08 2	B 12 0.08 2	B 12 0.08 2	B 12 0.08 2				
		2027 Background	TWSC	LOS Delay V/C Q	A 9 0.01 0	A 0 0.07 0	A 0 0.07 0	A 0 0.07 0	A 0 0.28 0	A 0 0.15 0	A 0 0.15 0	A 0 0.15 0	A 0 0.15 0	B 13 0.10 3	B 13 0.10 3	B 13 0.10 3	B 13 0.10 3				
		2027 Total	TWSC	LOS Delay V/C Q	A 10 0.01 0	A 0 0.07 0	A 0 0.07 0	A 0 0.07 0	A 0 0.29 0	A 0 0.15 0	A 0 0.15 0	A 0 0.15 0	A 0 0.15 0	B 13 0.10 3	B 13 0.10 3	B 13 0.10 3	B 13 0.10 3				
		2032 Background	TWSC	LOS Delay V/C Q	B 10 0.09 2	A 0 0.08 0	A 0 0.08 0	A 2 0.08 0	A 0 0.31 0	A 0 0.20 0	A 0 0.20 0	A 0 0.20 0	A 0 0.20 0	A 0 0.20 0	C 18 0.29 9	C 18 0.29 9	C 18 0.29 9	C 18 0.29 9			
		2032 Total	TWSC	LOS Delay V/C Q	B 10 0.09 2	A 0 0.09 0	A 0 0.09 0	A 2 0.09 0	A 0 0.32 0	A 0 0.20 0	A 0 0.20 0	A 0 0.20 0	A 0 0.20 0	A 0 0.20 0	C 18 0.29 10	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 3 0.28 26	A 4 0.28 26	B 11 0.44 62	B 11 0.44 62	B 11 0.44 62	B 11 0.44 62	B 11 0.44 62	C 31 0.05 5	C 32 0.16 14	C 32 0.16 14	A 0 0.16 14	B 12 0.49 14			
		2027 Background	TCS	LOS Delay V/C Q	A 7 0.58 23	A 4 0.31 29	A 4 0.31 29	A 4 0.31 29	B 12 0.49 77	B 12 0.49 77	B 12 0.49 77	B 12 0.49 77	B 12 0.49 77	C 31 0.06 6	C 32 0.17 14	C 32 0.17 14	A 0 0.17 14	B 13 0.56 14			
		2027 Total	TCS	LOS Delay V/C Q	A 8 0.61 28	A 4 0.31 30	A 4 0.31 30	A 5 0.31 30	B 13 0.51 78	B 13 0.51 78	B 13 0.51 78	B 13 0.51 78	B 13 0.51 78	C 31 0.09 8	C 32 0.18 14	C 32 0.18 14	A 0 0.18 14	B 13 0.59 14			
		2032 Background	TCS	LOS Delay V/C Q	B 17 0.71 65	A 4 0.34 34	A 4 0.34 34	A 8 0.34 34	B 17 0.64 91	B 17 0.64 91	B 17 0.64 91	B 17 0.64 91	B 17 0.64 91	C 32 0.15 11	C 32 0.20 15	C 32 0.20 15	A 0 0.20 15	B 16 0.68 15			
		2032 Total	TCS	LOS Delay V/C Q	B 19 0.74 74	A 4 0.34 34	A 4 0.34 34	A 8 0.34 34	B 18 0.65 93	B 18 0.65 93	B 18 0.65 93	B 18 0.65 93	B 18 0.65 93	C 32 0.18 12	C 32 0.20 15	C 32 0.20 15	A 0 0.20 15	B 17 0.71 15			
		2037 Background	TCS	LOS Delay V/C Q	B 11 0.63 41	A 0 0.28 0	A 0 0.28 0	A 3 0.28 0	B 11 0.59 60	B 11 0.59 60	B 11 0.59 60	B 11 0.59 60	B 11 0.59 60	A 0 0.00 0	C 32 0.22 15	C 32 0.22 15	A 0 0.22 15	B 7 0.76 15			
		2037 Total	TCS	LOS Delay V/C Q	C 21 0.77 85	A 2 0.34 27	A 2 0.34 27	A 8 0.34 27	B 15 0.67 92	B 15 0.67 92	B 15 0.67 92	B 15 0.67 92	B 15 0.67 92	D 37 0.18 4	C 34 0.00 3	C 34 0.00 3	A 0 0.00 3	B 11 0.8 3			

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 GO Station West Access at Cross Avenue

2023 Base Year Operations	Exceeding Capacity	●
2027 Background Operations	Exceeding Capacity	●
2027 Total Operations	Exceeding Capacity	●
2032 Background Operations	Exceeding Capacity	●
2032 Total Operations	Exceeding Capacity	●
2037 Background Operations	Exceeding Capacity	●
2037 Total Operations	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 2027 Background horizon, increased delay is projected for the westbound approach.

Under the 2032 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. Under then 2037 Background horizon, the southbound left turn movement is projected 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 2037 Total conditions is projected to have increased delay.

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

- ▶ Westbound Left/Through (2023 Base)
- ▶ Westbound Right (2037 Total)
- ▶ Southbound Left (2032 Background)



**TABLE 11.7A: AM PEAK HOUR OPERATIONS (7 OF 9)**

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 14	B 11 14	B 11	F 179 114	F 179 114	F 179	B 10 7	B 11 0	B 11					F 123 0.74			
		2027 Background	TCS	LOS Delay V/C Q	B 11 15	B 11 15	B 11	F 250 129	F 250 129	F 250	B 10 8	B 11 0	B 11					F 170 0.83			
		2027 Total	TCS	LOS Delay V/C Q	B 11 16	B 11 16	B 11	F 284 140	F 284 140	F 284	B 10 8	B 11 0	B 11	C 19 42	A 10 0	A 10 0	C 18	F 173 1.10			
		2032 Background	TCS	LOS Delay V/C Q	B 11 20	B 11 20	B 11	F 369 151	F 369 151	F 369	B 10 8	B 11 6	B 11	A 0 0	A 0 0	A 0 0	A 0	F 247 0.97			
		2032 Total	TCS	LOS Delay V/C Q	B 12 23	B 12 23	B 12	F 405 163	F 405 163	F 405	B 10 8	B 11 6	B 11	C 20 47	A 10 0	A 10 0	C 18	F 245 1.24			
		2037 Background	TCS	LOS Delay V/C Q	B 12 25	B 12 25	B 12	F 201 119	F 201 119	F 201	B 14 11	B 11 11	B 12	F 185 119	C 21 85	A 21 85	C 104	F 115 1.37			
		2037 Total	TCS	LOS Delay V/C Q	B 12 27	B 12 27	B 12	F 206 119	F 206 119	F 206	B 15 11	B 11 11	B 12	F 323 150	C 23 93	A 23 93	C 186	F 147 1.53			

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 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 9)**

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	23: GO Station West Access/Street C & Cross Ave	2023 Existing	TCS	LOS Delay V/C Q	B 13 27	B 13 27	B 13	C 18 34	C 18 34	C 18	A 0.14 12	B 0.43 32	B 11					B 14 0.56			
		2027 Background	TCS	LOS Delay V/C Q	B 13 30	B 13 30	B 13	C 20 42	C 20 42	C 20	A 0.16 13	B 0.54 43	B 13					C 15 0.66			
		2027 Total	TCS	LOS Delay V/C Q	B 12 33	B 12 33	B 12	D 30 64	D 30 64	D 30	B 0.17 13	C 0.57 43	C 15	C 17 22	A 9 0	A 9 0	C 16	C 20 0.74			
		2032 Background	TCS	LOS Delay V/C Q	B 12 36	B 12 36	B 12	D 32 63	D 32 63	D 32	B 0.18 14	C 0.69 68	C 18	A 0 0	A 0 0	A 0 0	C 0	C 21 0.81			
		2032 Total	TCS	LOS Delay V/C Q	B 13 39	B 13 39	B 13	F 91 84	F 91 84	F 91	B 0.19 14	C 0.69 68	C 18	C 20 28	A 9 0	A 9 0	C 19	E 45 0.91			
		2037 Background	TCS	LOS Delay V/C Q	C 18 53	C 18 53	C 18	D 29 59	D 29 59	D 29	B 0.23 15	C 0.78 82	C 21	F 121 62	B 11 17	B 11 17	F 77	D 31 1.03			
		2037 Total	TCS	LOS Delay V/C Q	C 24 67	C 24 67	C 24	D 32 61	D 32 61	D 32	B 0.24 15	C 0.78 82	C 21	F 182 70	B 11 18	B 11 18	F 115	E 41 1.12			

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 LOS - Level of Service  
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 AWSC - All-Way Stop Control  
 RBT - Roundabout



### 11.2.14 Future Local Road Network

In the 2037 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 2037 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.

#### **Critical Movements (LOS E/F)**

- ▶ Street C and Street 1 - Westbound Left/Through/Right (2037 Background)

### 11.2.15 Development Access

Under future traffic conditions, Driveway A to Street 1 is expected to operate at LOS A during the weekday peak hours under the 2037 Total conditions.

Driveway B at Street C is projected to operate at LOS D during the weekday peak hours under the 2037 Total conditions.



**TABLE 11.8A: AM PEAK HOUR OPERATIONS (8 OF 9)**

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	17: Street 1 & Driveway A	2027 Total	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 7 0.02 1	A 7 0.02 1	A 7 0.02 1	A 7 0.02 1	A 9 0.14 4	A 9 0.14 4							
		2032 Total	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 7 0.02 1	A 7 0.02 1	A 7 0.02 1	A 7 0.02 1	A 9 0.14 4	A 9 0.14 4							
		2037 Total	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 7 0.02 1	A 7 0.02 1	A 7 0.02 1	A 7 0.02 1	A 9 0.21 6	A 9 0.21 6							
	18: Street C & Driveway B	2027 Total	TWSC	LOS Delay V/C Q	A 10 0.16 5	A 10 0.16 5	A 10 0.16 5	A 10 0.16 5					A 4 0.03 1	A 4 0.03 1	A 4 0.03 1	A 4 0.03 1	A 0 0.09 0	A 0 0.09 0	A 0 0.09 0		
		2032 Total	TWSC	LOS Delay V/C Q	A 10 0.16 5	A 10 0.16 5	A 10 0.16 5	A 10 0.16 5					A 4 0.03 1	A 4 0.03 1	A 4 0.03 1	A 4 0.03 1	A 0 0.09 0	A 0 0.09 0	A 0 0.09 0		
		2037 Total	TWSC	LOS Delay V/C Q	D 25 0.29 10	D 25 0.29 10	D 25 0.29 10	D 25 0.29 10					A 2 0.01 0	A 2 0.01 0	A 2 0.01 0	A 2 0.01 0	A 0 0.67 0	A 0 0.67 0	A 0 0.67 0		
	19: Street C & South Service Road	2037 Background	TWSC	LOS Delay V/C Q	A 0 0.08 0	A 0 0.08 0	A 0 0.08 0	A 0 0.08 0					A 6 0.14 4	A 6 0.14 4	A 6 0.14 4	A 6 0.14 4	B 11 0.04 1	B 11 0.04 1	B 11 0.04 1		
		2037 Total	TWSC	LOS Delay V/C Q	A 0 0.08 0	A 0 0.08 0	A 0 0.08 0	A 0 0.08 0					A 6 0.14 4	A 6 0.14 4	A 6 0.14 4	A 6 0.14 4	B 11 0.04 1	B 11 0.04 1	B 11 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 11.8B: PM PEAK HOUR OPERATIONS (8 OF 9)**

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	17: Argus Road & North Driveway	2027 Total	TWSC	LOS Delay V/C Q	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 7 0.07 2	A 7 0.07 2	A 7 0.07 2	A 9 0.07 2	A 9 0.07 2	A 9 0.07 2								
		2032 Total	TWSC	LOS Delay V/C Q	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 7 0.07 2	A 7 0.07 2	A 7 0.07 2	A 9 0.07 2	A 9 0.07 2	A 9 0.07 2								
		2037 Total	TWSC	LOS Delay V/C Q	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 7 0.07 2	A 7 0.07 2	A 7 0.07 2	A 9 0.10 3	A 9 0.10 3	A 9 0.10 3								
	18: Street C & Driveway B	2027 Total	TWSC	LOS Delay V/C Q	A 9 0.08 2	A 9 0.08 2	A 9 0.08 2				A 4 0.08 2	A 4 0.08 2	A 4 0.08 2	A 4 0.04 0	A 0 0.04 0	A 0 0.04 0	A 0 0.04 0				
		2032 Total	TWSC	LOS Delay V/C Q	A 9 0.08 2	A 9 0.08 2	A 9 0.08 2				A 4 0.08 2	A 4 0.08 2	A 4 0.08 2	A 4 0.04 0	A 0 0.04 0	A 0 0.04 0	A 0 0.04 0				
		2037 Total	TWSC	LOS Delay V/C Q	B 11 0.06 2	B 11 0.06 2	B 11 0.06 2				A 1 0.02 1	A 1 0.02 1	A 1 0.02 1	A 1 0.30 0	A 0 0.30 0	A 0 0.30 0	A 0 0.30 0				
	19: Street C & South Service Road	2037 Background	TWSC	LOS Delay V/C Q	A 0 0.02 0	A 0 0.02 0	A 0 0.02 0				A 2 0.05 1	A 2 0.05 1	A 2 0.05 1	B 10 0.11 3	B 10 0.11 3	B 10 0.11 3	B 10 0.11 3				
		2037 Total	TWSC	LOS Delay V/C Q	A 0 0.02 0	A 0 0.02 0	A 0 0.02 0				A 2 0.05 1	A 2 0.05 1	A 2 0.05 1	B 10 0.11 3	B 10 0.11 3	B 10 0.11 3	B 10 0.11 3				

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 11.9A: AM PEAK HOUR OPERATIONS (9 OF 9)**

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	20: Street A & South Service Road	2037 Background	TWSC	LOS Delay V/C Q	A 0 0.13 0	A 0 0.13 0	A 0 0.13 0	A 0	A 1 0.00 0	A 1 0.00 0	A 1 0.00 0	A 1	A 10 0.03 1	A 10 0.03 1	A 10						
		2037 Total	TWSC	LOS Delay V/C Q	A 0 0.13 0	A 0 0.13 0	A 0 0.13 0	A 0	A 1 0.00 0	A 1 0.00 0	A 1 0.00 0	A 1	A 10 0.03 1	A 10 0.03 1	A 10						
	21: Argus Rd & Street 1	2037 Background	TWSC	LOS Delay V/C Q	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0					A 0 0.00 0	A 0 0.00 0	A 0	A 0 0.68 0	A 0 0.68 0	A 0			
		2037 Total	TWSC	LOS Delay V/C Q	E 38 0.67 36	E 38 0.67 36	E 38 0.67 36	E 38					A 0 0.00 0	A 0 0.00 0	A 0	A 0 0.72 0	A 0 0.72 0	A 0			
	22: Street C & Street 1	2032 Background	TWSC	LOS Delay V/C Q	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0	A 0 0.00 0	A 0 0.00 0	A 0	A 0 0.00 0	A 0 0.00 0	A 0			
		2032 Total	TWSC	LOS Delay V/C Q	A 9 0.14 4	A 9 0.14 4	A 9 0.14 4	A 9	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0	A 7 0.02 1	A 7 0.02 1	A 7	A 0 0.00 0	A 0 0.00 0	A 0			
		2037 Background	TWSC	LOS Delay V/C Q	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0	F 155 1.22 152	F 155 1.22 152	F 155 1.22 152	F 155	A 0 0.00 0	A 0 0.00 0	A 0	A 0 0.00 0	A 0 0.00 0	A 0			
		2037 Total	TWSC	LOS Delay V/C Q	D 29 0.61 31	D 29 0.61 31	D 29 0.61 31	D 29	F Err 3.17 Err	F Err 3.17 Err	F Err 3.17 Err	F Err	A 2 0.01 0	A 2 0.01 0	A 2	A 0 0.00 0	A 0 0.00 0	A 0			

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 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 9)**

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	2037 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							
		2037 Total	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							
	21: Argus Rd & Street 1	2037 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	
		2037 Total	TWSC	LOS Delay V/C Q	B 14 0.20 6	B 14 0.20 6	B 14 0.20 6	B 14 0.20 6					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	
	22: Street C & Street 1	2032 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	
		2032 Total	TWSC	LOS Delay V/C Q	A 9 0.07 2	A 9 0.07 2	A 9 0.07 2	A 9 0.07 2	A 9 0.07 2	A 9 0.07 2	A 9 0.07 2	A 9 0.07 2	A 9 0.07 2	A 7 0.07 2	A 7 0.07 2	A 7 0.07 2	A 7 0.07 2	A 7 0.07 2	A 7 0.07 2	A 7 0.07 2	
		2037 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	B 14 0.24 7	B 14 0.24 7	B 14 0.24 7	B 14 0.24 7	B 14 0.24 7	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	
		2037 Total	TWSC	LOS Delay V/C Q	B 15 0.23 7	B 15 0.23 7	B 15 0.23 7	B 15 0.23 7	E 44 0.81 58	E 44 0.81 58	E 44 0.81 58	E 44 0.81 58	A 1 0.02 1	A 1 0.02 1	A 1 0.02 1	A 1 0.02 1	A 1 0.02 1	A 1 0.02 1	A 1 0.02 1	A 1 0.02 1	

MOE - Measure of Effectiveness  
 LOS - Level of Service  
 Delay - Average Delay per Vehicle in Seconds  
 Q - 95th Percentile Queue Length  
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 Avail. - Available Storage  
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 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 Guidelines<sup>13</sup> 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

<sup>13</sup> 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. **The analysis also identified that the development would have minimal impact on the study area's traffic conditions.**

### 13.1 External Study Area Intersection

Mitigation measures at several external study area intersections have been identified through the Midtown Oakville Environmental Assessment. Because 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. Instead, 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 Plan<sup>14</sup> 2011 utilizes a transit mode split of 10% for 2021, 15% for 2026 and 20% for 2031, projecting a significant shift to transit increase.

The critical transportation network improvements 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;

<sup>14</sup> Halton Region Transportation Master Plan (2031) – The Road to Change, 2011



- ▶ 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.

## 13.2 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.

### 13.2.1 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



### **13.2.2 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

### **13.2.3 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

### **13.2.4 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

### **13.2.5 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

### **13.2.6 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



### 13.2.7 Future Lane Arrangement

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

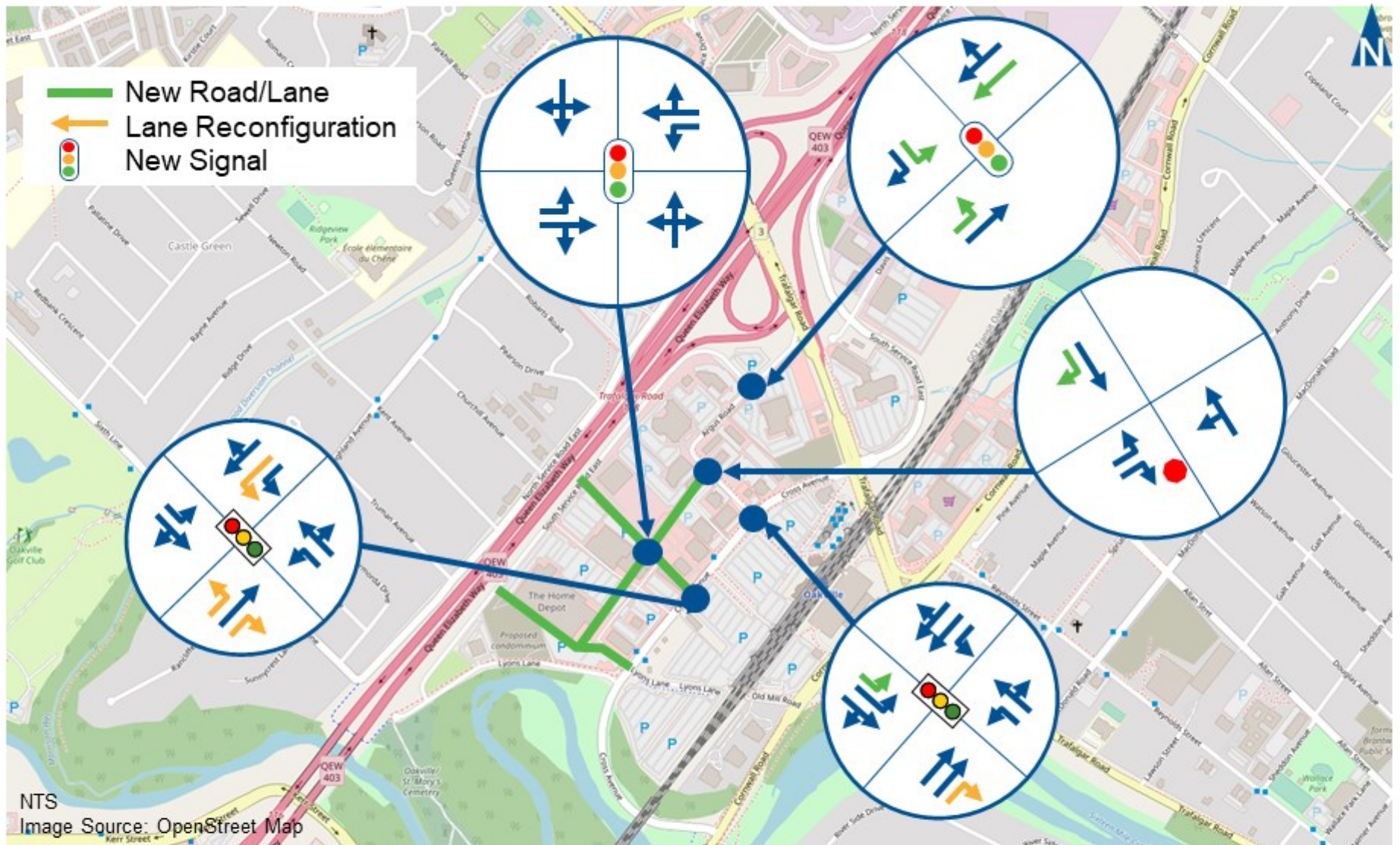
### 13.2.8 Sensitivity Analysis

A sensitivity analysis to assess the identified improvements noted above at the study area intersections have been undertaken for the 2037 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.







**TABLE 13.1: 2037 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	A 7	A 7		A 7		B 12	B 12	B 12						B 16	B 16	B 16	B 13	0.49
	13: GO Bus Terminal/Argus Rd & Cross Ave	TCS	LOS Delay V/C Q		D 44	D 44	D 44	C 29	B 16	B 16	B 17	E 61	D 45	D 45	D 50	E 73	E 73	E 73	E 61	D 40	0.86
	14: Lyons Lane/Street A & Cross Ave	TCS	LOS Delay V/C Q	B 12	B 12	B 12	B 12	A 7	A 4	A 4	A 5	C 25	C 24	C 24	C 25	C 28	C 26	C 26	C 27	B 12	0.54
	21: Argus Rd & Street 1	TWSC	LOS Delay V/C Q	A 0		C 20						C 20	C 20		A 0		A 0	A 0	A 0		
	22: Street C & Street 1	TCS	LOS Delay V/C Q	C 30	C 30	C 30	C 30	B 10	B 10	B 10	C 24	A 0	B 11	B 11	B 11	C 23	C 23	C 23	C 23	C 23	0.88
	23: GO Station West Access/Street C & Cross Ave	TCS	LOS Delay V/C Q	E 78	E 78	E 78	E 69	D 53	D 53	D 53	E 71	E 61	D 49	D 49	D 51	E 77	C 28	C 28	D 53	E 62	1.03
PM Peak Hour	11: Argus Rd & South Service Road	TCS	LOS Delay V/C Q	A 4	A 4		A 4		A 8	A 8	A 8					B 13		B 13	B 13	A 8	0.61
	13: GO Bus Terminal/Argus Rd & Cross Ave	TCS	LOS Delay V/C Q		D 38	D 38	D 38	C 29	B 12	B 12	B 13	E 67	D 42	D 42	D 48	E 69	E 69	E 69	E 62	D 36	0.78
	14: Lyons Lane/Street A & Cross Ave	TCS	LOS Delay V/C Q	B 13	B 12	B 12	B 12	B 12	B 13	B 13	B 13	B 20	B 14	B 14	B 18	C 29	C 28	C 28	C 28	B 16	0.52
	21: Argus Rd & Street 1	TWSC	LOS Delay V/C Q	A 0		B 12						B 12	B 12		A 0		A 0	A 0	A 0		
	22: Street C & Street 1	TCS	LOS Delay V/C Q	A 8	A 8	A 8	A 8	A 8	A 8	A 9	A 0	A 7	A 7	A 7	A 7	A 8	A 8	A 8	A 8	A 8	0.44
	23: GO Station West Access/Street C & Cross Ave	TCS	LOS Delay V/C Q	E 64	E 64	E 64	E 59	C 33	C 33	C 33	D 48	C 34	E 75	E 75	E 68	E 76	B 20	B 20	D 54	E 57	1.03

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



### 13.3 Interim Design – Cross Avenue at GO Driveway

An interim solution is also expected to be required. The Midtown EA Street network configuration contemplates the realignment of the GO Driveway on the south side of Cross Avenue from its current location towards the east, opposite the Applicant's eastern property limit where it will form a four-legged signalized intersection.

This realignment results from the planned introduction of a new north-south local roadway (Street C) running along the parcel fabric to supply access to Midtown. However, until the GO Driveway is realigned, a negative offset will occur between the north and south approaches.

As the timing of the realignment is unknown, an interim solution will need to be developed to provide access to the Applicant's lands. There are likely three possible options:

- ▶ **Option 1** – Interim driveway to be shifted to the west to align opposite the existing GO Driveway to eliminate the negative offset. A curve in the alignment would need to occur to provide the offset and then transition back to the Applicant's eastern property line. The curve however would not likely meet any design standards. There is also the additional complexity that if the lands directly to the east of the Applicant were to redevelop, providing an additional access point to Cross Avenue would not be feasible given spacing constraints.

Further, providing access to other parcels through the Applicant's lands may also become problematic given the access would be located on private property where the Applicant may object to granting an easement to other parties.

- ▶ **Option 2** – Interim driveway to remain as an offset connection, however, limit the connection to right in/out only. Through this arrangement, access to the site would be significantly limited for the primary outbound movement (left turns) as vehicles would have a lengthy detour. There is also the additional complexity of implementing a reasonable method to prohibit vehicles from making left-turns at the intersection.

The preferred method would be a median along Cross Avenue, however, the median would likely need to extend at least 30 metres in either direction of the driveway to be effective, however, this would result in the median being located within the functional area of the Cross Avenue and GO Driveway intersection. A secondary option would be to provide a divisional island "pork chop island" at the interim driveway, however, the entry and exit lane width would need to be designed wide (at least 6 metres) to maintain appropriate access for emergency



service vehicles as well as large design vehicles. The benefits of a divisional island would be lost with an oversized lane width which would likely have limited compliance.

- ▶ **Option 3** – Interim driveway to remain as an offset connection, however, have Cross Avenue and GO Driveway operate as one four-legged signalized intersection. The basis for the intersection to operate with an offset arrangement would be through a split phase for the north and south approaches. In addition, eastbound left turns would need to be prohibited.

Split phasing represents an assignment of the right-of-way to all movements of a particular approach, followed by all the movements of the opposing approach. Split phasing is typically implemented when intersection geometry results in partially conflicting vehicle paths through the intersections or where the approaches are offset such that left turning vehicles would have to occupy the same space to complete their turns. The prohibition of eastbound left turns is required to eliminate the left-turn overlap that could occur along Cross Avenue. As inbound left turns into the site are not the primary movement for development traffic, the majority of inbound trips to the site will not be impacted. However, it is acknowledged that vehicles entering the site from the west would need to travel along Speers Road towards Trafalgar Road and enter the site through that arrangement, or, assuming Lyons Lane remains open in the interim, detour to Lyons Lane and travel along the South Service Road.

Based on the proposed options noted above, the most feasible solution is likely Option 3; to have the intersection operate as a four-legged offset arrangement. Additionally, to improve the operations, given the high volume of westbound left-turns during the weekday AM peak hour into the GO Station, it is recommended that the following changes to the lane configuration occur:



- ▶ Option A
  - Repurpose westbound lanes to have a double left turn lane for westbound traffic with protected phasing. The westbound through lane is to operate as a shared through/right turn lane.
  - The eastbound approach to operate with a shared through/right turn lane,

OR

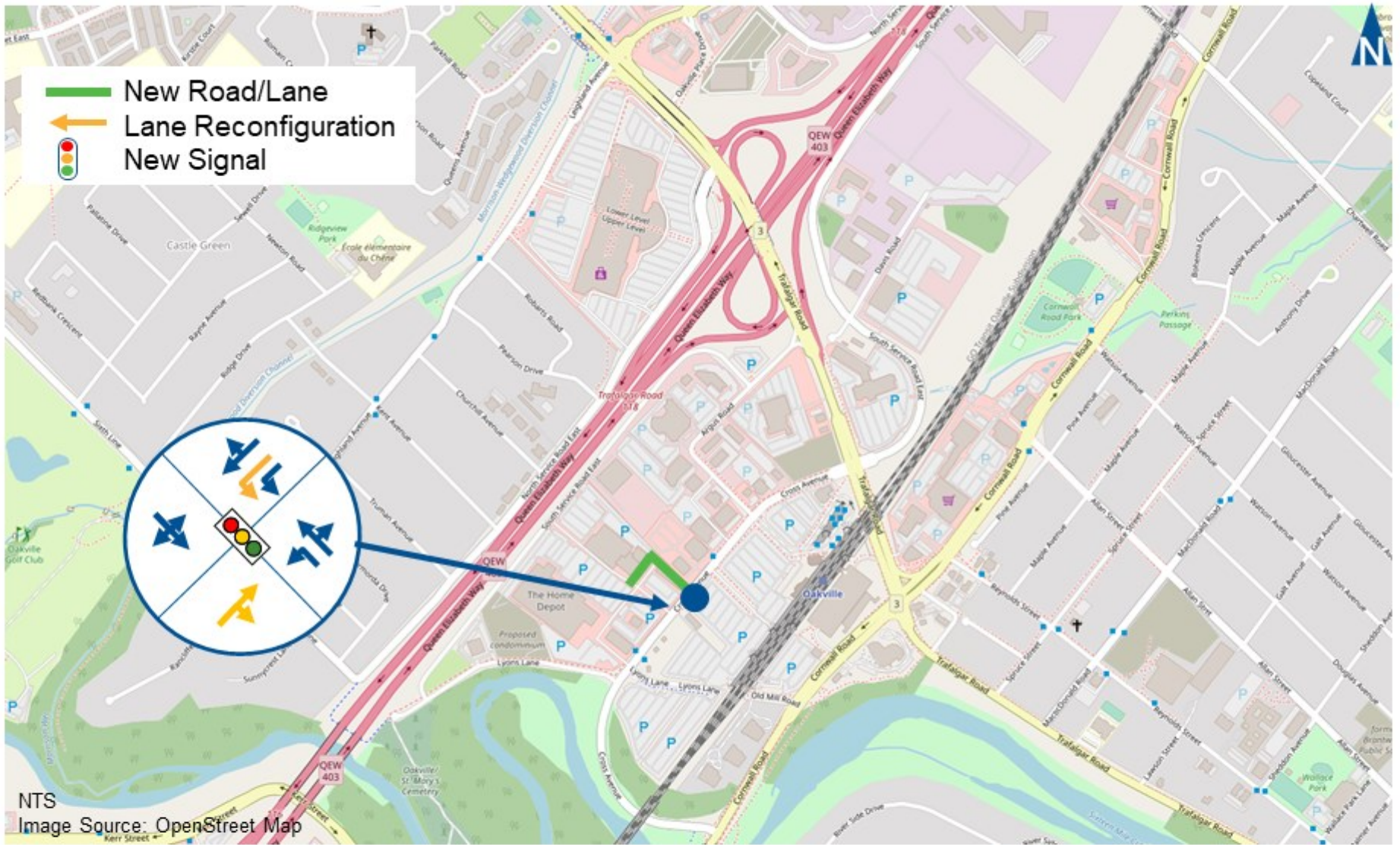
- ▶ Option B
  - An additional access to the GO Station be provided through an existing connection (approximately 110 metres west of the GO Station's Main Access).
  - This existing connection currently provided for outbound traffic only, however, given that inbound and outbound demand peaks occur at different times of the day, a possibility is to have the connection operate in a flexible manner with the connection operations as one-way inbound traffic for the morning peak hour and one-way outbound traffic through the afternoon peak hours. This will provide additional access points to the GO Station creating a more even distribution thus reducing demand at the main entrance.

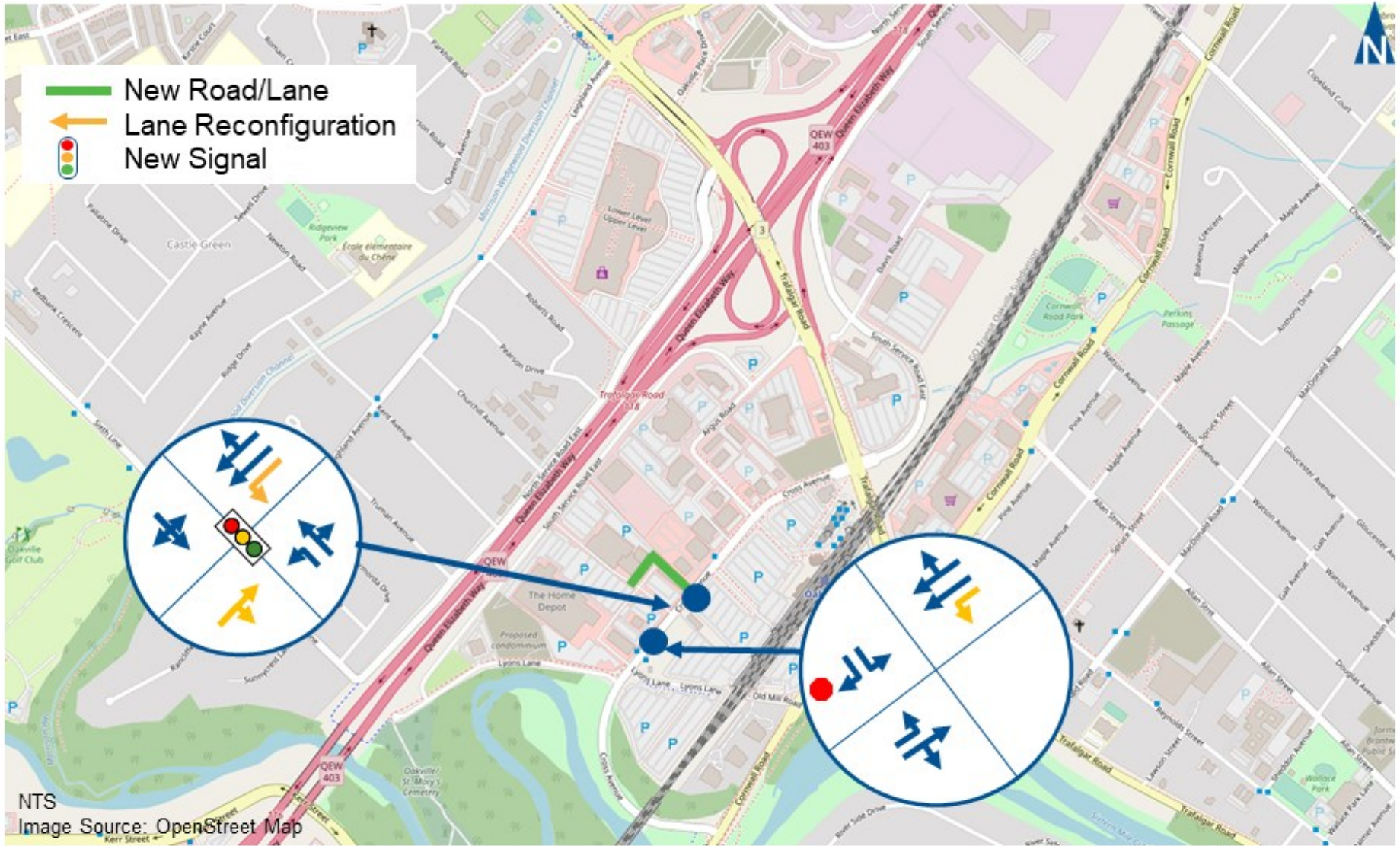
An interim analysis was completed for the intersection of Cross Avenue and GO Driveway/Street C for the 2032 horizon to assess the interim configuration. **Figure 13.2** illustrates the proposed interim lane configuration.

For the Option B scenario, it is assumed that 50% of the westbound left turn traffic and 50% of the eastbound right turning traffic at the intersection of Cross Avenue and GO Driveway/Street C during the weekday AM peak hour will be diverted to the GO "Flexible" Driveway.

**Table 13.2** summarizes the results of the interim analysis. **Appendix I** contains the detailed Synchro reports. Overall, the intersection of Cross Avenue and GO Driveway/Street C is expected to operate with some delay for the high traffic movements, however, no movement is projected to have a v/c ratio exceed 1.00.







**TABLE 13.2: 2032 INTERIM ANALYSIS**

Peak Hour	Intersection	Option	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	GO Station West Access/Street C & Cross Ave	A	TCS	LOS		F	F	F	E	B	B	D	D	D	D	E	E	E	E	E	
				Delay		80	80	80	67	18	18	48	50	50	50	50	77	77	77	77	77
		V/C		0.97	0.97	0.97	0.97	0.57	0.57		0.20	0.17	0.17		0.80	0.80	0.80			0.8	
		Q		185	185	172	131	131		25	0	0		99	99	99					
	B	TCS	LOS		E	E	E	E	C	C	C	D	D	D	D	E	E	E	E	D	
			Delay		77	77	77	61	21	21	33	41	41	41	41	59	59	59	59	59	44
V/C	Q	TWSC	LOS	Delay	V/C	Q	A	A	A	A	A	A	A	A	A	A	A	A	A	A	
																					0
PM Peak Hour	GO Station West Access/Street C & Cross Ave	A	TCS	LOS		E	E	E	E	C	C	D	D	E	E	D	D	D	D	D	
				Delay		59	59	59	66	21	21	36	48	67	67	63	46	46	46	46	46
		V/C		0.96	0.96	0.96	0.83	0.65	0.65		0.34	0.76	0.76		0.17	0.17	0.17			0.75	
		Q		238	238	62	139	139		40	102	102		25	25	25					
	B	TCS	LOS		E	E	E	F	B	B	D	D	E	E	E	D	D	D	D	D	
			Delay		75	75	75	82	15	15	38	51	62	62	60	51	51	51	51	51	55
V/C	Q	TCS	LOS	Delay	V/C	Q	A	A	A	A	A	A	A	A	A	A	A	A	A	A	
																					1.00

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





## 13.4 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 province<sup>15</sup>; 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.

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<sup>15</sup> 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>



## 13.5 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 a new private driveway connection to Cross Avenue during the interim conditions (i.e., before adjacent properties to the east and north of the Site are constructed). As land from adjacent properties is acquired by the Town of Oakville, the future local public street flanking the site will be implemented. Moreover, the Applicant will bear the cost of upgrading the traffic control signal at Cross Avenue and the GO Station Driveway and the restriping of pavement marking to accommodate the north leg operating as a private driveway.



# 14 Conclusions and Recommendations

## 14.1 Conclusions

### Proposed Development

The existing commercial office buildings will be demolished and redeveloped. The proposed site comprises 1,198 residential units, 2,693 m<sup>2</sup> of retail GFA, and 1,027 m<sup>2</sup> of office GFA located within two buildings.

On-site public realm improvements, including a pedestrian POPS connection through the site, will be provided. Sidewalks will be provided along the perimeter of the site, providing convenient access to / from all areas and components of the development.

Two vehicular access points to / from the site will be provided via site driveway onto Street 1 (north side of the site) and Street C (east side of the site). Both driveways will provide access to the parking ramp connecting to / from the proposed seven levelled underground parking garage. The Street 1 driveway will provide access to the at-grade consolidated loading facilities. Access to the bicycle parking is provided via the building elevators.

### 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 abundant 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."*

### **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 1,404 spaces (984 residential, 240 visitor, and 180 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 819 total parking spaces to meet the needs of the Project. This includes 599 resident parking spaces (effective parking supply of 0.50 parking spaces per unit), 180 residential visitor parking spaces (effective ratio of 0.15 parking spaces per unit), and 40 parking spaces for the retail and day care use (1.08 parking spaces per 100 m<sup>2</sup>)

Access to the underground parking facility is proposed from driveways off Street 1 and Street C.

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.



The reduced accessible parking supply is appropriate, primarily based on observed parking trends and demands that are expected to be accommodated 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 four spaces including 1 refuse collection loading space, 2 full-sized loading spaces, and 1 smaller size loading space are proposed to service the site.

Access to the consolidated loading area is proposed from the driveway off Street 1. The loading area will serve as the consolidated garbage pick up location for both Towers and has 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 1,204 bicycle parking spaces (904 long-term and 300 short-term bicycle parking spaces).

The site proposes 1,204 bicycle parking spaces, including 300 short-term spaces and 904 long-term spaces, which meets the minimum requirements specified under Zoning By-law 2014-014.

All bicycle parking is located on the ground level, mezzanine level, and level 2 of the site. Long-term bicycle parking are located within a secure, weather-protected facility.

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

### **Trip Generation**

The proposed development will generate approximately 340 new vehicle trips during the weekday AM peak hour and 401 new vehicle trips during the weekday PM peak hour.

Detailed traffic analysis was conducted for each study area intersection under Base conditions, 2027 (Full Build-Out), 2032 (5 years after Full



Build-Out), and 2037 (10 years after Full Build-Out) 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 Strategy<sup>16</sup> 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."*

*"Due to the principle of induced demand, vehicular congestion can never be solved completely, and Oakville should not fall into*

<sup>16</sup> Oakville Urban Mobility & Transportation Strategy, Steer, November 2021



*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 efficiently during peak weekday hours, with individual movements performing at a level of service (LOS) C or better. Based on traffic projections for 2027, similar operations are expected. However, by 2032, the southbound approach is forecasted to operate at LOS F, with a v/c ratio exceeding 1.00. By 2037, significant delays are projected for the southbound approach due to high volumes of east-west traffic along Argus Road, which will leave limited gaps for the southbound stop-controlled movements.

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

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

### **Argus Road at Cross Avenue**

The intersection at Cross Avenue and Argus Road is currently functioning at an acceptable level of service during peak hours on weekdays, with most movements operating at LOS C or better. However, future projections show that the southbound shared through/right turn will operate at LOS D with a v/c ratio of 0.89 under the 2027 Background conditions and under the 2032 Background



conditions, the southbound left turn and shared through right turn will operate at LOS F with a v/c ratio exceeding 1.00.

The implementation of the local road network in the study area (2037 Background Horizon) should alleviate some congestion at the intersection by providing alternative routing options. As a result, the southbound through/right turn movement is no longer considered a critical movement. However, the southbound left turn is still projected to operate at LOS F with a v/c ratio exceeding 1.00, and the eastbound shared through/right turn movement is projected to operate at LOS D with a v/c ratio of 0.99 under the 2037 Background conditions.

Regarding development traffic implications, the eastbound shared through/right turn movement is projected to operate at LOS C with a v/c ratio of 0.86, slightly exceeding the critical threshold point under the 2032 Total scenario.

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 peak hours on weekdays, the individual movements at the signalized intersection of Cross Avenue and Lyons Lane are currently operating at LOS C or better. However, it is expected that the northbound left-turn operations will deteriorate from LOS C to LOS D with a v/c ratio of 0.89 by 2037 Background conditions.

Total traffic conditions are expected to be similar to Background conditions, with only a minor increase in delay due to site-generated traffic volumes.

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 signalized intersection at Cross Avenue and GO Station West Access currently operates well, with individual movements running at LOS B, except for the westbound approach that operates at LOS F due to the high volume of left-turning traffic during the weekday AM peak hour. This creates a v/c ratio exceeding 1.00, causing increased delay for this approach, which is projected to continue under the 2027 Background horizon.

As for the 2032 Background horizon, the north leg of the intersection will be operational, but the westbound approach is still expected to operate at LOS F with a v/c ratio exceeding 1.00. Moreover, the southbound left-turn movement is projected to operate at LOS F with a v/c ratio exceeding 1.00 under the 2037 Background horizon.

With the addition of site-generated traffic, the southbound left-turn movement under the 2037 Total conditions is expected to experience increased delay.

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

Additionally, an interim solution is also expected to be required. The Midtown EA Street network configuration contemplates the realignment of the GO Driveway on the south side of Cross Avenue from its current location towards the east, opposite the Applicant's eastern property limit where it will form a four-legged signalized intersection. This realignment results from the planned introduction of a new north-south local roadway (Street C) running along the parcel fabric to supply access to Midtown.

After reviewing various options, it is recommended that the intersection operates as a four-legged offset arrangement with split phasing for the north and south approaches and eastbound left turns prohibited for the interim.



It is also suggested that an additional access point to the GO Station be provided through an existing connection approximately 110 meters west of the main access. This connection could operate flexibly, with one-way inbound traffic for the morning peak hour and one-way outbound traffic for the afternoon peak hour, providing additional access points to the GO Station and reducing demand on the main entrance. An alternative solution if the secondary access point is not pursued is to repurpose westbound lanes to have a double left turn lane with protected phasing and a westbound shared through/right turn lane.

### **Street C at Street 1**

The westbound movement at the intersection of Street C and Street 1 is forecast to operate at LOS D in the 2037 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.

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

## **14.2 Recommendations**

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

- ▶ The Applicant be responsible for costs related to constructing a new private driveway connection to Cross Avenue during the interim conditions (i.e., before adjacent properties to the east and north of the Site are constructed).
- ▶ The Applicant be responsible for costs related to upgrading the traffic control signal at Cross Avenue and the GO Station Driveway to accommodate the north leg operating as a private driveway.
- ▶ 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



**From:** [Akhtar, Usman \(MTO\)](#)  
**To:** [Adam Makarewicz](#)  
**Cc:** [Schmid, Kelly \(MTO\)](#); [Vallvé, Nina \(MTO\)](#); [Merey, Sabina \(She/Her\) \(MTO\)](#); [Greg Lue](#)  
**Subject:** FW: 230490: 157 & 167 Cross Avenue, Oakville TIA - TOR  
**Date:** July 24, 2023 11:35:34 AM  
**Attachments:** [image002.png](#)  
[image003.png](#)  
[10135 000 - QEW - MTO - CENTRAL - TORONTO - BURLINGTON .pdf](#)  
[TIS-Traffic Office Memo 2021-02.pdf](#)  
[QEW and Trafalgar May 2022 TMC ramp 61.pdf](#)  
[QEW and Trafalgar Bikes report ramp 61.pdf](#)  
[QEW and Trafalgar Bikes Report.pdf](#)  
[QEW and Trafalgar May 2022 TMC ramp 51.pdf](#)

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Hi Adam,

Looks ok, but please note that within the CAH over the Trafalgar Rd bridge and at the ramp terminals, we would not have signed HOV lanes. I've attached the latest TMC and bikes report at QEW and Trafalgar Rd.

---

**From:** Adam Makarewicz <[amakarewicz@ptsl.com](mailto:amakarewicz@ptsl.com)>  
**Sent:** July 21, 2023 10:11 AM  
**To:** Akhtar, Usman (MTO) <[Usman.Akhtar@ontario.ca](mailto:Usman.Akhtar@ontario.ca)>; Krusto, Matt <[Matt.Krusto@halton.ca](mailto:Matt.Krusto@halton.ca)>; Aquisha Khan <[aquisha.khan@oakville.ca](mailto:aquisha.khan@oakville.ca)>  
**Cc:** Greg Lue <[glue@ptsl.com](mailto:glue@ptsl.com)>  
**Subject:** 230490: 157 & 167 Cross Avenue, Oakville TIA - TOR

**CAUTION -- EXTERNAL E-MAIL - Do not click links or open attachments unless you recognize the sender.**

Hi All,

Paradigm Transportations Solutions Limited has been retained to conduct a Transportation Impact Analysis for a proposed development located 157 & 165 Cross Avenue in the Town of Oakville. The preliminary site plan envisions a large-scale mixed-use residential development of two towers with proposed heights of 44 and 58 storeys on top of a podium (preliminary site plan attached). The development would include approximately 1,180 units, 2,050 square metres of retail use and 5,400 square metres of office use. Vehicle access are not fully defined at this point, however, are envisioned to be provided to the future local roadway network.

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.

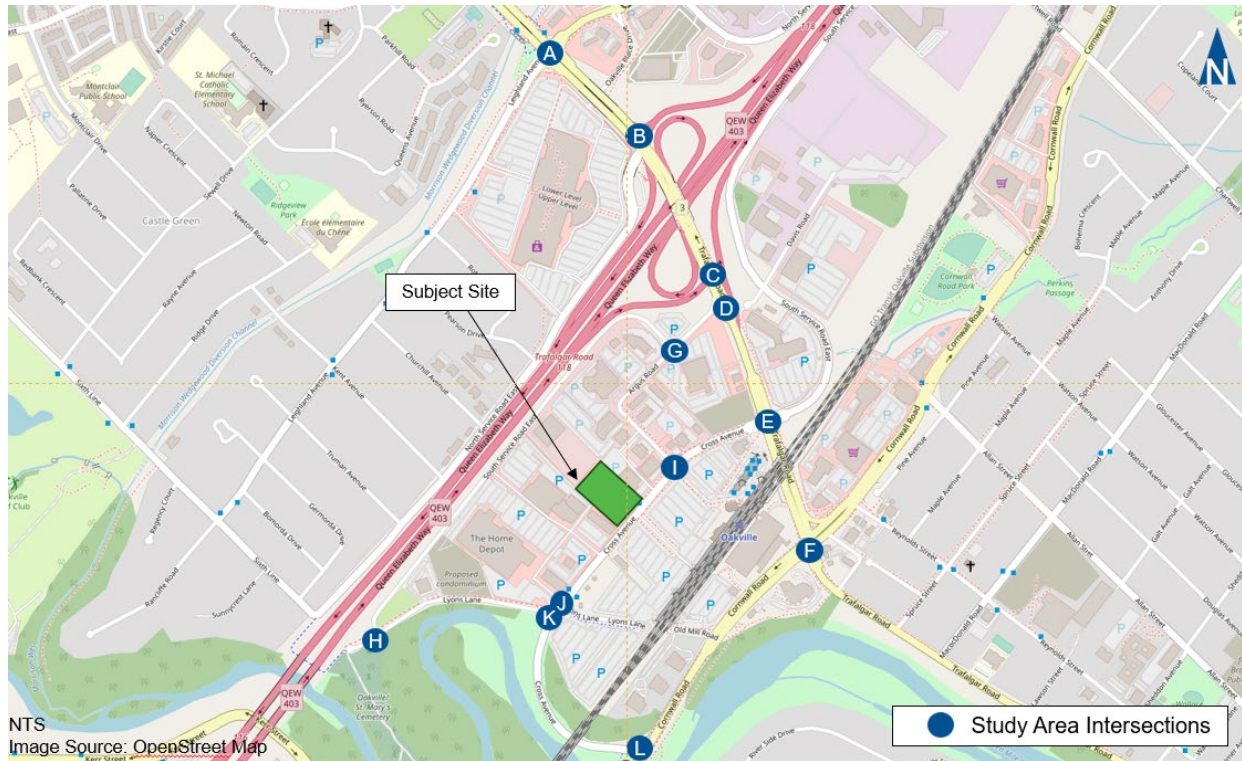
Would the following work plan be acceptable to the MTO, Region and Town to satisfy the traffic study requirements?

#### Proposed Terms of Reference

##### **Study Area Intersections**

- (A) Trafalgar Road and Leighland Avenue / Iroquois Shore Road (signalized)
- (B) Trafalgar Road and QEW Westbound Off-Ramp / North Service Road (Signalized);
- (C) Trafalgar Road and QEW Eastbound Off-Ramp (Signalized);
- (D) Trafalgar Road and Argus Road (Unsignalized);
- (E) Trafalgar Road and Cross Avenue / South Service Road (Signalized);
- (F) Trafalgar Road and Cornwall Road (Signalized);
- (G) Argus Road and South Service Road (Unsignalized);
- (H) Lyons Lane and South Service Road (Unsignalized);

- (I) Cross Avenue and Argus Road / GO Station Driveway (Signalized);
- (J) Cross Avenue and Lyons Lane/Commercial Driveway (Unsignalized);
- (K) Cross Avenue and Lyons Lane (Unsignalized);
- (L) Cross Avenue and Cornwall Road/Speers Road (Signalized)



### Existing Data

- Existing TMC data will be utilized and factored to 2023 volumes if required.

### 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 11
- HCM 2000

### Background Traffic

- Generalized growth rate 2% per annum
- The following Background Developments will be included
  - 157 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.
  - 166 South Service Road – Located west of the subject site, the proposed development is three mixed use towers with residential, commercial and office uses.
  - 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 day care 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
- o 599 Lyons Lane – Located north of Lyons Lane at Cross Avenue, the proposed development is a residential high-rise.
- o 627 Lyons Lane – Located east of South Service Road East at Lyons Lane, the proposed development is a residential high-rise.
- o 320 Davis Road – Located south of David Road and east of South Service Road, the proposed development is a pumping station expansion.

#### **Site Traffic Estimates**

- ITE Trip Generation Data 11<sup>th</sup> Edition
- As previously identified by MTO, no Modal split reductions will be considered.

#### **Site Traffic Distribution**

- Existing travel patterns/TTS 2016 data

#### **Transportation Demand Management**

- Discuss TDM measures and how they would be incorporated

Thanks,

#### **Adam J. Makarewicz**

*Senior Project Manager, Associate*

#### **Paradigm Transportation Solutions Limited**

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

p: 905.381.2229 x303

e: [amakarewicz@ptsl.com](mailto:amakarewicz@ptsl.com)

w: [www.ptsl.com](http://www.ptsl.com)

*Summer 2023 Vacation Notice: July 10-17*



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# Appendix B

## Existing Traffic Data





# 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:  $\times$

Heavys	3	10	10	23
Trucks	12	11	24	47
Cars	241	705	588	1534
<b>Totals</b>	<b>256</b>	<b>726</b>	<b>622</b>	



Heavys	21
Trucks	42
Cars	1314
<b>Totals</b>	<b>1377</b>

East Leg Total: 2084  
 East Entering: 1015  
 East Peds: 10  
 Peds Cross:  $\times$

Heavys	Trucks	Cars	Totals
12	25	745	782

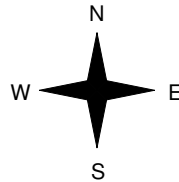


Trafalgar Rd

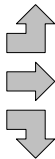
Cars	Trucks	Heavys	Totals
492	22	11	525
420	11	9	440
47	3	0	50
<b>959</b>	<b>36</b>	<b>20</b>	



Cornwall Rd



Heavys	Trucks	Cars	Totals
7	12	316	335
4	15	373	392
0	4	61	65
<b>11</b>	<b>31</b>	<b>750</b>	



Cornwall Rd



Cars	Trucks	Heavys	Totals
1012	43	14	1069

Peds Cross:  $\times$   
 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
<b>Totals</b>	<b>841</b>	<b>Totals</b>	<b>86</b>	<b>517</b>	<b>55</b>	



Trafalgar Rd

Peds Cross:  $\times$   
 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:  $\times$

Heavys	4	2	4	10
Trucks	5	13	25	43
Cars	187	647	483	1317
<b>Totals</b>	<b>196</b>	<b>662</b>	<b>512</b>	



Heavys	17
Trucks	25
Cars	1038
<b>Totals</b>	<b>1080</b>

East Leg Total: 1645  
 East Entering: 742  
 East Peds: 3  
 Peds Cross:  $\times$

Heavys	Trucks	Cars	Totals
6	29	587	622

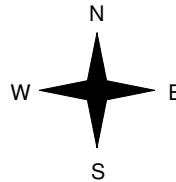


Trafalgar Rd

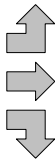
Cars	Trucks	Heavys	Totals
258	11	8	277
361	22	2	385
76	4	0	80
<b>695</b>	<b>37</b>	<b>10</b>	



Cornwall Rd



Heavys	Trucks	Cars	Totals
7	6	256	269
7	13	303	323
1	1	42	44
<b>15</b>	<b>20</b>	<b>601</b>	



Cornwall Rd



Peds Cross:  $\times$   
 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
<b>Totals</b>	<b>786</b>	<b>Totals</b>	<b>41</b>	<b>534</b>	<b>68</b>	



Trafalgar Rd



Peds Cross:  $\times$   
 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
<b>Totals</b>	<b>337</b>	<b>580</b>	<b>468</b>	



Heavys	12
Trucks	40
Cars	1133
<b>Totals</b>	<b>1185</b>

East Leg Total: 1962  
 East Entering: 1009  
 East Peds: 6  
 Peds Cross:  $\times$

Heavys	Trucks	Cars	Totals
15	38	977	1030

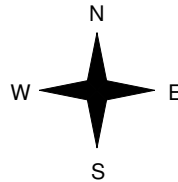


Trafalgar Rd

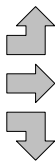
Cars	Trucks	Heavys	Totals
276	12	6	294
604	20	14	638
75	2	0	77
<b>955</b>	<b>34</b>	<b>20</b>	



Cornwall Rd



Heavys	Trucks	Cars	Totals
5	15	336	356
5	20	390	415
0	1	40	41
<b>10</b>	<b>36</b>	<b>766</b>	



Cornwall Rd



Cars	Trucks	Heavys	Totals
902	40	11	953

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
<b>Totals</b>	<b>698</b>	<b>Totals</b>	<b>55</b>	<b>535</b>	<b>70</b>	



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
<b>Totals</b>	<b>1967</b>	<b>4682</b>	<b>3722</b>	



Heavys	111
Trucks	227
Cars	8120
<b>Totals</b>	<b>8458</b>

East Leg Total: 12957  
 East Entering: 6144  
 East Peds: 62  
 Peds Cross:  $\times$

Heavys	Trucks	Cars	Totals
58	202	5396	5656



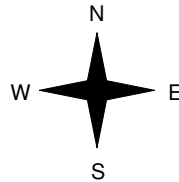
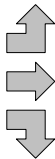
Trafalgar Rd

Cars	Trucks	Heavys	Totals
2165	92	57	2314
3144	128	37	3309
508	13	0	521
<b>5817</b>	<b>233</b>	<b>94</b>	



Cornwall Rd

Heavys	Trucks	Cars	Totals
39	64	2301	2404
34	99	2561	2694
2	16	355	373
<b>75</b>	<b>179</b>	<b>5217</b>	



Trafalgar 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
<b>Totals</b>	<b>5576</b>



Cars	366	3654	375	4395
Trucks	13	71	18	102
Heavys	1	15	4	20
<b>Totals</b>	<b>380</b>	<b>3740</b>	<b>397</b>	

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
<b>Totals</b>	<b>346</b>	<b>1445</b>	<b>189</b>	



Heavys 12

Trucks 33

Cars 1457

Totals 1502

East Leg Total: 421

East Entering: 171

East Peds: 14

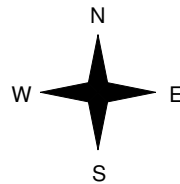
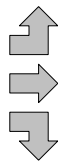
Peds Cross:  $\times$

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
	8		27		400		



Trafalgar Rd

Cars	58	Trucks	2	Heavys	2	Totals	62
	75		0		1		76
	29		4		0		33
	162		6		3		

South Service Rd



Cars	243	Trucks	4	Heavys	3	Totals	250
------	-----	--------	---	--------	---	--------	-----

Peds Cross:  $\times$

West Peds: 12

West Entering: 435

West Leg Total: 975

Cars	1505	Cars	107	1114	19	1240
Trucks	51	Trucks	11	14	4	29
Heavys	10	Heavys	0	3	0	3
<b>Totals</b>	<b>1566</b>	<b>Totals</b>	<b>118</b>	<b>1131</b>	<b>23</b>	



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

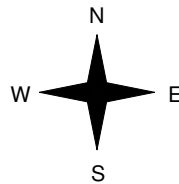


Trafalgar Rd

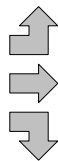
Cars	42	Trucks	3	Heavys	0	Totals	45
Cars	84	Trucks	0	Heavys	0	Totals	84
Cars	23	Trucks	0	Heavys	0	Totals	23
Cars	149	Trucks	3	Heavys	0	Totals	



Cross Ave



Heavys	21
Trucks	4
Cars	412
Totals	437
Heavys	0
Trucks	0
Cars	63
Totals	63
Heavys	4
Trucks	4
Cars	122
Totals	130
Heavys	25
Trucks	8
Cars	597
Totals	



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	Trucks	Cars	Totals
33	1	420	454

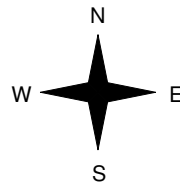


Trafalgar Rd

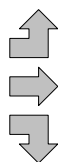
Cars	Trucks	Heavys	Totals
206	3	0	209
138	1	1	140
79	2	0	81
423	6	1	



Cross Ave



Heavys	Trucks	Cars	Totals
31	0	911	942
0	0	57	57
8	1	134	143
39	1	1102	



South Service Rd



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
<b>Totals</b>	<b>1824</b>	<b>10604</b>	<b>1047</b>	



Heavys	191
Trucks	308
Cars	14711
<b>Totals</b>	<b>15210</b>

East Leg Total: 3529  
 East Entering: 1902  
 East Peds: 50  
 Peds Cross:  $\times$

Heavys	Trucks	Cars	Totals
176	101	3456	3733

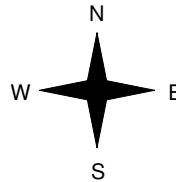


Trafalgar Rd

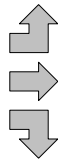
Cars	Trucks	Heavys	Totals
790	17	11	818
756	11	10	777
286	21	0	307
<b>1832</b>	<b>49</b>	<b>21</b>	



Cross Ave



Heavys	Trucks	Cars	Totals
121	106	3736	3963
1	3	354	358
27	35	806	868
<b>149</b>	<b>144</b>	<b>4896</b>	



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
<b>Totals</b>	<b>11779</b>



Cars	1062	10185	203	11450
Trucks	41	185	17	243
Heavys	29	59	2	90
<b>Totals</b>	<b>1132</b>	<b>10429</b>	<b>222</b>	

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:  $\nabla$

Heavys	9	24	33
Trucks	2	33	35
Cars	282	1443	1725
<b>Totals</b>	<b>293</b>	<b>1500</b>	



Heavys	28
Trucks	25
Cars	748
<b>Totals</b>	<b>801</b>

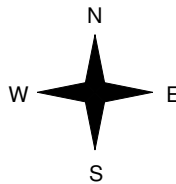
Heavys	Trucks	Cars	Totals
9	2	282	293



Trafalgar Rd



Argus Rd



Heavys	Trucks	Cars	Totals
0	0	0	0
0	0	21	21
0	0	21	



Trafalgar Rd

Peds Cross:  $\nabla$   
 West Peds: 9  
 West Entering: 21  
 West Leg Total: 314

Cars	1464
Trucks	33
Heavys	24
<b>Totals</b>	<b>1521</b>



Cars	0	748	748
Trucks	0	25	25
Heavys	0	28	28
<b>Totals</b>	<b>0</b>	<b>801</b>	

Peds Cross:  $\nabla$   
 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:  $\times$

Heavys	9	20	29
Trucks	4	20	24
Cars	264	1391	1655
<b>Totals</b>	<b>277</b>	<b>1431</b>	



Heavys	22
Trucks	25
Cars	1278
<b>Totals</b>	<b>1325</b>

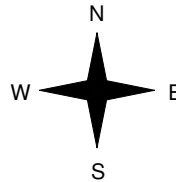
Heavys	Trucks	Cars	Totals
9	4	264	277



Trafalgar Rd



Argus Rd



Heavys	Trucks	Cars	Totals
0	0	0	0
0	2	45	47
0	2	45	



Trafalgar Rd



Peds Cross:  $\times$   
 West Peds: 13  
 West Entering: 47  
 West Leg Total: 324

Cars	1436
Trucks	22
Heavys	20
<b>Totals</b>	<b>1478</b>



Cars	0	1278	1278
Trucks	0	25	25
Heavys	0	22	22
<b>Totals</b>	<b>0</b>	<b>1325</b>	

Peds Cross:  $\times$   
 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
<b>Totals</b>	<b>268</b>	<b>1433</b>	



Heavys	27
Trucks	8
Cars	1597
<b>Totals</b>	<b>1632</b>

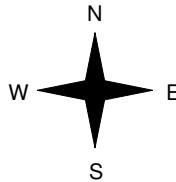
Heavys	Trucks	Cars	Totals
13	0	255	268



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
<b>Totals</b>	<b>1473</b>



Cars	0	1597	1597
Trucks	0	8	8
Heavys	0	27	27
<b>Totals</b>	<b>0</b>	<b>1632</b>	

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:  $\nabla$

Heavys	81	159	240
Trucks	18	178	196
Cars	2077	10521	12598
<b>Totals</b>	<b>2176</b>	<b>10858</b>	

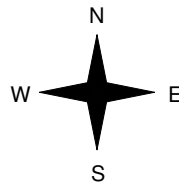
Heavys	215
Trucks	155
Cars	9279
<b>Totals</b>	<b>9649</b>

Heavys	Trucks	Cars	Totals
81	18	2077	2176



Argus Rd

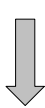
Heavys	Trucks	Cars	Totals
0	0	0	0
5	8	272	285
5	8	272	



Trafalgar Rd

Peds Cross:  $\nabla$   
 West Peds: 122  
 West Entering: 285  
 West Leg Total: 2461

Cars	10793
Trucks	186
Heavys	164
<b>Totals</b>	<b>11143</b>



Cars	0	9279	9279
Trucks	0	155	155
Heavys	0	215	215
<b>Totals</b>	<b>0</b>	<b>9649</b>	

Peds Cross:  $\nabla$   
 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
<b>Totals</b>	<b>38</b>	<b>1785</b>	<b>133</b>	



Heavys	36
Trucks	12
Cars	989
<b>Totals</b>	<b>1037</b>

East Leg Total: 1859  
 East Entering: 987  
 East Peds: 10  
 Peds Cross:  $\times$

Heavys	8
Trucks	3
Cars	222
<b>Totals</b>	<b>233</b>

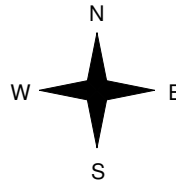


Trafalgar Rd

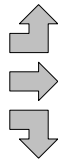
Cars	136	Trucks	3	Heavys	4	<b>Totals</b>	<b>143</b>
	60		1		1		62
	763		5		14		782
<b>Totals</b>	<b>959</b>	<b>9</b>	<b>19</b>				



Leighland Ave



Heavys	1	Trucks	2	Cars	25	<b>Totals</b>	<b>28</b>
	2		0		85		87
	7		2		368		377
<b>Totals</b>	<b>10</b>	<b>4</b>	<b>478</b>				



Iroquois Shore Rd



Peds Cross:  $\times$   
 West Peds: 17  
 West Entering: 492  
 West Leg Total: 725

Cars	2867
Trucks	15
Heavys	62
<b>Totals</b>	<b>2944</b>



Cars	126	828	632	1586
Trucks	2	7	5	14
Heavys	5	31	15	51
<b>Totals</b>	<b>133</b>	<b>866</b>	<b>652</b>	

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:  $\bowtie$

Heavys	2	21	1	24
Trucks	1	11	4	16
Cars	190	1015	107	1312
<b>Totals</b>	<b>193</b>	<b>1047</b>	<b>112</b>	



Heavys	26
Trucks	17
Cars	1210
<b>Totals</b>	<b>1253</b>

East Leg Total: 1640  
 East Entering: 752  
 East Peds: 5  
 Peds Cross:  $\bowtie$

Heavys	Trucks	Cars	Totals
6	4	553	563

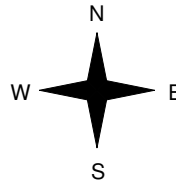


Trafalgar Rd

Cars	Trucks	Heavys	Totals
144	0	4	148
103	0	1	104
481	5	14	500
<b>728</b>	<b>5</b>	<b>19</b>	



Leighland Ave



Heavys	Trucks	Cars	Totals
1	2	133	136
1	0	130	131
6	0	328	334
8	2	591	



Iroquois Shore Rd



Cars	Trucks	Heavys	Totals
863	10	15	888

Peds Cross:  $\bowtie$   
 West Peds: 37  
 West Entering: 601  
 West Leg Total: 1164

Cars	1824
Trucks	16
Heavys	41
<b>Totals</b>	<b>1881</b>



Cars	260	933	626	1819
Trucks	3	15	6	24
Heavys	3	21	13	37
<b>Totals</b>	<b>266</b>	<b>969</b>	<b>645</b>	

Peds Cross:  $\bowtie$   
 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:  $\bowtie$

Heavys	0	15	0	15
Trucks	1	12	1	14
Cars	88	889	107	1084
<b>Totals</b>	<b>89</b>	<b>916</b>	<b>108</b>	



Heavys	22
Trucks	7
Cars	1668
<b>Totals</b>	<b>1697</b>

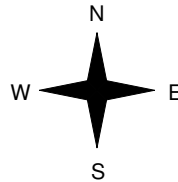
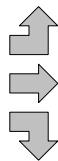
East Leg Total: 1799  
East Entering: 1059  
East Peds: 18  
Peds Cross:  $\bowtie$

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:  $\bowtie$   
West Peds: 13  
West Entering: 459  
West Leg Total: 1051

Cars	1880
Trucks	15
Heavys	28
<b>Totals</b>	<b>1923</b>



Cars	324	1423	540	2287
Trucks	1	4	2	7
Heavys	6	21	0	27
<b>Totals</b>	<b>331</b>	<b>1448</b>	<b>542</b>	

Peds Cross:  $\bowtie$   
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:  $\times$

Heavys	5	214	12	231
Trucks	5	76	14	95
Cars	841	8992	845	10678
<b>Totals</b>	<b>851</b>	<b>9282</b>	<b>871</b>	



Heavys	232
Trucks	89
Cars	9766
<b>Totals</b>	<b>10087</b>

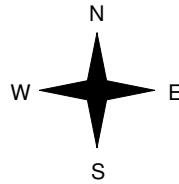
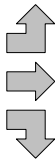
East Leg Total: 13269  
 East Entering: 6738  
 East Peds: 65  
 Peds Cross:  $\times$

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:  $\times$   
 West Peds: 171  
 West Entering: 4100  
 West Leg Total: 7686

Cars	16146
Trucks	139
Heavys	372
<b>Totals</b>	<b>16657</b>



Cars	1898	7899	4779	14576
Trucks	17	66	39	122
Heavys	35	205	81	321
<b>Totals</b>	<b>1950</b>	<b>8170</b>	<b>4899</b>	

Peds Cross:  $\times$   
 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

**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:**

Direction	Phase	Count	Percentage
Northbound	Left	2321	3%
	Through	10596	3%
	Right	0	0%
	Pedestrian	94	-
Southbound	Left	0	0%
	Through	9944	3%
	Right	4807	2%
	Pedestrian	4	-
Eastbound	Left	0	0%
	Through	5108	4%
	Right	0	0%
	Pedestrian	0	-
Westbound	Left	0	0%
	Through	2998	3%
	Right	0	0%
	Pedestrian	0	-

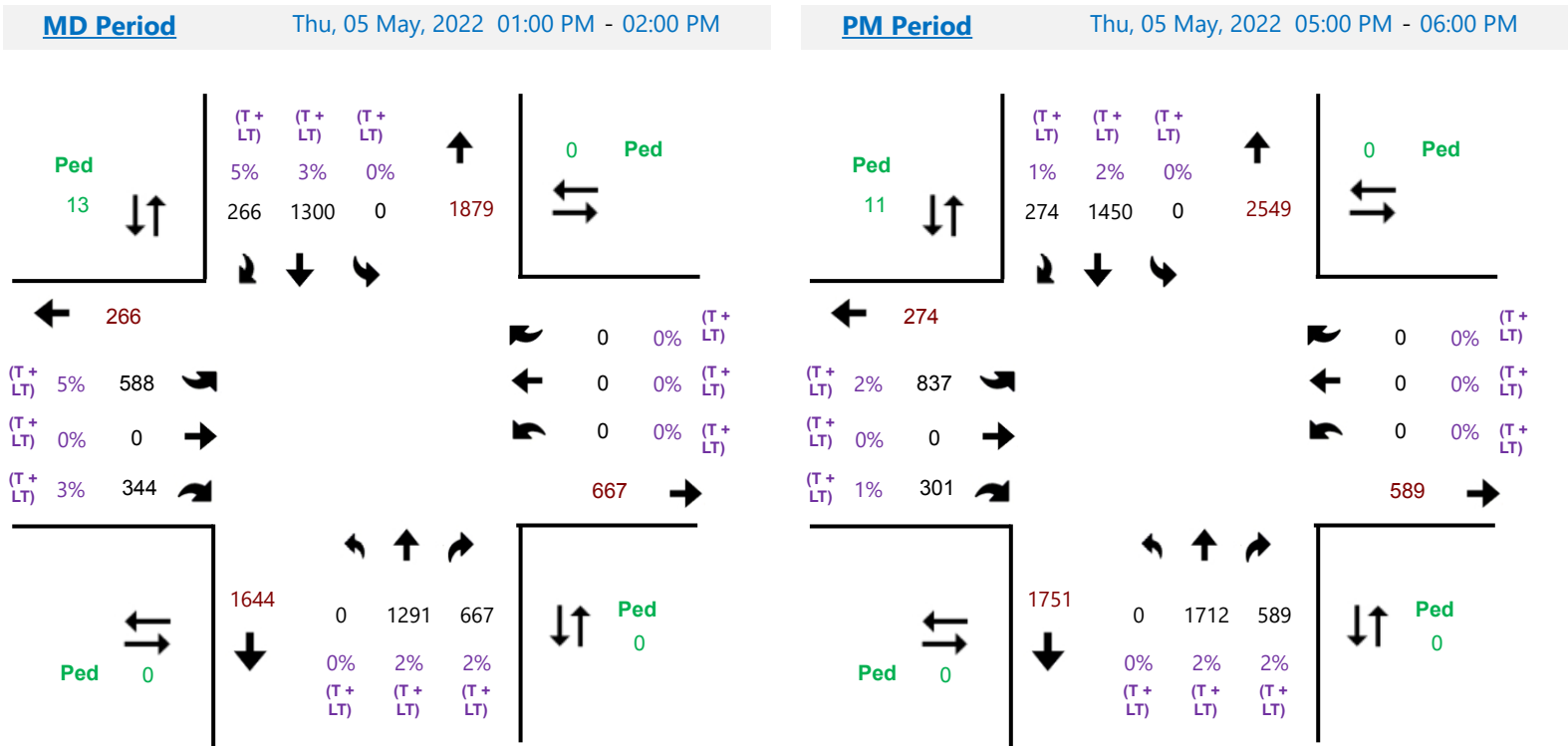
**AM Period Data:**

Direction	Phase	Count	Percentage
Northbound	Left	369	3%
	Through	1342	5%
	Right	0	0%
	Pedestrian	9	-
Southbound	Left	0	0%
	Through	982	6%
	Right	540	3%
	Pedestrian	1	-
Eastbound	Left	0	0%
	Through	699	4%
	Right	0	0%
	Pedestrian	0	-
Westbound	Left	0	0%
	Through	574	3%
	Right	0	0%
	Pedestrian	0	-



## TES - Traffic Engineering System Turning Movement Total Count and Peak Summary Report

<b>Description:</b>	HWY 1 @ TRAFALGAR RD - RAMP 51		
<b>Region</b>	CENTRAL	<b>Hwy #:</b>	HWY 1
<b>LHRS_Offset:</b>	10135_0000_51T	<b>Int. Type:</b>	Cross
<b>Count Date:</b>	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:**

- Northbound (Ped 49): 18% (56), 4% (15110), 0% (0)
- Southbound (Ped 0): 0% (106), 0% (0), 2% (1465)
- Westbound (Ped 3): 4% (1803), 2% (449), 4% (2983)
- Eastbound (Ped 22): 0% (1), 3% (12491), 3% (2554)
- Other: 14400 (up), 506 (left), 2554 (right), 19558 (down)

**AM Period Data:**

- Northbound (Ped 3): 40% (5), 4% (2041), 0% (0)
- Southbound (Ped 0): 0% (2), 0% (0), 2% (133)
- Westbound (Ped 0): 6% (200), 8% (25), 6% (363)
- Eastbound (Ped 1): 0% (0), 5% (1361), 5% (309)
- Other: 1563 (up), 30 (left), 309 (right), 2537 (down)

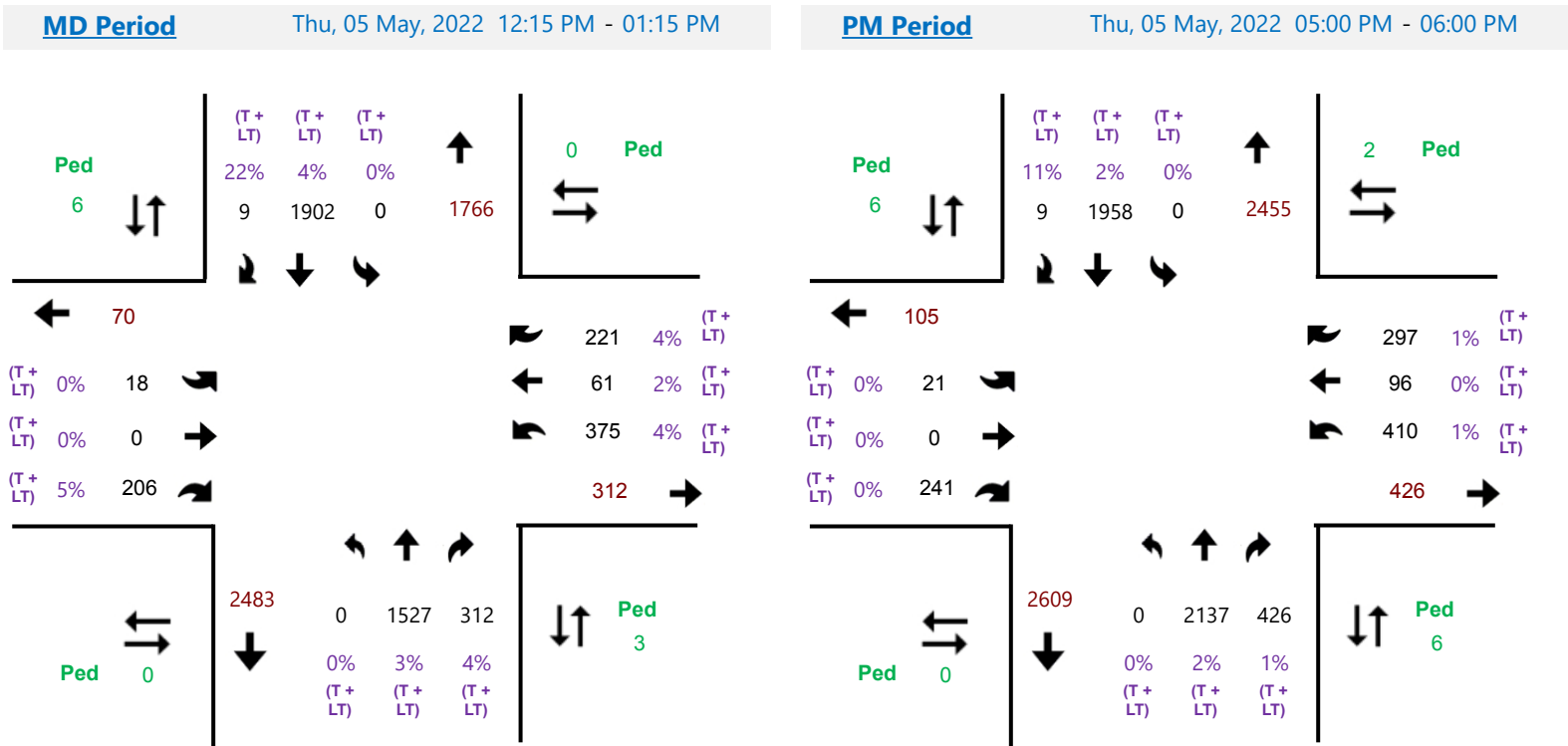
Monday, July 24, 2023

Page 1 of 2



## TES - Traffic Engineering System Turning Movement Total Count and Peak Summary Report

<b>Description:</b>	HWY 1 @ TRAFALGAR RD - RAMP 61		
<b>Region</b>	CENTRAL	<b>Hwy #:</b>	HWY 1
<b>LHRS_Offset:</b>	10135_0000_61T	<b>Int. Type:</b>	Cross
<b>Count Date:</b>	Thursday, 05 May, 2022		



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												
<b>Notes:</b>												

<p><b>Pattern 1</b>  <b>Time:</b> 6:00  <b>Cycle Length:</b> 120  <b>Offset (%):</b> 28%</p> <table border="0"> <tr><td colspan="5"> </td></tr> <tr><td><b>Direction</b></td><td></td><td></td><td></td><td></td></tr> <tr><td><b>Phase</b></td><td><b>1</b></td><td><b>2</b></td><td><b>3</b></td><td><b>4</b></td></tr> <tr><td><b>%</b></td><td>10%</td><td>44%</td><td>10%</td><td>36%</td></tr> <tr><td><b>Direction</b></td><td></td><td></td><td></td><td></td></tr> <tr><td><b>Phase</b></td><td><b>5</b></td><td><b>6</b></td><td><b>7</b></td><td><b>8</b></td></tr> <tr><td><b>%</b></td><td>10%</td><td>44%</td><td>31%</td><td>15%</td></tr> </table>						<b>Direction</b>					<b>Phase</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>%</b>	10%	44%	10%	36%	<b>Direction</b>					<b>Phase</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>%</b>	10%	44%	31%	15%	<p><b>Pattern 2</b>  <b>Time:</b> 10:00  <b>Cycle Length:</b> 120  <b>Offset (%):</b> 98%</p> <table border="0"> <tr><td colspan="5"> </td></tr> <tr><td><b>Direction</b></td><td></td><td></td><td></td><td></td></tr> <tr><td><b>Phase</b></td><td><b>1</b></td><td><b>2</b></td><td><b>3</b></td><td><b>4</b></td></tr> <tr><td><b>%</b></td><td>13%</td><td>41%</td><td>10%</td><td>36%</td></tr> <tr><td><b>Direction</b></td><td></td><td></td><td></td><td></td></tr> <tr><td><b>Phase</b></td><td><b>5</b></td><td><b>6</b></td><td><b>7</b></td><td><b>8</b></td></tr> <tr><td><b>%</b></td><td>16%</td><td>38%</td><td>31%</td><td>15%</td></tr> </table>						<b>Direction</b>					<b>Phase</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>%</b>	13%	41%	10%	36%	<b>Direction</b>					<b>Phase</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>%</b>	16%	38%	31%	15%
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<p><b>Pattern 3</b>  <b>Time:</b> 15:15  <b>Cycle Length:</b> 120  <b>Offset (%):</b> 88%</p> <table border="0"> <tr><td colspan="5"> </td></tr> <tr><td><b>Direction</b></td><td></td><td></td><td></td><td></td></tr> <tr><td><b>Phase</b></td><td><b>1</b></td><td><b>2</b></td><td><b>3</b></td><td><b>4</b></td></tr> <tr><td><b>%</b></td><td>10%</td><td>44%</td><td>10%</td><td>36%</td></tr> <tr><td><b>Direction</b></td><td></td><td></td><td></td><td></td></tr> <tr><td><b>Phase</b></td><td><b>5</b></td><td><b>6</b></td><td><b>7</b></td><td><b>8</b></td></tr> <tr><td><b>%</b></td><td>14%</td><td>40%</td><td>31%</td><td>15%</td></tr> </table>						<b>Direction</b>					<b>Phase</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>%</b>	10%	44%	10%	36%	<b>Direction</b>					<b>Phase</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>%</b>	14%	40%	31%	15%	<p><b>Pattern 4</b>  <b>Time:</b> 19:00  <b>Cycle Length:</b> 110  <b>Offset (%):</b> 27%</p> <table border="0"> <tr><td colspan="5"> </td></tr> <tr><td><b>Direction</b></td><td></td><td></td><td></td><td></td></tr> <tr><td><b>Phase</b></td><td><b>1</b></td><td><b>2</b></td><td><b>3</b></td><td><b>4</b></td></tr> <tr><td><b>%</b></td><td>12%</td><td>35%</td><td>13%</td><td>40%</td></tr> <tr><td><b>Direction</b></td><td></td><td></td><td></td><td></td></tr> <tr><td><b>Phase</b></td><td><b>5</b></td><td><b>6</b></td><td><b>7</b></td><td><b>8</b></td></tr> <tr><td><b>%</b></td><td>12%</td><td>35%</td><td>20%</td><td>33%</td></tr> </table>						<b>Direction</b>					<b>Phase</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>%</b>	12%	35%	13%	40%	<b>Direction</b>					<b>Phase</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>%</b>	12%	35%	20%	33%
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<b>%</b>	12%	35%	20%	33%																																																																			
<p><b>Pattern 5</b>  <b>Time:</b> Weekend  <b>Cycle Length:</b> 120  <b>Offset (%):</b> 98%</p> <table border="0"> <tr><td colspan="5"> </td></tr> <tr><td><b>Direction</b></td><td></td><td></td><td></td><td></td></tr> <tr><td><b>Phase</b></td><td><b>1</b></td><td><b>2</b></td><td><b>3</b></td><td><b>4</b></td></tr> <tr><td><b>%</b></td><td>13%</td><td>41%</td><td>10%</td><td>36%</td></tr> <tr><td><b>Direction</b></td><td></td><td></td><td></td><td></td></tr> <tr><td><b>Phase</b></td><td><b>5</b></td><td><b>6</b></td><td><b>7</b></td><td><b>8</b></td></tr> <tr><td><b>%</b></td><td>16%</td><td>38%</td><td>31%</td><td>15%</td></tr> </table>						<b>Direction</b>					<b>Phase</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>%</b>	13%	41%	10%	36%	<b>Direction</b>					<b>Phase</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>%</b>	16%	38%	31%	15%	<p><b>Pattern 6</b>  <b>Time:</b>  <b>Cycle Length:</b> Local  <b>Offset (%):</b></p> <table border="0"> <tr><td colspan="5"> </td></tr> <tr><td><b>Direction</b></td><td></td><td></td><td></td><td></td></tr> <tr><td><b>Phase</b></td><td><b>1</b></td><td><b>2</b></td><td><b>3</b></td><td><b>4</b></td></tr> <tr><td><b>%</b></td><td>x</td><td>x</td><td>x</td><td>x</td></tr> <tr><td><b>Direction</b></td><td></td><td></td><td></td><td></td></tr> <tr><td><b>Phase</b></td><td><b>5</b></td><td><b>6</b></td><td><b>7</b></td><td><b>8</b></td></tr> <tr><td><b>%</b></td><td>x</td><td>x</td><td>x</td><td>x</td></tr> </table>						<b>Direction</b>					<b>Phase</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>%</b>	x	x	x	x	<b>Direction</b>					<b>Phase</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>%</b>	x	x	x	x
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<b>%</b>	x	x	x	x																																																																			



Paradigm Transportation Solutions Limited  
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8  
519-896-3163 cbowness@ptsf.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	-	-

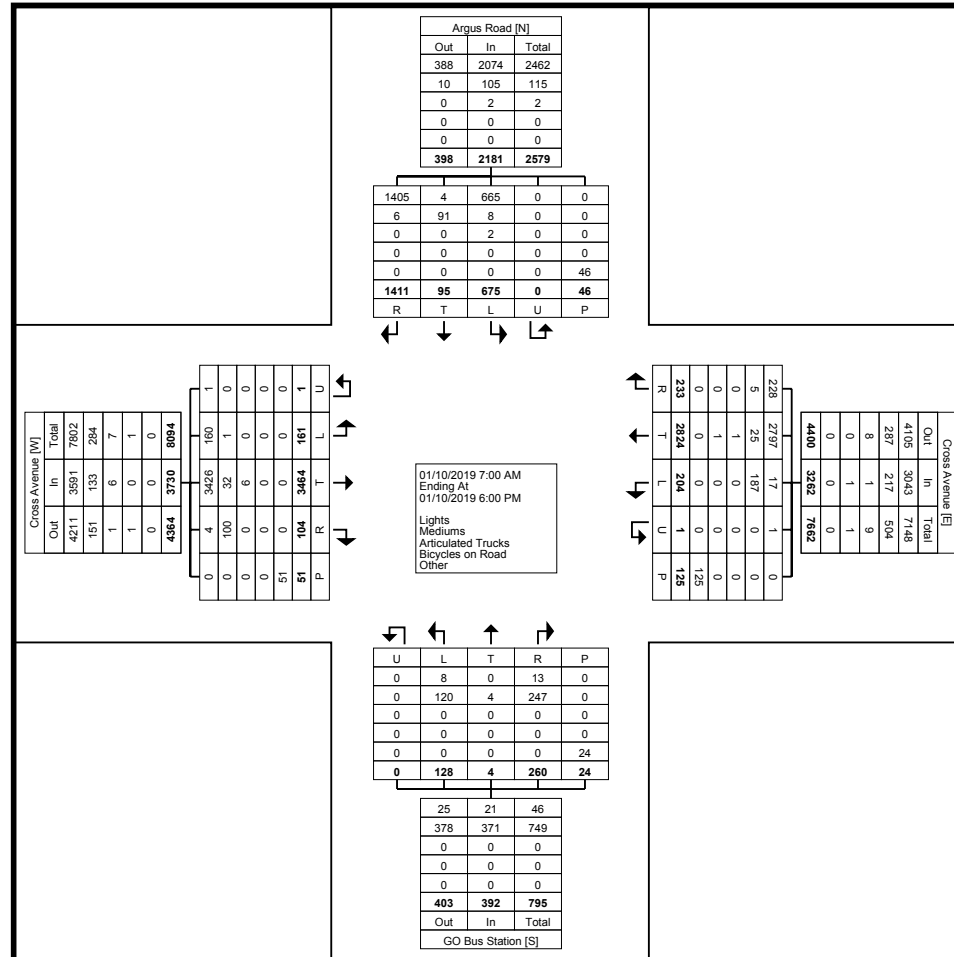




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Count Name: Cross Avenue & Argus Road  
Site Code:  
Start Date: 01/10/2019  
Page No: 3



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)

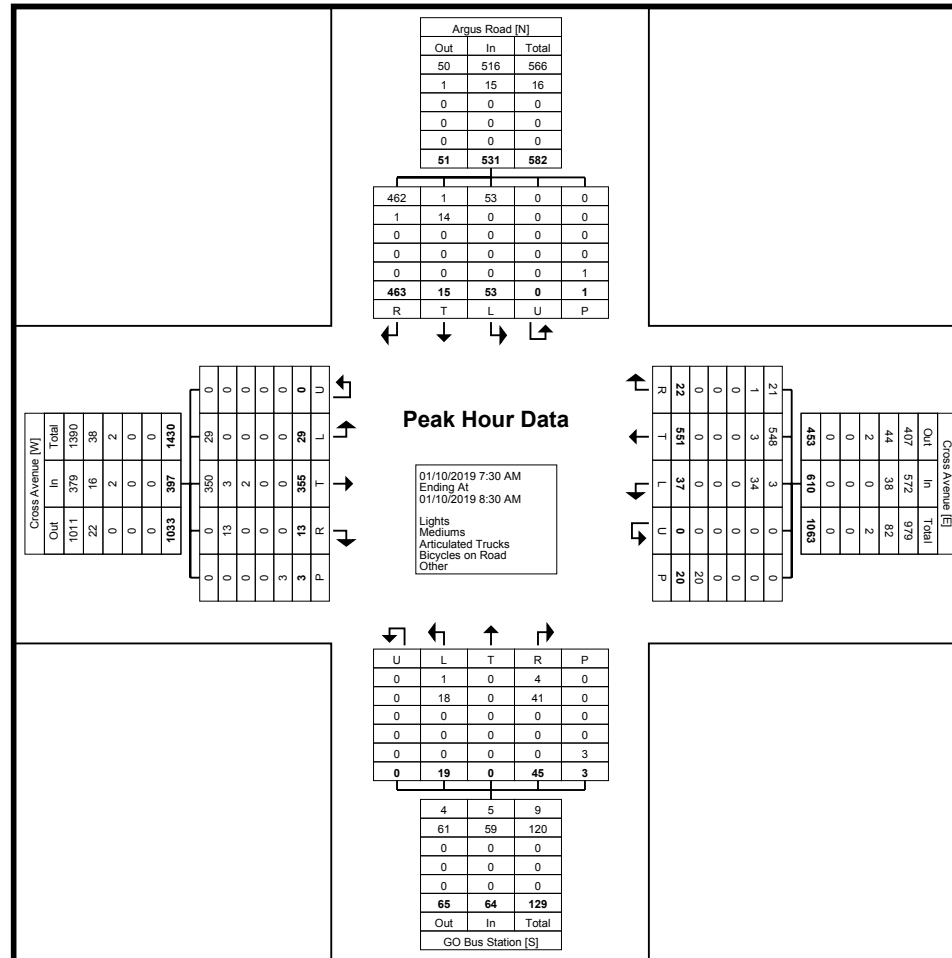
Start Time	Cross Avenue Eastbound						Cross Avenue Westbound						GO Bus Station Northbound						Argus Road Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
7:30 AM	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
<b>Total</b>	<b>29</b>	<b>355</b>	<b>13</b>	<b>0</b>	<b>3</b>	<b>397</b>	<b>37</b>	<b>551</b>	<b>22</b>	<b>0</b>	<b>20</b>	<b>610</b>	<b>19</b>	<b>0</b>	<b>45</b>	<b>0</b>	<b>3</b>	<b>64</b>	<b>53</b>	<b>15</b>	<b>463</b>	<b>0</b>	<b>1</b>	<b>531</b>	<b>1602</b>
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:  
Start Date: 01/10/2019  
Page No: 5



Turning Movement Peak Hour Data Plot (7:30 AM)



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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)

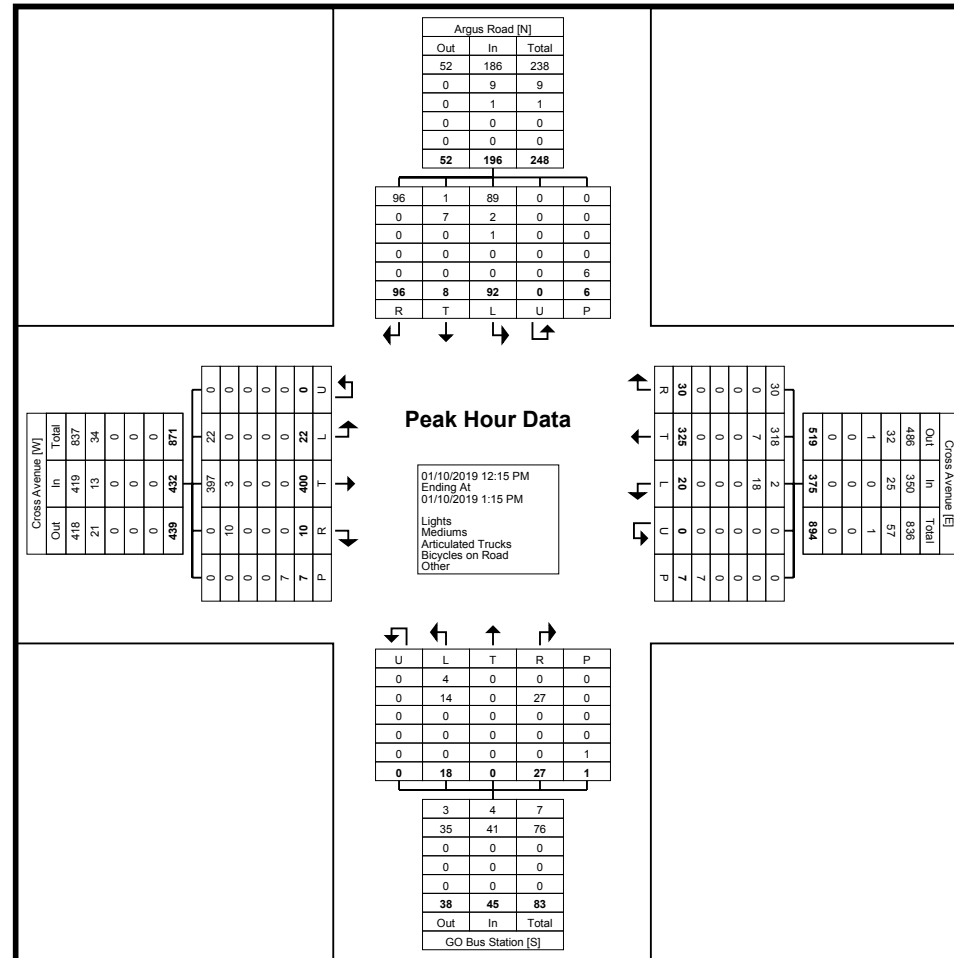
Start Time	Cross Avenue Eastbound						Cross Avenue Westbound						GO Bus Station Northbound						Argus Road Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
12:15 PM	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
<b>Total</b>	<b>22</b>	<b>400</b>	<b>10</b>	<b>0</b>	<b>7</b>	<b>432</b>	<b>20</b>	<b>325</b>	<b>30</b>	<b>0</b>	<b>7</b>	<b>375</b>	<b>18</b>	<b>0</b>	<b>27</b>	<b>0</b>	<b>1</b>	<b>45</b>	<b>92</b>	<b>8</b>	<b>96</b>	<b>0</b>	<b>6</b>	<b>196</b>	<b>1048</b>
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  
Page No: 7



Turning Movement Peak Hour Data Plot (12:15 PM)



Paradigm Transportation Solutions Limited  
22 King Street South, Suite 300

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Count Name: Cross Avenue & Argus Road  
Site Code:  
Start Date: 01/10/2019  
Page No: 8

### Turning Movement Peak Hour Data (5:00 PM)

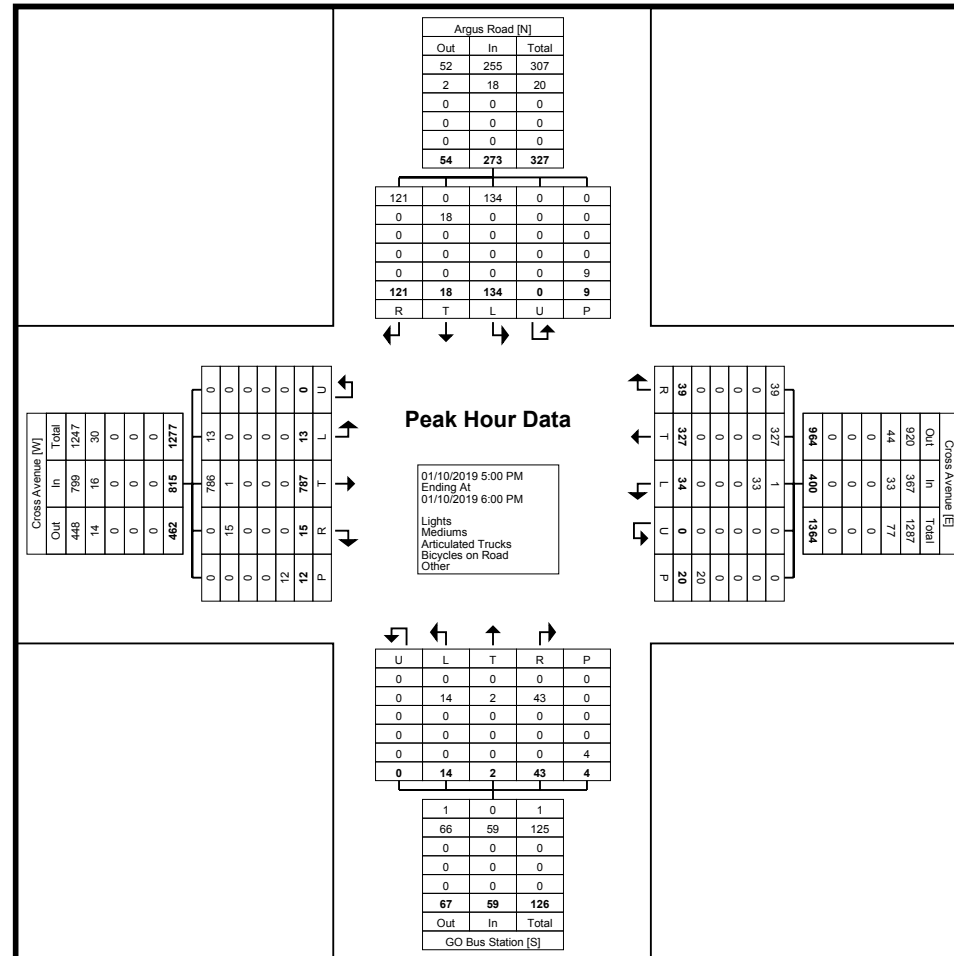
Start Time	Cross Avenue Eastbound						Cross Avenue Westbound						GO Bus Station Northbound						Argus Road Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
5:00 PM	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
<b>Total</b>	<b>13</b>	<b>787</b>	<b>15</b>	<b>0</b>	<b>12</b>	<b>815</b>	<b>34</b>	<b>327</b>	<b>39</b>	<b>0</b>	<b>20</b>	<b>400</b>	<b>14</b>	<b>2</b>	<b>43</b>	<b>0</b>	<b>4</b>	<b>59</b>	<b>134</b>	<b>18</b>	<b>121</b>	<b>0</b>	<b>9</b>	<b>273</b>	<b>1547</b>
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:  
Start Date: 01/10/2019  
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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  
Site Code:  
Start Date: 01/10/2019  
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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	

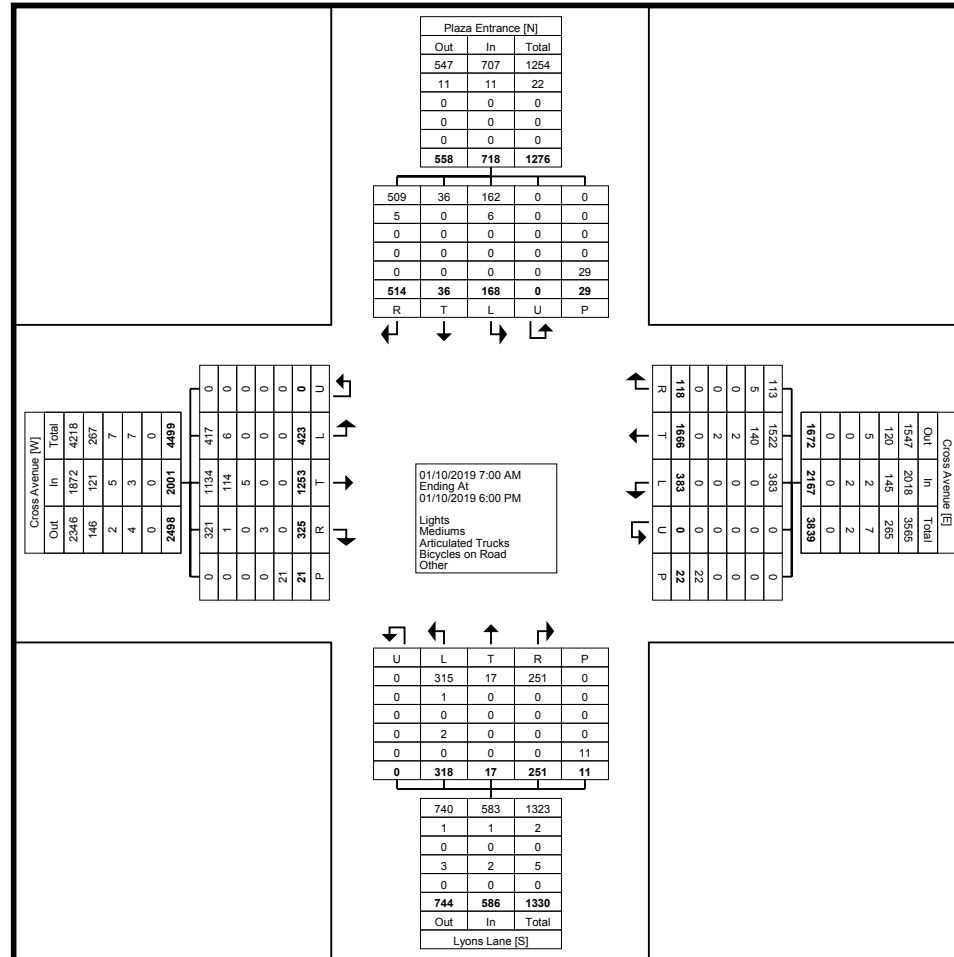
5:00 PM	9	41	0	0	0	50	1	76	2	0	0	79	73	0	32	0	1	105	5	0	24	0	0	29	263
5:15 PM	7	24	4	0	1	35	6	73	3	0	1	82	24	0	24	0	0	48	3	0	14	0	1	17	182
5:30 PM	15	42	4	0	0	61	2	66	5	0	1	73	59	1	46	0	0	106	4	1	10	0	1	15	255
5:45 PM	4	34	4	0	0	42	4	74	1	0	2	79	60	3	44	0	0	107	2	1	10	0	1	13	241
Hourly Total	35	141	12	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)

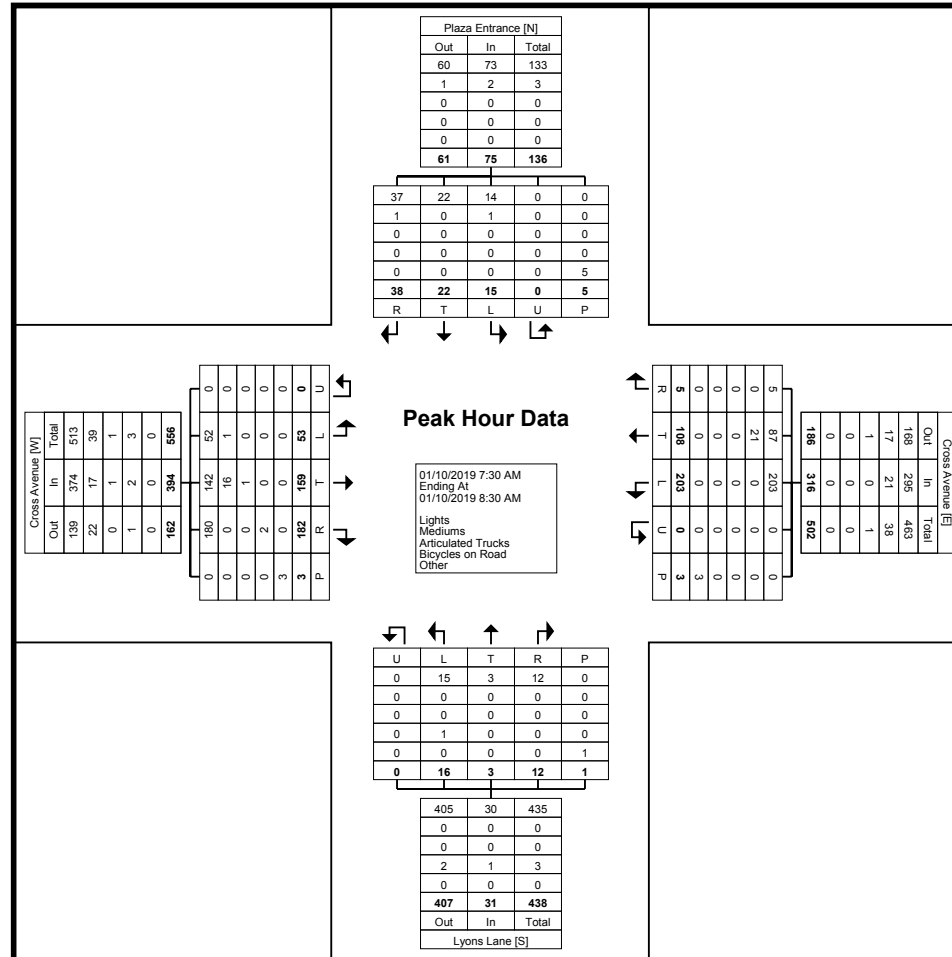
Start Time	Cross Avenue Eastbound						Cross Avenue Westbound						Lyons Lane Northbound						Plaza Entrance Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
7:30 AM	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
<b>Total</b>	<b>53</b>	<b>159</b>	<b>182</b>	<b>0</b>	<b>3</b>	<b>394</b>	<b>203</b>	<b>108</b>	<b>5</b>	<b>0</b>	<b>3</b>	<b>316</b>	<b>16</b>	<b>3</b>	<b>12</b>	<b>0</b>	<b>1</b>	<b>31</b>	<b>15</b>	<b>22</b>	<b>38</b>	<b>0</b>	<b>5</b>	<b>75</b>	<b>816</b>
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  
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Site Code:  
Start Date: 01/10/2019  
Page No: 5



Turning Movement Peak Hour Data Plot (7:30 AM)



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: 6

### Turning Movement Peak Hour Data (12:15 PM)

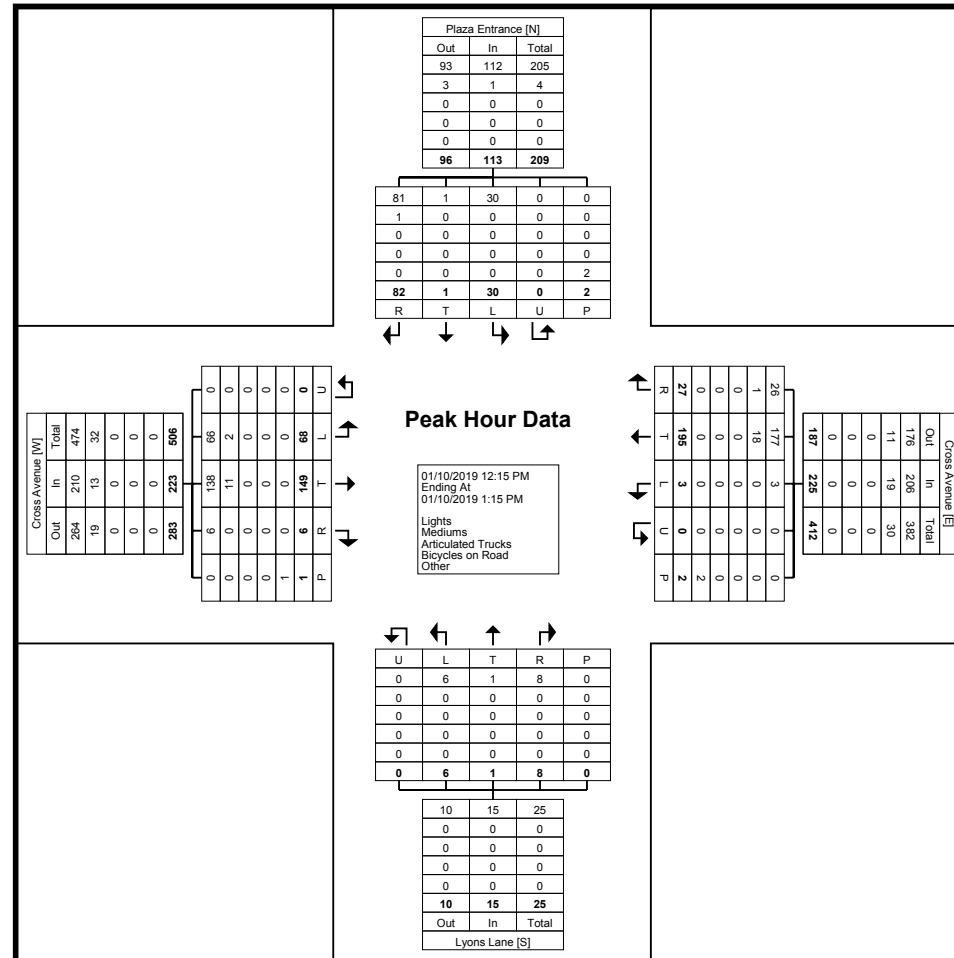
Start Time	Cross Avenue Eastbound						Cross Avenue Westbound						Lyons Lane Northbound						Plaza Entrance Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
12:15 PM	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
<b>Total</b>	<b>68</b>	<b>149</b>	<b>6</b>	<b>0</b>	<b>1</b>	<b>223</b>	<b>3</b>	<b>195</b>	<b>27</b>	<b>0</b>	<b>2</b>	<b>225</b>	<b>6</b>	<b>1</b>	<b>8</b>	<b>0</b>	<b>0</b>	<b>15</b>	<b>30</b>	<b>1</b>	<b>82</b>	<b>0</b>	<b>2</b>	<b>113</b>	<b>576</b>
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  
Site Code:  
Start Date: 01/10/2019  
Page No: 7



Turning Movement Peak Hour Data Plot (12:15 PM)



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Count Name: Cross Avenue & Lyons  
Lane/Commercial Plaza  
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 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
<b>Total</b>	<b>35</b>	<b>141</b>	<b>12</b>	<b>0</b>	<b>1</b>	<b>188</b>	<b>13</b>	<b>289</b>	<b>11</b>	<b>0</b>	<b>4</b>	<b>313</b>	<b>216</b>	<b>4</b>	<b>146</b>	<b>0</b>	<b>1</b>	<b>366</b>	<b>14</b>	<b>2</b>	<b>58</b>	<b>0</b>	<b>3</b>	<b>74</b>	<b>941</b>
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	-	-

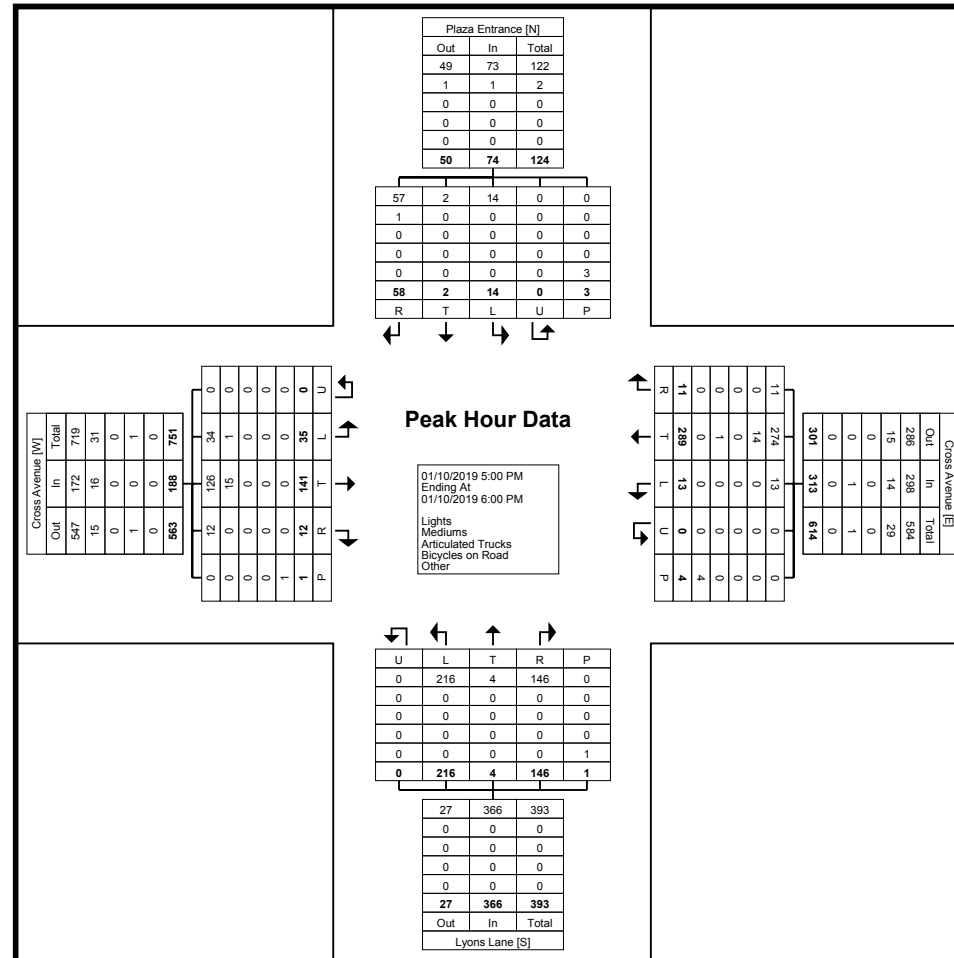




Paradigm Transportation Solutions Limited  
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8  
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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  
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Waterloo, Ontario, Canada N2J 1N8  
519-896-3163 cbowness@ptsl.com

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

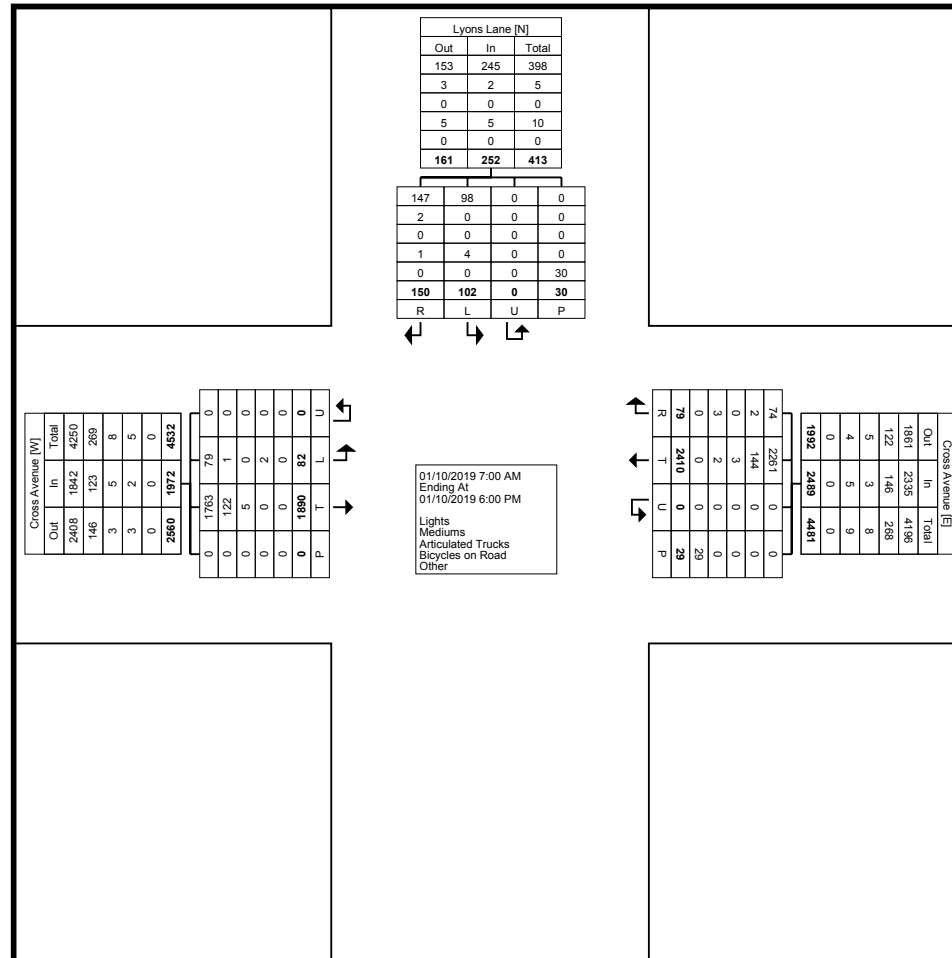
5:15 PM	0	37	0	0	37	104	3	0	4	107	1	3	0	0	4	148
5:30 PM	1	46	0	0	47	140	2	0	1	142	8	4	0	0	12	201
5:45 PM	2	44	0	0	46	145	0	0	3	145	1	3	0	0	4	195
Hourly Total	6	170	0	0	176	553	7	0	9	560	14	26	0	1	40	776
Grand Total	82	1890	0	0	1972	2410	79	0	29	2489	102	150	0	30	252	4713
Approach %	4.2	95.8	0.0	-	-	96.8	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	-	-



Paradigm Transportation Solutions Limited  
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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)

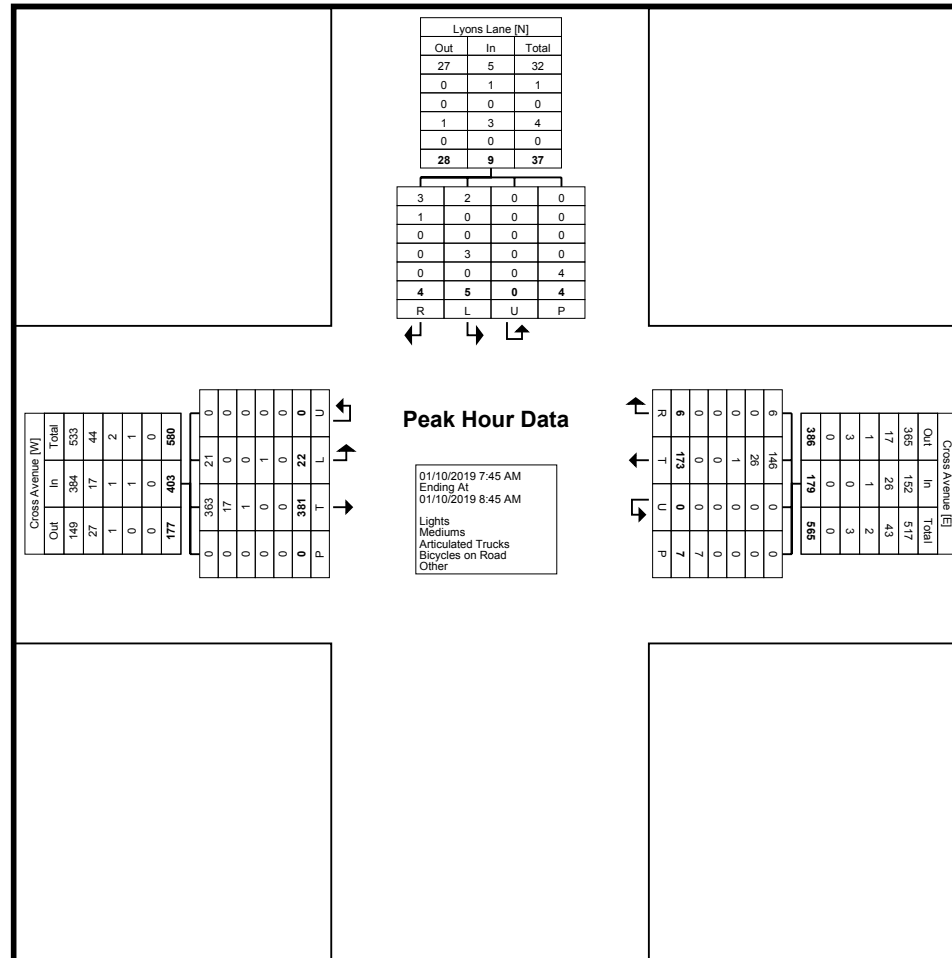
Start Time	Cross Avenue Eastbound					Cross Avenue Westbound					Lyons Lane Southbound					Int. Total
	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Left	Right	U-Turn	Peds	App. Total	
7:45 AM	2	111	0	0	113	36	0	0	3	36	2	2	0	2	4	153
8:00 AM	8	84	0	0	92	43	3	0	1	46	2	0	0	0	2	140
8:15 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)



Paradigm Transportation Solutions Limited  
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Waterloo, Ontario, Canada N2J 1N8  
519-896-3163 cbowness@ptsl.com

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	-	-

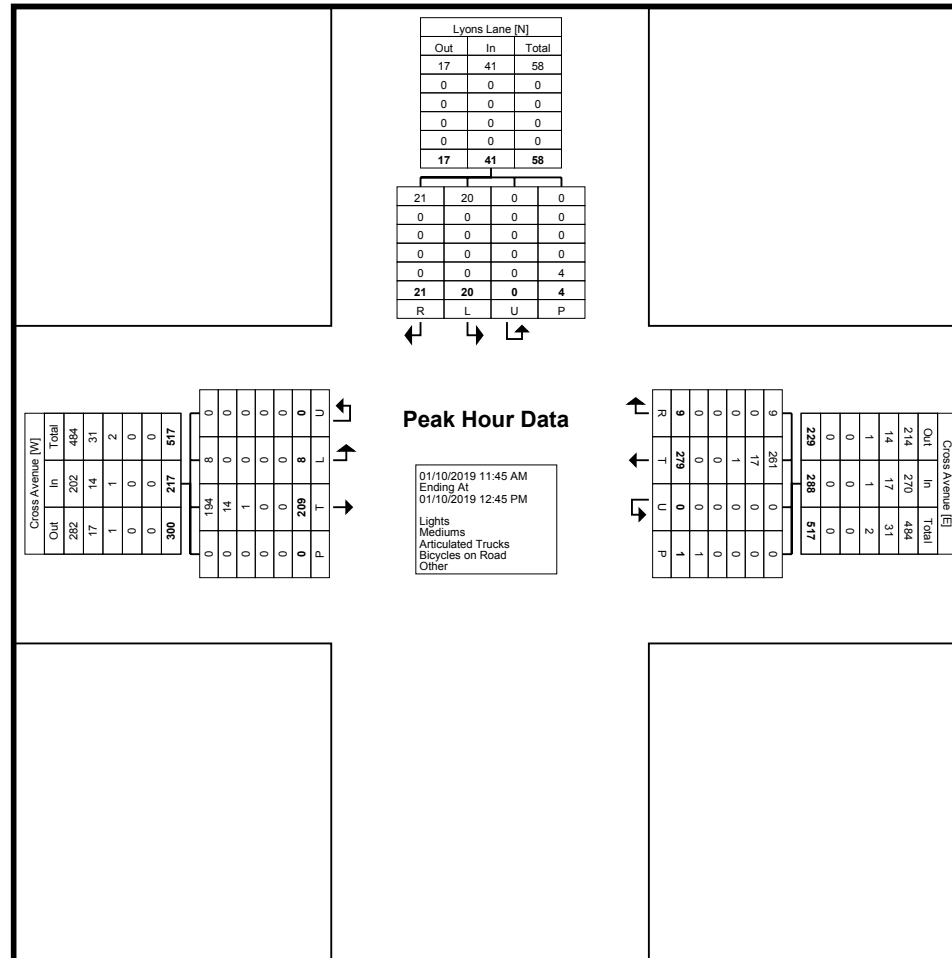




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Count Name: Cross Avenue & Lyons Lane  
Site Code:  
Start Date: 01/10/2019  
Page No: 7



Turning Movement Peak Hour Data Plot (11:45 AM)



Paradigm Transportation Solutions Limited  
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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)

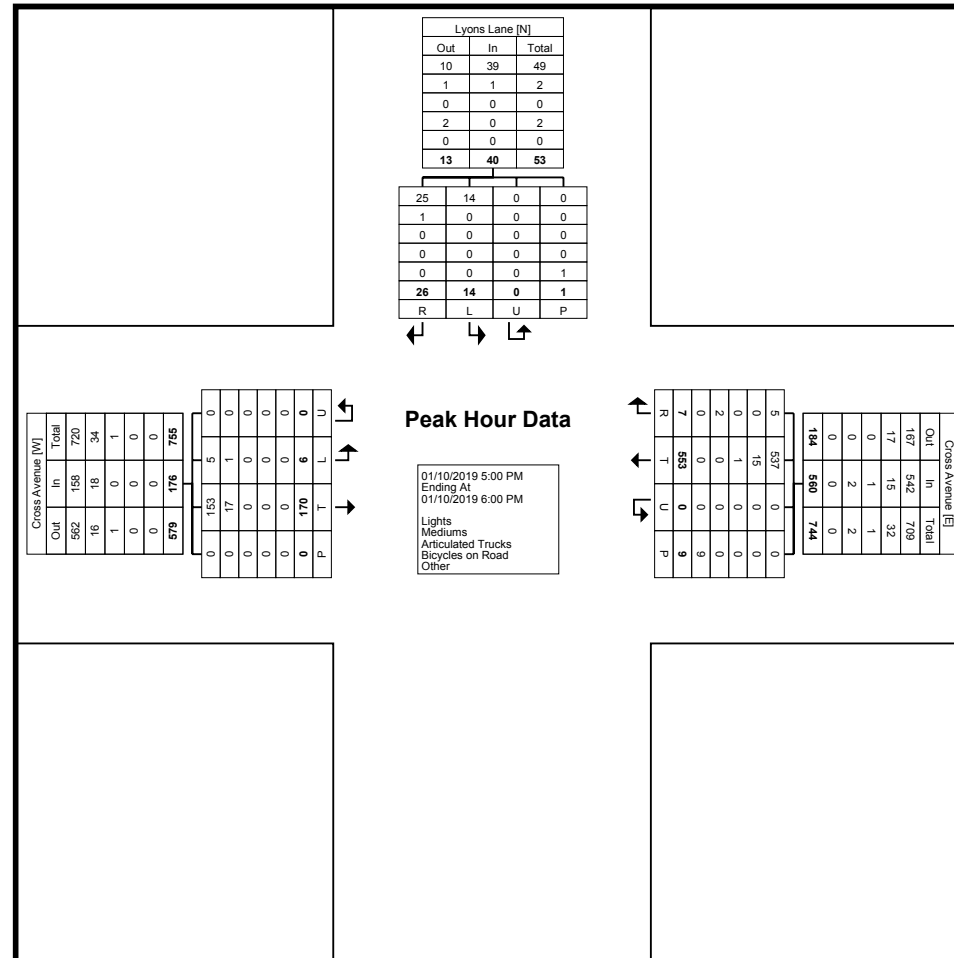
Start Time	Cross Avenue Eastbound					Cross Avenue Westbound					Lyons Lane Southbound					Int. Total
	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Left	Right	U-Turn	Peds	App. Total	
5:00 PM	3	43	0	0	46	164	2	0	1	166	4	16	0	1	20	232
5:15 PM	0	37	0	0	37	104	3	0	4	107	1	3	0	0	4	148
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  
22 King Street South, Suite 300

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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	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	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	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	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	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

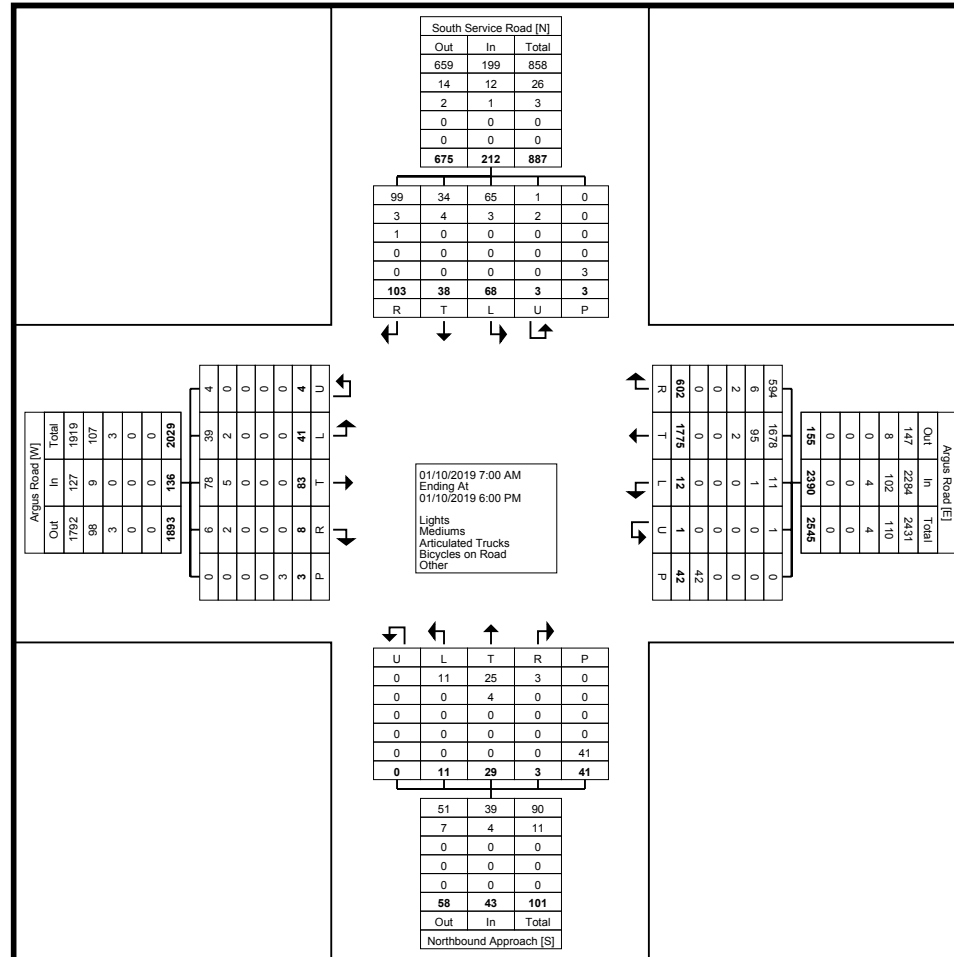
5:00 PM	2	5	0	0	0	7	0	27	16	0	0	43	0	1	0	0	0	1	10	1	13	0	1	24	75
5:15 PM	1	3	0	0	0	4	0	40	10	0	1	50	0	0	0	0	1	0	1	1	5	0	0	7	61
5:30 PM	0	4	0	0	0	4	0	36	15	0	1	51	0	0	0	0	2	0	1	1	2	0	0	4	59
5:45 PM	1	4	0	0	0	5	0	48	14	0	1	62	0	0	0	0	1	0	5	0	5	0	0	10	77
Hourly Total	4	16	0	0	0	20	0	151	55	0	3	206	0	1	0	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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Start Date: 01/10/2019  
Page No: 3



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  
Page No: 4

### 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	-	-

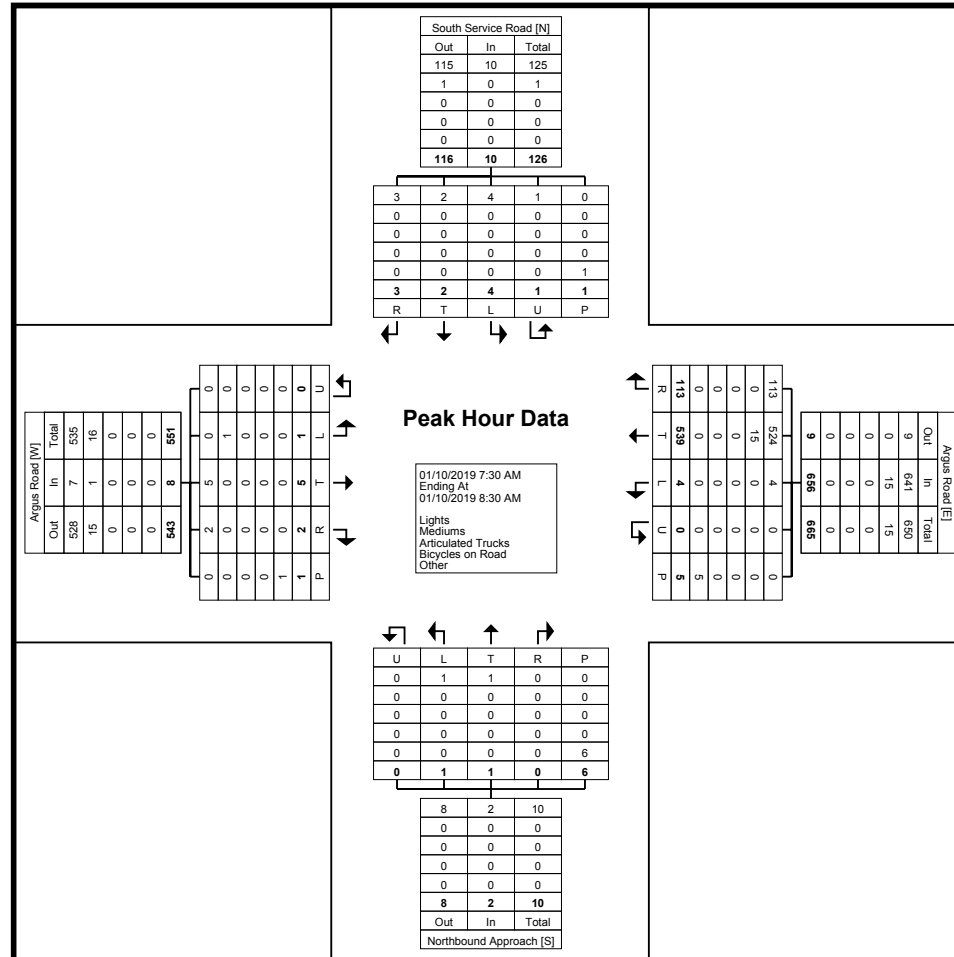




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Count Name: Argus Road & South Service Road  
Site Code:  
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Turning Movement Peak Hour Data Plot (7:30 AM)



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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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Start Date: 01/10/2019  
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### Turning Movement Peak Hour Data (4:00 PM)

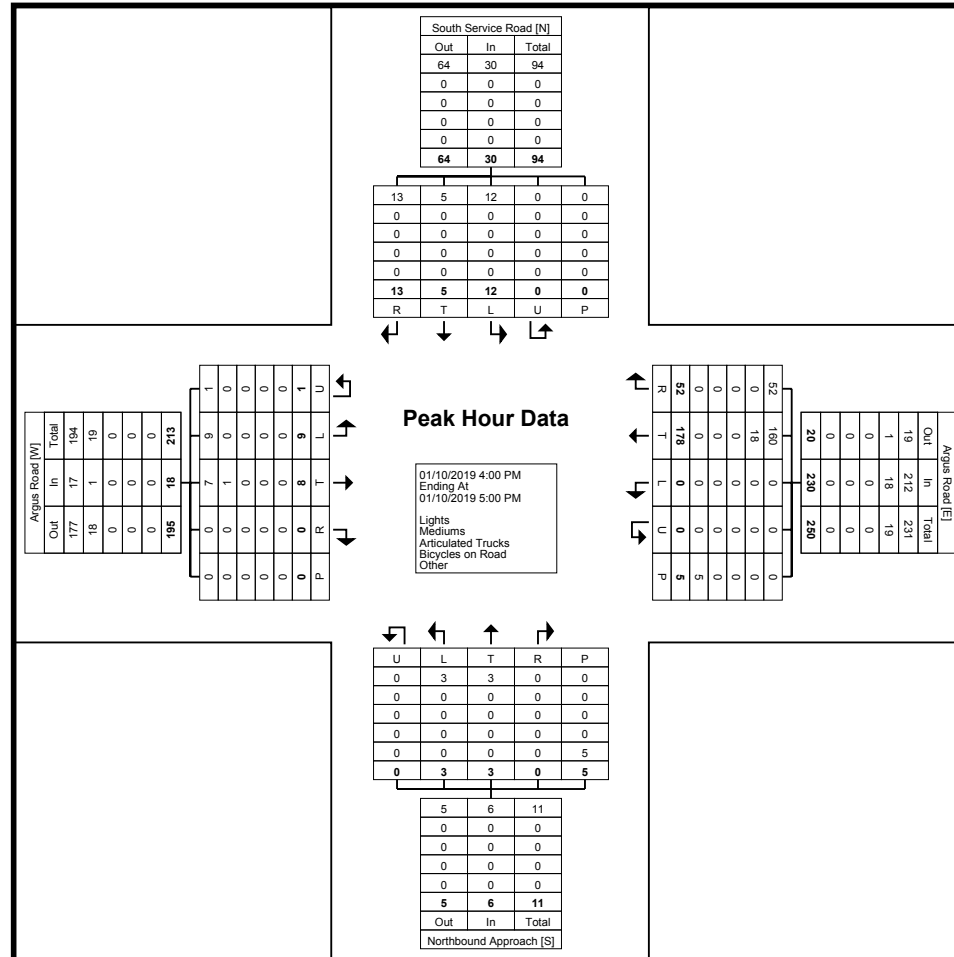
Start Time	Argus Road Eastbound						Argus Road Westbound						Northbound Approach Northbound						South Service Road Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
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
<b>Total</b>	<b>9</b>	<b>8</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>18</b>	<b>0</b>	<b>178</b>	<b>52</b>	<b>0</b>	<b>5</b>	<b>230</b>	<b>3</b>	<b>3</b>	<b>0</b>	<b>0</b>	<b>5</b>	<b>6</b>	<b>12</b>	<b>5</b>	<b>13</b>	<b>0</b>	<b>0</b>	<b>30</b>	<b>284</b>
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	-	-	-	-	-	-	-	-



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Count Name: Argus Road & South Service Road  
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Turning Movement Peak Hour Data Plot (4:00 PM)



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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	-	-

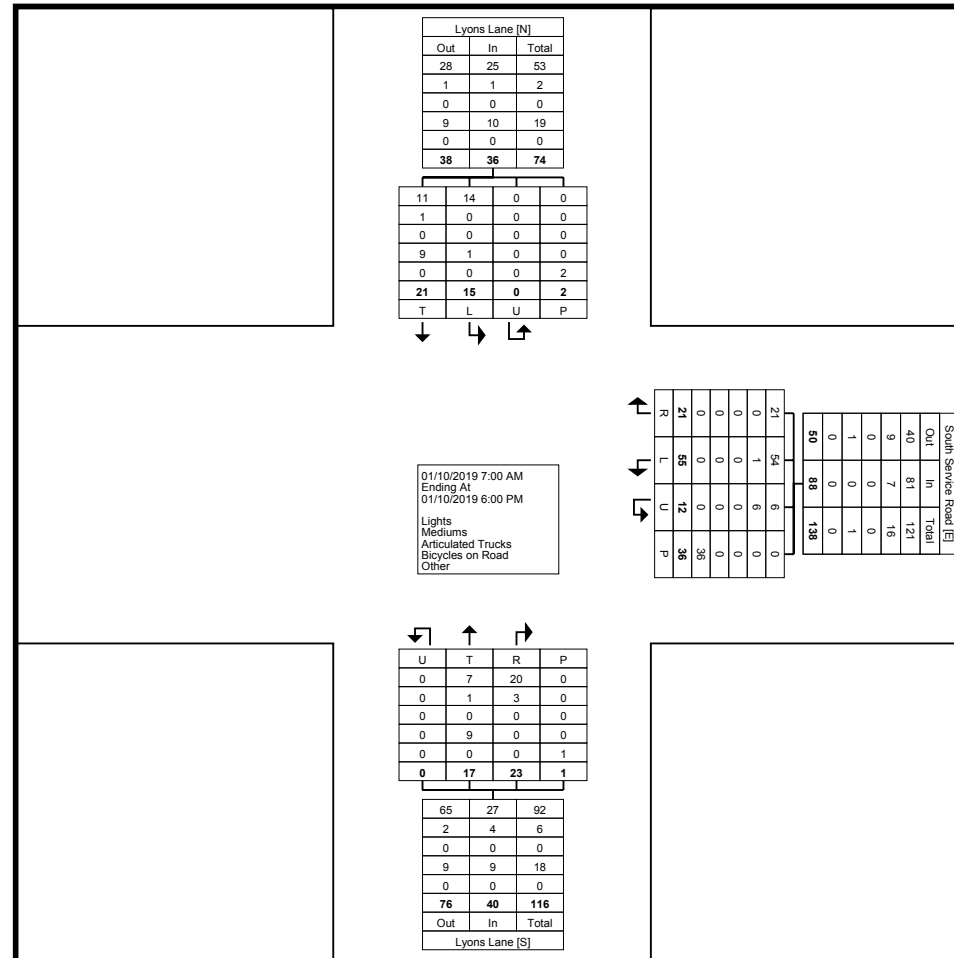




Paradigm Transportation Solutions Limited  
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Count Name: South Service Road & Lyons Lane  
Site Code:  
Start Date: 01/10/2019  
Page No: 3



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)

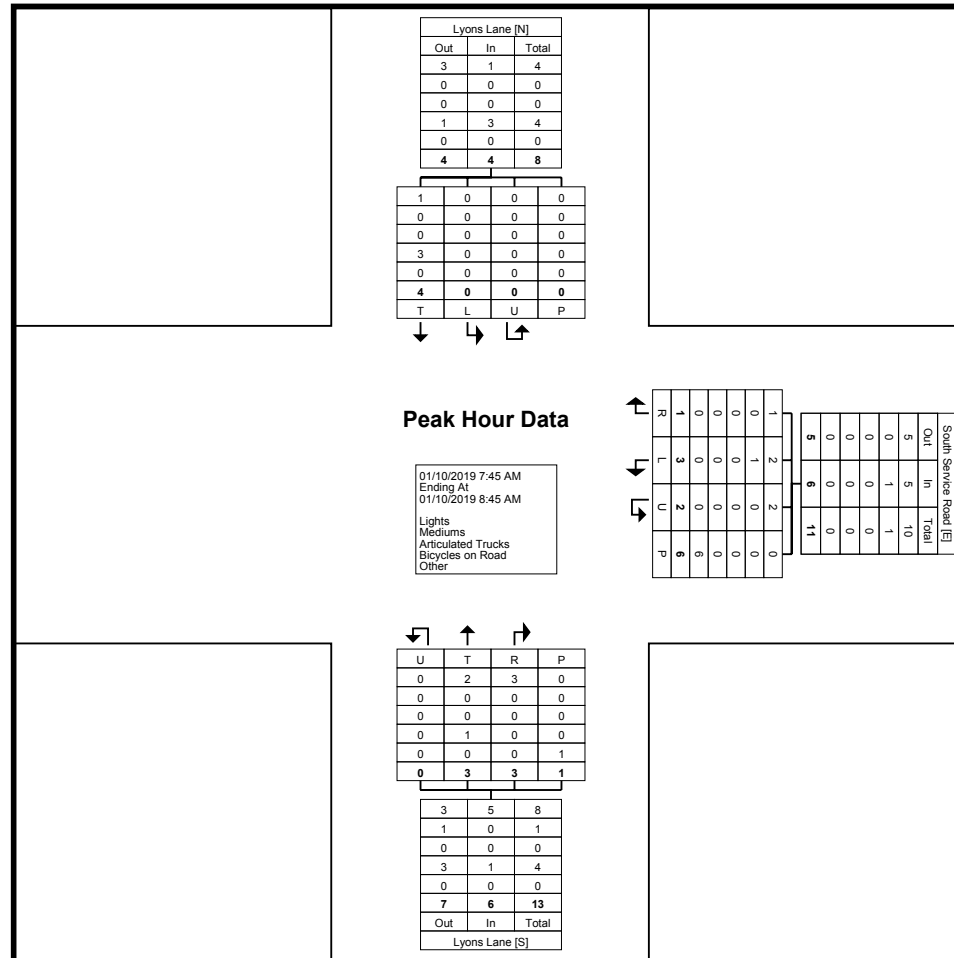
Start Time	South Service Road Westbound					Lyons Lane Northbound					Lyons Lane Southbound					Int. Total
	Left	Right	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	
7:45 AM	2	0	0	3	2	1	0	0	0	1	0	2	0	0	2	5
8:00 AM	1	0	2	2	3	1	1	0	0	2	0	1	0	0	1	6
8:15 AM	0	0	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  
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Turning Movement Peak Hour Data Plot (7:45 AM)

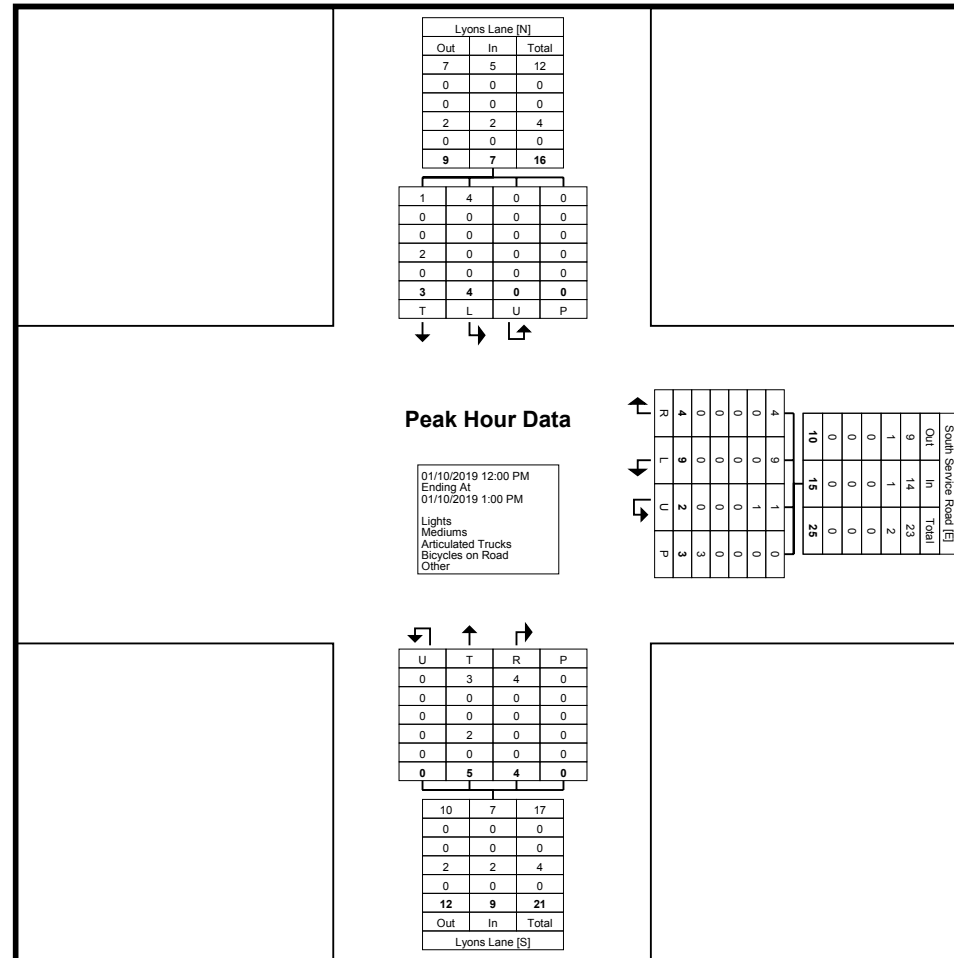




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Count Name: South Service Road & Lyons Lane  
Site Code:  
Start Date: 01/10/2019  
Page No: 7



Turning Movement Peak Hour Data Plot (12:00 PM)

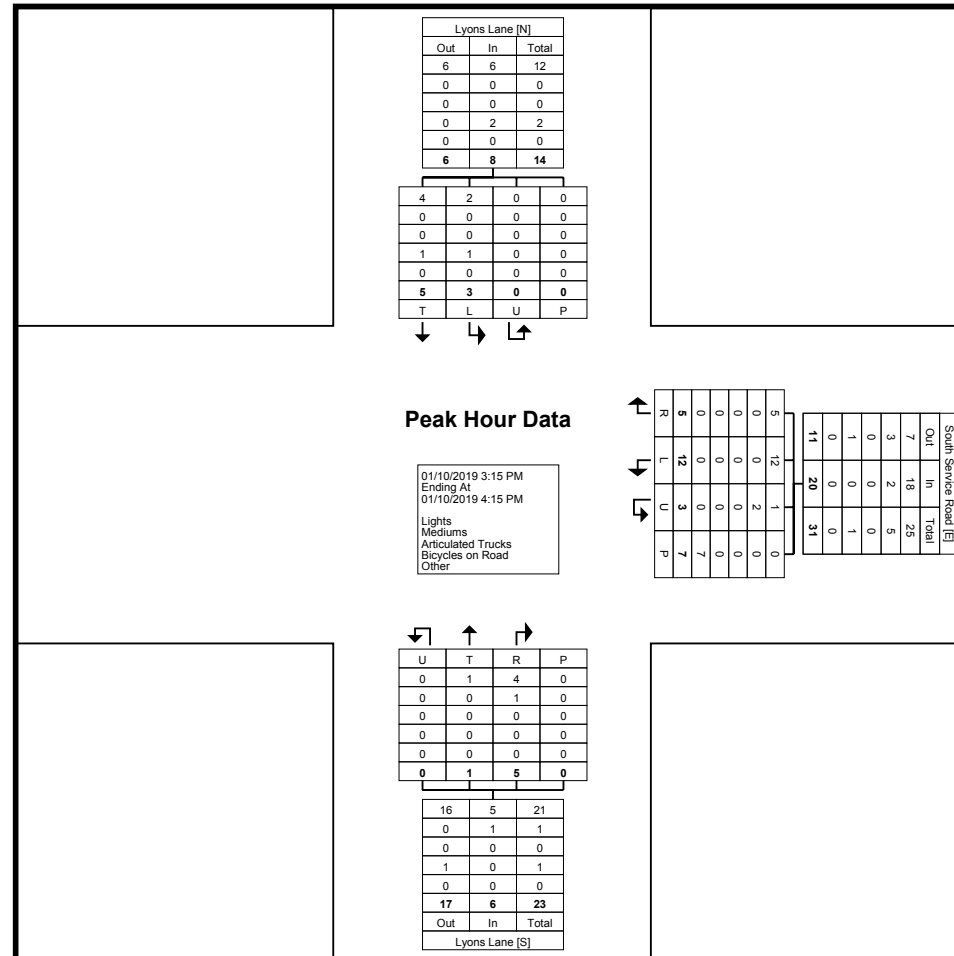




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Count Name: South Service Road & Lyons Lane  
Site Code:  
Start Date: 01/10/2019  
Page No: 9



Turning Movement Peak Hour Data Plot (3:15 PM)



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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 cdowness@ptsll.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

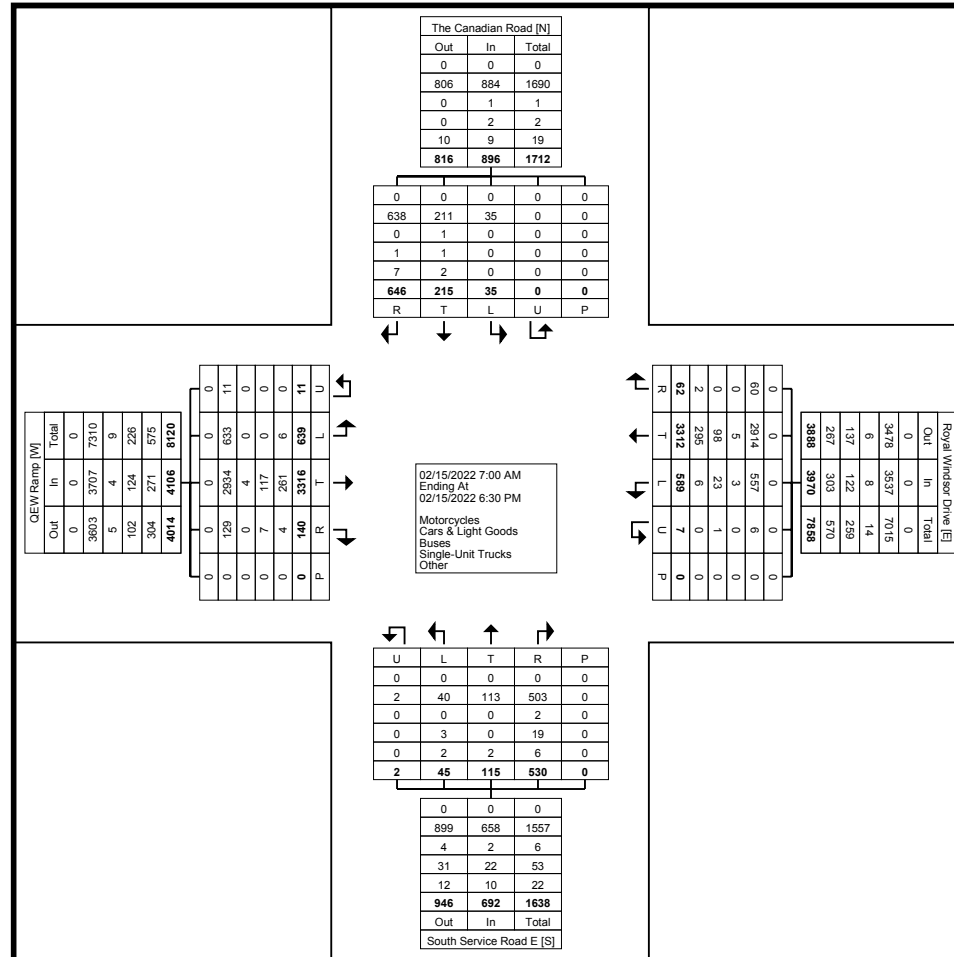




Paradigm Transportation Solutions Limited  
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Count Name: Royal Windsor Drive & Canadian Road  
Site Code: 210590  
Start Date: 02/15/2022  
Page No: 3



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)

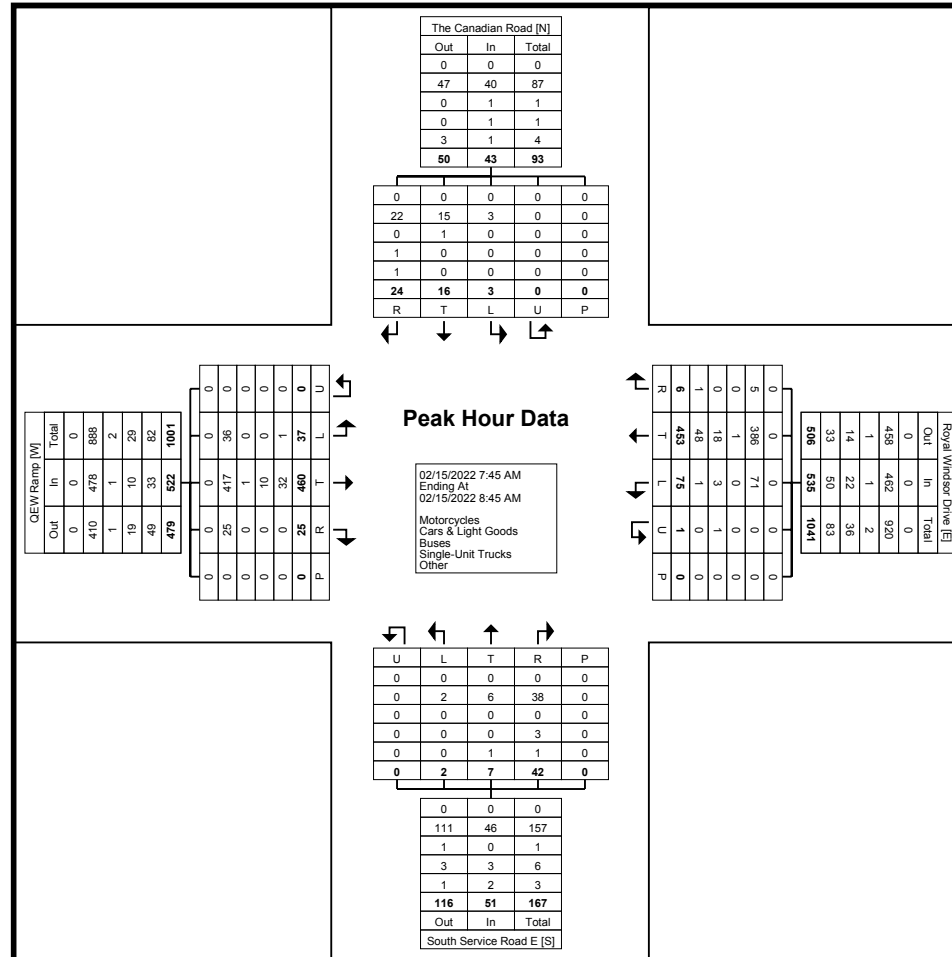
Start Time	QEW Ramp Eastbound						Royal Windsor Drive Westbound						South Service Road E Northbound						The Canadian Road Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. 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
<b>Total</b>	<b>37</b>	<b>460</b>	<b>25</b>	<b>0</b>	<b>0</b>	<b>522</b>	<b>75</b>	<b>453</b>	<b>6</b>	<b>1</b>	<b>0</b>	<b>535</b>	<b>2</b>	<b>7</b>	<b>42</b>	<b>0</b>	<b>0</b>	<b>51</b>	<b>3</b>	<b>16</b>	<b>24</b>	<b>0</b>	<b>0</b>	<b>43</b>	<b>1151</b>
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  
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: 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@ptsll.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)

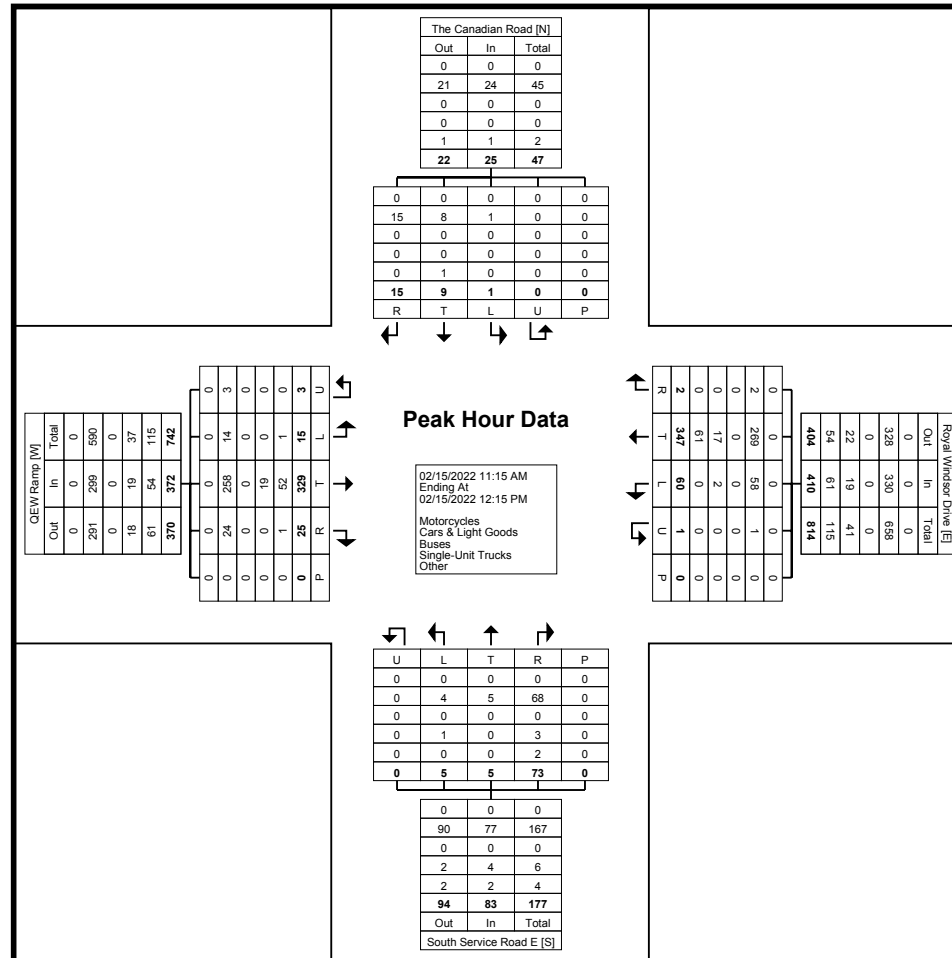
Start Time	QEW Ramp Eastbound						Royal Windsor Drive Westbound						South Service Road E Northbound						The Canadian Road Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. 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
<b>Total</b>	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)



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: 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
<b>Total</b>	<b>272</b>	<b>474</b>	<b>15</b>	<b>0</b>	<b>0</b>	<b>761</b>	<b>159</b>	<b>567</b>	<b>24</b>	<b>0</b>	<b>0</b>	<b>750</b>	<b>12</b>	<b>41</b>	<b>87</b>	<b>0</b>	<b>0</b>	<b>140</b>	<b>12</b>	<b>104</b>	<b>370</b>	<b>0</b>	<b>0</b>	<b>486</b>	<b>2137</b>
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	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

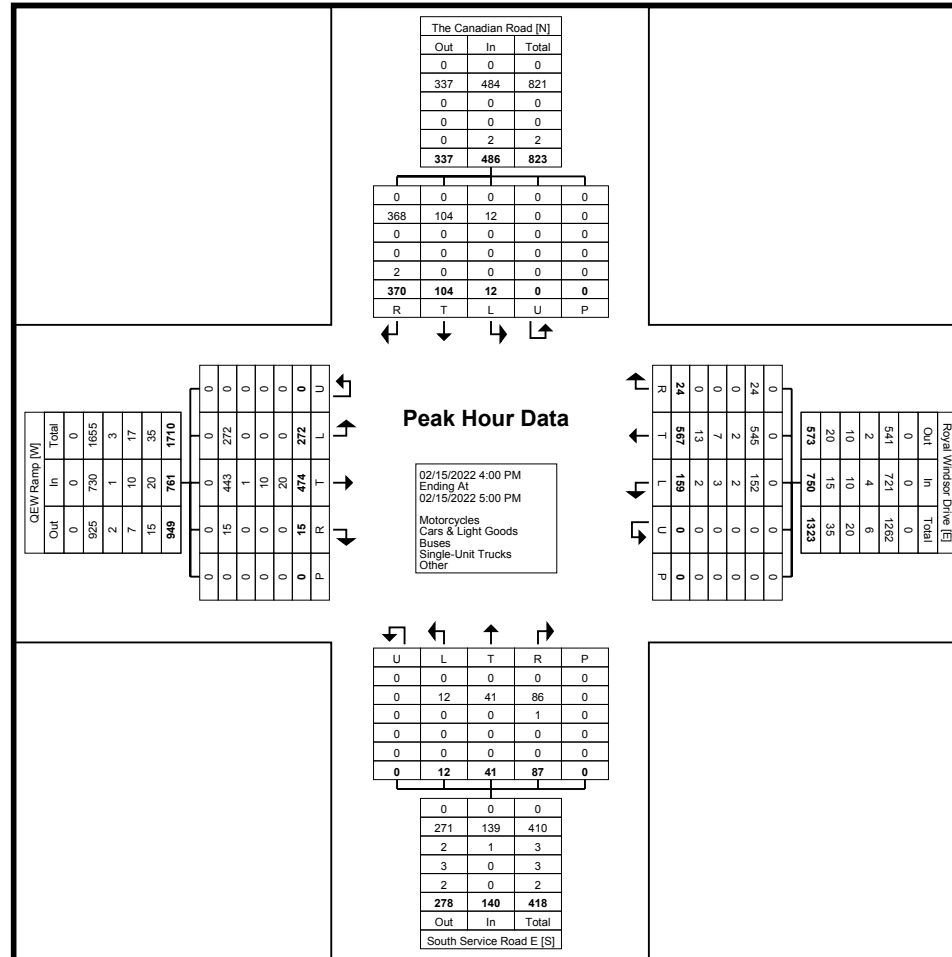




Paradigm Transportation Solutions Limited  
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8  
519-896-3163 cbowness@pts1.com

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												
<b>Notes:</b>												

<p><b>Pattern 1</b> 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><b>Pattern 2</b> 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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<p><b>Pattern 3</b> 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><b>Pattern 4</b> 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><b>Pattern 5</b> 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><b>Pattern 6</b> 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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<p><b>Pattern 7</b> Time: Cycle Length: 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></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> </table>						Direction					Phase	1	2	3	4	%					Direction					Phase	5	6	7	8	%					<p><b>Pattern 8</b> Time: Cycle Length: 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></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> </table>						Direction					Phase	1	2	3	4	%					Direction					Phase	5	6	7	8	%				
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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												
<b>Notes:</b>												

<p><b>Pattern 1</b>  <b>Time:</b> 6:00-7:00,9:00-10:00  <b>Cycle Length:</b> 120  <b>Offset (%):</b> 97%</p> <table border="0"> <tr> <td><b>Direction</b></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td><b>Phase</b></td> <td><b>1</b></td> <td><b>2</b></td> <td><b>3</b></td> <td><b>4</b></td> </tr> <tr> <td><b>%</b></td> <td>0</td> <td>60</td> <td>0</td> <td>40</td> </tr> <tr> <td><b>Direction</b></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td><b>Phase</b></td> <td><b>5</b></td> <td><b>6</b></td> <td><b>7</b></td> <td><b>8</b></td> </tr> <tr> <td><b>%</b></td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> </tr> </table>	<b>Direction</b>					<b>Phase</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>%</b>	0	60	0	40	<b>Direction</b>					<b>Phase</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>%</b>	0	0	0	0	<p><b>Pattern 2</b>  <b>Time:</b> 7:00-9:00  <b>Cycle Length:</b> 140  <b>Offset (%):</b> 4%</p> <table border="0"> <tr> <td><b>Direction</b></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td><b>Phase</b></td> <td><b>1</b></td> <td><b>2</b></td> <td><b>3</b></td> <td><b>4</b></td> </tr> <tr> <td><b>%</b></td> <td>0</td> <td>59</td> <td>0</td> <td>41</td> </tr> <tr> <td><b>Direction</b></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td><b>Phase</b></td> <td><b>5</b></td> <td><b>6</b></td> <td><b>7</b></td> <td><b>8</b></td> </tr> <tr> <td><b>%</b></td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> </tr> </table>	<b>Direction</b>					<b>Phase</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>%</b>	0	59	0	41	<b>Direction</b>					<b>Phase</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>%</b>	0	0	0	0
<b>Direction</b>																																																													
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<b>%</b>	0	0	0	0																																																									
<p><b>Pattern 3</b>  <b>Time:</b> 10:00-15:15, 19:00-22:00  <b>Cycle Length:</b> 120  <b>Offset (%):</b> 97%</p> <table border="0"> <tr> <td><b>Direction</b></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td><b>Phase</b></td> <td><b>1</b></td> <td><b>2</b></td> <td><b>3</b></td> <td><b>4</b></td> </tr> <tr> <td><b>%</b></td> <td>0</td> <td>60</td> <td>0</td> <td>40</td> </tr> <tr> <td><b>Direction</b></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td><b>Phase</b></td> <td><b>5</b></td> <td><b>6</b></td> <td><b>7</b></td> <td><b>8</b></td> </tr> <tr> <td><b>%</b></td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> </tr> </table>	<b>Direction</b>					<b>Phase</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>%</b>	0	60	0	40	<b>Direction</b>					<b>Phase</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>%</b>	0	0	0	0	<p><b>Pattern 4</b>  <b>Time:</b> 15:15-17:00  <b>Cycle Length:</b> 120  <b>Offset (%):</b> 65%</p> <table border="0"> <tr> <td><b>Direction</b></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td><b>Phase</b></td> <td><b>1</b></td> <td><b>2</b></td> <td><b>3</b></td> <td><b>4</b></td> </tr> <tr> <td><b>%</b></td> <td>0</td> <td>58</td> <td>0</td> <td>42</td> </tr> <tr> <td><b>Direction</b></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td><b>Phase</b></td> <td><b>5</b></td> <td><b>6</b></td> <td><b>7</b></td> <td><b>8</b></td> </tr> <tr> <td><b>%</b></td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> </tr> </table>	<b>Direction</b>					<b>Phase</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>%</b>	0	58	0	42	<b>Direction</b>					<b>Phase</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>%</b>	0	0	0	0
<b>Direction</b>																																																													
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<b>%</b>	0	0	0	0																																																									
<p><b>Pattern 5</b>  <b>Time:</b> 17:00-19:00  <b>Cycle Length:</b> 140  <b>Offset (%):</b> 37%</p> <table border="0"> <tr> <td><b>Direction</b></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td><b>Phase</b></td> <td><b>1</b></td> <td><b>2</b></td> <td><b>3</b></td> <td><b>4</b></td> </tr> <tr> <td><b>%</b></td> <td>0</td> <td>60</td> <td>0</td> <td>40</td> </tr> <tr> <td><b>Direction</b></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td><b>Phase</b></td> <td><b>5</b></td> <td><b>6</b></td> <td><b>7</b></td> <td><b>8</b></td> </tr> <tr> <td><b>%</b></td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> </tr> </table>	<b>Direction</b>					<b>Phase</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>%</b>	0	60	0	40	<b>Direction</b>					<b>Phase</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>%</b>	0	0	0	0	<p><b>Pattern 6</b>  <b>Time:</b> 22:00  <b>Cycle Length:</b> local  <b>Offset (%):</b></p> <table border="0"> <tr> <td><b>Direction</b></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td><b>Phase</b></td> <td><b>1</b></td> <td><b>2</b></td> <td><b>3</b></td> <td><b>4</b></td> </tr> <tr> <td><b>%</b></td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> </tr> <tr> <td><b>Direction</b></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td><b>Phase</b></td> <td><b>5</b></td> <td><b>6</b></td> <td><b>7</b></td> <td><b>8</b></td> </tr> <tr> <td><b>%</b></td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> </tr> </table>	<b>Direction</b>					<b>Phase</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>%</b>	0	0	0	0	<b>Direction</b>					<b>Phase</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>%</b>	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 &amp; CORNWALL RD Direct port 13 - Trafalgar &amp; 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 &amp; CORNWALL RD Direct port 13 - Trafalgar &amp; 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 &amp; CORNWALL RD Direct port 13 - Trafalgar &amp; 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											

1	3	15
1	4	36
1	5	14
1	6	35
1	7	36
1	8	15
2	1	9
2	2	47
2	3	12
2	4	32
2	5	12
2	6	44
2	7	32
2	8	12
3	1	10
3	2	39
3	3	15
3	4	36
3	5	14
3	6	35
3	7	36
3	8	15
4	1	10
4	2	39
4	3	15
4	4	36
4	5	14
4	6	35
4	7	36
4	8	15
5	1	10
5	2	44
5	3	13
5	4	33
5	5	12
5	6	42
5	7	33
5	8	13
11	1	15
11	2	36
11	3	19
11	4	30
11	5	15
11	6	36
11	7	30
11	8	19
12	1	19
12	2	36
12	3	17
12	4	28
12	5	19
12	6	36
12	7	28
12	8	17
13	1	13
13	2	49
13	3	13
13	4	25
13	5	13
13	6	49
13	7	25
13	8	13
18	1	11
18	2	38
18	3	21
18	4	30
18	5	11
18	6	38
18	7	30
18	8	21
21	1	15

	Ped Recall																			
2	Coord	X		X																
2	Ped Recall	X		X																
3	Coord	X		X																
3	Ped Recall	X		X																
4	Coord	X		X																
4	Ped Recall	X		X																
5	Coord	X		X																
5	Ped Recall	X		X																
6	Coord	X		X																
6	Ped Recall	X		X																
11	Coord	X		X																
11	Ped Recall	X		X																
12	Coord	X		X																
12	Ped Recall	X		X																
13	Coord	X		X																
13	Ped Recall	X		X																
18	Coord	X		X																
18	Ped Recall	X		X																
21	Coord	X		X																
21	Ped Recall	X		X																
23	Coord	X		X																
23	Ped Recall	X		X																
24	Ped Recall	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 &amp; CORNWALL RD Direct port 13 - Trafalgar &amp; 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
---------	---------	-------------	-----------------	---------------	-----------------

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 &amp; CORNWALL RD Direct port 13 - Trafalgar &amp; 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 &amp; CORNWALL RD Direct port 13 - Trafalgar &amp; 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 &amp; CORNWALL RD Direct port 13 - Trafalgar &amp; 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 &amp; CORNWALL RD Direct port 13 - Trafalgar &amp; 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
------	----------	--------	-----	------	------------



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												
<b>Notes:</b>												

<p><b>Pattern 1</b>  <b>Time:</b> 6:00-7:00, 9:00-10:00  <b>Cycle Length:</b> 120  <b>Offset (%):</b> 37%</p> <table border="1"> <tbody> <tr> <td><b>Direction</b></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td><b>Phase</b></td> <td><b>1</b></td> <td><b>2</b></td> <td><b>3</b></td> <td><b>4</b></td> </tr> <tr> <td><b>%</b></td> <td>20</td> <td>33</td> <td>10</td> <td>37</td> </tr> <tr> <td><b>Direction</b></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td><b>Phase</b></td> <td><b>5</b></td> <td><b>6</b></td> <td><b>7</b></td> <td><b>8</b></td> </tr> <tr> <td><b>%</b></td> <td>10</td> <td>43</td> <td>16</td> <td>31</td> </tr> </tbody> </table>	<b>Direction</b>					<b>Phase</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>%</b>	20	33	10	37	<b>Direction</b>					<b>Phase</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>%</b>	10	43	16	31	<p><b>Pattern 2</b>  <b>Time:</b> 7:00-9:00  <b>Cycle Length:</b> 140  <b>Offset (%):</b> 41%</p> <table border="1"> <tbody> <tr> <td><b>Direction</b></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td><b>Phase</b></td> <td><b>1</b></td> <td><b>2</b></td> <td><b>3</b></td> <td><b>4</b></td> </tr> <tr> <td><b>%</b></td> <td>27</td> <td>29</td> <td>9</td> <td>35</td> </tr> <tr> <td><b>Direction</b></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td><b>Phase</b></td> <td><b>5</b></td> <td><b>6</b></td> <td><b>7</b></td> <td><b>8</b></td> </tr> <tr> <td><b>%</b></td> <td>9</td> <td>47</td> <td>16</td> <td>28</td> </tr> </tbody> </table>	<b>Direction</b>					<b>Phase</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>%</b>	27	29	9	35	<b>Direction</b>					<b>Phase</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>%</b>	9	47	16	28
<b>Direction</b>																																																													
<b>Phase</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>																																																									
<b>%</b>	20	33	10	37																																																									
<b>Direction</b>																																																													
<b>Phase</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>																																																									
<b>%</b>	10	43	16	31																																																									
<b>Direction</b>																																																													
<b>Phase</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>																																																									
<b>%</b>	27	29	9	35																																																									
<b>Direction</b>																																																													
<b>Phase</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>																																																									
<b>%</b>	9	47	16	28																																																									
<p><b>Pattern 3</b>  <b>Time:</b> 10:00-15:15, 19:00-22:00  <b>Cycle Length:</b> 120  <b>Offset (%):</b> 37%</p> <table border="1"> <tbody> <tr> <td><b>Direction</b></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td><b>Phase</b></td> <td><b>1</b></td> <td><b>2</b></td> <td><b>3</b></td> <td><b>4</b></td> </tr> <tr> <td><b>%</b></td> <td>22</td> <td>33</td> <td>10</td> <td>35</td> </tr> <tr> <td><b>Direction</b></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td><b>Phase</b></td> <td><b>5</b></td> <td><b>6</b></td> <td><b>7</b></td> <td><b>8</b></td> </tr> <tr> <td><b>%</b></td> <td>10</td> <td>45</td> <td>14</td> <td>31</td> </tr> </tbody> </table>	<b>Direction</b>					<b>Phase</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>%</b>	22	33	10	35	<b>Direction</b>					<b>Phase</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>%</b>	10	45	14	31	<p><b>Pattern 4</b>  <b>Time:</b> 15:15-17:00  <b>Cycle Length:</b> 120  <b>Offset (%):</b> 78%</p> <table border="1"> <tbody> <tr> <td><b>Direction</b></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td><b>Phase</b></td> <td><b>1</b></td> <td><b>2</b></td> <td><b>3</b></td> <td><b>4</b></td> </tr> <tr> <td><b>%</b></td> <td>20</td> <td>33</td> <td>10</td> <td>37</td> </tr> <tr> <td><b>Direction</b></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td><b>Phase</b></td> <td><b>5</b></td> <td><b>6</b></td> <td><b>7</b></td> <td><b>8</b></td> </tr> <tr> <td><b>%</b></td> <td>10</td> <td>43</td> <td>16</td> <td>31</td> </tr> </tbody> </table>	<b>Direction</b>					<b>Phase</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>%</b>	20	33	10	37	<b>Direction</b>					<b>Phase</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>%</b>	10	43	16	31
<b>Direction</b>																																																													
<b>Phase</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>																																																									
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<b>%</b>	10	43	16	31																																																									
<p><b>Pattern 5</b>  <b>Time:</b> 17:00-19:00  <b>Cycle Length:</b> 140  <b>Offset (%):</b> 70</p> <table border="1"> <tbody> <tr> <td><b>Direction</b></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td><b>Phase</b></td> <td><b>1</b></td> <td><b>2</b></td> <td><b>3</b></td> <td><b>4</b></td> </tr> <tr> <td><b>%</b></td> <td>24</td> <td>30</td> <td>10</td> <td>36</td> </tr> <tr> <td><b>Direction</b></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td><b>Phase</b></td> <td><b>5</b></td> <td><b>6</b></td> <td><b>7</b></td> <td><b>8</b></td> </tr> <tr> <td><b>%</b></td> <td>10</td> <td>44</td> <td>18</td> <td>28</td> </tr> </tbody> </table>	<b>Direction</b>					<b>Phase</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>%</b>	24	30	10	36	<b>Direction</b>					<b>Phase</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>%</b>	10	44	18	28	<p><b>Pattern 6</b>  <b>Time:</b> 22:00  <b>Cycle Length:</b> local  <b>Offset (%):</b></p> <table border="1"> <tbody> <tr> <td><b>Direction</b></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td><b>Phase</b></td> <td><b>1</b></td> <td><b>2</b></td> <td><b>3</b></td> <td><b>4</b></td> </tr> <tr> <td><b>%</b></td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> </tr> <tr> <td><b>Direction</b></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td><b>Phase</b></td> <td><b>5</b></td> <td><b>6</b></td> <td><b>7</b></td> <td><b>8</b></td> </tr> <tr> <td><b>%</b></td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> </tr> </tbody> </table>	<b>Direction</b>					<b>Phase</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>%</b>	0	0	0	0	<b>Direction</b>					<b>Phase</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>%</b>	0	0	0	0
<b>Direction</b>																																																													
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<p><b>Pattern 7</b>  <b>Time:</b>  <b>Cycle Length:</b>  <b>Offset (%):</b></p> <table border="1"> <tbody> <tr> <td><b>Direction</b></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td><b>Phase</b></td> <td><b>1</b></td> <td><b>2</b></td> <td><b>3</b></td> <td><b>4</b></td> </tr> <tr> <td><b>%</b></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td><b>Direction</b></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td><b>Phase</b></td> <td><b>5</b></td> <td><b>6</b></td> <td><b>7</b></td> <td><b>8</b></td> </tr> <tr> <td><b>%</b></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	<b>Direction</b>					<b>Phase</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>%</b>					<b>Direction</b>					<b>Phase</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>%</b>					<p><b>Pattern 8</b>  <b>Time:</b> 7:15  <b>Cycle Length:</b> 140  <b>Offset (%):</b> 41%</p> <table border="1"> <tbody> <tr> <td><b>Direction</b></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td><b>Phase</b></td> <td><b>1</b></td> <td><b>2</b></td> <td><b>3</b></td> <td><b>4</b></td> </tr> <tr> <td><b>%</b></td> <td>27</td> <td>29</td> <td>9</td> <td>35</td> </tr> <tr> <td><b>Direction</b></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td><b>Phase</b></td> <td><b>5</b></td> <td><b>6</b></td> <td><b>7</b></td> <td><b>8</b></td> </tr> <tr> <td><b>%</b></td> <td>9</td> <td>47</td> <td>16</td> <td>28</td> </tr> </tbody> </table>	<b>Direction</b>					<b>Phase</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>%</b>	27	29	9	35	<b>Direction</b>					<b>Phase</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>%</b>	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

<b>Pre-Timed Phase</b>
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## 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
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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**

<b>Input</b>	<b>Solid</b>	<b>Pulsing</b>
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
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## 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
-------	-----------

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
---------	---------------	-----	-------	----------	--------------	-----------	------------	----------------

Pattern	Timing Plan	Actuated Walk Rest	Sequence	Phase Reservice	Action Plan	XArt Pattern	Vehicle Perm 1	Vehicle Perm 2	Vehicle Perm 3
---------	-------------	--------------------	----------	-----------------	-------------	--------------	----------------	----------------	----------------

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
---------	------------------	------------------	------------------	------------------	------------------------	------------------------	--------------	--------------	--------------

**Split Preference Phases**

Pattern	Phase	Preference 1	Preference 2
---------	-------	--------------	--------------

**Special Functions**

Pattern	Function	Output
---------	----------	--------

**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 @ 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**

<b>Input</b>	<b>Solid</b>	<b>Pulsing</b>
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
------	-------	---------	--------	-------	---------	---------	-------	-------	------------	------

**Action Plan Special Functions**

Plan	Function
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**Action Plan Auxiliary Functions**

Plan	Function
------	----------

**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
-----------------------	--------

## 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		<b>NBSB</b>		<b>WB</b>												
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	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 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 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)	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 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



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*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
	<b>12</b>	<b>13</b>	<b>14</b>	<b>15</b>	<b>16</b>	<b>17</b>	<b>18</b>	<b>19</b>	<b>20</b>	<b>21</b>	<b>22</b>
	X	X	X	X	X	X	X	X	X	X	X
	<b>23</b>	<b>24</b>	<b>25</b>	<b>26</b>	<b>27</b>	<b>28</b>	<b>29</b>	<b>30</b>	<b>31</b>		
	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		<b>NBSB</b>		<b>EB</b>												
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
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## 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	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 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 0 Pat 1 Split Demand 0 Pat 2 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 Pat 1 Split Demand 0 Pat 2 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)	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 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



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*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
	<b>12</b>	<b>13</b>	<b>14</b>	<b>15</b>	<b>16</b>	<b>17</b>	<b>18</b>	<b>19</b>	<b>20</b>	<b>21</b>	<b>22</b>
	X	X	X	X	X	X	X	X	X	X	X
	<b>23</b>	<b>24</b>	<b>25</b>	<b>26</b>	<b>27</b>	<b>28</b>	<b>29</b>	<b>30</b>	<b>31</b>		
	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



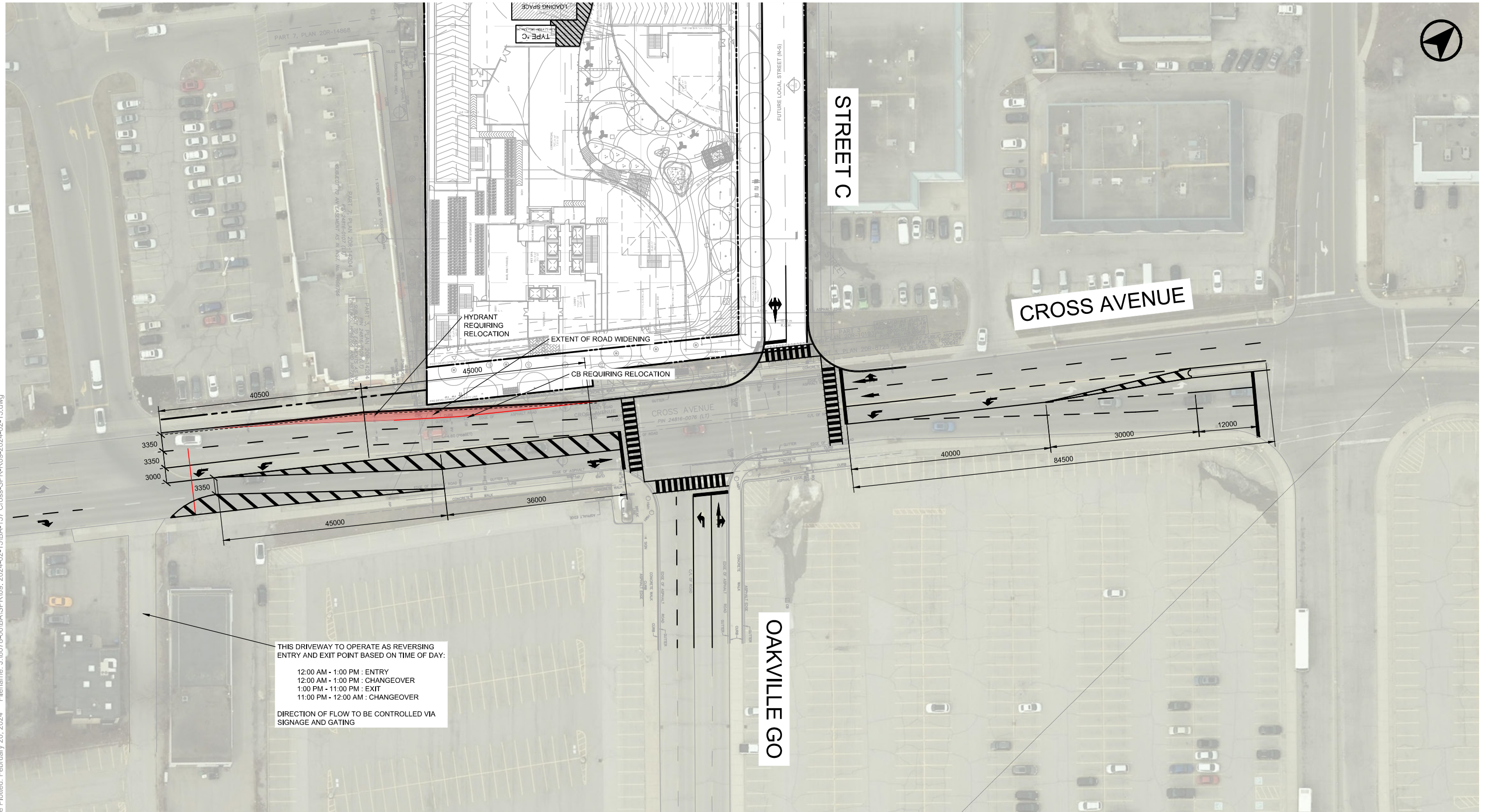
Max Int	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Time B4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cars Wt	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
STPTDuc	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TTReduc	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Min Gap	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

# Appendix C

## Functional Road Plan



Date Plotted: February 20, 2024 File Name: J:\8078-06\BA\SPR\09\_2024-02-15\BA-157 Cross-SPR-R09-2024-02-15.dwg



THIS DRIVEWAY TO OPERATE AS REVERSING ENTRY AND EXIT POINT BASED ON TIME OF DAY:

- 12:00 AM - 1:00 PM : ENTRY
- 12:00 AM - 1:00 PM : CHANGEOVER
- 1:00 PM - 11:00 PM : EXIT
- 11:00 PM - 12:00 AM : CHANGEOVER

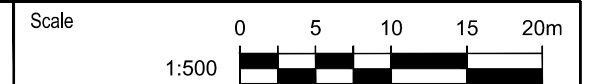
DIRECTION OF FLOW TO BE CONTROLLED VIA SIGNAGE AND GATING



### 157 CROSS AVENUE

Functional Road Plan for Interim Offset Intersection

Project: 157 CROSS  
 Project No. 8078-06  
 Date: October 02, 2023  
 Revised: February 20, 2024



Drawing No. **FD-01**

# Appendix D

## Reduced Scale Architectural Drawings





NO.	DATE	ISSUED FOR:

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1410 Dundas Street West, Toronto, ON, Canada, M5V 1Z1  
Tel: 416 593 1234

**MECHANICAL**  
-  
-

**ELECTRICAL**  
-

**LANDSCAPE**  
**Janet Rosenberg & Studio**  
1045 Bayview Avenue, Toronto, ON, M5S 1S3  
Tel: 416 593 6661

**TRAFFIC**  
**Trafalgar Engineering Limited**  
1400 Bayview Avenue, Toronto, ON, M5S 2G5  
Tel: 905 333-2000

**STRUCTURE**  
**BA Consulting Group Limited**  
1400 Bayview Avenue, Toronto, ON, M5S 2G5  
Tel: 416 961 1714


**CONCRETE**  
**R.J. Burnside & Associates Limited**  
1400 Bayview Avenue, Toronto, ON, M5S 2G5  
Tel: 416 961 2612

**FOUNDATIONS**  
**Boisfields Inc.**  
1400 Bayview Avenue, Toronto, ON, M5S 2G5  
Tel: 416 961 2704

**TOPOGRAHY**  
**District Developments**  
1400 Bayview Avenue, Toronto, ON, Canada M5S 1P5  
Tel: 416 463 6336

**CONCRETE**  
**R.J. Burnside & Associates Limited**  
1400 Bayview Avenue, Toronto, ON, M5S 2G5  
Tel: 416 961 2612

**DISTRIK**  
**157 - 165 CROSS AVE, OAKVILLE**  
237 & 165 Cross Avenue, Oakville, ON, Canada



**SITE SURVEY**

**Author** \_\_\_\_\_ **Checker** \_\_\_\_\_  
**DRAWN BY** \_\_\_\_\_ **CHECKED BY** \_\_\_\_\_

**3/2/20** **AMH** **3/23/23**  
**PROJ. NO.** \_\_\_\_\_ **SCALE** \_\_\_\_\_ **FORMAT** \_\_\_\_\_

**A101**

#### NOTES

CONTRIBUTOR HAS TO BE DERIVED FROM REALITY THE NETWORK (PINS) SUPERVISION. THE ZONE IS IN THE (ZONED) (ZONED).

CONTRIBUTOR HAS TO BE DERIVED FROM REALITY THE NETWORK (PINS) SUPERVISION. THE ZONE IS IN THE (ZONED) (ZONED).

CONTRIBUTOR HAS TO BE DERIVED FROM REALITY THE NETWORK (PINS) SUPERVISION. THE ZONE IS IN THE (ZONED) (ZONED).

CONTRIBUTOR HAS TO BE DERIVED FROM REALITY THE NETWORK (PINS) SUPERVISION. THE ZONE IS IN THE (ZONED) (ZONED).

#### PART 2 - SURVEY REPORT

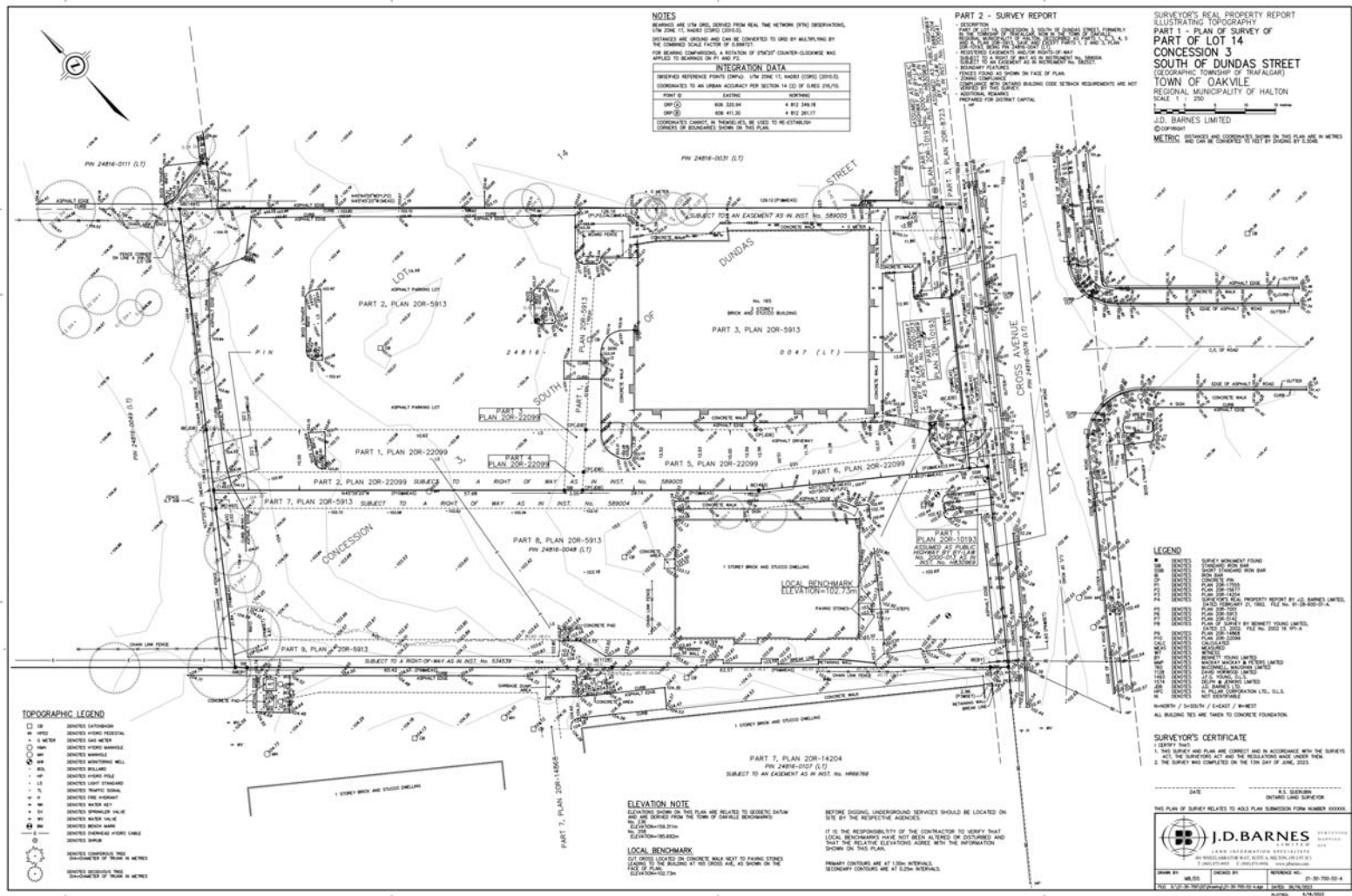
THIS REPORT IS A SUMMARY OF THE SURVEY WORK PERFORMED FOR THE PROJECT. IT IS THE PROPERTY OF THE ARCHITECT AND SHALL BE RETURNED TO THE ARCHITECT IMMEDIATELY UPON COMPLETION OF THE PROJECT. THE ARCHITECT IS NOT RESPONSIBLE FOR THE CONSTRUCTION OF THE PROJECT OR FOR ANY ERRORS IN THE DRAWING OR ANY OTHER DOCUMENTS IN THESE DOCUMENTS.

DATE: 2023-02-03  
PROJECT: 157-165 Cross Ave, Oakville  
SCALE: 1" = 250'

#### SURVEYOR'S REAL PROPERTY REPORT

**ILLUSTRATING TOPOGRAPHY**  
**PART 1 - PLAN OF SURVEY OF LOT 14 CONFESSION 3 SOUTH OF DUNDAS STREET**  
(GEOGRAPHIC TOWNSHIP OF TRAFALGAR REGIONAL MUNICIPALITY OF HALTON)  
SCALE 1" = 250'

**J.D. BARNES LIMITED**  
1400 BAYVIEW AVENUE, TORONTO, ON M5S 2G5  
TEL: 416 961 1714



#### ELEVATION NOTE

ELEVATIONS SHOWN ON THIS PLAN ARE RELATED TO ADJUSTED DATUM AND ARE BASED ON THE SURVEY OF CHIEFLY BENCHMARKS.

LOCAL BENCHMARK  
GIC CODE LOCATED ON CONCRETE ONLY NEXT TO PAVING STRIPS LOCATED ON THE SURFACE AT 75' SAID TO BE, AS SHOWN ON THE SURVEY DRAWING.

#### LEGEND

● BENCH MARK SURVEY MONUMENT FOUND  
○ BENCH MARK SURVEY MONUMENT SET  
○ BENCH MARK SURVEY MONUMENT SET

○ BENCH MARK SURVEY MONUMENT SET  
○ BENCH MARK SURVEY MONUMENT SET  
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○ BENCH MARK SURVEY MONUMENT SET

○ BENCH MARK SURVEY MONUMENT SET  
○ BENCH MARK SURVEY MONUMENT SET  
○ BENCH MARK SURVEY MONUMENT SET

#### TOPOGRAPHIC LEGEND

○ SURVEY BENCHMARK  
○ SURVEY MONUMENT FOUND  
○ SURVEY MONUMENT SET

○ SURVEY MONUMENT SET  
○ SURVEY MONUMENT SET  
○ SURVEY MONUMENT SET

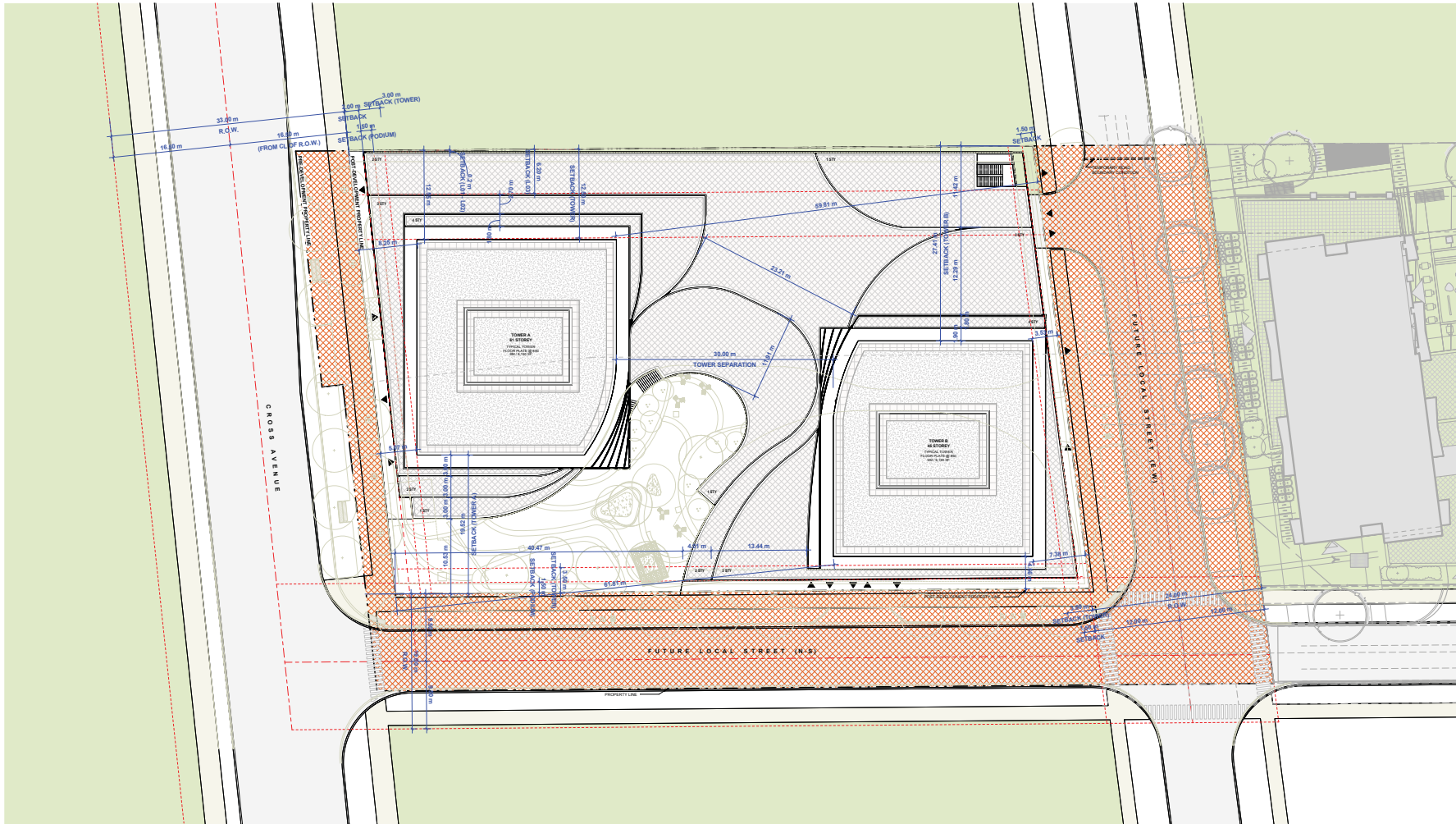
○ SURVEY MONUMENT SET  
○ SURVEY MONUMENT SET  
○ SURVEY MONUMENT SET

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 This drawing shall not be used for construction purposes unless counterchecked.  
 Teepik Architects Inc.

NO.	DATE	ISSUED FOR:



**ARCHITECT**  
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 T 416.593.5553

**STRUCTURAL**  
 +

**MECHANICAL**  
 +

**ELECTRICAL**  
 +

**LANDSCAPE**  
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**ENGINEER**  
**Trafalgar Engineering Limited**  
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**TRUCKING**  
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 T 416.961.7113

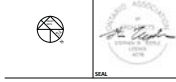
**MECHANICAL ENGINEERING**  
**R.J. Burnside & Associates Limited**  
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 T 416.594.8761

**CLIENT**  
**District Developments**  
 1400 Yonge Street Toronto, ON, Canada M5B 0P5  
 T 416.593.6534

**DISTRIKT**  
**157 - 165 CROSS**  
**AVE, OAKVILLE**

157 & 165 Cross Avenue, Oakville, ON, Canada



**SITE PLAN @ ROOF LEVEL**

Author	Checker
DRAWN BY	CHECKED BY
23/07	1/200
PROJ. NO.	SCALE
	FORMAT
	PLOT DATE

**A111**

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This drawing may not be used for construction purposes unless counterchecked.

Teepie Architects Inc.

NO.	DATE	ISSUED FOR:

**WASTE MANAGEMENT NOTES:**

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH SHEET 011 & A36 LEVEL 1 AND 1 PLANS RESPECTIVELY.
2. SOLID WASTE MANAGEMENT WILL PROVIDE BULK-LIFT COMPACTED GARBAGE, RECYCLING AND ORGANIC COLLECTION SERVICES FOR THE RESIDENTIAL COMPONENT OF THIS DEVELOPMENT.
3. A TRAINED ON-SITE STAFF MEMBER MUST BE AVAILABLE TO MANEUVER BINS FOR THE COLLECTION DRIVERS AND ALSO ACT AS A FLAGMAN WHEN THE TRUCK IS REVERSING. IN THE EVENT THE ON-SITE STAFF MEMBER IS UNAVAILABLE AT THE TIME THE RESIDENTIAL COLLECTION VEHICLE ARRIVES AT THE SITE, THE COLLECTION VEHICLE WILL LEAVE THE SITE AND NOT RETURN UNTIL THE NEXT SCHEDULED COLLECTION DAY.
4. ALL ACCESS DRIVERSWAYS TO BE USED BY THE COLLECTION VEHICLE WILL BE LEVEL (MIN) AT LEAST 4.5m WIDE THROUGHOUT THE SITE AND 6m WIDE AT ENTRANCES AND EXITS, HAVING A MINIMUM 4.5m CLEARANCE UNDER OVERHEAD DOORS.
5. THE WASTE LOADING SPACE WILL BE CONSTRUCTED OF AT LEAST 200mm THICK 30M<sub>1</sub> REINFORCED CONCRETE, BE LEVEL (MIN) AND BE AT LEAST 6m WIDE X 13m LONG AND HAVE VERTICAL CLEARANCE OF 7m.
6. IN ALL AREAS WHERE A COLLECTION VEHICLE IS REQUIRED TO DRIVE ONTO OR OVER A SUPPORT STRUCTURE, THE STRUCTURE IS TO BE DESIGNED TO SAFELY SUPPORT A FULLY LOADED COLLECTION VEHICLE AT 35 METRIC TONNES.
7. SPACING OF WASTE LOADING SPACE FOR PURPOSES OF MOVING WILL BE SCHEDULED ACCORDING TO GARBAGE PICK-UP TIMES. SHOULD THE WASTE LOADING SPACE BE REQUIRED FOR USE BY COMMERCIAL VEHICLES, THE COMMERCIAL COMPARTMENT MUST ARRANGE THIS USE SUCH THAT IT DOES NOT CONFLICT WITH ANY RESIDENTIAL USES.
8. TYPE B TRUCK SPACE 2 WILL BE RESTRICTED TO USE OUTSIDE THE WASTE COLLECTION WINDOW.
9. THE STAGING PAD ADJACENT TO THE FRONT OF THE WASTE LOADING SPACE SHALL BE LEVEL (+1.2%) AND SHALL BE CONSTRUCTED OF A MINIMUM OF 200MM REINFORCED CONCRETE.
10. THE WASTE LOADING SPACE WILL BE USED BY BOTH RESIDENTIAL AND NON-RESIDENTIAL SECTORS. THE NON-RESIDENTIAL WASTE MANAGEMENT MUST ARRANGE FOR THEIR COLLECTION DAYS TO BE SCHEDULED ON DIFFERENT DAYS FROM THOSE OF THE RESIDENTIAL COLLECTION DAYS. FAILURE TO COMPLY WITH THIS ARRANGEMENT WILL RESULT IN THE CANCELLATION OF RESIDENTIAL COLLECTION AT THIS SITE.
11. BEFORE SOLID WASTE COLLECTION SERVICES ARE TO BEGIN, THE TOWN OF OAKVILLE & REGION OF ONTARIO WILL NEED TO BE PROVIDED WITH A LETTER CERTIFIED BY A PROFESSIONAL ENGINEER THAT THE WASTE STORAGE ROOMS WILL BE DESIGNED TO SAFELY SUPPORT A FULLY LOADED COLLECTION VEHICLE ON METRIC TONNES AND COMPARE TO THE FOLLOWING:
  - i) DESIGN CODE - ONTARIO BUILDING CODE
  - ii) DESIGN LOAD - CITY BULK LIFT VEHICLE IN ADDITION TO BUILDING CODE REQUIREMENTS
  - iii) IMPACT FACTOR - 5% FOR MAXIMUM REGULAR SPEEDS TO 10KM/H AND 20% FOR HIGHER SPEEDS
12. DOUBLE DOORS MINIMUM 2.3m WIDTH TO BE PROVIDED TO ACCESS EACH WASTE STORAGE (AND BULKY WASTE STORAGE) ROOM. THESE DOORS SHALL OPEN OUTWARDS TO MAXIMIZE STORAGE SPACE.
13. WASTE STORAGE ROOMS TO HAVE A HOSE BIB AND FLOOR DRAIN FOR WASHING AND CLEANING OF THE ROOM AND WASTE CONTAINERS.
14. THE AIR EXCHANGE RATE FOR WASTE STORAGE ROOMS TO BE A MINIMUM OF ONE-CUBIC FOOT PER MINUTE PER SQUARE FOOT OF FLOOR SPACE (1 CFM/F<sup>2</sup>).
15. THIS DRAWING TO BE READ IN CONJUNCTION WITH R.J. BURNSIDE & ASSOCIATES LIMITED, SOLID WASTE MANAGEMENT PLAN.
16. WASTE BINS AND CARTS SHOWN ON THESE DRAWINGS ARE REPRESENTATIONAL ONLY.

**TABLE 1: WASTE CONTAINER COMPUTATION**

WASTE STREAM	CONTAINER TYPES	AREA (SQM)	NUMBER OF RESIDENTIAL UNITS SERVED PER BIN
GARBAGE (COMPACTED)	1 CUBIC YARD FRONT-LIFT BIN	2.27	54
RECYCLING (UNCOMPACTED)	4 CUBIC YARD FRONT-LIFT BIN	2.78	56
ORGANICS	360 L SEMI-AUTOMATED CART	0.80	25

**TABLE 2: REQUIRED RESIDENTIAL WASTE STORAGE ROOM AREA**

BUILDING	NUMBER OF RESIDENTIAL UNITS	APPROXIMATE WASTE STORAGE ROOM SPATIAL REQUIREMENT (SQM)**
BUILDING A	654	151.01
BUILDING B	504	201.77
TOTAL	2238	352.78

\*\* EXCLUDES 10 SQM REQUIRED FOR BULKY WASTE STORAGE

**TABLE 3: WASTE CONTAINER COUNTS**

WASTE STREAM	CONTAINER	BUILDING A # BINS	BUILDING B # BINS
GARBAGE (COMPACTED)	3 YARD FRONT-LIFT	14	11
RECYCLING	4 YARD FRONT-LIFT	14	10
ORGANICS	360 L SEMI-AUTOMATED CART	20	22

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**Teepie Architects Inc.**  
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 T: 416-966-9661

STRUCTURAL  
 +  
 +

MECHANICAL  
 +  
 +

ELECTRICAL  
 +  
 +

LANDSCAPE  
**Janet Rosenberg & Studio**  
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TRUCKS  
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PROJECT FINANCING/UNDERWRITER  
**R.J. Burnside & Associates Limited**  
 1000 Sheppard Avenue, Toronto, ON, M1V 1Y7  
 T: 416-298-2612

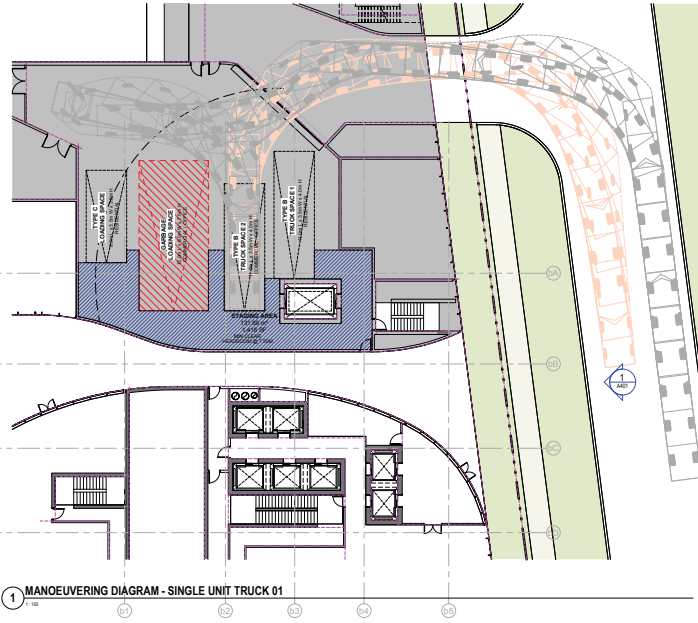
ENGINEER  
**Bousfields Inc.**  
 1000 Bay Street, Toronto, ON, M5S 1G0  
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QUALITY  
**District Developments**  
 1-800-999-9999  
 1-800-999-9999  
 1-800-999-9999  
 1-800-999-9999

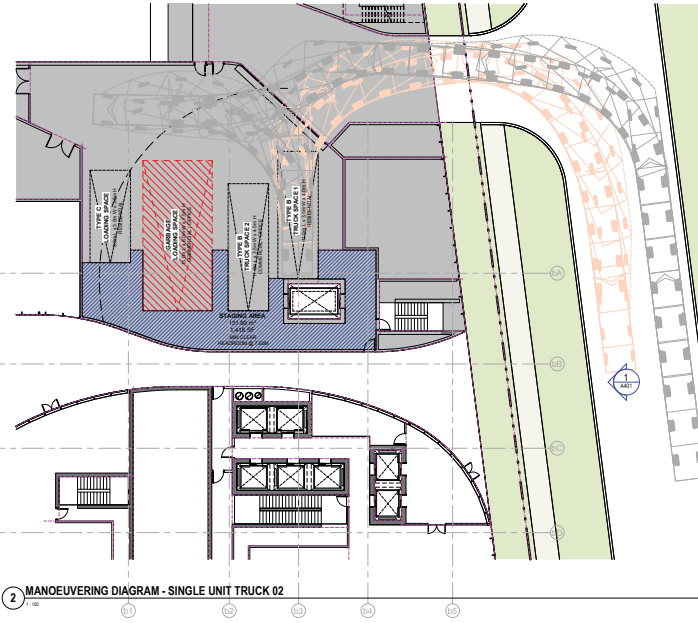
**DISTRIKT**  
 157 - 165 CROSS  
 AVE, OAKVILLE

157 & 165 Cross Avenue, Oakville, ON, Canada

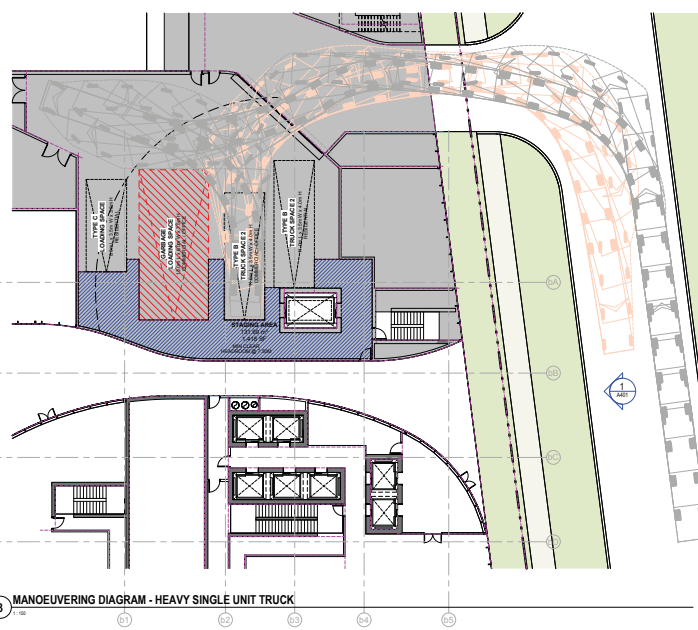
REALTOR  
 REALTOR



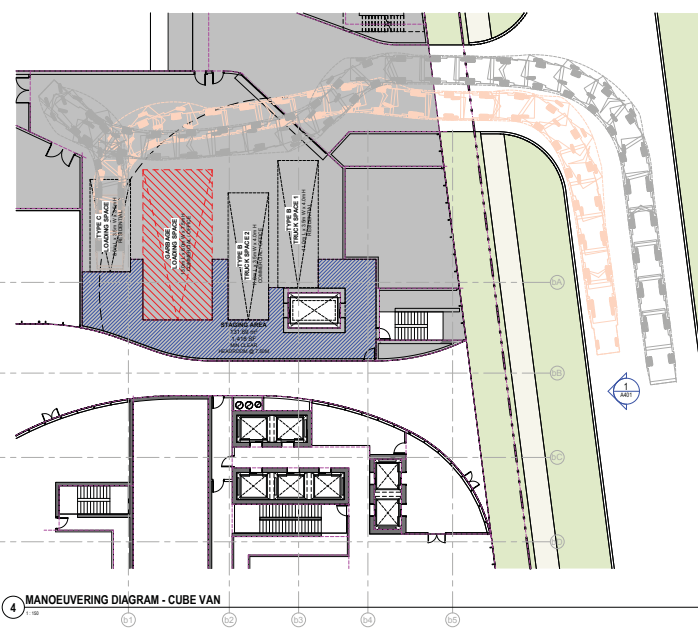
**1 MANOEUVRING DIAGRAM - SINGLE UNIT TRUCK 01**



**2 MANOEUVRING DIAGRAM - SINGLE UNIT TRUCK 02**



**3 MANOEUVRING DIAGRAM - HEAVY SINGLE UNIT TRUCK**



**4 MANOEUVRING DIAGRAM - CUBE VAN**

**LOADING PLAN**

Author Checker  
 DRAWN BY CHECKED BY

23-207 23-207  
 PROJ-NO. SCALE ARCH E 3/20/23-18  
 FORMET PLOT DATE



**WASTE MANAGEMENT NOTES:**

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH SHEET A011 & A06 LEVEL 1 AND P1 PLANS RESPECTIVELY.
2. SOLID WASTE MANAGEMENT WILL PROVIDE BULK LIFT COMPACTED GARBAGE, RECYCLING AND ORGANIC COLLECTION SERVICES FOR THE RESIDENTIAL COMPONENT OF THIS DEVELOPMENT.
3. A TRAINED ON-SITE STAFF MEMBER MUST BE AVAILABLE TO MANEUVER BINS FOR THE COLLECTION DRIVERS AND ALSO ACT AS A FLAGMAN WHEN THE TRUCK IS REVERSING. IN THE EVENT THE ON-SITE STAFF MEMBER IS UNAVAILABLE AT THE TIME THE RESIDENTIAL COLLECTION VEHICLE ARRIVES AT THE SITE, THE COLLECTION VEHICLE WILL LEAVE THE SITE AND NOT RETURN UNTIL THE NEXT SCHEDULED COLLECTION DAY.
4. ALL ACCESS DRIVEWAYS FOR THE COURSE OF THE COLLECTION VEHICLE SHALL BE LEVEL (±0.2%) AT LEAST 4.5m WIDE THROUGHOUT THE SITE AND 6m WIDE AT ENTRANCES AND EXITS, HAVING A MINIMUM 4.5m CLEARANCE UNDER OVERHEAD DOORS.
5. THE WASTE LOADING SPACE WILL BE CONSTRUCTED OF AT LEAST 200mm THICK (MIN.) REINFORCED CONCRETE, BE LEVEL (±0.2%) AND BE AT LEAST 6m WIDE X 13m LONG AND HAVE VERTICAL CLEARANCE OF 7.0m.
6. IN ALL AREAS WHERE A COLLECTION VEHICLE IS REQUIRED TO DRIVE ONTO OR OVER A SUPPORT STRUCTURE, THE STRUCTURE IS TO BE DESIGNED TO SAFELY SUPPORT A FULLY LOADED COLLECTION VEHICLE AT 35 METRIC TONNES.
7. SHEDDING OF WASTE LOADING SPACE FOR PURPOSES OF MOVING WILL BE SCHEDULED ACCORDING TO GARBAGE PICK-UP TIMES. SHOULD THE WASTE LOADING SPACE BE REQUIRED FOR USE BY COMMERCIAL SECTORS, THE COMMERCIAL COMPONENT MUST ARRANGE THIS USE SUCH THAT IT DOES NOT CONFLICT WITH ANY RESIDENTIAL USES.
8. TYPE B TRUCK SPACE 2 WILL BE RESTRICTED TO USE OUTSIDE THE WASTE COLLECTION WINDOW.
9. THE STAGING PAD ADJACENT TO THE FRONT OF THE WASTE LOADING SPACE SHALL BE LEVEL (±0.2%) AND SHALL BE CONSTRUCTED OF A MINIMUM OF 200mm REINFORCED CONCRETE.
10. THE WASTE LOADING SPACE WILL BE USED BY BOTH RESIDENTIAL AND NON-RESIDENTIAL SECTORS. THE NON-RESIDENTIAL WASTE MANAGEMENT MUST ARRANGE FOR THEIR COLLECTION DAYS TO BE SCHEDULED ON DIFFERENT DAYS FROM THOSE OF THE RESIDENTIAL COLLECTION DAYS. FAILURE TO COMPLY WITH THIS ARRANGEMENT WILL RESULT IN THE CANCELLATION OF RESIDENTIAL COLLECTION AT THIS SITE.
11. BEFORE SOLID WASTE COLLECTION SERVICES ARE TO BEGIN, THE TOWN OF OAKVILLE & REGION OF ONTARIO WILL NEED TO BE PROVIDED WITH A LETTER, DATED BY A PROFESSIONAL ENGINEER, SUPPORTED STRUCTURE, THAT THE STRUCTURE CAN SAFELY SUPPORT A FULLY LOADED COLLECTION VEHICLE ON METRIC TONNES AND CONFORM TO THE FOLLOWING:
  - i) DESIGN CODE - ONTARIO BUILDING CODE
  - ii) DESIGN LOAD - CITY BULK LIFT VEHICLE IN ADDITION TO BUILDING CODE REQUIREMENTS
  - iii) IMPACT FACTOR - 5% FOR MAXIMUM REGULAR SPEEDS TO 15km/h AND 20% FOR HIGHER SPEEDS
  - 12. DOUBLE DOORS MINIMUM 2.3m WIDTH TO BE PROVIDED TO ACCESS EACH WASTE STORAGE AND BULKY WASTE STORAGE ROOM. THESE DOORS SHALL OPEN OUTWARDS FOR WASHING STORAGE SPACE.
  - 13. WASTE STORAGE ROOMS TO HAVE A HOSE BIB AND FLOOR DRAIN FOR WASHING AND CLEANING OF THE ROOM AND WASTE CONTAINERS.
  - 14. THE AIR EXCHANGE RATE FOR WASTE STORAGE ROOMS TO BE A MINIMUM OF ONE-CUBIC FOOT PER MINUTE PER SQUARE FOOT OF FLOOR SPACE (1 CFM/F<sup>2</sup>).
  - 15. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH R.J. BURNSIDE & ASSOCIATES LIMITED, SOLID WASTE MANAGEMENT PLAN.
  - 16. WASTE BINS AND CARTS SHOWN ON THESE DRAWINGS ARE REPRESENTATIONAL ONLY.

DO NOT SCALE THIS DRAWING  
 This drawing shall not be used for construction purposes unless counterchecked  
 Teepie Architects Inc.

NO.	DATE	ISSUED FOR:

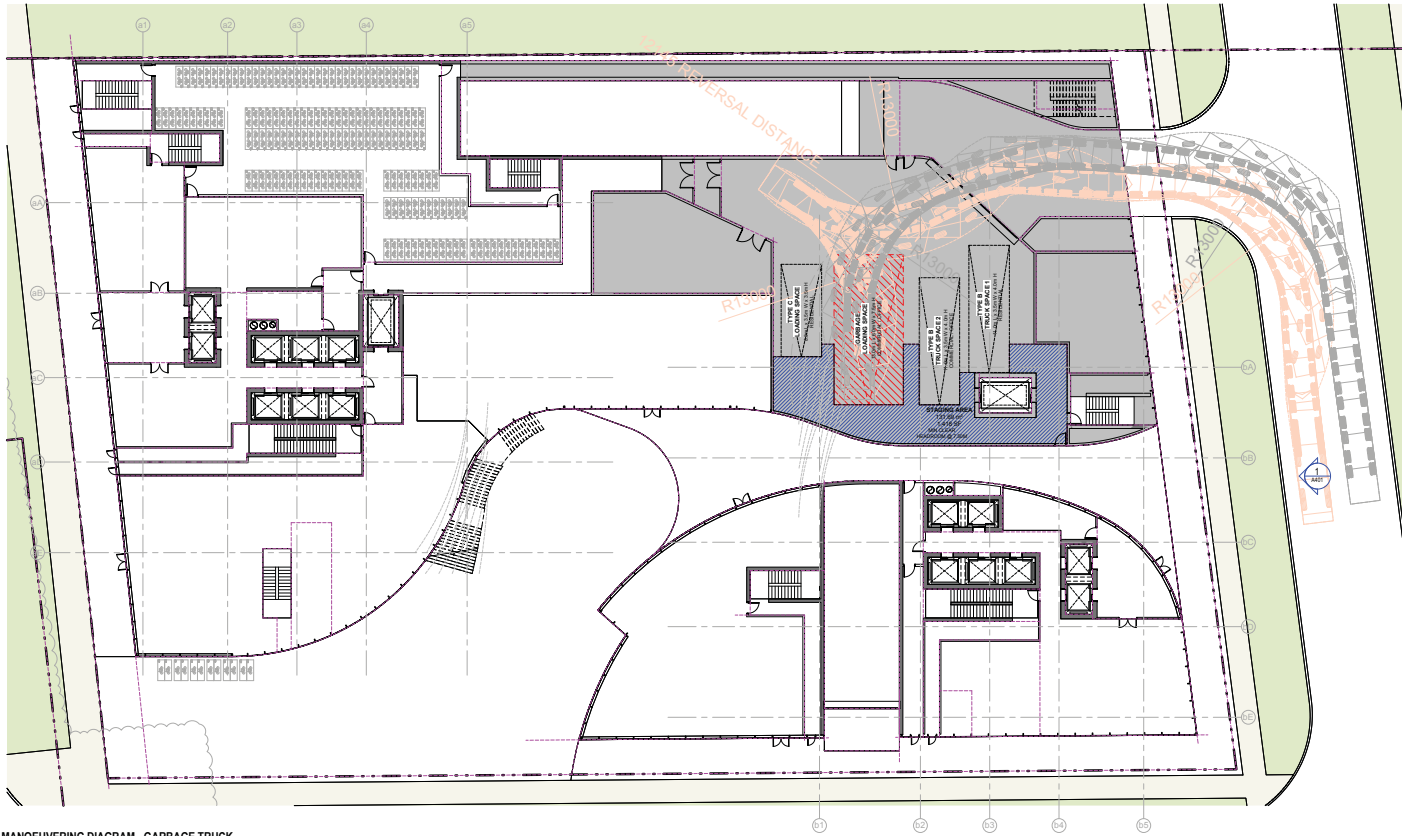


TABLE 1: WASTE CONTAINER COMPUTATION

WASTE STREAM	CONTAINER TYPES	AREA (SQM)	NUMBER OF RESIDENTIAL UNITS SERVED BY THIS BIN
GARBAGE (COMPACTED)	3 CUBIC YARD FRONT-LIFT BIN	2.27	54
RECYCLING (UNCOMPACTED)	4 CUBIC YARD FRONT-LIFT BIN	2.78	56
ORGANICS	360 L SEMI-AUTOMATED CART	0.80	25

TABLE 2: REQUIRED RESIDENTIAL WASTE STORAGE ROOM AREA

BUILDING	NUMBER OF RESIDENTIAL UNITS	APPROXIMATE WASTE STORAGE ROOM SPATIAL REQUIREMENT (SQM)**
BUILDING A	654	151.01
BUILDING B	504	201.77
TOTAL	2238	352.78

\*\* EXCLUDES 18 SQM REQUIRED FOR BULKY WASTE STORAGE

TABLE 3: WASTE CONTAINER COUNTS

WASTE STREAM	CONTAINER	NUMBER OF RESIDENTIAL UNITS	
		BUILDING A # UNITS	BUILDING B # UNITS
GARBAGE (COMPACTED)	3 YARD <sup>3</sup> FRONT-LIFT	14	11
RECYCLING	4 YARD <sup>3</sup> FRONT-LIFT	14	10
ORGANICS	360 L SEMI-AUTOMATED CART	20	22

1 MANOEUVRING DIAGRAM - GARBAGE TRUCK

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 1100 Midland Avenue, Toronto, ON, Canada M5V 1Y2  
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STRUCTURAL  
 +  
 +

MECHANICAL  
 +  
 +

ELECTRICAL  
 +  
 +

LANDSCAPE  
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SECTOR (P/E) (ENGINEERING)  
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PLANNING  
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CLIENT  
 District Developments  
 1400 Sheppard Avenue, Toronto, ON, Canada M6C 2S3  
 T: 416-465-8558

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**AVE, OAKVILLE**

157 & 165 Cross Avenue, Oakville, ON, Canada



**WASTE MANAGEMENT PLAN**

Author:  Checker:

DRAWN BY:  CHECKED BY:

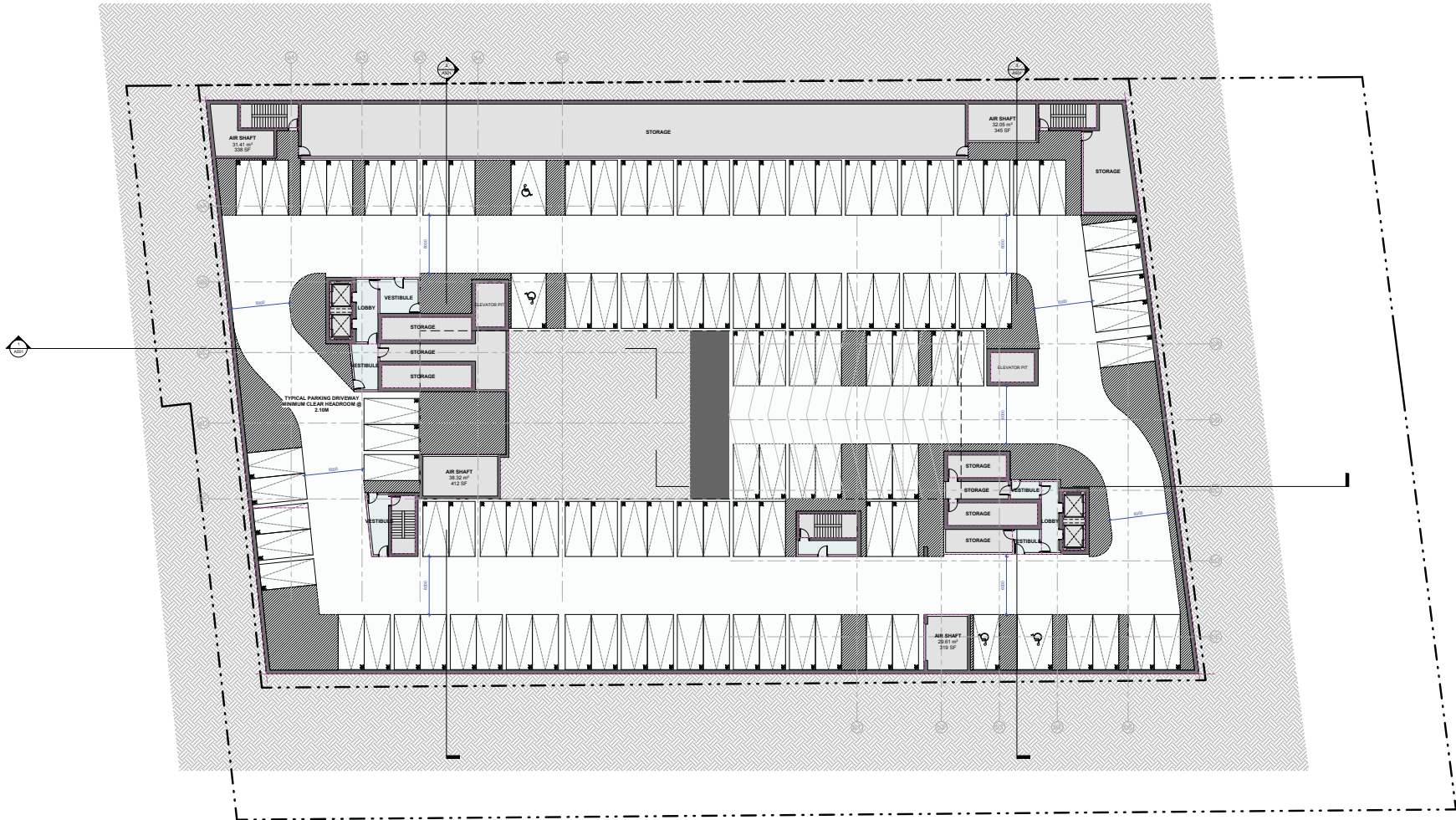
23-107 As Issued ADD 1 2024-02-18  
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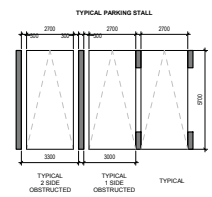
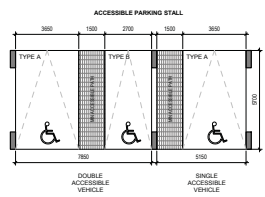
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NO.	DATE	ISSUED FOR:



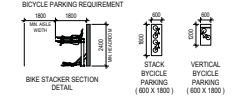
ARCHITECT	<b>Tegle Architects Inc.</b> 118 Dundas Street, Toronto, ON, Canada, M5V 1Z1 T 416.588.6264
STRUCTURAL	+
MECHANICAL	+
ELECTRICAL	+
LANDSCAPE	<b>Janet Rosenberg &amp; Studio</b> 318 Macaulay Street, Toronto, ON, M5C 2S3 T 416.588.6881
ENGINEER	<b>Trafalgar Engineering Limited</b> 1480 Midland Street, Oakville, ON, L6H 2B9 T 905.239.2560
MECHANICAL	<b>BA Consulting Group Limited</b> 2010 Kipling Ave., Oakville, ON, L6H 1A8 T 416.861.1710
ELECTRICAL	<b>R.J. Burnside &amp; Associates Limited</b> 1480 Midland Street, Oakville, ON, L6H 2B9 T 905.239.2560
PLUMBING	<b>Bousfields Inc.</b> 1900 Steeles Ave. East, Unit 100, Scarborough, ON, M1S 1B2 T 416.291.7214
CLIMATE CONTROL	<b>District Developments</b> 1400 Yonge Street, Toronto, ON, Canada M5B 1P5 416.588.8888

**DISTRIKT**  
**157 - 165 CROSS**  
**AVE, OAKVILLE**



VEHICULAR PARKING SUMMARY PER LEVEL	
112	NON-RESIDENTIAL*
	VISITOR
112	TOTAL

\*PERFORMING WITH ACCESSIBLE FACILITIES, See CANADA, 2015



BICYCLE PARKING SUMMARY PER LEVEL	
	NON-RESIDENTIAL*
	VISITOR
	TOTAL

\*PERFORMING WITH ACCESSIBLE FACILITIES, See CANADA, 2015

**LEVEL P7 PLAN**

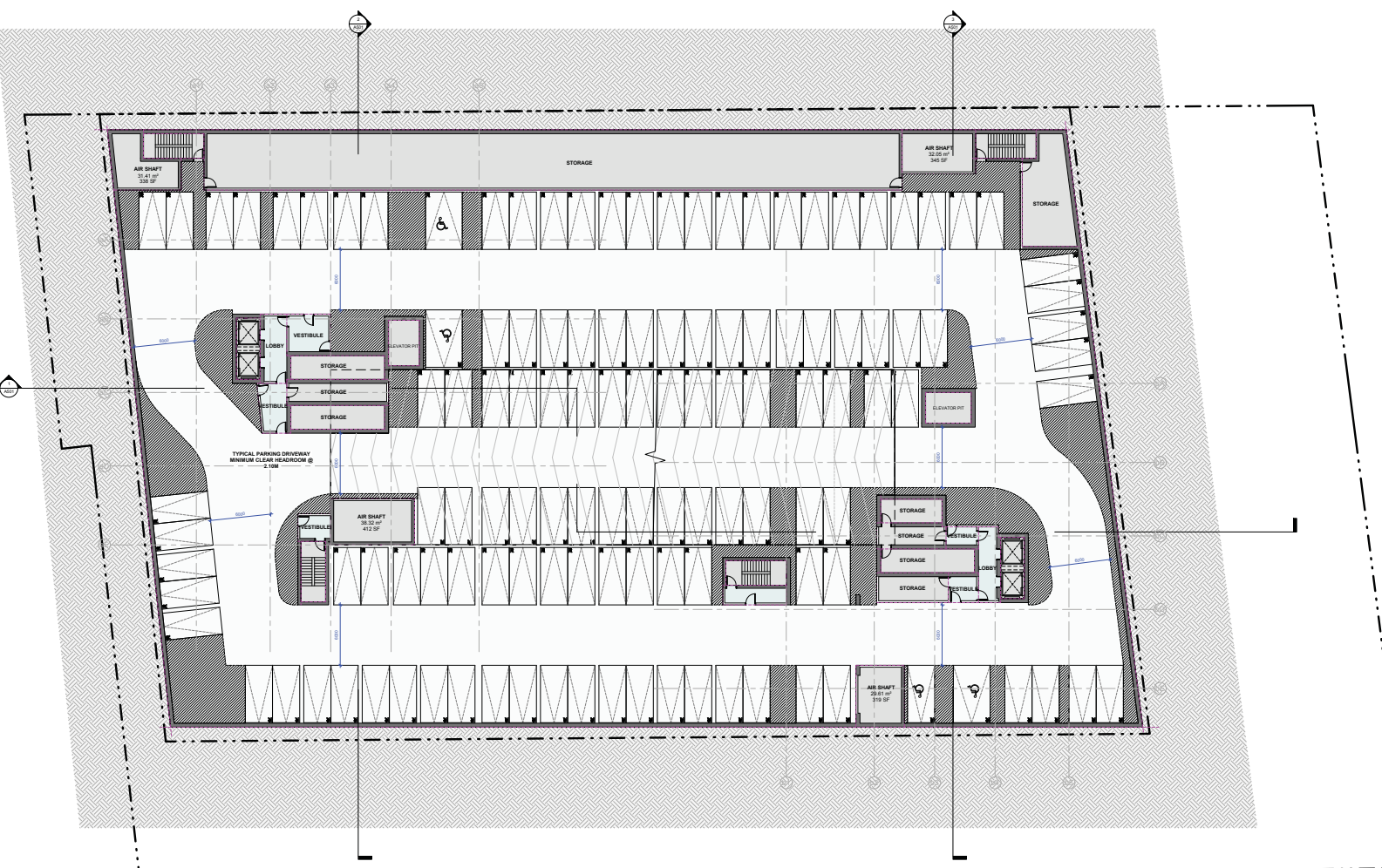
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PROJ-NO.	SCALE
	FORMAT
	PLOT DATE

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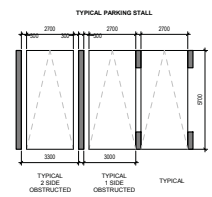
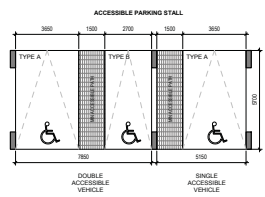
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- ARCHITECT: **Teepix Architects Inc.**  
100 Spadina Avenue, Toronto, ON, Canada, M5V 1Y2  
T 416.593.8681
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- MECHANICAL: **TRAJALGAR**
- ELECTRICAL: **BA CONSULTING**
- LANDSCAPE: **Janet Rosenberg & Studio**  
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- ELECTRICAL: **R.J. Burnside & Associates Limited**  
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- PLANNING: **Bousfields Inc.**  
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T 416.594.8724
- CLIENT: **District Developments**  
140 Spadina Avenue, Toronto, ON, Canada M5S 1P5  
416.593.6269

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**157 - 165 CROSS**  
**AVE, OAKVILLE**

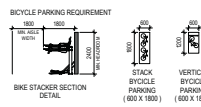
157 & 165 Cross Avenue, Oakville, ON, Canada



VEHICULAR PARKING SUMMARY PER LEVEL

125	NON-RESIDENTIAL*
	VISITOR
125	TOTAL

\*BASED ON 2015 CANADIAN NATIONAL BUILDING CODE



BICYCLE PARKING SUMMARY PER LEVEL

	NON-RESIDENTIAL*
	VISITOR
	TOTAL

\*BASED ON 2015 CANADIAN NATIONAL BUILDING CODE

**LEVEL P6 PLAN**

Author: \_\_\_\_\_  
Check: \_\_\_\_\_  
DRAWN BY: \_\_\_\_\_  
DESIGNED BY: \_\_\_\_\_

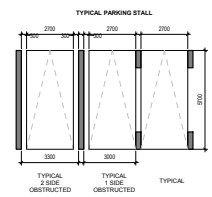
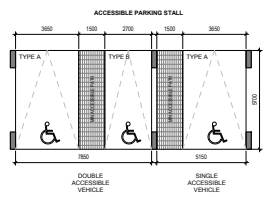
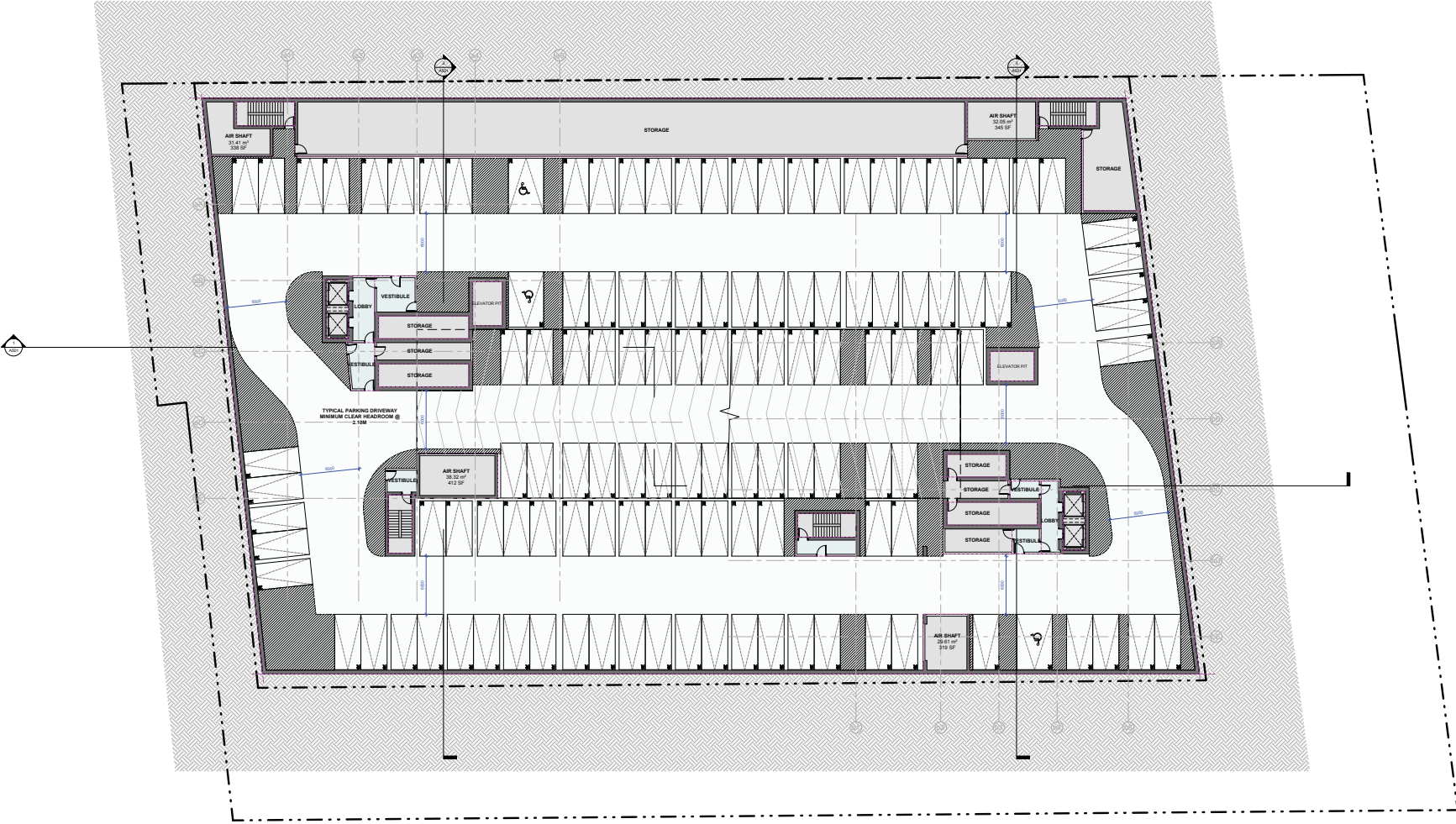
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**LEVEL P5**

**VEHICULAR PARKING SUMMARY PER LEVEL**

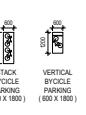
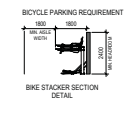
125	RESIDENTIAL*
	NON-RESIDENTIAL*
	VISITOR
125	TOTAL

\*PERFORMA WITH APPOINTED PROFESSIONAL SERVICES ONLY

**LEVEL P5**

**VEHICULAR PARKING SUMMARY PER LEVEL**

125	RESIDENTIAL
	NON-RESIDENTIAL*
	VISITOR
125	TOTAL



**BICYCLE PARKING SUMMARY PER LEVEL**

	RESIDENTIAL
	NON-RESIDENTIAL*
	VISITOR
	TOTAL

\*PERFORMA WITH APPOINTED PROFESSIONAL SERVICES ONLY

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**STRUCTURAL**  
+

**MECHANICAL**  
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**ELECTRICAL**  
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416 548 8588

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**AVE, OAKVILLE**

157 & 165 Cross Avenue, Oakville, ON, Canada

**LEVEL P5 PLAN**

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DRAWN BY: [Signature] CHECKED BY: [Signature]  
23-207 23-207 AMKH 3203-02-18  
PROJ-NO: 23-207 SCALE: 1/4" = 1'-0" FORMAT: PLOT DATE:

**A203**

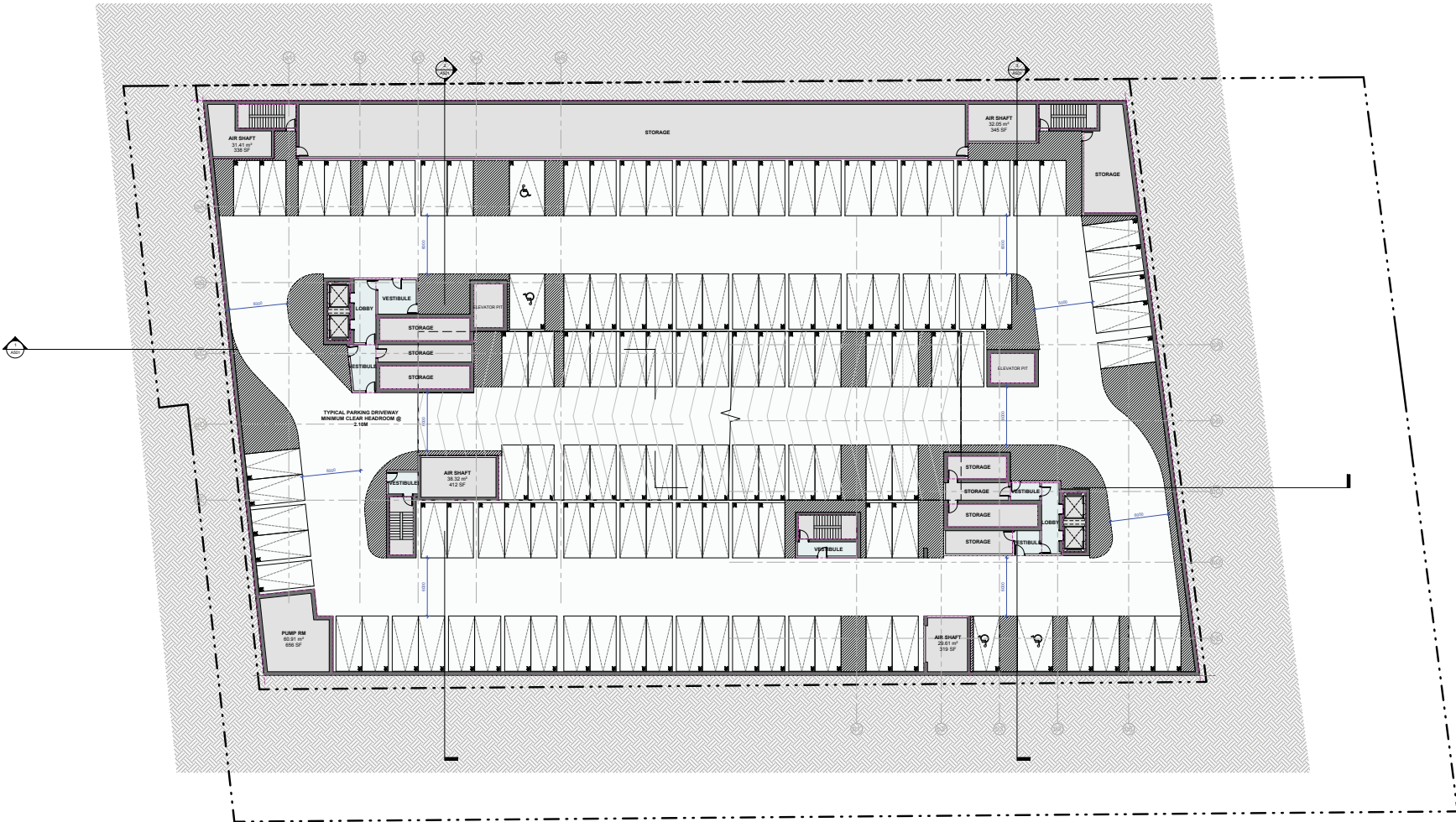
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Treple Architects Inc.

NO.	DATE	ISSUED FOR:



- ARCHITECT**  
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110 Dundas Street West, Toronto, ON, Canada M5V 1G2  
T: 416.593.8264
- STRUCTURAL**  
+  
-
- MECHANICAL**  
+  
-
- ELECTRICAL**  
+  
-
- LANDSCAPE**  
Janet Rosenberg & Studio  
110 Dundas Street West, Toronto, ON, Canada M5V 1G2  
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BA Consulting Group Limited  
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- ELECTRICAL**  
R.J. Burnside & Associates Limited  
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T: 416.593.8264
- PLUMBING**  
Bousfields Inc.  
110 Dundas Street West, Toronto, ON, Canada M5V 1G2  
T: 416.593.8264

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**157 - 165 CROSS**  
**AVE, OAKVILLE**

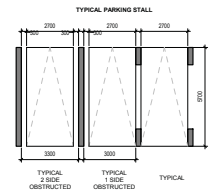
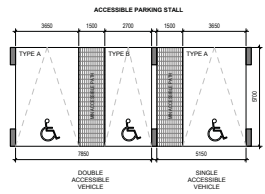
157 & 165 Cross Avenue, Oakville, ON, Canada



**LEVEL P4 PLAN**

Author: **AD** Checker: **AD**  
Drawn by: **AD** Designed by: **AD**  
Proj. No: **157-165** Scale: **AS SHOWN** Arch: **AD** 3/28/23 18  
Format: **PDF**

**A204**



**LEVEL P4**

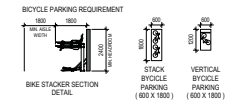
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125	RESIDENTIAL*
	NON-RESIDENTIAL*
	VISITOR
125	TOTAL

\*PERFORMED BY: NATHAN PERKINS, ARCHITECT

**LEVEL P5**

VEHICULAR PARKING SUMMARY PER LEVEL	
125	RESIDENTIAL*
	NON-RESIDENTIAL*
	VISITOR
125	TOTAL



**BICYCLE PARKING SUMMARY PER LEVEL**

BICYCLE PARKING SUMMARY PER LEVEL	
	RESIDENTIAL*
	NON-RESIDENTIAL*
	VISITOR
	TOTAL

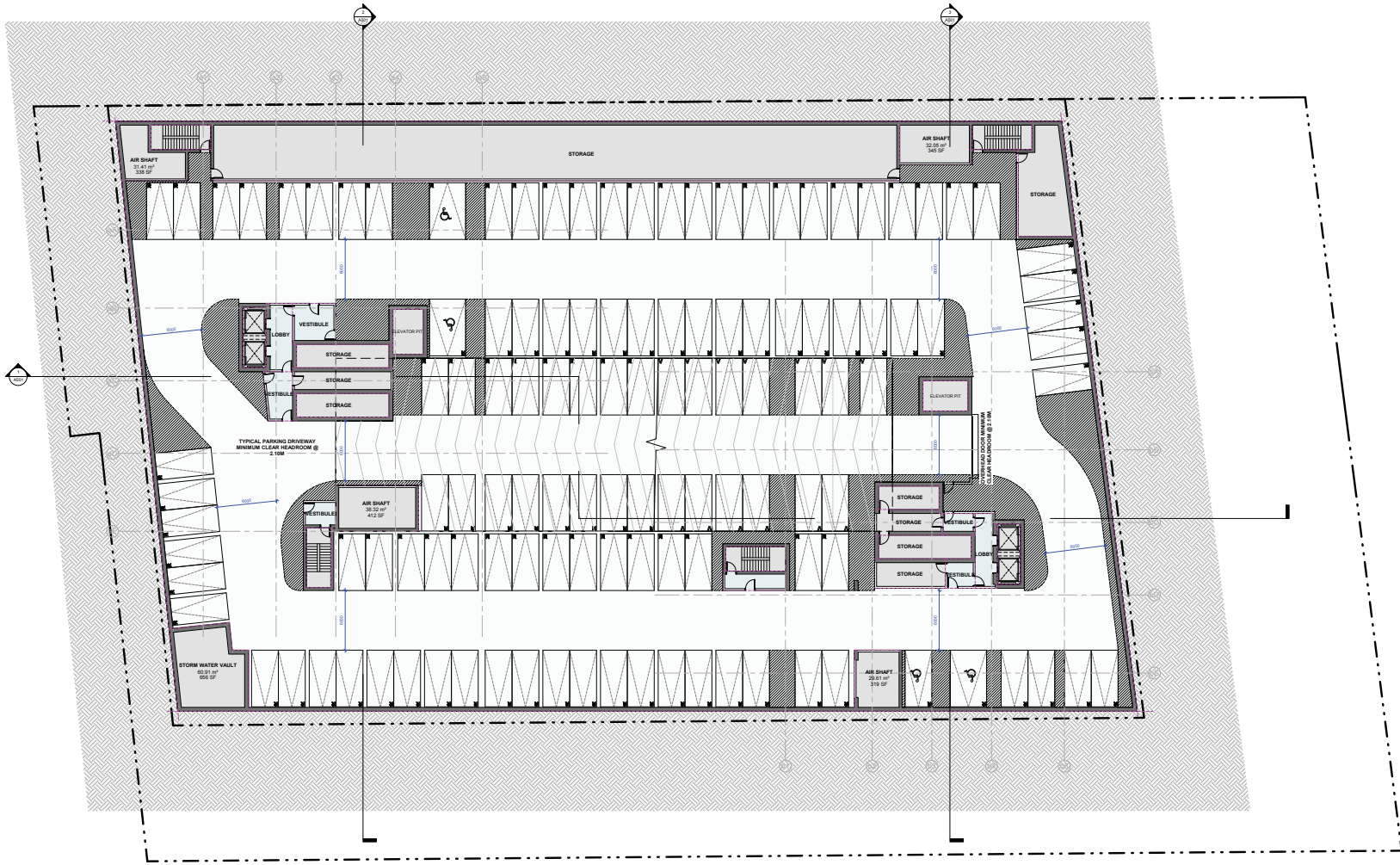
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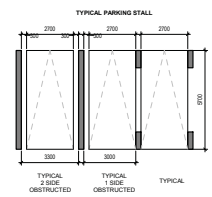
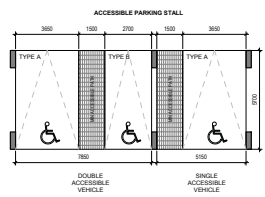
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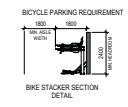
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**DISTRIKT**  
**157 - 165 CROSS**  
**AVE, OAKVILLE**  
 157 & 165 Cross Avenue, Oakville, ON, Canada



VEHICULAR PARKING SUMMARY PER LEVEL	
152	NON-RESIDENTIAL*
	VISITOR
128	TOTAL

\*PERMITTED BY THE MUNICIPAL ENGINEER, IN ACCORDANCE WITH THE PROVISIONS OF THE PROVISIONAL BY-LAW.



BICYCLE PARKING SUMMARY PER LEVEL	
	NON-RESIDENTIAL*
	VISITOR
	TOTAL

\*PERMITTED BY THE MUNICIPAL ENGINEER, IN ACCORDANCE WITH THE PROVISIONS OF THE PROVISIONAL BY-LAW.

**LEVEL P3 PLAN**

Author: **AK**      Checker: **AK**  
 DRAWN BY: **AK**      CHECKED BY: **AK**

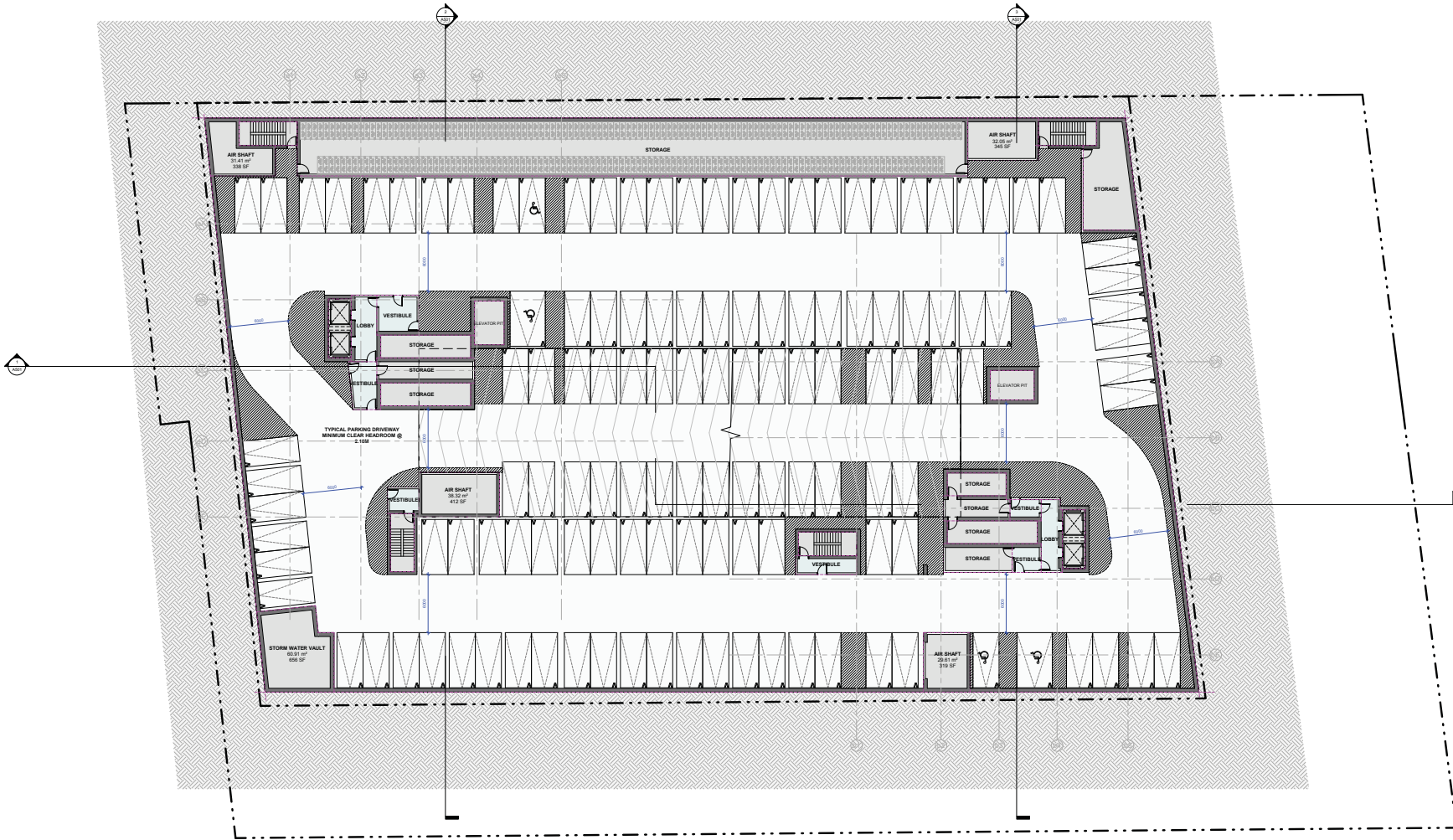
31-207      A4      AMH      2024-03-18  
 PROJ. NO.      SCALE      FORMAT      PLOT DATE

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MECHANICAL

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CONSULTING  
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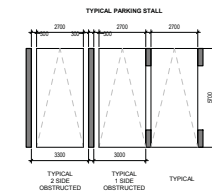
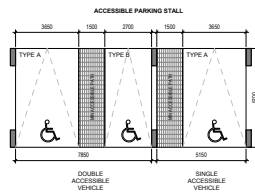
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**DISTRIKT**  
**157 - 165 CROSS**  
**AVE, OAKVILLE**

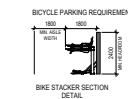
157 & 165 Cross Avenue, Oakville, ON, Canada



VEHICULAR PARKING SUMMARY PER LEVEL

	NON-RESIDENTIAL*
128	VISITOR
128	TOTAL

\*PERCENTAGE: 95% MINIMUM; 3% MAXIMUM.



BICYCLE PARKING SUMMARY PER LEVEL

	NON-RESIDENTIAL*
	VISITOR
	TOTAL

\*PERCENTAGE: 4% MINIMUM; 3% MAXIMUM.

**LEVEL P2 PLAN**

Author: [Name] Checker: [Name]  
DRAWN BY: [Name] CHECKED BY: [Name]  
31-207 30-210 30-211 30-212 30-213 30-214  
PROJ. NO. SCALE FORMAT PLOT DATE

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**AVE, OAKVILLE**

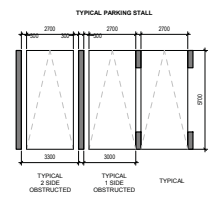
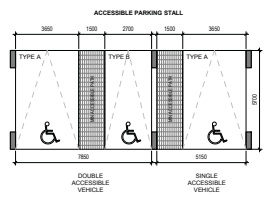
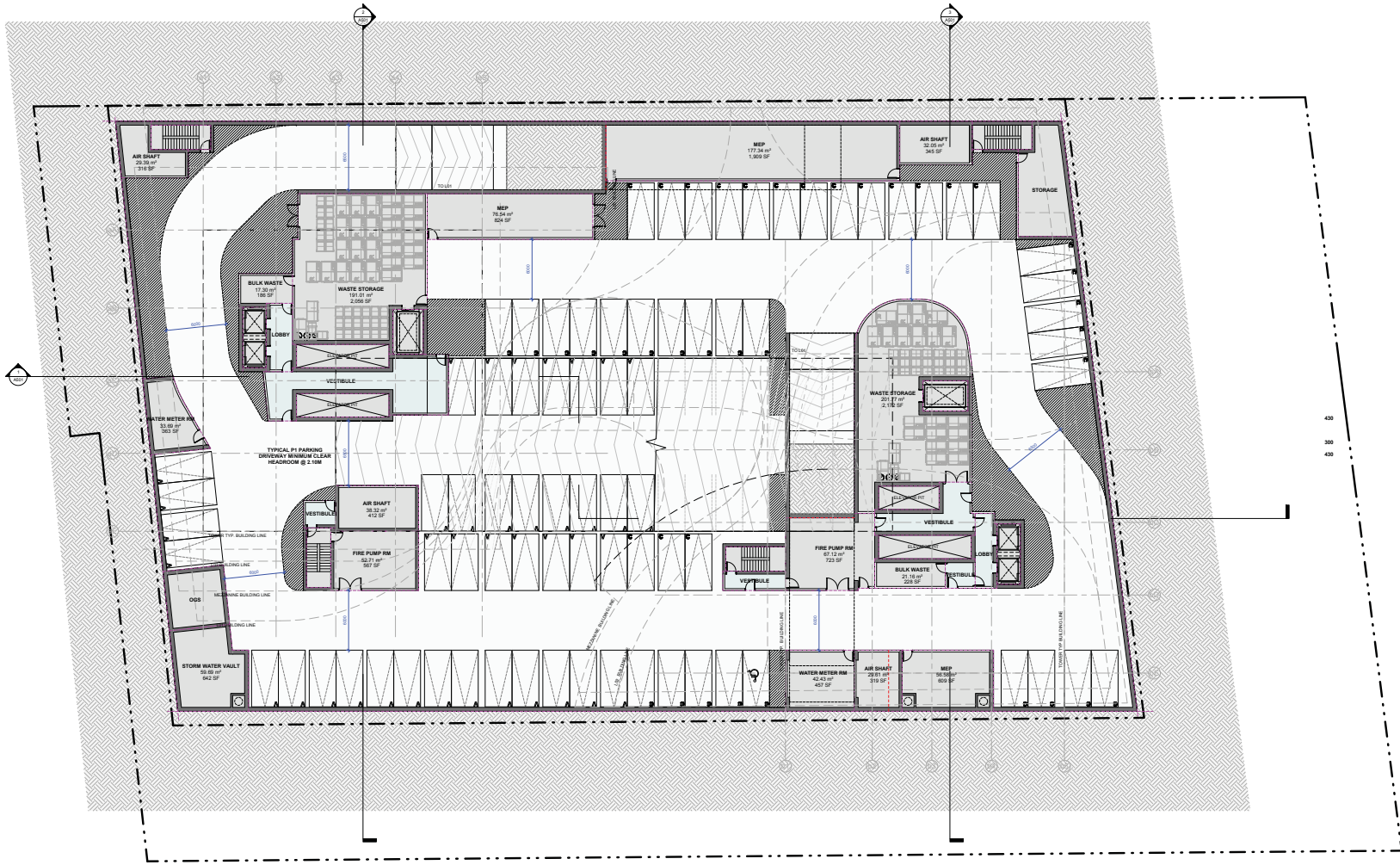
157 & 165 Cross Avenue, Oakville, ON, Canada



**LEVEL P1 PLAN**

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DRAWN BY: [Name] CHECKED BY: [Name]

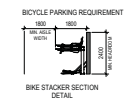
**A207**



**VEHICULAR PARKING SUMMARY PER LEVEL**

40	NON-RESIDENTIAL*
38	VISITOR
78	TOTAL

\*PERFORMA PERMITS REQUIRED FOR VISITOR, SEE CODE, 7.02



**BICYCLE PARKING SUMMARY PER LEVEL**

	NON-RESIDENTIAL*
	VISITOR
	TOTAL

\*PERFORMA PERMITS REQUIRED FOR VISITOR, SEE CODE, 7.02



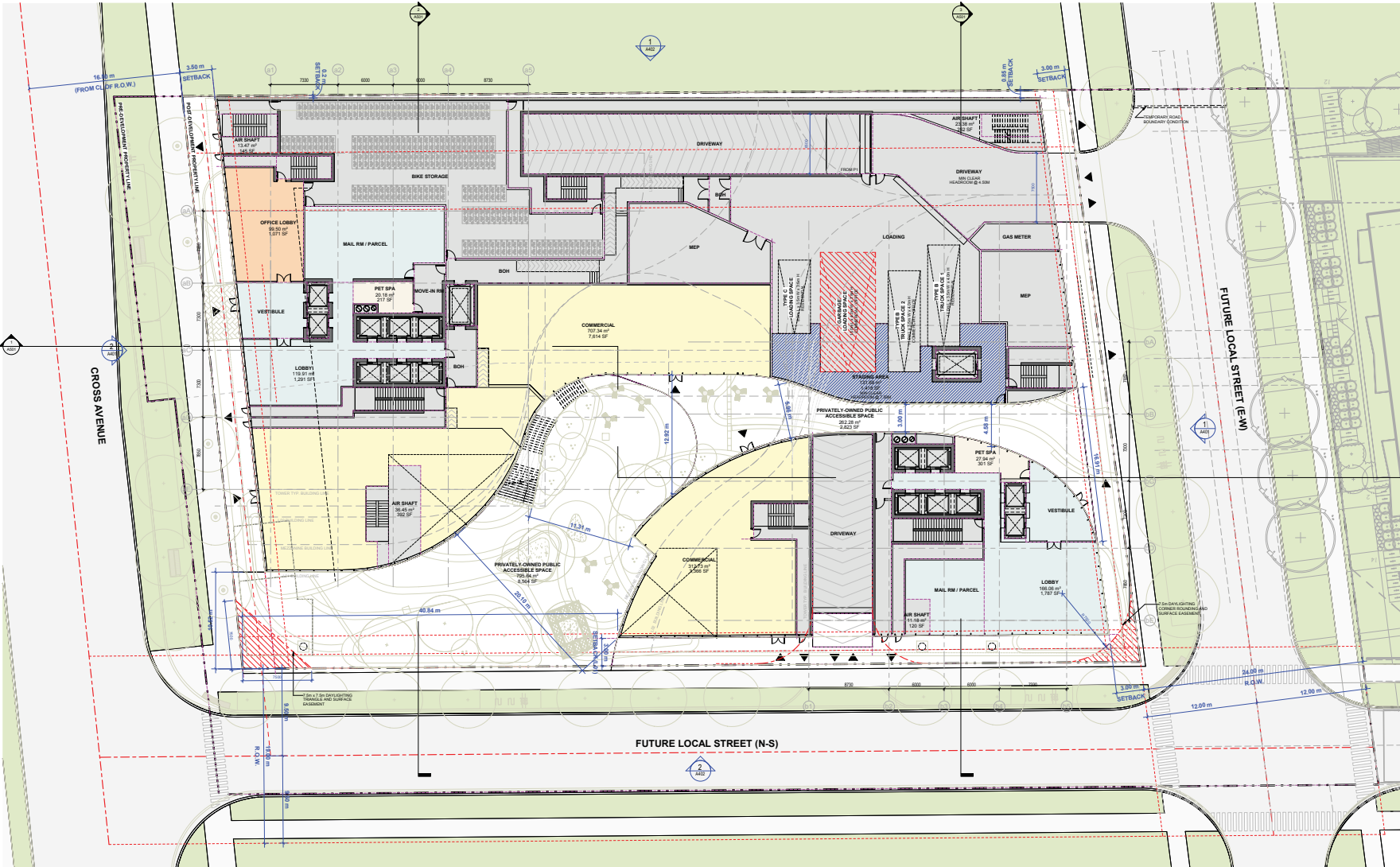
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Teepik Architects Inc.

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**ELECTRICAL**  
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**CLIENT**  
District Developments  
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416.463.6822

**DISTRIKT**  
**157 - 165 CROSS AVE, OAKVILLE**

337 & 335 Cross Avenue, Oakville, ON, Canada



**LEVEL 1 PLAN**

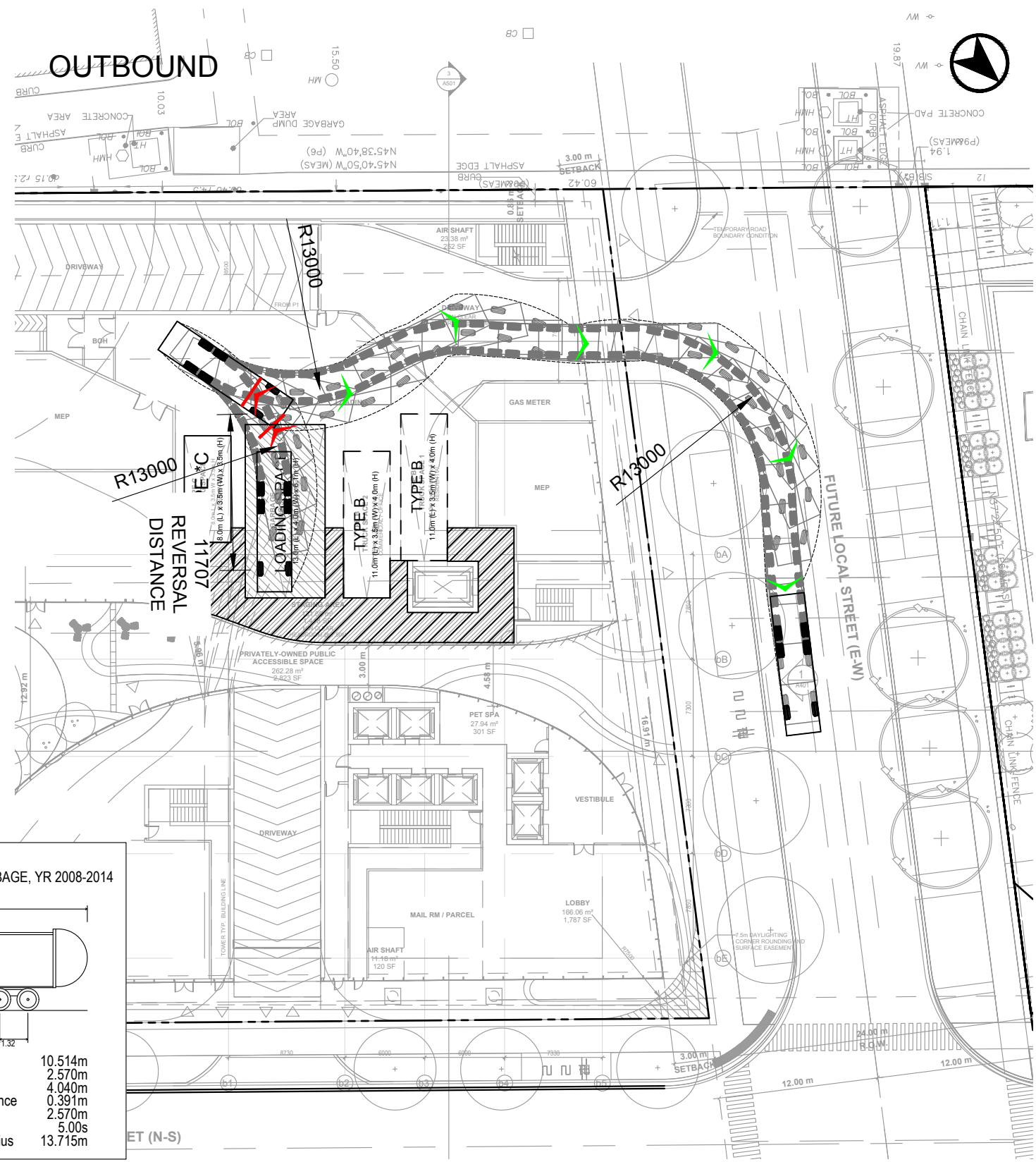
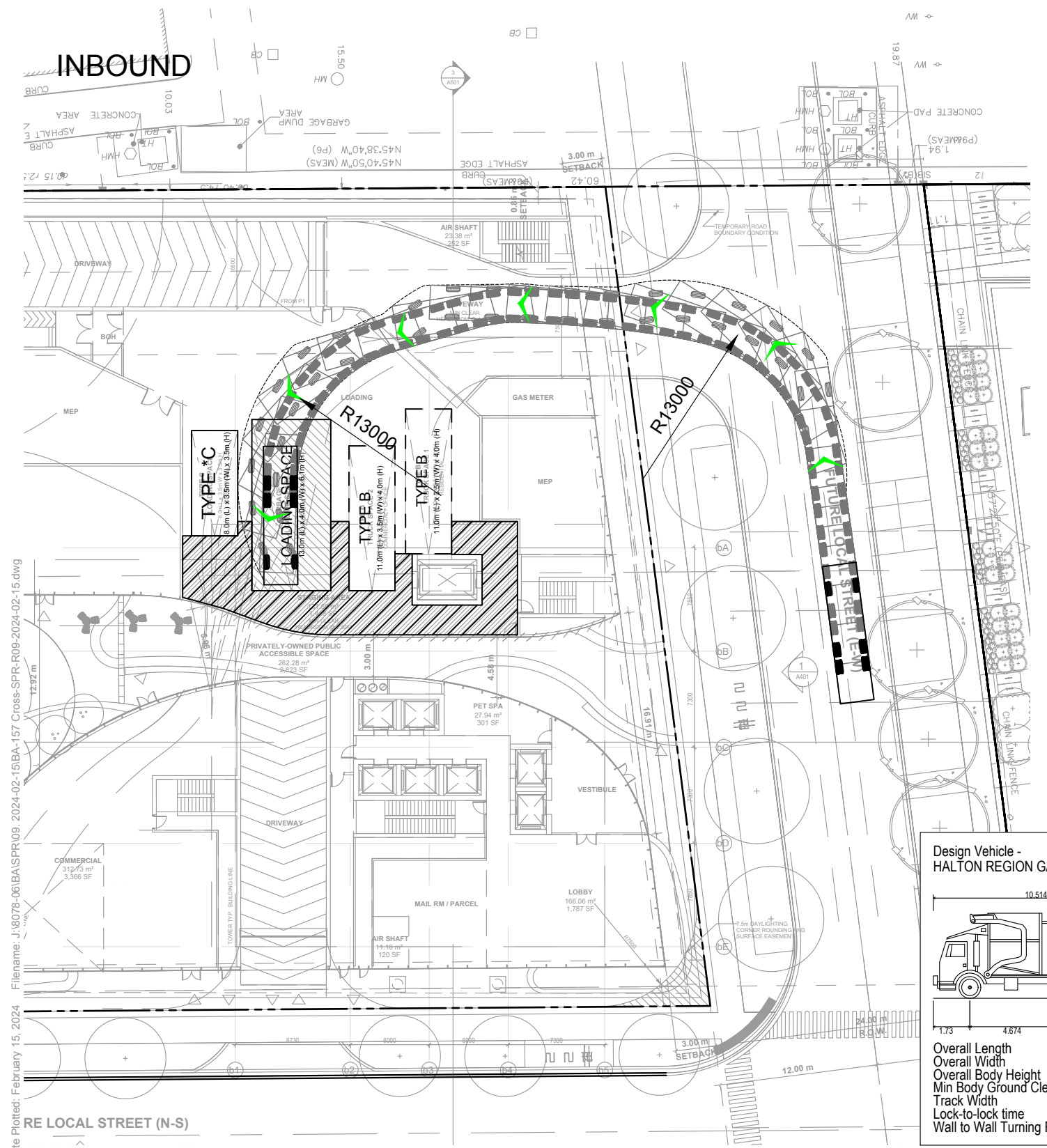
Author	Checked
DRAWN BY	DRAWN BY
23-207	1-130
PROJ. NO.	SCALE
	FORMATT
	PLOT DATE

**A211**

# Appendix E

## Vehicle Manoeuvring Diagrams





**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

Date Plotted: February 15, 2024  
 Filename: J:\8078-06\BA\SPR09\_2024-02-15\BA-157 Cross-SPR-R09-2024-02-15.dwg

**INBOUND**

**OUTBOUND**

RE LOCAL STREET (N-S)

ET (N-S)

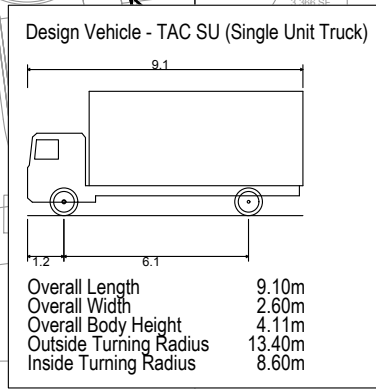
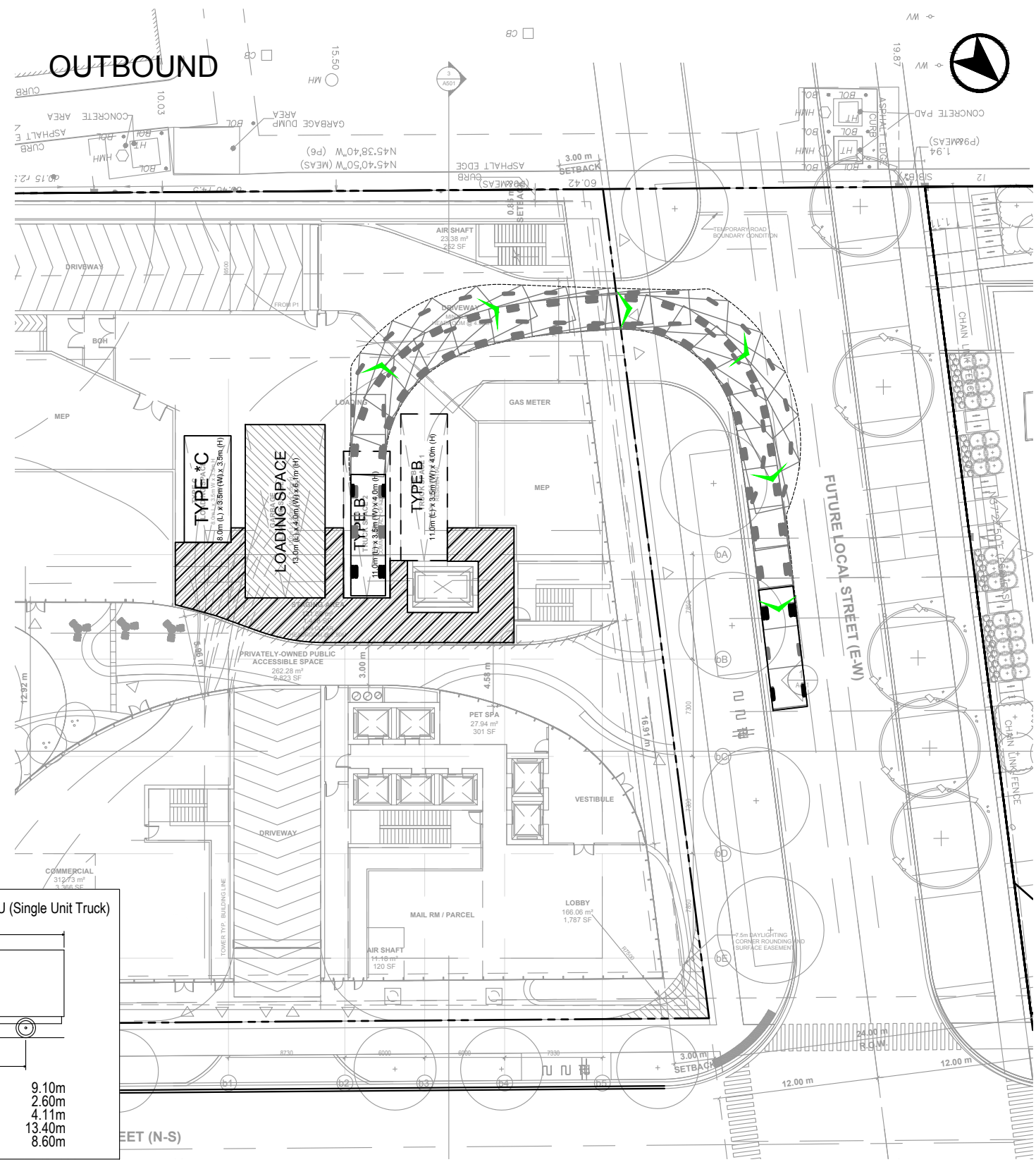
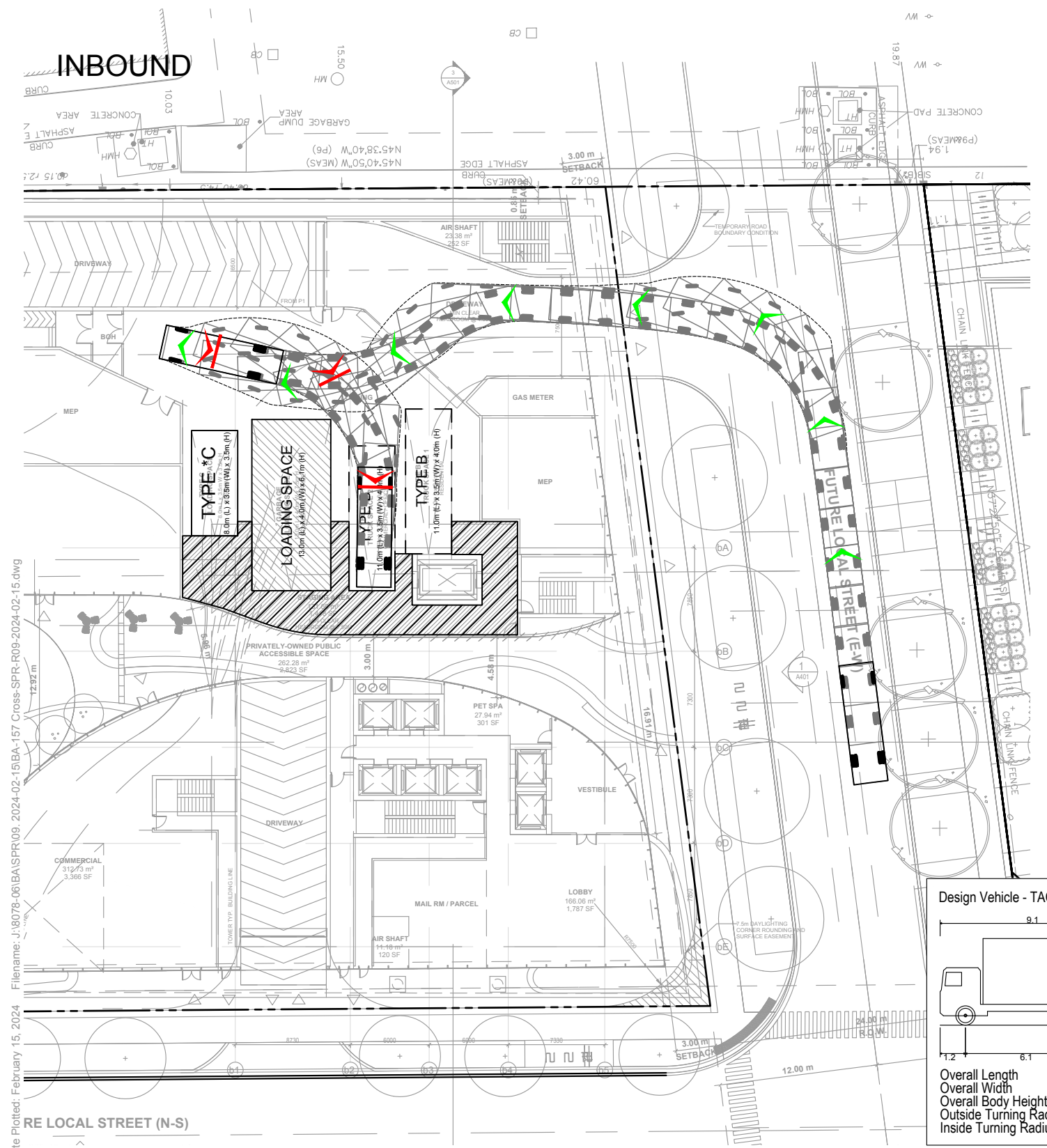


**157 CROSS AVENUE**  
 Vehicular Manoeuvring Diagram  
 Halton Region Waste Collection Vehicle

Project: 157 CROSS  
 Project No. 8078-06  
 Date: October 02, 2023  
 Revised: February 15, 2024

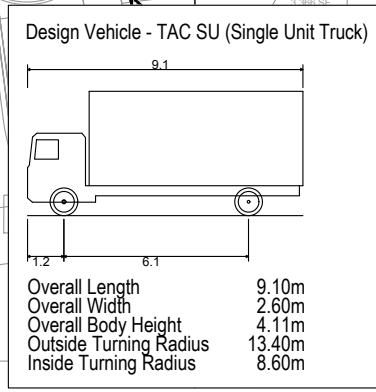
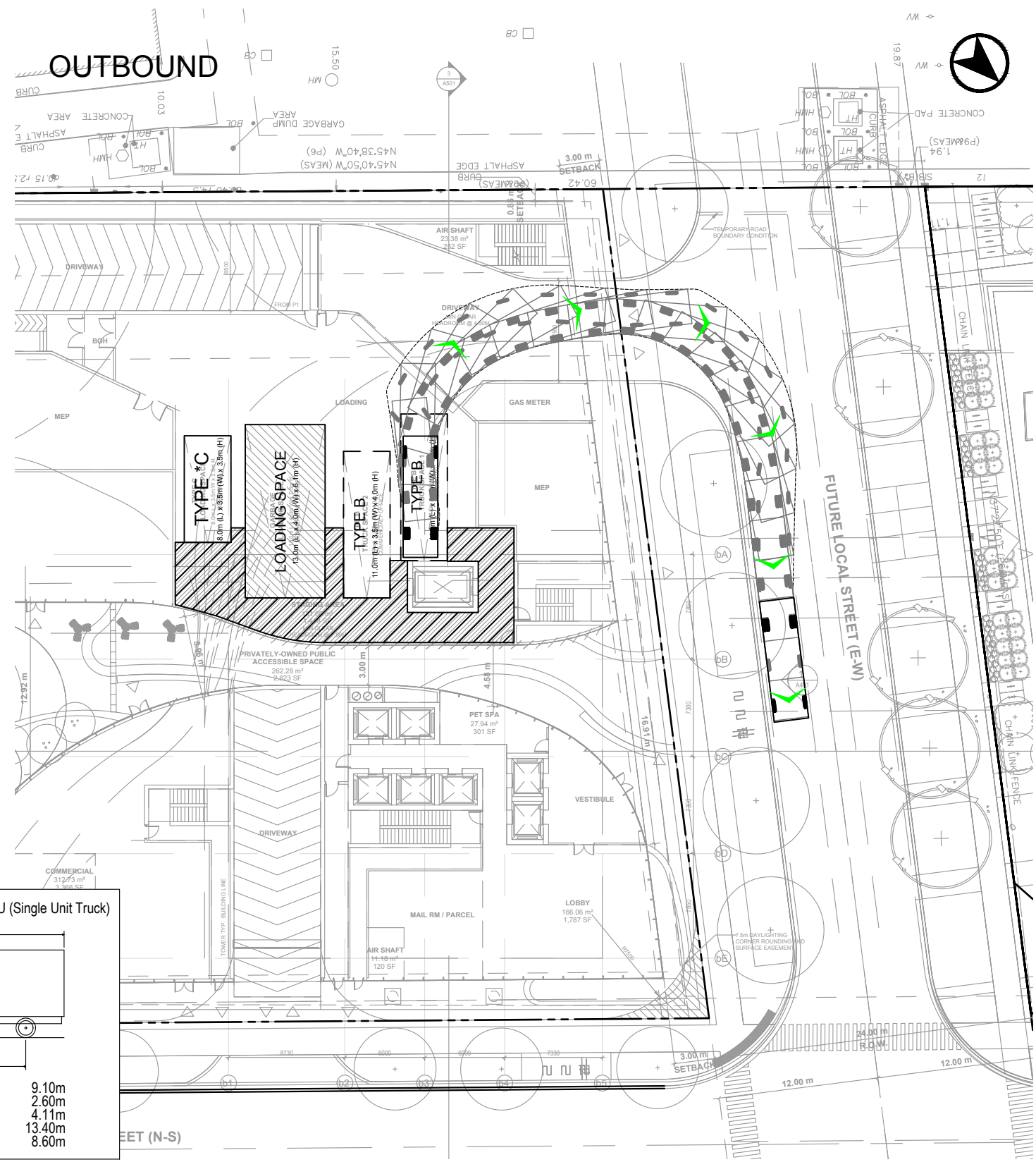
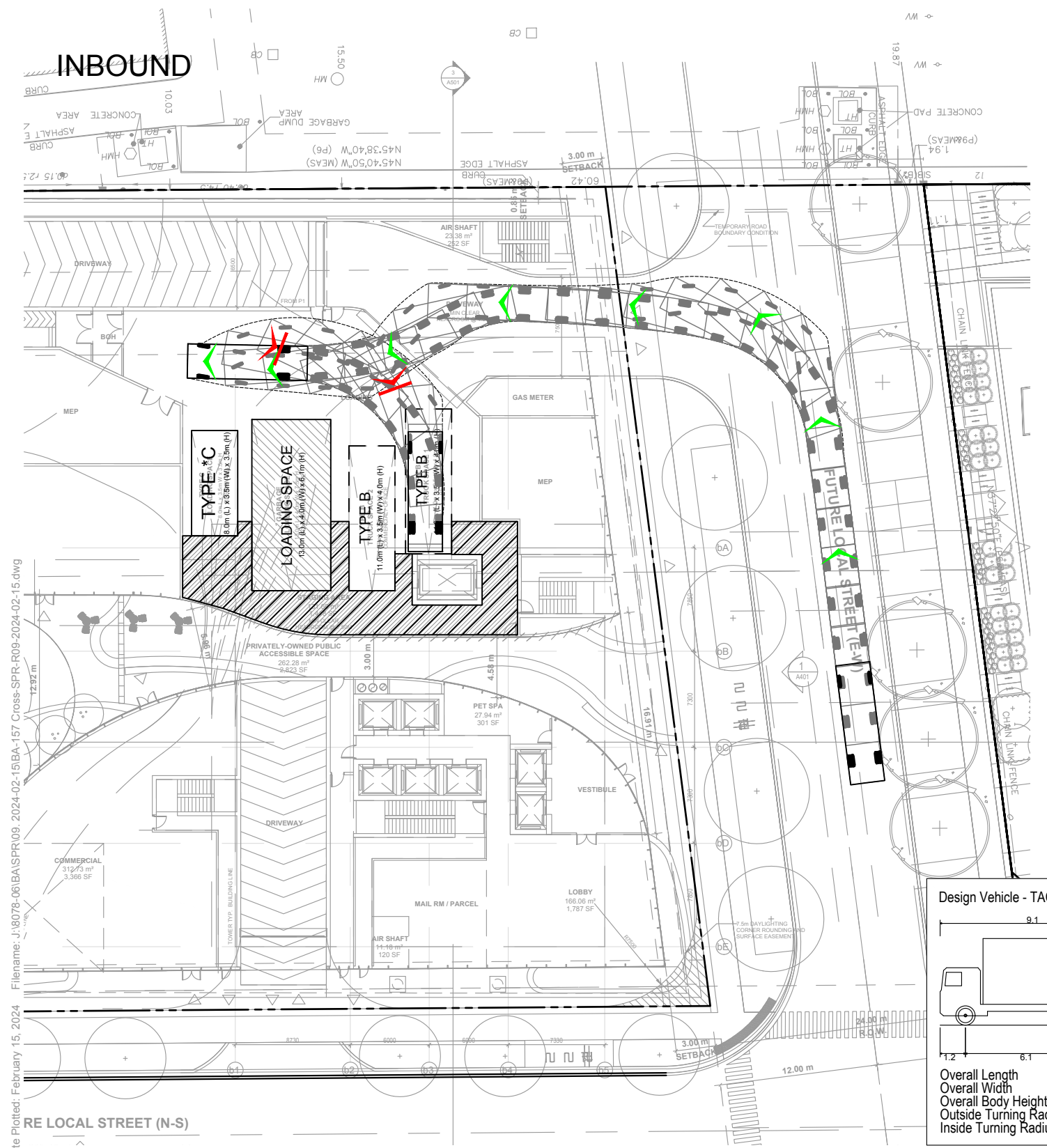
Scale 1:400

Drawing No. **VMD-01**



Date Plotted: February 15, 2024  
 Filename: J:\8078-06\BA\SPR09\_2024-02-15\BA-157 Cross-SPR-R09-2024-02-15.dwg

	<h3>157 CROSS AVENUE</h3> <p>Vehicular Manoeuvring Diagram TAC Single Unit Truck - Type B Space #1</p>	<p>Project: 157 CROSS          Project No. 8078-06          Date: October 02, 2023          Revised: February 15, 2024</p>	<p>Scale: 1:400</p> <p>Drawing No. <b>VMD-02</b></p>



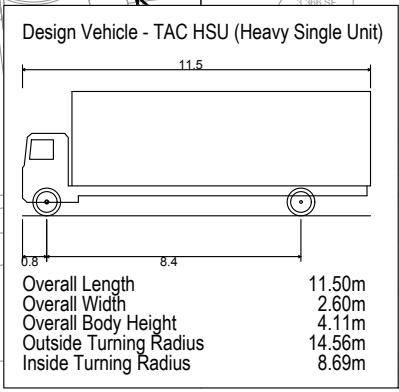
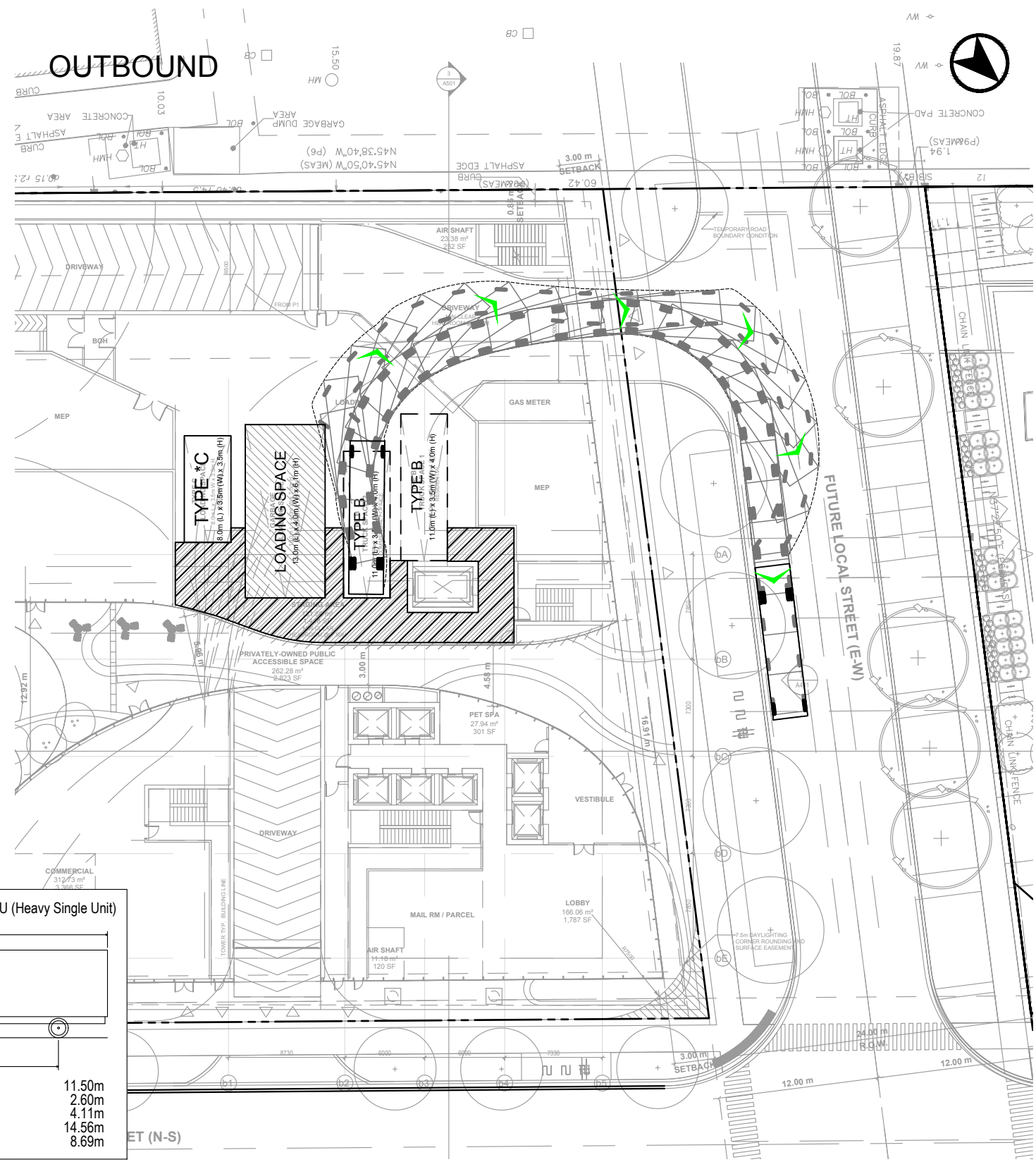
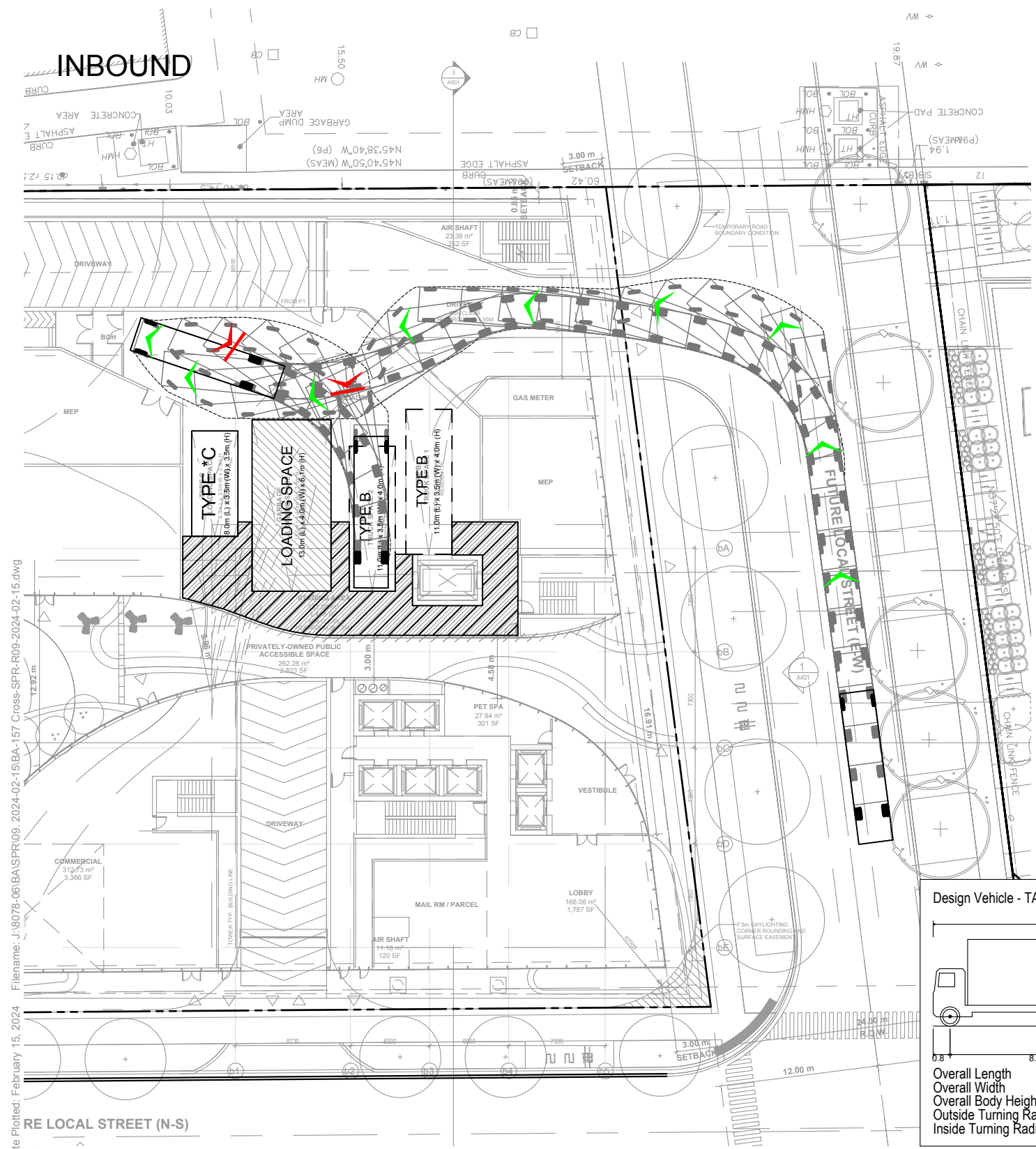
**157 CROSS AVENUE**  
 Vehicular Manoeuvring Diagram  
 TAC Single Unit Truck - Type B Space #2

Project: 157 CROSS  
 Project No. 8078-06  
 Date: October 02, 2023  
 Revised: February 15, 2024

Scale: 1:400

Drawing No. **VMD-03**

Date Plotted: February 15, 2024. Filename: J:\8078-06\BA\SPR09\_2024-02-15\BA-157 Cross-SPR-R09-2024-02-15.dwg



Date Plotted: February 15, 2024  
 Filename: J:\8078-06\BA\SPR09\_2024-02-15\BA-157 Cross-SPR-R09-2024-02-15.dwg

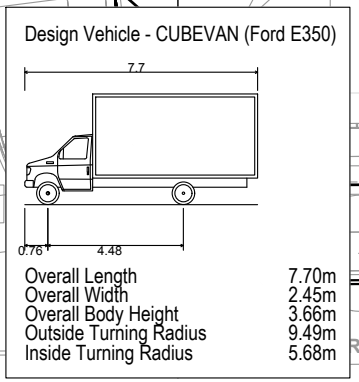
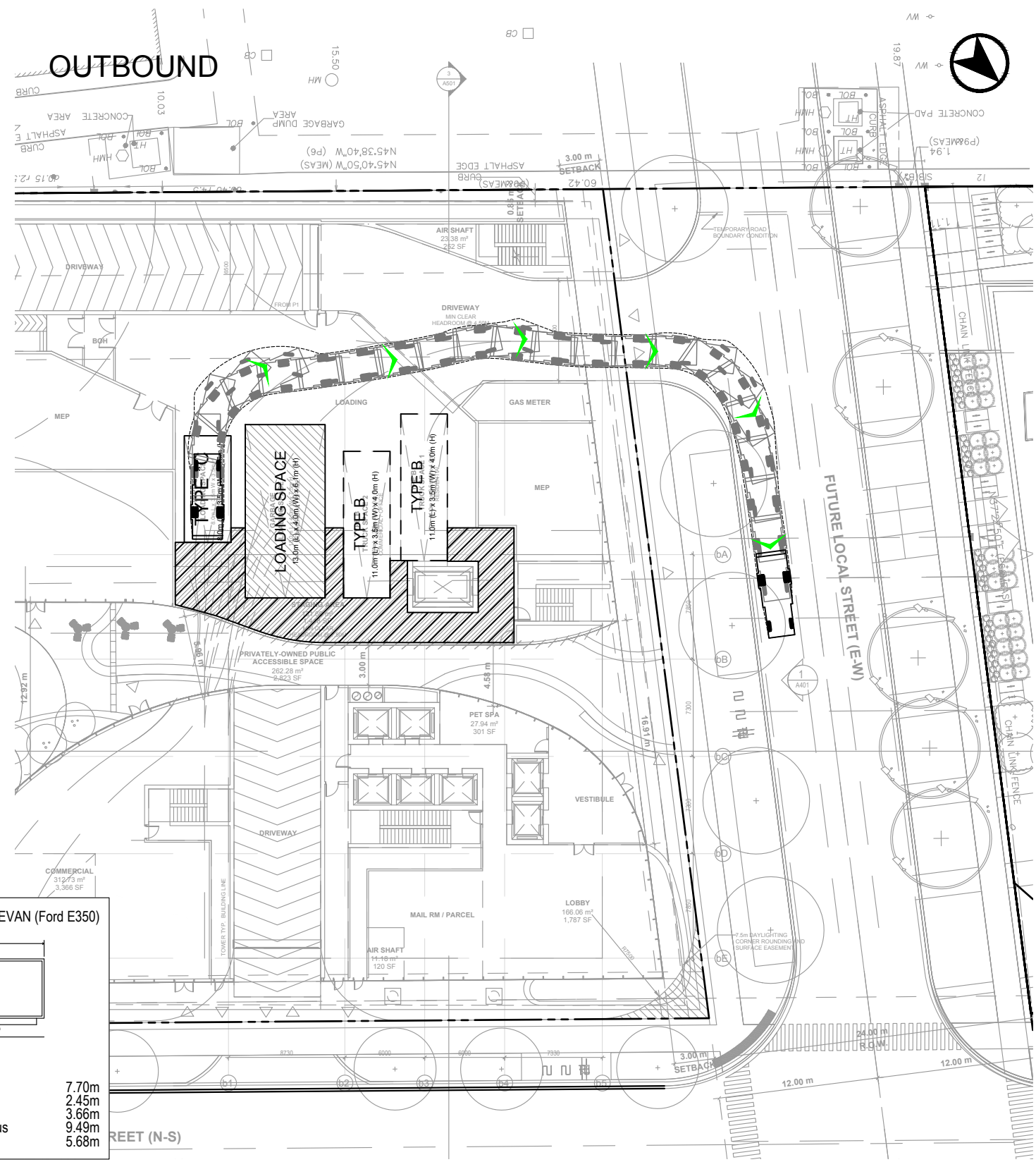
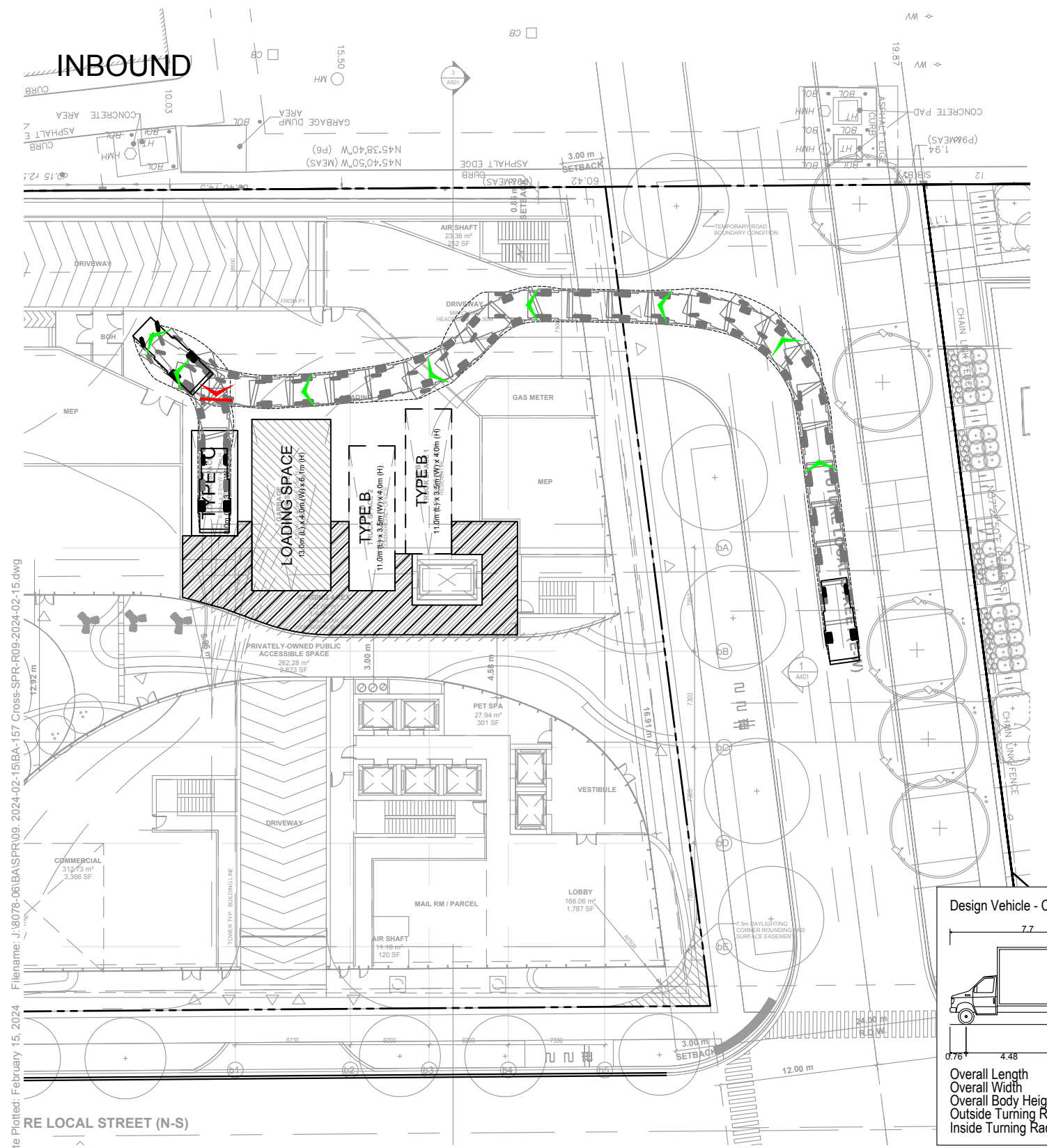


**157 CROSS AVENUE**  
 Vehicular Manoeuvring Diagram  
 TAC Heavy Single Unit Truck - Type B Space #1

Project: 157 CROSS  
 Project No. 8078-06  
 Date: October 02, 2023  
 Revised: February 15, 2024

Scale: 1:400

Drawing No. **VMD-04**



Date Plotted: February 15, 2024  
 Filename: J:\8078-06\BA\SPR09\_2024-02-15\BA-157 Cross-SPR-R09-2024-02-15.dwg



**157 CROSS AVENUE**  
 Vehicular Manoeuvring Diagram  
 Ford E350 Cube Van - Type C Space

Project: 157 CROSS  
 Project No: 8078-06  
 Date: October 02, 2023  
 Revised: February 15, 2024

Scale: 1:400

Drawing No. **VMD-05**

# Appendix F

## ITE Internal Capture Calculations





NCHRP 8-51 Internal Trip Capture Estimation Tool			
<b>Project Name:</b>	230490 - 157-167 Cross	<b>Organization:</b>	Paradigm Transportation Solutions Limited
<b>Project Location:</b>	Oakville, ON	<b>Performed By:</b>	
<b>Scenario Description:</b>		<b>Date:</b>	
<b>Analysis Year:</b>	Site Generated Traffic	<b>Checked By:</b>	
<b>Analysis Period:</b>	AM Street Peak Hour	<b>Date:</b>	

Table 1-A: Base Vehicle-Trip Generation Estimates (Single-Use Site Estimate)						
Land Use	Development Data (For Information Only)			Estimated Vehicle-Trips		
	ITE LUCs <sup>1</sup>	Quantity	Units	Total	Entering	Exiting
Office	710	15,209	Square Feet	13	11	2
Retail	822	24,783	Square Feet	59	35	24
Restaurant	-	-	-	0		
Cinema/Entertainment	-	-	-	0		
Residential	222	1,290	Dwelling Units	283	31	252
Hotel				0		
All Other Land Uses <sup>2</sup>						
<b>Total</b>				<b>355</b>	<b>77</b>	<b>278</b>

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 <sup>2</sup>						

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		1	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	355	77	278
Internal Capture Percentage	3%	6%	2%
External Vehicle-Trips <sup>3</sup>	345	72	273
External Transit-Trips <sup>4</sup>	0	0	0
External Non-Motorized Trips <sup>4</sup>	0	0	0

Table 6-A: Internal Trip Capture Percentages by Land Use		
Land Use	Entering Trips	Exiting Trips
Office	0%	50%
Retail	11%	4%
Restaurant	N/A	N/A
Cinema/Entertainment	N/A	N/A
Residential	3%	1%
Hotel	N/A	N/A

<sup>1</sup>Land Use Codes (LUCs) from *Trip Generation Informational Report*, published by the Institute of Transportation Engineers.

<sup>2</sup>Total estimate for all other land uses at mixed-use development site-not subject to internal trip capture computations in this estimator

<sup>3</sup>Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-A

<sup>4</sup>Person-Trips

\*Indicates computation that has been rounded to the nearest whole number.

*Estimation Tool Developed by the Texas Transportation Institute*

<b>Project Name:</b>	230490 - 157-167 Cross
<b>Analysis Period:</b>	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	11	11	1.00	2	2
Retail	1.00	35	35	1.00	24	24
Restaurant	1.00	0	0	1.00	0	0
Cinema/Entertainment	1.00	0	0	1.00	0	0
Residential	1.00	31	31	1.00	252	252
Hotel	1.00	0	0	1.00	0	0

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		1	1	0	0	0
Retail	7		3	0	3	0
Restaurant	0	0		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	5	3	50	0		0
Hotel	0	0	0	0	0	

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		11	0	0	0	0
Retail	0		0	0	1	0
Restaurant	2	3		0	2	0
Cinema/Entertainment	0	0	0		0	0
Residential	0	6	0	0		0
Hotel	0	1	0	0	0	

Destination Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles <sup>1</sup>	Transit <sup>2</sup>	Non-Motorized <sup>2</sup>
Office	0	11	11	11	0	0
Retail	4	31	35	31	0	0
Restaurant	0	0	0	0	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	1	30	31	30	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses <sup>3</sup>	0	0	0	0	0	0

Origin Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles <sup>1</sup>	Transit <sup>2</sup>	Non-Motorized <sup>2</sup>
Office	1	1	2	1	0	0
Retail	1	23	24	23	0	0
Restaurant	0	0	0	0	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	3	249	252	249	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses <sup>3</sup>	0	0	0	0	0	0

<sup>1</sup>Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-A  
<sup>2</sup>Person-Trips  
<sup>3</sup>Total 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			
<b>Project Name:</b>	230490 - 157-167 Cross	<b>Organization:</b>	Paradigm Transportation Solutions Limited
<b>Project Location:</b>	Oakville, ON	<b>Performed By:</b>	
<b>Scenario Description:</b>		<b>Date:</b>	
<b>Analysis Year:</b>	Site Generated Traffic	<b>Checked By:</b>	
<b>Analysis Period:</b>	PM Street Peak Hour	<b>Date:</b>	

Table 1-P: Base Vehicle-Trip Generation Estimates (Single-Use Site Estimate)						
Land Use	Development Data (For Information Only)			Estimated Vehicle-Trips		
	ITE LUCs <sup>1</sup>	Quantity	Units	Total	Entering	Exiting
Office	710	15,209	Square Feet	13	2	11
Retail	822	24,783	Square Feet	164	81	83
Restaurant	-	-	-	0		
Cinema/Entertainment	-	-	-	0		
Residential	222	1,290	Dwelling Units	245	169	76
Hotel				0		
All Other Land Uses <sup>2</sup>				0		
<b>Total</b>				<b>422</b>	<b>252</b>	<b>170</b>

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 <sup>2</sup>						

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		2	0	0	0	0
Retail	0		0	0	22	0
Restaurant	0	0		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	1	8	0	0		0
Hotel	0	0	0	0	0	

Table 5-P: Computations Summary			
	Total	Entering	Exiting
All Person-Trips	422	252	170
Internal Capture Percentage	16%	13%	19%
External Vehicle-Trips <sup>3</sup>	356	219	137
External Transit-Trips <sup>4</sup>	0	0	0
External Non-Motorized Trips <sup>4</sup>	0	0	0

Table 6-P: Internal Trip Capture Percentages by Land Use		
Land Use	Entering Trips	Exiting Trips
Office	50%	18%
Retail	12%	27%
Restaurant	N/A	N/A
Cinema/Entertainment	N/A	N/A
Residential	13%	12%
Hotel	N/A	N/A

<sup>1</sup>Land Use Codes (LUCs) from *Trip Generation Informational Report*, published by the Institute of Transportation Engineers.

<sup>2</sup>Total estimate for all other land uses at mixed-use development site-not subject to internal trip capture computations in this estimator

<sup>3</sup>Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-P

<sup>4</sup>Person-Trips

\*Indicates computation that has been rounded to the nearest whole number.

*Estimation Tool Developed by the Texas Transportation Institute*

<b>Project Name:</b>	230490 - 157-167 Cross
<b>Analysis Period:</b>	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	2	2	1.00	11	11
Retail	1.00	81	81	1.00	83	83
Restaurant	1.00	0	0	1.00	0	0
Cinema/Entertainment	1.00	0	0	1.00	0	0
Residential	1.00	169	169	1.00	76	76
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		2	0	0	0	0
Retail	2		24	3	22	4
Restaurant	0	0		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	3	32	16	0		2
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		6	0	0	7	0
Retail	1		0	0	78	0
Restaurant	1	41		0	27	0
Cinema/Entertainment	0	3	0		7	0
Residential	1	8	0	0		0
Hotel	0	2	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 <sup>1</sup>	Transit <sup>2</sup>	Non-Motorized <sup>2</sup>
Office	1	1	2	1	0	0
Retail	10	71	81	71	0	0
Restaurant	0	0	0	0	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	22	147	169	147	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses <sup>3</sup>	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 <sup>1</sup>	Transit <sup>2</sup>	Non-Motorized <sup>2</sup>
Office	2	9	11	9	0	0
Retail	22	61	83	61	0	0
Restaurant	0	0	0	0	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	9	67	76	67	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses <sup>3</sup>	0	0	0	0	0	0

<sup>1</sup>Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-P  
<sup>2</sup>Person-Trips  
<sup>3</sup>Total 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 G

## Synchro Analysis



Lanes, Volumes, Timings

1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd

Base Year

AM Peak Hour

	↖	→	↗	↙	←	↖	↙	↘	↗	↘	↖	↙
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		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

1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd

Base Year

AM Peak Hour

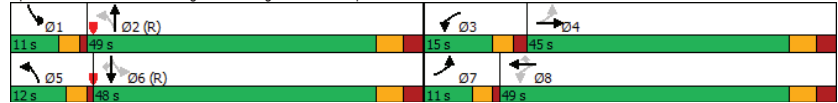
	↖	→	↗	↙	←	↖	↙	↘	↗	↘	↖	↙
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA	Free	pm+pt	NA	Perm	pm+pt	NA	Free	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		Free	8		8	2		Free	6		6
Detector Phase	7	4		3	8	8	5	2		1	6	6
Switch Phase												
Minimum Initial (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  
AM Peak Hour

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  
AM Peak Hour

Movement	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
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)	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	
<b>Intersection Summary</b>												
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

2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp

Base Year

AM Peak Hour

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	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	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

2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp

Base Year

AM Peak Hour

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			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	
<b>Intersection Summary</b>												
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											



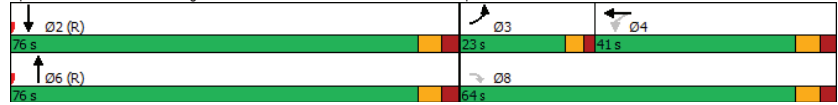
Lanes, Volumes, Timings

2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp

Base Year  
AM Peak Hour

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  
AM Peak Hour

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	
<b>Intersection Summary</b>												
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  
AM Peak Hour

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	

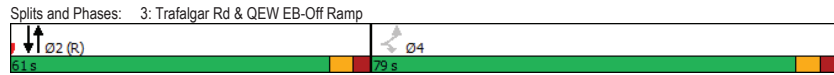
Lanes, Volumes, Timings  
3: Trafalgar Rd & QEW EB-Off Ramp

Base Year  
AM Peak Hour

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  
AM Peak Hour



HCM Signalized Intersection Capacity Analysis  
3: Trafalgar Rd & QEW EB-Off Ramp

Base Year  
AM Peak Hour

Movement	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
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)	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	
<b>Intersection Summary</b>						
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  
AM Peak Hour

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	
<b>Intersection Summary</b>						
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  
AM Peak Hour

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				
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>NB 1</b>	<b>NB 2</b>	<b>NB 3</b>	<b>SB 1</b>	<b>SB 2</b>	<b>SB 3</b>
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						
<b>Intersection Summary</b>							
Average Delay				0.1			
Intersection Capacity Utilization	53.1%		ICU Level of Service		A		
Analysis Period (min)	15						

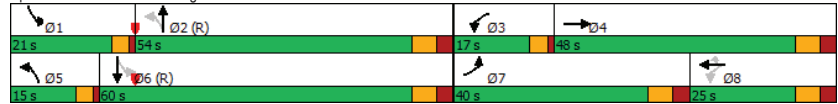


Lanes, Volumes, Timings  
5: Trafalgar Rd & Cross Ave/South Service Rd

Base Year  
AM Peak Hour

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.	

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  
AM Peak Hour

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	
<b>Intersection Summary</b>												
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  
AM Peak Hour

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	0	1	0	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
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2987	3055	0	1481	3154	1411	1540	2652	0	2929	1341	1356
Fit 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		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  
AM Peak Hour

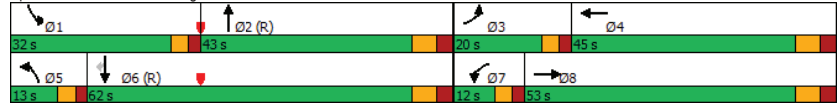
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0				0.0
Turn Type	Prot	NA		Prot	NA	Free	Prot	NA		Prot	NA	Perm
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases					Free							6
Detector Phase	3	8		7	4		5	2		1	6	6
Switch Phase												
Minimum Initial (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)	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		140.0	9.0	39.0		28.0	58.0
Actuated g/C Ratio	0.11	0.35		0.06	0.29		1.00	0.06	0.28		0.20	0.41
v/c Ratio	0.84	0.47		0.65	0.53		0.32	0.97	0.67		0.96	1.18
Control Delay	82.0	36.0		98.2	43.9		0.6	146.6	49.3		86.1	130.4
Queue Delay	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
LOS	F	D		F	D		A	F	D		F	F
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
Queue Length 95th (m)	#66.4	76.2		#37.9	81.4		0.0	#66.8	104.9		#117.9	#387.6
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)	341	1079		84	923		1384	99	745		585	555
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	0.84	0.47		0.65	0.53		0.32	0.97	0.67		0.96	1.18
<b>Intersection Summary</b>												
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  
AM Peak Hour

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  
AM Peak Hour

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	
<b>Intersection Summary</b>												
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												



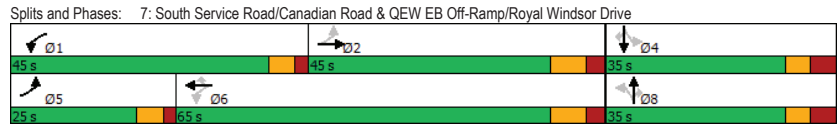
Lanes, Volumes, Timings  
7: South Service Road/Canadian Road & QEW EB Off-Ramp/Royal Windsor Drive Base Year  
AM Peak Hour

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	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 Base Year  
AM Peak Hour

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)	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%											
Analysis Period (min):	15											
Intersection LOS:	A											
ICU Level of Service:	A											

Lanes, Volumes, Timings  
 7: South Service Road/Canadian Road & QEW EB Off-Ramp/Royal Windsor Drive Base Year  
AM Peak Hour



HCM Signalized Intersection Capacity Analysis  
 7: South Service Road/Canadian Road & QEW EB Off-Ramp/Royal Windsor Drive Base Year  
AM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	↖	→	↘	↖	→	↘	↖	→	↘	↖	→	↘
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	0.92
Adj. Flow (vph)	41	510	28	84	502	7	2	8	47	3	17	26
RTOR Reduction (vph)	0	2	0	0	2	0	0	0	42	0	0	23
Lane Group Flow (vph)	41	536	0	84	502	5	2	8	5	3	17	3
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)	63.4	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	
<b>Intersection Summary</b>												
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  
AM Peak Hour

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	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	0.31			0.19	0.33	0.33

Lanes, Volumes, Timings  
8: QEW WB Off-Ramp & Kerr Street

Base Year  
AM Peak Hour

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

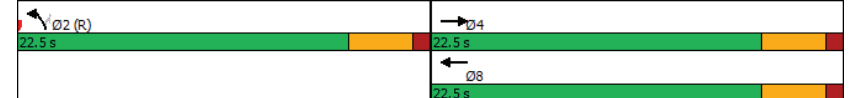
Intersection LOS: A

Intersection Capacity Utilization 33.3%

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

Base Year  
AM Peak Hour

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
Flt Protected	1.00			1.00	0.95	1.00
Satd. Flow (prot)	3539			3539	1770	1583
Flt 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	
<b>Intersection Summary</b>						
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  
AM Peak Hour

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				
Flt Protected	0.954					
Satd. Flow (prot)	3423	1441	3539	0	0	3539
Flt 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
<b>Two way Left Turn Lane</b>						
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
<b>Detector 1 Channel</b>						
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
<b>Detector 2 Channel</b>						
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  
AM Peak Hour

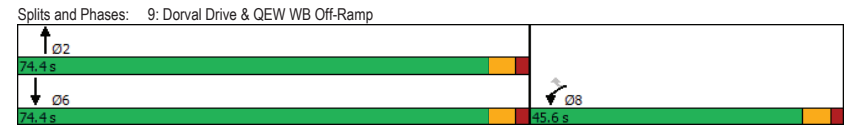
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Detector Phase	8	8	2			6
Switch Phase						
Minimum Initial (s)	10.0	10.0	20.0			20.0
Minimum Split (s)	24.0	24.0	26.0			26.0
Total Split (s)	45.6	45.6	74.4			74.4
Total Split (%)	38.0%	38.0%	62.0%			62.0%
Maximum Green (s)	39.6	39.6	68.4			68.4
Yellow Time (s)	4.0	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%
Intersection LOS:	C
ICU Level of Service:	C
Analysis Period (min):	15

Lanes, Volumes, Timings  
9: Dorval Drive & QEW WB Off-Ramp

Base Year  
AM Peak Hour



HCM Signalized Intersection Capacity Analysis  
9: Dorval Drive & QEWB Off-Ramp

Base Year  
AM Peak Hour

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	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 & QEWB Off-Ramp

Base Year  
AM Peak Hour

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	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  
AM Peak Hour

<b>Lane Group</b>	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%
Intersection LOS:	B
ICU Level of Service:	C
Analysis Period (min):	15

Lanes, Volumes, Timings  
10: Dorval Drive & QEW EB Off-Ramp

Base Year  
AM Peak Hour

Split 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  
AM Peak Hour

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	
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)	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  
AM Peak Hour

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						
Flt			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	
<b>Intersection Summary</b>						
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  
AM Peak Hour

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	
Grade		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			
<b>Intersection Summary</b>						
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  
AM Peak Hour

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	
<b>Intersection Summary</b>						
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  
AM Peak Hour

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			
cSH	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  
AM Peak Hour

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
Ft		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  
AM Peak Hour

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		1	6			8			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

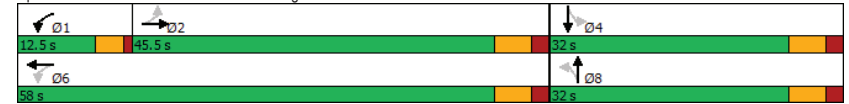
Area Type: CBD  
 Cycle Length: 90  
 Actuated Cycle Length: 69.4  
 Natural Cycle: 90  
 Control Type: Semi Act-Uncoord  
 Maximum v/c Ratio: 0.83  
 Intersection Signal Delay: 16.9  
 Intersection LOS: B

Lanes, Volumes, Timings  
13: GO Bus Terminal/Argus Rd & Cross Ave

Base Year  
AM Peak Hour

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  
AM Peak Hour

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	3.6	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	
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			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	
<b>Intersection Summary</b>												
HCM 2000 Control Delay		17.5										
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  
AM Peak Hour

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
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
<b>Shared Lane Traffic (%)</b>												
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	
<b>Two way Left Turn Lane</b>												
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	
<b>Detector 1 Channel</b>												
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	
<b>Detector 2 Channel</b>												

Lanes, Volumes, Timings  
14: Lyons Lane/Street A & Cross Ave

Base Year  
AM Peak Hour

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	4
Permitted Phases		2		6			8			4		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
<b>Intersection Summary</b>												
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  
AM Peak Hour

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

Base Year  
AM Peak Hour

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	
Frt	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  
AM Peak Hour

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			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%
Analysis Period (min)	15
	ICU Level of Service A

HCM Unsignalized Intersection Capacity Analysis  
15: Cross Ave & Lyons Lane

Base Year  
AM Peak Hour

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
<b>Intersection Summary</b>						
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  
AM Peak Hour

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	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

Base Year  
AM Peak Hour

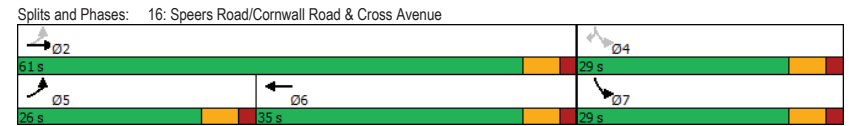
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Detector Phase	5	2	6		7	4
Switch Phase						
Minimum Initial (s)	6.0	25.0	25.0		6.0	6.0
Minimum Split (s)	12.0	35.0	35.0		29.0	29.0
Total Split (s)	26.0	61.0	35.0		29.0	29.0
Total Split (%)	28.9%	67.8%	38.9%		32.2%	32.2%
Maximum Green (s)	20.0	55.0	29.0		23.0	23.0
Yellow 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  
AM Peak Hour





HCM Signalized Intersection Capacity Analysis  
16: Speers Road/Cornwall Road & Cross Avenue

Base Year  
AM Peak Hour

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 <sub>t</sub>	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  
17: North Access & South Service Road

Base Year  
AM Peak Hour

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔			↔	↔	
Traffic Volume (vph)	0	0	0	0	0	0
Future Volume (vph)	0	0	0	0	0	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 <sub>t</sub>						
Fit Protected						
Satd. Flow (prot)	1863	0	0	1863	1863	0
Fit Permitted						
Satd. Flow (perm)	1863	0	0	1863	1863	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	0	0	0	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	0	0	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 0.0%	ICU Level of Service A
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis  
17: North Access & South Service Road

Base Year  
AM Peak Hour

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔			↔	↔	
Traffic Volume (veh/h)	0	0	0	0	0	0
Future Volume (Veh/h)	0	0	0	0	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	0	0	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None		None			
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			0		0	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			0		0	0
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			1623		1023	1085
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	0	0	0			
Volume Left	0	0	0			
Volume Right	0	0	0			
eSH	1700	1700	1700			
Volume to Capacity	0.00	0.00	0.00			
Queue Length 95th (m)	0.0	0.0	0.0			
Control Delay (s)	0.0	0.0	0.0			
Lane LOS			A			
Approach Delay (s)	0.0	0.0	0.0			
Approach LOS			A			
<b>Intersection Summary</b>						
Average Delay			0.0			
Intersection Capacity Utilization			0.0%		ICU Level of Service	A
Analysis Period (min)			15			

Lanes, Volumes, Timings  
18: Street C & East Access

Base Year  
AM Peak Hour

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔			↔	↔	
Traffic Volume (vph)	0	0	0	0	0	0
Future Volume (vph)	0	0	0	0	0	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
<b>Fr</b>						
Fit Protected						
Satd. Flow (prot)	1863	0	0	1863	1863	0
Fit Permitted						
Satd. Flow (perm)	1863	0	0	1863	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	0	0	0	0	0
<b>Shared Lane Traffic (%)</b>						
Lane Group Flow (vph)	0	0	0	0	0	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	
<b>Two way Left Turn Lane</b>						
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	
<b>Intersection Summary</b>						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	0.0%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis  
18: Street C & East Access

Base Year  
AM Peak Hour

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔			↕	↕	
Traffic Volume (veh/h)	0	0	0	0	0	0
Future Volume (Veh/h)	0	0	0	0	0	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	0	0	0	0	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None	None		
Median storage (veh)						
Upstream signal (m)			210			
pX, platoon unblocked						
vC, conflicting volume	0	0	0			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0	0	0			
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)	1023	1085	1623			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	0	0	0			
Volume Left	0	0	0			
Volume Right	0	0	0			
eSH	1700	1700	1700			
Volume to Capacity	0.00	0.00	0.00			
Queue Length 95th (m)	0.0	0.0	0.0			
Control Delay (s)	0.0	0.0	0.0			
Lane LOS	A					
Approach Delay (s)	0.0	0.0	0.0			
Approach LOS	A					
<b>Intersection Summary</b>						
Average Delay			0.0			
Intersection Capacity Utilization			0.0%	ICU Level of Service		A
Analysis Period (min)			15			

Lanes, Volumes, Timings  
19: Street C & South Service Road

Base Year  
AM Peak Hour

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔			↕	↕	
Traffic Volume (vph)	3	0	0	4	0	0
Future Volume (vph)	3	0	0	4	0	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
<b>Fr</b>						
Fit Protected						
Satd. Flow (prot)	1863	0	0	1863	1863	0
Fit Permitted						
Satd. Flow (perm)	1863	0	0	1863	1863	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)	3	0	0	4	0	0
<b>Shared Lane Traffic (%)</b>						
Lane Group Flow (vph)	3	0	0	4	0	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	
<b>Two way Left Turn Lane</b>						
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	
<b>Intersection Summary</b>						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	6.7%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis  
19: Street C & South Service Road

Base Year  
AM Peak Hour

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↘			↘	↗	
Traffic Volume (veh/h)	3	0	0	4	0	0
Future Volume (Veh/h)	3	0	0	4	0	0
Sign Control	Free		Free		Stop	
Grade	0%		0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	3	0	0	4	0	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None		None			
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			3	7	3	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			3	7	3	
tC, single (s)			4.1	6.4	6.2	
tC, 2 stage (s)						
tF (s)			2.2	3.5	3.3	
p0 queue free %			100	100	100	
cM capacity (veh/h)			1619	1014	1081	
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	3	4	0			
Volume Left	0	0	0			
Volume Right	0	0	0			
cSH	1700	1619	1700			
Volume to Capacity	0.00	0.00	0.00			
Queue Length 95th (m)	0.0	0.0	0.0			
Control Delay (s)	0.0	0.0	0.0			
Lane LOS				A		
Approach Delay (s)	0.0	0.0	0.0			
Approach LOS				A		
<b>Intersection Summary</b>						
Average Delay			0.0			
Intersection Capacity Utilization			6.7%	ICU Level of Service	A	
Analysis Period (min)			15			

Lanes, Volumes, Timings  
20: Street A & South Service Road

Base Year  
AM Peak Hour

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↘			↘	↗	
Traffic Volume (vph)	3	0	0	4	0	0
Future Volume (vph)	3	0	0	4	0	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
<b>Fr</b>						
Fit Protected						
Satd. Flow (prot)	1863	0	0	1863	1863	0
Fit Permitted						
Satd. Flow (perm)	1863	0	0	1863	1863	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)	3	0	0	4	0	0
<b>Shared Lane Traffic (%)</b>						
Lane Group Flow (vph)	3	0	0	4	0	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	
<b>Two way Left Turn Lane</b>						
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	
<b>Intersection Summary</b>						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	6.7%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis  
20: Street A & South Service Road

Base Year  
AM Peak Hour

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔			↔	↔	
Traffic Volume (veh/h)	3	0	0	4	0	0
Future Volume (Veh/h)	3	0	0	4	0	0
Sign Control	Free		Free		Stop	
Grade	0%		0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	3	0	0	4	0	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None		None			
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			3		7	3
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			3		7	3
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			1619		1014	1081
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	3	4	0			
Volume Left	0	0	0			
Volume Right	0	0	0			
eSH	1700	1619	1700			
Volume to Capacity	0.00	0.00	0.00			
Queue Length 95th (m)	0.0	0.0	0.0			
Control Delay (s)	0.0	0.0	0.0			
Lane LOS				A		
Approach Delay (s)	0.0	0.0	0.0			
Approach LOS				A		
<b>Intersection Summary</b>						
Average Delay			0.0			
Intersection Capacity Utilization			6.7%	ICU Level of Service	A	
Analysis Period (min)			15			

Lanes, Volumes, Timings  
21: Argus Rd & Street 1

Base Year  
AM Peak Hour

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔			↔	↔	
Traffic Volume (vph)	0	0	0	55	573	0
Future Volume (vph)	0	0	0	55	573	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 <sub>t</sub>						
Fit Protected						
Satd. Flow (prot)	1863	0	0	1863	1863	0
Fit Permitted						
Satd. Flow (perm)	1863	0	0	1863	1863	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	60	623	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	60	623	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	
<b>Intersection Summary</b>						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	33.5%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis  
21: Argus Rd & Street 1

Base Year  
AM Peak Hour

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔			↑	↑	
Traffic Volume (veh/h)	0	0	0	55	573	0
Future Volume (Veh/h)	0	0	0	55	573	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	0	0	60	623	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)				114		
pX, platoon unblocked						
vC, conflicting volume	683	623	623			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	683	623	623			
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)	415	486	958			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	0	60	623			
Volume Left	0	0	0			
Volume Right	0	0	0			
cSH	1700	958	1700			
Volume to Capacity	0.00	0.00	0.37			
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					
<b>Intersection Summary</b>						
Average Delay		0.0				
Intersection Capacity Utilization		33.5%		ICU Level of Service		A
Analysis Period (min)		15				

Lanes, Volumes, Timings  
22: Street C & Street 1

Base Year  
AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Future Volume (vph)	0	0	0	0	0	0	0	0	0	0	0	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
<b>Fit</b>												
Fit Protected												
Satd. Flow (prot)	0	1863	0	0	1863	0	0	1863	0	0	1863	0
Fit Permitted												
Satd. Flow (perm)	0	1863	0	0	1863	0	0	1863	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	0	0	0	0	0	0	0	0	0	0	0
<b>Shared Lane Traffic (%)</b>												
Lane Group Flow (vph)	0	0	0	0	0	0	0	0	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)		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	
<b>Two way Left Turn Lane</b>												
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	
<b>Intersection Summary</b>												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	0.0%						ICU Level of Service A					
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis  
22: Street C & Street 1

Base Year  
AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (veh/h)	0	0	0	0	0	0	0	0	0	0	0	0
Future Volume (Veh/h)	0	0	0	0	0	0	0	0	0	0	0	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	0	0	0	0	0	0	0	0	0	0	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None						None					
Median storage (veh)												
Upstream signal (m)	134											
pX, platoon unblocked												
vC, conflicting volume	0	0	0	0	0	0	0	0	0	0	0	0
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	0	0	0	0	0	0	0	0	0	0	0	0
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	100	100	100	100			100		
cM capacity (veh/h)	1023	896	1085	1023	896	1085	1623			1623		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	0	0	0	0								
Volume Left	0	0	0	0								
Volume Right	0	0	0	0								
eSH	1700	1700	1700	1700								
Volume to Capacity	0.00	0.00	0.00	0.00								
Queue Length 95th (m)	0.0	0.0	0.0	0.0								
Control Delay (s)	0.0	0.0	0.0	0.0								
Lane LOS	A	A										
Approach Delay (s)	0.0	0.0	0.0	0.0								
Approach LOS	A	A										
<b>Intersection Summary</b>												
Average Delay	0.0											
Intersection Capacity Utilization	0.0%			ICU Level of Service			A					
Analysis Period (min)	15											

Lanes, Volumes, Timings  
23: GO Station West Access/Street C & Cross Ave

Base Year  
AM Peak Hour

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			
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					0.653	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			
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	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	
Protected Phases					4	8		2		2		6	
Permitted Phases					4	8		2		6			

Lanes, Volumes, Timings

23: GO Station West Access/Street C & Cross Ave

Base Year

AM Peak Hour

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

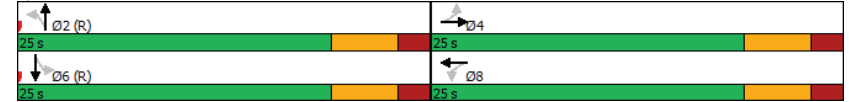
23: GO Station West Access/Street C & Cross Ave

Base Year

AM Peak Hour

- 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  
AM Peak Hour

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			
Frt		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				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							0.05			
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  
PM Peak Hour

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		
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	0.628			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

1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd

Base Year

PM Peak Hour

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

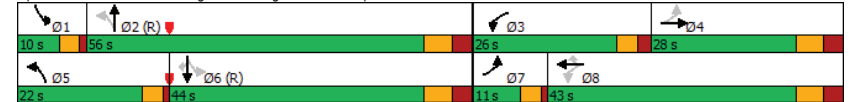
1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd

Base Year

PM Peak Hour


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  
PM Peak Hour



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			
<b>Intersection Summary</b>														
HCM 2000 Control Delay		41.1		HCM 2000 Level of Service								D		
HCM 2000 Volume to Capacity ratio		1.02												
Actuated Cycle Length (s)		120.0		Sum of lost time (s)								17.0		
Intersection Capacity Utilization		89.6%		ICU Level of Service								E		
Analysis Period (min)		15												
c Critical Lane Group														

Lanes, Volumes, Timings  
2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp

Base Year  
PM Peak Hour



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
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		
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	
<b>Two way Left Turn Lane</b>												
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
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	
<b>Detector 1 Channel</b>												
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	
<b>Detector 2 Channel</b>												

Lanes, Volumes, Timings

2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp

Base Year

PM Peak Hour

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

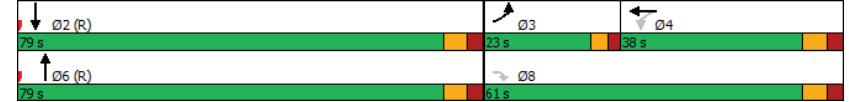
2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp

Base Year

PM Peak Hour

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  
 PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	[Diagrammatic 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	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	1550	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	1550	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)	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	Free	NA	NA	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	140.0	81.5	81.5	81.5
Effective Green, g (s)	9.1	47.5	34.4	34.4	140.0	84.5	140.0	84.5	140.0	84.5	84.5	84.5
Actuated g/C Ratio	0.06	0.34	0.25	0.25	1.00	0.60	1.00	0.60	1.00	0.60	1.00	0.60
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)	102	487	359	380	1391	2762	1400	2886	1400	2886	1400	2886
v/s Ratio Prot	0.01					0.52		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	0.86	0.34	0.76	0.76
Uniform Delay, d1	62.1	36.9	49.1	48.8	0.0	22.8	0.0	20.2	22.8	0.0	20.2	20.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	0.77	1.00	1.00	0.77	1.00	1.00	1.00
Incremental Delay, d2	1.1	0.8	9.9	7.8	0.4	2.6	0.4	1.9	2.6	0.4	1.9	1.9
Delay (s)	63.2	37.7	59.0	56.6	0.4	20.1	0.4	22.1	20.1	0.4	22.1	22.1
Level of Service	E	D	E	E	A	C	A	C	C	A	C	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  
 PM Peak Hour

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	[Diagrammatic 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		
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)	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	
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  
PM Peak Hour

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 Capacity Utilization:	71.2%
Intersection LOS:	C
ICU Level of Service:	C
Analysis Period (min):	15

Lanes, Volumes, Timings  
3: Trafalgar Rd & QEW EB-Off Ramp

Base Year  
PM Peak Hour

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

Base Year  
PM Peak Hour

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
Frbp, ped/bikes	1.00	0.99		1.00	1.00	1.00
Fipb, ped/bikes	1.00	1.00		1.00	1.00	1.00
Frt	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)	3046	1402		4577	4577	1454
Fit 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		

Lanes, Volumes, Timings  
4: Trafalgar Rd & Argus Rd

Base Year  
PM Peak Hour

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	
Fit Protected						
Satd. Flow (prot)	0	1354	0	4577	4460	0
Fit 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  
PM Peak Hour

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  
PM Peak Hour

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

5: Trafalgar Rd & Cross Ave/South Service Rd

Base Year

PM Peak Hour

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	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

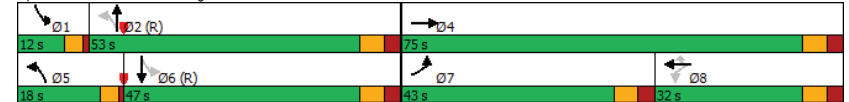
5: Trafalgar Rd & Cross Ave/South Service Rd

Base Year

PM Peak Hour

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  
PM Peak Hour

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	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	
Fpb, 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  
PM Peak Hour

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
Satd. Flow (RTOR)		8				293	7					292
Link Speed (k/h)		50			50		50			50		50
Link Distance (m)		285.8			142.3		311.4			130.3		130.3
Travel Time (s)		20.6			10.2		22.4			9.4		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			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

Base Year  
PM Peak Hour

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							
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

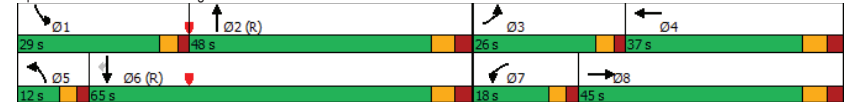
Area Type:	CBD
Cycle Length:	140
Actuated Cycle Length:	140
Offset:	0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green, Master Intersection
Natural Cycle:	130
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.99

Lanes, Volumes, Timings  
6: Trafalgar Rd & Cornwall Rd

Base Year  
PM Peak Hour

Intersection Signal Delay: 57.0	Intersection LOS: E
Intersection Capacity Utilization 92.6%	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  
PM Peak Hour

	←			→			↑			↓		
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
Frbp, ped/bikes	1.00	1.00		1.00	1.00	0.98	1.00	1.00		1.00	1.00	0.97
Ftpb, 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	0.99		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	3102		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	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  
PM Peak Hour

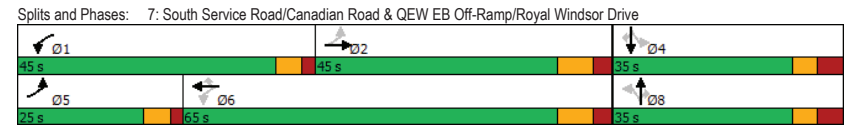
	←			→			↑			↓		
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	277	483	15	162	578	24	12	42	89	12	106	377
Future Volume (vph)	277	483	15	162	578	24	12	42	89	12	106	377
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	150.0	0.0	155.0	70.0	15.0		0.0	0.0		0.0	0.0	30.0
Storage Lanes	2	0	1	1	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		0.996				0.850		0.850			0.850	0.850
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3502	3398	0	1752	3505	1615	1805	1900	1615	1805	1900	1599
Fit Permitted	0.370			0.432			0.609			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	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 Base Year  
PM Peak Hour

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  
 7: South Service Road/Canadian Road & QEW EB Off-Ramp/Royal Windsor Drive Base Year  
PM Peak Hour



HCM Signalized Intersection Capacity Analysis  
 7: South Service Road/Canadian Road & QEW EB Off-Ramp/Royal Windsor Drive Base Year  
PM Peak Hour

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
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)	3502	3396		1752	3505	1615	1805	1900	1615	1805	1900	1599
Fit 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  
 8: QEW WB Off-Ramp & Kerr Street Base Year  
PM Peak Hour

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
Fit Protected					0.950	
Satd. Flow (prot)	3574	0	0	3574	1805	1599
Fit 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

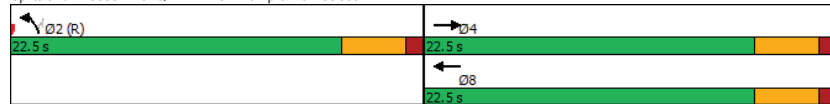
Lanes, Volumes, Timings  
8: QEWS WB Off-Ramp & Kerr Street

Base Year  
PM Peak Hour

	→	↘	↙	←	↖	↗
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: QEWS WB Off-Ramp & Kerr Street



HCM Signalized Intersection Capacity Analysis  
8: QEWS WB Off-Ramp & Kerr Street

Base Year  
PM Peak Hour

	→	↘	↙	←	↖	↗
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 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.31		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	32.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings  
9: Dorval Drive & QEWB WB Off-Ramp

Base Year  
PM Peak Hour

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 & QEWB WB Off-Ramp

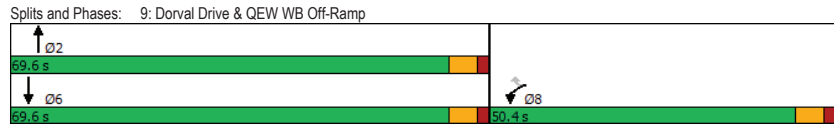
Base Year  
PM Peak Hour

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  
PM Peak Hour



HCM Signalized Intersection Capacity Analysis  
9: Dorval Drive & QEW WB Off-Ramp

Base Year  
PM Peak Hour

	↙	↖	↑	↗	↘	↓
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
<b>Intersection Summary</b>						
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  
PM Peak Hour

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
Frt	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  
PM Peak Hour

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  
PM Peak Hour

Splits and Phases: 10: Dorval Drive & QEW EB Off-Ramp

↑ Ø2 74.4 s	↘ Ø4 45.6 s
↓ Ø6 74.4 s	

HCM Signalized Intersection Capacity Analysis  
10: Dorval Drive & QEW EB Off-Ramp

Base Year  
PM Peak Hour

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	
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)	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, d1	35.5	34.5		5.2	5.1	
Progression Factor	1.00	1.00		1.00	1.00	
Incremental Delay, d2	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	
<b>Intersection Summary</b>						
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  
PM Peak Hour

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  
PM Peak Hour

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  
PM Peak Hour

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	
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	
<b>Intersection Summary</b>						
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  
PM Peak Hour

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
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>WB 1</b>	<b>SB 1</b>			
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			
<b>Intersection Summary</b>						
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  
PM Peak Hour

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	0.0	15.0	0.0	0.0	0.0
Storage Lanes	1	0	1	0	0	1	0	1	0	1	0	0
Taper Length (m)	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	0.99	0.97	0.98	0.98	0.98	0.98
Frt	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997
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	3180	0	797	3184	0	785	707	0	1570	1287	0
Flt Permitted	0.502	0.502	0.502	0.177	0.177	0.502	0.607	0.607	0.502	0.723	0.723	0.502
Satd. Flow (perm)	822	3180	0	148	3184	0	496	707	0	1169	1287	0
Right Turn on Red			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  
PM Peak Hour

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			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	
Pedestrian Calls (#/hr)	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  
PM Peak Hour

Intersection Capacity Utilization 57.6%  
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

Base Year  
PM Peak Hour

Movement	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	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	
<b>Intersection Summary</b>												
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  
PM Peak Hour

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	0.98	1.00	1.00	0.99	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  
PM Peak Hour

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		1	6			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	
Pedestrian Calls (#/hr)	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-Uncoord												
Maximum v/c Ratio: 0.72												
Intersection Signal Delay: 15.8												
Intersection LOS: B												



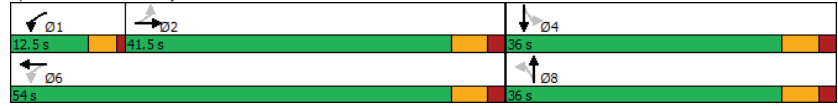
Lanes, Volumes, Timings  
14: Lyons Lane/Street A & Cross Ave

Base Year  
PM Peak Hour

Intersection Capacity Utilization 62.8%  
Analysis Period (min) 15

ICU Level of Service B

Splits and Phases: 14: Lyons Lane/Street A & Cross Ave



HCM Signalized Intersection Capacity Analysis  
14: Lyons Lane/Street A & Cross Ave

Base Year  
PM Peak Hour

Movement	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	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					
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	
<b>Intersection Summary</b>												
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  
PM Peak Hour

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%
Analysis Period (min)	15
	ICU Level of Service A

HCM Unsignalized Intersection Capacity Analysis  
15: Cross Ave & Lyons Lane

Base Year  
PM Peak Hour

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	
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	0.96				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%
Analysis Period (min)	15
	ICU Level of Service A

Lanes, Volumes, Timings  
16: Speers Road/Cornwall Road & Cross Avenue

Base Year  
PM Peak Hour

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  
PM Peak Hour

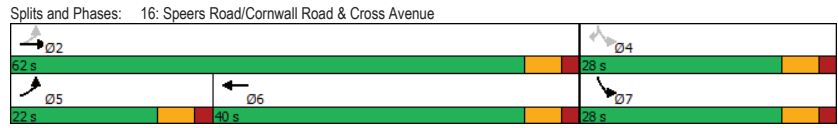
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Detector Phase	5	2	6		7	4
Switch Phase						
Minimum Initial (s)	6.0	5.0	5.0		5.0	5.0
Minimum Split (s)	12.0	33.5	33.5		27.5	27.5
Total Split (s)	22.0	62.0	40.0		28.0	28.0
Total Split (%)	24.4%	68.9%	44.4%		31.1%	31.1%
Maximum Green (s)	16.0	56.0	34.0		22.0	22.0
Yellow 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  
PM Peak Hour



HCM Signalized Intersection Capacity Analysis  
16: Speers Road/Cornwall Road & Cross Avenue

Base Year  
PM Peak Hour

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	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	
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		
<b>Intersection Summary</b>						
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  
17: North Access & South Service Road

Base Year  
PM Peak Hour

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↘			↘	↗	
Traffic Volume (vph)	0	0	0	0	0	0
Future Volume (vph)	0	0	0	0	0	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
<b>Fit</b>						
<b>Fit Protected</b>						
Satd. Flow (prot)	1863	0	0	1863	1863	0
<b>Fit Permitted</b>						
Satd. Flow (perm)	1863	0	0	1863	1863	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	0	0	0	0	0
<b>Shared Lane Traffic (%)</b>						
Lane Group Flow (vph)	0	0	0	0	0	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	
<b>Two way Left Turn Lane</b>						
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	

<b>Intersection Summary</b>	
Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	0.0% ICU Level of Service A
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis  
17: North Access & South Service Road

Base Year  
PM Peak Hour

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↘			↘	↗	
Traffic Volume (veh/h)	0	0	0	0	0	0
Future Volume (Veh/h)	0	0	0	0	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	0	0	0
<b>Pedestrians</b>						
<b>Lane Width (m)</b>						
<b>Walking Speed (m/s)</b>						
<b>Percent Blockage</b>						
<b>Right turn flare (veh)</b>						
<b>Median type</b>						
Median storage (veh)	None			None		
<b>Upstream signal (m)</b>						
<b>pX, platoon unblocked</b>						
vC, conflicting volume			0		0	0
<b>vC1, stage 1 conf vol</b>						
<b>vC2, stage 2 conf vol</b>						
vCu, unblocked vol			0		0	0
tC, single (s)			4.1		6.4	6.2
<b>tC, 2 stage (s)</b>						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			1623		1023	1085

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

<b>Intersection Summary</b>			
Average Delay		0.0	
Intersection Capacity Utilization	0.0%	ICU Level of Service	A
Analysis Period (min)	15		

Lanes, Volumes, Timings  
18: Street C & East Access

Base Year  
PM Peak Hour

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	0	0	0	0
Future Volume (vph)	0	0	0	0	0	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
<b>Fit</b>						
<b>Fit Protected</b>						
Satd. Flow (prot)	1863	0	0	1863	1863	0
<b>Fit Permitted</b>						
Satd. Flow (perm)	1863	0	0	1863	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	0	0	0	0	0
<b>Shared Lane Traffic (%)</b>						
Lane Group Flow (vph)	0	0	0	0	0	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	
<b>Two way Left Turn Lane</b>						
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	
<b>Intersection Summary</b>						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	0.0%				ICU Level of Service A	
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis  
18: Street C & East Access

Base Year  
PM Peak Hour

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	0	0	0	0
Future Volume (Veh/h)	0	0	0	0	0	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	0	0	0	0	0
<b>Pedestrians</b>						
<b>Lane Width (m)</b>						
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	0	0	0			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0	0	0			
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)	1023	1085	1623			
<b>Direction, Lane #</b>						
Volume Total	0	0	0			
Volume Left	0	0	0			
Volume Right	0	0	0			
eSH	1700	1700	1700			
Volume to Capacity	0.00	0.00	0.00			
Queue Length 95th (m)	0.0	0.0	0.0			
Control Delay (s)	0.0	0.0	0.0			
Lane LOS	A					
Approach Delay (s)	0.0	0.0	0.0			
Approach LOS	A					
<b>Intersection Summary</b>						
Average Delay			0.0			
Intersection Capacity Utilization	0.0%		ICU Level of Service		A	
Analysis Period (min)	15					

Lanes, Volumes, Timings  
19: Street C & South Service Road

Base Year  
PM Peak Hour

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↘			↘	↗	
Traffic Volume (vph)	9	0	0	18	0	0
Future Volume (vph)	9	0	0	18	0	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
<b>Fit</b>						
Fit Protected						
Satd. Flow (prot)	1863	0	0	1863	1863	0
Fit Permitted						
Satd. Flow (perm)	1863	0	0	1863	1863	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)	10	0	0	20	0	0
<b>Shared Lane Traffic (%)</b>						
Lane Group Flow (vph)	10	0	0	20	0	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	
<b>Two way Left Turn Lane</b>						
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	
<b>Intersection Summary</b>						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	6.7%			ICU Level of Service A		
Analysis Period (min)	15					

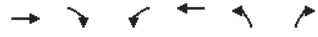
HCM Unsignalized Intersection Capacity Analysis  
19: Street C & South Service Road

Base Year  
PM Peak Hour

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↘			↘	↗	
Traffic Volume (veh/h)	9	0	0	18	0	0
Future Volume (Veh/h)	9	0	0	18	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	10	0	0	20	0	0
<b>Pedestrians</b>						
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		30	10
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			10		30	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		100	100
cM capacity (veh/h)			1610		984	1071
<b>Direction, Lane #</b>						
	EB 1	WB 1	NB 1			
Volume Total	10	20	0			
Volume Left	0	0	0			
Volume Right	0	0	0			
eSH	1700	1610	1700			
Volume to Capacity	0.01	0.00	0.00			
Queue Length 95th (m)	0.0	0.0	0.0			
Control Delay (s)	0.0	0.0	0.0			
Lane LOS			A			
Approach Delay (s)	0.0	0.0	0.0			
Approach LOS			A			
<b>Intersection Summary</b>						
Average Delay			0.0			
Intersection Capacity Utilization			6.7%		ICU Level of Service	A
Analysis Period (min)			15			


Lanes, Volumes, Timings  
20: Street A & South Service Road

Base Year  
PM Peak Hour

						
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔	↘	↙	↔	↙	↘
Traffic Volume (vph)	9	0	0	18	0	0
Future Volume (vph)	9	0	0	18	0	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
<b>Fit</b>						
<b>Fit Protected</b>						
Satd. Flow (prot)	1863	0	0	1863	1863	0
<b>Fit Permitted</b>						
Satd. Flow (perm)	1863	0	0	1863	1863	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)	10	0	0	20	0	0
<b>Shared Lane Traffic (%)</b>						
Lane Group Flow (vph)	10	0	0	20	0	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	
<b>Two way Left Turn Lane</b>						
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	
<b>Intersection Summary</b>						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	6.7%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis  
20: Street A & South Service Road

Base Year  
PM Peak Hour

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔	↘	↙	↔	↙	↘
Traffic Volume (veh/h)	9	0	0	18	0	0
Future Volume (Veh/h)	9	0	0	18	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	10	0	0	20	0	0
<b>Pedestrians</b>						
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		30	10
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			10		30	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		100	100
cM capacity (veh/h)			1610		984	1071
<b>Direction, Lane #</b>						
	EB 1	WB 1	NB 1			
Volume Total	10	20	0			
Volume Left	0	0	0			
Volume Right	0	0	0			
eSH	1700	1610	1700			
Volume to Capacity	0.01	0.00	0.00			
Queue Length 95th (m)	0.0	0.0	0.0			
Control Delay (s)	0.0	0.0	0.0			
Lane LOS					A	
Approach Delay (s)	0.0	0.0	0.0			
Approach LOS					A	
<b>Intersection Summary</b>						
Average Delay			0.0			
Intersection Capacity Utilization			6.7%		ICU Level of Service	A
Analysis Period (min)			15			



Lanes, Volumes, Timings  
21: Argus Rd & Street 1

Base Year  
PM Peak Hour

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	0	58	295	0
Future Volume (vph)	0	0	0	58	295	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
<b>Fit</b>						
<b>Fit Protected</b>						
Satd. Flow (prot)	1863	0	0	1863	1863	0
<b>Fit Permitted</b>						
Satd. Flow (perm)	1863	0	0	1863	1863	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	63	321	0
<b>Shared Lane Traffic (%)</b>						
Lane Group Flow (vph)	0	0	0	63	321	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	
<b>Two way Left Turn Lane</b>						
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	
<b>Intersection Summary</b>						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	18.9%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis  
21: Argus Rd & Street 1

Base Year  
PM Peak Hour

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	0	58	295	0
Future Volume (Veh/h)	0	0	0	58	295	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	0	0	63	321	0
<b>Pedestrians</b>						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)				116		
<b>pX, platoon unblocked</b>						
vC, conflicting volume	384	321	321			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	384	321	321			
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)	619	720	1239			
<b>Direction, Lane #</b>						
Volume Total	0	63	321			
Volume Left	0	0	0			
Volume Right	0	0	0			
eSH	1700	1239	1700			
Volume to Capacity	0.00	0.00	0.19			
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					
<b>Intersection Summary</b>						
Average Delay			0.0			
Intersection Capacity Utilization			18.9%		ICU Level of Service	A
Analysis Period (min)			15			

Lanes, Volumes, Timings  
22: Street C & Street 1

Base Year  
PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔				↔
Traffic Volume (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Future Volume (vph)	0	0	0	0	0	0	0	0	0	0	0	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
Fit												
Fit Protected												
Satd. Flow (prot)	0	1863	0	0	1863	0	0	1863	0	0	1863	0
Fit Permitted												
Satd. Flow (perm)	0	1863	0	0	1863	0	0	1863	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	0	0	0	0	0	0	0	0	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	0	0	0	0	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	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	
Sign Control	Stop		Stop		Free		Free					
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	0.0%		ICU Level of Service A									
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis  
22: Street C & Street 1

Base Year  
PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔				↔
Traffic Volume (veh/h)	0	0	0	0	0	0	0	0	0	0	0	0
Future Volume (Veh/h)	0	0	0	0	0	0	0	0	0	0	0	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	0	0	0	0	0	0	0	0	0	0	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (m)							133					
pX, platoon unblocked												
vC, conflicting volume	0	0	0	0	0	0	0	0	0	0	0	0
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	0	0	0	0	0	0	0	0	0	0	0	0
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	100	100	100	100			100		
cM capacity (veh/h)	1023	896	1085	1023	896	1085	1623			1623		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	0	0	0	0								
Volume Left	0	0	0	0								
Volume Right	0	0	0	0								
eSH	1700	1700	1700	1700								
Volume to Capacity	0.00	0.00	0.00	0.00								
Queue Length 95th (m)	0.0	0.0	0.0	0.0								
Control Delay (s)	0.0	0.0	0.0	0.0								
Lane LOS	A	A										
Approach Delay (s)	0.0	0.0	0.0	0.0								
Approach LOS	A	A										
Intersection Summary												
Average Delay				0.0								
Intersection Capacity Utilization	0.0%		ICU Level of Service A									
Analysis Period (min)				15								

Lanes, Volumes, Timings  
23: GO Station West Access/Street C & Cross Ave

Base Year  
PM Peak Hour

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	15.0		0.0
Storage Lanes	0		0	0		0	1		0	1		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	0.986						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	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	

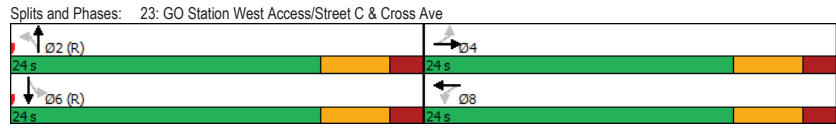
Lanes, Volumes, Timings  
23: GO Station West Access/Street C & Cross Ave

Base Year  
PM Peak Hour

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 LOS: B						
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.											

Lanes, Volumes, Timings  
23: GO Station West Access/Street C & Cross Ave

Base Year  
PM Peak Hour



HCM Signalized Intersection Capacity Analysis  
23: GO Station West Access/Street C & Cross Ave

Base Year  
PM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement												
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	
<b>Intersection Summary</b>												
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

1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd

Background 2027

AM Peak Hour

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		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			0.083			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)			220			189		681				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	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		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

Background 2027

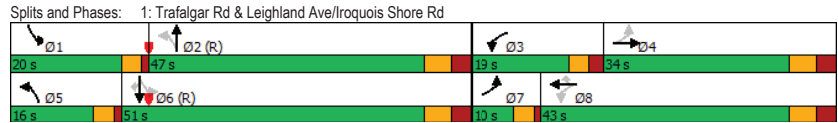
AM Peak Hour

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		6	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	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		25.0	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:SBT, 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

Background 2027  
AM Peak Hour

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.




HCM Signalized Intersection Capacity Analysis  
1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd

Background 2027  
AM Peak Hour


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
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	0.22	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	
<b>Intersection Summary</b>												
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 Background 2027  
 2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp AM Peak Hour



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
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	
Detector 2 Size(m)								0.6			0.6	
Detector 2 Type								Cl+Ex			Cl+Ex	
Detector 2 Channel												

Lanes, Volumes, Timings Background 2027  
 2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp AM Peak Hour



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)												0.0
Turn Type	Prot		Perm	Perm				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		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
Actuated g/C Ratio	0.06		0.31	0.22	0.22	1.00					0.63	1.00
v/c Ratio	0.02		0.36	0.74	0.74	0.18					0.59	0.28
Control Delay	63.0		30.9	64.0	63.4	0.3					13.3	0.4
Queue Delay	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
LOS	E		C	E	E	A					B	A
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
Queue Length 95th (m)	3.7		45.4	92.6	93.1	0.0					111.0	0.0
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
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	0.01		0.27	0.63	0.62	0.18					0.59	0.28

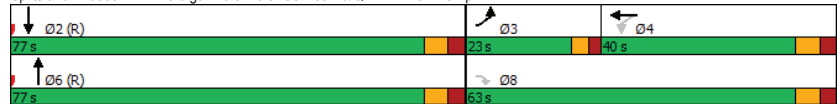
Intersection Summary	
Area Type:	CBD
Cycle Length:	140
Actuated Cycle Length:	140
Offset:	115.4 (82%), Referenced to phase 2:SBT and 6:NBT, Start of Green
Natural Cycle:	110
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.74

Lanes, Volumes, Timings  
2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp

Background 2027  
AM Peak Hour

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

Background 2027  
AM Peak Hour

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	
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	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	
<b>Intersection Summary</b>												
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

Background 2027  
AM Peak Hour

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
Flt Protected	0.950					0.850
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	

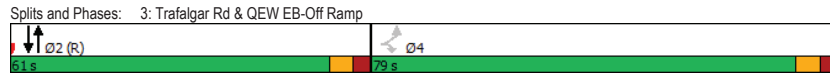
Lanes, Volumes, Timings  
3: Trafalgar Rd & QEW EB-Off Ramp

Background 2027  
AM Peak Hour

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

Background 2027  
AM Peak Hour



HCM Signalized Intersection Capacity Analysis  
3: Trafalgar Rd & QEW EB-Off Ramp

Background 2027  
AM Peak Hour

	EBL	EBR	NBL	NBT	SBT	SBR
Movement	↔	↔	↔	↑	↓	↔
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
Frt	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)	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, d1	22.2	30.9		32.6	37.4	0.0
Progression Factor	1.00	1.00		1.01	0.74	1.00
Incremental Delay, d2	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	
<b>Intersection Summary</b>						
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

Background 2027  
AM Peak Hour

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	
<b>Intersection Summary</b>						
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

Background 2027  
AM Peak Hour

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				
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>NB 1</b>	<b>NB 2</b>	<b>NB 3</b>	<b>SB 1</b>	<b>SB 2</b>	<b>SB 3</b>
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						
<b>Intersection Summary</b>							
Average Delay			0.1				
Intersection Capacity Utilization	57.6%		ICU Level of Service		B		
Analysis Period (min)	15						

Lanes, Volumes, Timings

5: Trafalgar Rd & Cross Ave/South Service Rd

Background 2027

AM Peak Hour

	↖	→	↘	↙	←	↖	↙	↘	↙	↘	↙	↘
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	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		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	
Satd. Flow (RTOR)		89				179		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)	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)	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	
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

5: Trafalgar Rd & Cross Ave/South Service Rd

Background 2027

AM Peak Hour

	↖	→	↘	↙	←	↖	↙	↘	↙	↘	↙	↘
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	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)	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	
<b>Intersection Summary</b>												
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

Background 2027  
AM Peak Hour

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

Background 2027  
AM Peak Hour

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	
<b>Intersection Summary</b>												
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

Background 2027  
AM Peak Hour

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	80.0	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	0.99		0.98	1.00	1.00	0.98	0.98		0.98
Frt	0.979				0.850		0.982			0.850		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

Background 2027  
AM Peak Hour

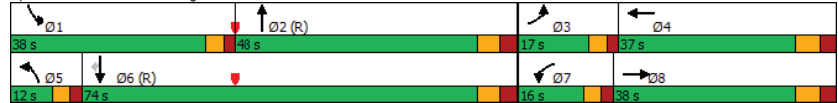
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA	Free	Prot	NA		Prot	NA	Perm
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases					Free							6
Detector Phase	3	8		7	4		5	2		1	6	6
Switch Phase												
Minimum Initial (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)	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
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

Background 2027  
AM Peak Hour

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

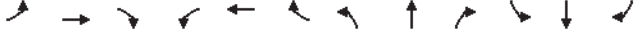


HCM Signalized Intersection Capacity Analysis  
6: Trafalgar Rd & Cornwall Rd

Background 2027  
AM Peak Hour


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		
<b>Intersection Summary</b>												
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 Background 2027  
 7: South Service Road/Canadian Road & QEW EB Off-Ramp/Royal Windsor Drive AM Peak Hour



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	0.0	0.0	0.0	0.0	30.0
Storage Lanes	2	0	1	1	1	1	1	1	1	1	1	1
Taper Length (m)	7.5		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	1.00	1.00	1.00	1.00	1.00
Fr		0.992			0.850		0.850		0.850			0.850
Fit Protected	0.950		0.950	0.950		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		Yes	
Satd. Flow (RTOR)		5			94			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			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
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	

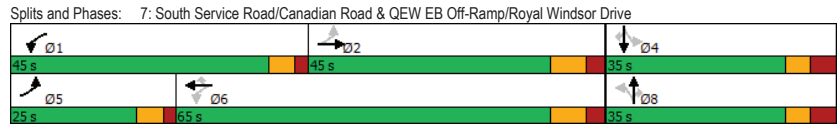
Lanes, Volumes, Timings Background 2027  
 7: South Service Road/Canadian Road & QEW EB Off-Ramp/Royal Windsor Drive AM Peak Hour



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%											
Analysis Period (min):	15											
Intersection LOS:	A											
ICU Level of Service:	A											



Lanes, Volumes, Timings Background 2027  
 7: South Service Road/Canadian Road & QEW EB Off-Ramp/Royal Windsor Drive AM Peak Hour



HCM Signalized Intersection Capacity Analysis Background 2027  
 7: South Service Road/Canadian Road & QEW EB Off-Ramp/Royal Windsor Drive AM Peak Hour

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
<b>Intersection Summary</b>												
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

Background 2027  
AM Peak Hour

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

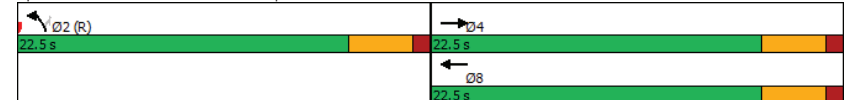
Lanes, Volumes, Timings  
8: QEW WB Off-Ramp & Kerr Street

Background 2027  
AM Peak Hour

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%
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

Background 2027  
AM Peak Hour

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 <sub>t</sub>	1.00			1.00	1.00	0.85
Fl <sub>t</sub> Protected	1.00			1.00	0.95	1.00
Satd. Flow (prot)	3539			3539	1770	1583
Fl <sub>t</sub> 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	
<b>Intersection Summary</b>						
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

Background 2027  
AM Peak Hour

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 <sub>t</sub>	0.993	0.850				
Fl <sub>t</sub> Protected	0.954					
Satd. Flow (prot)	3423	1441	3539	0	0	3539
Fl <sub>t</sub> 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
<b>Two way Left Turn Lane</b>						
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
<b>Detector 1 Channel</b>						
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
<b>Detector 2 Channel</b>						
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

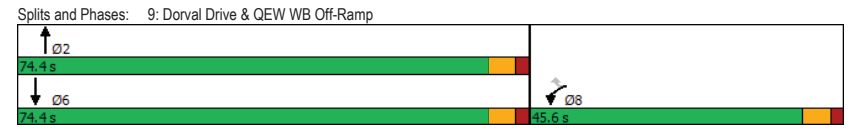
Background 2027  
AM Peak Hour

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

Background 2027  
AM Peak Hour



HCM Signalized Intersection Capacity Analysis  
9: Dorval Drive & QEWB WB Off-Ramp

Background 2027  
AM Peak Hour

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'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)	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

Background 2027  
AM Peak Hour

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't	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

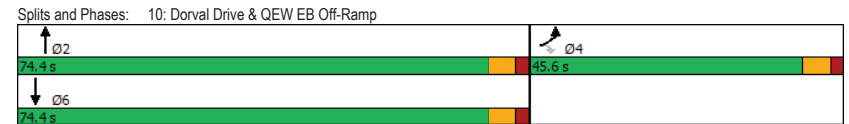
Background 2027  
AM Peak Hour

<b>Lane Group</b>	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	

<b>Intersection Summary</b>	
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%
Intersection LOS:	B
ICU Level of Service:	C
Analysis Period (min):	15

Lanes, Volumes, Timings  
10: Dorval Drive & QEW EB Off-Ramp

Background 2027  
AM Peak Hour



HCM Signalized Intersection Capacity Analysis  
10: Dorval Drive & QEW EB Off-Ramp

Background 2027  
AM Peak Hour

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	
Fr't	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

Background 2027  
AM Peak Hour

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						
Fr't			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	
<b>Intersection Summary</b>						
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

Background 2027  
AM Peak Hour

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	
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	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
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>WB 1</b>	<b>SB 1</b>			
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			
<b>Intersection Summary</b>						
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

Background 2027  
AM Peak Hour

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	
<b>Intersection Summary</b>						
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

Background 2027  
AM Peak Hour

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			
<b>Intersection Summary</b>						
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

Background 2027  
AM Peak Hour

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
Ft		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

Background 2027  
AM Peak Hour

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

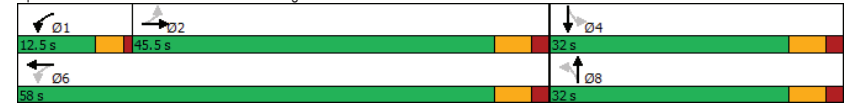
Area Type: CBD  
 Cycle Length: 90  
 Actuated Cycle Length: 72.7  
 Natural Cycle: 90  
 Control Type: Semi Act-Uncoord  
 Maximum v/c Ratio: 0.91  
 Intersection Signal Delay: 21.4      Intersection LOS: C

Lanes, Volumes, Timings  
13: GO Bus Terminal/Argus Rd & Cross Ave

Background 2027  
AM Peak Hour

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

Background 2027  
AM Peak Hour

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	3.6	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	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			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	
<b>Intersection Summary</b>												
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

Background 2027  
AM Peak Hour

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
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

Background 2027  
AM Peak Hour

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		1	6		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)	41.0	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

Background 2027  
AM Peak Hour

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

Background 2027  
AM Peak Hour

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	3.6	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	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

Background 2027  
AM Peak Hour

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%	ICU Level of Service A
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis  
15: Cross Ave & Lyons Lane

Background 2027  
AM Peak Hour

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
<b>Intersection Summary</b>						
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

Background 2027  
AM Peak Hour

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

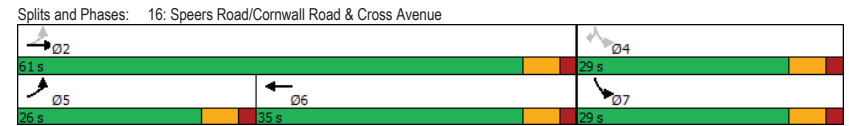
Background 2027  
AM Peak Hour

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

Background 2027  
AM Peak Hour



HCM Signalized Intersection Capacity Analysis  
16: Speers Road/Cornwall Road & Cross Avenue

Background 2027  
AM Peak Hour



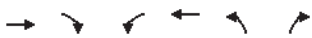
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↕	↕		↕	↕
Traffic Volume (vph)	211	662	614	23	6	253
Future Volume (vph)	211	662	614	23	6	253
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0		6.0	6.0
Lane Util. Factor	1.00	0.95	0.95		1.00	0.88
Fr <sub>t</sub>	1.00	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  
17: Driveway A & Street 1

Background 2027  
AM Peak Hour



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔			↕	↕	
Traffic Volume (vph)	0	0	0	0	0	0
Future Volume (vph)	0	0	0	0	0	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 <sub>t</sub>						
Fit Protected						
Satd. Flow (prot)	1863	0	0	1863	1863	0
Fit Permitted						
Satd. Flow (perm)	1863	0	0	1863	1863	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	38.1			83.6	48.0	
Travel Time (s)	2.7			6.0	3.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	0	0	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 0.0%	ICU Level of Service A
Analysis Period (min)	15



HCM Unsignalized Intersection Capacity Analysis  
17: Driveway A & Street 1

Background 2027  
AM Peak Hour

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔			↔	↔	
Traffic Volume (veh/h)	0	0	0	0	0	0
Future Volume (Veh/h)	0	0	0	0	0	0
Sign Control	Free		Free		Stop	
Grade	0%		0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	0	0	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None		None			
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			0		0	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			0		0	0
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			1623		1023	1085
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	0	0	0			
Volume Left	0	0	0			
Volume Right	0	0	0			
eSH	1700	1700	1700			
Volume to Capacity	0.00	0.00	0.00			
Queue Length 95th (m)	0.0	0.0	0.0			
Control Delay (s)	0.0	0.0	0.0			
Lane LOS				A		
Approach Delay (s)	0.0	0.0	0.0			
Approach LOS				A		
<b>Intersection Summary</b>						
Average Delay			0.0			
Intersection Capacity Utilization			0.0%	ICU Level of Service	A	
Analysis Period (min)			15			

Lanes, Volumes, Timings  
18: Street C & Driveway B

Background 2027  
AM Peak Hour

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔			↔	↔	
Traffic Volume (vph)	0	0	0	0	0	0
Future Volume (vph)	0	0	0	0	0	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
<b>Fr</b>						
Fit Protected						
Satd. Flow (prot)	1863	0	0	1863	1863	0
Fit Permitted						
Satd. Flow (perm)	1863	0	0	1863	1863	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	65.0			77.1	57.3	
Travel Time (s)	4.7			5.6	4.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	0	0
<b>Shared Lane Traffic (%)</b>						
Lane Group Flow (vph)	0	0	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	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	
<b>Two way Left Turn Lane</b>						
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	
<b>Intersection Summary</b>						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	0.0%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis  
18: Street C & Driveway B

Background 2027  
AM Peak Hour

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔			↕	↕	
Traffic Volume (veh/h)	0	0	0	0	0	0
Future Volume (Veh/h)	0	0	0	0	0	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	0	0	0	0	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None	None		
Median storage (veh)						
Upstream signal (m)			77			
pX, platoon unblocked						
vC, conflicting volume	0	0	0			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0	0	0			
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)	1023	1085	1623			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	0	0	0			
Volume Left	0	0	0			
Volume Right	0	0	0			
eSH	1700	1700	1700			
Volume to Capacity	0.00	0.00	0.00			
Queue Length 95th (m)	0.0	0.0	0.0			
Control Delay (s)	0.0	0.0	0.0			
Lane LOS	A					
Approach Delay (s)	0.0	0.0	0.0			
Approach LOS	A					
<b>Intersection Summary</b>						
Average Delay			0.0			
Intersection Capacity Utilization			0.0%	ICU Level of Service		A
Analysis Period (min)			15			

Lanes, Volumes, Timings  
19: Street C & South Service Road

Background 2027  
AM Peak Hour

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔			↕	↕	
Traffic Volume (vph)	4	0	0	5	0	0
Future Volume (vph)	4	0	0	5	0	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
<b>Fr</b>						
Fit Protected						
Satd. Flow (prot)	1863	0	0	1863	1863	0
Fit Permitted						
Satd. Flow (perm)	1863	0	0	1863	1863	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	235.2			305.2	159.9	
Travel Time (s)	16.9			22.0	11.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	4	0	0	5	0	0
<b>Shared Lane Traffic (%)</b>						
Lane Group Flow (vph)	4	0	0	5	0	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	
<b>Two way Left Turn Lane</b>						
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	
<b>Intersection Summary</b>						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	6.7%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis  
19: Street C & South Service Road

Background 2027  
AM Peak Hour

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↘			↘	↗	
Traffic Volume (veh/h)	4	0	0	5	0	0
Future Volume (Veh/h)	4	0	0	5	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	4	0	0	5	0	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None		None			
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			4	9	4	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			4	9	4	
tC, single (s)			4.1	6.4	6.2	
tC, 2 stage (s)						
tF (s)			2.2	3.5	3.3	
p0 queue free %			100	100	100	
cM capacity (veh/h)			1618	1011	1080	
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	4	5	0			
Volume Left	0	0	0			
Volume Right	0	0	0			
eSH	1700	1618	1700			
Volume to Capacity	0.00	0.00	0.00			
Queue Length 95th (m)	0.0	0.0	0.0			
Control Delay (s)	0.0	0.0	0.0			
Lane LOS			A			
Approach Delay (s)	0.0	0.0	0.0			
Approach LOS			A			
<b>Intersection Summary</b>						
Average Delay			0.0			
Intersection Capacity Utilization			6.7%	ICU Level of Service	A	
Analysis Period (min)			15			

Lanes, Volumes, Timings  
20: Street A & South Service Road

Background 2027  
AM Peak Hour

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↘			↘	↗	
Traffic Volume (vph)	4	0	0	5	0	0
Future Volume (vph)	4	0	0	5	0	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
<b>Fr</b>						
Fit Protected						
Satd. Flow (prot)	1863	0	0	1863	1863	0
Fit Permitted						
Satd. Flow (perm)	1863	0	0	1863	1863	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	285.4			235.2	98.8	
Travel Time (s)	20.5			16.9	7.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	4	0	0	5	0	0
<b>Shared Lane Traffic (%)</b>						
Lane Group Flow (vph)	4	0	0	5	0	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	
<b>Two way Left Turn Lane</b>						
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	
<b>Intersection Summary</b>						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	6.7%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis  
20: Street A & South Service Road

Background 2027  
AM Peak Hour

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔			↔	↔	
Traffic Volume (veh/h)	4	0	0	5	0	0
Future Volume (Veh/h)	4	0	0	5	0	0
Sign Control	Free		Free		Stop	
Grade	0%		0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	4	0	0	5	0	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None		None			
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			4		9	4
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			4		9	4
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			1618		1011	1080
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	4	5	0			
Volume Left	0	0	0			
Volume Right	0	0	0			
eSH	1700	1618	1700			
Volume to Capacity	0.00	0.00	0.00			
Queue Length 95th (m)	0.0	0.0	0.0			
Control Delay (s)	0.0	0.0	0.0			
Lane LOS				A		
Approach Delay (s)	0.0	0.0	0.0			
Approach LOS				A		
<b>Intersection Summary</b>						
Average Delay			0.0			
Intersection Capacity Utilization			6.7%	ICU Level of Service	A	
Analysis Period (min)			15			

Lanes, Volumes, Timings  
21: Argus Rd & Street 1

Background 2027  
AM Peak Hour

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔			↔	↔	
Traffic Volume (vph)	0	0	0	61	633	0
Future Volume (vph)	0	0	0	61	633	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						
Fit Protected						
Satd. Flow (prot)	1863	0	0	1863	1863	0
Fit Permitted						
Satd. Flow (perm)	1863	0	0	1863	1863	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	66	688	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	66	688	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	
<b>Intersection Summary</b>						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	36.6%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis  
21: Argus Rd & Street 1

Background 2027  
AM Peak Hour

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔			↑	↑	
Traffic Volume (veh/h)	0	0	0	61	633	0
Future Volume (Veh/h)	0	0	0	61	633	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	0	0	66	688	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)				114		
pX, platoon unblocked						
vC, conflicting volume	754	688	688			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	754	688	688			
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)	377	446	906			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	0	66	688			
Volume Left	0	0	0			
Volume Right	0	0	0			
eSH	1700	906	1700			
Volume to Capacity	0.00	0.00	0.40			
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					
<b>Intersection Summary</b>						
Average Delay			0.0			
Intersection Capacity Utilization		36.6%		ICU Level of Service		A
Analysis Period (min)			15			

Lanes, Volumes, Timings  
22: Street C & Street 1

Background 2027  
AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Future Volume (vph)	0	0	0	0	0	0	0	0	0	0	0	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
<b>Fit</b>												
Fit Protected												
Satd. Flow (prot)	0	1863	0	0	1863	0	0	1863	0	0	1863	0
Fit Permitted												
Satd. Flow (perm)	0	1863	0	0	1863	0	0	1863	0	0	1863	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		83.6			162.1			57.3			159.9	
Travel Time (s)		6.0			11.7			4.1			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	0	0	0	0	0	0	0	0	0	0	0
<b>Shared Lane Traffic (%)</b>												
Lane Group Flow (vph)	0	0	0	0	0	0	0	0	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)		0.0			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	
<b>Two way Left Turn Lane</b>												
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	
<b>Intersection Summary</b>												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	0.0%						ICU Level of Service A					
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis  
22: Street C & Street 1

Background 2027  
AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (veh/h)	0	0	0	0	0	0	0	0	0	0	0	0
Future Volume (Veh/h)	0	0	0	0	0	0	0	0	0	0	0	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	0	0	0	0	0	0	0	0	0	0	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None						None					
Median storage (veh)												
Upstream signal (m)	134											
pX, platoon unblocked												
vC, conflicting volume	0	0	0	0	0	0	0	0	0	0	0	0
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	0	0	0	0	0	0	0	0	0	0	0	0
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	100	100	100	100			100		
cM capacity (veh/h)	1023	896	1085	1023	896	1085	1623			1623		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	0	0	0	0								
Volume Left	0	0	0	0								
Volume Right	0	0	0	0								
eSH	1700	1700	1700	1700								
Volume to Capacity	0.00	0.00	0.00	0.00								
Queue Length 95th (m)	0.0	0.0	0.0	0.0								
Control Delay (s)	0.0	0.0	0.0	0.0								
Lane LOS	A	A										
Approach Delay (s)	0.0	0.0	0.0	0.0								
Approach LOS	A	A										
<b>Intersection Summary</b>												
Average Delay	0.0											
Intersection Capacity Utilization	0.0%			ICU Level of Service			A					
Analysis Period (min)	15											

Lanes, Volumes, Timings  
23: GO Station West Access/Street C & Cross Ave

Background 2027  
AM Peak Hour

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
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				0.643			0.757					
Satd. Flow (perm)	0	3383	0	0	2276	0	1410	1583	0	1863	1863	0
Right Turn on Red				Yes			Yes			Yes		
Satd. Flow (RTOR)	104						465					
Link Speed (k/h)	50			50			50			50		
Link Distance (m)	211.2			162.8			81.1			77.1		
Travel Time (s)	15.2			11.7			5.8			5.6		
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	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	25	15	25	15	25	15	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	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

Background 2027

AM Peak Hour

	↖	→	↘	↙	←	↖	↙	↑	↗	↘	↓	↙
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			53.1	
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

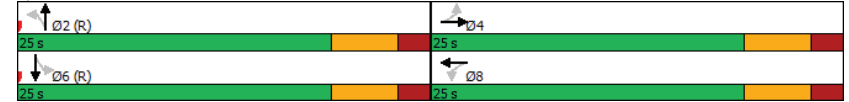
23: GO Station West Access/Street C & Cross Ave

Background 2027

AM Peak Hour

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

Background 2027  
AM Peak Hour

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
Frnt		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			2			6		
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	19.0			19.0		19.0	19.0			19.0		
Effective Green, g (s)	19.0			19.0		19.0	19.0			19.0		
Actuated g/C Ratio	0.38			0.38		0.38	0.38			0.38		
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)	1285			865		535	601			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			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				0.0		
Approach LOS	B			F		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

Background 2027  
PM Peak Hour

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
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		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	0.616			0.401			0.123			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	
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		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

1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd

Background 2027

PM Peak Hour

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

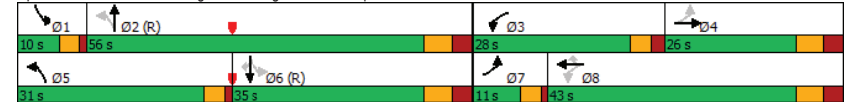
1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd

Background 2027

PM Peak Hour

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

Background 2027  
PM Peak Hour

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
Frbp, 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
Ftpb, 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
Fit 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
Fit 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										D
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

Background 2027  
PM Peak Hour

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
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	
Fit Protected	0.950			0.950	0.970							
Satd. Flow (prot)	1570	0	1437	1463	1551	1409	0	4577	1439	0	4781	0
Fit 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		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		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

2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp

Background 2027

PM Peak Hour

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				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		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						29.8				30.0
Approach LOS		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

2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp

Background 2027

PM Peak Hour

Intersection Signal Delay: 31.4	Intersection LOS: C
Intersection Capacity Utilization 82.5%	ICU Level of Service E
Analysis Period (min) 15	
# 95th percentile volume exceeds capacity, queue may be longer.	
m 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

Background 2027  
 PM Peak Hour

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	
Fit 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	
Fit 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

Background 2027  
 PM Peak Hour

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		
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)	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

Background 2027  
PM Peak Hour

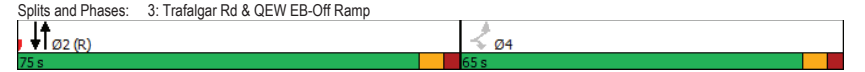
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Permitted Phases	4	4				Free
Detector Phase	4	4		2	2	
Switch Phase						
Minimum Initial (s)	10.0	10.0		29.0	29.0	
Minimum Split (s)	38.0	38.0		36.0	36.0	
Total Split (s)	65.0	65.0		75.0	75.0	
Total Split (%)	46.4%	46.4%		53.6%	53.6%	
Maximum Green (s)	58.0	58.0		68.0	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

Background 2027  
PM Peak Hour

m Volume for 95th percentile queue is metered by upstream signal.



HCM Signalized Intersection Capacity Analysis  
3: Trafalgar Rd & QEW EB-Off Ramp

Background 2027  
PM Peak Hour

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
Frbp, 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				c0.46	0.39	
v/s Ratio Perm	c0.34	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

Background 2027  
PM Peak Hour

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

Background 2027  
PM Peak Hour

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

Background 2027  
PM Peak Hour

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

Background 2027

PM Peak Hour

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	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

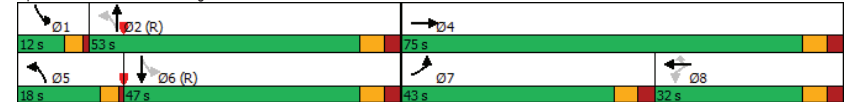
5: Trafalgar Rd & Cross Ave/South Service Rd

Background 2027

PM Peak Hour

Intersection Signal Delay: 52.0	Intersection LOS: D
Intersection Capacity Utilization 79.6%	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

Background 2027  
PM Peak Hour

	↖	→	↗	↖	←	↖	↖	↖	↖	↖	↖	↖	
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		
Frbp, ped/bikes	1.00	0.97		1.00	1.00	1.00	1.00	0.99		1.00	0.99		
Fipb, 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	1346		1497	1644	1423	1496	4576		1570	4463		
Flt 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	8	5	2	1		6	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			
<b>Intersection Summary</b>													
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

Background 2027  
PM Peak Hour

	↖	→	↗	↖	←	↖	↖	↖	↖	↖	↖	↖
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		
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		0.987				0.850		0.985				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3016	3104	0	1570	3217	1439	1540	2688	0	2987	1368	1409
Flt 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		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		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		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  
6: Trafalgar Rd & Cornwall Rd

Background 2027  
PM Peak Hour

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

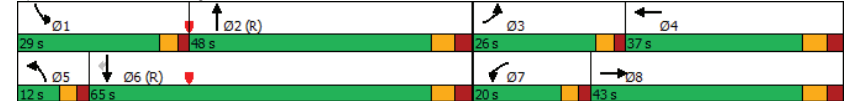
Area Type:	CBD
Cycle Length:	140
Actuated Cycle Length:	140
Offset:	0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green, Master Intersection
Natural Cycle:	140
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	1.10

Lanes, Volumes, Timings  
6: Trafalgar Rd & Cornwall Rd

Background 2027  
PM Peak Hour

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

Background 2027  
PM Peak Hour

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
Frbp, ped/bikes	1.00	1.00		1.00	1.00	0.98	1.00	1.00		1.00	1.00	0.97
Fpb, 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	0.99		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			
<b>Intersection Summary</b>												
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 PM Peak Hour

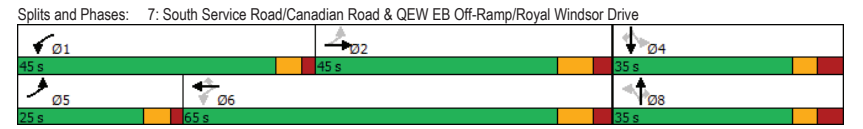
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	306	534	17	179	638	27	14	46	98	14	117	417
Future Volume (vph)	306	534	17	179	638	27	14	46	98	14	117	417
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	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
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		0.995				0.850		0.850				0.850
Fit Protected	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	
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	0.6	2.0	0.6	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 Background 2027  
 7: South Service Road/Canadian Road & QEW EB Off-Ramp/Royal Windsor Drive PM Peak Hour

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 Capacity Utilization:	67.5%
Analysis Period (min):	15
Intersection LOS:	B
ICU Level of Service:	C

Lanes, Volumes, Timings Background 2027  
 7: South Service Road/Canadian Road & QEW EB Off-Ramp/Royal Windsor Drive PM Peak Hour



HCM Signalized Intersection Capacity Analysis Background 2027  
 7: South Service Road/Canadian Road & QEW EB Off-Ramp/Royal Windsor Drive PM Peak Hour

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
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)	3502	3396		1752	3505	1615	1805	1900	1615	1805	1900	1599
Fit 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 Background 2027  
 8: QEW WB Off-Ramp & Kerr Street PM Peak Hour

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
Fit Protected					0.950	
Satd. Flow (prot)	3574	0	0	3574	1805	1599
Fit 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

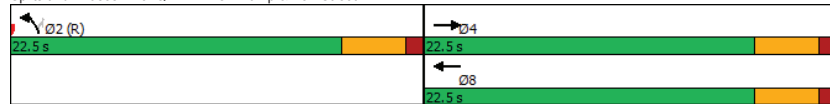
Lanes, Volumes, Timings  
8: QEW WB Off-Ramp & Kerr Street

Background 2027  
PM Peak Hour

	→	↘	↙	←	↖	↗
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

Background 2027  
PM Peak Hour

	→	↘	↙	←	↖	↗
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
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)	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

Background 2027  
PM Peak Hour

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔↔	↔	↕↕	0	0	↕↕
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

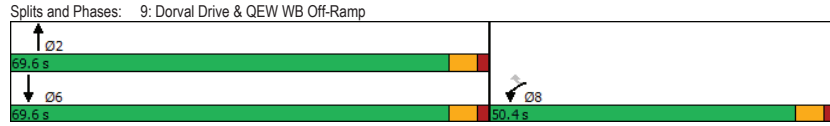
Lanes, Volumes, Timings  
9: Dorval Drive & QEWB WB Off-Ramp

Background 2027  
PM Peak Hour

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

Background 2027  
PM Peak Hour



HCM Signalized Intersection Capacity Analysis  
9: Dorval Drive & QEW WB Off-Ramp

Background 2027  
PM Peak Hour

	←	↖	↑	↗	→	
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
<b>Intersection Summary</b>						
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

Background 2027  
PM Peak Hour

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
Frt	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

Background 2027  
PM Peak Hour

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

Background 2027  
PM Peak Hour

Splits and Phases: 10: Dorval Drive & QEW EB Off-Ramp

↑ Ø2 74.4 s	Ø4 45.6 s
↓ Ø6 74.4 s	

HCM Signalized Intersection Capacity Analysis  
10: Dorval Drive & QEW EB Off-Ramp

Background 2027  
PM Peak Hour

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	
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)	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, d1	35.4	34.8		6.3	6.2	
Progression Factor	1.00	1.00		1.00	1.00	
Incremental Delay, d2	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	
<b>Intersection Summary</b>						
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

Background 2027  
PM Peak Hour

	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	
<b>Intersection Summary</b>						
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

Background 2027  
PM Peak Hour

	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
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>WB 1</b>	<b>SB 1</b>			
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			
<b>Intersection Summary</b>						
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

Background 2027  
PM Peak Hour

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	
<b>Intersection Summary</b>						
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

Background 2027  
PM Peak Hour

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
<b>Direction, Lane #</b>						
	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			
<b>Intersection Summary</b>						
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

Background 2027  
PM Peak Hour

	↖	→	↗	↙	←	↖	↗	↙	↘	↖	↗	↙	↘
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		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		0.950		0.950		
Satd. Flow (prot)	1570	3176	0	797	3184	0	785	706	0	1570	1288	0	
Flt Permitted	0.480			0.148			0.571			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				
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	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		
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	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

Background 2027  
PM Peak Hour

	↖	→	↗	↙	←	↖	↗	↙	↘	↖	↗	↙	↘
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	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		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
<b>Intersection Summary</b>													
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

Background 2027  
PM Peak Hour

Intersection Capacity Utilization 61.9% 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

Background 2027  
PM Peak Hour

Movement	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	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	
<b>Intersection Summary</b>												
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												

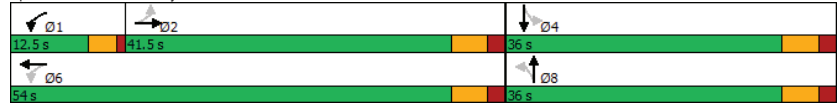


Lanes, Volumes, Timings  
14: Lyons Lane/Street A & Cross Ave

Background 2027  
PM Peak Hour

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


Background 2027  
PM Peak Hour

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	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	
<b>Intersection Summary</b>												
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

Background 2027  
PM Peak Hour




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%
Analysis Period (min)	15
	ICU Level of Service A

HCM Unsignalized Intersection Capacity Analysis  
15: Cross Ave & Lyons Lane

Background 2027  
PM Peak Hour



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%
Analysis Period (min)	15
	ICU Level of Service A

Lanes, Volumes, Timings  
16: Speers Road/Cornwall Road & Cross Avenue

Background 2027  
PM Peak Hour

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

Background 2027  
PM Peak Hour

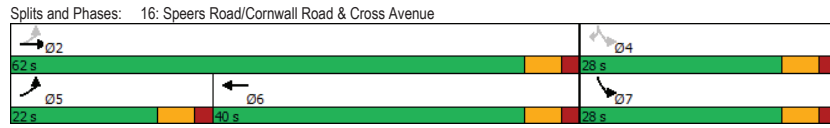
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Detector Phase	5	2	6		7	4
Switch Phase						
Minimum Initial (s)	6.0	5.0	5.0		5.0	5.0
Minimum Split (s)	12.0	33.5	33.5		27.5	27.5
Total Split (s)	22.0	62.0	40.0		28.0	28.0
Total Split (%)	24.4%	68.9%	44.4%		31.1%	31.1%
Maximum Green (s)	16.0	56.0	34.0		22.0	22.0
Yellow 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

Background 2027  
PM Peak Hour



HCM Signalized Intersection Capacity Analysis  
16: Speers Road/Cornwall Road & Cross Avenue

Background 2027  
PM Peak Hour

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	
<b>Intersection Summary</b>						
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  
17: Driveway A & Street 1

Background 2027  
PM Peak Hour

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↘			↘	↗	
Traffic Volume (vph)	0	0	0	0	0	0
Future Volume (vph)	0	0	0	0	0	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
<b>Fit</b>						
<b>Fit Protected</b>						
Satd. Flow (prot)	1863	0	0	1863	1863	0
<b>Fit Permitted</b>						
Satd. Flow (perm)	1863	0	0	1863	1863	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	22.8			100.5	51.6	
Travel Time (s)	1.6			7.2	3.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	0	0
<b>Shared Lane Traffic (%)</b>						
Lane Group Flow (vph)	0	0	0	0	0	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	
<b>Two way Left Turn Lane</b>						
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	
<b>Intersection Summary</b>						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	0.0%		ICU Level of Service		A	
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis  
17: Driveway A & Street 1

Background 2027  
PM Peak Hour

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↘			↘	↗	
Traffic Volume (veh/h)	0	0	0	0	0	0
Future Volume (Veh/h)	0	0	0	0	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	0	0	0
<b>Pedestrians</b>						
<b>Lane Width (m)</b>						
<b>Walking Speed (m/s)</b>						
<b>Percent Blockage</b>						
<b>Right turn flare (veh)</b>						
<b>Median type</b>						
Median storage (veh)	None			None		
<b>Upstream signal (m)</b>						
<b>pX, platoon unblocked</b>						
vC, conflicting volume			0		0	0
<b>vC1, stage 1 conf vol</b>						
<b>vC2, stage 2 conf vol</b>						
vCu, unblocked vol			0		0	0
tC, single (s)			4.1		6.4	6.2
<b>tC, 2 stage (s)</b>						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			1623		1023	1085
<b>Direction, Lane #</b>						
	EB 1	WB 1	NB 1			
Volume Total	0	0	0			
Volume Left	0	0	0			
Volume Right	0	0	0			
eSH	1700	1700	1700			
Volume to Capacity	0.00	0.00	0.00			
Queue Length 95th (m)	0.0	0.0	0.0			
Control Delay (s)	0.0	0.0	0.0			
Lane LOS			A			
Approach Delay (s)	0.0	0.0	0.0			
Approach LOS			A			
<b>Intersection Summary</b>						
Average Delay			0.0			
Intersection Capacity Utilization			0.0%		ICU Level of Service	A
Analysis Period (min)			15			

Lanes, Volumes, Timings  
18: Street C & Driveway B

Background 2027  
PM Peak Hour

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	0	0	0	0
Future Volume (vph)	0	0	0	0	0	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
<b>Fit</b>						
<b>Fit Protected</b>						
Satd. Flow (prot)	1863	0	0	1863	1863	0
<b>Fit Permitted</b>						
Satd. Flow (perm)	1863	0	0	1863	1863	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	49.1			75.1	57.8	
Travel Time (s)	3.5			5.4	4.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	0	0
<b>Shared Lane Traffic (%)</b>						
Lane Group Flow (vph)	0	0	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	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	
<b>Two way Left Turn Lane</b>						
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	
<b>Intersection Summary</b>						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	0.0%				ICU Level of Service A	
Analysis Period (min)	15					


HCM Unsignalized Intersection Capacity Analysis  
18: Street C & Driveway B

Background 2027  
PM Peak Hour

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	0	0	0	0
Future Volume (Veh/h)	0	0	0	0	0	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	0	0	0	0	0
<b>Pedestrians</b>						
<b>Lane Width (m)</b>						
Walking Speed (m/s)						
<b>Percent Blockage</b>						
<b>Right turn flare (veh)</b>						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)				75		
<b>pX, platoon unblocked</b>						
vC, conflicting volume	0	0	0			
<b>vC1, stage 1 conf vol</b>						
<b>vC2, stage 2 conf vol</b>						
vCu, unblocked vol	0	0	0			
tC, single (s)	6.4	6.2	4.1			
<b>tC, 2 stage (s)</b>						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	100			
cM capacity (veh/h)	1023	1085	1623			
<b>Direction, Lane #</b>						
EB 1				NB 1		SB 1
Volume Total	0	0	0			
Volume Left	0	0	0			
Volume Right	0	0	0			
eSH	1700	1700	1700			
Volume to Capacity	0.00	0.00	0.00			
Queue Length 95th (m)	0.0	0.0	0.0			
Control Delay (s)	0.0	0.0	0.0			
Lane LOS	A					
Approach Delay (s)	0.0	0.0	0.0			
Approach LOS	A					
<b>Intersection Summary</b>						
Average Delay					0.0	
Intersection Capacity Utilization	0.0%		ICU Level of Service		A	
Analysis Period (min)	15					


Lanes, Volumes, Timings  
19: Street C & South Service Road

Background 2027  
PM Peak Hour

						
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔			↔	↔	
Traffic Volume (vph)	10	0	0	20	0	0
Future Volume (vph)	10	0	0	20	0	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
<b>Fit</b>						
Fit Protected						
Satd. Flow (prot)	1863	0	0	1863	1863	0
Fit Permitted						
Satd. Flow (perm)	1863	0	0	1863	1863	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	264.4			306.3	164.3	
Travel Time (s)	19.0			22.1	11.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	11	0	0	22	0	0
<b>Shared Lane Traffic (%)</b>						
Lane Group Flow (vph)	11	0	0	22	0	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	
<b>Two way Left Turn Lane</b>						
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	
<b>Intersection Summary</b>						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	6.7%			ICU Level of Service A		
Analysis Period (min)	15					


HCM Unsignalized Intersection Capacity Analysis  
19: Street C & South Service Road

Background 2027  
PM Peak Hour

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔			↔	↔	
Traffic Volume (veh/h)	10	0	0	20	0	0
Future Volume (Veh/h)	10	0	0	20	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	0	0	22	0	0
<b>Pedestrians</b>						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type						
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			11		33	11
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			11		33	11
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			1608		980	1070
<b>Direction, Lane #</b>						
	EB 1	WB 1	NB 1			
Volume Total	11	22	0			
Volume Left	0	0	0			
Volume Right	0	0	0			
eSH	1700	1608	1700			
Volume to Capacity	0.01	0.00	0.00			
Queue Length 95th (m)	0.0	0.0	0.0			
Control Delay (s)	0.0	0.0	0.0			
Lane LOS			A			
Approach Delay (s)	0.0	0.0	0.0			
Approach LOS			A			
<b>Intersection Summary</b>						
Average Delay			0.0			
Intersection Capacity Utilization			6.7%		ICU Level of Service	A
Analysis Period (min)			15			


Lanes, Volumes, Timings  
20: Street A & South Service Road

Background 2027  
PM Peak Hour

						
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔			↔	↔	
Traffic Volume (vph)	10	0	0	20	0	0
Future Volume (vph)	10	0	0	20	0	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
<b>Fit</b>						
<b>Fit Protected</b>						
Satd. Flow (prot)	1863	0	0	1863	1863	0
<b>Fit Permitted</b>						
Satd. Flow (perm)	1863	0	0	1863	1863	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	255.1			264.4	119.8	
Travel Time (s)	18.4			19.0	8.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	11	0	0	22	0	0
<b>Shared Lane Traffic (%)</b>						
Lane Group Flow (vph)	11	0	0	22	0	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	
<b>Two way Left Turn Lane</b>						
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	
<b>Intersection Summary</b>						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	6.7%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis  
20: Street A & South Service Road

Background 2027  
PM Peak Hour

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔			↔	↔	
Traffic Volume (veh/h)	10	0	0	20	0	0
Future Volume (Veh/h)	10	0	0	20	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	0	0	22	0	0
<b>Pedestrians</b>						
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			11		33	11
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			11		33	11
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			1608		980	1070
<b>Direction, Lane #</b>						
	EB 1	WB 1	NB 1			
Volume Total	11	22	0			
Volume Left	0	0	0			
Volume Right	0	0	0			
eSH	1700	1608	1700			
Volume to Capacity	0.01	0.00	0.00			
Queue Length 95th (m)	0.0	0.0	0.0			
Control Delay (s)	0.0	0.0	0.0			
Lane LOS					A	
Approach Delay (s)	0.0	0.0	0.0			
Approach LOS					A	
<b>Intersection Summary</b>						
Average Delay			0.0			
Intersection Capacity Utilization			6.7%		ICU Level of Service	A
Analysis Period (min)			15			

Lanes, Volumes, Timings  
21: Argus Rd & Street 1

Background 2027  
PM Peak Hour

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	0	64	326	0
Future Volume (vph)	0	0	0	64	326	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
<b>Fit</b>						
<b>Fit Protected</b>						
Satd. Flow (prot)	1863	0	0	1863	1863	0
<b>Fit Permitted</b>						
Satd. Flow (perm)	1863	0	0	1863	1863	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	70	354	0
<b>Shared Lane Traffic (%)</b>						
Lane Group Flow (vph)	0	0	0	70	354	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	
<b>Two way Left Turn Lane</b>						
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	
<b>Intersection Summary</b>						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	20.5%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis  
21: Argus Rd & Street 1

Background 2027  
PM Peak Hour

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	0	64	326	0
Future Volume (Veh/h)	0	0	0	64	326	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	0	0	70	354	0
<b>Pedestrians</b>						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)				116		
<b>pX, platoon unblocked</b>						
vC, conflicting volume	424	354	354			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	424	354	354			
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)	587	690	1205			
<b>Direction, Lane #</b>						
	EB 1	NB 1	SB 1			
Volume Total	0	70	354			
Volume Left	0	0	0			
Volume Right	0	0	0			
eSH	1700	1205	1700			
Volume to Capacity	0.00	0.00	0.21			
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					
<b>Intersection Summary</b>						
Average Delay		0.0				
Intersection Capacity Utilization	20.5%			ICU Level of Service		A
Analysis Period (min)	15					



Lanes, Volumes, Timings  
22: Street C & Street 1

Background 2027  
PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Future Volume (vph)	0	0	0	0	0	0	0	0	0	0	0	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
Fit												
Fit Protected												
Satd. Flow (prot)	0	1863	0	0	1863	0	0	1863	0	0	1863	0
Fit Permitted												
Satd. Flow (perm)	0	1863	0	0	1863	0	0	1863	0	0	1863	0
Link Speed (k/h)	50		50		50		50		50		50	
Link Distance (m)	100.5		165.4		57.8		164.3					
Travel Time (s)	7.2		11.9		4.2		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	0	0	0	0	0	0	0	0	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	0	0	0	0	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	Right	Left	Left	Right	Right
Median Width(m)	0.0		0.0		0.0		0.0		0.0		0.0	
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	
Sign Control	Stop		Stop		Free		Free		Free		Free	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	0.0%		ICU Level of Service A									
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis  
22: Street C & Street 1

Background 2027  
PM Peak Hour


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	0	0	0	0	0	0	0	0	0
Future Volume (Veh/h)	0	0	0	0	0	0	0	0	0	0	0	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	0	0	0	0	0	0	0	0	0	0	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (m)							133					
pX, platoon unblocked												
vC, conflicting volume	0	0	0	0	0	0	0	0	0	0	0	0
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	0	0	0	0	0	0	0	0	0	0	0	0
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	100	100	100	100			100		
cM capacity (veh/h)	1023	896	1085	1023	896	1085	1623			1623		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	0	0	0	0								
Volume Left	0	0	0	0								
Volume Right	0	0	0	0								
eSH	1700	1700	1700	1700								
Volume to Capacity	0.00	0.00	0.00	0.00								
Queue Length 95th (m)	0.0	0.0	0.0	0.0								
Control Delay (s)	0.0	0.0	0.0	0.0								
Lane LOS	A	A										
Approach Delay (s)	0.0	0.0	0.0	0.0								
Approach LOS	A	A										
Intersection Summary												
Average Delay				0.0								
Intersection Capacity Utilization	0.0%		ICU Level of Service		A							
Analysis Period (min)	15											

Lanes, Volumes, Timings

23: GO Station West Access/Street C & Cross Ave

Background 2027

PM Peak Hour



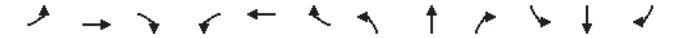
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔	↔		↔	↔		↔	↔	
Traffic Volume (vph)	0	489	49	267	284	0	83	0	411	0	0	0
Future Volume (vph)	0	489	49	267	284	0	83	0	411	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (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	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		0.986						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			Yes
Satd. Flow (RTOR)		25					169					
Link Speed (k/h)		50			50		50				50	
Link Distance (m)		209.8			164.3		55.1				75.1	
Travel Time (s)		15.1			11.8		4.0				5.4	
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
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	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	
Protected Phases		4			8			2			2	
Permitted Phases		4			8			2			6	

Lanes, Volumes, Timings

23: GO Station West Access/Street C & Cross Ave

Background 2027

PM Peak Hour

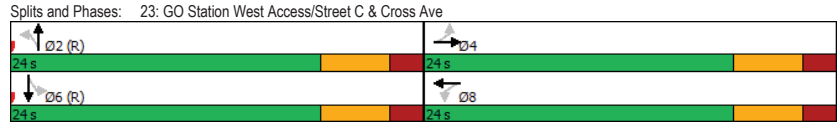


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4			8	8			2	2		6
Switch Phase												
Minimum Initial (s)	5.0	5.0			5.0	5.0			5.0	5.0		5.0
Minimum Split (s)	24.0	24.0			24.0	24.0			24.0	24.0		24.0
Total Split (s)	24.0	24.0			24.0	24.0			24.0	24.0		24.0
Total Split (%)	50.0%	50.0%			50.0%	50.0%			50.0%	50.0%		50.0%
Maximum Green (s)	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
All-Red Time (s)	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
Recall Mode	None	None			None	None			C-Max	C-Max		C-Max
Walk Time (s)	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
Pedestrian Calls (#/hr)	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			51.1
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

Background 2027  
 PM Peak Hour

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

Background 2027  
 PM Peak Hour

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				
Fr <sub>t</sub>		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
<b>Intersection Summary</b>												
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

1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd

Background 2032

AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	37	115	320	663	82	189	178	1104	795	175	1552	50
Future Volume (vph)	37	115	320	663	82	189	178	1104	795	175	1552	50
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	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	0.699			0.402			0.080			0.174		
Satd. Flow (perm)	1184	1693	1425	1295	1676	1366	120	4446	1377	286	4532	1398
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			218			205			648			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)	40	125	348	721	89	205	193	1200	864	190	1687	54
Shared Lane Traffic (%)												
Lane Group Flow (vph)	40	125	348	721	89	205	193	1200	864	190	1687	54
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

Background 2032

AM Peak Hour

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)	24.2	18.2	120.0	36.2	29.2	29.2	73.3	56.6	120.0	64.3	50.0	50.0
Actuated g/C Ratio	0.20	0.15	1.00	0.30	0.24	0.24	0.61	0.47	1.00	0.54	0.42	0.42
v/c Ratio	0.15	0.49	0.24	1.21	0.22	0.42	0.65	0.57	0.63	0.62	0.89	0.08
Control Delay	29.9	52.4	0.4	144.1	37.8	7.5	37.8	25.3	2.2	21.7	39.8	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	29.9	52.4	0.4	144.1	37.8	7.5	37.8	25.3	2.2	21.7	39.8	0.2
LOS	C	D	A	F	D	A	D	C	A	C	D	A
Approach Delay		15.4			107.2			17.5				36.9
Approach LOS		B			F			B				D
Queue Length 50th (m)	7.0	28.8	0.0	~105.2	18.2	0.0	29.5	77.6	0.0	18.8	140.1	0.0
Queue Length 95th (m)	14.6	46.4	0.0	#138.4	31.4	18.7	#75.1	103.8	0.0	35.9	163.1	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)	260	423	1425	596	544	582	299	2096	1377	304	1889	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	0.15	0.30	0.24	1.21	0.16	0.35	0.65	0.57	0.63	0.63	0.89	0.08

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:	110
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	1.21
Intersection Signal Delay:	39.8
Intersection LOS:	D

Lanes, Volumes, Timings  
1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd

Background 2032  
AM Peak Hour

Intersection Capacity Utilization 82.7% 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

Background 2032  
AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↑	↔	↔	↑	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	37	115	320	663	82	189	178	1104	795	175	1552	50
Future Volume (vph)	37	115	320	663	82	189	178	1104	795	175	1552	50
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	0.17	1.00	1.00
Satd. Flow (perm)	1188	1693	1425	1294	1676	1366	120	4446	1377	286	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)	40	125	348	721	89	205	193	1200	864	190	1687	54
RTOR Reduction (vph)	0	0	0	0	0	155	0	0	0	0	0	32
Lane Group Flow (vph)	40	125	348	721	89	50	193	1200	864	190	1687	22
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)	20.8	16.0	120.0	35.0	26.2	26.2	71.0	52.8	120.0	60.4	46.2	46.2
Effective Green, g (s)	20.8	19.0	120.0	35.0	29.2	29.2	71.0	55.8	120.0	60.4	49.2	49.2
Actuated g/C Ratio	0.17	0.16	1.00	0.29	0.24	0.24	0.59	0.46	1.00	0.50	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)	222	268	1425	583	407	332	297	2067	1377	294	1858	573
v/s Ratio Prot	0.01	0.07		c0.14	0.05		0.11	0.27		0.08	c0.37	
v/s Ratio Perm	0.02		0.24	c0.22		0.04	0.27		c0.63	0.25		0.02
v/c Ratio	0.18	0.47	0.24	1.24	0.22	0.15	0.65	0.58	0.63	0.65	0.91	0.04
Uniform Delay, d1	42.0	45.9	0.0	40.4	36.3	35.7	29.6	23.5	0.0	17.7	33.3	21.2
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	0.4	1.7	0.4	120.7	0.4	0.3	4.8	1.2	2.2	4.8	8.0	0.1
Delay (s)	42.4	47.6	0.4	161.2	36.7	35.9	34.5	24.7	2.2	22.6	41.3	21.3
Level of Service	D	D	A	F	D	D	C	C	A	C	D	C
Approach Delay (s)		15.2			125.0			16.9			38.9	
Approach LOS		B			F			B			D	

Intersection Summary			
HCM 2000 Control Delay	43.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	82.7%	ICU Level of Service	E
Analysis Period (min)	15		
c	Critical Lane Group		

Lanes, Volumes, Timings

2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp

Background 2032

AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	2	0	162	517	30	244	0	1829	434	0	2529	6
Future Volume (vph)	2	0	162	517	30	244	0	1829	434	0	2529	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	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)			86			252			183			
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	176	562	33	265	0	1988	472	0	2749	7
Shared Lane Traffic (%)				47%								
Lane Group Flow (vph)	2	0	176	298	297	265	0	1988	472	0	2756	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

Background 2032

AM Peak Hour

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 Phases	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)	14.8		16.8	33.7	33.7	140.0		79.5	140.0			79.5
Actuated g/C Ratio	0.11		0.12	0.24	0.24	1.00		0.57	1.00			0.57
v/c Ratio	0.01		0.72	0.87	0.85	0.20		0.79	0.35			0.85
Control Delay	53.0		46.6	76.1	73.0	0.3		25.1	0.5			29.6
Queue Delay	0.0		0.0	0.0	0.0	0.0		0.0	0.0			0.0
Total Delay	53.0		46.6	76.1	73.0	0.3		25.1	0.5			29.6
LOS	D		D	E	E	A		C	A			C
Approach Delay		46.7			51.7			20.4				29.6
Approach LOS		D			D			C				C
Queue Length 50th (m)	0.5		25.3	85.4	84.6	0.0		125.4	0.0			203.2
Queue Length 95th (m)	3.4		51.6	#143.4	#140.4	0.0		153.5	m0.0			220.7
Internal Link Dist (m)		118.1			168.6			300.8				251.1
Turn Bay Length (m)	50.0											
Base Capacity (vph)	213		282	353	360	1356		2523	1353			3242
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		0.62	0.84	0.82	0.20		0.79	0.35			0.85
<b>Intersection Summary</b>												
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:	120											
Control Type:	Actuated-Coordinated											
Maximum v/c Ratio:	0.87											

Lanes, Volumes, Timings

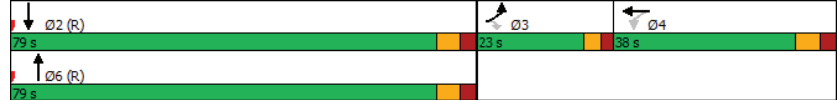
2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp

Background 2032

AM Peak Hour

Intersection Signal Delay: 29.5	Intersection LOS: C
Intersection Capacity Utilization 78.8%	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: 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

Background 2032

AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	2	0	162	517	30	244	0	1829	434	0	2529	6
Future Volume (vph)	2	0	162	517	30	244	0	1829	434	0	2529	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	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	0.91	1.00	0.86	1.00	0.86
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.98	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	0.85	1.00	1.00	1.00
Flt Protected	0.95	1.00	0.95	0.96	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1570	1395	1421	1454	1356	4446	1353	5709	5709	5709	5709	5709
Flt Permitted	0.95	1.00	0.95	0.96	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (perm)	1570	1395	1421	1454	1356	4446	1353	5709	5709	5709	5709	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	176	562	33	265	0	1988	472	0	2749	7
RTOR Reduction (vph)	0	0	76	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	2	0	100	298	297	265	0	1988	472	0	2756	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)	13.8		13.8	30.7	30.7	140.0		76.5	140.0		76.5	
Effective Green, g (s)	14.8		16.8	33.7	33.7	140.0		79.5	140.0		79.5	
Actuated g/C Ratio	0.11		0.12	0.24	0.24	1.00		0.57	1.00		0.57	
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)	165		167	342	349	1356		2524	1353		3241	
v/s Ratio Prot	0.00							0.45			c0.48	
v/s Ratio Perm			c0.07	c0.21	0.20	0.20			0.35			
v/c Ratio	0.01		0.60	0.87	0.85	0.20		0.79	0.35		0.85	
Uniform Delay, d1	56.1		58.4	51.1	50.8	0.0		23.7	0.0		25.3	
Progression Factor	1.00		1.00	1.00	1.00	1.00		0.94	1.00		1.00	
Incremental Delay, d2	0.0		6.0	20.8	17.7	0.3		1.7	0.5		3.0	
Delay (s)	56.1		64.4	71.8	68.5	0.3		23.8	0.5		28.3	
Level of Service	E		E	E	E	A		C	A		C	
Approach Delay (s)		64.3			48.6			19.3			28.3	
Approach LOS		E			D			B			C	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			28.6		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			78.8%		ICU Level of Service				D			
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings  
3: Trafalgar Rd & QEW EB-Off Ramp

Background 2032  
AM Peak Hour

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔↔	↔		↑↑↑	↑↑↑	↔
Traffic Volume (vph)	852	725	0	1435	1730	450
Future Volume (vph)	852	725	0	1435	1730	450
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				201
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)	926	788	0	1560	1880	489
Shared Lane Traffic (%)						
Lane Group Flow (vph)	926	788	0	1560	1880	489
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

Background 2032  
AM Peak Hour

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	0.60	1.06		0.84	0.99	0.34
Control Delay	25.4	83.6		38.0	42.5	0.3
Queue Delay	0.0	0.0		0.0	0.0	0.0
Total Delay	25.4	83.6		38.0	42.5	0.3
LOS	C	F		D	D	A
Approach Delay	52.2			38.0	33.8	
Approach LOS	D			D	C	
Queue Length 50th (m)	94.2	~252.0		116.2	162.5	0.0
Queue Length 95th (m)	115.8	#332.9		m105.3	#235.2	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	0.60	1.06		0.84	0.99	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:	1.06					
Intersection Signal Delay:	40.5					
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.					

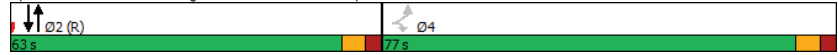


Lanes, Volumes, Timings  
3: Trafalgar Rd & QEW EB-Off Ramp

Background 2032  
AM Peak Hour

- # 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

Background 2032  
AM Peak Hour

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔↔	↔		↑↑↑	↑↑↑	↔
Traffic Volume (vph)	852	725	0	1435	1730	450
Future Volume (vph)	852	725	0	1435	1730	450
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)	926	788	0	1560	1880	489
RTOR Reduction (vph)	0	1	0	0	0	0
Lane Group Flow (vph)	926	787	0	1560	1880	489
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				0.35	c0.42	
v/s Ratio Perm	0.31	c0.55				0.34
v/c Ratio	0.60	1.06		0.84	0.99	0.34
Uniform Delay, d1	23.3	33.5		36.3	40.3	0.0
Progression Factor	1.00	1.00		0.96	0.70	1.00
Incremental Delay, d2	0.7	50.8		2.6	13.6	0.3
Delay (s)	24.0	84.3		37.6	41.9	0.3
Level of Service	C	F		D	D	A
Approach Delay (s)	51.7			37.6	33.3	
Approach LOS	D			D	C	
<b>Intersection Summary</b>						
HCM 2000 Control Delay			40.1		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			93.7%		ICU Level of Service	F
Analysis Period (min)			15			
c Critical Lane Group						

Lanes, Volumes, Timings  
4: Trafalgar Rd & Argus Rd

Background 2032  
AM Peak Hour

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	111	0	2414	1990	491
Future Volume (vph)	0	111	0	2414	1990	491
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			0.970	
Fit Protected						
Satd. Flow (prot)	0	1367	0	4363	4371	0
Fit Permitted						
Satd. Flow (perm)	0	1367	0	4363	4371	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	121	0	2624	2163	534
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	121	0	2624	2697	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	
<b>Intersection Summary</b>						
Area Type:	CBD					
Control Type:	Unsignalized					
Intersection Capacity Utilization	69.4%			ICU Level of Service C		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis  
4: Trafalgar Rd & Argus Rd

Background 2032  
AM Peak Hour

Movement	EBL	EBR	NBL	NBT	SBT	SBR	
Lane Configurations							
Traffic Volume (veh/h)	0	111	0	2414	1990	491	
Future Volume (Veh/h)	0	111	0	2414	1990	491	
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	121	0	2624	2163	534	
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	3316	999	2708				
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol	543	0	1452				
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	81	100				
cM capacity (veh/h)	333	622	275				
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>NB 1</b>	<b>NB 2</b>	<b>NB 3</b>	<b>SB 1</b>	<b>SB 2</b>	<b>SB 3</b>
Volume Total	121	875	875	875	865	865	967
Volume Left	0	0	0	0	0	0	0
Volume Right	121	0	0	0	0	0	534
eSH	622	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.19	0.51	0.51	0.51	0.51	0.51	0.57
Queue Length 95th (m)	5.7	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (s)	12.2	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	B						
Approach Delay (s)	12.2	0.0			0.0		
Approach LOS	B						
<b>Intersection Summary</b>							
Average Delay				0.3			
Intersection Capacity Utilization	69.4%			ICU Level of Service		C	
Analysis Period (min)	15						

Lanes, Volumes, Timings

Background 2032

5: Trafalgar Rd & Cross Ave/South Service Rd

AM Peak Hour



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔	↔	↔	↔	↔	↔	↔↔↔	↔↔↔	↔	↔	↔↔↔	↔
Traffic Volume (vph)	826	77	89	41	45	104	105	1202	27	195	1565	250
Future Volume (vph)	826	77	89	41	45	104	105	1202	27	195	1565	250
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	0.91	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	0.920					0.850		0.997			0.979	
Fit Protected	0.950			0.950		0.950		0.950			0.950	
Satd. Flow (prot)	2795	1424	0	1525	1583	1382	1428	4500	0	1525	4410	0
Fit Permitted	0.950			0.643		0.079		0.079			0.079	
Satd. Flow (perm)	2789	1424	0	1024	1583	1362	119	4500	0	127	4410	0
Right Turn on Red			Yes			Yes		Yes			Yes	
Satd. Flow (RTOR)		43				179		3			26	
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			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)	898	84	97	45	49	113	114	1307	29	212	1701	272
Shared Lane Traffic (%)												
Lane Group Flow (vph)	898	181	0	45	49	113	114	1336	0	212	1973	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	
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		14	24		14
Number of Detectors	1	2		1	2	1	1	1		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

Background 2032

5: Trafalgar Rd & Cross Ave/South Service Rd

AM Peak Hour



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	38.5		26.5	14.5	14.5	65.5	53.5		77.5	61.5	
Actuated g/C Ratio	0.26	0.28		0.19	0.10	0.10	0.47	0.38		0.55	0.44	
v/c Ratio	1.25	0.43		0.19	0.30	0.38	0.68	0.78		0.79	1.01	
Control Delay	167.0	34.6		31.3	62.5	3.8	47.8	48.9		46.5	57.8	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	167.0	34.6		31.3	62.5	3.8	47.8	48.9		46.5	57.8	
LOS	F	C		C	E	A	D	D		D	E	
Approach Delay		144.8			23.7			48.8			56.7	
Approach LOS		F			C			D			E	
Queue Length 50th (m)	~167.8	33.2		8.3	13.5	0.0	24.8	109.0		47.1	~171.3	
Queue Length 95th (m)	#209.9	55.0		16.4	26.5	0.8	m33.1	m119.0		m49.4	m#231.6	
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	477		247	237	356	176	1720		274	1950	
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	1.25	0.38		0.18	0.21	0.32	0.65	0.78		0.77	1.01	

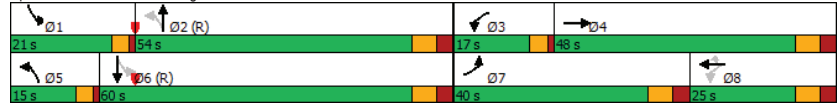
Intersection Summary	
Area Type:	CBD
Cycle Length:	140
Actuated Cycle Length:	140
Offset: 128 (91%), Referenced to phase 2:NBT and 6:SBTL, Start of Green	
Natural Cycle:	150
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	1.25

Lanes, Volumes, Timings  
5: Trafalgar Rd & Cross Ave/South Service Rd

Background 2032  
AM Peak Hour

Intersection Signal Delay: 72.3	Intersection LOS: E
Intersection Capacity Utilization 94.3%	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

Background 2032  
AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔		↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	826	77	89	41	45	104	105	1202	27	195	1565	250
Future Volume (vph)	826	77	89	41	45	104	105	1202	27	195	1565	250
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	0.92		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	1424		1518	1583	1362	1428	4499		1525	4411	
Flt Permitted	0.95	1.00		0.64	1.00	1.00	0.08	1.00		0.08	1.00	
Satd. Flow (perm)	2795	1424		1028	1583	1362	119	4499		126	4411	
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)	898	84	97	45	49	113	114	1307	29	212	1701	272
RTOR Reduction (vph)	0	31	0	0	0	101	0	2	0	0	15	0
Lane Group Flow (vph)	898	150	0	45	49	12	114	1334	0	212	1958	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	35.5		23.5	11.5	11.5	62.5	50.5		74.5	58.5	
Effective Green, g (s)	36.0	38.5		23.5	14.5	14.5	62.5	53.5		74.5	61.5	
Actuated g/C Ratio	0.26	0.28		0.17	0.10	0.10	0.45	0.38		0.53	0.44	
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	391		214	163	141	165	1719		266	1937	
v/s Ratio Prot	c0.32	c0.11		0.02	0.03		0.06	0.30		c0.11	c0.44	
v/s Ratio Perm				0.02		0.01	0.25			0.31		
v/c Ratio	1.25	0.38		0.21	0.30	0.08	0.69	0.78		0.80	1.01	
Uniform Delay, d1	52.0	41.1		50.0	58.1	56.7	30.6	38.0		38.1	39.2	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.17	1.20		1.17	1.14	
Incremental Delay, d2	124.2	0.9		0.6	1.4	0.3	7.6	2.2		5.4	14.5	
Delay (s)	176.2	42.0		50.5	59.5	57.1	43.5	47.8		50.2	59.3	
Level of Service	F	D		D	E	E	D	D		D	E	
Approach Delay (s)		153.7			56.2			47.5			58.5	
Approach LOS		F			E			D			E	
<b>Intersection Summary</b>												
HCM 2000 Control Delay		76.0									E	
HCM 2000 Volume to Capacity ratio		1.00										
Actuated Cycle Length (s)		140.0					Sum of lost time (s)	16.0				
Intersection Capacity Utilization		94.3%					ICU Level of Service	F				
Analysis Period (min)		15										
c Critical Lane Group												

Lanes, Volumes, Timings  
6: Trafalgar Rd & Cornwall Rd

Background 2032  
AM Peak Hour

	↖	→	↗	↙	←	↘	↖	↗	↙	↘	↖	↗	↙	↘
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR		
Lane Configurations	↖ ↗	↖ ↗		↖ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗		
Traffic Volume (vph)	314	510	85	66	550	496	106	492	72	683	760	253		
Future Volume (vph)	314	510	85	66	550	496	106	492	72	683	760	253		
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	0.98	0.99		0.99		0.98	1.00	1.00		0.98		0.98		
Frt		0.979				0.850		0.981				0.850		
Flt Protected	0.950			0.950			0.950			0.950				
Satd. Flow (prot)	2987	3055	0	1481	3154	1411	1540	2649	0	2929	1341	1356		
Flt Permitted	0.950			0.950			0.950			0.950				
Satd. Flow (perm)	2941	3055	0	1472	3154	1384	1534	2649	0	2880	1341	1324		
Right Turn on Red			Yes		Yes		Yes		Yes		Yes			
Satd. Flow (RTOR)		13			484		9					191		
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)	341	554	92	72	598	539	115	535	78	742	826	275		
Shared Lane Traffic (%)														
Lane Group Flow (vph)	341	646	0	72	598	539	115	613	0	742	826	275		
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

Background 2032  
AM Peak Hour

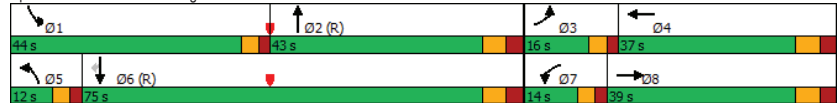
	↖	→	↗	↙	←	↘	↖	↗	↙	↘	↖	↗	↙	↘
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR		
Detector 2 Extend (s)		0.0			0.0							0.0		
Turn Type	Prot	NA		Prot	NA	Free	Prot	NA		Prot	NA	Perm		
Protected Phases	3	8		7	4		5	2		1	6			
Permitted Phases					Free									6
Detector Phases	3	8		7	4		5	2		1	6			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		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	1.33	0.84		0.69	0.80	0.39	1.31	0.82		0.89	1.21	0.36		
Control Delay	220.8	59.5		94.4	59.9	0.8	247.6	57.1		84.0	129.6	8.1		
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0		
Total Delay	220.8	59.5		94.4	59.9	0.8	247.6	57.1		84.0	129.6	8.1		
LOS	F	E		F	E	A	F	E		F	F	A		
Approach Delay		115.2			35.6			87.2			93.1			
Approach LOS		F			D			F			F			
Queue Length 50th (m)	-66.3	92.8		20.9	87.2	0.0	-42.9	103.5		118.8	-359.2	15.8		
Queue Length 95th (m)	#99.1	117.5		#46.0	110.5	0.0	#84.7	133.2		m119.1	m#358.1	m19.3		
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	773		105	743	1384	88	744		836	680	765		
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	1.33	0.84		0.69	0.80	0.39	1.31	0.82		0.89	1.21	0.36		
<b>Intersection Summary</b>														
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:	1.33													

Lanes, Volumes, Timings  
6: Trafalgar Rd & Cornwall Rd

Background 2032  
AM Peak Hour

Intersection Signal Delay: 82.2	Intersection LOS: F
Intersection Capacity Utilization 99.3%	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

Background 2032  
AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	314	510	85	66	550	496	106	492	72	683	760	253
Future Volume (vph)	314	510	85	66	550	496	106	492	72	683	760	253
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	2649		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	2649		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)	341	554	92	72	598	539	115	535	78	742	826	275
RTOR Reduction (vph)	0	10	0	0	0	0	0	6	0	0	0	94
Lane Group Flow (vph)	341	636	0	72	598	539	115	607	0	742	826	181
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	763		105	743	1384	88	737		836	680	671
v/s Ratio Prot	c0.11	c0.21		0.05	0.19		c0.07	0.23		0.25	c0.62	
v/s Ratio Perm						c0.39						0.14
v/c Ratio	1.33	0.83		0.69	0.80	0.39	1.31	0.82		0.89	1.21	0.27
Uniform Delay, d1	64.0	49.7		63.5	50.5	0.0	66.0	47.3		47.8	34.5	19.7
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.66	0.85	1.23
Incremental Delay, d2	173.7	10.4		30.7	9.1	0.8	198.6	10.1		4.8	101.0	0.3
Delay (s)	237.7	60.1		94.2	59.5	0.8	264.6	57.3		84.4	130.2	24.6
Level of Service	F	E		F	E	A	F	E		F	F	C
Approach Delay (s)	121.5				35.4		90.1				96.0	
Approach LOS	F				D		F				F	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			85.0		HCM 2000 Level of Service		F					
HCM 2000 Volume to Capacity ratio			1.14									
Actuated Cycle Length (s)			140.0		Sum of lost time (s)		16.0					
Intersection Capacity Utilization			99.3%		ICU Level of Service		F					
Analysis Period (min)			15									
c Critical Lane Group												

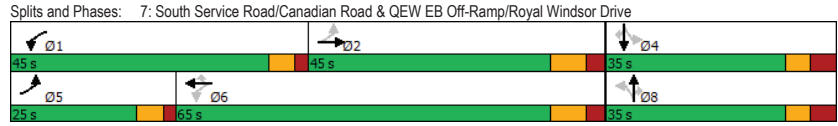
Lanes, Volumes, Timings Background 2032  
 7: South Service Road/Canadian Road & QEW EB Off-Ramp/Royal Windsor Drive AM Peak Hour

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
Fit 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
Fit 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		
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	Left	Right	Left	Left	Right
Median Width(m)	7.2		7.2		7.2		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	
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 Background 2032  
 7: South Service Road/Canadian Road & QEW EB Off-Ramp/Royal Windsor Drive AM Peak Hour

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		
Flash Dont Walk (s)	10.0			10.0			10.0			10.0		
Pedestrian Calls (#/hr)	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	
Starvation Cap Reductn	0			0			0		0		0	
Spillback Cap Reductn	0			0			0		0		0	
Storage Cap Reductn	0			0			0		0		0	
Reduced v/c Ratio	0.03	0.28		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%											
Analysis Period (min):	15											
ICU Level of Service:	A											

Lanes, Volumes, Timings Background 2032  
 7: South Service Road/Canadian Road & QEW EB Off-Ramp/Royal Windsor Drive AM Peak Hour



HCM Signalized Intersection Capacity Analysis Background 2032  
 7: South Service Road/Canadian Road & QEW EB Off-Ramp/Royal Windsor Drive AM Peak Hour

Movement	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
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
<b>Intersection Summary</b>												
HCM 2000 Control Delay			9.1									A
HCM 2000 Volume to Capacity ratio			0.26									
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

Background 2032  
AM Peak Hour

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

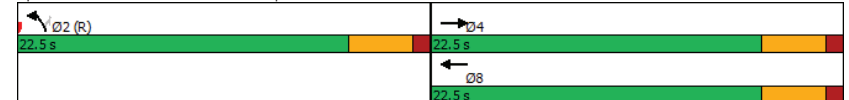
Background 2032  
AM Peak Hour

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

Background 2032  
AM Peak Hour

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 <sub>t</sub>	1.00			1.00	1.00	0.85
Fl <sub>t</sub> Protected	1.00			1.00	0.95	1.00
Satd. Flow (prot)	3539			3539	1770	1583
Fl <sub>t</sub> 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	
<b>Intersection Summary</b>						
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

Background 2032  
AM Peak Hour

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 <sub>t</sub>	0.993	0.850				
Fl <sub>t</sub> Protected	0.954					
Satd. Flow (prot)	3423	1441	3539	0	0	3539
Fl <sub>t</sub> 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
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
<b>Two way Left Turn Lane</b>						
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
<b>Detector 1 Channel</b>						
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
<b>Detector 2 Position(m)</b>						
Detector 2 Position(m)			9.4			9.4
Detector 2 Size(m)			0.6			0.6
Detector 2 Type			CI+Ex			CI+Ex
<b>Detector 2 Channel</b>						
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

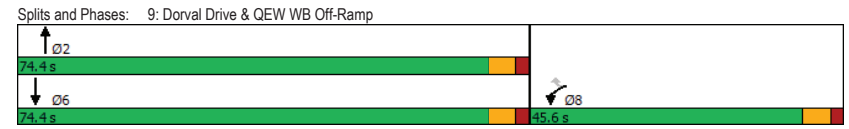
Background 2032  
AM Peak Hour

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

Background 2032  
AM Peak Hour



HCM Signalized Intersection Capacity Analysis  
9: Dorval Drive & QEWB Off-Ramp

Background 2032  
AM Peak Hour

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔↔	↔	↕↕	0	0	↕↕
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 & QEWB Off-Ramp

Background 2032  
AM Peak Hour

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

Background 2032  
AM Peak Hour

<b>Lane Group</b>	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%
Intersection LOS:	B
ICU Level of Service:	D
Analysis Period (min):	15

Lanes, Volumes, Timings  
10: Dorval Drive & QEW EB Off-Ramp

Background 2032  
AM Peak Hour

Split 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

Background 2032  
AM Peak Hour

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	
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

Background 2032  
AM Peak Hour

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Volume (vph)	8	25	723	229	69	372
Future Volume (vph)	8	25	723	229	69	372
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			0.968		0.886	
Flt Protected		0.988			0.992	
Satd. Flow (prot)	0	1352	1618	0	1503	0
Flt Permitted		0.988			0.992	
Satd. Flow (perm)	0	1352	1618	0	1503	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)	9	27	786	249	75	404
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	36	1035	0	479	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	
<b>Intersection Summary</b>						
Area Type:	CBD					
Control Type:	Unsignalized					
Intersection Capacity Utilization 94.3%				ICU Level of Service F		
Analysis Period (min) 15						

HCM Unsignalized Intersection Capacity Analysis  
11: Argus Rd & South Service Rd

Background 2032  
AM Peak Hour

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Volume (veh/h)	8	25	723	229	69	372
Future Volume (Veh/h)	8	25	723	229	69	372
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)	9	27	786	249	75	404
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	1036				962	912
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1036				962	912
tC, single (s)	5.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	3.1				3.5	3.3
p0 queue free %	98				73	0
cM capacity (veh/h)	404				279	334
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>WB 1</b>	<b>SB 1</b>			
Volume Total	36	1035	479			
Volume Left	9	0	75			
Volume Right	0	249	404			
eSH	404	1700	324			
Volume to Capacity	0.02	0.61	1.48			
Queue Length 95th (m)	0.5	0.0	209.9			
Control Delay (s)	3.8	0.0	261.8			
Lane LOS	A		F			
Approach Delay (s)	3.8	0.0	261.8			
Approach LOS			F			
<b>Intersection Summary</b>						
Average Delay			81.0			
Intersection Capacity Utilization		94.3%		ICU Level of Service	F	
Analysis Period (min)		15				

Lanes, Volumes, Timings  
12: Lyons Lane & South Service Road

Background 2032  
AM Peak Hour

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	
<b>Two way Left Turn Lane</b>						
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	
<b>Intersection Summary</b>						
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

Background 2032  
AM Peak Hour

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			
<b>Intersection Summary</b>						
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

Background 2032  
AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↕	↕		↕	↕		↕	↕		↕	↕	
Traffic Volume (vph)	45	512	17	48	729	34	25	0	58	583	19	646
Future Volume (vph)	45	512	17	48	729	34	25	0	58	583	19	646
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		0.995			0.993			0.850				0.854
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1570	3103	0	818	3186	0	805	734	0	1570	1401	0
Fit Permitted	0.340			0.283			0.143			0.716		
Satd. Flow (perm)	562	3103	0	243	3186	0	121	734	0	1158	1401	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5			9			312			193	
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)	49	557	18	52	792	37	27	0	63	634	21	702
Shared Lane Traffic (%)												
Lane Group Flow (vph)	49	575	0	52	829	0	27	63	0	634	723	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

Background 2032  
AM Peak Hour

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)	25.8	25.8		38.0	38.0			28.1	28.1		28.1	28.1
Actuated g/C Ratio	0.35	0.35		0.51	0.51			0.38	0.38		0.38	0.38
v/c Ratio	0.25	0.53		0.28	0.51			0.59	0.13		1.45	1.11
Control Delay	21.0	21.1		13.1	12.9			75.7	0.6		237.8	90.6
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0		0.0	0.0
Total Delay	21.0	21.1		13.1	12.9			75.7	0.6		237.8	90.6
LOS	C	C		B	B			E	A		F	F
Approach Delay		21.1			12.9				23.1			159.4
Approach LOS		C			B				C			F
Queue Length 50th (m)	5.0	34.3		3.7	38.8			3.0	0.0		~123.7	~100.1
Queue Length 95th (m)	13.5	49.4		9.3	53.2			#18.7	0.0		#206.8	#184.7
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)	315	1743		190	2328			46	472		438	650
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	0.33		0.27	0.36			0.59	0.13		1.45	1.11

Intersection Summary

Area Type: CBD  
 Cycle Length: 90  
 Actuated Cycle Length: 74.1  
 Natural Cycle: 130  
 Control Type: Semi Act-Uncoord  
 Maximum v/c Ratio: 1.45  
 Intersection Signal Delay: 82.3  
 Intersection LOS: F

Lanes, Volumes, Timings  
13: GO Bus Terminal/Argus Rd & Cross Ave

Background 2032  
AM Peak Hour

Intersection Capacity Utilization 96.8%  
 Analysis Period (min) 15  
 ICU Level of Service F  
 ~ 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

Background 2032  
AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔	
Traffic Volume (vph)	45	512	17	48	729	34	25	0	58	583	19	646	
Future Volume (vph)	45	512	17	48	729	34	25	0	58	583	19	646	
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		
Fr1	1.00	1.00		1.00	0.99		1.00	0.85		1.00	0.85		
Fl1 Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00		
Satd. Flow (prot)	1570	3104		818	3187		805	737		1543	1402		
Fl1 Permitted	0.34	1.00		0.28	1.00		0.14	1.00		0.72	1.00		
Satd. Flow (perm)	561	3104		244	3187		121	737		1163	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)	49	557	18	52	792	37	27	0	63	634	21	702	
RTOR Reduction (vph)	0	3	0	0	4	0	0	39	0	0	120	0	
Lane Group Flow (vph)	49	572	0	52	825	0	27	24	0	634	603	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)	23.8	23.8		36.0	36.0		26.0	26.0		26.0	26.0		
Effective Green, g (s)	25.8	25.8		36.0	38.0		28.0	28.0		28.0	28.0		
Actuated g/C Ratio	0.35	0.35		0.49	0.51		0.38	0.38		0.38	0.38		
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	1082		182	1636		45	278		440	530		
v/s Ratio Prot		0.18		0.03	c0.26			0.03			0.43		
v/s Ratio Perm	0.09			0.11			0.22			c0.55			
v/c Ratio	0.25	0.53		0.29	0.50		0.60	0.09		1.44	1.14		
Uniform Delay, d1	17.2	19.2		11.2	11.8		18.5	14.8		23.0	23.0		
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00		
Incremental Delay, d2	1.4	0.9		0.6	0.5		22.7	0.2		211.0	83.0		
Delay (s)	18.6	20.1		11.8	12.3		41.2	15.0		234.0	106.0		
Level of Service	B	C		B	B		D	B		F	F		
Approach Delay (s)		20.0			12.3			22.8			165.8		
Approach LOS		C			B			C			F		
<b>Intersection Summary</b>													
HCM 2000 Control Delay		84.8		HCM 2000 Level of Service				F					
HCM 2000 Volume to Capacity ratio		0.96											
Actuated Cycle Length (s)		74.0		Sum of lost time (s)				12.0					
Intersection Capacity Utilization		96.8%		ICU Level of Service				F					
Analysis Period (min)		15											
c Critical Lane Group													

Lanes, Volumes, Timings  
14: Lyons Lane/Street A & Cross Ave

Background 2032  
AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	68	267	235	262	205	6	21	4	15	19	28	49
Future Volume (vph)	68	267	235	262	205	6	21	4	15	19	28	49
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	
Fr1		0.930			0.995			0.880			0.904	
Fl1 Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1540	2825	0	1570	2727	0	1570	1486	0	1468	1502	0
Fl1 Permitted	0.608			0.374			0.703			0.744		
Satd. Flow (perm)	978	2825	0	618	2727	0	1158	1486	0	1145	1502	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		255			7			16			53	
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)	74	290	255	285	223	7	23	4	16	21	30	53
<b>Shared Lane Traffic (%)</b>												
Lane Group Flow (vph)	74	545	0	285	230	0	23	20	0	21	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	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	
<b>Two way Left Turn Lane</b>												
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	
<b>Detector 1 Channel</b>												
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	
<b>Detector 2 Channel</b>												

Lanes, Volumes, Timings  
14: Lyons Lane/Street A & Cross Ave

Background 2032  
AM Peak Hour

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		50.8	50.8		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	0.34		0.50	0.12		0.11	0.07		0.11	0.27	
Control Delay	10.6	6.0		6.8	3.3		27.1	15.2		27.0	15.3	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	10.6	6.0		6.8	3.3		27.1	15.2		27.0	15.3	
LOS	B	A		A	A		C	B		C	B	
Approach Delay		6.5			5.2			21.6			17.7	
Approach LOS		A			A			C			B	
Queue Length 50th (m)	4.9	10.3		10.9	4.0		2.8	0.5		2.5	3.6	
Queue Length 95th (m)	13.4	22.1		20.9	7.5		9.1	6.2		8.7	15.3	
Internal Link Dist (m)		16.1			187.2			45.1			46.9	
Turn Bay Length (m)				25.0			20.0					
Base Capacity (vph)	508	1591		668	2224		390	511		386	541	
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	0.34		0.43	0.10		0.06	0.04		0.05	0.15	

Intersection Summary

Area Type: CBD  
 Cycle Length: 90  
 Actuated Cycle Length: 71.2  
 Natural Cycle: 85  
 Control Type: Semi Act-Uncoord  
 Maximum v/c Ratio: 0.50  
 Intersection Signal Delay: 7.4  
 Intersection LOS: A

Lanes, Volumes, Timings  
14: Lyons Lane/Street A & Cross Ave

Background 2032  
AM Peak Hour

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

Background 2032  
AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	68	267	235	262	205	6	21	4	15	19	28	49
Future Volume (vph)	68	267	235	262	205	6	21	4	15	19	28	49
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	0.99		1.00	1.00		1.00	0.99		1.00	0.99	
Ftpb, ped/bikes	0.99	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.93		1.00	1.00		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	2825		1570	2729		1566	1487		1463	1503	
Flt Permitted	0.61	1.00		0.37	1.00		0.70	1.00		0.74	1.00	
Satd. Flow (perm)	980	2825		618	2729		1159	1487		1147	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)	74	290	255	285	223	7	23	4	16	21	30	53
RTOR Reduction (vph)	0	122	0	0	2	0	0	13	0	0	44	0
Lane Group Flow (vph)	74	423	0	285	228	0	23	7	0	21	39	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)	35.1	35.1		48.9	48.9		10.4	10.4		10.4	10.4	
Effective Green, g (s)	37.1	37.1		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)	509	1469		554	1948		201	258		199	261	
v/s Ratio Prot		0.15		c0.07	0.08			0.00			c0.03	
v/s Ratio Perm	0.08			c0.28			0.02			0.02		
v/c Ratio	0.15	0.29		0.51	0.12		0.11	0.03		0.11	0.15	
Uniform Delay, d1	8.9	9.6		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		0.6	0.1		0.3	0.1		0.3	0.4	
Delay (s)	9.2	9.9		5.4	3.2		25.2	24.5		25.1	25.3	
Level of Service	A	A		A	A		C	C		C	C	
Approach Delay (s)		9.8			4.4			24.9			25.3	
Approach LOS		A			A			C			C	

Intersection Summary			
HCM 2000 Control Delay	9.4	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.45		
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		

Lanes, Volumes, Timings  
15: Cross Ave & Lyons Lane

Background 2032  
AM Peak Hour

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↕	↕	↕	↕	↕
Traffic Volume (vph)	39	500	271	26	60	82
Future Volume (vph)	39	500	271	26	60	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			0.987		0.922	
Flt Protected	0.950				0.979	
Satd. Flow (prot)	1624	3094	2798	0	1349	0
Flt Permitted	0.950				0.979	
Satd. Flow (perm)	1624	3094	2798	0	1349	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)	42	543	295	28	65	89
Shared Lane Traffic (%)						
Lane Group Flow (vph)	42	543	323	0	154	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 32.4%	ICU Level of Service A
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis  
15: Cross Ave & Lyons Lane

Background 2032  
AM Peak Hour

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↕↕	↕↕		↕	↕↕
Traffic Volume (veh/h)	39	500	271	26	60	82
Future Volume (Veh/h)	39	500	271	26	60	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)	42	543	295	28	65	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	327				676	166
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	317				666	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	89
cM capacity (veh/h)	1246				379	790
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	42	272	272	197	126	154
Volume Left	42	0	0	0	0	65
Volume Right	0	0	0	0	28	89
sSH	1246	1700	1700	1700	1700	542
Volume to Capacity	0.03	0.16	0.16	0.12	0.07	0.28
Queue Length 95th (m)	0.8	0.0	0.0	0.0	0.0	9.3
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
<b>Intersection Summary</b>						
Average Delay			2.4			
Intersection Capacity Utilization			32.4%		ICU Level of Service	A
Analysis Period (min)			15			

Lanes, Volumes, Timings  
16: Speers Road/Cornwall Road & Cross Avenue

Background 2032  
AM Peak Hour

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↕↕	↕↕		↕	↕↕
Traffic Volume (vph)	240	721	674	31	40	364
Future Volume (vph)	240	721	674	31	40	364
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	0.281				0.950	
Satd. Flow (perm)	523	3539	3514	0	1770	2787
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)			5			396
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)	261	784	733	34	43	396
Shared Lane Traffic (%)						
Lane Group Flow (vph)	261	784	767	0	43	396
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

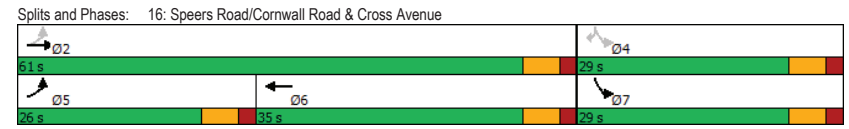
Background 2032  
AM Peak Hour

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	39.7		7.6	7.6
Actuated g/C Ratio	0.74	0.74	0.53		0.10	0.10
v/c Ratio	0.48	0.30	0.41		0.24	0.62
Control Delay	6.3	3.8	11.9		34.0	8.4
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	6.3	3.8	11.9		34.0	8.4
LOS	A	A	B		C	A
Approach Delay		4.4	11.9		10.9	
Approach LOS		A	B		B	
Queue Length 50th (m)	9.0	15.4	31.7		6.0	0.0
Queue Length 95th (m)	18.9	26.5	56.2		15.1	13.1
Internal Link Dist (m)		204.9	251.4		159.9	
Turn Bay Length (m)	75.0				55.0	
Base Capacity (vph)	720	2611	1871		546	1133
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	0.36	0.30	0.41		0.08	0.35

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:	0.62
Intersection Signal Delay:	8.2
Intersection Capacity Utilization:	54.1%
Analysis Period (min):	15
Intersection LOS:	A
ICU Level of Service:	A

Lanes, Volumes, Timings  
16: Speers Road/Cornwall Road & Cross Avenue

Background 2032  
AM Peak Hour



HCM Signalized Intersection Capacity Analysis  
16: Speers Road/Cornwall Road & Cross Avenue

Background 2032  
AM Peak Hour

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↕	↕		↕	↕
Traffic Volume (vph)	240	721	674	31	40	364
Future Volume (vph)	240	721	674	31	40	364
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
Fit Protected	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	0.28	1.00	1.00		0.95	1.00
Satd. Flow (perm)	524	3539	3516		1770	2787
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	261	784	733	34	43	396
RTOR Reduction (vph)	0	0	2	0	0	356
Lane Group Flow (vph)	261	784	765	0	43	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)	55.1	55.1	39.7		7.5	7.5
Effective Green, g (s)	55.1	55.1	39.7		7.5	7.5
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)	544	2613	1871		177	280
v/s Ratio Prot	c0.06	0.22	0.22		c0.02	
v/s Ratio Perm		c0.29				0.01
v/c Ratio	0.48	0.30	0.41		0.24	0.14
Uniform Delay, d1	4.1	3.3	10.4		30.9	30.6
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.7	0.3	0.7		0.7	0.2
Delay (s)	4.8	3.6	11.1		31.6	30.8
Level of Service	A	A	B		C	C
Approach Delay (s)		3.9	11.1		30.9	
Approach LOS		A	B		C	

Intersection Summary			
HCM 2000 Control Delay	11.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	74.6	Sum of lost time (s)	18.0
Intersection Capacity Utilization	54.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings  
17: Driveway A & Street 1

Background 2032  
AM Peak Hour

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔			↔	↔	
Traffic Volume (vph)	0	0	0	0	0	0
Future Volume (vph)	0	0	0	0	0	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
Fit Protected						
Satd. Flow (prot)	1863	0	0	1863	1863	0
Fit Permitted						
Satd. Flow (perm)	1863	0	0	1863	1863	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	25.3			86.7	45.3	
Travel Time (s)	1.8			6.2	3.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	0	0	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 0.0%	ICU Level of Service A
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis  
17: Driveway A & Street 1

Background 2032  
AM Peak Hour

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔			↔	↔	
Traffic Volume (veh/h)	0	0	0	0	0	0
Future Volume (Veh/h)	0	0	0	0	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	0	0	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None		None			
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			0		0	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			0		0	0
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			1623		1023	1085
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	0	0	0			
Volume Left	0	0	0			
Volume Right	0	0	0			
cSH	1700	1700	1700			
Volume to Capacity	0.00	0.00	0.00			
Queue Length 95th (m)	0.0	0.0	0.0			
Control Delay (s)	0.0	0.0	0.0			
Lane LOS			A			
Approach Delay (s)	0.0	0.0	0.0			
Approach LOS			A			
<b>Intersection Summary</b>						
Average Delay			0.0			
Intersection Capacity Utilization			0.0%		ICU Level of Service	A
Analysis Period (min)			15			

Lanes, Volumes, Timings  
18: Street C & Driveway B

Background 2032  
AM Peak Hour

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔			↔	↔	
Traffic Volume (vph)	0	0	0	0	0	0
Future Volume (vph)	0	0	0	0	0	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						
Fit Protected						
Satd. Flow (prot)	1863	0	0	1863	1863	0
Fit Permitted						
Satd. Flow (perm)	1863	0	0	1863	1863	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	50.0			80.0	54.5	
Travel Time (s)	3.6			5.8	3.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	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
Sign Control	Stop			Free	Free	
<b>Intersection Summary</b>						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	0.0%			ICU Level of Service A		
Analysis Period (min)	15					



HCM Unsignalized Intersection Capacity Analysis  
18: Street C & Driveway B

Background 2032  
AM Peak Hour

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔			↑	↑	
Traffic Volume (veh/h)	0	0	0	0	0	0
Future Volume (Veh/h)	0	0	0	0	0	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	0	0	0	0	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None	None		
Median storage (veh)						
Upstream signal (m)				80		
pX, platoon unblocked						
vC, conflicting volume	0	0	0			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0	0	0			
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)	1023	1085	1623			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	0	0	0			
Volume Left	0	0	0			
Volume Right	0	0	0			
eSH	1700	1700	1700			
Volume to Capacity	0.00	0.00	0.00			
Queue Length 95th (m)	0.0	0.0	0.0			
Control Delay (s)	0.0	0.0	0.0			
Lane LOS	A					
Approach Delay (s)	0.0	0.0	0.0			
Approach LOS	A					
<b>Intersection Summary</b>						
Average Delay			0.0			
Intersection Capacity Utilization			0.0%	ICU Level of Service		A
Analysis Period (min)			15			

Lanes, Volumes, Timings  
19: Street C & South Service Road

Background 2032  
AM Peak Hour

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔		↔	↔	↔	↔
Traffic Volume (vph)	222	0	0	61	0	0
Future Volume (vph)	222	0	0	61	0	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
<b>Fr</b>						
Fit Protected						
Satd. Flow (prot)	1863	0	0	1863	1863	0
Fit Permitted						
Satd. Flow (perm)	1863	0	0	1863	1863	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	235.2			305.2	159.9	
Travel Time (s)	16.9			22.0	11.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	241	0	0	66	0	0
<b>Shared Lane Traffic (%)</b>						
Lane Group Flow (vph)	241	0	0	66	0	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	
<b>Two way Left Turn Lane</b>						
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	
<b>Intersection Summary</b>						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	15.0%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis  
19: Street C & South Service Road

Background 2032  
AM Peak Hour

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↘			↘	↗	
Traffic Volume (veh/h)	222	0	0	61	0	0
Future Volume (Veh/h)	222	0	0	61	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	241	0	0	66	0	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			241		307	241
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			241		307	241
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			1326		685	798
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	241	66	0			
Volume Left	0	0	0			
Volume Right	0	0	0			
eSH	1700	1326	1700			
Volume to Capacity	0.14	0.00	0.00			
Queue Length 95th (m)	0.0	0.0	0.0			
Control Delay (s)	0.0	0.0	0.0			
Lane LOS			A			
Approach Delay (s)	0.0	0.0	0.0			
Approach LOS			A			
Intersection Summary						
Average Delay			0.0			
Intersection Capacity Utilization			15.0%		ICU Level of Service	A
Analysis Period (min)			15			

Lanes, Volumes, Timings  
20: Street A & South Service Road

Background 2032  
AM Peak Hour

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↘			↘	↗	
Traffic Volume (vph)	95	0	0	43	0	0
Future Volume (vph)	95	0	0	43	0	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						
Fit Protected						
Satd. Flow (prot)	1863	0	0	1863	1863	0
Fit Permitted						
Satd. Flow (perm)	1863	0	0	1863	1863	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	285.4			235.2	98.8	
Travel Time (s)	20.5			16.9	7.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	103	0	0	47	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	103	0	0	47	0	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	8.3%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis  
20: Street A & South Service Road

Background 2032  
AM Peak Hour

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔			↔	↔	
Traffic Volume (veh/h)	95	0	0	43	0	0
Future Volume (Veh/h)	95	0	0	43	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	103	0	0	47	0	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None		None			
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			103		150	103
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			103		150	103
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			1489		842	952
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	103	47	0			
Volume Left	0	0	0			
Volume Right	0	0	0			
cSH	1700	1489	1700			
Volume to Capacity	0.06	0.00	0.00			
Queue Length 95th (m)	0.0	0.0	0.0			
Control Delay (s)	0.0	0.0	0.0			
Lane LOS			A			
Approach Delay (s)	0.0	0.0	0.0			
Approach LOS			A			
<b>Intersection Summary</b>						
Average Delay			0.0			
Intersection Capacity Utilization			8.3%		ICU Level of Service	A
Analysis Period (min)			15			

Lanes, Volumes, Timings  
21: Argus Rd & Street 1

Background 2032  
AM Peak Hour

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔			↔	↔	
Traffic Volume (vph)	0	0	0	80	1248	0
Future Volume (vph)	0	0	0	80	1248	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						
Fit Protected						
Satd. Flow (prot)	1863	0	0	1863	1863	0
Fit Permitted						
Satd. Flow (perm)	1863	0	0	1863	1863	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	87	1357	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	87	1357	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	
<b>Intersection Summary</b>						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	69.0%			ICU Level of Service C		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis  
21: Argus Rd & Street 1

Background 2032  
AM Peak Hour

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔			↑	↑	
Traffic Volume (veh/h)	0	0	0	80	1248	0
Future Volume (Veh/h)	0	0	0	80	1248	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	0	0	87	1357	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)				114		
pX, platoon unblocked						
vC, conflicting volume	1444	1357	1357			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1444	1357	1357			
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)	145	182	507			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	0	87	1357			
Volume Left	0	0	0			
Volume Right	0	0	0			
eSH	1700	507	1700			
Volume to Capacity	0.00	0.00	0.80			
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					
<b>Intersection Summary</b>						
Average Delay			0.0			
Intersection Capacity Utilization		69.0%		ICU Level of Service		C
Analysis Period (min)			15			

Lanes, Volumes, Timings  
22: Street C & Street 1

Background 2032  
AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Future Volume (vph)	0	0	0	0	0	0	0	0	0	0	0	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
<b>Fit</b>												
Fit Protected												
Satd. Flow (prot)	0	1863	0	0	1863	0	0	1863	0	0	1863	0
Fit Permitted												
Satd. Flow (perm)	0	1863	0	0	1863	0	0	1863	0	0	1863	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		86.7			162.1			54.5			159.9	
Travel Time (s)		6.2			11.7			3.9			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	0	0	0	0	0	0	0	0	0	0	0
<b>Shared Lane Traffic (%)</b>												
Lane Group Flow (vph)	0	0	0	0	0	0	0	0	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)		0.0			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	
<b>Two way Left Turn Lane</b>												
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	
<b>Intersection Summary</b>												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	0.0%						ICU Level of Service A					
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis  
22: Street C & Street 1

Background 2032  
AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (veh/h)	0	0	0	0	0	0	0	0	0	0	0	0
Future Volume (Veh/h)	0	0	0	0	0	0	0	0	0	0	0	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	0	0	0	0	0	0	0	0	0	0	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None						None					
Median storage (veh)												
Upstream signal (m)	134											
pX, platoon unblocked												
vC, conflicting volume	0	0	0	0	0	0	0	0	0	0	0	0
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	0	0	0	0	0	0	0	0	0	0	0	0
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	100	100	100	100			100		
cM capacity (veh/h)	1023	896	1085	1023	896	1085	1623			1623		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	0	0	0	0								
Volume Left	0	0	0	0								
Volume Right	0	0	0	0								
eSH	1700	1700	1700	1700								
Volume to Capacity	0.00	0.00	0.00	0.00								
Queue Length 95th (m)	0.0	0.0	0.0	0.0								
Control Delay (s)	0.0	0.0	0.0	0.0								
Lane LOS	A	A										
Approach Delay (s)	0.0	0.0	0.0	0.0								
Approach LOS	A	A										
<b>Intersection Summary</b>												
Average Delay	0.0											
Intersection Capacity Utilization	0.0%			ICU Level of Service			A					
Analysis Period (min)	15											

Lanes, Volumes, Timings  
23: GO Station West Access/Street C & Cross Ave

Background 2032  
AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	0	313	104	871	495	0	46	0	245	0	0	0
Future Volume (vph)	0	313	104	871	495	0	46	0	245	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		
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						0.850					
Fit Protected				0.969			0.950					
Satd. Flow (prot)	0	3408	0	0	3429	0	1770	1583	0	1863	1863	0
Fit Permitted	0.622			0.757								
Satd. Flow (perm)	0	3408	0	0	2201	0	1410	1583	0	1863	1863	0
Right Turn on Red	Yes			Yes			Yes			Yes		
Satd. Flow (RTOR)	105			342								
Link Speed (k/h)	50			50			50			50		
Link Distance (m)	211.2			162.8			81.1			80.0		
Travel Time (s)	15.2			11.7			5.8			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
Adj. Flow (vph)	0	340	113	947	538	0	50	0	266	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	453	0	0	1485	0	50	266	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	15	25	15	25	15	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		
Protected Phases	4			8			2			6		
Permitted Phases	4			8			2			6		

Lanes, Volumes, Timings

23: GO Station West Access/Street C & Cross Ave

Background 2032

AM Peak Hour

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		0.33			2.73dl			0.09			0.33	
Control Delay		9.1			373.9			10.6			1.9	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		9.1			373.9			10.6			1.9	
LOS		A			F			B			A	
Approach Delay		9.1			373.9			3.3				
Approach LOS		A			F			A				
Queue Length 50th (m)		11.3			~114.9			2.9			0.0	
Queue Length 95th (m)		20.0			#151.1			8.2			6.1	
Internal Link Dist (m)		187.2			138.8			57.1			56.0	
Turn Bay Length (m)												
Base Capacity (vph)		1360			836			535			813	
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		0.33			1.78			0.09			0.33	

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: 1.78  
 Intersection Signal Delay: 248.6  
 Intersection LOS: F  
 Intersection Capacity Utilization 90.4%  
 ICU Level of Service E  
 Analysis Period (min) 15  
 ~ Volume exceeds capacity, queue is theoretically infinite.

Lanes, Volumes, Timings

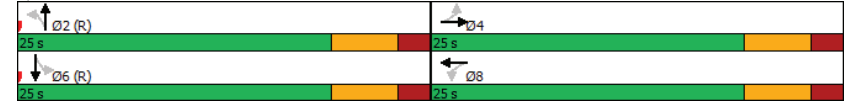
23: GO Station West Access/Street C & Cross Ave

Background 2032

AM Peak Hour

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

Background 2032  
 AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔	↔		↔	↔		↔	↔	
Traffic Volume (vph)	0	313	104	871	495	0	46	0	245	0	0	0
Future Volume (vph)	0	313	104	871	495	0	46	0	245	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		0.85
Flt Protected		1.00		0.97		0.95		1.00		1.00		1.00
Satd. Flow (prot)		3407		3430		1770		1583		1583		1583
Flt Permitted		1.00		0.62		0.76		1.00		1.00		1.00
Satd. Flow (perm)		3407		2203		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	340	113	947	538	0	50	0	266	0	0	0
RTOR Reduction (vph)	0	65	0	0	0	0	0	165	0	0	0	0
Lane Group Flow (vph)	0	388	0	0	1485	0	50	101	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)		1294			837		535		601			
v/s Ratio Prot		0.11							0.06			
v/s Ratio Perm					0.67		0.04					
v/c Ratio		0.30			2.73dl		0.09		0.17			
Uniform Delay, d1		10.8			15.5		10.0		10.3			
Progression Factor		1.00			1.00		1.00		1.00			
Incremental Delay, d2		0.1			353.2		0.3		0.6			
Delay (s)		11.0			368.7		10.3		10.9			
Level of Service		B			F		B		B			
Approach Delay (s)		11.0			368.7		10.8					0.0
Approach LOS		B			F		B					A

**Intersection Summary**

HCM 2000 Control Delay	246.7	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	50.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	90.4%	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

Background 2032  
 PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	141	119	340	961	227	187	436	1917	714	142	1255	117
Future Volume (vph)	141	119	340	961	227	187	436	1917	714	142	1255	117
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			0.850
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	0.606			0.382			0.105			0.118		
Satd. Flow (perm)	1011	1710	1425	1255	1710	1360	178	4577	1402	200	4532	1425
Right Turn on Red			Yes			Yes			Yes		Yes	
Satd. Flow (RTOR)			255			151			336		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)	153	129	370	1045	247	203	474	2084	776	154	1364	127
Shared Lane Traffic (%)												
Lane Group Flow (vph)	153	129	370	1045	247	203	474	2084	776	154	1364	127
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

1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd

Background 2032

PM Peak Hour

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)	25.4	18.4	120.0	46.4	36.4	36.4	64.6	52.0	120.0	45.6	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	0.61	0.49	0.26	1.22	0.48	0.39	1.26	1.05	0.55	0.87	0.98	0.22
Control Delay	40.9	52.8	0.4	139.3	37.1	11.5	166.8	68.8	1.6	68.4	60.4	1.6
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	40.9	52.8	0.4	139.3	37.1	11.5	166.8	68.8	1.6	68.4	60.4	1.6
LOS	D	D	A	F	D	B	F	E	A	E	E	A
Approach Delay		20.3			105.1			67.1			56.6	
Approach LOS		C			F			E			E	
Queue Length 50th (m)	24.8	29.4	0.0	~129.5	49.3	9.2	~134.4	~206.3	0.0	21.7	122.3	0.0
Queue Length 95th (m)	39.7	49.0	0.0	#165.6	73.4	28.8	#208.8	#236.9	0.0	#71.0	#156.4	2.6
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	857	555	543	377	1983	1402	177	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	0.61	0.43	0.26	1.22	0.45	0.37	1.26	1.05	0.55	0.87	0.98	0.22

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:	140
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	1.26
Intersection Signal Delay:	68.3
Intersection LOS:	E

Lanes, Volumes, Timings

1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd

Background 2032

PM Peak Hour

Intersection Capacity Utilization	106.3%	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

Background 2032  
PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	141	119	340	961	227	187	436	1917	714	142	1255	117
Future Volume (vph)	141	119	340	961	227	187	436	1917	714	142	1255	117
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	0.95	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
Fit 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
Fit Permitted	0.61	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)	1021	1710	1425	1255	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)	153	129	370	1045	247	203	474	2084	776	154	1364	127
RTOR Reduction (vph)	0	0	0	0	0	105	0	0	0	0	0	88
Lane Group Flow (vph)	153	129	370	1045	247	98	474	2084	776	154	1364	39
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	44.4	33.4	33.4	61.6	49.0	120.0	42.6	34.0	34.0
Effective Green, g (s)	22.4	18.4	120.0	44.4	36.4	36.4	61.6	52.0	120.0	42.6	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	0.36	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	262	1425	837	518	412	372	1983	1402	171	1397	439
v/s Ratio Prot	0.04	0.08		c0.25	0.14		c0.25	0.46		0.06	0.30	
v/s Ratio Perm	0.09		0.26	c0.21		0.07	c0.40		0.55	0.25		0.03
v/c Ratio	0.68	0.49	0.26	1.25	0.48	0.24	1.27	1.05	0.55	0.90	0.98	0.09
Uniform Delay, d1	44.2	46.5	0.0	34.4	34.0	31.4	37.1	34.0	0.0	31.7	41.1	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	8.3	3.0	0.4	121.8	1.4	0.6	142.8	35.1	1.6	41.5	19.1	0.4
Delay (s)	52.5	49.5	0.4	156.1	35.5	32.0	179.9	69.1	1.6	73.3	60.1	29.9
Level of Service	D	D	A	F	D	C	F	E	A	E	E	C
Approach Delay (s)	22.4			119.3			69.2			59.0		
Approach LOS	C			F			E			E		
<b>Intersection Summary</b>												
HCM 2000 Control Delay	73.1			HCM 2000 Level of Service			E					
HCM 2000 Volume to Capacity ratio	1.26											
Actuated Cycle Length (s)	120.0			Sum of lost time (s)			17.0					
Intersection Capacity Utilization	106.3%			ICU Level of Service			G					
Analysis Period (min)	15											
c Critical Lane Group												

Lanes, Volumes, Timings  
2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp

Background 2032  
PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	26	0	301	744	144	362	0	2679	542	0	2544	11
Future Volume (vph)	26	0	301	744	144	362	0	2679	542	0	2544	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		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	
Fit Protected	0.950			0.950	0.967							
Satd. Flow (prot)	1570	0	1437	1463	1545	1409	0	4577	1439	0	4780	0
Fit 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)			86			227			156			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
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	327	809	157	393	0	2912	589	0	2765	12
Shared Lane Traffic (%)	41%											
Lane Group Flow (vph)	28	0	327	477	489	393	0	2912	589	0	2777	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	
<b>Two way Left Turn Lane</b>												
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	CI+Ex		CI+Ex	CI+Ex	CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	
<b>Detector 1 Channel</b>												
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	
<b>Detector 2 Channel</b>												

Lanes, Volumes, Timings

2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp

Background 2032

PM Peak Hour

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			3	4		Free		6	Free			2
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	1.34	1.30	0.28		1.19	0.42			1.08
Control Delay	55.1		133.0	213.1	196.8	0.5		117.1	0.3			77.4
Queue Delay	0.0		0.0	0.0	0.0	0.0		0.0	0.0			0.0
Total Delay	55.1		133.0	213.1	196.8	0.5		117.1	0.3			77.4
LOS	E		F	F	F	A		F	A			E
Approach Delay		126.9			145.8			97.5				77.4
Approach LOS		F			F			F				E
Queue Length 50th (m)	7.3		~88.1	~190.5	~191.7	0.0		~372.0	0.0			~263.5
Queue Length 95th (m)	17.3		#151.3	#264.4	#266.3	0.0		#398.4	m0.0			#284.5
Internal Link Dist (m)		118.1			168.6			300.8				256.4
Turn Bay Length (m)	50.0											
Base Capacity (vph)	213		288	355	375	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	1.34	1.30	0.28		1.19	0.42			1.08

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: 1.34

Lanes, Volumes, Timings

2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp

Background 2032

PM Peak Hour

Intersection Signal Delay: 100.0 Intersection LOS: F  
 Intersection Capacity Utilization 99.0% 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

Background 2032  
PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	26	0	301	744	144	362	0	2679	542	0	2544	11
Future Volume (vph)	26	0	301	744	144	362	0	2679	542	0	2544	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	1.00	0.85	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	1545	1391	4577	1400	4782	1400	1400	4782	1400
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	1545	1391	4577	1400	4782	1400	1400	4782	1400
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	327	809	157	393	0	2912	589	0	2765	12
RTOR Reduction (vph)	0	0	73	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	28	0	254	477	489	393	0	2912	589	0	2777	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			3	4		Free			Free			
Actuated Green, G (s)	18.0		18.0	31.0	31.0	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	
Actuated g/C Ratio	0.14		0.15	0.24	0.24	1.00		0.54	1.00		0.54	
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)	213		215	355	375	1391		2451	1400		2561	
v/s Ratio Prot	0.02							0.64			0.58	
v/s Ratio Perm			0.18	0.33	0.32	0.28			0.42			
v/c Ratio	0.13		1.18	1.34	1.30	0.28		1.19	0.42		1.08	
Uniform Delay, d1	53.2		59.5	53.0	53.0	0.0		32.5	0.0		32.5	
Progression Factor	1.00		1.00	1.00	1.00	1.00		0.99	1.00		1.00	
Incremental Delay, d2	0.3		118.9	172.4	155.0	0.5		86.3	0.3		45.4	
Delay (s)	53.5		178.4	225.4	208.0	0.5		118.5	0.3		77.9	
Level of Service	D		F	F	F	A		F	A		E	
Approach Delay (s)		168.5				154.1			98.6			77.9
Approach LOS		F				F			F			E

Intersection Summary			
HCM 2000 Control Delay	104.0	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.24		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	99.0%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings  
3: Trafalgar Rd & QEW EB-Off Ramp

Background 2032  
PM Peak Hour

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	1020	444	0	2185	2195	334
Future Volume (vph)	1020	444	0	2185	2195	334
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)	1109	483	0	2375	2386	363
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1109	483	0	2375	2386	363
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	Free
Protected Phases					2	2

Lanes, Volumes, Timings  
3: Trafalgar Rd & QEW EB-Off Ramp

Background 2032  
PM Peak Hour

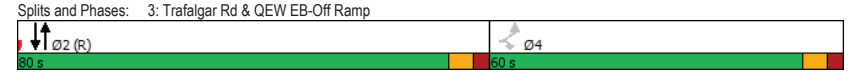
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Permitted Phases	4	4				Free
Detector Phase	4	4		2	2	
Switch Phase						
Minimum Initial (s)	10.0	10.0		29.0	29.0	
Minimum Split (s)	38.0	38.0		36.0	36.0	
Total Split (s)	60.0	60.0		80.0	80.0	
Total Split (%)	42.9%	42.9%		57.1%	57.1%	
Maximum Green (s)	53.0	53.0		73.0	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)	55.2	55.2		76.8	76.8	140.0
Actuated g/C Ratio	0.39	0.39		0.55	0.55	1.00
v/c Ratio	0.92	0.87		0.95	0.95	0.25
Control Delay	53.6	56.5		31.9	18.9	0.0
Queue Delay	0.0	0.0		0.0	0.0	0.0
Total Delay	53.6	56.5		31.9	18.9	0.0
LOS	D	E		C	B	A
Approach Delay	54.5			31.9	16.4	
Approach LOS	D			C	B	
Queue Length 50th (m)	155.8	127.2		241.9	193.4	0.0
Queue Length 95th (m)	#199.1	#192.2		m210.6	m134.1	m0.0
Internal Link Dist (m)	175.2			27.4	300.8	
Turn Bay Length (m)						
Base Capacity (vph)	1218	562		2509	2509	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	0.91	0.86		0.95	0.95	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:	90
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.95
Intersection Signal Delay:	30.9
Intersection LOS:	C
Intersection Capacity Utilization:	86.1%
ICU Level of Service:	E
Analysis Period (min):	15

Lanes, Volumes, Timings  
3: Trafalgar Rd & QEW EB-Off Ramp

Background 2032  
PM Peak Hour

- # 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  
3: Trafalgar Rd & QEW EB-Off Ramp

Background 2032  
PM Peak Hour

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	1020	444	0	2185	2195	334
Future Volume (vph)	1020	444	0	2185	2195	334
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)	1109	483	0	2375	2386	363
RTOR Reduction (vph)	0	1	0	0	0	0
Lane Group Flow (vph)	1109	482	0	2375	2386	363
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)	52.2	52.2		73.8	73.8	140.0
Effective Green, g (s)	55.2	55.2		76.8	76.8	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)	1200	552		2510	2510	1454
v/s Ratio Prot				0.52	0.52	
v/s Ratio Perm	c0.36	0.34				0.25
v/c Ratio	0.92	0.87		0.95	0.95	0.25
Uniform Delay, d1	40.4	39.2		29.7	29.8	0.0
Progression Factor	1.00	1.00		0.88	0.57	1.00
Incremental Delay, d2	11.8	14.2		5.2	1.2	0.0
Delay (s)	52.2	53.4		31.3	18.1	0.0
Level of Service	D	D		C	B	A
Approach Delay (s)	52.6			31.3	15.7	
Approach LOS	D			C	B	

Intersection Summary			
HCM 2000 Control Delay	30.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	86.1%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings  
4: Trafalgar Rd & Argus Rd

Background 2032  
PM Peak Hour

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	88	0	3039	1865	772
Future Volume (vph)	0	88	0	3039	1865	772
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			0.956	
Flt Protected						
Satd. Flow (prot)	0	1354	0	4577	4363	0
Flt 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	96	0	3303	2027	839
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	96	0	3303	2866	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 72.6%	ICU Level of Service C
Analysis Period (min) 15	

HCM Unsignalized Intersection Capacity Analysis  
4: Trafalgar Rd & Argus Rd

Background 2032  
PM Peak Hour

Movement	EBL	EBR	NBL	NBT	SBT	SBR	
Lane Configurations		↖		↗↗	↘↘		
Traffic Volume (veh/h)	0	88	0	3039	1865	772	
Future Volume (Veh/h)	0	88	0	3039	1865	772	
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	96	0	3303	2027	839	
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	0.68	0.51	0.51				
vC, conflicting volume	3572	1119	2890				
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol	0	0	1321				
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	82	100				
cM capacity (veh/h)	684	529	263				
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>NB 1</b>	<b>NB 2</b>	<b>NB 3</b>	<b>SB 1</b>	<b>SB 2</b>	<b>SB 3</b>
Volume Total	96	1101	1101	1101	811	811	1244
Volume Left	0	0	0	0	0	0	0
Volume Right	96	0	0	0	0	0	839
sSH	529	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.18	0.65	0.65	0.65	0.48	0.48	0.73
Queue Length 95th (m)	5.3	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (s)	13.3	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	B						
Approach Delay (s)	13.3	0.0			0.0		
Approach LOS	B						
<b>Intersection Summary</b>							
Average Delay				0.2			
Intersection Capacity Utilization			72.6%		ICU Level of Service		C
Analysis Period (min)			15				

Lanes, Volumes, Timings  
5: Trafalgar Rd & Cross Ave/South Service Rd

Background 2032  
PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖↗	↖	↗	↖	↗	↘	↖↗	↖↗	↘	↖↗	↖↗	↘
Traffic Volume (vph)	866	46	126	78	84	195	160	1584	38	87	1454	269
Future Volume (vph)	866	46	126	78	84	195	160	1584	38	87	1454	269
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		0.890				0.850		0.997			0.977	
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2958	1352	0	1540	1644	1423	1496	4579	0	1570	4465	0
Fit Permitted	0.950			0.640			0.073			0.079		
Satd. Flow (perm)	2958	1352	0	1009	1644	1423	115	4579	0	131	4465	0
Right Turn on Red			Yes			Yes		Yes		Yes		Yes
Satd. Flow (RTOR)		126				148		3			30	
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)	941	50	137	85	91	212	174	1722	41	95	1580	292
Shared Lane Traffic (%)												
Lane Group Flow (vph)	941	187	0	85	91	212	174	1763	0	95	1872	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	
<b>Two way Left Turn Lane</b>												
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	
<b>Detector 1 Channel</b>												
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	
<b>Detector 2 Channel</b>												

Lanes, Volumes, Timings  
5: Trafalgar Rd & Cross Ave/South Service Rd

Background 2032  
PM Peak Hour

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	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	59.9		15.9	18.9	18.9	71.9	60.3		61.4	53.6	
Actuated g/C Ratio	0.26	0.43		0.11	0.14	0.14	0.51	0.43		0.44	0.38	
v/c Ratio	1.20	0.29		0.75	0.41	0.66	0.86	0.89		0.69	1.08	
Control Delay	148.0	9.7		95.3	60.6	28.9	57.3	52.4		45.2	89.7	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	148.0	9.7		95.3	60.6	28.9	57.3	52.4		45.2	89.7	
LOS	F	A		F	E	C	E	D		D	F	
Approach Delay		125.1			50.9			52.8			87.6	
Approach LOS		F			D			D			F	
Queue Length 50th (m)	~171.4	10.2		24.0	24.2	16.8	45.0	158.5		19.2	~231.2	
Queue Length 95th (m)	#213.8	26.9		#49.1	42.7	45.9	m46.3	m144.1		m21.6	m#255.0	
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	668		129	246	339	217	1972		139	1726	
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	1.20	0.28		0.66	0.37	0.63	0.80	0.89		0.68	1.08	

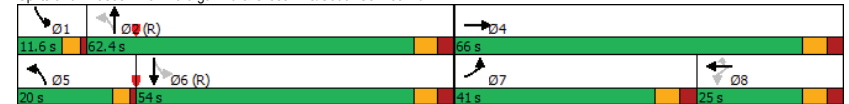
Intersection Summary	
Area Type:	CBD
Cycle Length:	140
Actuated Cycle Length:	140
Offset:	128 (91%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle:	140
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	1.20

Lanes, Volumes, Timings  
5: Trafalgar Rd & Cross Ave/South Service Rd

Background 2032  
PM Peak Hour

Intersection Signal Delay: 80.3	Intersection LOS: F
Intersection Capacity Utilization 97.1%	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

Background 2032  
PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	↔	↔		↔	↔	↔	↔↔↔	↔↔↔		↔	↔↔	↔	
Traffic Volume (vph)	866	46	126	78	84	195	160	1584	38	87	1454	269	
Future Volume (vph)	866	46	126	78	84	195	160	1584	38	87	1454	269	
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	0.97		1.00	1.00	1.00	1.00	0.99		1.00	0.99		
Fibp, 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	1352		1498	1644	1423	1496	4576		1570	4463		
Flt Permitted	0.95	1.00		0.64	1.00	1.00	0.07	1.00		0.08	1.00		
Satd. Flow (perm)	2958	1352		1009	1644	1423	115	4576		131	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)	941	50	137	85	91	212	174	1722	41	95	1580	292	
RTOR Reduction (vph)	0	72	0	0	0	128	0	2	0	0	19	0	
Lane Group Flow (vph)	941	115	0	85	91	84	174	1761	0	95	1853	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	56.9		15.9	15.9	15.9	69.1	57.3		58.4	50.6		
Effective Green, g (s)	37.0	59.9		15.9	18.9	18.9	69.1	60.3		58.4	53.6		
Actuated g/C Ratio	0.26	0.43		0.11	0.13	0.13	0.49	0.43		0.42	0.38		
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	578		114	221	192	199	1970		134	1708		
v/s Ratio Prot	c0.32	0.08		0.06			c0.09	0.38		0.04	c0.42		
v/s Ratio Perm				c0.08		0.06	0.34			0.26			
v/c Ratio	1.20	0.20		0.75	0.41	0.44	0.87	0.89		0.71	1.09		
Uniform Delay, d1	51.5	25.0		60.1	55.5	55.7	41.2	36.9		30.7	43.2		
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.27	1.35		1.31	1.19		
Incremental Delay, d2	104.2	0.2		24.3	1.7	2.2	12.6	2.3		7.1	43.4		
Delay (s)	155.7	25.3		84.4	57.2	57.8	64.8	51.9		47.3	94.9		
Level of Service	F	C		F	E	E	E	D		D	F		
Approach Delay (s)	134.1			63.5			53.1			92.6			
Approach LOS	F			E			D			F			
<b>Intersection Summary</b>													
HCM 2000 Control Delay		85.0		HCM 2000 Level of Service				F					
HCM 2000 Volume to Capacity ratio		1.03											
Actuated Cycle Length (s)		140.0		Sum of lost time (s)				16.0					
Intersection Capacity Utilization		97.1%		ICU Level of Service				F					
Analysis Period (min)		15											
c Critical Lane Group													

Lanes, Volumes, Timings  
6: Trafalgar Rd & Cornwall Rd

Background 2032  
PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔		↔	↔	↔	↔↔↔	↔↔↔		↔	↔↔	↔
Traffic Volume (vph)	513	525	53	99	809	453	73	798	89	593	669	381
Future Volume (vph)	513	525	53	99	809	453	73	798	89	593	669	381
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		0.850	0.985			0.99		0.850
Frt		0.986										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)	2990	3101	0	1549	3217	1413	1527	2688	0	2970	1368	1361
Right Turn on Red			Yes			Yes		Yes		Yes		Yes
Satd. Flow (RTOR)		8				301		7				293
Link Speed (k/h)		50			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)	558	571	58	108	879	492	79	867	97	645	727	414
Shared Lane Traffic (%)												
Lane Group Flow (vph)	558	629	0	108	879	492	79	964	0	645	727	414
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		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  
6: Trafalgar Rd & Cornwall Rd

Background 2032  
PM Peak Hour

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	1.36	0.71		0.74	1.13	0.35	0.90	1.06		1.26	1.18	0.54
Control Delay	223.2	49.2		91.0	120.2	0.7	135.3	92.0		181.9	109.3	3.9
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	223.2	49.2		91.0	120.2	0.7	135.3	92.0		181.9	109.3	3.9
LOS	F	D		F	F	A	F	F		F	F	A
Approach Delay		131.0			78.3			95.3				111.1
Approach LOS		F			E			F				F
Queue Length 50th (m)	~110.1	85.6		31.2	~155.4	0.0	23.3	~192.3		~124.7	~306.8	18.1
Queue Length 95th (m)	#148.1	108.3		#62.4	#198.0	0.0	#56.8	#244.8		m#115.7	m#281.2	m16.2
Internal Link Dist (m)		261.8			118.3			287.4			106.3	
Turn Bay Length (m)	80.0			80.0			25.0			80.0		
Base Capacity (vph)	409	891		145	781	1413	88	907		512	615	773
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	0.71		0.74	1.13	0.35	0.90	1.06		1.26	1.18	0.54

Intersection Summary

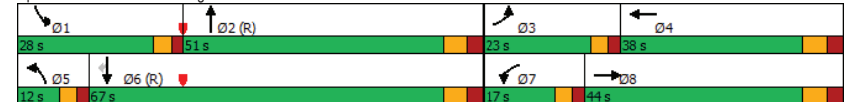
Area Type:	CBD
Cycle Length:	140
Actuated Cycle Length:	140
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green, Master Intersection	
Natural Cycle:	150
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	1.36

Lanes, Volumes, Timings  
6: Trafalgar Rd & Cornwall Rd

Background 2032  
PM Peak Hour

Intersection Signal Delay: 103.6	Intersection LOS: F
Intersection Capacity Utilization 101.2%	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

Background 2032  
PM Peak Hour

	↖		→		↗		↖		←		↗		↖		↗	
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR				
Lane Configurations	↖	↑	↗	↖	↑	↗	↖	↑	↗	↖	↑	↗				
Traffic Volume (vph)	513	525	53	99	809	453	73	798	89	593	669	381				
Future Volume (vph)	513	525	53	99	809	453	73	798	89	593	669	381				
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				
Frbp, ped/bikes	1.00	1.00		1.00	1.00	0.98	1.00	1.00		1.00	1.00	0.97				
Fipb, 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	3101		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	3101		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)	558	571	58	108	879	492	79	867	97	645	727	414				
RTOR Reduction (vph)	0	6	0	0	0	0	0	5	0	0	0	161				
Lane Group Flow (vph)	558	623	0	108	879	492	79	959	0	645	727	253				
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	902		512	615	612				
v/s Ratio Prot	c0.18	0.20		0.07	c0.27		0.05	0.36		c0.22	c0.53					
v/s Ratio Perm					0.35							0.19				
v/c Ratio	1.36	0.70		0.74	1.13	0.35	0.90	1.06		1.26	1.18	0.41				
Uniform Delay, d1	60.5	44.7		61.9	53.0	0.0	65.6	46.5		58.0	38.5	26.0				
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.48	0.64	0.48				
Incremental Delay, d2	179.0	4.7		28.9	72.6	0.7	61.6	48.4		118.4	83.6	0.2				
Delay (s)	239.5	49.4		90.8	125.6	0.7	127.2	94.9		204.1	108.2	12.6				
Level of Service	F	D		F	F	A	F	F		F	F	B				
Approach Delay (s)	138.8			81.5			97.3			120.7						
Approach LOS	F			F			F			F						
<b>Intersection Summary</b>																
HCM 2000 Control Delay	109.6			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)				16.0								
Intersection Capacity Utilization	101.2%			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 PM Peak Hour

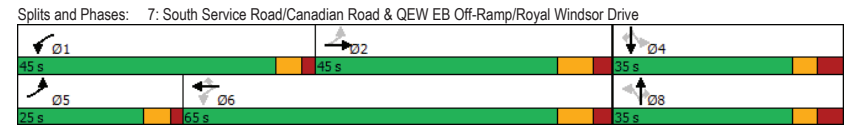
	↖		→		↗		↖		←		↗		↖		↗	
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR				
Lane Configurations	↖	↑	↗	↖	↑	↗	↖	↑	↗	↖	↑	↗				
Traffic Volume (vph)	338	589	19	198	704	30	15	51	108	15	129	460				
Future Volume (vph)	338	589	19	198	704	30	15	51	108	15	129	460				
Ideal Flow (vphpl)	1900	1900	1900	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				
Fit 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				
Fit 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	0.6	2.0	0.6	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 Background 2032  
 7: South Service Road/Canadian Road & QEW EB Off-Ramp/Royal Windsor Drive PM Peak Hour

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 Capacity Utilization:	70.1%
Analysis Period (min):	15
Intersection LOS:	B
ICU Level of Service:	C

Lanes, Volumes, Timings Background 2032  
 7: South Service Road/Canadian Road & QEW EB Off-Ramp/Royal Windsor Drive PM Peak Hour



HCM Signalized Intersection Capacity Analysis Background 2032  
 7: South Service Road/Canadian Road & QEW EB Off-Ramp/Royal Windsor Drive PM Peak Hour

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
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)	3502	3396		1752	3505	1615	1805	1900	1615	1805	1900	1599
Fit 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 Background 2032  
 8: QEW WB Off-Ramp & Kerr Street PM Peak Hour

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
Fit Protected					0.950	
Satd. Flow (prot)	3574	0	0	3574	1805	1599
Fit 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

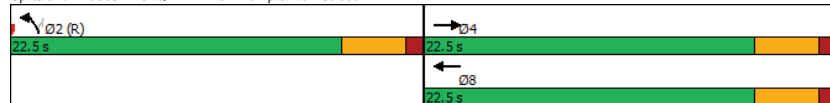
Lanes, Volumes, Timings  
8: QEW WB Off-Ramp & Kerr Street

Background 2032  
PM Peak Hour

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

Background 2032  
PM Peak Hour

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
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)	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

Background 2032  
PM Peak Hour

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔↔	↔	↕↕	0	0	↕↕
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

Background 2032  
PM Peak Hour

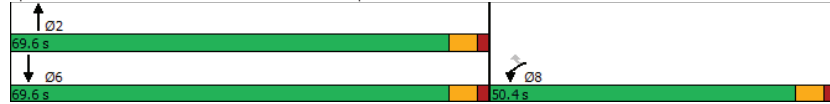
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Permitted Phases		8				
Detector Phase	8	8	2			6
Switch Phase						
Minimum Initial (s)	10.0	10.0	20.0			20.0
Minimum Split (s)	24.0	24.0	26.0			26.0
Total Split (s)	50.4	50.4	69.6			69.6
Total Split (%)	42.0%	42.0%	58.0%			58.0%
Maximum Green (s)	44.4	44.4	63.6			63.6
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

Background 2032  
PM Peak Hour

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

Background 2032  
PM Peak Hour

	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				
w/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
<b>Intersection Summary</b>						
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

Background 2032  
PM Peak Hour

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
Frt	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

Background 2032  
PM Peak Hour

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

Background 2032  
PM Peak Hour

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

Background 2032  
PM Peak Hour

	↖	↗	↖	↑	↓	↗
Movement	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
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	
<b>Intersection Summary</b>						
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

Background 2032  
PM Peak Hour




Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Volume (vph)	41	16	455	417	44	177
Future Volume (vph)	41	16	455	417	44	177
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			0.935		0.892	
Flt Protected		0.965			0.990	
Satd. Flow (prot)	0	1593	1520	0	1510	0
Flt Permitted		0.965			0.990	
Satd. Flow (perm)	0	1593	1520	0	1510	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)	45	17	495	453	48	192
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	62	948	0	240	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

Background 2032  
PM Peak Hour




Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Volume (veh/h)	41	16	455	417	44	177
Future Volume (Veh/h)	41	16	455	417	44	177
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)	45	17	495	453	48	192
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	948				834	722
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	948				834	722
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				85	55
cM capacity (veh/h)	732				319	430

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	62	948	240
Volume Left	45	0	48
Volume Right	0	453	192
eSH	732	1700	402
Volume to Capacity	0.06	0.56	0.60
Queue Length 95th (m)	1.6	0.0	30.0
Control Delay (s)	7.6	0.0	26.3
Lane LOS	A		D
Approach Delay (s)	7.6	0.0	26.3
Approach LOS			D

Intersection Summary	
Average Delay	5.4
Intersection Capacity Utilization	76.4%
Analysis Period (min)	15
	ICU Level of Service D

Lanes, Volumes, Timings  
12: Lyons Lane & South Service Road

Background 2032  
PM Peak Hour




Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Volume (vph)	4	6	1	64	57	6
Future Volume (vph)	4	6	1	64	57	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			0.867		0.986	
Flt Protected		0.982			0.957	
Satd. Flow (prot)	0	1679	1218	0	1614	0
Flt Permitted		0.982			0.957	
Satd. Flow (perm)	0	1679	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	7	1	70	62	7
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	11	71	0	69	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	17.5%
Analysis Period (min)	15
	ICU Level of Service A

HCM Unsignalized Intersection Capacity Analysis  
12: Lyons Lane & South Service Road

Background 2032  
PM Peak Hour



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Volume (veh/h)	4	6	1	64	57	6
Future Volume (Veh/h)	4	6	1	64	57	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	70	62	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	78				58	43
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	78				58	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				946	1027

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	11	71	69
Volume Left	4	0	62
Volume Right	0	70	7
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)	2.7	0.0	9.1
Lane LOS	A		A
Approach Delay (s)	2.7	0.0	9.1
Approach LOS			A

Intersection Summary	
Average Delay	4.3
Intersection Capacity Utilization	17.5%
Analysis Period (min)	15
	ICU Level of Service A

Lanes, Volumes, Timings  
13: GO Bus Terminal/Argus Rd & Cross Ave

Background 2032  
PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	49	1035	19	44	485	76	18	3	55	380	23	172
Future Volume (vph)	49	1035	19	44	485	76	18	3	55	380	23	172
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	0.99	0.99	0.99	0.97	0.98	0.98	0.98	0.98
Frt	0.997	0.980	0.980	0.980	0.980	0.857	0.857	0.868	0.868	0.868	0.868	0.868
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	3179	0	797	3168	0	785	708	0	1570	1297	0
Flt Permitted	0.421	0.107	0.107	0.532	0.532	0.716	0.716	0.716	0.716	0.716	0.716	0.716
Satd. Flow (perm)	691	3179	0	90	3168	0	436	708	0	1158	1297	0
Right Turn on Red		Yes		Yes		Yes		Yes		Yes		Yes
Satd. Flow (RTOR)		3		36		60		187		187		187
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	20	20	12	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)	53	1125	21	48	527	83	20	3	60	413	25	187
Shared Lane Traffic (%)												
Lane Group Flow (vph)	53	1146	0	48	610	0	20	63	0	413	212	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	24	14	24	24	14	24	24	14	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

Background 2032  
PM Peak Hour

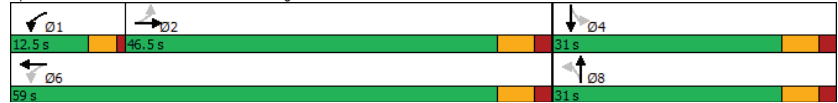
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0				0.0
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	NA
Protected Phases		2		1	6			8			4	4
Permitted Phases		2		6			8			4		4
Detector Phases	2	2		1	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	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)	40.0	40.0		52.2	52.2		27.1	27.1		27.1	27.1	
Actuated g/C Ratio	0.46	0.46		0.60	0.60		0.31	0.31		0.31	0.31	
v/c Ratio	0.17	0.79		0.40	0.32		0.15	0.24		0.15	0.40	
Control Delay	15.3	24.5		19.1	8.6		26.6	9.7		127.0	7.8	
Queue Delay	0.0	0.3		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	15.3	24.9		19.1	8.6		26.6	9.7		127.0	7.8	
LOS	B	C		B	A		C	A		F	A	
Approach Delay		24.4			9.3			13.8			86.5	
Approach LOS		C			A			B			F	
Queue Length 50th (m)	5.2	85.8		3.3	23.8		2.6	0.4		-90.6	3.2	
Queue Length 95th (m)	12.9	113.2		10.2	33.1		8.8	10.1		#148.5	20.4	
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)	337	1552		122	2013		135	260		358	531	
Starvation Cap Reductn	0	86		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	0.78		0.39	0.30		0.15	0.24		0.15	0.40	
<b>Intersection Summary</b>												
Area Type: CBD												
Cycle Length: 90												
Actuated Cycle Length: 87.3												
Natural Cycle: 90												
Control Type: Semi Act-Uncoordinated												
Maximum v/c Ratio: 1.15												
Intersection Signal Delay: 35.4												
Intersection LOS: D												

Lanes, Volumes, Timings  
13: GO Bus Terminal/Argus Rd & Cross Ave

Background 2032  
PM Peak Hour

Intersection Capacity Utilization 79.2%	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

Background 2032  
PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	49	1035	19	44	485	76	18	3	55	380	23	172
Future Volume (vph)	49	1035	19	44	485	76	18	3	55	380	23	172
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)	1559	3180		797	3167		778	709		1538	1298	
Flt Permitted	0.42	1.00		0.11	1.00		0.53	1.00		0.72	1.00	
Satd. Flow (perm)	691	3180		90	3167		436	709		1159	1298	
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)	53	1125	21	48	527	83	20	3	60	413	25	187
RTOR Reduction (vph)	0	2	0	0	14	0	0	41	0	0	129	0
Lane Group Flow (vph)	53	1144	0	48	596	0	20	22	0	413	83	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)	38.0	38.0		50.2	50.2		25.1	25.1		25.1	25.1	
Effective Green, g (s)	40.0	40.0		50.2	52.2		27.1	27.1		27.1	27.1	
Actuated g/C Ratio	0.46	0.46		0.58	0.60		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)	316	1457		118	1893		135	220		359	402	
v/s Ratio Prot		c0.36		c0.04	0.19			0.03			0.06	
v/s Ratio Perm	0.08			0.20			0.05			c0.36		
v/c Ratio	0.17	0.79		0.41	0.31		0.15	0.10		1.15	0.21	
Uniform Delay, d1	13.9	20.0		12.6	8.7		21.8	21.4		30.1	22.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.5	3.3		1.7	0.2		0.7	0.3		95.0	0.3	
Delay (s)	14.4	23.3		14.3	8.9		22.5	21.7		125.1	22.5	
Level of Service	B	C		B	A		C	C		F	C	
Approach Delay (s)		22.9			9.3			21.9			90.3	
Approach LOS		C			A			C			F	
<b>Intersection Summary</b>												
HCM 2000 Control Delay		35.8					HCM 2000 Level of Service			D		
HCM 2000 Volume to Capacity ratio		0.88										
Actuated Cycle Length (s)		87.3		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

Background 2032  
PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	45	233	15	17	452	14	279	5	188	18	3	75
Future Volume (vph)	45	233	15	17	452	14	279	5	188	18	3	75
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			0.525			0.702			0.548		
Satd. Flow (perm)	746	2914	0	867	3084	0	1159	1436	0	903	1416	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		9			5			204			82	
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)	49	253	16	18	491	15	303	5	204	20	3	82
Shared Lane Traffic (%)												
Lane Group Flow (vph)	49	269	0	18	506	0	303	209	0	20	85	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

Background 2032  
PM Peak Hour

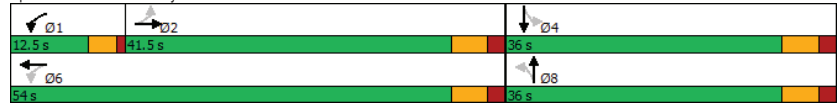
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6		8		8		4	
Permitted Phases		2		6			8		8		4	
Detector Phases		2	2	1	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	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		27.8	27.8		27.8	27.8	
Actuated g/C Ratio	0.44	0.44		0.58	0.58		0.33	0.33		0.33	0.33	
v/c Ratio	0.15	0.21		0.03	0.28		0.80	0.34		0.07	0.16	
Control Delay	17.6	15.7		9.2	10.1		43.1	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	17.6	15.7		9.2	10.1		43.1	5.0		19.7	5.9	
LOS	B	B		A	B		D	A		B	A	
Approach Delay		16.0			10.1			27.5			8.6	
Approach LOS		B			B			C			A	
Queue Length 50th (m)	5.3	15.0		1.4	23.1		46.5	0.6		2.3	0.4	
Queue Length 95th (m)	13.2	24.1		4.4	33.5		#86.4	14.9		7.3	9.7	
Internal Link Dist (m)		16.1			185.8			45.1			46.9	
Turn Bay Length (m)				25.0			20.0					
Base Capacity (vph)	330	1295		572	1822		437	669		341	586	
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	0.21		0.03	0.28		0.69	0.31		0.06	0.15	
<b>Intersection Summary</b>												
Area Type:	CBD											
Cycle Length:	90											
Actuated Cycle Length:	85											
Natural Cycle:	85											
Control Type:	Semi Act-Uncoord											
Maximum v/c Ratio:	0.80											
Intersection Signal Delay:	17.4						Intersection LOS: B					

Lanes, Volumes, Timings  
14: Lyons Lane/Street A & Cross Ave

Background 2032  
PM Peak Hour

Intersection Capacity Utilization 72.1% 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: 14: Lyons Lane/Street A & Cross Ave




HCM Signalized Intersection Capacity Analysis  
14: Lyons Lane/Street A & Cross Ave

Background 2032  
PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	45	233	15	17	452	14	279	5	188	18	3	75
Future Volume (vph)	45	233	15	17	452	14	279	5	188	18	3	75
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	2914		1569	3083		1569	1436		1565	1417	
Flt Permitted	0.47	1.00		0.52	1.00		0.70	1.00		0.55	1.00	
Satd. Flow (perm)	746	2914		867	3083		1159	1436		903	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)	49	253	16	18	491	15	303	5	204	20	3	82
RTOR Reduction (vph)	0	5	0	0	2	0	0	137	0	0	55	0
Lane Group Flow (vph)	49	264	0	18	504	0	303	72	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		25.8	25.8		25.8	25.8	
Effective Green, g (s)	37.2	37.2		47.2	49.2		27.8	27.8		27.8	27.8	
Actuated g/C Ratio	0.44	0.44		0.56	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)	326	1275		547	1784		379	469		295	463	
v/s Ratio Prot		0.09		0.00	c0.16			0.05			0.02	
v/s Ratio Perm	0.07			0.02			c0.26			0.02		
v/c Ratio	0.15	0.21		0.03	0.28		0.80	0.15		0.07	0.06	
Uniform Delay, d1	14.4	14.8		8.6	9.0		26.1	20.3		19.7	19.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.4	0.2		0.0	0.2		11.8	0.2		0.1	0.1	
Delay (s)	14.8	14.9		8.6	9.2		37.9	20.5		19.8	19.7	
Level of Service	B	B		A	A		D	C		B	B	
Approach Delay (s)		14.9			9.2			30.8			19.8	
Approach LOS		B			A			C			B	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			18.8				HCM 2000 Level of Service				B	
HCM 2000 Volume to Capacity ratio			0.49									
Actuated Cycle Length (s)			85.0				Sum of lost time (s)				12.0	
Intersection Capacity Utilization			72.1%				ICU Level of Service				C	
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings  
15: Cross Ave & Lyons Lane

Background 2032  
PM Peak Hour




Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↕↕	↕↕		↕↕	
Traffic Volume (vph)	58	251	730	72	37	67
Future Volume (vph)	58	251	730	72	37	67
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		0.913	
Flt Protected	0.950				0.983	
Satd. Flow (prot)	1388	2954	3122	0	1496	0
Flt Permitted	0.950				0.983	
Satd. Flow (perm)	1388	2954	3122	0	1496	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)	63	273	793	78	40	73
Shared Lane Traffic (%)						
Lane Group Flow (vph)	63	273	871	0	113	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	45.4%
ICU Level of Service A	
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis  
15: Cross Ave & Lyons Lane

Background 2032  
PM Peak Hour



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↕↕	↕↕		↕↕	
Traffic Volume (veh/h)	58	251	730	72	37	67
Future Volume (Veh/h)	58	251	730	72	37	67
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)	63	273	793	78	40	73
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	872				1104	436
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	702				953	232
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				82	90
cM capacity (veh/h)	738				219	707
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	63	136	136	529	342	113
Volume Left	63	0	0	0	0	40
Volume Right	0	0	0	0	78	73
eSH	738	1700	1700	1700	1700	395
Volume to Capacity	0.09	0.08	0.08	0.31	0.20	0.29
Queue Length 95th (m)	2.2	0.0	0.0	0.0	0.0	9.3
Control Delay (s)	10.3	0.0	0.0	0.0	0.0	17.7
Lane LOS	B					C
Approach Delay (s)	1.9			0.0		17.7
Approach LOS						C

Intersection Summary	
Average Delay	2.0
Intersection Capacity Utilization	45.4%
ICU Level of Service A	
Analysis Period (min)	15



Lanes, Volumes, Timings  
16: Speers Road/Cornwall Road & Cross Avenue

Background 2032  
PM Peak Hour

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	335	828	910	48	24	511
Future Volume (vph)	335	828	910	48	24	511
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	0.158				0.950	
Satd. Flow (perm)	294	3539	3514	0	1770	2787
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)			7			555
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)	364	900	989	52	26	555
Shared Lane Traffic (%)						
Lane Group Flow (vph)	364	900	1041	0	26	555
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

Background 2032  
PM Peak Hour

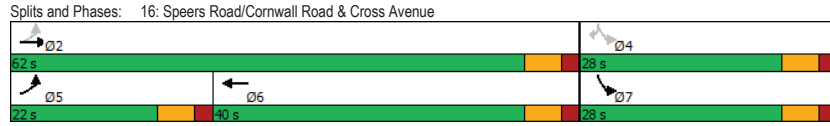
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Detector Phase	5	2	6		7	4
Switch Phase						
Minimum Initial (s)	6.0	5.0	5.0		5.0	5.0
Minimum Split (s)	12.0	33.5	33.5		27.5	27.5
Total Split (s)	22.0	62.0	40.0		28.0	28.0
Total Split (%)	24.4%	68.9%	44.4%		31.1%	31.1%
Maximum Green (s)	16.0	56.0	34.0		22.0	22.0
Yellow 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	35.3		7.5	7.5
Actuated g/C Ratio	0.74	0.74	0.47		0.10	0.10
v/c Ratio	0.72	0.34	0.63		0.15	0.72
Control Delay	19.0	4.0	18.1		32.5	8.9
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	19.0	4.0	18.1		32.5	8.9
LOS	B	A	B		C	A
Approach Delay		8.3	18.1		9.9	
Approach LOS		A	B		A	
Queue Length 50th (m)	20.6	17.7	59.2		3.7	0.0
Queue Length 95th (m)	#64.4	34.0	91.0		10.6	15.0
Internal Link Dist (m)		165.7	250.5		160.2	
Turn Bay Length (m)	75.0				55.0	
Base Capacity (vph)	531	2625	1642		515	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	0.69	0.34	0.63		0.05	0.46

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: 0.72  
 Intersection Signal Delay: 12.2  
 Intersection Capacity Utilization 64.4%  
 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

Background 2032  
PM Peak Hour





HCM Signalized Intersection Capacity Analysis  
16: Speers Road/Cornwall Road & Cross Avenue

Background 2032  
PM Peak Hour

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↕	↕	↔	↔	↕
Traffic Volume (vph)	335	828	910	48	24	511
Future Volume (vph)	335	828	910	48	24	511
Ideal Flow (vphpl)	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	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	3513	1770	2787	
Fit Permitted	0.16	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	294	3539	3513	1770	2787	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	364	900	989	52	26	555
RTOR Reduction (vph)	0	0	4	0	0	500
Lane Group Flow (vph)	364	900	1037	0	26	55
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	35.3	7.5	7.5	
Effective Green, g (s)	56.1	56.1	35.3	7.5	7.5	
Actuated g/C Ratio	0.74	0.74	0.47	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)	507	2626	1640	175	276	
v/s Ratio Prot	c0.14	0.25	0.30	0.01		
v/s Ratio Perm	c0.39				c0.02	
v/c Ratio	0.72	0.34	0.63	0.15	0.20	
Uniform Delay, d1	11.9	3.4	15.2	31.1	31.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	4.8	0.4	1.9	0.4	0.4	
Delay (s)	16.8	3.7	17.1	31.5	31.6	
Level of Service	B	A	B	C	C	
Approach Delay (s)		7.5	17.1	31.6		
Approach LOS		A	B	C		
<b>Intersection Summary</b>						
HCM 2000 Control Delay		15.8		HCM 2000 Level of Service		B
HCM 2000 Volume to Capacity ratio		0.69				
Actuated Cycle Length (s)		75.6		Sum of lost time (s)		18.0
Intersection Capacity Utilization		64.4%		ICU Level of Service		C
Analysis Period (min)		15				
c Critical Lane Group						

Lanes, Volumes, Timings  
17: Driveway A & Street 1



Background 2032  
PM Peak Hour

						
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	0	0	0	0	0	0
Future Volume (vph)	0	0	0	0	0	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
<b>Fit</b>						
<b>Fit Protected</b>						
Satd. Flow (prot)	1863	0	0	1863	1863	0
<b>Fit Permitted</b>						
Satd. Flow (perm)	1863	0	0	1863	1863	0
Link Speed (k/h)	50		50		50	
Link Distance (m)	17.5		85.5		41.7	
Travel Time (s)	1.3		6.2		3.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	0	0
<b>Shared Lane Traffic (%)</b>						
Lane Group Flow (vph)	0	0	0	0	0	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	
<b>Two way Left Turn Lane</b>						
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	

<b>Intersection Summary</b>	
Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	0.0% ICU Level of Service A
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis  
17: Driveway A & Street 1

Background 2032  
PM Peak Hour

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	0	0	0	0
Future Volume (Veh/h)	0	0	0	0	0	0
Sign Control	Free			Free Stop		
Grade	0%			0% 0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	0	0	0
<b>Pedestrians</b>						
<b>Lane Width (m)</b>						
<b>Walking Speed (m/s)</b>						
<b>Percent Blockage</b>						
<b>Right turn flare (veh)</b>						
<b>Median type</b>						
None			None			
<b>Median storage (veh)</b>						
<b>Upstream signal (m)</b>						
<b>pX, platoon unblocked</b>						
vC, conflicting volume			0		0 0	
<b>vC1, stage 1 conf vol</b>						
<b>vC2, stage 2 conf vol</b>						
vCu, unblocked vol			0		0 0	
tC, single (s)			4.1		6.4 6.2	
<b>tC, 2 stage (s)</b>						
tF (s)			2.2		3.5 3.3	
p0 queue free %			100		100 100	
cM capacity (veh/h)			1623		1023 1085	

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

<b>Intersection Summary</b>			
Average Delay	0.0		
Intersection Capacity Utilization	0.0%	ICU Level of Service	A
Analysis Period (min)	15		

Lanes, Volumes, Timings  
18: Street C & Driveway B

Background 2032  
PM Peak Hour

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	0	0	0	0
Future Volume (vph)	0	0	0	0	0	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
<b>Fit</b>						
<b>Fit Protected</b>						
Satd. Flow (prot)	1863	0	0	1863	1863	0
<b>Fit Permitted</b>						
Satd. Flow (perm)	1863	0	0	1863	1863	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	40.6			73.1	59.9	
Travel Time (s)	2.9			5.3	4.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	0	0
<b>Shared Lane Traffic (%)</b>						
Lane Group Flow (vph)	0	0	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	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	
<b>Two way Left Turn Lane</b>						
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	

<b>Intersection Summary</b>	
Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	0.0% ICU Level of Service A
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis  
18: Street C & Driveway B

Background 2032  
PM Peak Hour

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	0	0	0	0
Future Volume (Veh/h)	0	0	0	0	0	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	0	0	0	0	0
<b>Pedestrians</b>						
<b>Lane Width (m)</b>						
<b>Walking Speed (m/s)</b>						
<b>Percent Blockage</b>						
<b>Right turn flare (veh)</b>						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)				73		
<b>pX, platoon unblocked</b>						
vC, conflicting volume	0	0	0			
<b>vC1, stage 1 conf vol</b>						
<b>vC2, stage 2 conf vol</b>						
vCu, unblocked vol	0	0	0			
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)	1023	1085	1623			

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

<b>Intersection Summary</b>			
Average Delay		0.0	
Intersection Capacity Utilization	0.0%	ICU Level of Service	A
Analysis Period (min)	15		

Lanes, Volumes, Timings  
19: Street C & South Service Road

Background 2032  
PM Peak Hour

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↘			↘	↘	
Traffic Volume (vph)	130	0	0	224	0	0
Future Volume (vph)	130	0	0	224	0	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
<b>Fr</b>						
Fit Protected						
Satd. Flow (prot)	1863	0	0	1863	1863	0
Fit Permitted						
Satd. Flow (perm)	1863	0	0	1863	1863	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	264.4			306.3	164.3	
Travel Time (s)	19.0			22.1	11.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	141	0	0	243	0	0
<b>Shared Lane Traffic (%)</b>						
Lane Group Flow (vph)	141	0	0	243	0	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	
<b>Two way Left Turn Lane</b>						
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	
<b>Intersection Summary</b>						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	15.1%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis  
19: Street C & South Service Road

Background 2032  
PM Peak Hour

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↘			↘	↘	
Traffic Volume (veh/h)	130	0	0	224	0	0
Future Volume (Veh/h)	130	0	0	224	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	141	0	0	243	0	0
<b>Pedestrians</b>						
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			141		384	141
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			141		384	141
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			1442		619	907
<b>Direction, Lane #</b>						
	EB 1	WB 1	NB 1			
Volume Total	141	243	0			
Volume Left	0	0	0			
Volume Right	0	0	0			
eSH	1700	1442	1700			
Volume to Capacity	0.08	0.00	0.00			
Queue Length 95th (m)	0.0	0.0	0.0			
Control Delay (s)	0.0	0.0	0.0			
Lane LOS			A			
Approach Delay (s)	0.0	0.0	0.0			
Approach LOS			A			
<b>Intersection Summary</b>						
Average Delay			0.0			
Intersection Capacity Utilization			15.1%		ICU Level of Service	A
Analysis Period (min)			15			

Lanes, Volumes, Timings  
20: Street A & South Service Road

Background 2032  
PM Peak Hour

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔	↘	↙	↔	↙	↘
Traffic Volume (vph)	85	0	0	104	0	0
Future Volume (vph)	85	0	0	104	0	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
<b>Fit</b>						
<b>Fit Protected</b>						
Satd. Flow (prot)	1863	0	0	1863	1863	0
<b>Fit Permitted</b>						
Satd. Flow (perm)	1863	0	0	1863	1863	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	255.1			264.4	119.8	
Travel Time (s)	18.4			19.0	8.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	92	0	0	113	0	0
<b>Shared Lane Traffic (%)</b>						
Lane Group Flow (vph)	92	0	0	113	0	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	
<b>Two way Left Turn Lane</b>						
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	

<b>Intersection Summary</b>	
Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	8.8%
Analysis Period (min)	15
	ICU Level of Service A

HCM Unsignalized Intersection Capacity Analysis  
20: Street A & South Service Road

Background 2032  
PM Peak Hour

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔	↘	↙	↔	↙	↘
Traffic Volume (veh/h)	85	0	0	104	0	0
Future Volume (Veh/h)	85	0	0	104	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	92	0	0	113	0	0
<b>Pedestrians</b>						
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		205	92
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			92		205	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 %			100		100	100
cM capacity (veh/h)			1503		783	965

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	92	113	0
Volume Left	0	0	0
Volume Right	0	0	0
eSH	1700	1503	1700
Volume to Capacity	0.05	0.00	0.00
Queue Length 95th (m)	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0
Lane LOS			A
Approach Delay (s)	0.0	0.0	0.0
Approach LOS			A

<b>Intersection Summary</b>			
Average Delay		0.0	
Intersection Capacity Utilization	8.8%	ICU Level of Service	A
Analysis Period (min)	15		

Lanes, Volumes, Timings  
21: Argus Rd & Street 1

Background 2032  
PM Peak Hour

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	0	128	575	0
Future Volume (vph)	0	0	0	128	575	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
<b>Fit</b>						
<b>Fit Protected</b>						
Satd. Flow (prot)	1863	0	0	1863	1863	0
<b>Fit Permitted</b>						
Satd. Flow (perm)	1863	0	0	1863	1863	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	139	625	0
<b>Shared Lane Traffic (%)</b>						
Lane Group Flow (vph)	0	0	0	139	625	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	
<b>Two way Left Turn Lane</b>						
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	
<b>Intersection Summary</b>						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	33.6%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis  
21: Argus Rd & Street 1

Background 2032  
PM Peak Hour

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	0	128	575	0
Future Volume (Veh/h)	0	0	0	128	575	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	0	0	139	625	0
<b>Pedestrians</b>						
<b>Lane Width (m)</b>						
<b>Walking Speed (m/s)</b>						
<b>Percent Blockage</b>						
<b>Right turn flare (veh)</b>						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)				116		
<b>pX, platoon unblocked</b>						
vC, conflicting volume	764	625	625			
<b>vC1, stage 1 conf vol</b>						
<b>vC2, stage 2 conf vol</b>						
vCu, unblocked vol	764	625	625			
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)	372	485	956			
<b>Direction, Lane #</b>						
Volume Total	0	139	625			
Volume Left	0	0	0			
Volume Right	0	0	0			
eSH	1700	956	1700			
Volume to Capacity	0.00	0.00	0.37			
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					
<b>Intersection Summary</b>						
Average Delay				0.0		
Intersection Capacity Utilization	33.6%			ICU Level of Service		A
Analysis Period (min)	15					

Lanes, Volumes, Timings  
22: Street C & Street 1

Background 2032  
PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Future Volume (vph)	0	0	0	0	0	0	0	0	0	0	0	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
Fit												
Fit Protected												
Satd. Flow (prot)	0	1863	0	0	1863	0	0	1863	0	0	1863	0
Fit Permitted												
Satd. Flow (perm)	0	1863	0	0	1863	0	0	1863	0	0	1863	0
Link Speed (k/h)	50		50		50		50		50		50	
Link Distance (m)	85.5		165.4		59.9		164.3					
Travel Time (s)	6.2		11.9		4.3		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	0	0	0	0	0	0	0	0	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	0	0	0	0	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	Right	Left	Left	Right	Right
Median Width(m)	0.0		0.0		0.0		0.0		0.0		0.0	
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	
Sign Control	Stop		Stop		Free		Free		Free		Free	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	0.0%		ICU Level of Service A									
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis  
22: Street C & Street 1

Background 2032  
PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (veh/h)	0	0	0	0	0	0	0	0	0	0	0	0
Future Volume (Veh/h)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop		Stop		Free		Free		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	0	0	0	0	0	0	0	0	0	0	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None						None					
Median storage (veh)												
Upstream signal (m)	133											
pX, platoon unblocked												
vC, conflicting volume	0	0	0	0	0	0	0	0	0	0	0	0
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	0	0	0	0	0	0	0	0	0	0	0	0
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	100	100	100	100			100		
cM capacity (veh/h)	1023	896	1085	1023	896	1085	1623			1623		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	0	0	0	0								
Volume Left	0	0	0	0								
Volume Right	0	0	0	0								
eSH	1700	1700	1700	1700								
Volume to Capacity	0.00	0.00	0.00	0.00								
Queue Length 95th (m)	0.0	0.0	0.0	0.0								
Control Delay (s)	0.0	0.0	0.0	0.0								
Lane LOS	A	A										
Approach Delay (s)	0.0	0.0	0.0	0.0								
Approach LOS	A	A										
Intersection Summary												
Average Delay	0.0											
Intersection Capacity Utilization	0.0%		ICU Level of Service A									
Analysis Period (min)	15											



Lanes, Volumes, Timings

23: GO Station West Access/Street C & Cross Ave

Background 2032

PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔			↔			↔	↔		↔	↔	
Traffic Volume (vph)	0	580	53	289	386	0	90	0	445	0	0	0
Future Volume (vph)	0	580	53	289	386	0	90	0	445	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	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						0.850					
Flt Protected					0.979		0.950					
Satd. Flow (prot)	0	3493	0	0	3465	0	1770	1583	0	1863	1863	0
Flt Permitted					0.596		0.757					
Satd. Flow (perm)	0	3493	0	0	2109	0	1410	1583	0	1863	1863	0
Right Turn on Red			Yes				Yes				Yes	
Satd. Flow (RTOR)	23						118					
Link Speed (k/h)	50				50		50				50	
Link Distance (m)	209.8				164.3		55.1				73.1	
Travel Time (s)	15.1				11.8		4.0				5.3	
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	630	58	314	420	0	98	0	484	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	688	0	0	734	0	98	484	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
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

Background 2032

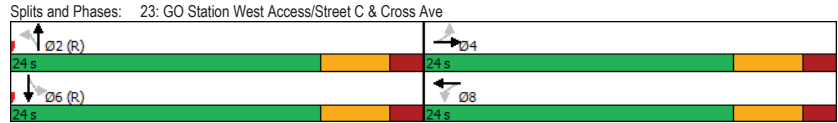
PM Peak Hour

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)	17.9				17.9		18.1		18.1			
Actuated g/C Ratio	0.37				0.37		0.38		0.38			
v/c Ratio	0.52				1.27dl		0.18		0.72			
Control Delay	13.0				37.5		11.3		17.9			
Queue Delay	0.0				0.0		0.0		0.0			
Total Delay	13.0				37.5		11.3		17.9			
LOS	B				D		B		B			
Approach Delay	13.0				37.5		16.7					
Approach LOS	B				D		B					
Queue Length 50th (m)	23.0				31.6		5.6		25.9			
Queue Length 95th (m)	35.9				#63.1		13.6		#67.6			
Internal Link Dist (m)	185.8				140.3		31.1				49.1	
Turn Bay Length (m)												
Base Capacity (vph)	1324				790		530		669			
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	0.52				0.93		0.18		0.72			
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:	60											
Control Type:	Actuated-Coordinated											
Maximum v/c Ratio:	0.93											
Intersection Signal Delay:	23.0						Intersection LOS: C					
Intersection Capacity Utilization:	79.3%						ICU Level of Service D					
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

Background 2032  
 PM Peak Hour

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

Background 2032  
 PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↔			↔↔		↔	↔		↔	↔	
Traffic Volume (vph)	0	580	53	289	386	0	90	0	445	0	0	0
Future Volume (vph)	0	580	53	289	386	0	90	0	445	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				
Fr <sub>t</sub>		0.99			1.00		1.00	0.85				
Fit Protected		1.00			0.98		0.95	1.00				
Satd. Flow (prot)		3494			3465		1770	1583				
Fit Permitted		1.00			0.60		0.76	1.00				
Satd. Flow (perm)		3494			2109		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	630	58	314	420	0	98	0	484	0	0	0
RTOR Reduction (vph)	0	14	0	0	0	0	0	74	0	0	0	0
Lane Group Flow (vph)	0	674	0	0	734	0	98	410	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)		17.9			17.9		18.1	18.1				
Effective Green, g (s)		17.9			17.9		18.1	18.1				
Actuated g/C Ratio		0.37			0.37		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)		1302			786		531	596				
v/s Ratio Prot		0.19						c0.26				
v/s Ratio Perm					c0.35		0.07					
v/c Ratio		0.52			1.27dl		0.18	0.69				
Uniform Delay, d1		11.7			14.5		10.0	12.6				
Progression Factor		1.00			1.00		1.00	1.00				
Incremental Delay, d2		0.3			17.9		0.8	6.4				
Delay (s)		12.0			32.4		10.8	19.0				
Level of Service		B			C		B	B				
Approach Delay (s)		12.0			32.4		17.6				0.0	
Approach LOS		B			C		B				A	

Intersection Summary

HCM 2000 Control Delay	21.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	48.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	79.3%	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

Background 2037

AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	41	127	357	743	90	208	215	1265	910	194	1725	55
Future Volume (vph)	41	127	357	743	90	208	215	1265	910	194	1725	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	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	0.694			0.383			0.085			0.094		
Satd. Flow (perm)	1175	1693	1425	1234	1676	1366	128	4446	1377	154	4532	1398
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			218			226			648			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	388	808	98	226	234	1375	989	211	1875	60
Shared Lane Traffic (%)												
Lane Group Flow (vph)	45	138	388	808	98	226	234	1375	989	211	1875	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

1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd

Background 2037

AM Peak Hour

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	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	50.6	120.0	69.4	50.0	50.0	50.0
Actuated g/C Ratio	0.21	0.16	1.00	0.31	0.25	0.25	0.59	0.42	1.00	0.58	0.42	0.42
v/c Ratio	0.17	0.51	0.27	1.36	0.23	0.44	0.80	0.73	0.72	0.67	0.99	0.09
Control Delay	29.4	52.4	0.5	205.6	37.3	7.3	52.3	32.4	3.2	35.7	54.2	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	205.6	37.3	7.3	52.3	32.4	3.2	35.7	54.2	0.3
LOS	C	D	A	F	D	A	D	C	A	D	D	A
Approach Delay		15.3			151.5			23.1				50.9
Approach LOS		B			F			C				D
Queue Length 50th (m)	7.8	31.7	0.0	~135.9	19.9	0.0	41.7	104.8	0.0	30.8	166.5	0.0
Queue Length 95th (m)	15.8	50.2	0.0	#167.9	33.3	19.2	#103.1	126.3	0.0	#70.8	#206.8	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	1874	1377	316	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	1.36	0.18	0.38	0.80	0.73	0.72	0.67	0.99	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:	1.36											
Intersection Signal Delay:	54.2						Intersection LOS: D					

Lanes, Volumes, Timings  
1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd

Background 2037  
AM Peak Hour

Intersection Capacity Utilization 96.3%	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

Background 2037  
AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↑	↗	↖	↑	↗	↖	↕	↕	↕	↕	↕
Traffic Volume (vph)	41	127	357	743	90	208	215	1265	910	194	1725	55
Future Volume (vph)	41	127	357	743	90	208	215	1265	910	194	1725	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	155	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	388	808	98	226	234	1375	989	211	1875	60
RTOR Reduction (vph)	0	0	0	0	0	170	0	0	0	0	0	35
Lane Group Flow (vph)	45	138	388	808	98	57	234	1375	989	211	1875	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	66.8	46.8	120.0	65.6	46.2	46.2
Effective Green, g (s)	21.6	19.8	120.0	35.8	30.0	30.0	66.8	49.8	120.0	65.6	49.2	49.2
Actuated g/C Ratio	0.18	0.17	1.00	0.30	0.25	0.25	0.56	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	1845	1377	312	1858	573
v/s Ratio Prot	0.01	0.08		c0.16	0.06		0.14	0.31		0.11	c0.41	
v/s Ratio Perm	0.03		0.27	c0.25		0.04	0.32		c0.72	0.26		0.02
v/c Ratio	0.20	0.49	0.27	1.39	0.23	0.17	0.82	0.75	0.72	0.68	1.01	0.04
Uniform Delay, d1	41.5	45.6	0.0	39.9	35.8	35.2	34.1	29.7	0.0	26.4	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	187.3	0.4	0.3	16.1	2.8	3.2	5.7	23.1	0.1
Delay (s)	41.9	47.4	0.5	227.1	36.2	35.5	50.3	32.5	3.2	32.1	58.5	21.4
Level of Service	D	D	A	F	D	D	D	C	A	C	E	C
Approach Delay (s)		15.1			172.4			23.0			54.9	
Approach LOS		B			F			C			D	

Intersection Summary			
HCM 2000 Control Delay	59.1	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	96.3%	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

Background 2037

AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	3	0	182	630	34	269	0	2122	530	0	2817	7
Future Volume (vph)	3	0	182	630	34	269	0	2122	530	0	2817	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		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	1455	1356	0	4446	1384	0	5711	0
Flt Permitted	0.950			0.950	0.957							
Satd. Flow (perm)	1570	0	1395	1421	1455	1356	0	4446	1353	0	5711	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			31			230			193			
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	198	685	37	292	0	2307	576	0	3062	8
Shared Lane Traffic (%)				47%								
Lane Group Flow (vph)	3	0	198	363	359	292	0	2307	576	0	3070	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

Background 2037

AM Peak Hour

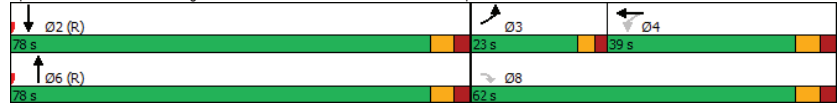
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)						0.0					0.0	0.0
Turn Type	Prot		Perm	Perm	NA	Free			NA	Free	NA	NA
Protected Phases	3				4				6			2
Permitted Phases			8	4		Free			Free			
Detector Phase	3		8	4	4				6			2
Switch Phase												
Minimum Initial (s)	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		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
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		58.0	46.0	46.0	140.0			74.0		140.0	74.0
Actuated g/C Ratio	0.06		0.41	0.33	0.33	1.00			0.53		1.00	0.53
v/c Ratio	0.03		0.33	0.78	0.75	0.22			0.98		0.43	1.02
Control Delay	63.3		25.1	55.4	53.2	0.4			41.8		0.4	53.6
Queue Delay	0.0		0.0	0.0	0.0	0.0			0.0		0.0	0.0
Total Delay	63.3		25.1	55.4	53.2	0.4			41.8		0.4	53.6
LOS	E		C	E	D	A			D		A	D
Approach Delay		25.6				38.8			33.5			53.6
Approach LOS		C				D			C			D
Queue Length 50th (m)	0.9		32.4	100.4	98.0	0.0			169.3		0.0	~274.3
Queue Length 95th (m)	4.2		53.2	#146.0	140.7	0.0			m170.9		m0.0	#293.4
Internal Link Dist (m)		118.1				168.6			300.8			251.1
Turn Bay Length (m)	50.0											
Base Capacity (vph)	213		596	466	478	1356			2350		1353	3018
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	0.78	0.75	0.22			0.98		0.43	1.02
<b>Intersection Summary</b>												
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:	1.02											

Lanes, Volumes, Timings  
2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp

Background 2037  
AM Peak Hour

Intersection Signal Delay: 42.7	Intersection LOS: D
Intersection Capacity Utilization 88.4%	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

Background 2037  
AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	3	0	182	630	34	269	0	2122	530	0	2817	7
Future Volume (vph)	3	0	182	630	34	269	0	2122	530	0	2817	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	1455	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	1455	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	198	685	37	292	0	2307	576	0	3062	8
RTOR Reduction (vph)	0	0	18	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	3	0	180	363	359	292	0	2307	576	0	3070	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		55.0	43.0	43.0	140.0		71.0	140.0		71.0	
Effective Green, g (s)	8.0		58.0	46.0	46.0	140.0		74.0	140.0		74.0	
Actuated g/C Ratio	0.06		0.41	0.33	0.33	1.00		0.53	1.00		0.53	
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		577	466	478	1356		2350	1353		3017	
v/s Ratio Prot	0.00							0.52			c0.54	
v/s Ratio Perm			0.13	c0.26	0.25	0.22			c0.43			
v/c Ratio	0.03		0.31	0.78	0.75	0.22		0.98	0.43		1.02	
Uniform Delay, d1	62.3		27.6	42.4	41.9	0.0		32.3	0.0		33.0	
Progression Factor	1.00		1.00	1.00	1.00	1.00		1.03	1.00		1.00	
Incremental Delay, d2	0.2		0.3	8.0	6.5	0.4		8.6	0.4		20.9	
Delay (s)	62.5		27.9	50.4	48.4	0.4		41.8	0.4		53.9	
Level of Service	E		C	D	D	A		D	A		D	
Approach Delay (s)		28.4			35.3			33.5			53.9	
Approach LOS		C			D			C			D	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			42.4					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			88.4%					ICU Level of Service			E	
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings  
3: Trafalgar Rd & QEW EB-Off Ramp

Background 2037  
AM Peak Hour

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔↔	↔		↕↕↕	↕↕↕	↔
Traffic Volume (vph)	940	812	0	1735	2018	496
Future Volume (vph)	940	812	0	1735	2018	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				190
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	883	0	1886	2193	539
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1022	883	0	1886	2193	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

Background 2037  
AM Peak Hour

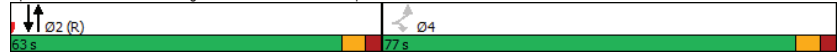
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Switch Phase						
Minimum Initial (s)	10.0	10.0		29.0	29.0	
Minimum Split (s)	38.0	38.0		36.0	36.0	
Total Split (s)	77.0	77.0		63.0	63.0	
Total Split (%)	55.0%	55.0%		45.0%	45.0%	
Maximum Green (s)	70.0	70.0		56.0	56.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	
All-Red Time (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	1.19		1.02	1.16	0.37
Control Delay	27.1	130.3		52.6	104.5	0.2
Queue Delay	0.0	0.0		0.0	0.0	0.0
Total Delay	27.1	130.3		52.6	104.5	0.2
LOS	C	F		D	F	A
Approach Delay	74.9			52.6	83.9	
Approach LOS	E			D	F	
Queue Length 50th (m)	109.1	~310.5		~194.6	~274.0	0.0
Queue Length 95th (m)	133.3	#393.3		m122.2 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	1.19		1.02	1.16	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:	1.19					
Intersection Signal Delay:	72.3			Intersection LOS: E		
Intersection Capacity Utilization	105.9%			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

Background 2037  
AM Peak Hour

- # 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

Background 2037  
AM Peak Hour

	EBL	EBR	NBL	NBT	SBT	SBR
Movement	↔	↔	↔	↑	↓	↔
Lane Configurations	↔	↔		↑↑↑	↓↓↓	↔
Traffic Volume (vph)	940	812	0	1735	2018	496
Future Volume (vph)	940	812	0	1735	2018	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	883	0	1886	2193	539
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	1022	883	0	1886	2193	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				0.43	0.49	
v/s Ratio Perm	0.35	0.62				0.37
v/c Ratio	0.66	1.19		1.02	1.16	0.37
Uniform Delay, d1	24.5	33.5		40.5	40.5	0.0
Progression Factor	1.00	1.00		1.04	0.77	1.00
Incremental Delay, d2	1.1	99.1		11.1	74.2	0.3
Delay (s)	25.6	132.6		53.3	105.4	0.3
Level of Service	C	F		D	F	A
Approach Delay (s)	75.2			53.3	84.7	
Approach LOS	E			D	F	
<b>Intersection Summary</b>						
HCM 2000 Control Delay			72.8		HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio			1.20			
Actuated Cycle Length (s)			140.0		Sum of lost time (s)	11.0
Intersection Capacity Utilization			105.9%		ICU Level of Service	G
Analysis Period (min)			15			
c Critical Lane Group						



Lanes, Volumes, Timings  
4: Trafalgar Rd & Argus Rd

Background 2037  
AM Peak Hour

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	164	0	3046	2217	614
Future Volume (vph)	0	164	0	3046	2217	614
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	
Flt Protected						
Satd. Flow (prot)	0	1367	0	4363	4359	0
Flt 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	178	0	3311	2410	667
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	178	0	3311	3077	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	
<b>Intersection Summary</b>						
Area Type:	CBD					
Control Type:	Unsignalized					
Intersection Capacity Utilization	81.0%			ICU Level of Service D		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis  
4: Trafalgar Rd & Argus Rd

Background 2037  
AM Peak Hour

Movement	EBL	EBR	NBL	NBT	SBT	SBR	
Lane Configurations							
Traffic Volume (veh/h)	0	164	0	3046	2217	614	
Future Volume (Veh/h)	0	164	0	3046	2217	614	
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	178	0	3311	2410	667	
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	3858	1148	3088				
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol	891	0	2089				
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	71	100				
cM capacity (veh/h)	208	620	156				
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>NB 1</b>	<b>NB 2</b>	<b>NB 3</b>	<b>SB 1</b>	<b>SB 2</b>	<b>SB 3</b>
Volume Total	178	1104	1104	1104	964	964	1149
Volume Left	0	0	0	0	0	0	0
Volume Right	178	0	0	0	0	0	667
eSH	620	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.29	0.65	0.65	0.65	0.57	0.57	0.68
Queue Length 95th (m)	9.5	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						
<b>Intersection Summary</b>							
Average Delay				0.4			
Intersection Capacity Utilization	81.0%			ICU Level of Service		D	
Analysis Period (min)	15						

Lanes, Volumes, Timings  
5: Trafalgar Rd & Cross Ave/South Service Rd

Background 2037  
AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔		↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	1298	80	98	46	47	114	124	1323	30	220	1761	300
Future Volume (vph)	1298	80	98	46	47	114	124	1323	30	220	1761	300
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	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	0.917					0.850		0.997			0.978	
Fit Protected	0.950			0.950		0.950		0.950		0.950		
Satd. Flow (prot)	2795	1418	0	1525	1583	1382	1428	4500	0	1525	4404	0
Fit Permitted	0.950			0.636		0.090		0.083		0.083		
Satd. Flow (perm)	2789	1418	0	1013	1583	1362	135	4500	0	133	4404	0
Right Turn on Red			Yes			Yes		Yes			Yes	
Satd. Flow (RTOR)		48				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)	1411	87	107	50	51	124	135	1438	33	239	1914	326
Shared Lane Traffic (%)												
Lane Group Flow (vph)	1411	194	0	50	51	124	135	1471	0	239	2240	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

Background 2037  
AM Peak Hour

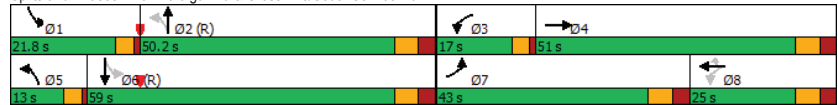
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases				8		8	2			6		
Detector Phases	7	4		3	8	8	5	2		1	6	
Switch Phase												
Minimum Initial (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)	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	41.6		26.6	14.6	14.6	62.1	47.4		74.4	55.7	
Actuated g/C Ratio	0.28	0.30		0.19	0.10	0.10	0.44	0.34		0.53	0.40	
v/c Ratio	1.81	0.43		0.21	0.31	0.41	0.69	0.96		0.80	1.27	
Control Delay	401.4	32.3		30.5	62.6	5.6	47.5	66.7		42.9	161.2	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	401.4	32.3		30.5	62.6	5.6	47.5	66.7		42.9	161.2	
LOS	F	C		C	E	A	D	E		D	F	
Approach Delay		356.8			24.0			65.1			149.8	
Approach LOS		F			C			E			F	
Queue Length 50th (m)	~318.4	34.3		8.9	14.1	0.0	31.0	136.2		55.9	~297.9	
Queue Length 95th (m)	#362.4	56.2		17.0	27.6	4.2	m38.0	m137.7		m50.0	m#233.4	
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)	778	507		247	237	356	195	1525		299	1769	
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	1.81	0.38		0.20	0.22	0.35	0.69	0.96		0.80	1.27	
<b>Intersection Summary</b>												
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:	1.81											

Lanes, Volumes, Timings  
5: Trafalgar Rd & Cross Ave/South Service Rd

Background 2037  
AM Peak Hour

Intersection Signal Delay: 178.2	Intersection LOS: F
Intersection Capacity Utilization 110.8%	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

Background 2037  
AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔	↔	↔	↔	↔	↔	↔↔↔	↔↔↔	↔	↔↔	↔↔	↔
Traffic Volume (vph)	1298	80	98	46	47	114	124	1323	30	220	1761	300
Future Volume (vph)	1298	80	98	46	47	114	124	1323	30	220	1761	300
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	0.92		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	1418		1518	1583	1362	1428	4498		1525	4405	
Flt Permitted	0.95	1.00		0.64	1.00	1.00	0.09	1.00		0.08	1.00	
Satd. Flow (perm)	2795	1418		1016	1583	1362	135	4498		133	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)	1411	87	107	50	51	124	135	1438	33	239	1914	326
RTOR Reduction (vph)	0	34	0	0	0	111	0	2	0	0	17	0
Lane Group Flow (vph)	1411	160	0	50	51	13	135	1469	0	239	2223	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	38.6		23.6	11.6	11.6	59.1	44.4		71.4	52.7	
Effective Green, g (s)	39.0	41.6		23.6	14.6	14.6	59.1	47.4		71.4	55.7	
Actuated g/C Ratio	0.28	0.30		0.17	0.10	0.10	0.42	0.34		0.51	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)	778	421		214	165	142	192	1522		296	1752	
v/s Ratio Prot	c0.50	c0.11		0.02	0.03		0.07	0.33		c0.13	c0.50	
v/s Ratio Perm				0.02		0.01	0.22			0.28		
v/c Ratio	1.81	0.38		0.23	0.31	0.09	0.70	0.97		0.81	1.27	
Uniform Delay, d1	50.5	39.0		50.0	58.0	56.7	32.2	45.5		40.3	42.1	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.21	1.27		1.15	1.19	
Incremental Delay, d2	371.2	0.8		0.7	1.5	0.4	5.8	10.0		1.5	121.4	
Delay (s)	421.7	39.8		50.7	59.5	57.1	44.8	67.6		48.0	171.7	
Level of Service	F	D		D	E	E	D	E		D	F	
Approach Delay (s)		375.6			56.2			65.7			159.8	
Approach LOS		F			E			E			F	
<b>Intersection Summary</b>												
HCM 2000 Control Delay		188.8									F	
HCM 2000 Volume to Capacity ratio		1.30										
Actuated Cycle Length (s)		140.0					Sum of lost time (s)			16.0		
Intersection Capacity Utilization		110.8%					ICU Level of Service			H		
Analysis Period (min)		15										
c Critical Lane Group												

Lanes, Volumes, Timings

Background 2037

6: Trafalgar Rd & Cornwall Rd

AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	347	580	93	72	613	550	116	549	79	763	862	280
Future Volume (vph)	347	580	93	72	613	550	116	549	79	763	862	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	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	1.00		0.99		0.98	1.00	1.00		0.98		0.98
Frt		0.979				0.850		0.981				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2987	3055	0	1481	3154	1411	1540	2649	0	2929	1341	1356
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2945	3055	0	1473	3154	1384	1535	2649	0	2885	1341	1324
Right Turn on Red			Yes			Yes		Yes			Yes	
Satd. Flow (RTOR)		12				482		9				184
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	630	101	78	666	598	126	597	86	829	937	304
Shared Lane Traffic (%)												
Lane Group Flow (vph)	377	731	0	78	666	598	126	683	0	829	937	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

Background 2037

6: Trafalgar Rd & Cornwall Rd

AM Peak Hour

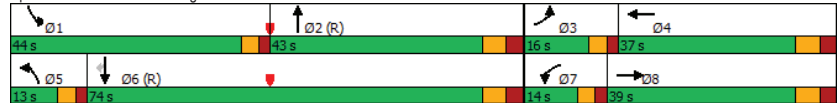
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA	Free	Prot	NA		Prot	NA	Perm
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases					Free							6
Detector Phases	3	8		7	4		5	2		1	6	6
Switch Phase												
Minimum Initial (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	0.95		0.74	0.90	0.43	1.27	0.92		0.99	1.40	0.40
Control Delay	275.3	72.4		101.2	67.7	1.0	230.5	66.6		89.9	208.9	7.9
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	275.3	72.4		101.2	67.7	1.0	230.5	66.6		89.9	208.9	7.9
LOS	F	E		F	E	A	F	E		F	F	A
Approach Delay		141.4			39.9			92.1				131.7
Approach LOS		F			D			F				F
Queue Length 50th (m)	-77.6	109.3		22.7	99.7	0.0	-46.3	119.7		132.8	-444.3	18.1
Queue Length 95th (m)	#111.2	#150.0		#50.9	#134.1	0.0	#89.8	#164.9		m108.5m#314.7	m12.4	
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	754
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	0.95		0.74	0.90	0.43	1.27	0.92		0.99	1.40	0.40
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: 1.47												

Lanes, Volumes, Timings  
6: Trafalgar Rd & Cornwall Rd

Background 2037  
AM Peak Hour

Intersection Signal Delay: 104.6	Intersection LOS: F
Intersection Capacity Utilization 106.9%	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

Background 2037  
AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	347	580	93	72	613	550	116	549	79	763	862	280
Future Volume (vph)	347	580	93	72	613	550	116	549	79	763	862	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	1.00		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	2649		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	2649		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	630	101	78	666	598	126	597	86	829	937	304
RTOR Reduction (vph)	0	9	0	0	0	0	0	6	0	0	0	92
Lane Group Flow (vph)	377	722	0	78	666	598	126	677	0	829	937	212
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	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	764		105	743	1384	99	737		836	670	662
v/s Ratio Prot	c0.13	c0.24		0.05	0.21		c0.08	0.26		0.28	c0.70	
v/s Ratio Perm						c0.43						0.16
v/c Ratio	1.47	0.95		0.74	0.90	0.43	1.27	0.92		0.99	1.40	0.32
Uniform Delay, d1	64.0	51.6		63.7	51.8	0.0	65.5	48.9		49.8	35.0	20.8
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.71	0.92	0.96
Incremental Delay, d2	232.7	21.6		37.4	15.7	1.0	180.4	18.3		7.6	180.2	0.1
Delay (s)	296.7	73.2		101.2	67.5	1.0	245.9	67.2		93.0	212.4	20.0
Level of Service	F	E		F	E	A	F	E		F	F	C
Approach Delay (s)	149.2			39.8			95.1			136.4		
Approach LOS	F			D			F			F		
<b>Intersection Summary</b>												
HCM 2000 Control Delay	108.5			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	106.9%			ICU Level of Service		G						
Analysis Period (min)	15											
c Critical Lane Group												

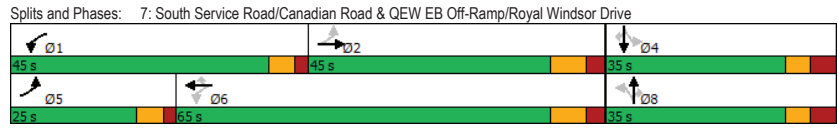
Lanes, Volumes, Timings Background 2037  
 7: South Service Road/Canadian Road & QEW EB Off-Ramp/Royal Windsor Drive AM Peak Hour

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		
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	Thru	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 Background 2037  
 7: South Service Road/Canadian Road & QEW EB Off-Ramp/Royal Windsor Drive AM Peak Hour

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 Effect 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 Background 2037  
 7: South Service Road/Canadian Road & QEW EB Off-Ramp/Royal Windsor Drive AM Peak Hour



HCM Signalized Intersection Capacity Analysis Background 2037  
 7: South Service Road/Canadian Road & QEW EB Off-Ramp/Royal Windsor Drive AM Peak Hour

	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
w/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
<b>Intersection Summary</b>												
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: QEWS WB Off-Ramp & Kerr Street

Background 2037  
AM Peak Hour

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	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	0.41			0.25	0.43	0.47

Lanes, Volumes, Timings  
8: QEWS WB Off-Ramp & Kerr Street

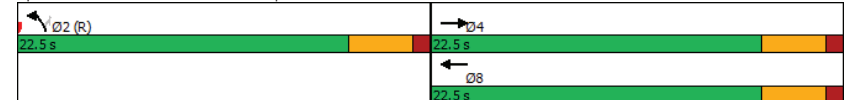
Background 2037  
AM Peak Hour

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: QEWS WB Off-Ramp & Kerr Street





HCM Signalized Intersection Capacity Analysis  
8: QEW WB Off-Ramp & Kerr Street

Background 2037  
AM Peak Hour

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 <sub>t</sub>	1.00			1.00	1.00	0.85
Fl <sub>t</sub> Protected	1.00			1.00	0.95	1.00
Satd. Flow (prot)	3539			3539	1770	1583
Fl <sub>t</sub> 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	
<b>Intersection Summary</b>						
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

Background 2037  
AM Peak Hour

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 <sub>t</sub>	0.993	0.850				
Fl <sub>t</sub> Protected	0.954					
Satd. Flow (prot)	3423	1441	3539	0	0	3539
Fl <sub>t</sub> 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
<b>Two way Left Turn Lane</b>						
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
<b>Detector 1 Channel</b>						
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
<b>Detector 2 Channel</b>						
Detector 2 Position(m)			9.4			9.4
Detector 2 Size(m)			0.6			0.6
Detector 2 Type			Cl+Ex			Cl+Ex
<b>Detector 2 Channel</b>						
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

Background 2037  
AM Peak Hour

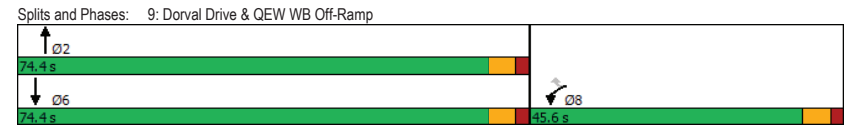
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Detector Phase	8	8	2			6
Switch Phase						
Minimum Initial (s)	10.0	10.0	20.0			20.0
Minimum Split (s)	24.0	24.0	26.0			26.0
Total Split (s)	45.6	45.6	74.4			74.4
Total Split (%)	38.0%	38.0%	62.0%			62.0%
Maximum Green (s)	39.6	39.6	68.4			68.4
Yellow Time (s)	4.0	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

Background 2037  
AM Peak Hour



HCM Signalized Intersection Capacity Analysis  
9: Dorval Drive & QEWB Off-Ramp

Background 2037  
AM Peak Hour

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'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)	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

Background 2037  
AM Peak Hour

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't	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

Background 2037  
AM Peak Hour

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

Background 2037  
AM Peak Hour

Split and Phases: 10: Dorval Drive & QEW EB Off-Ramp

↑ Ø2	74.4 s		↘ Ø4	45.6 s
↓ Ø6	74.4 s			

HCM Signalized Intersection Capacity Analysis  
10: Dorval Drive & QEW EB Off-Ramp

Background 2037  
AM Peak Hour

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	
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

Background 2037  
AM Peak Hour

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	1	41	807	301	89	154
Future Volume (vph)	1	41	807	301	89	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						
Fr't			0.963		0.915	
Flt Protected		0.999			0.982	
Satd. Flow (prot)	0	1672	1612	0	1536	0
Flt Permitted		0.999			0.982	
Satd. Flow (perm)	0	1672	1612	0	1536	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	45	877	327	97	167
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	46	1204	0	264	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	
<b>Intersection Summary</b>						
Area Type:	CBD					
Control Type:	Unsignalized					
Intersection Capacity Utilization	90.3%			ICU Level of Service E		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis  
11: Argus Rd & South Service Rd

Background 2037  
AM Peak Hour

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Volume (veh/h)	1	41	807	301	89	154
Future Volume (Veh/h)	1	41	807	301	89	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)	1	45	877	327	97	167
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	1205				1094	1042
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1205				1094	1042
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				59	41
cM capacity (veh/h)	338				237	281
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>WB 1</b>	<b>SB 1</b>			
Volume Total	46	1204	264			
Volume Left	1	0	97			
Volume Right	0	327	167			
eSH	338	1700	263			
Volume to Capacity	0.00	0.71	1.00			
Queue Length 95th (m)	0.1	0.0	80.1			
Control Delay (s)	0.4	0.0	98.1			
Lane LOS	A		F			
Approach Delay (s)	0.4	0.0	98.1			
Approach LOS			F			
<b>Intersection Summary</b>						
Average Delay			17.1			
Intersection Capacity Utilization		90.3%		ICU Level of Service		E
Analysis Period (min)		15				

Lanes, Volumes, Timings  
12: Lyons Lane & South Service Road

Background 2037  
AM Peak Hour

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Volume (vph)	0	0	0	0	0	0
Future Volume (vph)	0	0	0	0	0	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
Ped Bike Factor						
Fr						
Fit Protected						
Satd. Flow (prot)	0	1710	1710	0	1286	0
Fit Permitted						
Satd. Flow (perm)	0	1710	1710	0	1286	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	0	0	0	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	0	0	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	
<b>Intersection Summary</b>						
Area Type:	CBD					
Control Type:	Unsignalized					
Intersection Capacity Utilization	8.5%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis  
12: Lyons Lane & South Service Road

Background 2037  
AM Peak Hour

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Volume (veh/h)	0	0	0	0	0	0
Future Volume (Veh/h)	0	0	0	0	0	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	0	0	0
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	6				7	6
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	6				7	6
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)	1620				934	1077
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	0	0	0			
Volume Left	0	0	0			
Volume Right	0	0	0			
sSH	1700	1700	1700			
Volume to Capacity	0.00	0.00	0.00			
Queue Length 95th (m)	0.0	0.0	0.0			
Control Delay (s)	0.0	0.0	0.0			
Lane LOS			A			
Approach Delay (s)	0.0	0.0	0.0			
Approach LOS			A			
<b>Intersection Summary</b>						
Average Delay			0.0			
Intersection Capacity Utilization			8.5%		ICU Level of Service	A
Analysis Period (min)			15			

Lanes, Volumes, Timings  
13: GO Bus Terminal/Argus Rd & Cross Ave

Background 2037  
AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↕	↕		↕	↕		↕	↕		↕	↕	
Traffic Volume (vph)	41	1021	19	53	848	31	27	0	64	375	21	257
Future Volume (vph)	41	1021	19	53	848	31	27	0	64	375	21	257
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
Ft		0.997			0.995			0.850				0.861
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1570	3148	0	818	3194	0	805	734	0	1570	1355	0
Fit Permitted	0.299			0.108			0.410			0.711		
Satd. Flow (perm)	494	3148	0	93	3194	0	347	734	0	1150	1355	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3			7			164			143	
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)	45	1110	21	58	922	34	29	0	70	408	23	279
Shared Lane Traffic (%)												
Lane Group Flow (vph)	45	1131	0	58	956	0	29	70	0	408	302	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.3			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

Background 2037  
AM Peak Hour

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)	39.5	39.5		51.8	51.8		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	0.20	0.80		0.48	0.51		0.26	0.20		1.11	0.57	
Control Delay	17.3	25.7		23.8	11.5		31.0	1.3		112.6	18.0	
Queue Delay	0.0	0.3		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	17.3	25.9		23.8	11.5		31.0	1.3		112.6	18.0	
LOS	B	C		C	B		C	A		F	B	
Approach Delay		25.6			12.2			10.0			72.4	
Approach LOS		C			B			B			E	
Queue Length 50th (m)	4.6	86.5		4.2	47.5		3.9	0.0		-86.7	22.8	
Queue Length 95th (m)	12.5	114.7		13.3	62.7		12.3	0.0		#144.2	50.7	
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)	233	1491		125	1969		110	346		367	530	
Starvation Cap Reductn	0	56		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.19	0.79		0.46	0.49		0.26	0.20		1.11	0.57	

Intersection Summary

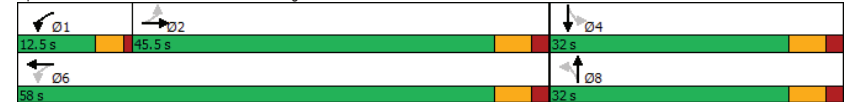
Area Type: CBD  
 Cycle Length: 90  
 Actuated Cycle Length: 87.8  
 Natural Cycle: 90  
 Control Type: Semi Act-Uncoord  
 Maximum v/c Ratio: 1.11  
 Intersection Signal Delay: 31.6  
 Intersection LOS: C

Lanes, Volumes, Timings  
13: GO Bus Terminal/Argus Rd & Cross Ave

Background 2037  
AM Peak Hour

Intersection Capacity Utilization 85.2%  
 Analysis Period (min) 15  
 ICU Level of Service E  
 - 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

Background 2037  
AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	41	1021	19	53	848	31	27	0	64	375	21	257
Future Volume (vph)	41	1021	19	53	848	31	27	0	64	375	21	257
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	0.86	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1570	3149		818	3193		804	735		1538	1356	
Flt Permitted	0.30	1.00		0.11	1.00		0.41	1.00		0.71	1.00	
Satd. Flow (perm)	495	3149		93	3193		347	735		1152	1356	
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	1110	21	58	922	34	29	0	70	408	23	279
RTOR Reduction (vph)	0	2	0	0	3	0	0	48	0	0	97	0
Lane Group Flow (vph)	45	1129	0	58	953	0	29	22	0	408	205	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)	37.6	37.6		49.8	49.8		26.0	26.0		26.0	26.0	
Effective Green, g (s)	39.6	39.6		49.8	51.8		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)	223	1420		120	1883		110	234		367	432	
v/s Ratio Prot		c0.36		0.04	c0.30			0.03			0.15	
v/s Ratio Perm	0.09			0.23			0.08			c0.35		
v/c Ratio	0.20	0.80		0.48	0.51		0.26	0.10		1.11	0.47	
Uniform Delay, d1	14.6	20.6		13.3	10.5		22.2	21.0		29.9	24.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.9	3.6		2.2	0.4		1.7	0.2		80.7	1.1	
Delay (s)	15.5	24.3		15.5	11.0		24.0	21.2		110.6	25.1	
Level of Service	B	C		B	B		C	C		F	C	
Approach Delay (s)		23.9			11.2			22.0			74.2	
Approach LOS		C			B			C			E	
<b>Intersection Summary</b>												
HCM 2000 Control Delay		31.5										C
HCM 2000 Volume to Capacity ratio		0.89										
Actuated Cycle Length (s)		87.8			Sum of lost time (s)			12.0				
Intersection Capacity Utilization		85.2%			ICU Level of Service			E				
Analysis Period (min)		15										
c Critical Lane Group												

Lanes, Volumes, Timings  
14: Lyons Lane/Street A & Cross Ave

Background 2037  
AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	113	247	259	289	268	24	23	4	17	82	31	120
Future Volume (vph)	113	247	259	289	268	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
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		0.923			0.988			0.877			0.881	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1540	2814	0	1570	2727	0	1570	1481	0	1468	1453	0
Flt Permitted	0.560			0.363			0.563			0.743		
Satd. Flow (perm)	902	2814	0	600	2727	0	928	1481	0	1144	1453	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		282			21			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	268	282	314	291	26	25	4	18	89	34	130
<b>Shared Lane Traffic (%)</b>												
Lane Group Flow (vph)	123	550	0	314	317	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	
<b>Two way Left Turn Lane</b>												
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	
<b>Detector 1 Channel</b>												
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	
<b>Detector 2 Channel</b>												

Lanes, Volumes, Timings  
14: Lyons Lane/Street A & Cross Ave

Background 2037  
AM Peak Hour

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	0.28	0.36		0.56	0.17		0.14	0.07		0.40	0.42	
Control Delay	15.2	6.9		8.9	4.2		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	15.2	6.9		8.9	4.2		27.5	14.1		32.7	11.8	
LOS	B	A		A	A		C	B		C	B	
Approach Delay		8.4			6.5			21.2			19.1	
Approach LOS		A			A			C			B	
Queue Length 50th (m)	9.7	10.6		14.1	6.2		3.1	0.5		11.5	4.2	
Queue Length 95th (m)	27.2	26.9		31.6	13.5		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)	445	1533		638	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	0.28	0.36		0.49	0.15		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:	0.56
Intersection Signal Delay:	9.7
Intersection LOS:	A

Lanes, Volumes, Timings  
14: Lyons Lane/Street A & Cross Ave

Background 2037  
AM Peak Hour

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

Background 2037  
AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	113	247	259	289	268	24	23	4	17	82	31	120
Future Volume (vph)	113	247	259	289	268	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	
Frbp, ped/bikes	1.00	0.99		1.00	1.00		1.00	0.99		1.00	0.99	
Fipb, 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	2815		1570	2726		1567	1482		1463	1454	
Flt Permitted	0.56	1.00		0.36	1.00		0.56	1.00		0.74	1.00	
Satd. Flow (perm)	902	2815		601	2726		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	268	282	314	291	26	25	4	18	89	34	130
RTOR Reduction (vph)	0	143	0	0	6	0	0	14	0	0	104	0
Lane Group Flow (vph)	123	408	0	314	311	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)	446	1392		547	1899		182	291		225	286	
v/s Ratio Prot		0.14		c0.09	0.11			0.01			0.04	
v/s Ratio Perm	0.14			c0.30			0.03			c0.08		
v/c Ratio	0.28	0.29		0.57	0.16		0.14	0.03		0.40	0.21	
Uniform Delay, d1	11.1	11.2		5.7	3.9		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	0.7	0.2		1.2	0.1		0.5	0.0		1.6	0.5	
Delay (s)	11.8	11.5		6.9	4.0		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	11.9	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  
15: Cross Ave & Lyons Lane

Background 2037  
AM Peak Hour

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↕	↕	↕	↕	↕
Traffic Volume (vph)	0	609	435	0	0	0
Future Volume (vph)	0	609	435	0	0	0
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						
Flt Protected						
Satd. Flow (prot)	1710	3094	2801	0	1710	0
Flt Permitted						
Satd. Flow (perm)	1710	3094	2801	0	1710	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)	0	662	473	0	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	662	473	0	0	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 22.0%	ICU Level of Service A
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis  
15: Cross Ave & Lyons Lane

Background 2037  
AM Peak Hour

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	609	435	0	0	0
Future Volume (Veh/h)	0	609	435	0	0	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	662	473	0	0	0
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	0.98			0.98	0.98	
vC, conflicting volume	477			815	240	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	433			777	192	
tC, single (s)	4.1			6.8	7.4	
tC, 2 stage (s)						
tF (s)	2.2			3.5	3.5	
p0 queue free %	100			100	100	
cM capacity (veh/h)	1114			329	735	
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	0	331	331	315	158	0
Volume Left	0	0	0	0	0	0
Volume Right	0	0	0	0	0	0
sSH	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.00	0.19	0.19	0.19	0.09	0.00
Queue Length 95th (m)	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS						A
Approach Delay (s)	0.0			0.0		0.0
Approach LOS						A
Intersection Summary						
Average Delay			0.0			
Intersection Capacity Utilization			22.0%		ICU Level of Service	A
Analysis Period (min)			15			

Lanes, Volumes, Timings  
16: Speers Road/Cornwall Road & Cross Avenue

Background 2037  
AM Peak Hour

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	274	792	734	39	62	430
Future Volume (vph)	274	792	734	39	62	430
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
Fit Protected	0.950				0.950	
Satd. Flow (prot)	1770	3539	3511	0	1770	2787
Fit Permitted	0.242				0.950	
Satd. Flow (perm)	451	3539	3511	0	1770	2787
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)			6			467
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)	298	861	798	42	67	467
Shared Lane Traffic (%)						
Lane Group Flow (vph)	298	861	840	0	67	467
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

Background 2037  
AM Peak Hour

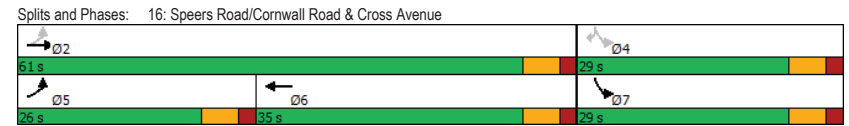
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Detector Phase	5	2	6		7	4
Switch Phase						
Minimum Initial (s)	6.0	25.0	25.0		6.0	6.0
Minimum Split (s)	12.0	35.0	35.0		29.0	29.0
Total Split (s)	26.0	61.0	35.0		29.0	29.0
Total Split (%)	28.9%	67.8%	38.9%		32.2%	32.2%
Maximum Green (s)	20.0	55.0	29.0		23.0	23.0
Yellow 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	37.7		8.3	8.3
Actuated g/C Ratio	0.73	0.73	0.50		0.11	0.11
v/c Ratio	0.57	0.33	0.48		0.35	0.65
Control Delay	8.0	4.2	14.6		35.9	8.0
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	8.0	4.2	14.6		35.9	8.0
LOS	A	A	B		D	A
Approach Delay		5.2	14.6		11.5	
Approach LOS		A	B		B	
Queue Length 50th (m)	11.3	18.8	39.2		9.5	0.0
Queue Length 95th (m)	22.4	30.7	71.0		20.9	13.9
Internal Link Dist (m)		204.9	251.4		159.9	
Turn Bay Length (m)	75.0				55.0	
Base Capacity (vph)	679	2585	1760		540	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	0.44	0.33	0.48		0.12	0.40

Intersection Summary

Area Type:	Other
Cycle Length:	90
Actuated Cycle Length:	75.3
Natural Cycle:	80
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.65
Intersection Signal Delay:	9.6
Intersection Capacity Utilization:	56.7%
Intersection LOS:	A
ICU Level of Service:	B
Analysis Period (min):	15

Lanes, Volumes, Timings  
16: Speers Road/Cornwall Road & Cross Avenue

Background 2037  
AM Peak Hour



HCM Signalized Intersection Capacity Analysis  
 16: Speers Road/Cornwall Road & Cross Avenue

Background 2037  
 AM Peak Hour

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↕	↕	↔	↔	↕
Traffic Volume (vph)	274	792	734	39	62	430
Future Volume (vph)	274	792	734	39	62	430
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 <sub>t</sub>	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	0.24	1.00	1.00		0.95	1.00
Satd. Flow (perm)	450	3539	3513		1770	2787
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	298	861	798	42	67	467
RTOR Reduction (vph)	0	0	3	0	0	416
Lane Group Flow (vph)	298	861	837	0	67	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	37.7		8.3	8.3
Effective Green, g (s)	55.0	55.0	37.7		8.3	8.3
Actuated g/C Ratio	0.73	0.73	0.50		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)	526	2584	1758		195	307
v/s Ratio Prot	c0.08	0.24	0.24		c0.04	
v/s Ratio Perm	c0.33					0.02
v/c Ratio	0.57	0.33	0.48		0.34	0.17
Uniform Delay, d1	5.2	3.6	12.3		31.0	30.4
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	1.4	0.3	0.9		1.1	0.3
Delay (s)	6.6	4.0	13.3		32.0	30.6
Level of Service	A	A	B		C	C
Approach Delay (s)		4.6	13.3		30.8	
Approach LOS		A	B		C	

Intersection Summary			
HCM 2000 Control Delay	13.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	75.3	Sum of lost time (s)	18.0
Intersection Capacity Utilization	56.7%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings  
 17: Driveway A & Street 1

Background 2037  
 AM Peak Hour

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	0	0	0	0	0	0
Future Volume (vph)	0	0	0	0	0	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 <sub>t</sub>						
Fit Protected						
Satd. Flow (prot)	1863	0	0	1863	1863	0
Fit Permitted						
Satd. Flow (perm)	1863	0	0	1863	1863	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	39.1			82.7	58.5	
Travel Time (s)	2.8			6.0	4.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	0	0	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 0.0%	ICU Level of Service A
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis  
17: Driveway A & Street 1

Background 2037  
AM Peak Hour

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔			↔	↔	
Traffic Volume (veh/h)	0	0	0	0	0	0
Future Volume (Veh/h)	0	0	0	0	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	0	0	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None		None			
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			0		0	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			0		0	0
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			1623		1023	1085
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	0	0	0			
Volume Left	0	0	0			
Volume Right	0	0	0			
eSH	1700	1700	1700			
Volume to Capacity	0.00	0.00	0.00			
Queue Length 95th (m)	0.0	0.0	0.0			
Control Delay (s)	0.0	0.0	0.0			
Lane LOS			A			
Approach Delay (s)	0.0	0.0	0.0			
Approach LOS			A			
<b>Intersection Summary</b>						
Average Delay			0.0			
Intersection Capacity Utilization			0.0%		ICU Level of Service	A
Analysis Period (min)			15			

Lanes, Volumes, Timings  
18: Street C & Driveway B

Background 2037  
AM Peak Hour

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔			↔	↔	
Traffic Volume (vph)	0	0	0	40	1000	0
Future Volume (vph)	0	0	0	40	1000	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 <sub>t</sub>						
Fit Protected						
Satd. Flow (prot)	1863	0	0	1863	1863	0
Fit Permitted						
Satd. Flow (perm)	1863	0	0	1863	1863	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	49.2			76.4	58.0	
Travel Time (s)	3.5			5.5	4.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	43	1087	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	43	1087	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	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
Sign Control	Stop			Free	Free	
<b>Intersection Summary</b>						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	56.0%			ICU Level of Service B		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis  
18: Street C & Driveway B

Background 2037  
AM Peak Hour

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔			↑	↑	
Traffic Volume (veh/h)	0	0	0	40	1000	0
Future Volume (Veh/h)	0	0	0	40	1000	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	0	0	43	1087	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)				77		
pX, platoon unblocked						
vC, conflicting volume	1130	1087	1087			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1130	1087	1087			
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)	225	263	642			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	0	43	1087			
Volume Left	0	0	0			
Volume Right	0	0	0			
cSH	1700	642	1700			
Volume to Capacity	0.00	0.00	0.64			
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					
<b>Intersection Summary</b>						
Average Delay			0.0			
Intersection Capacity Utilization		56.0%		ICU Level of Service		B
Analysis Period (min)		15				

Lanes, Volumes, Timings  
19: Street C & South Service Road

Background 2037  
AM Peak Hour

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔			↔	↔	
Traffic Volume (vph)	68	51	192	98	6	16
Future Volume (vph)	68	51	192	98	6	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
Frt	0.942				0.904	
Fit Protected				0.968	0.986	
Satd. Flow (prot)	1755	0	0	1803	1660	0
Fit Permitted				0.968	0.986	
Satd. Flow (perm)	1755	0	0	1803	1660	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	235.2			305.2	159.9	
Travel Time (s)	16.9			22.0	11.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	74	55	209	107	7	17
<b>Shared Lane Traffic (%)</b>						
Lane Group Flow (vph)	129	0	0	316	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	
<b>Two way Left Turn Lane</b>						
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	
<b>Intersection Summary</b>						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	32.5%			ICU Level of Service A		
Analysis Period (min)	15					



HCM Unsignalized Intersection Capacity Analysis  
19: Street C & South Service Road

Background 2037  
AM Peak Hour

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔		↔		↔	
Traffic Volume (veh/h)	68	51	192	98	6	16
Future Volume (Veh/h)	68	51	192	98	6	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)	74	55	209	107	7	17
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None		None			
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			129		626	102
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			129		626	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 %			86		98	98
cM capacity (veh/h)			1457		383	954
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	129	316	24			
Volume Left	0	209	7			
Volume Right	55	0	17			
cSH	1700	1457	665			
Volume to Capacity	0.08	0.14	0.04			
Queue Length 95th (m)	0.0	4.0	0.9			
Control Delay (s)	0.0	5.6	10.6			
Lane LOS	A		B			
Approach Delay (s)	0.0	5.6	10.6			
Approach LOS	A		B			
<b>Intersection Summary</b>						
Average Delay			4.3			
Intersection Capacity Utilization			32.5%	ICU Level of Service		A
Analysis Period (min)	15					

Lanes, Volumes, Timings  
20: Street A & South Service Road

Background 2037  
AM Peak Hour

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 <sub>t</sub>	0.923					
Fit Protected			0.993		0.950	
Satd. Flow (prot)	1719		0		0	
Fit Permitted			0.993		0.950	
Satd. Flow (perm)	1719		0		0	
Link Speed (k/h)	50		50		50	
Link Distance (m)	285.4		235.2		98.8	
Travel Time (s)	20.5		16.9		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
<b>Shared Lane Traffic (%)</b>						
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	
<b>Two way Left Turn Lane</b>						
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	
<b>Intersection Summary</b>						
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

Background 2037  
AM Peak Hour

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			
<b>Intersection Summary</b>						
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

Background 2037  
AM Peak Hour

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔		↔		↔	
Traffic Volume (vph)	0	0	0	73	653	411
Future Volume (vph)	0	0	0	73	653	411
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 <sub>t</sub>	0.948					
Fit Protected						
Satd. Flow (prot)	1863	0	0	1863	1766	0
Fit Permitted						
Satd. Flow (perm)	1863	0	0	1863	1766	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	79	710	447
<b>Shared Lane Traffic (%)</b>						
Lane Group Flow (vph)	0	0	0	79	1157	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	
<b>Two way Left Turn Lane</b>						
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	
<b>Intersection Summary</b>						
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  
21: Argus Rd & Street 1

Background 2037  
AM Peak Hour

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔			↑	↑	
Traffic Volume (veh/h)	0	0	0	73	653	411
Future Volume (Veh/h)	0	0	0	73	653	411
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	79	710	447
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	1012	934	1157			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1012	934	1157			
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)	265	322	604			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	0	79	1157			
Volume Left	0	0	0			
Volume Right	0	0	447			
cSH	1700	604	1700			
Volume to Capacity	0.00	0.00	0.68			
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					
<b>Intersection Summary</b>						
Average Delay		0.0				
Intersection Capacity Utilization		62.8%		ICU Level of Service		B
Analysis Period (min)		15				

Lanes, Volumes, Timings  
22: Street C & Street 1

Background 2037  
AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	0	0	0	411	0	0	0	40	0	0	586	0
Future Volume (vph)	0	0	0	411	0	0	0	40	0	0	586	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
<b>Fr</b>												
Fit Protected					0.950							
Satd. Flow (prot)	0	1863	0	0	1770	0	0	1863	0	0	1863	0
Fit Permitted					0.950							
Satd. Flow (perm)	0	1863	0	0	1770	0	0	1863	0	0	1863	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		82.7			162.1			58.0			159.9	
Travel Time (s)		6.0			11.7			4.2			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	0	0	447	0	0	0	43	0	0	637	0
<b>Shared Lane Traffic (%)</b>												
Lane Group Flow (vph)	0	0	0	0	447	0	0	43	0	0	637	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
<b>Two way Left Turn Lane</b>												
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	
<b>Intersection Summary</b>												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	60.3%						ICU Level of Service B					
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis  
22: Street C & Street 1

Background 2037  
AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↔		↔				↔			↔		
Traffic Volume (veh/h)	0	0	0	411	0	0	0	40	0	0	586	0	
Future Volume (Veh/h)	0	0	0	411	0	0	0	40	0	0	586	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	0	0	447	0	0	0	43	0	0	637	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	680	680	637	680	680	43	637						43
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	680	680	637	680	680	43	637						43
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1						4.1
tC, 2 stage (s)													
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2						2.2
p0 queue free %	100	100	100	0	100	100	100						100
cM capacity (veh/h)	365	373	477	365	373	1027	947						1566
Direction, Lane #	EB 1	WB 1	NB 1	SB 1									
Volume Total	0	447	43	637									
Volume Left	0	447	0	0									
Volume Right	0	0	0	0									
eSH	1700	365	947	1566									
Volume to Capacity	0.00	1.22	0.00	0.00									
Queue Length 95th (m)	0.0	152.4	0.0	0.0									
Control Delay (s)	0.0	154.8	0.0	0.0									
Lane LOS	A	F											
Approach Delay (s)	0.0	154.8	0.0	0.0									
Approach LOS	A	F											
Intersection Summary													
Average Delay				61.4									
Intersection Capacity Utilization				60.3%			ICU Level of Service			B			
Analysis Period (min)				15									

Lanes, Volumes, Timings  
23: GO Station West Access/Street C & Cross Ave

Background 2037  
AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔				↔			↔	
Traffic Volume (vph)	19	340	115	550	522	21	51	0	271	503	411	82
Future Volume (vph)	19	340	115	550	522	21	51	0	271	503	411	82
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	0.964		0.997		0.850		0.975					
Fit Protected	0.998		0.975		0.950		0.950					
Satd. Flow (prot)	0	3405	0	0	3440	0	1770	1583	0	1770	1816	0
Fit Permitted	0.808		0.633		0.290		0.577					
Satd. Flow (perm)	0	2757	0	0	2234	0	540	1583	0	1075	1816	0
Right Turn on Red	Yes			Yes			Yes			Yes		
Satd. Flow (RTOR)	99			4			308			23		
Link Speed (k/h)	50			50			50			50		
Link Distance (m)	211.2			162.8			81.1			76.4		
Travel Time (s)	15.2			11.7			5.8			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)	21	370	125	598	567	23	55	0	295	547	447	89
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	516	0	0	1188	0	55	295	0	547	536	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	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

Background 2037

AM Peak Hour

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			1.82dl			0.27	0.37		1.34	0.76
Control Delay		10.9			205.6			15.0	3.1		190.2	22.4
Queue Delay		0.0			0.0			0.0	0.0		0.0	0.0
Total Delay		10.9			205.6			15.0	3.1		190.2	22.4
LOS		B			F			B	A		F	C
Approach Delay		10.9			205.6			5.0			107.2	
Approach LOS		B			F			A			F	
Queue Length 50th (m)		14.3			~83.5			3.4	0.0		~70.2	40.1
Queue Length 95th (m)		25.2			#118.7			10.8	10.9		#119.1	#85.2
Internal Link Dist (m)		187.2			138.8			57.1			52.4	
Turn Bay Length (m)											15.0	
Base Capacity (vph)		1109			851			205	792		408	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		0.47			1.40			0.27	0.37		1.34	0.76

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: 130  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 1.40  
 Intersection Signal Delay: 117.2 Intersection LOS: F  
 Intersection Capacity Utilization 109.4% ICU Level of Service H  
 Analysis Period (min) 15  
 ~ Volume exceeds capacity, queue is theoretically infinite.

Lanes, Volumes, Timings

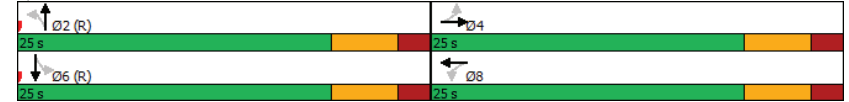
23: GO Station West Access/Street C & Cross Ave

Background 2037

AM Peak Hour

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

Background 2037  
AM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔		↔			↔		
Traffic Volume (vph)	19	340	115	550	522	21	51	0	271	503	411	82
Future Volume (vph)	19	340	115	550	522	21	51	0	271	503	411	82
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		1.00
Fr't		0.96			1.00		1.00		0.85	1.00		0.98
Flt Protected		1.00			0.98		0.95		1.00	0.95		1.00
Satd. Flow (prot)		3404			3442		1770		1583	1770		1816
Flt Permitted		0.81			0.63		0.29		1.00	0.58		1.00
Satd. Flow (perm)		2754			2235		540		1583	1075		1816
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	370	125	598	567	23	55	0	295	547	447	89
RTOR Reduction (vph)	0	61	0	0	2	0	0	183	0	0	14	0
Lane Group Flow (vph)	0	455	0	0	1186	0	55	112	0	547	522	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)		1046			849		205	601		408	690	
v/s Ratio Prot								0.07			0.29	
v/s Ratio Perm		0.17			c0.53		0.10			c0.51		
v/c Ratio		0.43			1.82dl		0.27	0.19		1.34	0.76	
Uniform Delay, d1		11.5			15.5		10.7	10.3		15.5	13.5	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.3			185.5		3.2	0.7		169.1	7.6	
Delay (s)		11.8			201.0		13.9	11.0		184.6	21.1	
Level of Service		B			F		B	B		F	C	
Approach Delay (s)		11.8			201.0			11.5			103.6	
Approach LOS		B			F			B			F	

Intersection Summary			
HCM 2000 Control Delay	115.1	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.37		
Actuated Cycle Length (s)	50.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	109.4%	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

Background 2037  
PM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔		↔			↔		
Traffic Volume (vph)	156	131	387	1091	250	207	490	2132	803	157	1395	130
Future Volume (vph)	156	131	387	1091	250	207	490	2132	803	157	1395	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			
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	0.592			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			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)	170	142	421	1186	272	225	533	2317	873	171	1516	141
Shared Lane Traffic (%)												
Lane Group Flow (vph)	170	142	421	1186	272	225	533	2317	873	171	1516	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

Background 2037

PM Peak Hour

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	0.30	1.47	0.54	0.44	1.47	1.17	0.62	0.91	1.03	0.24
Control Delay	44.3	52.1	0.5	244.7	39.3	14.0	255.8	113.9	2.1	75.3	71.4	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	244.7	39.3	14.0	255.8	113.9	2.1	75.3	71.4	2.3
LOS	D	D	A	F	D	B	F	F	A	E	E	A
Approach Delay		20.7			180.7			108.0			66.5	
Approach LOS		C			F			F			E	
Queue Length 50th (m)	28.3	32.4	0.0	~173.3	56.1	13.6	~168.7	~250.4	0.0	25.8	~147.2	0.0
Queue Length 95th (m)	43.7	52.2	0.0	#210.3	81.2	35.2	#249.7	#280.4	0.0	#82.4	#178.2	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	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	0.30	1.47	0.49	0.41	1.47	1.17	0.62	0.91	1.03	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:	1.47
Intersection Signal Delay:	105.8
Intersection LOS:	F

Lanes, Volumes, Timings

1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd

Background 2037

PM Peak Hour

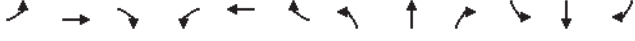
Intersection Capacity Utilization	117.2%	ICU Level of Service H
Analysis Period (min)	15	
- Volume exceeds capacity, queue is theoretically infinite.		
Queue shown is maximum after two cycles.		
# 95th percentile volume exceeds capacity, queue may be longer.		
Queue shown is maximum after two cycles.		

Splits and Phases: 1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd



HCM Signalized Intersection Capacity Analysis  
1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd

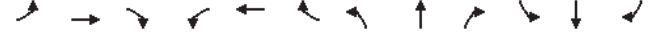
Background 2037  
PM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	156	131	387	1091	250	207	490	2132	803	157	1395	130
Future Volume (vph)	156	131	387	1091	250	207	490	2132	803	157	1395	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
Frbp, 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
Ftpb, 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	421	1186	272	225	533	2317	873	171	1516	141
RTOR Reduction (vph)	0	0	0	0	0	106	0	0	0	0	0	95
Lane Group Flow (vph)	170	142	421	1186	272	119	533	2317	873	171	1516	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		c0.28	0.16		c0.28	0.51		0.07	0.33	
v/s Ratio Perm	0.10		0.30	c0.27		0.09	c0.50		0.62	0.28		0.03
v/c Ratio	0.74	0.51	0.30	1.51	0.54	0.30	1.49	1.17	0.62	0.93	1.03	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	233.9	2.0	0.9	236.2	81.6	2.1	47.6	31.5	0.4
Delay (s)	55.6	49.1	0.5	268.7	37.4	33.5	273.7	115.6	2.1	78.2	72.0	28.7
Level of Service	E	D	A	F	D	C	F	F	A	E	E	C
Approach Delay (s)		22.7			199.8			111.6			69.2	
Approach LOS		C			F			F			E	
<b>Intersection Summary</b>												
HCM 2000 Control Delay		112.4										F
HCM 2000 Volume to Capacity ratio		1.50										
Actuated Cycle Length (s)		120.0						Sum of lost time (s)		17.0		
Intersection Capacity Utilization		117.2%						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

Background 2037  
PM Peak Hour



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	28	0	337	1024	129	400	0	2997	620	0	2859	12
Future Volume (vph)	28	0	337	1024	129	400	0	2997	620	0	2859	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	0.963							
Satd. Flow (prot)	1570	0	1437	1463	1537	1409	0	4577	1439	0	4780	0
Flt Permitted	0.950			0.950	0.963							
Satd. Flow (perm)	1569	0	1437	1463	1537	1391	0	4577	1400	0	4780	0
Right Turn on Red			Yes			Yes		Yes		Yes		Yes
Satd. Flow (RTOR)			31			195			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	366	1113	140	435	0	3258	674	0	3108	13
Shared Lane Traffic (%)				44%								
Lane Group Flow (vph)	30	0	366	623	630	435	0	3258	674	0	3121	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
<b>Two way Left Turn Lane</b>												
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	
<b>Detector 1 Channel</b>												
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	
<b>Detector 2 Channel</b>												



Lanes, Volumes, Timings

Background 2037

2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp

PM Peak Hour

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		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		0.61	1.37	1.32	0.31		1.33	0.48			1.22
Control Delay	68.1		34.8	218.7	197.6	0.6		178.8	0.1			132.9
Queue Delay	0.0		0.0	0.0	0.0	0.0		0.0	0.0			0.0
Total Delay	68.1		34.8	218.7	197.6	0.6		178.8	0.1			132.9
LOS	E		C	F	F	A		F	A			F
Approach Delay		37.4						148.1				132.9
Approach LOS		D				F		F				F
Queue Length 50th (m)	8.5		76.4	~250.5	~247.5	0.0		~450.2	0.0			~324.8
Queue Length 95th (m)	19.2		112.2	#340.4	#338.0	0.0		m#413.9	m0.0			#343.9
Internal Link Dist (m)		118.1			168.6			300.8				256.4
Turn Bay Length (m)	50.0											
Base Capacity (vph)	213		603	454	477	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		0.61	1.37	1.32	0.31		1.33	0.48			1.22

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

Background 2037

2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp

PM Peak Hour

Intersection Signal Delay: 139.3	Intersection LOS: F
Intersection Capacity Utilization 114.7%	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

Background 2037  
PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	28	0	337	1024	129	400	0	2997	620	0	2859	12
Future Volume (vph)	28	0	337	1024	129	400	0	2997	620	0	2859	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	0.96	1.00		1.00	1.00		1.00	
Satd. Flow (prot)	1570		1437	1463	1536	1391		4577	1400		4782	
Fit Permitted	0.95		1.00	0.95	0.96	1.00		1.00	1.00		1.00	
Satd. Flow (perm)	1570		1437	1463	1536	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	366	1113	140	435	0	3258	674	0	3108	13
RTOR Reduction (vph)	0	0	18	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	30	0	348	623	630	435	0	3258	674	0	3121	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	477	1391		2451	1400		2561	
v/s Ratio Prot	0.02							0.71			0.65	
v/s Ratio Perm			0.24	0.43	0.41	0.31			0.48			
v/c Ratio	0.28		0.59	1.37	1.32	0.31		1.33	0.48		1.22	
Uniform Delay, d1	62.0		32.5	48.2	48.2	0.0		32.5	0.0		32.5	
Progression Factor	1.00		1.00	1.00	1.00	1.00		1.04	1.00		1.00	
Incremental Delay, d2	1.5		1.6	181.0	158.5	0.6		148.4	0.1		102.1	
Delay (s)	63.5		34.1	229.3	206.7	0.6		182.3	0.1		134.6	
Level of Service	E		C	F	F	A		F	A		F	
Approach Delay (s)		36.3				161.9		151.1			134.6	
Approach LOS		D				F		F			F	

Intersection Summary			
HCM 2000 Control Delay	142.5	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.30		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	114.7%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings  
3: Trafalgar Rd & QEW EB-Off Ramp

Background 2037  
PM Peak Hour

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	1126	522	0	2471	2661	369
Future Volume (vph)	1126	522	0	2471	2661	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				107
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	567	0	2686	2892	401
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1224	567	0	2686	2892	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

Background 2037  
PM Peak Hour

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	1.03		1.07	1.15	0.28
Control Delay	73.8	87.5		60.7	90.4	0.0
Queue Delay	0.0	0.0		0.0	0.0	0.0
Total Delay	73.8	87.5		60.7	90.4	0.0
LOS	E	F		E	F	A
Approach Delay	78.2			60.7	79.4	
Approach LOS	E			E	E	
Queue Length 50th (m)	~195.0	~176.1		~313.6	~360.9	0.0
Queue Length 95th (m)	#238.6	#250.9		m227.2	m195.2	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	1.03		1.07	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:	120
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	1.15
Intersection Signal Delay:	72.7
Intersection Capacity Utilization:	99.9%
Intersection LOS:	E
ICU Level of Service:	F
Analysis Period (min):	15

Lanes, Volumes, Timings  
3: Trafalgar Rd & QEW EB-Off Ramp

Background 2037  
PM Peak Hour

- 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

Background 2037  
PM Peak Hour

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	1126	522	0	2471	2661	369
Future Volume (vph)	1126	522	0	2471	2661	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
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)	1224	567	0	2686	2892	401
RTOR Reduction (vph)	0	1	0	0	0	0
Lane Group Flow (vph)	1224	566	0	2686	2892	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				0.59	0.63	
v/s Ratio Perm	0.40	0.40				0.28
v/c Ratio	1.02	1.03		1.07	1.15	0.28
Uniform Delay, d1	42.5	42.5		31.5	31.5	0.0
Progression Factor	1.00	1.00		0.94	0.67	1.00
Incremental Delay, d2	32.1	46.2		31.2	67.5	0.0
Delay (s)	74.6	88.7		60.8	88.8	0.0
Level of Service	E	F		E	F	A
Approach Delay (s)	79.1			60.8	78.0	
Approach LOS	E			E	E	

Intersection Summary			
HCM 2000 Control Delay	72.3	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.12		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	99.9%	ICU Level of Service	F
Analysis Period (min)	15		

Lanes, Volumes, Timings  
4: Trafalgar Rd & Argus Rd

Background 2037  
PM Peak Hour

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	111	0	3518	2114	1068
Future Volume (vph)	0	111	0	3518	2114	1068
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			0.950	
Flt Protected						
Satd. Flow (prot)	0	1354	0	4577	4334	0
Flt Permitted						
Satd. Flow (perm)	0	1354	0	4577	4334	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	121	0	3824	2298	1161
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	121	0	3824	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 87.0%	ICU Level of Service E
Analysis Period (min) 15	

HCM Unsignalized Intersection Capacity Analysis  
4: Trafalgar Rd & Argus Rd

Background 2037  
PM Peak Hour

Movement	EBL	EBR	NBL	NBT	SBT	SBR	
Lane Configurations		↗		↖↖	↗↗		
Traffic Volume (veh/h)	0	111	0	3518	2114	1068	
Future Volume (Veh/h)	0	111	0	3518	2114	1068	
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	121	0	3824	2298	1161	
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	4177	1370	3483				
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol	0	0	2272				
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	75	100				
cM capacity (veh/h)	661	477	102				
Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	121	1275	1275	1275	919	919	1621
Volume Left	0	0	0	0	0	0	0
Volume Right	121	0	0	0	0	0	1161
sSH	477	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.25	0.75	0.75	0.75	0.54	0.54	0.95
Queue Length 95th (m)	8.0	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			0.2				
Intersection Capacity Utilization			87.0%		ICU Level of Service		E
Analysis Period (min)			15				

Lanes, Volumes, Timings  
5: Trafalgar Rd & Cross Ave/South Service Rd

Background 2037  
PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖↖	↖	↗	↖	↖	↗	↖↖	↖↖	↗	↖↖	↖↖	↖↖
Traffic Volume (vph)	1115	48	139	86	84	215	208	1746	42	95	1600	358
Future Volume (vph)	1115	48	139	86	84	215	208	1746	42	95	1600	358
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		0.888				0.850		0.996			0.973	
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2958	1348	0	1540	1644	1423	1496	4573	0	1570	4438	0
Fit Permitted	0.950			0.630			0.077			0.083		
Satd. Flow (perm)	2958	1348	0	994	1644	1423	121	4573	0	137	4438	0
Right Turn on Red			Yes			Yes		Yes		Yes		Yes
Satd. Flow (RTOR)		132				148		3			40	
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)	1212	52	151	93	91	234	226	1898	46	103	1739	389
Shared Lane Traffic (%)												
Lane Group Flow (vph)	1212	203	0	93	91	234	226	1944	0	103	2128	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

Background 2037

PM Peak Hour

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	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	59.5		16.5	19.5	19.5	72.5	60.6		58.9	51.0	
Actuated g/C Ratio	0.26	0.42		0.12	0.14	0.14	0.52	0.43		0.42	0.36	
v/c Ratio	1.59	0.31		0.80	0.40	0.72	0.97	0.98		0.75	1.30	
Control Delay	308.3	10.5		102.1	59.9	34.4	57.0	54.2		37.1	175.0	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	308.3	10.5		102.1	59.9	34.4	57.0	54.2		37.1	175.0	
LOS	F	B		F	E	C	E	D		D	F	
Approach Delay		265.6			55.0			54.5			168.6	
Approach LOS		F			E			D			F	
Queue Length 50th (m)	~259.2	12.2		26.5	24.2	23.5	~62.6	~179.2		20.7	~284.9	
Queue Length 95th (m)	#302.8	30.4		#55.7	42.7	55.5	m55.5	m145.2		m18.5	m#235.3	
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	661		127	246	339	234	1982		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	1.59	0.31		0.73	0.37	0.69	0.97	0.98		0.75	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:	1.59

Lanes, Volumes, Timings

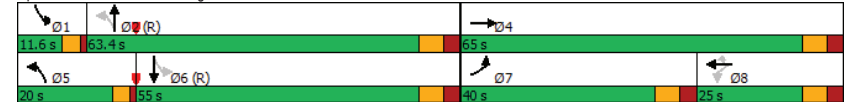
5: Trafalgar Rd & Cross Ave/South Service Rd

Background 2037

PM Peak Hour

Intersection Signal Delay: 143.3	Intersection LOS: F
Intersection Capacity Utilization 113.4%	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: 5: Trafalgar Rd & Cross Ave/South Service Rd



HCM Signalized Intersection Capacity Analysis  
5: Trafalgar Rd & Cross Ave/South Service Rd

Background 2037  
PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗
Traffic Volume (vph)	1115	48	139	86	84	215	208	1746	42	95	1600	358
Future Volume (vph)	1115	48	139	86	84	215	208	1746	42	95	1600	358
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	4.0	4.0	4.0
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	1.00	0.91	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	1.00	0.99	1.00	0.99
Fipb, ped/bikes	1.00	1.00	0.97	1.00	1.00	1.00	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	1.00	0.97	1.00	0.97
Flt Protected	0.95	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Satd. Flow (prot)	2958	1349	1499	1644	1423	1496	4575	1570	4436	1570	4436	1570
Flt Permitted	0.95	1.00	0.63	1.00	1.00	0.08	1.00	0.08	1.00	0.08	1.00	0.08
Satd. Flow (perm)	2958	1349	995	1644	1423	121	4575	138	4436	138	4436	138
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)	1212	52	151	93	91	234	226	1898	46	103	1739	389
RTOR Reduction (vph)	0	76	0	0	127	0	2	0	0	25	0	0
Lane Group Flow (vph)	1212	127	0	93	91	107	226	1942	0	103	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		8	5	2		1		6
Permitted Phases				8		8	2			6		
Actuated Green, G (s)	33.0	56.5		16.5	16.5	16.5	69.5	57.6		55.9		48.0
Effective Green, g (s)	36.0	59.5		16.5	19.5	19.5	69.5	60.6		55.9		51.0
Actuated g/C Ratio	0.26	0.42		0.12	0.14	0.14	0.50	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		117	228	198	231	1980		135		1615
v/s Ratio Prot	c0.41	0.09		0.06			c0.12	0.42		0.04		c0.47
v/s Ratio Perm				c0.09		0.07	0.36			0.26		
v/c Ratio	1.59	0.22		0.79	0.40	0.54	0.98	0.98		0.76		1.30
Uniform Delay, d1	52.0	25.6		60.1	54.9	56.1	44.9	39.1		33.2		44.5
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.24	1.33		1.30		1.19
Incremental Delay, d2	273.8	0.3		31.4	1.6	3.6	13.0	3.1		2.4		136.3
Delay (s)	325.8	25.8		91.5	56.5	59.6	68.6	55.0		45.6		189.4
Level of Service	F	C		F	E	E	E	D		D		F
Approach Delay (s)	282.8			66.0			56.4			182.7		
Approach LOS	F			E			E			F		
<b>Intersection Summary</b>												
HCM 2000 Control Delay			153.6				HCM 2000 Level of Service			F		
HCM 2000 Volume to Capacity ratio			1.24									
Actuated Cycle Length (s)			140.0			Sum of lost time (s)				16.0		
Intersection Capacity Utilization			113.4%			ICU Level of Service				H		
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings  
6: Trafalgar Rd & Cornwall Rd

Background 2037  
PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗
Traffic Volume (vph)	566	585	55	109	904	511	74	901	98	653	748	420
Future Volume (vph)	566	585	55	109	904	511	74	901	98	653	748	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	80.0	0.0	80.0	0.0
Storage Lanes	2	0	1	1	1	1	1	1	0	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	*0.80	0.95	0.97	*0.80	1.00
Ped Bike Factor	0.99	1.00	0.99	0.99	0.850	0.985	0.985	0.985	1.00	1.00	0.97	0.97
Frt	0.987											0.850
Flt Protected	0.950			0.950			0.950		0.950		0.950	
Satd. Flow (prot)	3016	3105	0	1570	3217	1439	1540	2688	0	2987	1368	1409
Flt Permitted	0.950			0.950			0.950		0.950		0.950	
Satd. Flow (perm)	2994	3105	0	1551	3217	1413	1528	2688	0	2972	1368	1361
Right Turn on Red			Yes			Yes		Yes		Yes		Yes
Satd. Flow (RTOR)		7				304		7				289
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	636	60	118	983	555	80	979	107	710	813	457
Shared Lane Traffic (%)												
Lane Group Flow (vph)	615	696	0	118	983	555	80	1086	0	710	813	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

Background 2037  
PM Peak Hour

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							
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	0.80		0.75	1.22	0.39	0.91	1.17		1.45	1.32	0.59
Control Delay	315.3	54.5		89.4	155.3	0.8	137.9	129.9		255.9	172.1	5.8
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	54.5		89.4	155.3	0.8	137.9	129.9		255.9	172.1	5.8
LOS	F	D		F	F	A	F	F		F	F	A
Approach Delay		176.8			98.8			130.4			163.7	
Approach LOS		F			F			F			F	
Queue Length 50th (m)	~131.2	98.6		34.0	~184.8	0.0	23.6	~235.3		~148.7	~371.1	20.4
Queue Length 95th (m)	#170.2	123.5		#66.2	#228.7	0.0	#58.1	#288.6		m#108.2m#261.5	m13.4	
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	870		157	804	1413	88	926		490	615	771
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	0.80		0.75	1.22	0.39	0.91	1.17		1.45	1.32	0.59

Intersection Summary

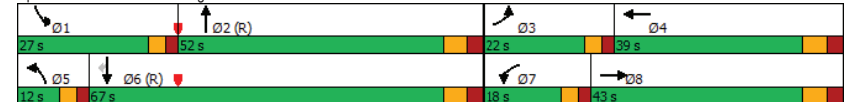
Area Type:	CBD
Cycle Length:	140
Actuated Cycle Length:	140
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green, Master Intersection	
Natural Cycle:	150
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	1.59

Lanes, Volumes, Timings  
6: Trafalgar Rd & Cornwall Rd

Background 2037  
PM Peak Hour

Intersection Signal Delay: 142.6	Intersection LOS: F
Intersection Capacity Utilization 111.0%	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

Background 2037  
PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	566	585	55	109	904	511	74	901	98	653	748	420
Future Volume (vph)	566	585	55	109	904	511	74	901	98	653	748	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
Frbp, ped/bikes	1.00	1.00		1.00	1.00	0.98	1.00	1.00		1.00	1.00	0.97
Fipb, 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	0.99		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	3105		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	3105		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)	615	636	60	118	983	555	80	979	107	710	813	457
RTOR Reduction (vph)	0	5	0	0	0	0	0	5	0	0	0	159
Lane Group Flow (vph)	615	691	0	118	983	555	80	1081	0	710	813	298
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	921		490	615	612
v/s Ratio Prot	c0.20	0.22		0.08	c0.31		0.05	0.40		c0.24	c0.59	
v/s Ratio Perm					c0.39							0.22
v/c Ratio	1.59	0.80		0.75	1.22	0.39	0.91	1.17		1.45	1.32	0.49
Uniform Delay, d1	61.0	46.9		61.3	52.5	0.0	65.6	46.0		58.5	38.5	27.1
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.43	0.69	0.55
Incremental Delay, d2	277.1	7.7		27.8	111.3	0.8	64.9	89.9		203.1	146.0	0.3
Delay (s)	338.1	54.5		89.1	163.8	0.8	130.5	135.9		287.0	172.4	15.2
Level of Service	F	D		F	F	A	F	F		F	F	B
Approach Delay (s)	187.6			103.8			135.5			177.2		
Approach LOS	F			F			F			F		

Intersection Summary			
HCM 2000 Control Delay	151.6	HCM 2000 Level of Service	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	111.0%	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 PM Peak Hour

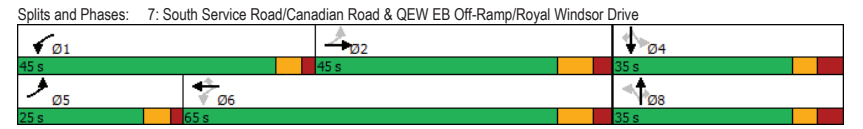
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	366	638	20	214	763	32	16	55	117	16	140	498
Future Volume (vph)	366	638	20	214	763	32	16	55	117	16	140	498
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	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
Frt		0.995				0.850		0.850				0.850
Fit 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
Fit 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	0.6	2.0	0.6	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 Background 2037  
 7: South Service Road/Canadian Road & QEW EB Off-Ramp/Royal Windsor Drive PM Peak Hour

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%
Intersection LOS:	B
ICU Level of Service:	C
Analysis Period (min):	15

Lanes, Volumes, Timings Background 2037  
 7: South Service Road/Canadian Road & QEW EB Off-Ramp/Royal Windsor Drive PM Peak Hour



HCM Signalized Intersection Capacity Analysis Background 2037  
 7: South Service Road/Canadian Road & QEW EB Off-Ramp/Royal Windsor Drive PM Peak Hour

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
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)	3502	3396		1752	3505	1615	1805	1900	1615	1805	1900	1599
Fit 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 Background 2037  
 8: QEW WB Off-Ramp & Kerr Street PM Peak Hour

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
Fit Protected					0.950	
Satd. Flow (prot)	3574	0	0	3574	1805	1599
Fit 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

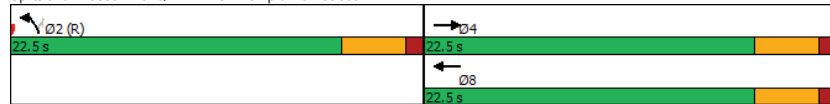
Lanes, Volumes, Timings  
8: QEW WB Off-Ramp & Kerr Street

Background 2037  
PM Peak Hour

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



HCM Signalized Intersection Capacity Analysis  
8: QEW WB Off-Ramp & Kerr Street

Background 2037  
PM Peak Hour

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
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)	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

Background 2037  
PM Peak Hour

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

Background 2037  
PM Peak Hour

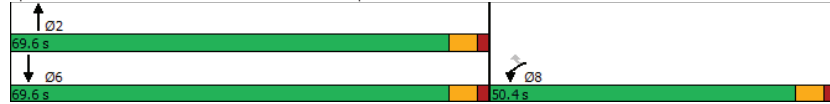
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Permitted Phases		8				
Detector Phase	8	8	2			6
Switch Phase						
Minimum Initial (s)	10.0	10.0	20.0			20.0
Minimum Split (s)	24.0	24.0	26.0			26.0
Total Split (s)	50.4	50.4	69.6			69.6
Total Split (%)	42.0%	42.0%	58.0%			58.0%
Maximum Green (s)	44.4	44.4	63.6			63.6
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-Uncoord					
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

Background 2037  
PM Peak Hour

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

Background 2037  
PM Peak Hour

	WBL	WBR	NBT	NBR	SBL	SBT
Movement	↔	↔	↑	↔	↔	↔
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
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)	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
<b>Intersection Summary</b>						
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

Background 2037  
PM Peak Hour

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
Frt	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

Background 2037  
PM Peak Hour

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

Background 2037  
PM Peak Hour

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


Background 2037  
PM Peak Hour

	↖	↘	↙	↑	↓	↗
Movement	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
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)	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, d1	35.1	34.9		9.3	9.0	
Progression Factor	1.00	1.00		1.00	1.00	
Incremental Delay, d2	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	
<b>Intersection Summary</b>						
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

Background 2037  
PM Peak Hour




Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Volume (vph)	13	24	509	671	57	78
Future Volume (vph)	13	24	509	671	57	78
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			0.923		0.922	
Flt Protected		0.983			0.979	
Satd. Flow (prot)	0	1550	1513	0	1544	0
Flt Permitted		0.983			0.979	
Satd. Flow (perm)	0	1550	1513	0	1544	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	26	553	729	62	85
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	40	1282	0	147	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	90.9%
Analysis Period (min)	15
	ICU Level of Service E

HCM Unsignalized Intersection Capacity Analysis  
11: Argus Rd & South Service Rd

Background 2037  
PM Peak Hour



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Volume (veh/h)	13	24	509	671	57	78
Future Volume (Veh/h)	13	24	509	671	57	78
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	26	553	729	62	85
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	1282				976	918
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1282				976	918
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				77	74
cM capacity (veh/h)	548				272	332

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	40	1282	147
Volume Left	14	0	62
Volume Right	0	729	85
eSH	548	1700	304
Volume to Capacity	0.03	0.75	0.48
Queue Length 95th (m)	0.6	0.0	19.9
Control Delay (s)	4.3	0.0	27.4
Lane LOS	A		D
Approach Delay (s)	4.3	0.0	27.4
Approach LOS			D

Intersection Summary	
Average Delay	2.9
Intersection Capacity Utilization	90.9%
Analysis Period (min)	15
	ICU Level of Service E

Lanes, Volumes, Timings  
12: Lyons Lane & South Service Road

Background 2037  
PM Peak Hour

	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Volume (vph)	0	0	0	0	0	0
Future Volume (vph)	0	0	0	0	0	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
Ped Bike Factor						
Fr						
Fit Protected						
Satd. Flow (prot)	0	1710	1710	0	1710	0
Fit Permitted						
Satd. Flow (perm)	0	1710	1710	0	1710	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)	0	0	0	0	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	0	0	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	
<b>Intersection Summary</b>						
Area Type:	CBD					
Control Type:	Unsignalized					
Intersection Capacity Utilization	8.7%		ICU Level of Service A			
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis  
12: Lyons Lane & South Service Road

Background 2037  
PM Peak Hour

	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Volume (veh/h)	0	0	0	0	0	0
Future Volume (Veh/h)	0	0	0	0	0	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	0	0	0
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	7				7	7
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	7				7	7
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	1617				1013	1075
<b>Direction, Lane #</b>						
	EB 1	WB 1	SB 1			
Volume Total	0	0	0			
Volume Left	0	0	0			
Volume Right	0	0	0			
eSH	1700	1700	1700			
Volume to Capacity	0.00	0.00	0.00			
Queue Length 95th (m)	0.0	0.0	0.0			
Control Delay (s)	0.0	0.0	0.0			
Lane LOS					A	
Approach Delay (s)	0.0	0.0	0.0			
Approach LOS					A	
<b>Intersection Summary</b>						
Average Delay					0.0	
Intersection Capacity Utilization				8.7%	ICU Level of Service	A
Analysis Period (min)				15		

Lanes, Volumes, Timings  
13: GO Bus Terminal/Argus Rd & Cross Ave

Background 2037  
PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	19	1351	21	48	556	56	20	3	61	309	26	62
Future Volume (vph)	19	1351	21	48	556	56	20	3	61	309	26	62
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		0.99	0.97		0.98	0.98	
Frt	0.998				0.986		0.857			0.894		
Flt Protected	0.950			0.950		0.950			0.950			
Satd. Flow (prot)	1570	3192	0	797	3193	0	785	708	0	1570	1159	0
Flt Permitted	0.399			0.090		0.695			0.712			
Satd. Flow (perm)	655	3192	0	76	3193	0	567	708	0	1152	1159	0
Right Turn on Red			Yes		Yes		Yes		Yes		Yes	
Satd. Flow (RTOR)		2		22		66		67				
Link Speed (k/h)		50		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)	21	1468	23	52	604	61	22	3	66	336	28	67
Shared Lane Traffic (%)												
Lane Group Flow (vph)	21	1491	0	52	665	0	22	69	0	336	95	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

Background 2037  
PM Peak Hour

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)	42.5	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	0.07	0.99		0.46	0.34		0.13	0.27		0.97	0.24	
Control Delay	13.8	44.4		25.2	8.9		25.4	9.8		75.0	11.2	
Queue Delay	0.0	13.9		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	13.8	58.4		25.2	8.9		25.4	9.8		75.0	11.2	
LOS	B	E		C	A		C	A		E	B	
Approach Delay		57.8			10.1			13.6			60.9	
Approach LOS		E			B			B			E	
Queue Length 50th (m)	2.0	134.1		3.6	27.3		2.9	0.4		59.6	3.6	
Queue Length 95th (m)	6.3	#192.0		13.2	37.4		9.1	10.6		#115.2	15.3	
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)	310	1513		114	1966		171	259		346	395	
Starvation Cap Reductn	0	74		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.07	1.04		0.46	0.34		0.13	0.27		0.97	0.24	
<b>Intersection Summary</b>												
Area Type:	CBD											
Cycle Length:	90											
Actuated Cycle Length:	89.7											
Natural Cycle:	90											
Control Type:	Semi Act-Uncoordinated											
Maximum v/c Ratio:	0.99											
Intersection Signal Delay:	44.4						Intersection LOS: D					

Lanes, Volumes, Timings  
13: GO Bus Terminal/Argus Rd & Cross Ave

Background 2037  
PM Peak Hour

Intersection Capacity Utilization 76.7% 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.

Splits and Phases: 13: GO Bus Terminal/Argus Rd & Cross Ave



HCM Signalized Intersection Capacity Analysis  
13: GO Bus Terminal/Argus Rd & Cross Ave

Background 2037  
PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕		↔	↕		↔	↕		↔	↕	↔
Traffic Volume (vph)	19	1351	21	48	556	56	20	3	61	309	26	62
Future Volume (vph)	19	1351	21	48	556	56	20	3	61	309	26	62
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	0.99		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)	1559	3191		797	3193		776	708		1537	1160	
Flt Permitted	0.40	1.00		0.09	1.00		0.70	1.00		0.71	1.00	
Satd. Flow (perm)	655	3191		75	3193		568	708		1152	1160	
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	1468	23	52	604	61	22	3	66	336	28	67
RTOR Reduction (vph)	0	1	0	0	9	0	0	46	0	0	47	0
Lane Group Flow (vph)	21	1490	0	52	656	0	22	23	0	336	48	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)	310	1511		110	1947		170	213		346	349	
v/s Ratio Prot		c0.47		c0.04	0.21			0.03			0.04	
v/s Ratio Perm	0.03			0.23			0.04			c0.29		
v/c Ratio	0.07	0.99		0.47	0.34		0.13	0.11		0.97	0.14	
Uniform Delay, d1	12.8	23.3		16.6	8.6		22.8	22.6		31.0	22.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	19.8		2.3	0.2		0.5	0.3		40.6	0.2	
Delay (s)	13.0	43.1		19.0	8.8		23.3	22.9		71.6	23.1	
Level of Service	B	D		B	A		C	C		E	C	
Approach Delay (s)		42.7			9.5			23.0			60.9	
Approach LOS		D			A			C			E	
<b>Intersection Summary</b>												
HCM 2000 Control Delay				36.3			HCM 2000 Level of Service				D	
HCM 2000 Volume to Capacity ratio				0.93								
Actuated Cycle Length (s)				89.7			Sum of lost time (s)			12.0		
Intersection Capacity Utilization				76.7%			ICU Level of Service			D		
Analysis Period (min)				15								
c Critical Lane Group												

Lanes, Volumes, Timings  
14: Lyons Lane/Street A & Cross Ave

Background 2037  
PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	62	284	17	19	453	26	308	6	208	42	3	123
Future Volume (vph)	62	284	17	19	453	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		0.992			0.992			0.855			0.853	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1525	2916	0	1570	3073	0	1570	1438	0	1570	1412	0
Flt Permitted	0.460			0.478			0.654			0.524		
Satd. Flow (perm)	736	2916	0	789	3073	0	1080	1438	0	863	1412	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		8			10			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	309	18	21	492	28	335	7	226	46	3	134
Shared Lane Traffic (%)												
Lane Group Flow (vph)	67	327	0	21	520	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

Background 2037  
PM Peak Hour

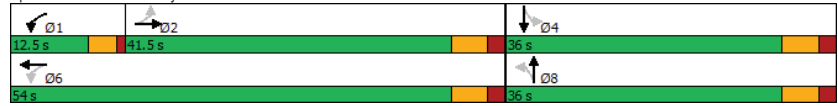
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6		8		8		4	
Permitted Phases		2		6			8		8		4	
Detector Phases		2	2	1	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	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	0.22	0.26		0.04	0.30		0.89	0.36		0.15	0.24	
Control Delay	19.2	17.1		9.4	10.9		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	19.2	17.1		9.4	10.9		54.3	4.9		21.0	5.0	
LOS	B	B		A	B		D	A		C	A	
Approach Delay		17.4			10.8			34.1			9.1	
Approach LOS		B			B			C			A	
Queue Length 50th (m)	7.6	19.2		1.6	24.3		55.1	0.8		5.5	0.3	
Queue Length 95th (m)	17.4	29.1		4.9	34.3		#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)	315	1253		517	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	0.26		0.04	0.30		0.85	0.35		0.15	0.23	
<b>Intersection Summary</b>												
Area Type: CBD												
Cycle Length: 90												
Actuated Cycle Length: 87.6												
Natural Cycle: 85												
Control Type: Semi Act-Uncoordinated												
Maximum v/c Ratio: 0.89												
Intersection Signal Delay: 20.0												
Intersection LOS: B												

Lanes, Volumes, Timings  
14: Lyons Lane/Street A & Cross Ave

Background 2037  
PM Peak Hour

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

Background 2037  
PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	62	284	17	19	453	26	308	6	208	42	3	123
Future Volume (vph)	62	284	17	19	453	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	3073		1569	1438		1565	1413	
Flt Permitted	0.46	1.00		0.48	1.00		0.65	1.00		0.52	1.00	
Satd. Flow (perm)	735	2915		790	3073		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	309	18	21	492	28	335	7	226	46	3	134
RTOR Reduction (vph)	0	5	0	0	4	0	0	147	0	0	87	0
Lane Group Flow (vph)	67	322	0	21	516	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	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)	310	1231		495	1718		377	502		301	493	
v/s Ratio Prot		0.11		0.00	c0.17			0.06			0.04	
v/s Ratio Perm	0.09			0.02			c0.31			0.05		
v/c Ratio	0.22	0.26		0.04	0.30		0.89	0.17		0.15	0.10	
Uniform Delay, d1	16.1	16.4		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	16.7		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)		16.7			10.4			37.0			19.5	
Approach LOS		B			B			D			B	
<b>Intersection Summary</b>												
HCM 2000 Control Delay		21.8					HCM 2000 Level of Service			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  
15: Cross Ave & Lyons Lane

Background 2037  
PM Peak Hour

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	0	355	879	0	0	0
Future Volume (vph)	0	355	879	0	0	0
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						
<b>Fr</b>						
Fit Protected						
Satd. Flow (prot)	1462	2954	3154	0	1710	0
Fit Permitted						
Satd. Flow (perm)	1462	2954	3154	0	1710	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)	0	386	955	0	0	0
<b>Shared Lane Traffic (%)</b>						
Lane Group Flow (vph)	0	386	955	0	0	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	
<b>Two way Left Turn Lane</b>						
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	

<b>Intersection Summary</b>	
Area Type:	CBD
Control Type:	Unsignalized
Intersection Capacity Utilization	30.3% ICU Level of Service A
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis  
15: Cross Ave & Lyons Lane

Background 2037  
PM Peak Hour

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	355	879	0	0	0
Future Volume (Veh/h)	0	355	879	0	0	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	386	955	0	0	0
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	0.92				0.92	0.92
vC, conflicting volume	956				1158	478
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	778				998	259
tC, single (s)	4.4				6.8	7.0
tC, 2 stage (s)						
tF (s)	2.4				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	683				223	675
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>EB 2</b>	<b>EB 3</b>	<b>WB 1</b>	<b>WB 2</b>	<b>SB 1</b>
Volume Total	0	193	193	637	318	0
Volume Left	0	0	0	0	0	0
Volume Right	0	0	0	0	0	0
eSH	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.00	0.11	0.11	0.37	0.19	0.00
Queue Length 95th (m)	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS						A
Approach Delay (s)	0.0			0.0		0.0
Approach LOS						A

<b>Intersection Summary</b>			
Average Delay		0.0	
Intersection Capacity Utilization	30.3%	ICU Level of Service	A
Analysis Period (min)	15		

Lanes, Volumes, Timings  
16: Speers Road/Cornwall Road & Cross Avenue

Background 2037  
PM Peak Hour

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	378	905	995	59	0	0
Future Volume (vph)	378	905	995	59	0	0
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				
Flt Protected	0.950					
Satd. Flow (prot)	1770	3539	3511	0	1863	3278
Flt Permitted	0.160					
Satd. Flow (perm)	298	3539	3511	0	1863	3278
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)			8			
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)	411	984	1082	64	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	411	984	1146	0	0	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	1.00	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

Background 2037  
PM Peak Hour

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	62.0	34.0			
Actuated g/C Ratio	0.90	1.00	0.55			
v/c Ratio	0.63	0.28	0.59			
Control Delay	11.6	0.2	10.9			
Queue Delay	0.0	0.0	0.0			
Total Delay	11.6	0.2	10.9			
LOS	B	A	B			
Approach Delay		3.6	10.9			
Approach LOS		A	B			
Queue Length 50th (m)	13.1	0.0	43.3			
Queue Length 95th (m)	40.5	0.0	60.4			
Internal Link Dist (m)		165.7	250.5		160.2	
Turn Bay Length (m)	75.0					
Base Capacity (vph)	649	3539	1929			
Starvation Cap Reductn	0	0	0			
Spillback Cap Reductn	0	0	0			
Storage Cap Reductn	0	0	0			
Reduced v/c Ratio	0.63	0.28	0.59			

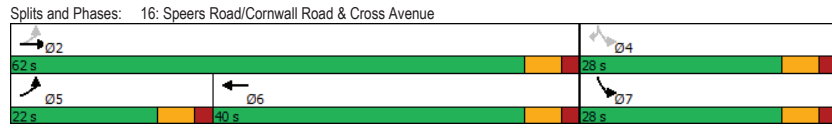
Intersection Summary

Area Type:	Other
Cycle Length:	90
Actuated Cycle Length:	62
Natural Cycle:	90
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.63
Intersection Signal Delay:	6.9
Intersection Capacity Utilization:	60.3%
Intersection LOS:	A
ICU Level of Service:	B
Analysis Period (min):	15



Lanes, Volumes, Timings  
16: Speers Road/Cornwall Road & Cross Avenue

Background 2037  
PM Peak Hour



HCM Signalized Intersection Capacity Analysis  
16: Speers Road/Cornwall Road & Cross Avenue

Background 2037  
PM Peak Hour

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↕	↕	↔	↔	↕
Traffic Volume (vph)	378	905	995	59	0	0
Future Volume (vph)	378	905	995	59	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0			
Lane Util. Factor	1.00	0.95	0.95			
Frt	1.00	1.00	0.99			
Fit Protected	0.95	1.00	1.00			
Satd. Flow (prot)	1770	3539	3510			
Fit Permitted	0.16	1.00	1.00			
Satd. Flow (perm)	299	3539	3510			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	411	984	1082	64	0	0
RTOR Reduction (vph)	0	0	4	0	0	0
Lane Group Flow (vph)	411	984	1142	0	0	0
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	62.0	34.0			
Effective Green, g (s)	56.0	62.0	34.0			
Actuated g/C Ratio	0.90	1.00	0.55			
Clearance Time (s)	6.0	6.0	6.0			
Vehicle Extension (s)	3.0	3.0	3.0			
Lane Grp Cap (vph)	649	3539	1924			
v/s Ratio Prot	c0.16	0.28	0.33			
v/s Ratio Perm	c0.41					
v/c Ratio	0.63	0.28	0.59			
Uniform Delay, d1	8.9	0.0	9.4			
Progression Factor	1.00	1.00	1.00			
Incremental Delay, d2	2.0	0.2	1.4			
Delay (s)	10.9	0.2	10.7			
Level of Service	B	A	B			
Approach Delay (s)		3.4	10.7		0.0	
Approach LOS		A	B		A	
<b>Intersection Summary</b>						
HCM 2000 Control Delay		6.7		HCM 2000 Level of Service		A
HCM 2000 Volume to Capacity ratio		0.76				
Actuated Cycle Length (s)		62.0		Sum of lost time (s)		18.0
Intersection Capacity Utilization		60.3%		ICU Level of Service		B
Analysis Period (min)		15				

c Critical Lane Group

Lanes, Volumes, Timings  
17: Driveway A & Street 1

Background 2037  
PM Peak Hour

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↩			↩	↩	
Traffic Volume (vph)	0	0	0	0	0	0
Future Volume (vph)	0	0	0	0	0	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
<b>Fit</b>						
<b>Fit Protected</b>						
Satd. Flow (prot)	1863	0	0	1863	1863	0
<b>Fit Permitted</b>						
Satd. Flow (perm)	1863	0	0	1863	1863	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	28.7			89.9	45.0	
Travel Time (s)	2.1			6.5	3.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	0	0
<b>Shared Lane Traffic (%)</b>						
Lane Group Flow (vph)	0	0	0	0	0	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	
<b>Two way Left Turn Lane</b>						
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	

<b>Intersection Summary</b>	
Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	0.0% ICU Level of Service A
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis  
17: Driveway A & Street 1

Background 2037  
PM Peak Hour

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↩			↩	↩	
Traffic Volume (veh/h)	0	0	0	0	0	0
Future Volume (Veh/h)	0	0	0	0	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	0	0	0
<b>Pedestrians</b>						
<b>Lane Width (m)</b>						
<b>Walking Speed (m/s)</b>						
<b>Percent Blockage</b>						
<b>Right turn flare (veh)</b>						
<b>Median type</b>						
Median storage (veh)	None			None		
<b>Upstream signal (m)</b>						
<b>pX, platoon unblocked</b>						
vC, conflicting volume			0		0	0
<b>vC1, stage 1 conf vol</b>						
<b>vC2, stage 2 conf vol</b>						
vCu, unblocked vol			0		0	0
tC, single (s)			4.1		6.4	6.2
<b>tC, 2 stage (s)</b>						
IF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			1623		1023	1085

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

<b>Intersection Summary</b>			
Average Delay		0.0	
Intersection Capacity Utilization	0.0%	ICU Level of Service	A
Analysis Period (min)	15		

Lanes, Volumes, Timings  
18: Street C & Driveway B

Background 2037  
PM Peak Hour

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	0	148	374	0
Future Volume (vph)	0	0	0	148	374	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
<b>Fit</b>						
<b>Fit Protected</b>						
Satd. Flow (prot)	1863	0	0	1863	1863	0
<b>Fit Permitted</b>						
Satd. Flow (perm)	1863	0	0	1863	1863	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	63.9			72.9	59.9	
Travel Time (s)	4.6			5.2	4.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	161	407	0
<b>Shared Lane Traffic (%)</b>						
Lane Group Flow (vph)	0	0	0	161	407	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	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	
<b>Two way Left Turn Lane</b>						
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	
<b>Intersection Summary</b>						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	23.0%			ICU Level of Service A		
Analysis Period (min)	15					


HCM Unsignalized Intersection Capacity Analysis  
18: Street C & Driveway B

Background 2037  
PM Peak Hour

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	0	148	374	0
Future Volume (Veh/h)	0	0	0	148	374	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	0	0	161	407	0
<b>Pedestrians</b>						
<b>Lane Width (m)</b>						
<b>Walking Speed (m/s)</b>						
<b>Percent Blockage</b>						
<b>Right turn flare (veh)</b>						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)				73		
<b>pX, platoon unblocked</b>						
vC, conflicting volume	568	407	407			
<b>vC1, stage 1 conf vol</b>						
<b>vC2, stage 2 conf vol</b>						
vCu, unblocked vol	568	407	407			
tC, single (s)	6.4	6.2	4.1			
<b>tC, 2 stage (s)</b>						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	100			
cM capacity (veh/h)	484	644	1152			
<b>Direction, Lane #</b>						
	EB 1	NB 1	SB 1			
Volume Total	0	161	407			
Volume Left	0	0	0			
Volume Right	0	0	0			
eSH	1700	1152	1700			
Volume to Capacity	0.00	0.00	0.24			
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					
<b>Intersection Summary</b>						
Average Delay			0.0			
Intersection Capacity Utilization	23.0%			ICU Level of Service		A
Analysis Period (min)	15					

Lanes, Volumes, Timings  
19: Street C & South Service Road


Background 2037  
PM Peak Hour

						
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔	↘	↙	↔	↙	↘
Traffic Volume (vph)	38	0	75	370	19	54
Future Volume (vph)	38	0	75	370	19	54
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					0.900	
Flt Protected				0.992	0.987	
Satd. Flow (prot)	1863	0	0	1848	1655	0
Flt Permitted				0.992	0.987	
Satd. Flow (perm)	1863	0	0	1848	1655	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	264.4			306.3	164.3	
Travel Time (s)	19.0			22.1	11.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	41	0	82	402	21	59
Shared Lane Traffic (%)						
Lane Group Flow (vph)	41	0	0	484	80	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	41.3%
ICU Level of Service A	
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis  
19: Street C & South Service Road

Background 2037  
PM Peak Hour



						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔	↘	↙	↔	↙	↘
Traffic Volume (veh/h)	38	0	75	370	19	54
Future Volume (Veh/h)	38	0	75	370	19	54
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	0	82	402	21	59
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			41		607	41
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			41		607	41
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		95	94
cM capacity (veh/h)			1568		436	1030

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	41	484	80
Volume Left	0	82	21
Volume Right	0	0	59
eSH	1700	1568	758
Volume to Capacity	0.02	0.05	0.11
Queue Length 95th (m)	0.0	1.3	2.8
Control Delay (s)	0.0	1.7	10.3
Lane LOS	A	A	B
Approach Delay (s)	0.0	1.7	10.3
Approach LOS		B	

Intersection Summary			
Average Delay		2.7	
Intersection Capacity Utilization	41.3%	ICU Level of Service	A
Analysis Period (min)	15		

Lanes, Volumes, Timings  
20: Street A & South Service Road



Background 2037  
PM Peak Hour

						
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
Fr	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		264.4		119.8	
Travel Time (s)	18.4		19.0		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

Background 2037  
PM Peak Hour

						
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 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

Background 2037  
PM Peak Hour

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	0	77	397	113
Future Volume (vph)	0	0	0	77	397	113
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					0.970	
Fit Protected						
Satd. Flow (prot)	1863	0	0	1863	1807	0
Fit Permitted						
Satd. Flow (perm)	1863	0	0	1863	1807	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	84	432	123
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	84	555	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	
<b>Intersection Summary</b>						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	31.1%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis  
21: Argus Rd & Street 1

Background 2037  
PM Peak Hour

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	0	77	397	113
Future Volume (Veh/h)	0	0	0	77	397	113
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	84	432	123
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	578	494	555			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	578	494	555			
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)	478	576	1015			
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>NB 1</b>	<b>SB 1</b>			
Volume Total	0	84	555			
Volume Left	0	0	0			
Volume Right	0	0	123			
eSH	1700	1015	1700			
Volume to Capacity	0.00	0.00	0.33			
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					
<b>Intersection Summary</b>						
Average Delay			0.0			
Intersection Capacity Utilization		31.1%		ICU Level of Service	A	
Analysis Period (min)		15				

Lanes, Volumes, Timings  
22: Street C & Street 1

Background 2037  
PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	113	0	0	0	148	0	0	261	0
Future Volume (vph)	0	0	0	113	0	0	0	148	0	0	261	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												
Flt Protected					0.950							
Satd. Flow (prot)	0	1863	0	0	1770	0	0	1863	0	0	1863	0
Flt Permitted					0.950							
Satd. Flow (perm)	0	1863	0	0	1770	0	0	1863	0	0	1863	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		89.9			165.4			59.9			164.3	
Travel Time (s)		6.5			11.9			4.3			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	0	0	123	0	0	0	161	0	0	284	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	123	0	0	161	0	0	284	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			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	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	26.7%			ICU Level of Service A								
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis  
22: Street C & Street 1

Background 2037  
PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (veh/h)	0	0	0	113	0	0	0	148	0	0	261	0	
Future Volume (Veh/h)	0	0	0	113	0	0	0	148	0	0	261	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	0	0	123	0	0	0	161	0	0	284	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	445	445	284	445	445	161	284				161		
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	445	445	284	445	445	161	284				161		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1				4.1		
tC, 2 stage (s)													
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2				2.2		
p0 queue free %	100	100	100	76	100	100	100				100		
cM capacity (veh/h)	523	508	755	523	508	884	1278				1418		
Direction, Lane #													
	EB 1	WB 1	NB 1	SB 1									
Volume Total	0	123	161	284									
Volume Left	0	123	0	0									
Volume Right	0	0	0	0									
eSH	1700	523	1278	1418									
Volume to Capacity	0.00	0.24	0.00	0.00									
Queue Length 95th (m)	0.0	7.2	0.0	0.0									
Control Delay (s)	0.0	14.0	0.0	0.0									
Lane LOS	A	B											
Approach Delay (s)	0.0	14.0	0.0	0.0									
Approach LOS	A	B											
Intersection Summary													
Average Delay				3.0									
Intersection Capacity Utilization			26.7%		ICU Level of Service					A			
Analysis Period (min)			15										

Lanes, Volumes, Timings

23: GO Station West Access/Street C & Cross Ave

Background 2037

PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔		↔		↔		↔		↔		↔	
Traffic Volume (vph)	71	616	58	206	355	77	99	0	491	226	113	35
Future Volume (vph)	71	616	58	206	355	77	99	0	491	226	113	35
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	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	0.988			0.982			0.850		0.965			
Flt Protected	0.995		0.984		0.950		0.950		0.950			
Satd. Flow (prot)	0	3479	0	0	3420	0	1770	1583	0	1770	1798	0
Flt Permitted	0.795		0.581		0.655		0.301		0.301			
Satd. Flow (perm)	0	2780	0	0	2019	0	1220	1583	0	561	1798	0
Right Turn on Red	Yes			Yes			Yes		Yes			
Satd. Flow (RTOR)	21		36		102		37		37			
Link Speed (k/h)	50		50		50		50		50			
Link Distance (m)	209.8		164.3		55.1		72.9		72.9			
Travel Time (s)	15.1		11.8		4.0		5.2		5.2			
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)	77	670	63	224	386	84	108	0	534	246	123	38
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	810	0	0	694	0	108	534	0	246	161	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	
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			
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			
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	4		8		8		2		2		6	
Permitted Phases	4		8		2		6		6			

Lanes, Volumes, Timings

23: GO Station West Access/Street C & Cross Ave

Background 2037

PM Peak Hour

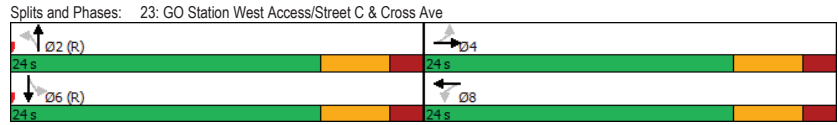
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4	8		8		2	2	6		6	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0
Total Split (s)	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	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%	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	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	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	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	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	C-Max	C-Max	C-Max	C-Max	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	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	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0	0	0	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	0.79		1.06dl		0.23		0.80		1.14		0.23	
Control Delay	20.2		33.8		12.0		22.8		129.2		9.1	
Queue Delay	0.0		0.0		0.0		0.0		0.0		0.0	
Total Delay	20.2		33.8		12.0		22.8		129.2		9.1	
LOS	C		C		B		C		F		A	
Approach Delay	20.2		33.8		21.0		81.7		81.7			
Approach LOS	C		C		C		F		F			
Queue Length 50th (m)	31.1		27.7		6.3		32.8		-27.6		7.1	
Queue Length 95th (m)	#53.0		#58.5		15.1		#82.0		#62.0		17.0	
Internal Link Dist (m)	185.8		140.3		31.1		48.9		48.9			
Turn Bay Length (m)	1055		779		468		671		215		713	
Base Capacity (vph)	1055		779		468		671		215		713	
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	0.77		0.89		0.23		0.80		1.14		0.23	
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:	1.14											
Intersection Signal Delay:	33.9						Intersection LOS: C					
Intersection Capacity Utilization:	102.1%						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

Background 2037  
 PM Peak Hour

- 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.



HCM Signalized Intersection Capacity Analysis  
 23: GO Station West Access/Street C & Cross Ave

Background 2037  
 PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↔			↔↔		↔	↔		↔	↔	
Traffic Volume (vph)	71	616	58	206	355	77	99	0	491	226	113	35
Future Volume (vph)	71	616	58	206	355	77	99	0	491	226	113	35
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 <sub>t</sub>		0.99			0.98		1.00	0.85		1.00		0.96
Fit Protected		1.00			0.98		0.95	1.00		0.95		1.00
Satd. Flow (prot)		3481			3420		1770	1583		1770		1797
Fit Permitted		0.80			0.58		0.66	1.00		0.30		1.00
Satd. Flow (perm)		2781			2018		1220	1583		561		1797
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)	77	670	63	224	386	84	108	0	534	246	123	38
RTOR Reduction (vph)	0	13	0	0	23	0	63	0	0	23	0	0
Lane Group Flow (vph)	0	797	0	0	671	0	108	471	0	246	138	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)		1019			739		467	606		215		688
v/s Ratio Prot								0.30				0.08
v/s Ratio Perm		0.29			c0.33		0.09			c0.44		
v/c Ratio		0.78			1.06dl		0.23	0.78		1.14		0.20
Uniform Delay, d1		13.5			14.4		10.0	13.0		14.8		9.9
Progression Factor		1.00			1.00		1.00	1.00		1.00		1.00
Incremental Delay, d2		4.0			14.9		1.2	9.5		105.7		0.7
Delay (s)		17.5			29.3		11.2	22.5		120.5		10.5
Level of Service		B			C		B	C		F		B
Approach Delay (s)		17.5			29.3			20.6				77.0
Approach LOS		B			C			C				E

Intersection Summary

HCM 2000 Control Delay	31.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	1.03		
Actuated Cycle Length (s)	48.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	102.1%	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

Future Total 2027

1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd

AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR		
Lane Configurations														
Traffic Volume (vph)	34	106	295	611	76	174	153	951	716	162	1413	46		
Future Volume (vph)	34	106	295	611	76	174	153	951	716	162	1413	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			
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			0.077			0.211				
Satd. Flow (perm)	1190	1693	1425	1382	1676	1366	116	4446	1377	346	4532	1398		
Right Turn on Red			Yes			Yes			Yes					
Satd. Flow (RTOR)			219			189			677			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	321	664	83	189	166	1034	778	176	1536	50		
Shared Lane Traffic (%)														
Lane Group Flow (vph)	37	115	321	664	83	189	166	1034	778	176	1536	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

Future Total 2027

1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd

AM Peak Hour

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		6	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	73.5	59.0	120.0	69.4	57.0	57.0		
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	0.23	1.10	0.19	0.39	0.73	0.47	0.56	0.54	0.71	0.07		
Control Delay	30.3	52.4	0.4	103.2	37.0	7.5	43.2	22.3	1.7	16.8	28.7	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	103.2	37.0	7.5	43.2	22.3	1.7	16.8	28.7	0.2		
LOS	C	D	A	F	D	A	D	C	A	B	C	A		
Approach Delay		15.4			78.0			15.9			26.7			
Approach LOS		B			E			B			C			
Queue Length 50th (m)	6.5	26.5	0.0	-86.1	17.0	0.0	24.1	59.4	0.0	16.9	107.4	0.0		
Queue Length 95th (m)	14.1	43.7	0.0	#116.5	30.0	18.3	49.9	87.6	0.0	31.1	148.4	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)	255	423	1425	605	544	571	235	2186	1377	377	2151	744		
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	0.23	1.10	0.15	0.33	0.71	0.47	0.56	0.47	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:	30.9							Intersection LOS: C						

Lanes, Volumes, Timings  
1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd

Future Total 2027  
AM Peak Hour

Intersection Capacity Utilization 77.0%	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

Future Total 2027  
AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↗	↖	↕	↗	↖	↕	↗	↖	↕	↗
Traffic Volume (vph)	34	106	295	611	76	174	153	951	716	162	1413	46
Future Volume (vph)	34	106	295	611	76	174	153	951	716	162	1413	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	116	4446	1377	347	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	321	664	83	189	166	1034	778	176	1536	50
RTOR Reduction (vph)	0	0	0	0	0	141	0	0	0	0	0	27
Lane Group Flow (vph)	37	115	321	664	83	48	166	1034	778	176	1536	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	68.9	54.4	120.0	64.7	52.3	52.3
Effective Green, g (s)	19.8	19.2	120.0	35.2	30.6	30.6	68.9	57.4	120.0	64.7	55.3	55.3
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	224	2126	1377	312	2088	644
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		0.23	c0.20		0.04	0.34		c0.57	0.25		0.02
v/c Ratio	0.18	0.43	0.23	1.10	0.19	0.14	0.74	0.49	0.56	0.56	0.74	0.04
Uniform Delay, d1	42.8	45.4	0.0	40.5	35.0	34.5	28.5	21.3	0.0	15.1	26.4	17.7
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	1.5	0.4	68.8	0.3	0.2	12.4	0.8	1.7	2.3	2.4	0.1
Delay (s)	43.2	46.9	0.4	109.4	35.3	34.8	40.9	22.1	1.7	17.5	28.7	17.8
Level of Service	D	D	A	F	D	C	D	C	A	B	C	B
Approach Delay (s)		15.0			87.7			15.6			27.3	
Approach LOS		B			F			B			C	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			32.7	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)				17.0				
Intersection Capacity Utilization			77.0%	ICU Level of Service				D				
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings

2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp

Future Total 2027

AM Peak Hour

	↖	→	↘	↙	←	↖	↙	↘	↙	↘	↙	↘
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖		↖	↖	↖	↖		↖	↖		↖	↖
Traffic Volume (vph)	2	0	150	443	28	225	0	1593	375	0	2313	6
Future Volume (vph)	2	0	150	443	28	225	0	1593	375	0	2313	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
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			245			182			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	482	30	245	0	1732	408	0	2514	7
Shared Lane Traffic (%)				47%								
Lane Group Flow (vph)	2	0	163	255	257	245	0	1732	408	0	2521	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

Future Total 2027

AM Peak Hour

	↖	→	↘	↙	←	↖	↙	↘	↙	↘	↙	↘
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		45.1	33.1	33.1	140.0		86.9	140.0			86.9
Actuated g/C Ratio	0.06		0.32	0.24	0.24	1.00		0.62	1.00			0.62
v/c Ratio	0.02		0.35	0.76	0.75	0.18		0.63	0.30			0.71
Control Delay	63.0		29.7	63.8	62.6	0.3		16.1	0.4			20.5
Queue Delay	0.0		0.0	0.0	0.0	0.0		0.0	0.0			0.0
Total Delay	63.0		29.7	63.8	62.6	0.3		16.1	0.4			20.5
LOS	E		C	E	E	A		B	A			C
Approach Delay		30.1			42.8			13.1				20.5
Approach LOS		C			D			B				C
Queue Length 50th (m)	0.6		29.0	73.2	73.5	0.0		88.2	0.0			137.6
Queue Length 95th (m)	3.7		44.4	98.6	99.0	0.0		121.8	0.0			181.2
Internal Link Dist (m)		118.1			168.6			300.8				251.1
Turn Bay Length (m)	50.0											
Base Capacity (vph)	213		605	381	390	1356		2759	1353			3545
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	0.67	0.66	0.18		0.63	0.30			0.71
<b>Intersection Summary</b>												
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:	0.76											

Lanes, Volumes, Timings

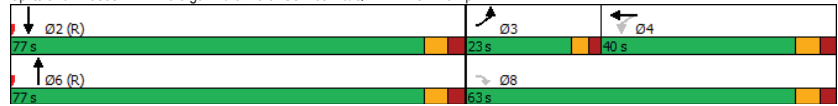
2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp

Future Total 2027

AM Peak Hour

Intersection Signal Delay: 21.0	Intersection LOS: C
Intersection Capacity Utilization 72.1%	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

Future Total 2027

AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↘	→	↗	↘	→	↗	↘	→	↗	↘	→	↗
Traffic Volume (vph)	2	0	150	443	28	225	0	1593	375	0	2313	6
Future Volume (vph)	2	0	150	443	28	225	0	1593	375	0	2313	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	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	163	482	30	245	0	1732	408	0	2514	7
RTOR Reduction (vph)	0	0	21	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	2	0	142	255	257	245	0	1732	408	0	2521	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		42.1	30.1	30.1	140.0		83.9	140.0		83.9	
Effective Green, g (s)	8.0		45.1	33.1	33.1	140.0		86.9	140.0		86.9	
Actuated g/C Ratio	0.06		0.32	0.24	0.24	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		449	335	343	1356		2759	1353		3543	
v/s Ratio Prot	0.00							0.39			c0.44	
v/s Ratio Perm			0.10	c0.18	0.18	0.18			c0.30			
v/c Ratio	0.02		0.32	0.76	0.75	0.18		0.63	0.30		0.71	
Uniform Delay, d1	62.3		35.8	49.8	49.6	0.0		16.5	0.0		18.0	
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	9.8	8.7	0.3		0.8	0.4		1.2	
Delay (s)	62.4		36.2	59.6	58.3	0.3		15.1	0.4		19.3	
Level of Service	E		D	E	E	A		B	A		B	
Approach Delay (s)		36.5			39.9			12.3			19.3	
Approach LOS		D			D			B			B	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			19.9			HCM 2000 Level of Service		B				
HCM 2000 Volume to Capacity ratio			0.71									
Actuated Cycle Length (s)			140.0			Sum of lost time (s)		12.0				
Intersection Capacity Utilization			72.1%			ICU Level of Service		C				
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings  
3: Trafalgar Rd & QEW EB-Off Ramp

Future Total 2027  
AM Peak Hour

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔↔	↔		↕↕↕	↕↕↕	↔
Traffic Volume (vph)	787	649	0	1193	1562	416
Future Volume (vph)	787	649	0	1193	1562	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
Fr't		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)		3				206
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	705	0	1297	1698	452
Shared Lane Traffic (%)						
Lane Group Flow (vph)	855	705	0	1297	1698	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

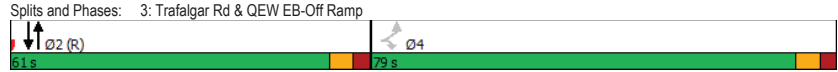
Future Total 2027  
AM Peak Hour

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)	73.7	73.7		58.3	58.3	140.0
Actuated g/C Ratio	0.53	0.53		0.42	0.42	1.00
v/c Ratio	0.55	0.94		0.71	0.91	0.31
Control Delay	23.5	52.5		39.8	35.3	0.4
Queue Delay	0.0	0.0		0.0	0.0	0.0
Total Delay	23.5	52.5		39.8	35.3	0.4
LOS	C	D		D	D	A
Approach Delay	36.6			39.8	27.9	
Approach LOS	D			D	C	
Queue Length 50th (m)	81.3	182.5		128.9	177.6	0.0
Queue Length 95th (m)	100.4	#273.0		m104.0	#174.3	0.0
Internal Link Dist (m)	175.2			27.4	300.8	
Turn Bay Length (m)						
Base Capacity (vph)	1584	763		1834	1869	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	0.92		0.71	0.91	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:	0.94					
Intersection Signal Delay:	33.7			Intersection LOS: C		
Intersection Capacity Utilization:	84.9%			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

Future Total 2027  
AM Peak Hour

m Volume for 95th percentile queue is metered by upstream signal.



HCM Signalized Intersection Capacity Analysis  
3: Trafalgar Rd & QEW EB-Off Ramp

Future Total 2027  
AM Peak Hour

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔↔	↔		↕↕↕	↕↕↕	↔
Traffic Volume (vph)	787	649	0	1193	1562	416
Future Volume (vph)	787	649	0	1193	1562	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
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)	855	705	0	1297	1698	452
RTOR Reduction (vph)	0	1	0	0	0	0
Lane Group Flow (vph)	855	704	0	1297	1698	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)	70.7	70.7		55.3	55.3	140.0
Effective Green, g (s)	73.7	73.7		58.3	58.3	140.0
Actuated g/C Ratio	0.53	0.53		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)	1557	749		1833	1869	1454
v/s Ratio Prot				0.29	c0.38	
v/s Ratio Perm	0.29	c0.49				0.31
v/c Ratio	0.55	0.94		0.71	0.91	0.31
Uniform Delay, d1	22.1	31.1		33.8	38.3	0.0
Progression Factor	1.00	1.00		1.10	0.75	1.00
Incremental Delay, d2	0.4	19.3		1.9	6.0	0.4
Delay (s)	22.5	50.4		39.2	34.6	0.4
Level of Service	C	D		D	C	A
Approach Delay (s)	35.1			39.2	27.4	
Approach LOS	D			D	C	
<b>Intersection Summary</b>						
HCM 2000 Control Delay			32.9		HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.95			
Actuated Cycle Length (s)			140.0		Sum of lost time (s)	11.0
Intersection Capacity Utilization			84.9%		ICU Level of Service	E
Analysis Period (min)			15			

c Critical Lane Group

Lanes, Volumes, Timings  
4: Trafalgar Rd & Argus Rd

Future Total 2027  
AM Peak Hour

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	26	0	1932	1802	409
Future Volume (vph)	0	26	0	1932	1802	409
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			0.972	
Fit Protected						
Satd. Flow (prot)	0	1367	0	4363	4379	0
Fit Permitted						
Satd. Flow (perm)	0	1367	0	4363	4379	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	2100	1959	445
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	28	0	2100	2404	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	
<b>Intersection Summary</b>						
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

Future Total 2027  
AM Peak Hour

Movement	EBL	EBR	NBL	NBT	SBT	SBR	
Lane Configurations							
Traffic Volume (veh/h)	0	26	0	1932	1802	409	
Future Volume (Veh/h)	0	26	0	1932	1802	409	
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	2100	1959	445	
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	0.72	0.65	0.65				
vC, conflicting volume	2892	886	2415				
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol	874	0	1284				
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)	210	686	352				
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>NB 1</b>	<b>NB 2</b>	<b>NB 3</b>	<b>SB 1</b>	<b>SB 2</b>	<b>SB 3</b>
Volume Total	28	700	700	700	784	784	837
Volume Left	0	0	0	0	0	0	0
Volume Right	28	0	0	0	0	0	445
eSH	686	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.04	0.41	0.41	0.41	0.46	0.46	0.49
Queue Length 95th (m)	1.0	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						
<b>Intersection Summary</b>							
Average Delay				0.1			
Intersection Capacity Utilization	59.0%		ICU Level of Service		B		
Analysis Period (min)	15						



Lanes, Volumes, Timings

Future Total 2027

5: Trafalgar Rd & Cross Ave/South Service Rd

AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔	↔		↔	↔	↔	↔↔↔	↔↔↔	↔	↔↔	↔↔	↔
Traffic Volume (vph)	498	32	104	38	33	96	89	1078	25	167	1350	227
Future Volume (vph)	498	32	104	38	33	96	89	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		
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	0.885					0.850		0.997		0.978		
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2795	1346	0	1525	1583	1382	1428	4499	0	1525	4404	0
Fit Permitted	0.950			0.663			0.081			0.158		
Satd. Flow (perm)	2789	1346	0	1056	1583	1362	122	4499	0	254	4404	0
Right Turn on Red			Yes			Yes		Yes			Yes	
Satd. Flow (RTOR)		107				179		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)	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)	541	35	113	41	36	104	97	1172	27	182	1467	247
Shared Lane Traffic (%)												
Lane Group Flow (vph)	541	148	0	41	36	104	97	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	
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

Future Total 2027

5: Trafalgar Rd & Cross Ave/South Service Rd

AM Peak Hour

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	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)	23.0	24.8		25.8	13.8	13.8	83.3	73.0		90.5	76.9	
Actuated g/C Ratio	0.16	0.18		0.18	0.10	0.10	0.60	0.52		0.65	0.55	
v/c Ratio	1.18	0.45		0.18	0.23	0.35	0.58	0.51		0.62	0.70	
Control Delay	150.6	21.0		38.6	61.8	3.3	34.2	26.6		25.4	25.3	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	150.6	21.0		38.6	61.8	3.3	34.2	26.6		25.4	25.3	
LOS	F	C		D	E	A	C	C		C	C	
Approach Delay		122.8			22.9			27.1			25.3	
Approach LOS		F			C			C			C	
Queue Length 50th (m)	-97.0	10.3		8.8	9.9	0.0	18.0	70.1		28.1	106.0	
Queue Length 95th (m)	#134.7	31.7		18.2	21.2	0.0	m28.9	m90.6		m33.2	130.4	
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)	459	381		245	237	356	215	2346		374	2434	
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	1.18	0.39		0.17	0.15	0.29	0.45	0.51		0.49	0.70	
<b>Intersection Summary</b>												
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:	100											
Control Type:	Actuated-Coordinated											
Maximum v/c Ratio:	1.18											

Lanes, Volumes, Timings  
5: Trafalgar Rd & Cross Ave/South Service Rd

Future Total 2027  
AM Peak Hour

Intersection Signal Delay: 42.3	Intersection LOS: D
Intersection Capacity Utilization 78.3%	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.	
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

Future Total 2027  
AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔		↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	498	32	104	38	33	96	89	1078	25	167	1350	227
Future Volume (vph)	498	32	104	38	33	96	89	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		1.00	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	1347		1517	1583	1362	1428	4498		1525	4406	
Flt Permitted	0.95	1.00		0.66	1.00	1.00	0.08	1.00		0.16	1.00	
Satd. Flow (perm)	2795	1347		1059	1583	1362	122	4498		253	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)	541	35	113	41	36	104	97	1172	27	182	1467	247
RTOR Reduction (vph)	0	88	0	0	0	94	0	1	0	0	14	0
Lane Group Flow (vph)	541	60	0	41	36	10	97	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)	20.0	21.8		22.8	10.8	10.8	80.2	69.9		88.2	73.9	
Effective Green, g (s)	23.0	24.8		22.8	13.8	13.8	80.2	72.9		88.2	76.9	
Actuated g/C Ratio	0.16	0.18		0.16	0.10	0.10	0.57	0.52		0.63	0.55	
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)	459	238		211	156	134	165	2342		289	2420	
v/s Ratio Prot	c0.19	c0.04		0.02	0.02		0.04	0.27		c0.06	c0.39	
v/s Ratio Perm				0.01		0.01	0.29			0.33		
v/c Ratio	1.18	0.25		0.19	0.23	0.08	0.59	0.51		0.63	0.70	
Uniform Delay, d1	58.5	49.6		50.4	58.2	57.3	18.5	21.9		14.3	23.2	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.31	1.14		1.98	1.04	
Incremental Delay, d2	101.0	0.8		0.5	1.0	0.3	3.9	0.6		1.8	0.7	
Delay (s)	159.5	50.4		51.0	59.2	57.6	28.1	25.6		30.1	24.9	
Level of Service	F	D		D	E	E	C	C		C	C	
Approach Delay (s)		136.0			56.4			25.8			25.4	
Approach LOS		F			E			C			C	
<b>Intersection Summary</b>												
HCM 2000 Control Delay		45.7									D	
HCM 2000 Volume to Capacity ratio		0.75										
Actuated Cycle Length (s)		140.0					Sum of lost time (s)			16.0		
Intersection Capacity Utilization		78.3%					ICU Level of Service			D		
Analysis Period (min)		15										
c Critical Lane Group												

Lanes, Volumes, Timings  
6: Trafalgar Rd & Cornwall Rd


Future Total 2027  
AM Peak Hour



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔		↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	290	452	73	56	498	450	97	451	62	578	680	234
Future Volume (vph)	290	452	73	56	498	450	97	451	62	578	680	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
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	0.98	1.00		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)	2937	3055	0	1470	3154	1384	1533	2652	0	2876	1341	1324
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		12				485			9			194
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	491	79	61	541	489	105	490	67	628	739	254
Shared Lane Traffic (%)												
Lane Group Flow (vph)	315	570	0	61	541	489	105	557	0	628	739	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		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

Future Total 2027  
AM Peak Hour



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 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)	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	0.76		0.48	0.73	0.35	1.19	0.66		0.88	1.10	0.33
Control Delay	151.3	55.7		74.6	56.0	0.7	210.6	45.5		81.9	90.6	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	55.7		74.6	56.0	0.7	210.6	45.5		81.9	90.6	5.9
LOS	F	E		E	E	A	F	D		F	F	A
Approach Delay		89.7			32.2			71.7				73.9
Approach LOS		F			C			E				E
Queue Length 50th (m)	-54.9	80.1		17.2	77.1	0.0	-36.9	86.6		83.6	-300.0	10.2
Queue Length 95th (m)	#86.7	102.7		33.2	99.0	0.0	#76.8	112.5		#127.1	#400.5	16.8
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)	277	751		126	743	1384	88	839		711	670	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	1.14	0.76		0.48	0.73	0.35	1.19	0.66		0.88	1.10	0.33
<b>Intersection Summary</b>												
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

Future Total 2027  
AM Peak Hour

Intersection Signal Delay: 66.2	Intersection LOS: E
Intersection Capacity Utilization 93.3%	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

Future Total 2027  
AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	290	452	73	56	498	450	97	451	62	578	680	234
Future Volume (vph)	290	452	73	56	498	450	97	451	62	578	680	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	1.00		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	491	79	61	541	489	105	490	67	628	739	254
RTOR Reduction (vph)	0	9	0	0	0	0	0	6	0	0	0	97
Lane Group Flow (vph)	315	561	0	61	541	489	105	551	0	628	739	157
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	742		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	c0.55	
v/s Ratio Perm						c0.35						0.12
v/c Ratio	1.14	0.76		0.48	0.73	0.35	1.19	0.66		0.88	1.10	0.24
Uniform Delay, d1	63.5	49.2		61.0	49.4	0.0	66.0	41.5		51.1	35.0	19.9
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.38	0.80	0.94
Incremental Delay, d2	96.3	7.1		12.7	6.2	0.7	156.9	4.1		11.6	62.1	0.6
Delay (s)	159.8	56.2		73.8	55.5	0.7	222.9	45.7		82.2	90.2	19.2
Level of Service	F	E		E	E	A	F	D		F	F	B
Approach Delay (s)	93.1			32.0			73.8			76.0		
Approach LOS	F			C			E			E		
<b>Intersection Summary</b>												
HCM 2000 Control Delay	67.9			HCM 2000 Level of Service			E					
HCM 2000 Volume to Capacity ratio	1.03											
Actuated Cycle Length (s)	140.0			Sum of lost time (s)			16.0					
Intersection Capacity Utilization	93.3%			ICU Level of Service			F					
Analysis Period (min)	15											
c Critical Lane Group												

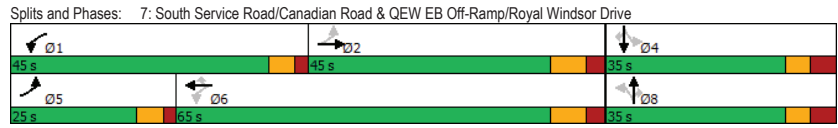
Lanes, Volumes, Timings  
 7: South Service Road/Canadian Road & QEW EB Off-Ramp/Royal Windsor Drive AM Peak Hour

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			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	Thru	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 AM Peak Hour

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 Future Total 2027  
 7: South Service Road/Canadian Road & QEW EB Off-Ramp/Royal Windsor Drive AM Peak Hour



HCM Signalized Intersection Capacity Analysis Future Total 2027  
 7: South Service Road/Canadian Road & QEW EB Off-Ramp/Royal Windsor Drive AM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	↔	↕	↘	↔	↕	↘	↔	↕	↘	↔	↕	↘
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	
<b>Intersection Summary</b>												
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

Future Total 2027  
AM Peak Hour

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

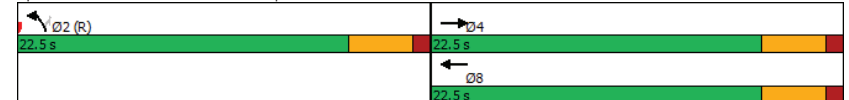
Future Total 2027  
AM Peak Hour

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

Future Total 2027  
AM Peak Hour

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
Flt Protected	1.00			1.00	0.95	1.00
Satd. Flow (prot)	3539			3539	1770	1583
Flt 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	
<b>Intersection Summary</b>						
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

Future Total 2027  
AM Peak Hour

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				
Flt Protected	0.954					
Satd. Flow (prot)	3423	1441	3539	0	0	3539
Flt 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
<b>Two way Left Turn Lane</b>						
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
<b>Detector 1 Channel</b>						
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
<b>Detector 2 Channel</b>						
Detector 2 Position(m)			9.4			9.4
Detector 2 Size(m)			0.6			0.6
Detector 2 Type			CI+Ex			CI+Ex
<b>Detector 2 Channel</b>						
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

Future Total 2027  
AM Peak Hour

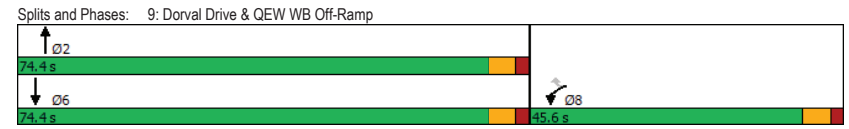
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Detector Phase	8	8	2			6
Switch Phase						
Minimum Initial (s)	10.0	10.0	20.0			20.0
Minimum Split (s)	24.0	24.0	26.0			26.0
Total Split (s)	45.6	45.6	74.4			74.4
Total Split (%)	38.0%	38.0%	62.0%			62.0%
Maximum Green (s)	39.6	39.6	68.4			68.4
Yellow Time (s)	4.0	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

Future Total 2027  
AM Peak Hour



HCM Signalized Intersection Capacity Analysis  
9: Dorval Drive & QEWB WB Off-Ramp

Future Total 2027  
AM Peak Hour

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'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)	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

Future Total 2027  
AM Peak Hour

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't	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

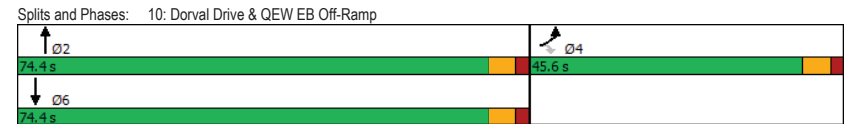
Future Total 2027  
AM Peak Hour

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%
Intersection LOS:	B
ICU Level of Service:	C
Analysis Period (min):	15

Lanes, Volumes, Timings  
10: Dorval Drive & QEW EB Off-Ramp

Future Total 2027  
AM Peak Hour



HCM Signalized Intersection Capacity Analysis  
10: Dorval Drive & QEW EB Off-Ramp

Future Total 2027  
AM Peak Hour

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

Future Total 2027  
AM Peak Hour

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↖	↖		↖	
Traffic Volume (vph)	1	6	700	135	5	4
Future Volume (vph)	1	6	700	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			0.978		0.940	
Flt Protected		0.994			0.973	
Satd. Flow (prot)	0	1511	1631	0	1564	0
Flt Permitted		0.994			0.973	
Satd. Flow (perm)	0	1511	1631	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	761	147	5	4
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	8	908	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	
<b>Intersection Summary</b>						
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  
11: Argus Rd & South Service Rd

Future Total 2027  
AM Peak Hour

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Volume (veh/h)	1	6	700	135	5	4
Future Volume (Veh/h)	1	6	700	135	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)	1	7	761	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	909				850	836
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	909				850	836
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				98	99
cM capacity (veh/h)	462				331	369
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>WB 1</b>	<b>SB 1</b>			
Volume Total	8	908	9			
Volume Left	1	0	5			
Volume Right	0	147	4			
eSH	462	1700	347			
Volume to Capacity	0.00	0.53	0.03			
Queue Length 95th (m)	0.1	0.0	0.6			
Control Delay (s)	1.6	0.0	15.6			
Lane LOS	A		C			
Approach Delay (s)	1.6	0.0	15.6			
Approach LOS			C			
<b>Intersection Summary</b>						
Average Delay			0.2			
Intersection Capacity Utilization		60.4%		ICU Level of Service		B
Analysis Period (min)		15				

Lanes, Volumes, Timings  
12: Lyons Lane & South Service Road

Future Total 2027  
AM Peak Hour

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	
<b>Intersection Summary</b>						
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

Future Total 2027  
AM Peak Hour

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

Future Total 2027  
AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↕	↕		↕	↕		↕	↕		↕	↕	
Traffic Volume (vph)	35	666	16	44	663	26	23	0	54	63	18	610
Future Volume (vph)	35	666	16	44	663	26	23	0	54	63	18	610
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			0.994			0.850		0.854		
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1570	3135	0	818	3190	0	805	734	0	1570	1400	0
Fit Permitted	0.367			0.214			0.142			0.719		
Satd. Flow (perm)	606	3135	0	184	3190	0	120	734	0	1163	1400	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3			8			241			226	
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	724	17	48	721	28	25	0	59	68	20	663
Shared Lane Traffic (%)												
Lane Group Flow (vph)	38	741	0	48	749	0	25	59	0	68	683	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

Future Total 2027  
AM Peak Hour

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)	29.6	29.6		41.8	41.8			28.1	28.1		28.1	28.1
Actuated g/C Ratio	0.38	0.38		0.54	0.54			0.36	0.36		0.36	0.36
v/c Ratio	0.17	0.62		0.29	0.44			0.58	0.14		0.16	1.05
Control Delay	17.5	21.9		13.2	11.5			80.3	0.7		20.3	69.8
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0		0.0	0.0
Total Delay	17.5	21.9		13.2	11.5			80.3	0.7		20.3	69.8
LOS	B	C		B	B			F	A		C	E
Approach Delay		21.7			11.6				24.4			65.3
Approach LOS		C			B				C			E
Queue Length 50th (m)	3.8	47.4		3.4	33.9			3.0	0.0		6.8	-90.6
Queue Length 95th (m)	10.4	65.1		8.4	45.9			#18.8	0.0		18.9	#180.6
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)	324	1678		167	2222			43	418		419	649
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	0.44		0.29	0.34			0.58	0.14		0.16	1.05

Intersection Summary

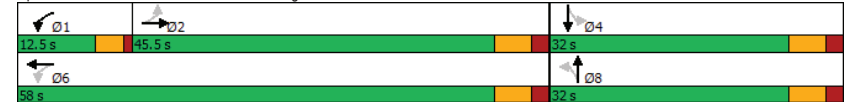
Area Type: CBD  
 Cycle Length: 90  
 Actuated Cycle Length: 78  
 Natural Cycle: 100  
 Control Type: Semi Act-Uncooord  
 Maximum v/c Ratio: 1.05  
 Intersection Signal Delay: 32.0  
 Intersection LOS: C

Lanes, Volumes, Timings  
13: GO Bus Terminal/Argus Rd & Cross Ave

Future Total 2027  
AM Peak Hour

Intersection Capacity Utilization 90.6%  
 Analysis Period (min) 15  
 ICU Level of Service E  
 ~ 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

Future Total 2027  
AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	35	666	16	44	663	26	23	0	54	63	18	610
Future Volume (vph)	35	666	16	44	663	26	23	0	54	63	18	610
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)	1569	3133		818	3191		805	737		1541	1402	
Flt Permitted	0.37	1.00		0.21	1.00		0.14	1.00		0.72	1.00	
Satd. Flow (perm)	607	3133		184	3191		121	737		1165	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)	38	724	17	48	721	28	25	0	59	68	20	663
RTOR Reduction (vph)	0	2	0	0	4	0	0	38	0	0	144	0
Lane Group Flow (vph)	38	739	0	48	745	0	25	21	0	68	539	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)	27.6	27.6		39.8	39.8		26.1	26.1		26.1	26.1	
Effective Green, g (s)	29.6	29.6		39.8	41.8		28.1	28.1		28.1	28.1	
Actuated g/C Ratio	0.38	0.38		0.51	0.54		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)	230	1190		160	1712		43	265		420	505	
v/s Ratio Prot		c0.24		0.03	c0.23			0.03			c0.38	
v/s Ratio Perm	0.06			0.12			0.21			0.06		
v/c Ratio	0.17	0.62		0.30	0.44		0.58	0.08		0.16	1.07	
Uniform Delay, d1	16.0	19.6		11.2	10.9		20.1	16.4		16.9	24.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.7	1.4		0.8	0.4		21.5	0.2		0.2	58.9	
Delay (s)	16.7	21.0		12.0	11.3		41.6	16.6		17.2	83.8	
Level of Service	B	C		B	B		D	B		B	F	
Approach Delay (s)		20.8			11.3			24.0			77.8	
Approach LOS		C			B			C			E	
<b>Intersection Summary</b>												
HCM 2000 Control Delay	35.5		HCM 2000 Level of Service				D					
HCM 2000 Volume to Capacity ratio	0.80											
Actuated Cycle Length (s)	77.9		Sum of lost time (s)				12.0					
Intersection Capacity Utilization	90.6%		ICU Level of Service				E					
Analysis Period (min)	15											
c Critical Lane Group												

Lanes, Volumes, Timings  
14: Lyons Lane/Street A & Cross Ave

Future Total 2027  
AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	63	190	217	242	159	6	19	4	14	18	26	45
Future Volume (vph)	63	190	217	242	159	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
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		0.920			0.994			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	0.638			0.432			0.707			0.745		
Satd. Flow (perm)	1026	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	173	7	21	4	15	20	28	49
Shared Lane Traffic (%)												
Lane Group Flow (vph)	68	443	0	263	180	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

Future Total 2027  
AM Peak Hour

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		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	0.13	0.28		0.42	0.09		0.10	0.07		0.10	0.26	
Control Delay	10.0	4.9		5.8	3.2		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	3.2		26.7	15.4		26.7	15.3	
LOS	B	A		A	A		C	B		C	B	
Approach Delay		5.6			4.7			21.4				17.6
Approach LOS		A			A			C				B
Queue Length 50th (m)	4.4	7.0		9.8	3.0		2.5	0.5		2.4	3.3	
Queue Length 95th (m)	12.0	16.3		18.8	5.9		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)	537	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	0.13	0.28		0.37	0.08		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:	6.9
Intersection LOS:	A

Lanes, Volumes, Timings  
14: Lyons Lane/Street A & Cross Ave

Future Total 2027  
AM Peak Hour

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

Future Total 2027  
AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	63	190	217	242	159	6	19	4	14	18	26	45
Future Volume (vph)	63	190	217	242	159	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	3.6	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)	1530	2811		1570	2728		1566	1490		1463	1503	
Flt Permitted	0.64	1.00		0.43	1.00		0.71	1.00		0.75	1.00	
Satd. Flow (perm)	1028	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	173	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	178	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)	537	1471		602	1944		202	259		199	261	
v/s Ratio Prot		0.12		c0.06	0.07			0.00			c0.02	
v/s Ratio Perm	0.07			c0.24			0.02			0.02		
v/c Ratio	0.13	0.22		0.44	0.09		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	3.2		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	9.1	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

Future Total 2027  
AM Peak Hour

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↕	↕	↕	↕	↕
Traffic Volume (vph)	26	462	236	7	6	5
Future Volume (vph)	26	462	236	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	2799	0	1421	0
Flt Permitted	0.950				0.972	
Satd. Flow (perm)	1624	3094	2799	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	502	257	8	7	5
Shared Lane Traffic (%)						
Lane Group Flow (vph)	28	502	265	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	24.9%
ICU Level of Service	A
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis  
15: Cross Ave & Lyons Lane

Future Total 2027  
AM Peak Hour

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↕↕	↕↕		↕	↕↕
Traffic Volume (veh/h)	26	462	236	7	6	5
Future Volume (Veh/h)	26	462	236	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	502	257	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	269				579	136
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	269				579	136
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)	1302				437	816
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	28	251	251	171	94	12
Volume Left	28	0	0	0	0	7
Volume Right	0	0	0	0	8	5
sSH	1302	1700	1700	1700	1700	542
Volume to Capacity	0.02	0.15	0.15	0.10	0.06	0.02
Queue Length 95th (m)	0.5	0.0	0.0	0.0	0.0	0.5
Control Delay (s)	7.8	0.0	0.0	0.0	0.0	11.8
Lane LOS	A					B
Approach Delay (s)	0.4			0.0		11.8
Approach LOS						B
<b>Intersection Summary</b>						
Average Delay			0.4			
Intersection Capacity Utilization			24.9%		ICU Level of Service	A
Analysis Period (min)			15			

Lanes, Volumes, Timings  
16: Speers Road/Cornwall Road & Cross Avenue

Future Total 2027  
AM Peak Hour

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↕↕	↕↕		↕	↕↕
Traffic Volume (vph)	216	662	614	26	17	272
Future Volume (vph)	216	662	614	26	17	272
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			296
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)	235	720	667	28	18	296
Shared Lane Traffic (%)						
Lane Group Flow (vph)	235	720	695	0	18	296
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

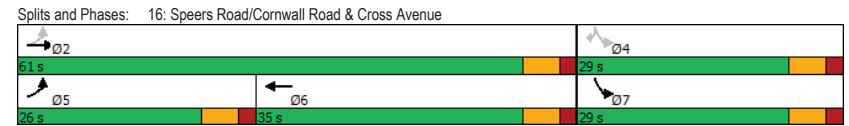
Future Total 2027  
AM Peak Hour

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		0.11	0.56
Control Delay	5.2	3.5	10.4		31.9	8.7
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	5.2	3.5	10.4		31.9	8.7
LOS	A	A	B		C	A
Approach Delay		3.9	10.4		10.1	
Approach LOS		A	B		B	
Queue Length 50th (m)	7.3	12.8	26.4		2.5	0.0
Queue Length 95th (m)	16.1	22.6	45.2		8.3	11.7
Internal Link Dist (m)		204.9	251.4		159.9	
Turn Bay Length (m)	75.0				55.0	
Base Capacity (vph)	757	2632	1931		550	1070
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		0.03	0.28

Intersection Summary	
Area Type:	Other
Cycle Length:	90
Actuated Cycle Length:	74
Natural Cycle:	80
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.56
Intersection Signal Delay:	7.2
Intersection Capacity Utilization:	52.8%
Analysis Period (min):	15
	Intersection LOS: A
	ICU Level of Service A

Lanes, Volumes, Timings  
16: Speers Road/Cornwall Road & Cross Avenue

Future Total 2027  
AM Peak Hour



HCM Signalized Intersection Capacity Analysis  
 16: Speers Road/Cornwall Road & Cross Avenue

Future Total 2027  
 AM Peak Hour

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↕↕	↕↕	↔	↔	↕↕
Traffic Volume (vph)	216	662	614	26	17	272
Future Volume (vph)	216	662	614	26	17	272
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 <sub>t</sub>	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	0.32	1.00	1.00		0.95	1.00
Satd. Flow (perm)	590	3539	3518		1770	2787
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	235	720	667	28	18	296
RTOR Reduction (vph)	0	0	2	0	0	268
Lane Group Flow (vph)	235	720	693	0	18	28
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	40.6		6.9	6.9
Effective Green, g (s)	55.1	55.1	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)	574	2635	1930		165	259
v/s Ratio Prot	c0.05	0.20	0.20		c0.01	
v/s Ratio Perm	c0.26					0.01
v/c Ratio	0.41	0.27	0.36		0.11	0.11
Uniform Delay, d1	3.5	3.0	9.4		30.7	30.7
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.5	0.3	0.5		0.3	0.2
Delay (s)	4.0	3.3	9.9		31.0	30.9
Level of Service	A	A	A		C	C
Approach Delay (s)		3.5	9.9		30.9	
Approach LOS		A	A		C	

Intersection Summary			
HCM 2000 Control Delay	10.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	74.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	52.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings  
 17: Driveway A & Street 1

Future Total 2027  
 AM Peak Hour

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔			↕	↕	
Traffic Volume (vph)	0	0	36	0	0	137
Future Volume (vph)	0	0	36	0	0	137
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 <sub>t</sub>					0.865	
Fit Protected				0.950		
Satd. Flow (prot)	1863	0	0	1770	1611	0
Fit Permitted				0.950		
Satd. Flow (perm)	1863	0	0	1770	1611	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	38.1			83.6	48.0	
Travel Time (s)	2.7			6.0	3.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	39	0	0	149
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	39	149	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	18.5%
Analysis Period (min)	15
ICU Level of Service	A

HCM Unsignalized Intersection Capacity Analysis  
17: Driveway A & Street 1

Future Total 2027  
AM Peak Hour

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔			↔	↔	
Traffic Volume (veh/h)	0	0	36	0	0	137
Future Volume (Veh/h)	0	0	36	0	0	137
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	0	39	0	0	149
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			0		78	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			0		78	0
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			98		100	86
cM capacity (veh/h)			1623		903	1085
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	0	39	149			
Volume Left	0	39	0			
Volume Right	0	0	149			
cSH	1700	1623	1085			
Volume to Capacity	0.00	0.02	0.14			
Queue Length 95th (m)	0.0	0.6	3.8			
Control Delay (s)	0.0	7.3	8.8			
Lane LOS		A	A			
Approach Delay (s)	0.0	7.3	8.8			
Approach LOS			A			
<b>Intersection Summary</b>						
Average Delay			8.5			
Intersection Capacity Utilization		18.5%		ICU Level of Service		A
Analysis Period (min)			15			

Lanes, Volumes, Timings  
18: Street C & Driveway B

Future Total 2027  
AM Peak Hour

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔			↔	↔	
Traffic Volume (vph)	0	136	36	36	137	0
Future Volume (vph)	0	136	36	36	137	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 <sub>t</sub>	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)	65.0			77.1	57.3	
Travel Time (s)	4.7			5.6	4.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	148	39	39	149	0
<b>Shared Lane Traffic (%)</b>						
Lane Group Flow (vph)	148	0	0	78	149	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	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	
<b>Two way Left Turn Lane</b>						
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	
<b>Intersection Summary</b>						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	29.5%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis  
18: Street C & Driveway B

Future Total 2027  
AM Peak Hour

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔	↔	↔	↕	↕	↔
Traffic Volume (veh/h)	0	136	36	36	137	0
Future Volume (Veh/h)	0	136	36	36	137	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	148	39	39	149	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)				77		
pX, platoon unblocked						
vC, conflicting volume	266	149	149			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	266	149	149			
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	84	97			
cM capacity (veh/h)	703	898	1432			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	148	78	149			
Volume Left	0	39	0			
Volume Right	148	0	0			
cSH	898	1432	1700			
Volume to Capacity	0.16	0.03	0.09			
Queue Length 95th (m)	4.7	0.7	0.0			
Control Delay (s)	9.8	3.9	0.0			
Lane LOS	A	A				
Approach Delay (s)	9.8	3.9	0.0			
Approach LOS	A					
<b>Intersection Summary</b>						
Average Delay		4.7				
Intersection Capacity Utilization		29.5%		ICU Level of Service	A	
Analysis Period (min)		15				


Lanes, Volumes, Timings  
19: Street C & South Service Road

Future Total 2027  
AM Peak Hour

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔	↔	↔	↕	↕	↔
Traffic Volume (vph)	4	0	0	5	0	0
Future Volume (vph)	4	0	0	5	0	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
<b>Fr</b>						
Fit Protected						
Satd. Flow (prot)	1863	0	0	1863	1863	0
Fit Permitted						
Satd. Flow (perm)	1863	0	0	1863	1863	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	235.2			305.2	159.9	
Travel Time (s)	16.9			22.0	11.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	4	0	0	5	0	0
<b>Shared Lane Traffic (%)</b>						
Lane Group Flow (vph)	4	0	0	5	0	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	
<b>Two way Left Turn Lane</b>						
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	
<b>Intersection Summary</b>						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	6.7%			ICU Level of Service A		
Analysis Period (min)	15					


HCM Unsignalized Intersection Capacity Analysis  
19: Street C & South Service Road

Future Total 2027  
AM Peak Hour

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔	↘	↙	↙	↙	↘
Traffic Volume (veh/h)	4	0	0	5	0	0
Future Volume (Veh/h)	4	0	0	5	0	0
Sign Control	Free		Free		Stop	
Grade	0%		0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	4	0	0	5	0	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None		None			
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			4	9	4	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			4	9	4	
tC, single (s)			4.1	6.4	6.2	
tC, 2 stage (s)						
tF (s)			2.2	3.5	3.3	
p0 queue free %			100	100	100	
cM capacity (veh/h)			1618	1011	1080	
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	4	5	0			
Volume Left	0	0	0			
Volume Right	0	0	0			
eSH	1700	1618	1700			
Volume to Capacity	0.00	0.00	0.00			
Queue Length 95th (m)	0.0	0.0	0.0			
Control Delay (s)	0.0	0.0	0.0			
Lane LOS				A		
Approach Delay (s)	0.0	0.0	0.0			
Approach LOS				A		
<b>Intersection Summary</b>						
Average Delay			0.0			
Intersection Capacity Utilization			6.7%	ICU Level of Service	A	
Analysis Period (min)			15			

Lanes, Volumes, Timings  
20: Street A & South Service Road

Future Total 2027  
AM Peak Hour

						
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔	↘	↙	↙	↙	↘
Traffic Volume (vph)	4	0	0	5	0	0
Future Volume (vph)	4	0	0	5	0	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						
Fit Protected						
Satd. Flow (prot)	1863	0	0	1863	1863	0
Fit Permitted						
Satd. Flow (perm)	1863	0	0	1863	1863	0
Link Speed (k/h)	50		50		50	
Link Distance (m)	285.4		235.2		98.8	
Travel Time (s)	20.5		16.9		7.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	4	0	0	5	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	4	0	0	5	0	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	
<b>Intersection Summary</b>						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	6.7%			ICU Level of Service A		
Analysis Period (min)	15					



HCM Unsignalized Intersection Capacity Analysis  
20: Street A & South Service Road

Future Total 2027  
AM Peak Hour

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔			↔	↔	
Traffic Volume (veh/h)	4	0	0	5	0	0
Future Volume (Veh/h)	4	0	0	5	0	0
Sign Control	Free		Free		Stop	
Grade	0%		0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	4	0	0	5	0	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None		None			
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			4		9	4
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			4		9	4
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			1618		1011	1080
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	4	5	0			
Volume Left	0	0	0			
Volume Right	0	0	0			
cSH	1700	1618	1700			
Volume to Capacity	0.00	0.00	0.00			
Queue Length 95th (m)	0.0	0.0	0.0			
Control Delay (s)	0.0	0.0	0.0			
Lane LOS				A		
Approach Delay (s)	0.0	0.0	0.0			
Approach LOS				A		
<b>Intersection Summary</b>						
Average Delay			0.0			
Intersection Capacity Utilization			6.7%	ICU Level of Service	A	
Analysis Period (min)			15			

Lanes, Volumes, Timings  
21: Argus Rd & Street 1

Future Total 2027  
AM Peak Hour

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔			↔	↔	
Traffic Volume (vph)	0	0	0	61	691	0
Future Volume (vph)	0	0	0	61	691	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						
Fit Protected						
Satd. Flow (prot)	1863	0	0	1863	1863	0
Fit Permitted						
Satd. Flow (perm)	1863	0	0	1863	1863	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	66	751	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	66	751	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	
<b>Intersection Summary</b>						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	39.7%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis  
21: Argus Rd & Street 1

Future Total 2027  
AM Peak Hour

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔			↑	↑	
Traffic Volume (veh/h)	0	0	0	61	691	0
Future Volume (Veh/h)	0	0	0	61	691	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	0	0	66	751	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)				114		
pX, platoon unblocked						
vC, conflicting volume	817	751	751			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	817	751	751			
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)	346	411	858			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	0	66	751			
Volume Left	0	0	0			
Volume Right	0	0	0			
cSH	1700	858	1700			
Volume to Capacity	0.00	0.00	0.44			
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					
<b>Intersection Summary</b>						
Average Delay			0.0			
Intersection Capacity Utilization		39.7%		ICU Level of Service		A
Analysis Period (min)		15				

Lanes, Volumes, Timings  
22: Street C & Street 1

Future Total 2027  
AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	0	0	137	0	0	0	36	0	0	0	0	0
Future Volume (vph)	0	0	137	0	0	0	36	0	0	0	0	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 <sub>t</sub>		0.865										
Fit Protected								0.950				
Satd. Flow (prot)	0	1611	0	0	1863	0	0	1770	0	0	1863	0
Fit Permitted								0.950				
Satd. Flow (perm)	0	1611	0	0	1863	0	0	1770	0	0	1863	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		83.6			162.1			57.3			159.9	
Travel Time (s)		6.0			11.7			4.1			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	0	149	0	0	0	39	0	0	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	149	0	0	0	0	39	0	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)		0.0			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	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	
<b>Intersection Summary</b>												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	18.5%						ICU Level of Service A					
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis  
22: Street C & Street 1

Future Total 2027  
AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔				↔			↔	
Traffic Volume (veh/h)	0	0	137	0	0	0	36	0	0	0	0	0
Future Volume (Veh/h)	0	0	137	0	0	0	36	0	0	0	0	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	0	149	0	0	0	39	0	0	0	0	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None						None					
Median storage (veh)												
Upstream signal (m)	134											
pX, platoon unblocked												
vC, conflicting volume	78	78	0	227	78	0	0			0		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	78	78	0	227	78	0	0			0		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	86	100	100	100	98			100		
cM capacity (veh/h)	894	793	1085	617	793	1085	1623			1623		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	149	0	39	0								
Volume Left	0	0	39	0								
Volume Right	149	0	0	0								
eSH	1085	1700	1623	1700								
Volume to Capacity	0.14	0.00	0.02	0.00								
Queue Length 95th (m)	3.8	0.0	0.6	0.0								
Control Delay (s)	8.8	0.0	7.3	0.0								
Lane LOS	A	A	A									
Approach Delay (s)	8.8	0.0	7.3	0.0								
Approach LOS	A	A										
Intersection Summary												
Average Delay	8.5											
Intersection Capacity Utilization	18.5%			ICU Level of Service			A					
Analysis Period (min)	15											

Lanes, Volumes, Timings  
23: GO Station West Access/Street C & Cross Ave

Future Total 2027  
AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔				↔			↔	
Traffic Volume (vph)	8	232	96	804	396	64	43	0	227	243	0	30
Future Volume (vph)	8	232	96	804	396	64	43	0	227	243	0	30
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	0.957		0.992		0.850		0.850					
Fit Protected	0.999		0.969		0.950		0.950					
Satd. Flow (prot)	0	3384	0	0	3402	0	1770	1583	0	1770	1583	0
Fit Permitted	0.794		0.647		0.736		0.606					
Satd. Flow (perm)	0	2689	0	0	2272	0	1371	1583	0	1129	1583	0
Right Turn on Red	Yes						Yes		Yes		Yes	
Satd. Flow (RTOR)	104		12		464		250					
Link Speed (k/h)	50		50		50		50					
Link Distance (m)	211.2		162.8		81.1		77.1					
Travel Time (s)	15.2		11.7		5.8		5.6					
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)	9	252	104	874	430	70	47	0	247	264	0	33
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	365	0	0	1374	0	47	247	0	264	33	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	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	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

Future Total 2027

AM Peak Hour

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		0.34			2.27dl			0.09	0.28		0.62	0.04
Control Delay		8.7			286.3			10.6	0.8		20.4	0.1
Queue Delay		0.0			0.0			0.0	0.0		0.0	0.0
Total Delay		8.7			286.3			10.6	0.8		20.4	0.1
LOS		A			F			B	A		C	A
Approach Delay		8.7			286.3			2.4			18.1	
Approach LOS		A			F			A			B	
Queue Length 50th (m)		8.4			~103.0			2.7	0.0		19.2	0.0
Queue Length 95th (m)		16.4			#139.8			7.9	0.0		#42.4	0.0
Internal Link Dist (m)		187.2			138.8			57.1			53.1	
Turn Bay Length (m)											15.0	
Base Capacity (vph)		1086			870			520	889		429	756
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		0.34			1.58			0.09	0.28		0.62	0.04

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: 1.58  
 Intersection Signal Delay: 172.8 Intersection LOS: F  
 Intersection Capacity Utilization 101.8% ICU Level of Service G  
 Analysis Period (min) 15  
 ~ Volume exceeds capacity, queue is theoretically infinite.

Lanes, Volumes, Timings

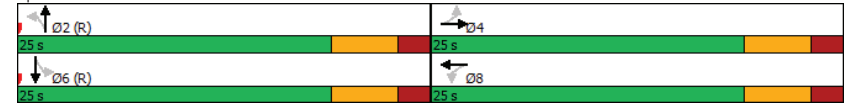
23: GO Station West Access/Street C & Cross Ave

Future Total 2027

AM Peak Hour

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

Future Total 2027  
AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔			↔	↔		↔	↔	
Traffic Volume (vph)	8	232	96	804	396	64	43	0	227	243	0	30
Future Volume (vph)	8	232	96	804	396	64	43	0	227	243	0	30
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 <sub>t</sub>		0.96			0.99		1.00	0.85		1.00	0.85	
Fl <sub>t</sub> Protected		1.00			0.97		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		3384			3404		1770	1583		1770	1583	
Fl <sub>t</sub> Permitted		0.79			0.65		0.74	1.00		0.61	1.00	
Satd. Flow (perm)		2690			2272		1370	1583		1128	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)	9	252	104	874	430	70	47	0	247	264	0	33
RTOR Reduction (vph)	0	64	0	0	7	0	0	153	0	0	20	0
Lane Group Flow (vph)	0	301	0	0	1367	0	47	94	0	264	13	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)		1022			863		520	601		428	601	
v/s Ratio Prot								0.06			0.01	
v/s Ratio Perm		0.11			c0.60		0.03			c0.23		
v/c Ratio		0.29			2.27dl		0.09	0.16		0.62	0.02	
Uniform Delay, d1		10.8			15.5		10.0	10.2		12.6	9.7	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.2			268.1		0.3	0.6		6.5	0.1	
Delay (s)		11.0			283.6		10.3	10.8		19.1	9.8	
Level of Service		B			F		B	B		B	A	
Approach Delay (s)		11.0			283.6			10.7			18.0	
Approach LOS		B			F			B			B	

Intersection Summary			
HCM 2000 Control Delay	172.6	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.10		
Actuated Cycle Length (s)	50.0	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

Future Total 2027  
PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔			↔	↔		↔	↔	
Traffic Volume (vph)	130	110	308	875	210	173	400	1740	655	132	1079	108
Future Volume (vph)	130	110	308	875	210	173	400	1740	655	132	1079	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		
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 <sub>t</sub>			0.850			0.850			0.850			0.850
Fl <sub>t</sub> 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 <sub>t</sub> Permitted	0.616			0.401			0.125			0.143		
Satd. Flow (perm)	1027	1710	1425	1317	1710	1360	212	4577	1402	242	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	335	951	228	188	435	1891	712	143	1173	117
Shared Lane Traffic (%)												
Lane Group Flow (vph)	141	120	335	951	228	188	435	1891	712	143	1173	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

Future Total 2027

1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd

PM Peak Hour

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	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	40.7	31.0	31.0
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	0.24	1.13	0.46	0.37	0.92	0.95	0.51	0.74	1.00	0.23
Control Delay	38.2	51.8	0.4	105.7	37.3	10.1	57.4	44.7	1.3	50.2	71.5	1.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	38.2	51.8	0.4	105.7	37.3	10.1	57.4	44.7	1.3	50.2	71.5	1.2
LOS	D	D	A	F	D	B	E	D	A	D	E	A
Approach Delay		19.7			81.1			36.3			63.6	
Approach LOS		B			F			D			E	
Queue Length 50th (m)	23.1	27.4	0.0	~106.8	45.9	6.6	88.1	162.6	0.0	18.0	~107.2	0.0
Queue Length 95th (m)	36.8	45.5	0.0	#137.3	67.7	24.8	#164.8	#200.8	0.0	#61.7	#141.4	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	474	1988	1402	192	1170	509
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	0.24	1.13	0.41	0.35	0.92	0.95	0.51	0.74	1.00	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:	120
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	1.13
Intersection Signal Delay:	50.4
Intersection LOS:	D

Lanes, Volumes, Timings

Future Total 2027

1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd

PM Peak Hour

Intersection Capacity Utilization	98.0%	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

Future Total 2027  
PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↘	↗	↘	↘	↘	↘	↘	↘	↘	↘	↘	↘
Traffic Volume (vph)	130	110	308	875	210	173	400	1740	655	132	1079	108
Future Volume (vph)	130	110	308	875	210	173	400	1740	655	132	1079	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
Frbp, 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
Fit 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
Fit 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	212	4577	1402	242	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	335	951	228	188	435	1891	712	143	1173	117
RTOR Reduction (vph)	0	0	0	0	0	107	0	0	0	0	0	87
Lane Group Flow (vph)	141	120	335	951	228	81	435	1891	712	143	1173	30
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	37.7	28.0	28.0
Effective Green, g (s)	22.2	18.2	120.0	43.2	35.2	35.2	62.8	52.1	120.0	37.7	31.0	31.0
Actuated g/C Ratio	0.18	0.15	1.00	0.36	0.29	0.29	0.52	0.43	1.00	0.31	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	469	1987	1402	186	1170	368
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		0.24	c0.20		0.06	0.25		0.51	0.18		0.02
v/c Ratio	0.63	0.46	0.24	1.16	0.46	0.20	0.93	0.95	0.51	0.77	1.00	0.08
Uniform Delay, d1	43.9	46.4	0.0	35.3	34.6	31.9	33.8	32.7	0.0	32.6	44.5	33.7
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	5.4	2.7	0.4	85.3	1.4	0.5	24.5	11.6	1.3	17.2	26.9	0.4
Delay (s)	49.3	49.2	0.4	120.6	36.0	32.4	58.3	44.4	1.3	49.8	71.4	34.2
Level of Service	D	D	A	F	D	C	E	D	A	D	E	C
Approach Delay (s)		21.8			94.3			36.3			66.2	
Approach LOS		C			F			D			E	

Intersection Summary	
HCM 2000 Control Delay	53.9 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	98.0% 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

Future Total 2027  
PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↘	↗	↘	↘	↘	↘	↘	↘	↘	↘	↘	↘
Traffic Volume (vph)	24	0	274	567	108	334	0	2437	493	0	2251	10
Future Volume (vph)	24	0	274	567	108	334	0	2437	493	0	2251	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	
Fit Protected	0.950			0.950	0.967							
Satd. Flow (prot)	1570	0	1437	1463	1545	1409	0	4577	1439	0	4780	0
Fit 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	Yes
Satd. Flow (RTOR)			31			278			156			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	298	616	117	363	0	2649	536	0	2447	11
Shared Lane Traffic (%)				41%								
Lane Group Flow (vph)	26	0	298	363	370	363	0	2649	536	0	2458	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

Future Total 2027

2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp

PM Peak Hour

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	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		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		57.0	43.8	43.8	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	0.25		0.49	0.79	0.77	0.26		1.08	0.38		0.96	
Control Delay	67.6		30.7	58.3	55.7	0.5		69.4	0.4		41.8	
Queue Delay	0.0		0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Total Delay	67.6		30.7	58.3	55.7	0.5		69.4	0.4		41.8	
LOS	E		C	E	E	A		E	A		D	
Approach Delay		33.7			38.3			57.8			41.8	
Approach LOS		C			D			E			D	
Queue Length 50th (m)	7.4		57.2	101.3	102.1	0.0		~312.3	0.0		192.7	
Queue Length 95th (m)	17.6		86.3	#161.4	#158.2	0.0		#340.3	m0.0		#219.2	
Internal Link Dist (m)		118.1			168.6			300.8			256.4	
Turn Bay Length (m)	50.0											
Base Capacity (vph)	213		603	457	482	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	0.12		0.49	0.79	0.77	0.26		1.08	0.38		0.96	

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: 1.08

Lanes, Volumes, Timings

Future Total 2027

2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp

PM Peak Hour

Intersection Signal Delay: 48.1  
 Intersection Capacity Utilization 86.3%  
 Intersection LOS: D  
 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

Future Total 2027  
 PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	24	0	274	567	108	334	0	2437	493	0	2251	10
Future Volume (vph)	24	0	274	567	108	334	0	2437	493	0	2251	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	
Fit Protected	0.95		1.00	0.95	0.97	1.00		1.00	1.00		1.00	
Satd. Flow (prot)	1570		1437	1463	1545	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	1545	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	298	616	117	363	0	2649	536	0	2447	11
RTOR Reduction (vph)	0	0	18	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	26	0	280	363	370	363	0	2649	536	0	2458	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		54.0	40.8	40.8	140.0		72.0	140.0		72.0	
Effective Green, g (s)	9.2		57.0	43.8	43.8	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)	103		585	457	483	1391		2451	1400		2561	
v/s Ratio Prot	0.02							c0.58			0.51	
v/s Ratio Perm			c0.19	c0.25	0.24	0.26			0.38			
v/c Ratio	0.25		0.48	0.79	0.77	0.26		1.08	0.38		0.96	
Uniform Delay, d1	62.1		30.5	44.0	43.5	0.0		32.5	0.0		31.1	
Progression Factor	1.00		1.00	1.00	1.00	1.00		0.87	1.00		1.00	
Incremental Delay, d2	1.3		0.6	9.2	7.1	0.5		41.0	0.4		10.6	
Delay (s)	63.4		31.2	53.2	50.6	0.5		69.3	0.4		41.6	
Level of Service	E		C	D	D	A		E	A		D	
Approach Delay (s)		33.8				34.9		57.7			41.6	
Approach LOS		C				C		E			D	

Intersection Summary			
HCM 2000 Control Delay	47.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	86.3%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings  
 3: Trafalgar Rd & QEW EB-Off Ramp

Future Total 2027  
 PM Peak Hour

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	943	361	0	1972	1786	309
Future Volume (vph)	943	361	0	1972	1786	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
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)		5				134
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	392	0	2143	1941	336
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1025	392	0	2143	1941	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

Future Total 2027  
PM Peak Hour

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	0.69		0.87	0.78	0.23
Control Delay	44.6	41.0		25.4	17.8	0.2
Queue Delay	0.0	0.0		0.0	0.0	0.0
Total Delay	44.6	41.0		25.4	17.8	0.2
LOS	D	D		C	B	A
Approach Delay	43.6			25.4	15.2	
Approach LOS	D			C	B	
Queue Length 50th (m)	135.1	91.0		189.6	102.7	0.0
Queue Length 95th (m)	157.2	125.1		229.8	147.9	m0.0
Internal Link Dist (m)	175.2			27.4	300.8	
Turn Bay Length (m)						
Base Capacity (vph)	1327	613		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	0.64		0.87	0.78	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:	25.8
Intersection LOS:	C
Intersection Capacity Utilization:	78.9%
ICU Level of Service:	D
Analysis Period (min):	15

Lanes, Volumes, Timings  
3: Trafalgar Rd & QEW EB-Off Ramp

Future Total 2027  
PM Peak Hour

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

Future Total 2027  
PM Peak Hour

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔↔	↗		↕↕	↕↕	↗
Traffic Volume (vph)	943	361	0	1972	1786	309
Future Volume (vph)	943	361	0	1972	1786	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	392	0	2143	1941	336
RTOR Reduction (vph)	0	3	0	0	0	0
Lane Group Flow (vph)	1025	389	0	2143	1941	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				c0.47	0.42	
v/s Ratio Perm	c0.34	0.28				0.23
v/c Ratio	0.84	0.69		0.86	0.78	0.23
Uniform Delay, d1	37.8	34.7		27.7	25.6	0.0
Progression Factor	1.00	1.00		0.78	0.62	1.00
Incremental Delay, d2	5.2	3.7		2.9	1.1	0.2
Delay (s)	43.0	38.4		24.4	17.1	0.2
Level of Service	D	D		C	B	A
Approach Delay (s)	41.7			24.4	14.6	
Approach LOS	D			C	B	

Intersection Summary			
HCM 2000 Control Delay	24.8	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	78.9%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings  
4: Trafalgar Rd & Argus Rd

Future Total 2027  
PM Peak Hour

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗		↕↕	↕↕	↗
Traffic Volume (vph)	0	49	0	2700	1659	487
Future Volume (vph)	0	49	0	2700	1659	487
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	
Flt Protected						
Satd. Flow (prot)	0	1354	0	4577	4411	0
Flt Permitted						
Satd. Flow (perm)	0	1354	0	4577	4411	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	2935	1803	529
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	53	0	2935	2332	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	61.3%
ICU Level of Service	B
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis  
4: Trafalgar Rd & Argus Rd

Future Total 2027  
PM Peak Hour

Movement	EBL	EBR	NBL	NBT	SBT	SBR	
Lane Configurations		↗		↖↖	↗↗		
Traffic Volume (veh/h)	0	49	0	2700	1659	487	
Future Volume (Veh/h)	0	49	0	2700	1659	487	
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	2935	1803	529	
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	0.82	0.66	0.66				
vC, conflicting volume	3070	890	2356				
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol	205	0	1271				
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)	618	693	360				
Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	53	978	978	978	721	721	890
Volume Left	0	0	0	0	0	0	0
Volume Right	53	0	0	0	0	0	529
eSH	693	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.08	0.58	0.58	0.58	0.42	0.42	0.52
Queue Length 95th (m)	2.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (s)	10.6	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	B						
Approach Delay (s)	10.6	0.0			0.0		
Approach LOS	B						
Intersection Summary							
Average Delay			0.1				
Intersection Capacity Utilization			61.3%		ICU Level of Service		B
Analysis Period (min)			15				

Lanes, Volumes, Timings  
5: Trafalgar Rd & Cross Ave/South Service Rd

Future Total 2027  
PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖↖	↖	↗	↖	↖	↗	↖↖	↖↖	↗	↖↖	↖↖	↖↖
Traffic Volume (vph)	705	40	127	72	62	180	117	1445	35	77	1255	232
Future Volume (vph)	705	40	127	72	62	180	117	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		0.96		0.97				0.99				0.99
Ft		0.886				0.850		0.996				0.977
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2958	1344	0	1540	1644	1423	1496	4573	0	1570	4465	0
Fit Permitted	0.950			0.643			0.075			0.080		
Satd. Flow (perm)	2958	1344	0	1014	1644	1423	118	4573	0	132	4465	0
Right Turn on Red			Yes			Yes		Yes		Yes		Yes
Satd. Flow (RTOR)		138				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)	766	43	138	78	67	196	127	1571	38	84	1364	252
Shared Lane Traffic (%)												
Lane Group Flow (vph)	766	181	0	78	67	196	127	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

Future Total 2027

PM Peak Hour

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)	38.8	62.9		17.2	20.2	20.2	67.7	56.3		62.0	53.2	
Actuated g/C Ratio	0.28	0.45		0.12	0.14	0.14	0.48	0.40		0.44	0.38	
v/c Ratio	0.94	0.27		0.63	0.28	0.59	0.73	0.87		0.57	0.94	
Control Delay	68.6	6.7		78.8	54.6	22.4	54.4	59.3		47.8	58.3	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	68.6	6.7		78.8	54.6	22.4	54.4	59.3		47.8	58.3	
LOS	E	A		E	D	C	D	E		D	E	
Approach Delay		56.8			41.6			58.9			57.7	
Approach LOS		E			D			E			E	
Queue Length 50th (m)	112.4	7.0		22.0	17.7	12.6	32.8	156.6		17.4	137.5	
Queue Length 95th (m)	#151.1	19.7		38.4	31.0	36.9	m37.5	m156.7		m26.8	#230.0	
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)	824	749		181	328	403	197	1840		150	1714	
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	0.93	0.24		0.43	0.20	0.49	0.64	0.87		0.56	0.94	

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:	110
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.94

Lanes, Volumes, Timings

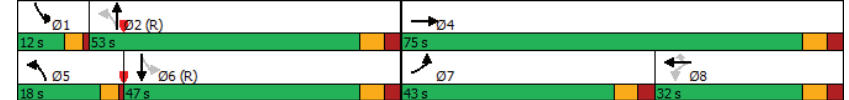
5: Trafalgar Rd & Cross Ave/South Service Rd

Future Total 2027

PM Peak Hour

Intersection Signal Delay: 56.8	Intersection LOS: E
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.	
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

Future Total 2027  
PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔		↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	705	40	127	72	62	180	117	1445	35	77	1255	232
Future Volume (vph)	705	40	127	72	62	180	117	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	
Frbp, ped/bikes	1.00	0.96		1.00	1.00	1.00	1.00	0.99		1.00	0.99	
Ftp, 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	1343		1498	1644	1423	1496	4576		1570	4463	
Flt Permitted	0.95	1.00		0.64	1.00	1.00	0.08	1.00		0.08	1.00	
Satd. Flow (perm)	2958	1343		1014	1644	1423	118	4576		132	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)	766	43	138	78	67	196	127	1571	38	84	1364	252
RTOR Reduction (vph)	0	76	0	0	0	127	0	2	0	0	17	0
Lane Group Flow (vph)	766	105	0	78	67	69	127	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	8	5	2	1		6	6	
Permitted Phases			8		8		2			6		
Actuated Green, G (s)	35.8	60.0		17.2	17.2	17.2	65.0	53.2		59.0	50.2	
Effective Green, g (s)	38.8	63.0		17.2	20.2	20.2	65.0	56.2		59.0	53.2	
Actuated g/C Ratio	0.28	0.45		0.12	0.14	0.14	0.46	0.40		0.42	0.38	
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)	819	604		124	237	205	170	1836		146	1695	
v/s Ratio Prot	c0.26	0.08			0.04		c0.06	0.35		0.04	c0.36	
v/s Ratio Perm			c0.08			0.05		0.28			0.21	
v/c Ratio	0.94	0.17		0.63	0.28	0.34	0.75	0.88		0.58	0.94	
Uniform Delay, d1	49.4	23.0		58.4	53.4	53.9	32.1	38.7		29.9	41.9	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.44	1.45		1.54	1.23	
Incremental Delay, d2	17.6	0.2		10.8	0.9	1.3	8.3	3.1		3.6	8.6	
Delay (s)	67.0	23.2		69.2	54.3	55.2	54.5	59.3		49.8	60.2	
Level of Service	E	C		E	D	E	D	E		D	E	
Approach Delay (s)	58.6			58.2			59.0			59.6		
Approach LOS	E			E			E			E		

Intersection Summary			
HCM 2000 Control Delay	59.1	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	84.2%	ICU Level of Service	E
Analysis Period (min)	15		

Lanes, Volumes, Timings  
6: Trafalgar Rd & Cornwall Rd

Future Total 2027  
PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔		↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	474	473	46	87	727	399	62	723	79	491	610	352
Future Volume (vph)	474	473	46	87	727	399	62	723	79	491	610	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		0.850	0.985			0.99		0.850
Frt		0.987				0.850	0.985					0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3016	3104	0	1570	3217	1439	1540	2688	0	2987	1368	1409
Flt 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		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	514	50	95	790	434	67	786	86	534	663	383
Shared Lane Traffic (%)												
Lane Group Flow (vph)	515	564	0	95	790	434	67	872	0	534	663	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			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	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
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		9.4		9.4
Detector 2 Size(m)	0.6			0.6		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  
6: Trafalgar Rd & Cornwall Rd

Future Total 2027  
PM Peak Hour

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	0.65		0.53	1.04	0.31	0.76	1.03		1.00	1.11	0.51
Control Delay	121.5	48.0		70.1	95.4	0.6	110.6	84.4		110.7	85.8	3.4
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	121.5	48.0		70.1	95.4	0.6	110.6	84.4		110.7	85.8	3.4
LOS	F	D		E	F	A	F	F		F	F	A
Approach Delay		83.1			62.4			86.2				74.3
Approach LOS		F			E			F				E
Queue Length 50th (m)	-86.6	75.5		26.5	-130.7	0.0	19.6	-168.1		-85.8	-269.0	1.4
Queue Length 95th (m)	#123.7	96.7		46.0	#172.7	0.0	#47.2	#219.5		m#99.8	m#302.2	m7.0
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)	473	869		179	758	1413	88	849		533	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	1.03		1.00	1.11	0.51

Intersection Summary

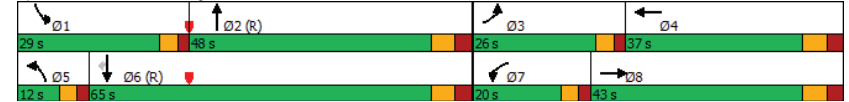
Area Type:	CBD
Cycle Length:	140
Actuated Cycle Length:	140
Offset:	0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green, Master Intersection
Natural Cycle:	140
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	1.11

Lanes, Volumes, Timings  
6: Trafalgar Rd & Cornwall Rd

Future Total 2027  
PM Peak Hour

Intersection Signal Delay: 75.3	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

Future Total 2027  
PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	474	473	46	87	727	399	62	723	79	491	610	352
Future Volume (vph)	474	473	46	87	727	399	62	723	79	491	610	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
Frbp, 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
Frt	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	514	50	95	790	434	67	786	86	534	663	383
RTOR Reduction (vph)	0	5	0	0	0	0	0	5	0	0	0	164
Lane Group Flow (vph)	515	559	0	95	790	434	67	867	0	534	663	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	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	845		533	596	593
v/s Ratio Prot	c0.17	0.18		0.06	c0.25		0.04	0.32		c0.18	c0.48	
v/s Ratio Perm					0.31							0.16
v/c Ratio	1.09	0.65		0.53	1.04	0.31	0.76	1.03		1.00	1.11	0.37
Uniform Delay, d1	59.0	44.4		58.5	53.5	0.0	65.1	48.0		57.5	39.5	26.6
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.50	0.54	0.32
Incremental Delay, d2	67.6	3.7		10.8	44.2	0.6	28.8	37.8		27.7	62.4	0.9
Delay (s)	126.6	48.2		69.3	97.7	0.6	93.9	85.8		114.2	83.8	9.4
Level of Service	F	D		E	F	A	F	F		F	F	A
Approach Delay (s)		85.6			63.7			86.4			76.0	
Approach LOS		F			E			F			E	

Intersection Summary			
HCM 2000 Control Delay	76.8	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.09		
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

Future Total 2027  
PM Peak Hour

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
Frt		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			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
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

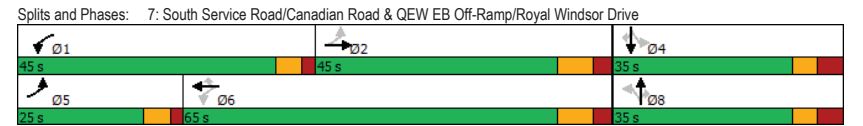


Lanes, Volumes, Timings  
 7: South Service Road/Canadian Road & QEW EB Off-Ramp/Royal Windsor Drive Future Total 2027  
 PM Peak Hour

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 Capacity Utilization:	67.5%
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 Future Total 2027  
 PM Peak Hour



HCM Signalized Intersection Capacity Analysis  
 7: South Service Road/Canadian Road & QEW EB Off-Ramp/Royal Windsor Drive PM Peak Hour

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 Future Total 2027 PM Peak Hour

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

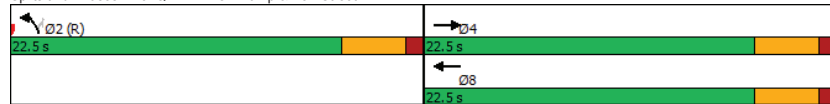
Lanes, Volumes, Timings  
8: QEW WB Off-Ramp & Kerr Street

Future Total 2027  
PM Peak Hour

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

Future Total 2027  
PM Peak Hour

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
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)	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

Future Total 2027  
PM Peak Hour

	↙	↖	↑	↗	↘	↓
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

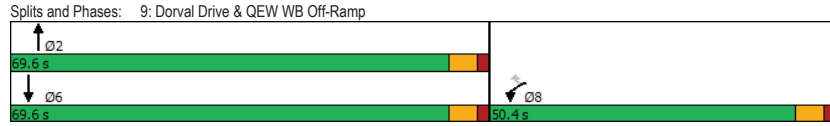
Lanes, Volumes, Timings  
9: Dorval Drive & QEW WB Off-Ramp

Future Total 2027  
PM Peak Hour

	↙	↖	↑	↗	↘	↓
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

Future Total 2027  
PM Peak Hour



HCM Signalized Intersection Capacity Analysis  
9: Dorval Drive & QEW WB Off-Ramp

Future Total 2027  
PM Peak Hour

	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				
w/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
<b>Intersection Summary</b>						
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

Future Total 2027  
PM Peak Hour

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
Frt	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

Future Total 2027  
PM Peak Hour

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

Future Total 2027  
PM Peak Hour

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

Future Total 2027  
PM Peak Hour

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	
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)	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, d1	35.4	34.8		6.3	6.2	
Progression Factor	1.00	1.00		1.00	1.00	
Incremental Delay, d2	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	
<b>Intersection Summary</b>						
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

Future Total 2027  
PM Peak Hour

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Volume (vph)	11	10	489	92	14	16
Future Volume (vph)	11	10	489	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			0.979		0.928	
Flt Protected		0.975			0.977	
Satd. Flow (prot)	0	1570	1544	0	1550	0
Flt Permitted		0.975			0.977	
Satd. Flow (perm)	0	1570	1544	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	532	100	15	17
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	23	632	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	44.8%		ICU Level of Service A			
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis  
11: Argus Rd & South Service Rd

Future Total 2027  
PM Peak Hour

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Volume (veh/h)	11	10	489	92	14	16
Future Volume (Veh/h)	11	10	489	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	532	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	632				622	582
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	632				622	582
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)	960				446	517


Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	23	632	32
Volume Left	12	0	15
Volume Right	0	100	17
cSH	960	1700	481
Volume to Capacity	0.01	0.37	0.07
Queue Length 95th (m)	0.3	0.0	1.7
Control Delay (s)	4.6	0.0	13.0
Lane LOS	A		B
Approach Delay (s)	4.6	0.0	13.0
Approach LOS			B

Intersection Summary			
Average Delay		0.8	
Intersection Capacity Utilization	44.8%	ICU Level of Service	A
Analysis Period (min)	15		



Lanes, Volumes, Timings  
12: Lyons Lane & South Service Road

Future Total 2027  
PM Peak Hour




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%
Analysis Period (min)	15
	ICU Level of Service A

HCM Unsignalized Intersection Capacity Analysis  
12: Lyons Lane & South Service Road

Future Total 2027  
PM Peak Hour



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%
Analysis Period (min)	15
	ICU Level of Service A

Lanes, Volumes, Timings  
13: GO Bus Terminal/Argus Rd & Cross Ave

Future Total 2027  
PM Peak Hour

	↖	→	↘	↙	←	↖	↙	↘	↗	↖	↘	↗
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗
Traffic Volume (vph)	16	1060	18	41	410	47	17	2	51	160	21	319
Future Volume (vph)	16	1060	18	41	410	47	17	2	51	160	21	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	3.6
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	0.99	0.97	0.98	0.98	0.98	0.98	0.98	0.98
Frt	0.997		0.985		0.855		0.859		0.859		0.859	
Flt Protected	0.950		0.950		0.950		0.950		0.950		0.950	
Satd. Flow (prot)	1570	3183	0	797	3188	0	785	706	0	1570	1349	0
Flt Permitted	0.470		0.116		0.238		0.720		0.720		0.720	
Satd. Flow (perm)	770	3183	0	97	3188	0	195	706	0	1164	1349	0
Right Turn on Red		Yes		Yes		Yes		Yes		Yes		Yes
Satd. Flow (RTOR)		3		25		55		347		347		347
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)	17	1152	20	45	446	51	18	2	55	174	23	347
Shared Lane Traffic (%)												
Lane Group Flow (vph)	17	1172	0	45	497	0	18	57	0	174	370	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  
13: GO Bus Terminal/Argus Rd & Cross Ave

Future Total 2027  
PM Peak Hour

	↖	→	↘	↙	←	↖	↙	↘	↗	↖	↘	↗
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)	38.2	38.2		50.6	50.6		20.0	20.0		20.0	20.0	
Actuated g/C Ratio	0.49	0.49		0.64	0.64		0.25	0.25		0.25	0.25	
v/c Ratio	0.05	0.76		0.33	0.24		0.37	0.26		0.59	0.62	
Control Delay	12.6	20.9		13.4	6.5		48.1	10.6		35.5	8.8	
Queue Delay	0.0	0.1		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	12.6	21.1		13.4	6.5		48.1	10.6		35.5	8.8	
LOS	B	C		B	A		D	B		D	A	
Approach Delay		21.0			7.1			19.6			17.4	
Approach LOS		C			A			B			B	
Queue Length 50th (m)	1.4	76.1		2.5	15.0		2.5	0.3		25.7	2.9	
Queue Length 95th (m)	5.4	117.3		8.5	26.7		10.0	9.4		46.7	26.6	
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)	425	1758		139	2284		68	283		408	698	
Starvation Cap Reductn	0	89		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	0.70		0.32	0.22		0.26	0.20		0.43	0.53	
<b>Intersection Summary</b>												
Area Type:	CBD											
Cycle Length:	90											
Actuated Cycle Length:	78.7											
Natural Cycle:	90											
Control Type:	Semi Act-Uncoord											
Maximum v/c Ratio:	0.76											
Intersection Signal Delay:	16.9						Intersection LOS: B					

Lanes, Volumes, Timings  
13: GO Bus Terminal/Argus Rd & Cross Ave

Future Total 2027  
PM Peak Hour

Intersection Capacity Utilization 68.8% ICU Level of Service C  
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

Future Total 2027  
PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	16	1060	18	41	410	47	17	2	51	160	21	319
Future Volume (vph)	16	1060	18	41	410	47	17	2	51	160	21	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	3.6
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	0.86	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1558	3185		797	3187		781	709		1541	1352	
Flt Permitted	0.47	1.00		0.12	1.00		0.24	1.00		0.72	1.00	
Satd. Flow (perm)	771	3185		97	3187		196	709		1167	1352	
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	1152	20	45	446	51	18	2	55	174	23	347
RTOR Reduction (vph)	0	2	0	0	9	0	0	41	0	0	259	0
Lane Group Flow (vph)	17	1170	0	45	488	0	18	16	0	174	111	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)	36.2	36.2		48.5	48.5		17.9	17.9		17.9	17.9	
Effective Green, g (s)	38.2	38.2		48.5	50.5		19.9	19.9		19.9	19.9	
Actuated g/C Ratio	0.49	0.49		0.62	0.64		0.25	0.25		0.25	0.25	
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)	375	1551		134	2052		49	179		296	343	
v/s Ratio Prot		c0.37		c0.04	0.15			0.02			0.08	
v/s Ratio Perm	0.02			0.17			0.09			c0.15		
v/c Ratio	0.05	0.75		0.34	0.24		0.37	0.09		0.59	0.32	
Uniform Delay, d1	10.5	16.3		9.6	5.9		24.1	22.3		25.7	23.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	2.5		1.1	0.1		6.3	0.3		3.5	0.8	
Delay (s)	10.6	18.8		10.7	6.0		30.3	22.6		29.2	24.5	
Level of Service	B	B		B	A		C	C		C	C	
Approach Delay (s)		18.7			6.4			24.5			26.0	
Approach LOS		B			A			C			C	
<b>Intersection Summary</b>												
HCM 2000 Control Delay				17.8			HCM 2000 Level of Service				B	
HCM 2000 Volume to Capacity ratio				0.65								
Actuated Cycle Length (s)				78.4			Sum of lost time (s)				12.0	
Intersection Capacity Utilization				68.8%			ICU Level of Service				C	
Analysis Period (min)				15								
c Critical Lane Group												

Lanes, Volumes, Timings  
14: Lyons Lane/Street A & Cross Ave

Future Total 2027  
PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	42	192	14	16	360	13	258	5	174	17	2	69
Future Volume (vph)	42	192	14	16	360	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		0.990				0.995		0.854			0.854	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1525	2913	0	1570	3081	0	1570	1436	0	1570	1414	0
Flt Permitted	0.514			0.549			0.707			0.565		
Satd. Flow (perm)	822	2913	0	906	3081	0	1167	1436	0	931	1414	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		10			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	209	15	17	391	14	280	5	189	18	2	75
Shared Lane Traffic (%)												
Lane Group Flow (vph)	46	224	0	17	405	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

Future Total 2027  
PM Peak Hour

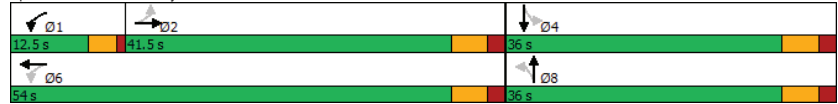
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases		2			6			8			4	
Detector Phases		2		2	1	6		8		8		4
Switch Phase												
Minimum Initial (s)	35.0	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	0.13	0.17		0.03	0.22		0.77	0.33		0.06	0.16	
Control Delay	16.7	14.8		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	14.8		9.0	9.2		40.4	5.2		19.6	6.1	
LOS	B	B		A	A		D	A		B	A	
Approach Delay		15.1			9.2			26.0			8.7	
Approach LOS		B			A			C			A	
Queue Length 50th (m)	4.6	11.3		1.1	16.0		41.7	0.6		2.1	0.3	
Queue Length 95th (m)	12.3	20.2		4.2	26.5		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		602	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	0.17		0.03	0.22		0.62	0.29		0.05	0.13	
<b>Intersection Summary</b>												
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

Future Total 2027  
PM Peak Hour

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

Future Total 2027  
PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	42	192	14	16	360	13	258	5	174	17	2	69
Future Volume (vph)	42	192	14	16	360	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	2913		1569	3081		1569	1437		1565	1414	
Flt Permitted	0.51	1.00		0.55	1.00		0.71	1.00		0.57	1.00	
Satd. Flow (perm)	822	2913		908	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	209	15	17	391	14	280	5	189	18	2	75
RTOR Reduction (vph)	0	6	0	0	2	0	0	130	0	0	51	0
Lane Group Flow (vph)	46	218	0	17	403	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	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)	366	1299		577	1817		366	451		292	444	
v/s Ratio Prot		0.08		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	0.17		0.03	0.22		0.77	0.14		0.06	0.06	
Uniform Delay, d1	13.6	13.8		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	14.0		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)		13.9			8.2			29.5			20.1	
Approach LOS		B			A			C			C	
<b>Intersection Summary</b>												
HCM 2000 Control Delay				18.3			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

Future Total 2027  
PM Peak Hour




Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↕	↕		↕	↔
Traffic Volume (vph)	7	227	674	8	17	31
Future Volume (vph)	7	227	674	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	247	733	9	18	34
Shared Lane Traffic (%)						
Lane Group Flow (vph)	8	247	742	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	31.0%
ICU Level of Service A	
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis  
15: Cross Ave & Lyons Lane

Future Total 2027  
PM Peak Hour



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↕	↕		↕	↔
Traffic Volume (veh/h)	7	227	674	8	17	31
Future Volume (Veh/h)	7	227	674	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	247	733	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	743				887	372
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	618				770	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				94	95
cM capacity (veh/h)	817				318	729
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	8	124	124	489	253	52
Volume Left	8	0	0	0	0	18
Volume Right	0	0	0	0	9	34
eSH	817	1700	1700	1700	1700	503
Volume to Capacity	0.01	0.07	0.07	0.29	0.15	0.10
Queue Length 95th (m)	0.2	0.0	0.0	0.0	0.0	2.7
Control Delay (s)	9.5	0.0	0.0	0.0	0.0	13.0
Lane LOS	A					B
Approach Delay (s)	0.3			0.0		13.0
Approach LOS						B

Intersection Summary	
Average Delay	0.7
Intersection Capacity Utilization	31.0%
ICU Level of Service A	
Analysis Period (min)	15

Lanes, Volumes, Timings

16: Speers Road/Cornwall Road & Cross Avenue

Future Total 2027

PM Peak Hour

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	276	758	832	27	15	449
Future Volume (vph)	276	758	832	27	15	449
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
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1770	3539	3522	0	1770	2787
Flt Permitted	0.214				0.950	
Satd. Flow (perm)	399	3539	3522	0	1770	2787
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)			4			488
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)	300	824	904	29	16	488
Shared Lane Traffic (%)						
Lane Group Flow (vph)	300	824	933	0	16	488
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

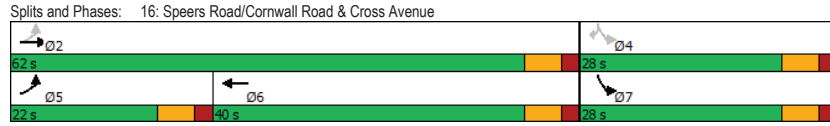
Future Total 2027

PM Peak Hour

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	39.1		7.2	7.2
Actuated g/C Ratio	0.75	0.75	0.52		0.10	0.10
v/c Ratio	0.60	0.31	0.51		0.09	0.69
Control Delay	9.6	3.8	14.1		31.7	9.0
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	9.6	3.8	14.1		31.7	9.0
LOS	A	A	B		C	A
Approach Delay		5.3	14.1		9.7	
Approach LOS		A	B		A	
Queue Length 50th (m)	9.7	15.2	41.7		2.2	0.0
Queue Length 95th (m)	28.1	29.5	77.8		7.7	14.3
Internal Link Dist (m)		165.7	250.5		160.2	
Turn Bay Length (m)	75.0				55.0	
Base Capacity (vph)	588	2634	1832		517	1160
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	0.51	0.31	0.51		0.03	0.42
<b>Intersection Summary</b>						
Area Type:	Other					
Cycle Length:	90					
Actuated Cycle Length:	75.3					
Natural Cycle:	75					
Control Type:	Semi Act-Uncoord					
Maximum v/c Ratio:	0.69					
Intersection Signal Delay:	9.4			Intersection LOS: A		
Intersection Capacity Utilization:	58.3%			ICU Level of Service B		
Analysis Period (min)	15					

Lanes, Volumes, Timings  
16: Speers Road/Cornwall Road & Cross Avenue

Future Total 2027  
PM Peak Hour



HCM Signalized Intersection Capacity Analysis  
16: Speers Road/Cornwall Road & Cross Avenue

Future Total 2027  
PM Peak Hour

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↕	↕	↔	↔	↕
Traffic Volume (vph)	276	758	832	27	15	449
Future Volume (vph)	276	758	832	27	15	449
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	3523		1770	2787
Fit Permitted	0.21	1.00	1.00		0.95	1.00
Satd. Flow (perm)	399	3539	3523		1770	2787
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	300	824	904	29	16	488
RTOR Reduction (vph)	0	0	2	0	0	441
Lane Group Flow (vph)	300	824	931	0	16	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)	56.0	56.0	39.1		7.2	7.2
Effective Green, g (s)	56.0	56.0	39.1		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)	495	2635	1831		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	0.61	0.31	0.51		0.09	0.18
Uniform Delay, d1	5.5	3.2	11.8		31.0	31.3
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	2.1	0.3	1.0		0.2	0.3
Delay (s)	7.6	3.5	12.8		31.3	31.6
Level of Service	A	A	B		C	C
Approach Delay (s)		4.6	12.8		31.6	
Approach LOS		A	B		C	
<b>Intersection Summary</b>						
HCM 2000 Control Delay			12.9		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.59			
Actuated Cycle Length (s)			75.2		Sum of lost time (s)	18.0
Intersection Capacity Utilization			58.3%		ICU Level of Service	B
Analysis Period (min)			15			

c Critical Lane Group



Lanes, Volumes, Timings  
17: Driveway A & Street 1

Future Total 2027  
PM Peak Hour

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	0	0	110	0	0	69
Future Volume (vph)	0	0	110	0	0	69
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
Flt Protected						0.950
Satd. Flow (prot)	1863	0	0	1770	1611	0
Flt Permitted						0.950
Satd. Flow (perm)	1863	0	0	1770	1611	0
Link Speed (k/h)	50		50		50	
Link Distance (m)	22.8		100.5		51.6	
Travel Time (s)	1.6		7.2		3.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	120	0	0	75
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	120	75	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	17.0%
Analysis Period (min)	15
	ICU Level of Service A

HCM Unsignalized Intersection Capacity Analysis  
17: Driveway A & Street 1

Future Total 2027  
PM Peak Hour

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	110	0	0	69
Future Volume (Veh/h)	0	0	110	0	0	69
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)	0	0	120	0	0	75
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			0		240	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			0		240	
tC, single (s)			4.1		6.4	
tC, 2 stage (s)						
tF (s)			2.2		3.5	
p0 queue free %			93		100	
cM capacity (veh/h)			1623		693	
			693		1085	

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	0	120	75
Volume Left	0	120	0
Volume Right	0	0	75
eSH	1700	1623	1085
Volume to Capacity	0.00	0.07	0.07
Queue Length 95th (m)	0.0	1.9	1.8
Control Delay (s)	0.0	7.4	8.6
Lane LOS	A		
Approach Delay (s)	0.0	7.4	8.6
Approach LOS	A		

Intersection Summary

Average Delay	7.8	
Intersection Capacity Utilization	17.0%	ICU Level of Service A
Analysis Period (min)	15	

Lanes, Volumes, Timings  
18: Street C & Driveway B

Future Total 2027  
PM Peak Hour

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	68	109	110	69	0
Future Volume (vph)	0	68	109	110	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				0.976		
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)	49.1			75.1	57.8	
Travel Time (s)	3.5			5.4	4.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	74	118	120	75	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	74	0	0	238	75	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	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
Sign Control	Stop			Free	Free	
<b>Intersection Summary</b>						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	29.4%			ICU Level of Service A		
Analysis Period (min)	15					



HCM Unsignalized Intersection Capacity Analysis  
18: Street C & Driveway B

Future Total 2027  
PM Peak Hour

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	68	109	110	69	0
Future Volume (Veh/h)	0	68	109	110	69	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	74	118	120	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)				75		
pX, platoon unblocked						
vC, conflicting volume	431	75	75			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	431	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	92	92			
cM capacity (veh/h)	536	986	1524			
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>NB 1</b>	<b>SB 1</b>			
Volume Total	74	238	75			
Volume Left	0	118	0			
Volume Right	74	0	0			
eSH	986	1524	1700			
Volume to Capacity	0.08	0.08	0.04			
Queue Length 95th (m)	1.9	2.0	0.0			
Control Delay (s)	8.9	4.1	0.0			
Lane LOS	A	A				
Approach Delay (s)	8.9	4.1	0.0			
Approach LOS	A					
<b>Intersection Summary</b>						
Average Delay			4.2			
Intersection Capacity Utilization	29.4%			ICU Level of Service		A
Analysis Period (min)	15					



Lanes, Volumes, Timings  
19: Street C & South Service Road

Future Total 2027  
PM Peak Hour

						
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	10	0	0	20	0	0
Future Volume (vph)	10	0	0	20	0	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
<b>Fit</b>						
Fit Protected						
Satd. Flow (prot)	1863	0	0	1863	1863	0
Fit Permitted						
Satd. Flow (perm)	1863	0	0	1863	1863	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	264.4			306.3	164.3	
Travel Time (s)	19.0			22.1	11.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	11	0	0	22	0	0
<b>Shared Lane Traffic (%)</b>						
Lane Group Flow (vph)	11	0	0	22	0	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	
<b>Two way Left Turn Lane</b>						
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	
<b>Intersection Summary</b>						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	6.7%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis  
19: Street C & South Service Road

Future Total 2027  
PM Peak Hour

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	10	0	0	20	0	0
Future Volume (Veh/h)	10	0	0	20	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	0	0	22	0	0
<b>Pedestrians</b>						
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			11			33 11
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			11			33 11
tC, single (s)			4.1			6.4 6.2
tC, 2 stage (s)						
tF (s)			2.2			3.5 3.3
p0 queue free %			100			100 100
cM capacity (veh/h)			1608			980 1070
<b>Direction, Lane #</b>						
	EB 1	WB 1	NB 1			
Volume Total	11	22	0			
Volume Left	0	0	0			
Volume Right	0	0	0			
eSH	1700	1608	1700			
Volume to Capacity	0.01	0.00	0.00			
Queue Length 95th (m)	0.0	0.0	0.0			
Control Delay (s)	0.0	0.0	0.0			
Lane LOS	A					
Approach Delay (s)	0.0	0.0	0.0			
Approach LOS	A					
<b>Intersection Summary</b>						
Average Delay			0.0			
Intersection Capacity Utilization			6.7%	ICU Level of Service		A
Analysis Period (min)			15			

Lanes, Volumes, Timings  
20: Street A & South Service Road

Future Total 2027  
PM Peak Hour

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔			↔	↔	
Traffic Volume (vph)	10	0	0	20	0	0
Future Volume (vph)	10	0	0	20	0	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
<b>Fit</b>						
Fit Protected						
Satd. Flow (prot)	1863	0	0	1863	1863	0
Fit Permitted						
Satd. Flow (perm)	1863	0	0	1863	1863	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	255.1			264.4	119.8	
Travel Time (s)	18.4			19.0	8.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	11	0	0	22	0	0
<b>Shared Lane Traffic (%)</b>						
Lane Group Flow (vph)	11	0	0	22	0	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	
<b>Two way Left Turn Lane</b>						
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	
<b>Intersection Summary</b>						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	6.7%			ICU Level of Service A		
Analysis Period (min)	15					











HCM Unsignalized Intersection Capacity Analysis  
20: Street A & South Service Road

Future Total 2027  
PM Peak Hour

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔			↔	↔	
Traffic Volume (veh/h)	10	0	0	20	0	0
Future Volume (Veh/h)	10	0	0	20	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	0	0	22	0	0
<b>Pedestrians</b>						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type						
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			11		33	11
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			11		33	11
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			1608		980	1070
<b>Direction, Lane #</b>						
	EB 1	WB 1	NB 1			
Volume Total	11	22	0			
Volume Left	0	0	0			
Volume Right	0	0	0			
eSH	1700	1608	1700			
Volume to Capacity	0.01	0.00	0.00			
Queue Length 95th (m)	0.0	0.0	0.0			
Control Delay (s)	0.0	0.0	0.0			
Lane LOS			A			
Approach Delay (s)	0.0	0.0	0.0			
Approach LOS			A			
<b>Intersection Summary</b>						
Average Delay			0.0			
Intersection Capacity Utilization			6.7%		ICU Level of Service	A
Analysis Period (min)			15			











Lanes, Volumes, Timings  
21: Argus Rd & Street 1

Future Total 2027  
PM Peak Hour

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	0	64	501	0
Future Volume (vph)	0	0	0	64	501	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
<b>Fit</b>						
<b>Fit Protected</b>						
Satd. Flow (prot)	1863	0	0	1863	1863	0
<b>Fit Permitted</b>						
Satd. Flow (perm)	1863	0	0	1863	1863	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	70	545	0
<b>Shared Lane Traffic (%)</b>						
Lane Group Flow (vph)	0	0	0	70	545	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	
<b>Two way Left Turn Lane</b>						
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	
<b>Intersection Summary</b>						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	29.7%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis  
21: Argus Rd & Street 1

Future Total 2027  
PM Peak Hour

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	0	64	501	0
Future Volume (Veh/h)	0	0	0	64	501	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	0	0	70	545	0
<b>Pedestrians</b>						
<b>Lane Width (m)</b>						
Walking Speed (m/s)						
<b>Percent Blockage</b>						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)	116					
<b>pX, platoon unblocked</b>						
vC, conflicting volume	615	545	545			
<b>vC1, stage 1 conf vol</b>						
<b>vC2, stage 2 conf vol</b>						
vCu, unblocked vol	615	545	545			
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)	455	538	1024			
<b>Direction, Lane #</b>						
	EB 1	NB 1	SB 1			
Volume Total	0	70	545			
Volume Left	0	0	0			
Volume Right	0	0	0			
eSH	1700	1024	1700			
Volume to Capacity	0.00	0.00	0.32			
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					
<b>Intersection Summary</b>						
Average Delay	0.0					
Intersection Capacity Utilization	29.7%		ICU Level of Service	A		
Analysis Period (min)	15					

Lanes, Volumes, Timings  
22: Street C & Street 1

Future Total 2027  
PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	0	0	69	0	0	0	110	0	0	0	0	0
Future Volume (vph)	0	0	69	0	0	0	110	0	0	0	0	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	0.865											
Flt Protected	0.950											
Satd. Flow (prot)	0	1611	0	0	1863	0	0	1770	0	0	1863	0
Flt Permitted	0.950											
Satd. Flow (perm)	0	1611	0	0	1863	0	0	1770	0	0	1863	0
Link Speed (k/h)	50		50		50		50		50		50	
Link Distance (m)	100.5		165.4		57.8		164.3					
Travel Time (s)	7.2		11.9		4.2		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	0	75	0	0	0	120	0	0	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	75	0	0	0	0	120	0	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	Right	Left	Left	Right	Right
Median Width(m)	0.0		0.0		0.0		0.0		0.0		0.0	
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
Sign Control	Stop		Stop		Free		Free		Free		Free	

Intersection Summary	
Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	17.0%
Analysis Period (min)	15
	ICU Level of Service A

HCM Unsignalized Intersection Capacity Analysis  
22: Street C & Street 1

Future Total 2027  
PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (veh/h)	0	0	69	0	0	0	110	0	0	0	0	0
Future Volume (Veh/h)	0	0	69	0	0	0	110	0	0	0	0	0
Sign Control	Stop		Stop		Free		Free		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	0	75	0	0	0	120	0	0	0	0	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None											
Median storage (veh)	0											
Upstream signal (m)	133											
pX, platoon unblocked												
vC, conflicting volume	240	240	0	315	240	0	0	0	0	0	0	0
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	240	240	0	315	240	0	0	0	0	0	0	0
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1	4.1	4.1	4.1	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	2.2	2.2	2.2	2.2
p0 queue free %	100	100	93	100	100	100	93	100	100	100	100	100
cM capacity (veh/h)	674	612	1085	560	612	1085	1623	1623	1623	1623	1623	1623
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	75	0	120	0								
Volume Left	0	0	120	0								
Volume Right	75	0	0	0								
eSH	1085	1700	1623	1700								
Volume to Capacity	0.07	0.00	0.07	0.00								
Queue Length 95th (m)	1.8	0.0	1.9	0.0								
Control Delay (s)	8.6	0.0	7.4	0.0								
Lane LOS	A	A	A	A								
Approach Delay (s)	8.6	0.0	7.4	0.0								
Approach LOS	A	A	A	A								

Intersection Summary	
Average Delay	7.8
Intersection Capacity Utilization	17.0%
Analysis Period (min)	15
	ICU Level of Service A

Lanes, Volumes, Timings

23: GO Station West Access/Street C & Cross Ave

Future Total 2027

PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔			↔			↔	↔		↔	↔	
Traffic Volume (vph)	24	489	49	267	284	195	83	0	411	122	0	15
Future Volume (vph)	24	489	49	267	284	195	83	0	411	122	0	15
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		0.961		0.850		0.850		0.850		0.850	
Flt Protected	0.998		0.982		0.950		0.950		0.950		0.950	
Satd. Flow (prot)	0	3486	0	0	3340	0	1770	1583	0	1770	1583	0
Flt Permitted	0.894		0.643		0.747		0.401		0.401		0.401	
Satd. Flow (perm)	0	3123	0	0	2187	0	1391	1583	0	747	1583	0
Right Turn on Red	Yes			Yes			Yes			Yes		
Satd. Flow (RTOR)	24		118		169		376		376		376	
Link Speed (k/h)	50		50		50		50		50		50	
Link Distance (m)	209.8		164.3		55.1		75.1		75.1		75.1	
Travel Time (s)	15.1		11.8		4.0		5.4		5.4		5.4	
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
Adj. Flow (vph)	26	532	53	290	309	212	90	0	447	133	0	16
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	611	0	0	811	0	90	447	0	133	16	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		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	
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		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	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	4		8		8		2		2		6	
Permitted Phases	4		8		2		6		6		6	

Lanes, Volumes, Timings

23: GO Station West Access/Street C & Cross Ave

Future Total 2027

PM Peak Hour

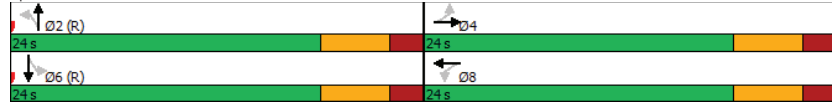
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	24.0	24.0		24.0	24.0		24.0	24.0		24.0	24.0	
Total Split (s)	24.0	24.0		24.0	24.0		24.0	24.0		24.0	24.0	
Total 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	0.53		0.93		0.17		0.63		0.47		0.02	
Control Delay	13.3		32.3		11.1		12.2		18.1		0.1	
Queue Delay	0.0		0.0		0.0		0.0		0.0		0.0	
Total Delay	13.3		32.3		11.1		12.2		18.1		0.1	
LOS	B		C		B		B		B		A	
Approach Delay	13.3		32.3		12.0		16.1		16.1		16.1	
Approach LOS	B		C		B		B		B		B	
Queue Length 50th (m)	20.3		29.6		5.1		18.0		8.6		0.0	
Queue Length 95th (m)	32.5		#63.5		12.7		43.0		22.2		0.0	
Internal Link Dist (m)	185.8		140.3		31.1		51.1		51.1		51.1	
Turn Bay Length (m)					15.0		15.0		15.0		15.0	
Base Capacity (vph)	1186		893		533		711		286		838	
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	0.52		0.91		0.17		0.63		0.47		0.02	
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:	0.93											
Intersection Signal Delay:	20.5						Intersection LOS: C					
Intersection Capacity Utilization:	89.8%						ICU Level of Service E					
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

Future Total 2027  
PM Peak Hour

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

Future Total 2027  
PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↔			↔↔		↔	↔		↔	↔	
Traffic Volume (vph)	24	489	49	267	284	195	83	0	411	122	0	15
Future Volume (vph)	24	489	49	267	284	195	83	0	411	122	0	15
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			0.96		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)		3486			3341		1770	1583		1770	1583	
Fit Permitted		0.89			0.64		0.75	1.00		0.40	1.00	
Satd. Flow (perm)		3123			2188		1392	1583		746	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)	26	532	53	290	309	212	90	0	447	133	0	16
RTOR Reduction (vph)	0	15	0	0	75	0	0	104	0	0	10	0
Lane Group Flow (vph)	0	596	0	0	736	0	90	343	0	133	6	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)		1145			802		533	606		285	606	
v/s Ratio Prot								c0.22			0.00	
v/s Ratio Perm		0.19			c0.34		0.06			0.18		
v/c Ratio		0.52			0.92		0.17	0.57		0.47	0.01	
Uniform Delay, d1		11.9			14.5		9.8	11.7		11.1	9.2	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.4			15.2		0.7	3.8		5.4	0.0	
Delay (s)		12.3			29.7		10.4	15.4		16.5	9.2	
Level of Service		B			C		B	B		B	A	
Approach Delay (s)		12.3			29.7			14.6			15.7	
Approach LOS		B			C			B			B	
<b>Intersection Summary</b>												
HCM 2000 Control Delay					19.8		HCM 2000 Level of Service				B	
HCM 2000 Volume to Capacity ratio					0.74							
Actuated Cycle Length (s)					48.0		Sum of lost time (s)				12.0	
Intersection Capacity Utilization					89.8%		ICU Level of Service				E	
Analysis Period (min)					15							

c Critical Lane Group



Lanes, Volumes, Timings

Future Total 2032

1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd

AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	37	115	322	668	82	189	189	1134	814	175	1560	50
Future Volume (vph)	37	115	322	668	82	189	189	1134	814	175	1560	50
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	0.699			0.402			0.080			0.161		
Satd. Flow (perm)	1184	1693	1425	1295	1676	1366	120	4446	1377	264	4532	1398
Right Turn on Red			Yes			Yes		Yes		Yes		Yes
Satd. Flow (RTOR)			218			205				646		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)	40	125	350	726	89	205	205	1233	885	190	1696	54
Shared Lane Traffic (%)												
Lane Group Flow (vph)	40	125	350	726	89	205	205	1233	885	190	1696	54
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

Future Total 2032

1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd

AM Peak Hour

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		6		6
Permitted Phases	4		Free	8		8	2		Free	6		6
Detector Phase	7	4		3	8	8	5	2		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)	24.2	18.2	120.0	36.2	29.2	29.2	73.2	56.1	120.0	64.7	50.0	50.0
Actuated g/C Ratio	0.20	0.15	1.00	0.30	0.24	0.24	0.61	0.47	1.00	0.54	0.42	0.42
v/c Ratio	0.15	0.49	0.25	1.22	0.22	0.42	0.69	0.59	0.64	0.63	0.90	0.08
Control Delay	29.9	52.4	0.4	147.4	37.8	7.5	40.7	26.0	2.3	22.9	40.3	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	29.9	52.4	0.4	147.4	37.8	7.5	40.7	26.0	2.3	22.9	40.3	0.2
LOS	C	D	A	F	D	A	D	C	A	C	D	A
Approach Delay		15.3			109.7			18.3			37.5	
Approach LOS		B			F			B			D	
Queue Length 50th (m)	7.0	28.8	0.0	~106.8	18.2	0.0	32.7	81.5	0.0	18.8	141.3	0.0
Queue Length 95th (m)	14.6	46.4	0.0	#140.3	31.4	18.7	#83.0	107.5	0.0	39.2	164.5	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)	260	423	1425	596	544	582	299	2078	1377	301	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	0.15	0.30	0.25	1.22	0.16	0.35	0.69	0.59	0.64	0.63	0.90	0.08
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:	110											
Control Type:	Actuated-Coordinated											
Maximum v/c Ratio:	1.22											
Intersection Signal Delay:	40.5						Intersection LOS: D					

Lanes, Volumes, Timings  
1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd

Future Total 2032  
AM Peak Hour

Intersection Capacity Utilization 83.6% 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

Future Total 2032  
AM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Movement	↔	↗	↘	↔	↗	↘	↔	↗	↘	↔	↗	↘	
Lane Configurations	↔	↗	↘	↔	↗	↘	↔	↗	↘	↔	↗	↘	
Traffic Volume (vph)	37	115	322	668	82	189	189	1134	814	175	1560	50	
Future Volume (vph)	37	115	322	668	82	189	189	1134	814	175	1560	50	
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	0.16	1.00	1.00	
Satd. Flow (perm)	1188	1693	1425	1294	1676	1366	120	4446	1377	265	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)	40	125	350	726	89	205	205	1233	885	190	1696	54	
RTOR Reduction (vph)	0	0	0	0	0	155	0	0	0	0	0	32	
Lane Group Flow (vph)	40	125	350	726	89	50	205	1233	885	190	1696	22	
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)	20.8	16.0	120.0	35.0	26.2	26.2	71.0	52.3	120.0	60.9	46.2	46.2	
Effective Green, g (s)	20.8	19.0	120.0	35.0	29.2	29.2	71.0	55.3	120.0	60.9	49.2	49.2	
Actuated g/C Ratio	0.17	0.16	1.00	0.29	0.24	0.24	0.59	0.46	1.00	0.51	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)	222	268	1425	583	407	332	297	2048	1377	293	1858	573	
v/s Ratio Prot	0.01	0.07		c0.15	0.05		0.12	0.28		0.08	c0.37		
v/s Ratio Perm	0.02		0.25	c0.22		0.04	0.29		c0.64	0.25		0.02	
v/c Ratio	0.18	0.47	0.25	1.25	0.22	0.15	0.69	0.60	0.64	0.65	0.91	0.04	
Uniform Delay, d1	42.0	45.9	0.0	40.4	36.3	35.7	30.9	24.1	0.0	17.8	33.4	21.2	
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	0.4	1.7	0.4	124.3	0.4	0.3	6.7	1.3	2.3	4.9	8.4	0.1	
Delay (s)	42.4	47.6	0.4	164.7	36.7	35.9	37.7	25.5	2.3	22.7	41.7	21.3	
Level of Service	D	D	A	F	D	D	D	C	A	C	D	C	
Approach Delay (s)		15.1			127.7			17.7			39.3		
Approach LOS		B			F			B			D		
<b>Intersection Summary</b>													
HCM 2000 Control Delay			44.1	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			83.6%	ICU Level of Service						E			
Analysis Period (min)	15												
c Critical Lane Group													

Lanes, Volumes, Timings

Future Total 2032

2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp

AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	→	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	2	0	163	552	30	244	0	1889	461	0	2544	6
Future Volume (vph)	2	0	163	552	30	244	0	1889	461	0	2544	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	0.957							
Satd. Flow (prot)	1570	0	1395	1421	1454	1356	0	4446	1384	0	5711	0
Flt Permitted	0.950			0.950	0.957							
Satd. Flow (perm)	1570	0	1395	1421	1454	1356	0	4446	1353	0	5711	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			31			238			188			
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	177	600	33	265	0	2053	501	0	2765	7
Shared Lane Traffic (%)				47%								
Lane Group Flow (vph)	2	0	177	318	315	265	0	2053	501	0	2772	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

Future Total 2032

2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp

AM Peak Hour

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 Phases	3		8	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		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		59.0	34.0	34.0			69.0			69.0	
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			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	
Flash Dont Walk (s)				24.0	24.0			21.0			21.0	
Pedestrian Calls (#/hr)				0	0			0			0	
Act Effct Green (s)	8.0		53.9	39.9	39.9	140.0		80.1		140.0	80.1	
Actuated g/C Ratio	0.06		0.38	0.28	0.28	1.00		0.57		1.00	0.57	
v/c Ratio	0.02		0.32	0.79	0.76	0.20		0.81		0.37	0.85	
Control Delay	63.0		25.0	59.7	57.5	0.3		28.8		0.5	29.1	
Queue Delay	0.0		0.0	0.0	0.0	0.0		0.0		0.0	0.0	
Total Delay	63.0		25.0	59.7	57.5	0.3		28.8		0.5	29.1	
LOS	E		C	E	E	A		C		A	C	
Approach Delay		25.4			41.4			23.3			29.1	
Approach LOS		C			D			C			C	
Queue Length 50th (m)	0.6		29.1	89.7	88.1	0.0		139.7		0.0	189.3	
Queue Length 95th (m)	3.7		44.3	120.0	117.5	0.0		167.0		m0.0	234.3	
Internal Link Dist (m)		118.1			168.6			300.8			251.1	
Turn Bay Length (m)	50.0											
Base Capacity (vph)	213		635	421	431	1356		2544		1353	3268	
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		0.28	0.76	0.73	0.20		0.81		0.37	0.85	
<b>Intersection Summary</b>												
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:	120											
Control Type:	Actuated-Coordinated											
Maximum v/c Ratio:	0.85											

Lanes, Volumes, Timings

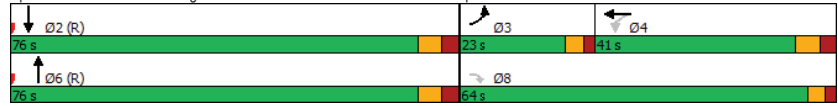
2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp

Future Total 2032

AM Peak Hour

Intersection Signal Delay: 28.4	Intersection LOS: C
Intersection Capacity Utilization 80.2%	ICU Level of Service D
Analysis Period (min) 15	
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

Future Total 2032

AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔		↔	↔	↔	↔		↕↕↕	↕	↕↕↕	↕	↕
Traffic Volume (vph)	2	0	163	552	30	244	0	1889	461	0	2544	6
Future Volume (vph)	2	0	163	552	30	244	0	1889	461	0	2544	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	1455	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	1455	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	177	600	33	265	0	2053	501	0	2765	7
RTOR Reduction (vph)	0	0	19	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	2	0	158	318	315	265	0	2053	501	0	2772	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		50.9	36.9	36.9	140.0		77.1	140.0		77.1	
Effective Green, g (s)	8.0		53.9	39.9	39.9	140.0		80.1	140.0		80.1	
Actuated g/C Ratio	0.06		0.38	0.28	0.28	1.00		0.57	1.00		0.57	
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)	89		537	404	414	1356		2543	1353		3266	
v/s Ratio Prot	0.00							0.46			c0.49	
v/s Ratio Perm			0.11	c0.22	0.22	0.20			c0.37			
v/c Ratio	0.02		0.29	0.79	0.76	0.20		0.81	0.37		0.85	
Uniform Delay, d1	62.3		29.9	46.1	45.7	0.0		23.8	0.0		24.9	
Progression Factor	1.00		1.00	1.00	1.00	1.00		1.07	1.00		1.00	
Incremental Delay, d2	0.1		0.3	9.7	8.0	0.3		1.7	0.5		3.0	
Delay (s)	62.4		30.2	55.9	53.7	0.3		27.3	0.5		27.9	
Level of Service	E		C	E	D	A		C	A		C	
Approach Delay (s)		30.5			38.7			22.0			27.9	
Approach LOS		C			D			C			C	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			27.1			HCM 2000 Level of Service			C			
HCM 2000 Volume to Capacity ratio			0.81									
Actuated Cycle Length (s)			140.0			Sum of lost time (s)			12.0			
Intersection Capacity Utilization			80.2%			ICU Level of Service			D			
Analysis Period (min)	15											
c Critical Lane Group												

Lanes, Volumes, Timings  
3: Trafalgar Rd & QEW EB-Off Ramp

Future Total 2032  
AM Peak Hour

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔↔	↔		↑↑↑	↑↑↑	↔
Traffic Volume (vph)	852	732	0	1522	1780	450
Future Volume (vph)	852	732	0	1522	1780	450
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				195
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)	926	796	0	1654	1935	489
Shared Lane Traffic (%)						
Lane Group Flow (vph)	926	796	0	1654	1935	489
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

Future Total 2032  
AM Peak Hour

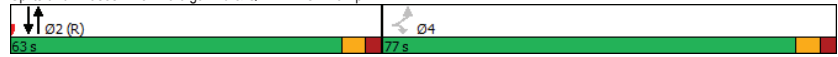
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Switch Phase						
Minimum Initial (s)	10.0	10.0		29.0	29.0	
Minimum Split (s)	38.0	38.0		36.0	36.0	
Total Split (s)	77.0	77.0		63.0	63.0	
Total Split (%)	55.0%	55.0%		45.0%	45.0%	
Maximum Green (s)	70.0	70.0		56.0	56.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	
All-Red Time (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	0.60	1.07		0.89	1.02	0.34
Control Delay	25.4	87.1		41.6	51.8	0.4
Queue Delay	0.0	0.0		0.0	0.0	0.0
Total Delay	25.4	87.1		41.6	51.8	0.4
LOS	C	F		D	D	A
Approach Delay	53.9			41.6	41.4	
Approach LOS	D			D	D	
Queue Length 50th (m)	94.2	~256.9		149.2	~220.8	0.0
Queue Length 95th (m)	115.8	#337.9		m109.8	#246.6	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	0.60	1.07		0.89	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:	1.07					
Intersection Signal Delay:	45.2			Intersection LOS: D		
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.						

Lanes, Volumes, Timings  
3: Trafalgar Rd & QEW EB-Off Ramp

Future Total 2032  
AM Peak Hour

- # 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

Future Total 2032  
AM Peak Hour

	EBL	EBR	NBL	NBT	SBT	SBR
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	852	732	0	1522	1780	450
Future Volume (vph)	852	732	0	1522	1780	450
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)	926	796	0	1654	1935	489
RTOR Reduction (vph)	0	1	0	0	0	0
Lane Group Flow (vph)	926	795	0	1654	1935	489
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				0.38	c0.43	
v/s Ratio Perm	0.31	c0.56				0.34
v/c Ratio	0.60	1.07		0.89	1.02	0.34
Uniform Delay, d1	23.3	33.5		37.5	40.5	0.0
Progression Factor	1.00	1.00		1.05	0.73	1.00
Incremental Delay, d2	0.7	54.4		1.8	21.9	0.4
Delay (s)	24.0	87.9		41.3	51.4	0.4
Level of Service	C	F		D	D	A
Approach Delay (s)	53.5			41.3	41.1	
Approach LOS	D			D	D	
<b>Intersection Summary</b>						
HCM 2000 Control Delay			44.9		HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio			1.07			
Actuated Cycle Length (s)			140.0		Sum of lost time (s)	11.0
Intersection Capacity Utilization			95.2%		ICU Level of Service	F
Analysis Period (min)			15			
c Critical Lane Group						

Lanes, Volumes, Timings  
4: Trafalgar Rd & Argus Rd

Future Total 2032  
AM Peak Hour

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	111	0	2632	1990	548
Future Volume (vph)	0	111	0	2632	1990	548
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			0.968	
Flt Protected						
Satd. Flow (prot)	0	1367	0	4363	4363	0
Flt 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	121	0	2861	2163	596
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	121	0	2861	2759	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	
<b>Intersection Summary</b>						
Area Type:	CBD					
Control Type:	Unsignalized					
Intersection Capacity Utilization	70.9%			ICU Level of Service C		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis  
4: Trafalgar Rd & Argus Rd

Future Total 2032  
AM Peak Hour

Movement	EBL	EBR	NBL	NBT	SBT	SBR	
Lane Configurations							
Traffic Volume (veh/h)	0	111	0	2632	1990	548	
Future Volume (Veh/h)	0	111	0	2632	1990	548	
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	121	0	2861	2163	596	
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	3426	1030	2770				
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol	683	0	1546				
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	80	100				
cM capacity (veh/h)	271	620	252				
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>NB 1</b>	<b>NB 2</b>	<b>NB 3</b>	<b>SB 1</b>	<b>SB 2</b>	<b>SB 3</b>
Volume Total	121	954	954	954	865	865	1029
Volume Left	0	0	0	0	0	0	0
Volume Right	121	0	0	0	0	0	596
eSH	620	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.20	0.56	0.56	0.56	0.51	0.51	0.61
Queue Length 95th (m)	5.8	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (s)	12.2	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	B						
Approach Delay (s)	12.2	0.0			0.0		
Approach LOS	B						
<b>Intersection Summary</b>							
Average Delay				0.3			
Intersection Capacity Utilization	70.9%			ICU Level of Service		C	
Analysis Period (min)	15						

Lanes, Volumes, Timings

Future Total 2032

5: Trafalgar Rd & Cross Ave/South Service Rd

AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	1045	79	111	41	46	104	111	1202	27	195	1565	250
Future Volume (vph)	1045	79	111	41	46	104	111	1202	27	195	1565	250
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	0.91	0.91	1.00	0.91	0.91	0.91
Ped Bike Factor	1.00	0.99		0.99		0.99		1.00			1.00	
Frt	0.912					0.850		0.997			0.979	
Fit Protected	0.950			0.950		0.950		0.950			0.950	
Satd. Flow (prot)	2795	1407	0	1525	1583	1382	1428	4500	0	1525	4410	0
Fit Permitted	0.950			0.628		0.079		0.078			0.078	
Satd. Flow (perm)	2789	1407	0	1001	1583	1362	119	4500	0	125	4410	0
Right Turn on Red			Yes			Yes		Yes			Yes	
Satd. Flow (RTOR)		53				179		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)	1136	86	121	45	50	113	121	1307	29	212	1701	272
Shared Lane Traffic (%)												
Lane Group Flow (vph)	1136	207	0	45	50	113	121	1336	0	212	1973	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

Future Total 2032

5: Trafalgar Rd & Cross Ave/South Service Rd

AM Peak Hour

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)	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	38.6		26.6	14.6	14.6	66.1	53.5		77.4	60.8	
Actuated g/C Ratio	0.26	0.28		0.19	0.10	0.10	0.47	0.38		0.55	0.43	
v/c Ratio	1.58	0.49		0.19	0.30	0.37	0.70	0.78		0.79	1.02	
Control Delay	303.3	35.1		31.3	62.5	3.8	49.5	49.0		46.0	60.6	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	303.3	35.1		31.3	62.5	3.8	49.5	49.0		46.0	60.6	
LOS	F	D		C	E	A	D	D		D	E	
Approach Delay		262.0			23.9			49.0			59.2	
Approach LOS		F			C			D			E	
Queue Length 50th (m)	~242.0	37.8		8.3	13.8	0.0	26.7	109.2		47.5	~195.5	
Queue Length 95th (m)	#285.4	61.6		16.4	27.0	0.8	m35.4	m118.9		m48.5	m#222.4	
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)	718	478		245	237	356	179	1720		273	1930	
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	1.58	0.43		0.18	0.21	0.32	0.68	0.78		0.78	1.02	
<b>Intersection Summary</b>												
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:	1.58											

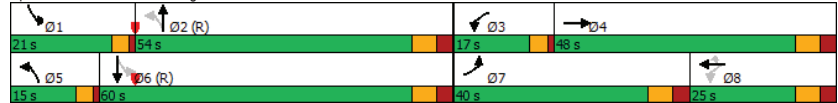


Lanes, Volumes, Timings  
5: Trafalgar Rd & Cross Ave/South Service Rd

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Intersection Signal Delay: 107.3	Intersection LOS: F
Intersection Capacity Utilization 96.6%	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.	
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

Future Total 2032  
AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔		↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	1045	79	111	41	46	104	111	1202	27	195	1565	250
Future Volume (vph)	1045	79	111	41	46	104	111	1202	27	195	1565	250
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	0.91		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	1407		1518	1583	1362	1428	4499		1525	4411	
Flt Permitted	0.95	1.00		0.63	1.00	1.00	0.08	1.00		0.08	1.00	
Satd. Flow (perm)	2795	1407		1004	1583	1362	119	4499		126	4411	
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)	1136	86	121	45	50	113	121	1307	29	212	1701	272
RTOR Reduction (vph)	0	38	0	0	0	101	0	2	0	0	15	0
Lane Group Flow (vph)	1136	169	0	45	50	12	121	1334	0	212	1958	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	35.6		23.6	11.6	11.6	63.0	50.4		74.4	57.8	
Effective Green, g (s)	36.0	38.6		23.6	14.6	14.6	63.0	53.4		74.4	60.8	
Actuated g/C Ratio	0.26	0.28		0.17	0.10	0.10	0.45	0.38		0.53	0.43	
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	387		213	165	142	171	1716		266	1915	
v/s Ratio Prot	c0.41	c0.12		0.02	0.03		0.06	0.30		c0.11	c0.44	
v/s Ratio Perm				0.02		0.01	0.25			0.31		
v/c Ratio	1.58	0.44		0.21	0.30	0.08	0.71	0.78		0.80	1.02	
Uniform Delay, d1	52.0	41.7		49.9	58.0	56.7	31.1	38.1		38.2	39.6	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.18	1.20		1.17	1.15	
Incremental Delay, d2	268.6	1.1		0.6	1.4	0.3	8.1	2.2		4.7	17.2	
Delay (s)	320.6	42.8		50.5	59.4	57.0	44.9	48.0		49.5	62.7	
Level of Service	F	D		D	E	E	D	D		D	E	
Approach Delay (s)		277.8			56.2			47.8			61.4	
Approach LOS		F			E			D			E	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			113.3				HCM 2000 Level of Service				F	
HCM 2000 Volume to Capacity ratio			1.11									
Actuated Cycle Length (s)			140.0				Sum of lost time (s)				16.0	
Intersection Capacity Utilization			96.6%				ICU Level of Service				F	
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings  
6: Trafalgar Rd & Cornwall Rd

Future Total 2032  
AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↕	↕	↕	↕	↕	↕	↕
Traffic Volume (vph)	314	521	85	66	553	498	106	496	72	691	774	253
Future Volume (vph)	314	521	85	66	553	498	106	496	72	691	774	253
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	0	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		0.981				0.850
Flt Protected	0.950			0.950		0.950		0.950		0.950		
Satd. Flow (prot)	2987	3055	0	1481	3154	1411	1540	2649	0	2929	1341	1356
Flt Permitted	0.950			0.950		0.950		0.950		0.950		
Satd. Flow (perm)	2941	3055	0	1472	3154	1384	1534	2649	0	2880	1341	1324
Right Turn on Red			Yes			Yes		Yes		Yes		Yes
Satd. Flow (RTOR)		12				484		9				188
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)	341	566	92	72	601	541	115	539	78	751	841	275
Shared Lane Traffic (%)												
Lane Group Flow (vph)	341	658	0	72	601	541	115	617	0	751	841	275
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

Future Total 2032  
AM Peak Hour

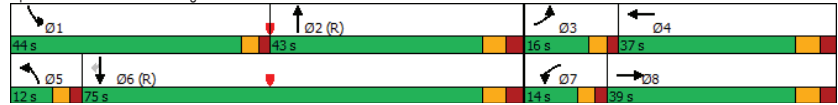
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0				0.0
Turn Type	Prot	NA		Prot	NA	Free	Prot	NA		Prot	NA	Perm
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases					Free							6
Detector Phases	3	8		7	4		5	2		1	6	6
Switch Phase												
Minimum Initial (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		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
v/c Ratio	1.33	0.85		0.69	0.81		0.39	1.31		0.83	0.90	1.24
Control Delay	220.8	60.9		94.4	60.2		0.8	247.6		57.5	83.9	139.0
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	220.8	60.9		94.4	60.2		0.8	247.6		57.5	83.9	139.0
LOS	F	E		F	E		A	F		E	F	A
Approach Delay		115.5			35.8			87.3				97.6
Approach LOS		F			D			F				F
Queue Length 50th (m)	~66.3	95.2		20.9	87.6		0.0	~42.9		104.5	120.3	~370.6
Queue Length 95th (m)	#99.1	#125.4		#46.0	111.2		0.0	#84.7		134.3	m119.6m#365.3	m18.9
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)	256	772		105	743		1384	88		744	836	680
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	1.33	0.85		0.69	0.81		0.39	1.31		0.83	0.90	1.24
<b>Intersection Summary</b>												
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:	1.33											

Lanes, Volumes, Timings  
6: Trafalgar Rd & Cornwall Rd

Future Total 2032  
AM Peak Hour

Intersection Signal Delay: 84.1	Intersection LOS: F
Intersection Capacity Utilization 100.1%	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

Future Total 2032  
AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	314	521	85	66	553	498	106	496	72	691	774	253
Future Volume (vph)	314	521	85	66	553	498	106	496	72	691	774	253
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	2649		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	2649		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)	341	566	92	72	601	541	115	539	78	751	841	275
RTOR Reduction (vph)	0	9	0	0	0	0	0	6	0	0	0	93
Lane Group Flow (vph)	341	649	0	72	601	541	115	611	0	751	841	182
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	763		105	743	1384	88	737		836	680	671
v/s Ratio Prot	c0.11	c0.21		0.05	0.19		c0.07	0.23		0.26	c0.63	
v/s Ratio Perm						c0.39						0.14
v/c Ratio	1.33	0.85		0.69	0.81	0.39	1.31	0.83		0.90	1.24	0.27
Uniform Delay, d1	64.0	50.0		63.5	50.5	0.0	66.0	47.4		48.0	34.5	19.7
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.65	0.85	1.23
Incremental Delay, d2	173.7	11.5		30.7	9.3	0.8	198.6	10.4		5.1	110.5	0.3
Delay (s)	237.7	61.5		94.2	59.8	0.8	264.6	57.8		84.5	139.8	24.5
Level of Service	F	E		F	E	A	F	E		F	F	C
Approach Delay (s)	121.6				35.6		90.3				100.6	
Approach LOS	F				D		F				F	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			87.0		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			100.1%		ICU Level of Service		G					
Analysis Period (min)			15									
c Critical Lane Group												

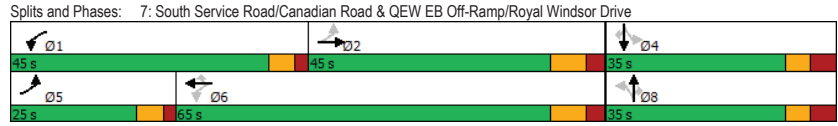
Lanes, Volumes, Timings  
 7: South Service Road/Canadian Road & QEW EB Off-Ramp/Royal Windsor Drive AM Peak Hour

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
Fit 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
Fit 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	Thru	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 AM Peak Hour

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 Future Total 2032  
 7: South Service Road/Canadian Road & QEW EB Off-Ramp/Royal Windsor Drive AM Peak Hour



HCM Signalized Intersection Capacity Analysis Future Total 2032  
 7: South Service Road/Canadian Road & QEW EB Off-Ramp/Royal Windsor Drive AM Peak Hour

	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
w/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
<b>Intersection Summary</b>												
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

Future Total 2032  
AM Peak Hour

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

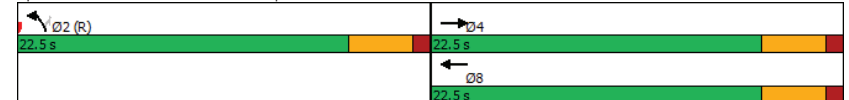
Future Total 2032  
AM Peak Hour

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

Future Total 2032  
AM Peak Hour

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
Flt Protected	1.00			1.00	0.95	1.00
Satd. Flow (prot)	3539			3539	1770	1583
Flt 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	
<b>Intersection Summary</b>						
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

Future Total 2032  
AM Peak Hour

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				
Flt Protected	0.954					
Satd. Flow (prot)	3423	1441	3539	0	0	3539
Flt 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
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
<b>Two way Left Turn Lane</b>						
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
<b>Detector 1 Channel</b>						
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
<b>Detector 2 Channel</b>						
Detector 2 Position(m)			9.4			9.4
Detector 2 Size(m)			0.6			0.6
Detector 2 Type			Cl+Ex			Cl+Ex
<b>Detector 2 Channel</b>						
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

Future Total 2032  
AM Peak Hour

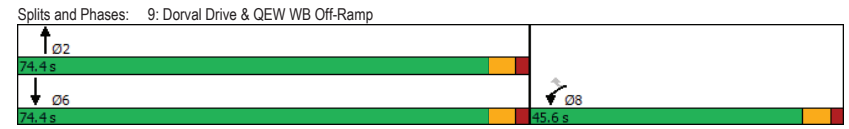
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Detector Phase	8	8	2			6
Switch Phase						
Minimum Initial (s)	10.0	10.0	20.0			20.0
Minimum Split (s)	24.0	24.0	26.0			26.0
Total Split (s)	45.6	45.6	74.4			74.4
Total Split (%)	38.0%	38.0%	62.0%			62.0%
Maximum Green (s)	39.6	39.6	68.4			68.4
Yellow Time (s)	4.0	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 Capacity Utilization:	77.7%
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

Future Total 2032  
AM Peak Hour





HCM Signalized Intersection Capacity Analysis  
9: Dorval Drive & QEWB Off-Ramp

Future Total 2032  
AM Peak Hour

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 & QEWB Off-Ramp

Future Total 2032  
AM Peak Hour

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

Future Total 2032  
AM Peak Hour

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%
Intersection LOS:	B
ICU Level of Service:	D
Analysis Period (min):	15

Lanes, Volumes, Timings  
10: Dorval Drive & QEW EB Off-Ramp

Future Total 2032  
AM Peak Hour

Split and Phases: 10: Dorval Drive & QEW EB Off-Ramp

↑ Ø2	74.4 s		↑ Ø4	45.6 s
↓ Ø6	74.4 s			

HCM Signalized Intersection Capacity Analysis  
10: Dorval Drive & QEW EB Off-Ramp

Future Total 2032  
AM Peak Hour

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 <sub>t</sub>	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, d <sub>1</sub>	33.1	35.6		8.2	12.4	
Progression Factor	1.00	1.00		1.00	1.00	
Incremental Delay, d <sub>2</sub>	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

Future Total 2032  
AM Peak Hour

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↖	↖		↗	
Traffic Volume (vph)	8	25	780	229	69	372
Future Volume (vph)	8	25	780	229	69	372
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 <sub>t</sub>			0.969		0.886	
Fit Protected		0.988			0.992	
Satd. Flow (prot)	0	1352	1619	0	1503	0
Fit Permitted		0.988			0.992	
Satd. Flow (perm)	0	1352	1619	0	1503	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)	9	27	848	249	75	404
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	36	1097	0	479	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	
<b>Intersection Summary</b>						
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

Future Total 2032  
AM Peak Hour

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Volume (veh/h)	8	25	780	229	69	372
Future Volume (Veh/h)	8	25	780	229	69	372
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)	9	27	848	249	75	404
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	1098				1024	974
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1098				1024	974
tC, single (s)	5.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	3.1				3.5	3.3
p0 queue free %	98				71	0
cM capacity (veh/h)	379				256	307
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>WB 1</b>	<b>SB 1</b>			
Volume Total	36	1097	479			
Volume Left	9	0	75			
Volume Right	0	249	404			
eSH	379	1700	298			
Volume to Capacity	0.02	0.65	1.61			
Queue Length 95th (m)	0.6	0.0	230.8			
Control Delay (s)	4.0	0.0	319.3			
Lane LOS	A		F			
Approach Delay (s)	4.0	0.0	319.3			
Approach LOS			F			
<b>Intersection Summary</b>						
Average Delay			95.0			
Intersection Capacity Utilization			97.6%		ICU Level of Service	F
Analysis Period (min)			15			

Lanes, Volumes, Timings  
12: Lyons Lane & South Service Road

Future Total 2032  
AM Peak Hour

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	
<b>Intersection Summary</b>						
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

Future Total 2032  
AM Peak Hour

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			
<b>Intersection Summary</b>						
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

Future Total 2032  
AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕
Traffic Volume (vph)	45	755	17	48	736	34	25	0	58	583	19	703
Future Volume (vph)	45	755	17	48	736	34	25	0	58	583	19	703
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			0.993			0.850				0.854
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1570	3139	0	818	3186	0	805	734	0	1570	1403	0
Fit Permitted	0.337			0.183			0.142			0.716		
Satd. Flow (perm)	557	3139	0	157	3186	0	120	734	0	1158	1403	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3			9			213			189	
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)	49	821	18	52	800	37	27	0	63	634	21	764
<b>Shared Lane Traffic (%)</b>												
Lane Group Flow (vph)	49	839	0	52	837	0	27	63	0	634	785	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	
<b>Two way Left Turn Lane</b>												
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	
<b>Detector 1 Channel</b>												
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	
<b>Detector 2 Channel</b>												

Lanes, Volumes, Timings  
13: GO Bus Terminal/Argus Rd & Cross Ave

Future Total 2032  
AM Peak Hour

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)	32.4	32.4		44.7	44.7			28.2	28.2		28.2	28.2
Actuated g/C Ratio	0.40	0.40		0.55	0.55			0.35	0.35		0.35	0.35
v/c Ratio	0.22	0.67		0.34	0.47			0.66	0.16		1.57	1.28
Control Delay	18.2	22.4		14.3	11.6			95.2	0.9		294.9	161.8
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0		0.0	0.0
Total Delay	18.2	22.4		14.3	11.6			95.2	0.9		294.9	161.8
LOS	B	C		B	B			F	A		F	F
Approach Delay		22.1			11.8				29.2			221.3
Approach LOS		C			B				C			F
Queue Length 50th (m)	5.0	56.0		3.7	39.3			3.6	0.0		~147.2	~142.6
Queue Length 95th (m)	13.0	75.5		8.8	52.5			#20.8	0.0		#239.4	#239.3
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)	287	1621		156	2142			41	394		403	611
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	0.17	0.52		0.33	0.39			0.66	0.16		1.57	1.28

Intersection Summary

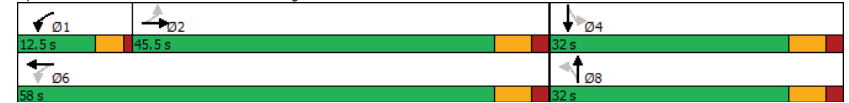
Area Type: CBD  
 Cycle Length: 90  
 Actuated Cycle Length: 80.9  
 Natural Cycle: 130  
 Control Type: Semi Act-Uncoord  
 Maximum v/c Ratio: 1.57  
 Intersection Signal Delay: 105.5  
 Intersection LOS: F

Lanes, Volumes, Timings  
13: GO Bus Terminal/Argus Rd & Cross Ave

Future Total 2032  
AM Peak Hour

Intersection Capacity Utilization 100.7%  
 Analysis Period (min) 15  
 ICU Level of Service G  
 ~ 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

Future Total 2032  
 AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	45	755	17	48	736	34	25	0	58	583	19	703
Future Volume (vph)	45	755	17	48	736	34	25	0	58	583	19	703
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	
Fipb, 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)	1569	3139		818	3187		805	736		1540	1404	
Flt Permitted	0.34	1.00		0.18	1.00		0.14	1.00		0.72	1.00	
Satd. Flow (perm)	556	3139		157	3187		120	736		1161	1404	
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	821	18	52	800	37	27	0	63	634	21	764
RTOR Reduction (vph)	0	2	0	0	4	0	0	41	0	0	123	0
Lane Group Flow (vph)	49	837	0	52	833	0	27	22	0	634	662	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)	30.5	30.5		42.7	42.7		26.2	26.2		26.2	26.2	
Effective Green, g (s)	32.5	32.5		42.7	44.7		28.2	28.2		28.2	28.2	
Actuated g/C Ratio	0.40	0.40		0.53	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)	223	1261		149	1760		41	256		404	489	
v/s Ratio Prot		c0.27		0.04	c0.26			0.03			0.47	
v/s Ratio Perm	0.09			0.15			0.22			c0.55		
v/c Ratio	0.22	0.66		0.35	0.47		0.66	0.09		1.57	1.35	
Uniform Delay, d1	15.9	19.7		11.5	11.0		22.3	17.7		26.4	26.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.0	1.8		1.0	0.4		35.1	0.2		267.9	172.1	
Delay (s)	16.9	21.5		12.5	11.4		57.4	17.9		294.3	198.5	
Level of Service	B	C		B	B		E	B		F	F	
Approach Delay (s)		21.3			11.5			29.8			241.3	
Approach LOS		C			B			C			F	
<b>Intersection Summary</b>												
HCM 2000 Control Delay		113.8										F
HCM 2000 Volume to Capacity ratio		1.02										
Actuated Cycle Length (s)		80.9			Sum of lost time (s)			12.0				
Intersection Capacity Utilization		100.7%			ICU Level of Service			G				
Analysis Period (min)		15										
c Critical Lane Group												

Lanes, Volumes, Timings  
 14: Lyons Lane/Street A & Cross Ave

Future Total 2032  
 AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	68	267	235	262	235	6	21	4	15	19	28	49
Future Volume (vph)	68	267	235	262	235	6	21	4	15	19	28	49
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	
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		0.930			0.996			0.880			0.904	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1540	2825	0	1570	2729	0	1570	1486	0	1468	1502	0
Flt Permitted	0.590			0.374			0.703			0.744		
Satd. Flow (perm)	949	2825	0	618	2729	0	1158	1486	0	1145	1502	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		255			6			16			53	
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)	74	290	255	285	255	7	23	4	16	21	30	53
Shared Lane Traffic (%)												
Lane Group Flow (vph)	74	545	0	285	262	0	23	20	0	21	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	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

Future Total 2032  
AM Peak Hour

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		50.8	50.8		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	0.34		0.50	0.13		0.11	0.07		0.11	0.27	
Control Delay	10.7	6.0		6.8	3.4		27.1	15.2		27.0	15.3	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	10.7	6.0		6.8	3.4		27.1	15.2		27.0	15.3	
LOS	B	A		A	A		C	B		C	B	
Approach Delay		6.5			5.2			21.6			17.7	
Approach LOS		A			A			C			B	
Queue Length 50th (m)	4.9	10.3		10.9	4.6		2.8	0.5		2.5	3.6	
Queue Length 95th (m)	13.4	22.1		20.9	8.6		9.1	6.2		8.7	15.3	
Internal Link Dist (m)		16.1			187.2			45.1			46.9	
Turn Bay Length (m)				25.0			20.0					
Base Capacity (vph)	493	1591		668	2225		390	511		386	541	
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	0.34		0.43	0.12		0.06	0.04		0.05	0.15	

Intersection Summary

Area Type: CBD  
 Cycle Length: 90  
 Actuated Cycle Length: 71.2  
 Natural Cycle: 85  
 Control Type: Semi Act-Uncoord  
 Maximum v/c Ratio: 0.50  
 Intersection Signal Delay: 7.3  
 Intersection LOS: A

Lanes, Volumes, Timings  
14: Lyons Lane/Street A & Cross Ave

Future Total 2032  
AM Peak Hour

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

Future Total 2032  
AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	68	267	235	262	235	6	21	4	15	19	28	49
Future Volume (vph)	68	267	235	262	235	6	21	4	15	19	28	49
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	1.00		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)	1531	2825		1570	2729		1566	1487		1463	1503	
Flt Permitted	0.59	1.00		0.37	1.00		0.70	1.00		0.74	1.00	
Satd. Flow (perm)	951	2825		618	2729		1159	1487		1147	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)	74	290	255	285	255	7	23	4	16	21	30	53
RTOR Reduction (vph)	0	122	0	0	2	0	0	13	0	0	44	0
Lane Group Flow (vph)	74	423	0	285	260	0	23	7	0	21	39	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)	35.1	35.1		48.9	48.9		10.4	10.4		10.4	10.4	
Effective Green, g (s)	37.1	37.1		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)	494	1469		554	1948		201	258		199	261	
v/s Ratio Prot		0.15		c0.07	0.10			0.00			c0.03	
v/s Ratio Perm	0.08			c0.28			0.02			0.02		
v/c Ratio	0.15	0.29		0.51	0.13		0.11	0.03		0.11	0.15	
Uniform Delay, d1	8.9	9.6		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		0.6	0.1		0.3	0.1		0.3	0.4	
Delay (s)	9.2	9.9		5.4	3.3		25.2	24.5		25.1	25.3	
Level of Service	A	A		A	A		C	C		C	C	
Approach Delay (s)		9.8			4.4			24.9			25.3	
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	0.45		
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		

Lanes, Volumes, Timings  
15: Cross Ave & Lyons Lane

Future Total 2032  
AM Peak Hour

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↕	↕	↕	↕	↕
Traffic Volume (vph)	39	508	301	26	60	82
Future Volume (vph)	39	508	301	26	60	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			0.988		0.922	
Fr						
Flt Protected	0.950				0.979	
Satd. Flow (prot)	1624	3094	2798	0	1349	0
Flt Permitted	0.950				0.979	
Satd. Flow (perm)	1624	3094	2798	0	1349	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)	42	552	327	28	65	89
Shared Lane Traffic (%)						
Lane Group Flow (vph)	42	552	355	0	154	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	33.2%
Analysis Period (min)	15
	ICU Level of Service A

HCM Unsignalized Intersection Capacity Analysis  
15: Cross Ave & Lyons Lane

Future Total 2032  
AM Peak Hour

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↕	↕		↕	↕
Traffic Volume (veh/h)	39	508	301	26	60	82
Future Volume (Veh/h)	39	508	301	26	60	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)	42	552	327	28	65	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	0.99			0.99	0.99	
vC, conflicting volume	359			712	182	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	334			691	155	
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			82	89	
cM capacity (veh/h)	1221			363	785	
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	42	276	276	218	137	154
Volume Left	42	0	0	0	0	65
Volume Right	0	0	0	0	28	89
sSH	1221	1700	1700	1700	1700	527
Volume to Capacity	0.03	0.16	0.16	0.13	0.08	0.29
Queue Length 95th (m)	0.9	0.0	0.0	0.0	0.0	9.7
Control Delay (s)	8.1	0.0	0.0	0.0	0.0	14.6
Lane LOS	A					B
Approach Delay (s)	0.6			0.0		14.6
Approach LOS						B
<b>Intersection Summary</b>						
Average Delay			2.3			
Intersection Capacity Utilization			33.2%		ICU Level of Service	A
Analysis Period (min)			15			

Lanes, Volumes, Timings  
16: Speers Road/Cornwall Road & Cross Avenue

Future Total 2032  
AM Peak Hour

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↕	↕		↕	↕
Traffic Volume (vph)	245	721	674	34	51	384
Future Volume (vph)	245	721	674	34	51	384
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	0.278				0.950	
Satd. Flow (perm)	518	3539	3514	0	1770	2787
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)			6			417
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	784	733	37	55	417
Shared Lane Traffic (%)						
Lane Group Flow (vph)	266	784	770	0	55	417
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

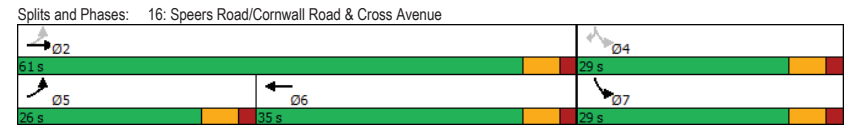
Future Total 2032  
AM Peak Hour

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	39.5		7.9	7.9
Actuated g/C Ratio	0.73	0.73	0.53		0.11	0.11
v/c Ratio	0.49	0.30	0.42		0.30	0.63
Control Delay	6.6	3.9	12.2		35.0	8.2
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	6.6	3.9	12.2		35.0	8.2
LOS	A	A	B		C	A
Approach Delay		4.6	12.2		11.3	
Approach LOS		A	B		B	
Queue Length 50th (m)	9.6	16.2	32.6		7.7	0.0
Queue Length 95th (m)	19.5	26.7	57.3		18.1	13.4
Internal Link Dist (m)		204.9	251.4		159.9	
Turn Bay Length (m)	75.0				55.0	
Base Capacity (vph)	714	2598	1855		543	1144
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		0.10	0.36

Intersection Summary	
Area Type:	Other
Cycle Length:	90
Actuated Cycle Length:	74.9
Natural Cycle:	80
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.63
Intersection Signal Delay:	8.5
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

Future Total 2032  
AM Peak Hour



HCM Signalized Intersection Capacity Analysis  
16: Speers Road/Cornwall Road & Cross Avenue

Future Total 2032  
AM Peak Hour

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↕↕	↕↔	↔	↔	↕↕
Traffic Volume (vph)	245	721	674	34	51	384
Future Volume (vph)	245	721	674	34	51	384
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 <sub>t</sub>	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	0.28	1.00	1.00		0.95	1.00
Satd. Flow (perm)	519	3539	3514		1770	2787
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	266	784	733	37	55	417
RTOR Reduction (vph)	0	0	3	0	0	373
Lane Group Flow (vph)	266	784	767	0	55	44
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	39.5		7.9	7.9
Effective Green, g (s)	55.0	55.0	39.5		7.9	7.9
Actuated g/C Ratio	0.73	0.73	0.53		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)	539	2598	1853		186	293
v/s Ratio Prot	c0.06	0.22	0.22		c0.03	
v/s Ratio Perm		c0.30				0.02
v/c Ratio	0.49	0.30	0.41		0.30	0.15
Uniform Delay, d1	4.3	3.4	10.7		30.9	30.4
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.7	0.3	0.7		0.9	0.2
Delay (s)	5.0	3.7	11.4		31.8	30.7
Level of Service	A	A	B		C	C
Approach Delay (s)		4.0	11.4		30.8	
Approach LOS		A	B		C	

Intersection Summary			
HCM 2000 Control Delay	12.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	74.9	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  
17: Driveway A & Street 1

Future Total 2032  
AM Peak Hour

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔			↔	↔	
Traffic Volume (vph)	0	0	36	0	0	137
Future Volume (vph)	0	0	36	0	0	137
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 <sub>t</sub>					0.865	
Fit Protected				0.950		
Satd. Flow (prot)	1863	0	0	1770	1611	0
Fit Permitted				0.950		
Satd. Flow (perm)	1863	0	0	1770	1611	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	25.3			86.7	45.3	
Travel Time (s)	1.8			6.2	3.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	39	0	0	149
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	39	149	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	18.5%
Analysis Period (min)	15
ICU Level of Service	A

HCM Unsignalized Intersection Capacity Analysis  
17: Driveway A & Street 1

Future Total 2032  
AM Peak Hour

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔			↔	↔	
Traffic Volume (veh/h)	0	0	36	0	0	137
Future Volume (Veh/h)	0	0	36	0	0	137
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	0	39	0	0	149
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			0		78	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			0		78	0
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			98		100	86
cM capacity (veh/h)			1623		903	1085
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	0	39	149			
Volume Left	0	39	0			
Volume Right	0	0	149			
cSH	1700	1623	1085			
Volume to Capacity	0.00	0.02	0.14			
Queue Length 95th (m)	0.0	0.6	3.8			
Control Delay (s)	0.0	7.3	8.8			
Lane LOS		A	A			
Approach Delay (s)	0.0	7.3	8.8			
Approach LOS			A			
<b>Intersection Summary</b>						
Average Delay			8.5			
Intersection Capacity Utilization		18.5%		ICU Level of Service		A
Analysis Period (min)			15			

Lanes, Volumes, Timings  
18: Street C & Driveway B

Future Total 2032  
AM Peak Hour

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔			↔	↔	
Traffic Volume (vph)	0	136	36	36	137	0
Future Volume (vph)	0	136	36	36	137	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 <sub>t</sub>	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)	50.0			80.0	54.5	
Travel Time (s)	3.6			5.8	3.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	148	39	39	149	0
<b>Shared Lane Traffic (%)</b>						
Lane Group Flow (vph)	148	0	0	78	149	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	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	
<b>Two way Left Turn Lane</b>						
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	
<b>Intersection Summary</b>						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	29.5%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis  
18: Street C & Driveway B

Future Total 2032  
AM Peak Hour

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔	↔	↔	↕	↕	↔
Traffic Volume (veh/h)	0	136	36	36	137	0
Future Volume (Veh/h)	0	136	36	36	137	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	148	39	39	149	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)				80		
pX, platoon unblocked						
vC, conflicting volume	266	149	149			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	266	149	149			
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	84	97			
cM capacity (veh/h)	703	898	1432			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	148	78	149			
Volume Left	0	39	0			
Volume Right	148	0	0			
cSH	898	1432	1700			
Volume to Capacity	0.16	0.03	0.09			
Queue Length 95th (m)	4.7	0.7	0.0			
Control Delay (s)	9.8	3.9	0.0			
Lane LOS	A	A				
Approach Delay (s)	9.8	3.9	0.0			
Approach LOS	A					
<b>Intersection Summary</b>						
Average Delay		4.7				
Intersection Capacity Utilization		29.5%		ICU Level of Service	A	
Analysis Period (min)		15				

Lanes, Volumes, Timings  
19: Street C & South Service Road

Future Total 2032  
AM Peak Hour

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔	↔	↔	↕	↕	↔
Traffic Volume (vph)	222	0	0	61	0	0
Future Volume (vph)	222	0	0	61	0	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
<b>Fr</b>						
Fit Protected						
Satd. Flow (prot)	1863	0	0	1863	1863	0
Fit Permitted						
Satd. Flow (perm)	1863	0	0	1863	1863	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	235.2			305.2	159.9	
Travel Time (s)	16.9			22.0	11.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	241	0	0	66	0	0
<b>Shared Lane Traffic (%)</b>						
Lane Group Flow (vph)	241	0	0	66	0	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	
<b>Two way Left Turn Lane</b>						
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	
<b>Intersection Summary</b>						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	15.0%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis  
19: Street C & South Service Road

Future Total 2032  
AM Peak Hour

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔		↔		↔	
Traffic Volume (veh/h)	222	0	0	61	0	0
Future Volume (Veh/h)	222	0	0	61	0	0
Sign Control	Free		Free		Stop	
Grade	0%		0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	241	0	0	66	0	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None		None			
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			241		307	241
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			241		307	241
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			1326		685	798
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	241	66	0			
Volume Left	0	0	0			
Volume Right	0	0	0			
sSH	1700	1326	1700			
Volume to Capacity	0.14	0.00	0.00			
Queue Length 95th (m)	0.0	0.0	0.0			
Control Delay (s)	0.0	0.0	0.0			
Lane LOS	A					
Approach Delay (s)	0.0	0.0	0.0			
Approach LOS	A					
<b>Intersection Summary</b>						
Average Delay			0.0			
Intersection Capacity Utilization			15.0%	ICU Level of Service	A	
Analysis Period (min)			15			

Lanes, Volumes, Timings  
20: Street A & South Service Road

Future Total 2032  
AM Peak Hour

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔		↔		↔	
Traffic Volume (vph)	95	0	0	43	0	0
Future Volume (vph)	95	0	0	43	0	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						
Fit Protected						
Satd. Flow (prot)	1863	0	0	1863	1863	0
Fit Permitted						
Satd. Flow (perm)	1863	0	0	1863	1863	0
Link Speed (k/h)	50		50		50	
Link Distance (m)	285.4		235.2		98.8	
Travel Time (s)	20.5		16.9		7.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	103	0	0	47	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	103	0	0	47	0	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	
<b>Intersection Summary</b>						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	8.3%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis  
20: Street A & South Service Road

Future Total 2032  
AM Peak Hour

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔		↔		↔	
Traffic Volume (veh/h)	95	0	0	43	0	0
Future Volume (Veh/h)	95	0	0	43	0	0
Sign Control	Free		Free		Stop	
Grade	0%		0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	103	0	0	47	0	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None		None			
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			103		150	103
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			103		150	103
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			1489		842	952
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	103	47	0			
Volume Left	0	0	0			
Volume Right	0	0	0			
cSH	1700	1489	1700			
Volume to Capacity	0.06	0.00	0.00			
Queue Length 95th (m)	0.0	0.0	0.0			
Control Delay (s)	0.0	0.0	0.0			
Lane LOS				A		
Approach Delay (s)	0.0	0.0	0.0			
Approach LOS				A		
<b>Intersection Summary</b>						
Average Delay			0.0			
Intersection Capacity Utilization			8.3%	ICU Level of Service	A	
Analysis Period (min)			15			

Lanes, Volumes, Timings  
21: Argus Rd & Street 1

Future Total 2032  
AM Peak Hour

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔		↔		↔	
Traffic Volume (vph)	0	0	0	80	1306	0
Future Volume (vph)	0	0	0	80	1306	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						
Fit Protected						
Satd. Flow (prot)	1863	0	0	1863	1863	0
Fit Permitted						
Satd. Flow (perm)	1863	0	0	1863	1863	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	87	1420	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	87	1420	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	
<b>Intersection Summary</b>						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	72.1%			ICU Level of Service C		
Analysis Period (min)	15					



HCM Unsignalized Intersection Capacity Analysis  
21: Argus Rd & Street 1

Future Total 2032  
AM Peak Hour

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔			↑	↑	
Traffic Volume (veh/h)	0	0	0	80	1306	0
Future Volume (Veh/h)	0	0	0	80	1306	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	0	0	87	1420	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)				114		
pX, platoon unblocked						
vC, conflicting volume	1507	1420	1420			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1507	1420	1420			
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)	133	167	479			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	0	87	1420			
Volume Left	0	0	0			
Volume Right	0	0	0			
cSH	1700	479	1700			
Volume to Capacity	0.00	0.00	0.84			
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					
<b>Intersection Summary</b>						
Average Delay			0.0			
Intersection Capacity Utilization		72.1%		ICU Level of Service		C
Analysis Period (min)		15				

Lanes, Volumes, Timings  
22: Street C & Street 1

Future Total 2032  
AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	0	0	137	0	0	0	36	0	0	0	0	0
Future Volume (vph)	0	0	137	0	0	0	36	0	0	0	0	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 <sub>t</sub>		0.865										
Fit Protected								0.950				
Satd. Flow (prot)	0	1611	0	0	1863	0	0	1770	0	0	1863	0
Fit Permitted								0.950				
Satd. Flow (perm)	0	1611	0	0	1863	0	0	1770	0	0	1863	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		86.7			162.1			54.5			159.9	
Travel Time (s)		6.2			11.7			3.9			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	0	149	0	0	0	39	0	0	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	149	0	0	0	0	39	0	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)		0.0			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	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	
<b>Intersection Summary</b>												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	18.5%						ICU Level of Service A					
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis  
22: Street C & Street 1

Future Total 2032  
AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔				↔			↔	
Traffic Volume (veh/h)	0	0	137	0	0	0	36	0	0	0	0	0
Future Volume (Veh/h)	0	0	137	0	0	0	36	0	0	0	0	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	0	149	0	0	0	39	0	0	0	0	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None						None					
Median storage (veh)												
Upstream signal (m)	134											
pX, platoon unblocked												
vC, conflicting volume	78	78	0	227	78	0	0			0		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	78	78	0	227	78	0	0			0		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	86	100	100	100	98			100		
cM capacity (veh/h)	894	793	1085	617	793	1085	1623			1623		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	149	0	39	0								
Volume Left	0	0	39	0								
Volume Right	149	0	0	0								
eSH	1085	1700	1623	1700								
Volume to Capacity	0.14	0.00	0.02	0.00								
Queue Length 95th (m)	3.8	0.0	0.6	0.0								
Control Delay (s)	8.8	0.0	7.3	0.0								
Lane LOS	A	A	A									
Approach Delay (s)	8.8	0.0	7.3	0.0								
Approach LOS	A	A										
Intersection Summary												
Average Delay	8.5											
Intersection Capacity Utilization	18.5%			ICU Level of Service			A					
Analysis Period (min)	15											

Lanes, Volumes, Timings  
23: GO Station West Access/Street C & Cross Ave

Future Total 2032  
AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔				↔			↔	
Traffic Volume (vph)	8	313	104	871	495	64	46	0	245	243	0	30
Future Volume (vph)	8	313	104	871	495	64	46	0	245	243	0	30
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		0.993		0.850		0.850					
Fit Protected	0.999		0.970		0.950		0.950					
Satd. Flow (prot)	0	3405	0	0	3409	0	1770	1583	0	1770	1583	0
Fit Permitted	0.707		0.625		0.736		0.595					
Satd. Flow (perm)	0	2410	0	0	2197	0	1371	1583	0	1108	1583	0
Right Turn on Red	Yes						Yes		Yes		Yes	
Satd. Flow (RTOR)	101		11		342		170					
Link Speed (k/h)	50		50		50		50					
Link Distance (m)	211.2		162.8		81.1		80.0					
Travel Time (s)	15.2		11.7		5.8		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
Adj. Flow (vph)	9	340	113	947	538	70	50	0	266	264	0	33
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	462	0	0	1555	0	50	266	0	264	33	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	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

Future Total 2032

AM Peak Hour

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			2.71dl			0.10	0.33		0.63	0.05
Control Delay		10.9			406.0			10.7	1.9		21.1	0.1
Queue Delay		0.0			0.0			0.0	0.0		0.0	0.0
Total Delay		10.9			406.0			10.7	1.9		21.1	0.1
LOS		B			F			B	A		C	A
Approach Delay		10.9			406.0			3.3			18.8	
Approach LOS		B			F			A			B	
Queue Length 50th (m)		12.4			~125.0			2.9	0.0		19.3	0.0
Queue Length 95th (m)		22.9			#163.2			8.3	6.1		#47.4	0.0
Internal Link Dist (m)		187.2			138.8			57.1			56.0	
Turn Bay Length (m)											15.0	
Base Capacity (vph)		978			841			520	813		421	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		0.47			1.85			0.10	0.33		0.63	0.05

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: 244.5  
 Intersection LOS: F  
 Intersection Capacity Utilization 109.1%  
 ICU Level of Service H  
 Analysis Period (min) 15  
 ~ Volume exceeds capacity, queue is theoretically infinite.

Lanes, Volumes, Timings

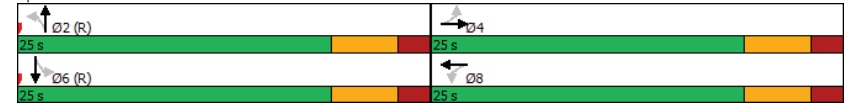
23: GO Station West Access/Street C & Cross Ave

Future Total 2032

AM Peak Hour

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

Future Total 2032  
AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔		↔	↔	↔		↔		↔
Traffic Volume (vph)	8	313	104	871	495	64	46	0	245	243	0	30
Future Volume (vph)	8	313	104	871	495	64	46	0	245	243	0	30
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		
Fr't	0.96			0.99			1.00			0.85		
Flt Protected	1.00			0.97			0.95			1.00		
Satd. Flow (prot)	3406			3411			1770			1583		
Flt Permitted	0.71			0.63			0.74			1.00		
Satd. Flow (perm)	2411			2198			1370			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)	9	340	113	947	538	70	50	0	266	264	0	33
RTOR Reduction (vph)	0	63	0	0	7	0	0	165	0	0	20	0
Lane Group Flow (vph)	0	399	0	0	1548	0	50	101	0	264	13	0
Turn Type	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)	916		835		520		601		421		601	
v/s Ratio Prot					0.06		0.01					
v/s Ratio Perm	0.17		c0.70		0.04		c0.24					
v/c Ratio	0.44		2.71dl		0.10		0.17		0.63		0.02	
Uniform Delay, d1	11.5		15.5		10.0		10.3		12.6		9.7	
Progression Factor	1.00		1.00		1.00		1.00		1.00		1.00	
Incremental Delay, d2	0.3		389.0		0.4		0.6		6.9		0.1	
Delay (s)	11.9		404.5		10.3		10.9		19.5		9.8	
Level of Service	B		F		B		B		B		A	
Approach Delay (s)	11.9		404.5		10.8		18.4					
Approach LOS	B		F		B		B					

Intersection Summary			
HCM 2000 Control Delay	244.6	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.24		
Actuated Cycle Length (s)	50.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	109.1%	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			

Lanes, Volumes, Timings  
1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd

Future Total 2032  
PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	141	119	346	977	227	187	442	1932	724	142	1279	117
Future Volume (vph)	141	119	346	977	227	187	442	1932	724	142	1279	117
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			0.98		
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	0.606			0.382			0.105			0.118		
Satd. Flow (perm)	1011	1710	1425	1255	1710	1360	178	4577	1402	200	4532	1425
Right Turn on Red	Yes			Yes			Yes			Yes		
Satd. Flow (RTOR)	255			151			338			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)	153	129	376	1062	247	203	480	2100	787	154	1390	127
Shared Lane Traffic (%)												
Lane Group Flow (vph)	153	129	376	1062	247	203	480	2100	787	154	1390	127
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	
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

Future Total 2032

PM Peak Hour

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)	25.4	18.4	120.0	46.4	36.4	36.4	64.6	52.0	120.0	45.6	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	0.61	0.49	0.26	1.24	0.48	0.39	1.27	1.06	0.56	0.87	0.99	0.22
Control Delay	40.9	52.8	0.5	147.5	37.1	11.5	173.1	71.5	1.6	68.4	64.5	1.6
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	40.9	52.8	0.5	147.5	37.1	11.5	173.1	71.5	1.6	68.4	64.5	1.6
LOS	D	D	A	F	D	B	F	E	A	E	E	A
Approach Delay		20.1			111.2			69.6			60.1	
Approach LOS		C			F			E			E	
Queue Length 50th (m)	24.8	29.4	0.0	~134.0	49.3	9.2	~137.5	~209.4	0.0	21.7	125.7	0.0
Queue Length 95th (m)	39.7	49.0	0.0	#170.3	73.4	28.8	#212.0	#240.0	0.0	#71.0	#161.4	2.6
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	857	555	543	377	1983	1402	177	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	0.61	0.43	0.26	1.24	0.45	0.37	1.27	1.06	0.56	0.87	0.99	0.22

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:	130
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	1.27
Intersection Signal Delay:	71.6
Intersection LOS:	E

Lanes, Volumes, Timings

1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd

Future Total 2032

PM Peak Hour

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.		

Splits and Phases: 1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd



HCM Signalized Intersection Capacity Analysis  
1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd

Future Total 2032  
PM Peak Hour

	↖	→	↗	↖	←	↖	↗	↖	↗	↖	↗	↖
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	→	↗	↖	↗	↖	↖	↖	↖	↖	↖	↖
Traffic Volume (vph)	141	119	346	977	227	187	442	1932	724	142	1279	117
Future Volume (vph)	141	119	346	977	227	187	442	1932	724	142	1279	117
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	0.95	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
Fit 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
Fit Permitted	0.61	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)	1021	1710	1425	1255	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)	153	129	376	1062	247	203	480	2100	787	154	1390	127
RTOR Reduction (vph)	0	0	0	0	0	105	0	0	0	0	0	88
Lane Group Flow (vph)	153	129	376	1062	247	98	480	2100	787	154	1390	39
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	44.4	33.4	33.4	61.6	49.0	120.0	42.6	34.0	34.0
Effective Green, g (s)	22.4	18.4	120.0	44.4	36.4	36.4	61.6	52.0	120.0	42.6	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	0.36	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	262	1425	837	518	412	372	1983	1402	171	1397	439
v/s Ratio Prot	0.04	0.08		c0.25	0.14		c0.25	0.46		0.06	0.31	
v/s Ratio Perm	0.09		0.26	c0.22		0.07	c0.41		0.56	0.25		0.03
v/c Ratio	0.68	0.49	0.26	1.27	0.48	0.24	1.29	1.06	0.56	0.90	0.99	0.09
Uniform Delay, d1	44.2	46.5	0.0	34.4	34.0	31.4	37.1	34.0	0.0	31.7	41.4	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	8.3	3.0	0.5	130.4	1.4	0.6	149.4	37.9	1.6	41.5	22.9	0.4
Delay (s)	52.5	49.5	0.5	164.8	35.5	32.0	186.6	71.9	1.6	73.3	64.3	29.9
Level of Service	D	D	A	F	D	C	F	E	A	E	E	C
Approach Delay (s)	22.2			125.8			71.9			62.5		
Approach LOS	C			F			E			E		
<b>Intersection Summary</b>												
HCM 2000 Control Delay	76.5			HCM 2000 Level of Service			E					
HCM 2000 Volume to Capacity ratio	1.28											
Actuated Cycle Length (s)	120.0			Sum of lost time (s)			17.0					
Intersection Capacity Utilization	107.6%			ICU Level of Service			G					
Analysis Period (min)	15											
c Critical Lane Group												

Lanes, Volumes, Timings  
2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp

Future Total 2032  
PM Peak Hour

	↖	→	↗	↖	←	↖	↗	↖	↗	↖	↗	↖
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖		↗	↖	↗	↖	↖	↖	↖	↖	↖	↖
Traffic Volume (vph)	26	0	303	849	144	362	0	2709	556	0	2590	11
Future Volume (vph)	26	0	303	849	144	362	0	2709	556	0	2590	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	3.5	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		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	
Fit Protected	0.950			0.950	0.966							
Satd. Flow (prot)	1570	0	1437	1463	1543	1409	0	4577	1439	0	4780	0
Fit 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)			86		204			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		
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	329	923	157	393	0	2945	604	0	2815	12
Shared Lane Traffic (%)	42%			42%			42%			42%		
Lane Group Flow (vph)	28	0	329	535	545	393	0	2945	604	0	2827	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		
<b>Two way Left Turn Lane</b>												
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		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	CI+Ex		CI+Ex	CI+Ex	CI+Ex	CI+Ex		CI+Ex	CI+Ex	CI+Ex		CI+Ex
<b>Detector 1 Channel</b>												
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		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
<b>Detector 2 Channel</b>												

Lanes, Volumes, Timings

Future Total 2032

2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp

PM Peak Hour

	↖	→	↘	↙	←	↖	↙	↘	↙	↘	↙	↘
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				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)	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	1.51	1.46	0.28		1.20	0.43			1.10
Control Delay	55.1		135.4	279.1	257.9	0.5		123.1	0.3			85.0
Queue Delay	0.0		0.0	0.0	0.0	0.0		0.0	0.0			0.0
Total Delay	55.1		135.4	279.1	257.9	0.5		123.1	0.3			85.0
LOS	E		F	F	F	A		F	A			F
Approach Delay		129.1						102.2				85.0
Approach LOS		F						F				F
Queue Length 50th (m)	7.3		~89.3	~227.4	~227.6	0.0		~379.5	0.0			~272.4
Queue Length 95th (m)	17.3		#152.5	#303.7	#304.6	0.0		m#404.4	m0.0			#293.3
Internal Link Dist (m)		118.1			168.6			300.8				256.4
Turn Bay Length (m)	50.0											
Base Capacity (vph)	213		288	355	374	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	1.51	1.46	0.28		1.20	0.43			1.10

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:	1.51

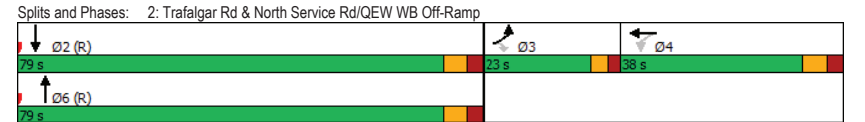
Lanes, Volumes, Timings

Future Total 2032

2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp

PM Peak Hour

Intersection Signal Delay: 114.5	Intersection LOS: F
Intersection Capacity Utilization 103.1%	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.	



HCM Signalized Intersection Capacity Analysis  
 2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp

Future Total 2032  
 PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	26	0	303	849	144	362	0	2709	556	0	2590	11
Future Volume (vph)	26	0	303	849	144	362	0	2709	556	0	2590	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	
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	0.91	1.00	0.86	0.99	1.00	0.86	
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	
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	
Frt	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	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	
Satd. Flow (prot)	1570	1437	1463	1542	1391	4577	1400	4782	1400	1900	4782	
Flt Permitted	0.95	1.00	0.95	0.97	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	1400	1900	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)	28	0	329	923	157	393	0	2945	604	0	2815	12
RTOR Reduction (vph)	0	0	73	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	28	0	256	535	545	393	0	2945	604	0	2827	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			3	4		Free			Free			
Actuated Green, G (s)	18.0		18.0	31.0	31.0	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	
Actuated g/C Ratio	0.14		0.15	0.24	0.24	1.00		0.54	1.00		0.54	
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)	213		215	355	374	1391		2451	1400		2561	
v/s Ratio Prot	0.02							c0.64			0.59	
v/s Ratio Perm			c0.18	c0.37	0.35	0.28			0.43			
v/c Ratio	0.13		1.19	1.51	1.46	0.28		1.20	0.43		1.10	
Uniform Delay, d1	53.2		59.5	53.0	53.0	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	0.3		122.3	242.4	220.1	0.5		92.1	0.3		53.2	
Delay (s)	53.5		181.8	295.4	273.1	0.5		124.8	0.3		85.7	
Level of Service	D		F	F	F	A		F	A		F	
Approach Delay (s)		171.7				208.5		103.6			85.7	
Approach LOS		F				F		F			F	

Intersection Summary			
HCM 2000 Control Delay	119.2	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)	12.0
Intersection Capacity Utilization	103.1%	ICU Level of Service	G
Analysis Period (min)	15		

Lanes, Volumes, Timings  
 3: Trafalgar Rd & QEW EB-Off Ramp

Future Total 2032  
 PM Peak Hour

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	1020	466	0	2229	2349	334
Future Volume (vph)	1020	466	0	2229	2349	334
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)	1109	507	0	2423	2553	363
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1109	507	0	2423	2553	363
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

Future Total 2032  
PM Peak Hour

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)	55.2	55.2		76.8	76.8	140.0
Actuated g/C Ratio	0.39	0.39		0.55	0.55	1.00
v/c Ratio	0.92	0.92		0.97	1.02	0.25
Control Delay	53.6	62.8		34.5	30.8	0.0
Queue Delay	0.0	0.0		0.0	0.0	0.0
Total Delay	53.6	62.8		34.5	30.8	0.0
LOS	D	E		C	C	A
Approach Delay	56.5			34.5	27.0	
Approach LOS	E			C	C	
Queue Length 50th (m)	155.8	137.5		251.6	~288.4	0.0
Queue Length 95th (m)	#199.1	#209.2		m202.7	m151.6	m0.0
Internal Link Dist (m)	175.2			27.4	300.8	
Turn Bay Length (m)						
Base Capacity (vph)	1218	561		2509	2509	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	0.91	0.90		0.97	1.02	0.25
<b>Intersection Summary</b>						
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:	90					
Control Type:	Actuated-Coordinated					
Maximum v/c Ratio:	1.02					
Intersection Signal Delay:	36.5			Intersection LOS: D		
Intersection Capacity Utilization	89.4%			ICU Level of Service E		
Analysis Period (min)	15					

Lanes, Volumes, Timings  
3: Trafalgar Rd & QEW EB-Off Ramp

Future Total 2032  
PM Peak Hour

- 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

Future Total 2032  
PM Peak Hour

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	1020	466	0	2229	2349	334
Future Volume (vph)	1020	466	0	2229	2349	334
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)	1109	507	0	2423	2553	363
RTOR Reduction (vph)	0	1	0	0	0	0
Lane Group Flow (vph)	1109	506	0	2423	2553	363
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)	52.2	52.2		73.8	73.8	140.0
Effective Green, g (s)	55.2	55.2		76.8	76.8	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)	1200	552		2510	2510	1454
v/s Ratio Prot				0.53	0.56	
v/s Ratio Perm	c0.36	0.36				0.25
v/c Ratio	0.92	0.92		0.97	1.02	0.25
Uniform Delay, d1	40.4	40.2		30.3	31.6	0.0
Progression Factor	1.00	1.00		0.93	0.60	1.00
Incremental Delay, d2	11.8	20.1		5.8	10.5	0.0
Delay (s)	52.2	60.3		34.1	29.4	0.0
Level of Service	D	E		C	C	A
Approach Delay (s)	54.8			34.1	25.7	
Approach LOS	D			C	C	

Intersection Summary			
HCM 2000 Control Delay		35.4	HCM 2000 Level of Service D
HCM 2000 Volume to Capacity ratio		1.00	
Actuated Cycle Length (s)		140.0	Sum of lost time (s) 11.0
Intersection Capacity Utilization		89.4%	ICU Level of Service E
Analysis Period (min)		15	
c Critical Lane Group			

Lanes, Volumes, Timings  
4: Trafalgar Rd & Argus Rd

Future Total 2032  
PM Peak Hour

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	88	0	3149	1865	947
Future Volume (vph)	0	88	0	3149	1865	947
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	96	0	3423	2027	1029
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	96	0	3423	3056	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 77.1%	ICU Level of Service D
Analysis Period (min) 15	

HCM Unsignalized Intersection Capacity Analysis  
4: Trafalgar Rd & Argus Rd

Future Total 2032  
PM Peak Hour

Movement	EBL	EBR	NBL	NBT	SBT	SBR	
Lane Configurations		↗		↖↖	↗↗		
Traffic Volume (veh/h)	0	88	0	3149	1865	947	
Future Volume (Veh/h)	0	88	0	3149	1865	947	
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	96	0	3423	2027	1029	
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	0.63	0.46	0.46				
vC, conflicting volume	3706	1214	3080				
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol	0	0	1399				
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	80	100				
cM capacity (veh/h)	635	478	222				
Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	96	1141	1141	1141	811	811	1434
Volume Left	0	0	0	0	0	0	0
Volume Right	96	0	0	0	0	0	1029
sSH	478	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.20	0.67	0.67	0.67	0.48	0.48	0.84
Queue Length 95th (m)	5.9	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			0.2				
Intersection Capacity Utilization			77.1%		ICU Level of Service		D
Analysis Period (min)			15				

Lanes, Volumes, Timings  
5: Trafalgar Rd & Cross Ave/South Service Rd

Future Total 2032  
PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖↖	↗	↘	↖	↗	↘	↖↖	↗↗	↘↘	↖↖	↗↗	↘↘
Traffic Volume (vph)	975	48	137	78	86	195	178	1584	38	87	1454	269
Future Volume (vph)	975	48	137	78	86	195	178	1584	38	87	1454	269
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		0.889				0.850		0.997			0.977	
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2958	1350	0	1540	1644	1423	1496	4579	0	1570	4465	0
Fit Permitted	0.950			0.632			0.075			0.081		
Satd. Flow (perm)	2958	1350	0	997	1644	1423	118	4579	0	134	4465	0
Right Turn on Red			Yes			Yes		Yes		Yes		Yes
Satd. Flow (RTOR)		132				148		3			30	
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)	1060	52	149	85	93	212	193	1722	41	95	1580	292
Shared Lane Traffic (%)												
Lane Group Flow (vph)	1060	201	0	85	93	212	193	1763	0	95	1872	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

Future Total 2032

PM Peak Hour

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	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	59.9		15.9	18.9	18.9	72.1	60.2		60.3	52.4	
Actuated g/C Ratio	0.26	0.43		0.11	0.14	0.14	0.52	0.43		0.43	0.37	
v/c Ratio	1.36	0.31		0.75	0.42	0.66	0.90	0.89		0.69	1.11	
Control Delay	208.7	10.1		96.0	60.8	28.8	61.2	52.4		42.0	98.2	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	208.7	10.1		96.0	60.8	28.8	61.2	52.4		42.0	98.2	
LOS	F	B		F	E	C	E	D		D	F	
Approach Delay		177.0			51.1			53.3			95.5	
Approach LOS		F			D			D			F	
Queue Length 50th (m)	~208.5	11.6		24.0	24.7	16.8	50.5	158.4		19.0	~231.7	
Queue Length 95th (m)	#251.9	29.3		#49.5	43.3	45.9	m51.1	m143.1		m19.8	m#232.4	
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)	781	671		128	246	339	220	1971		139	1691	
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	1.36	0.30		0.66	0.38	0.63	0.88	0.89		0.68	1.11	

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:	1.36

Lanes, Volumes, Timings

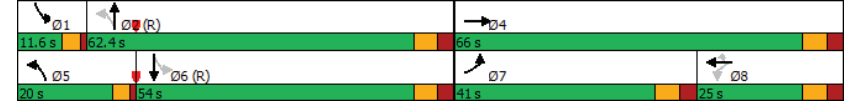
5: Trafalgar Rd & Cross Ave/South Service Rd

Future Total 2032

PM Peak Hour

Intersection Signal Delay: 96.0	Intersection LOS: F
Intersection Capacity Utilization 101.7%	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: 5: Trafalgar Rd & Cross Ave/South Service Rd



HCM Signalized Intersection Capacity Analysis  
5: Trafalgar Rd & Cross Ave/South Service Rd

Future Total 2032  
PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	↔	↔		↔	↔	↔	↔	↔		↔	↔	↔	
Traffic Volume (vph)	975	48	137	78	86	195	178	1584	38	87	1454	269	
Future Volume (vph)	975	48	137	78	86	195	178	1584	38	87	1454	269	
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	0.97		1.00	1.00	1.00	1.00	0.99		1.00	0.99		
Ft	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	1350		1499	1644	1423	1496	4576		1570	4463		
Flt Permitted	0.95	1.00		0.63	1.00	1.00	0.07	1.00		0.08	1.00		
Satd. Flow (perm)	2958	1350		996	1644	1423	118	4576		134	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)	1060	52	149	85	93	212	193	1722	41	95	1580	292	
RTOR Reduction (vph)	0	76	0	0	0	128	0	2	0	0	19	0	
Lane Group Flow (vph)	1060	125	0	85	93	84	193	1761	0	95	1853	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	56.9		15.9	15.9	15.9	69.1	57.3		57.3	49.5		
Effective Green, g (s)	37.0	59.9		15.9	18.9	18.9	69.1	60.3		57.3	52.5		
Actuated g/C Ratio	0.26	0.43		0.11	0.13	0.13	0.49	0.43		0.41	0.38		
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	577		113	221	192	211	1970		134	1673		
v/s Ratio Prot	c0.36	0.09		0.06			c0.10	0.38		0.04	c0.42		
v/s Ratio Perm				c0.09			0.06	0.35		0.25			
v/c Ratio	1.36	0.22		0.75	0.42	0.44	0.91	0.89		0.71	1.11		
Uniform Delay, d1	51.5	25.3		60.1	55.5	55.7	42.7	36.9		31.1	43.8		
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.26	1.35		1.31	1.20		
Incremental Delay, d2	169.1	0.3		25.6	1.8	2.2	16.3	2.2		5.4	51.8		
Delay (s)	220.6	25.5		85.7	57.3	57.8	70.4	51.8		46.0	104.2		
Level of Service	F	C		F	E	E	E	D		D	F		
Approach Delay (s)	189.5			63.8			53.7			101.4			
Approach LOS	F			E			D			F			
<b>Intersection Summary</b>													
HCM 2000 Control Delay		102.0		HCM 2000 Level of Service				F					
HCM 2000 Volume to Capacity ratio		1.09											
Actuated Cycle Length (s)		140.0		Sum of lost time (s)				16.0					
Intersection Capacity Utilization		101.7%		ICU Level of Service				G					
Analysis Period (min)		15											
c Critical Lane Group													

Lanes, Volumes, Timings  
6: Trafalgar Rd & Cornwall Rd

Future Total 2032  
PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔		↔	↔	↔	↔	↔		↔	↔	↔
Traffic Volume (vph)	513	530	53	99	817	460	73	809	89	598	676	381
Future Volume (vph)	513	530	53	99	817	460	73	809	89	598	676	381
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		0.850	0.985		0.99	0.99		0.850
Frt		0.986										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)	2990	3101	0	1549	3217	1413	1527	2688	0	2970	1368	1361
Right Turn on Red			Yes			Yes		Yes		Yes		Yes
Satd. Flow (RTOR)		8				303		7				290
Link Speed (k/h)		50			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)	558	576	58	108	888	500	79	879	97	650	735	414
<b>Shared Lane Traffic (%)</b>												
Lane Group Flow (vph)	558	634	0	108	888	500	79	976	0	650	735	414
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
<b>Two way Left Turn Lane</b>												
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
<b>Detector 1 Channel</b>												
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
<b>Detector 2 Channel</b>												

Lanes, Volumes, Timings  
6: Trafalgar Rd & Cornwall Rd

Future Total 2032  
PM Peak Hour

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	1.36	0.71		0.74	1.14	0.35	0.90	1.08		1.27	1.20	0.54
Control Delay	223.2	49.5		91.0	124.2	0.7	135.3	96.1		185.5	115.4	4.0
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	223.2	49.5		91.0	124.2	0.7	135.3	96.1		185.5	115.4	4.0
LOS	F	D		F	F	A	F	F		F	F	A
Approach Delay		130.8			80.5			99.1			115.1	
Approach LOS		F			F			F			F	
Queue Length 50th (m)	~110.1	86.4		31.2	~158.3	0.0	23.3	~196.9		~126.3	~312.8	18.1
Queue Length 95th (m)	#148.1	109.5		#62.4	#201.2	0.0	#56.8	#249.4		m#113.8m#279.2	m15.4	
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	907		512	615	771
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	0.71		0.74	1.14	0.35	0.90	1.08		1.27	1.20	0.54

Intersection Summary

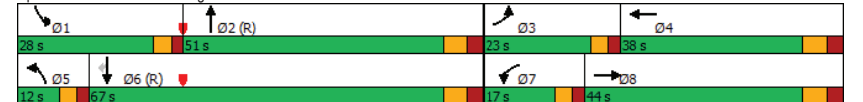
Area Type:	CBD
Cycle Length:	140
Actuated Cycle Length:	140
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green, Master Intersection	
Natural Cycle:	150
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	1.36

Lanes, Volumes, Timings  
6: Trafalgar Rd & Cornwall Rd

Future Total 2032  
PM Peak Hour

Intersection Signal Delay: 106.1	Intersection LOS: F
Intersection Capacity Utilization 101.7%	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

Future Total 2032  
PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	513	530	53	99	817	460	73	809	89	598	676	381
Future Volume (vph)	513	530	53	99	817	460	73	809	89	598	676	381
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)	558	576	58	108	888	500	79	879	97	650	735	414
RTOR Reduction (vph)	0	6	0	0	0	0	0	5	0	0	0	160
Lane Group Flow (vph)	558	628	0	108	888	500	79	971	0	650	735	255
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	902		512	615	612
v/s Ratio Prot	c0.18	0.20		0.07	c0.28		0.05	0.36		c0.22	c0.54	
v/s Ratio Perm						0.35						0.19
v/c Ratio	1.36	0.71		0.74	1.14	0.35	0.90	1.08		1.27	1.20	0.42
Uniform Delay, d1	60.5	44.8		61.9	53.0	0.0	65.6	46.5		58.0	38.5	26.0
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.47	0.65	0.49
Incremental Delay, d2	179.0	4.8		28.9	77.0	0.7	61.6	52.9		122.8	89.4	0.2
Delay (s)	239.5	49.6		90.8	130.0	0.7	127.2	99.4		208.2	114.5	12.9
Level of Service	F	D		F	F	A	F	F		F	F	B
Approach Delay (s)	138.5			83.9			101.5			125.0		
Approach LOS	F			F			F			F		
<b>Intersection Summary</b>												
HCM 2000 Control Delay	112.3			HCM 2000 Level of Service			F					
HCM 2000 Volume to Capacity ratio	1.24											
Actuated Cycle Length (s)	140.0			Sum of lost time (s)			16.0					
Intersection Capacity Utilization	101.7%			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

Future Total 2032  
PM Peak Hour

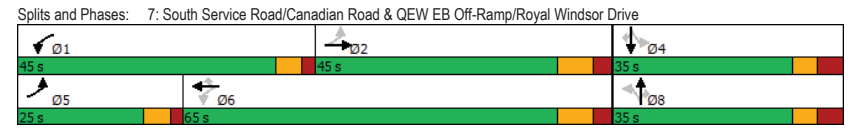
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	338	589	19	198	704	30	15	51	108	15	129	460
Future Volume (vph)	338	589	19	198	704	30	15	51	108	15	129	460
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	150.0	0.0	155.0		70.0	15.0		0.0	0.0		0.0	30.0
Storage Lanes	2	0	1		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	0.297			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
<b>Shared Lane Traffic (%)</b>												
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		7.2		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	
<b>Two way Left Turn Lane</b>												
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	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
<b>Detector 1 Channel</b>												
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		0.6		0.6		0.6	
Detector 2 Size(m)	0.6		0.6		0.6		0.6		0.6		0.6	
Detector 2 Type	CI+Ex		CI+Ex		CI+Ex		CI+Ex		CI+Ex		CI+Ex	
<b>Detector 2 Channel</b>												
Detector 2 Extend (s)	0.0		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	

Lanes, Volumes, Timings  
 7: South Service Road/Canadian Road & QEW EB Off-Ramp/Royal Windsor Drive Future Total 2032  
PM Peak Hour

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 Capacity Utilization:	70.1%
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 Future Total 2032  
PM Peak Hour





HCM Signalized Intersection Capacity Analysis  
 7: South Service Road/Canadian Road & QEW EB Off-Ramp/Royal Windsor Drive PM Peak Hour

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
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)	3502	3396		1752	3505	1615	1805	1900	1615	1805	1900	1599
Fit 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 Future Total 2032 PM Peak Hour

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
Fit Protected					0.950	
Satd. Flow (prot)	3574	0	0	3574	1805	1599
Fit 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

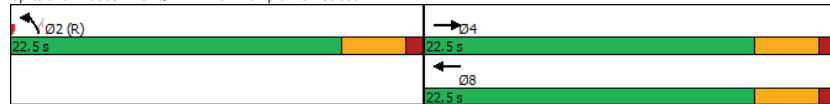
Lanes, Volumes, Timings  
8: QEW WB Off-Ramp & Kerr Street

Future Total 2032  
PM Peak Hour

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

Future Total 2032  
PM Peak Hour

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 <sub>t</sub>	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

Future Total 2032  
PM Peak Hour

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔↔	↔	↕↕	0	0	↕↕
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

Future Total 2032  
PM Peak Hour

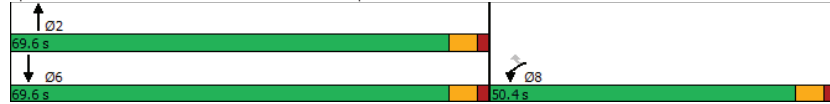
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Permitted Phases		8				
Detector Phase	8	8	2			6
Switch Phase						
Minimum Initial (s)	10.0	10.0	20.0			20.0
Minimum Split (s)	24.0	24.0	26.0			26.0
Total Split (s)	50.4	50.4	69.6			69.6
Total Split (%)	42.0%	42.0%	58.0%			58.0%
Maximum Green (s)	44.4	44.4	63.6			63.6
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

Future Total 2032  
PM Peak Hour

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

Future Total 2032  
PM Peak Hour

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				
w/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
<b>Intersection Summary</b>						
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

Future Total 2032  
PM Peak Hour

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
Frt	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

Future Total 2032  
PM Peak Hour

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

Future Total 2032  
PM Peak Hour

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

Future Total 2032  
PM Peak Hour

Movement	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
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	
<b>Intersection Summary</b>						
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

Future Total 2032  
PM Peak Hour

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Volume (vph)	41	16	631	417	44	177
Future Volume (vph)	41	16	631	417	44	177
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			0.946		0.892	
Flt Protected		0.965			0.990	
Satd. Flow (prot)	0	1593	1526	0	1510	0
Flt Permitted		0.965			0.990	
Satd. Flow (perm)	0	1593	1526	0	1510	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)	45	17	686	453	48	192
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	62	1139	0	240	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	86.7%		ICU Level of Service E			
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis  
11: Argus Rd & South Service Rd

Future Total 2032  
PM Peak Hour


Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Volume (veh/h)	41	16	631	417	44	177
Future Volume (Veh/h)	41	16	631	417	44	177
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)	45	17	686	453	48	192
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					1024	912
vC, conflicting volume	1139					
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1139				1024	912
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				80	43
cM capacity (veh/h)	621				243	334

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	62	1139	240
Volume Left	45	0	48
Volume Right	0	453	192
eSH	621	1700	311
Volume to Capacity	0.07	0.67	0.77
Queue Length 95th (m)	1.9	0.0	48.3
Control Delay (s)	8.4	0.0	46.8
Lane LOS	A		E
Approach Delay (s)	8.4	0.0	46.8
Approach LOS			E

Intersection Summary			
Average Delay		8.2	
Intersection Capacity Utilization	86.7%	ICU Level of Service	E
Analysis Period (min)	15		

Lanes, Volumes, Timings  
12: Lyons Lane & South Service Road

Future Total 2032  
PM Peak Hour




Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Volume (vph)	4	6	1	64	57	6
Future Volume (vph)	4	6	1	64	57	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			0.867		0.986	
Flt Protected		0.982			0.957	
Satd. Flow (prot)	0	1679	1218	0	1614	0
Flt Permitted		0.982			0.957	
Satd. Flow (perm)	0	1679	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	7	1	70	62	7
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	11	71	0	69	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	17.5%
Analysis Period (min)	15
	ICU Level of Service A

HCM Unsignalized Intersection Capacity Analysis  
12: Lyons Lane & South Service Road

Future Total 2032  
PM Peak Hour



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Volume (veh/h)	4	6	1	64	57	6
Future Volume (Veh/h)	4	6	1	64	57	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	70	62	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	78				58	43
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	78				58	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				946	1027

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	11	71	69
Volume Left	4	0	62
Volume Right	0	70	7
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)	2.7	0.0	9.1
Lane LOS	A		A
Approach Delay (s)	2.7	0.0	9.1
Approach LOS			A

Intersection Summary	
Average Delay	4.3
Intersection Capacity Utilization	17.5%
Analysis Period (min)	15
	ICU Level of Service A



Lanes, Volumes, Timings  
13: GO Bus Terminal/Argus Rd & Cross Ave

Future Total 2032  
PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	49	1157	19	44	505	76	18	3	55	380	23	347
Future Volume (vph)	49	1157	19	44	505	76	18	3	55	380	23	347
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	1.00	0.99	0.97	1.00	1.00	0.98	1.00
Ped Bike Factor	0.99	1.00		1.00	0.98	0.857		0.859				
Frt	0.998		0.980		0.950		0.950		0.950		0.859	
Fit Protected	0.950		0.950		0.950		0.950		0.950		0.859	
Satd. Flow (prot)	1570	3189	0	797	3168	0	785	708	0	1570	1349	0
Fit Permitted	0.412		0.092		0.257		0.716		0.716		0.859	
Satd. Flow (perm)	676	3189	0	77	3168	0	211	708	0	1158	1349	0
Right Turn on Red		Yes		Yes		Yes			Yes			Yes
Satd. Flow (RTOR)		2		34		60		328				
Link Speed (k/h)	50		50		50		50		50		50	
Link Distance (m)	164.3		72.9		81.9		115.7		115.7		8.3	
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		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)	53	1258	21	48	549	83	20	3	60	413	25	377
Shared Lane Traffic (%)												
Lane Group Flow (vph)	53	1279	0	48	632	0	20	63	0	413	402	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  
13: GO Bus Terminal/Argus Rd & Cross Ave

Future Total 2032  
PM Peak Hour

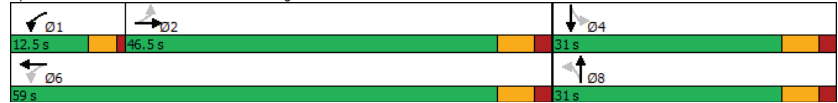
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6		8		8		4	
Permitted Phases		2		6		8		8		4		
Detector Phases		2	2	1	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	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)	41.6	41.6		53.8	53.8		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	0.86		0.42	0.33		0.31	0.25		1.17	0.63	
Control Delay	15.3	28.0		22.5	8.6		40.1	9.8		135.6	10.8	
Queue Delay	0.0	1.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	15.3	29.0		22.5	8.6		40.1	9.8		135.6	10.8	
LOS	B	C		C	A		D	A		F	B	
Approach Delay		28.4			9.6			17.1			74.0	
Approach LOS		C			A			B			E	
Queue Length 50th (m)	5.2	102.4		3.3	25.0		2.8	0.4		-90.6	9.8	
Queue Length 95th (m)	12.9	134.8		11.8	34.8		10.6	10.1		#148.5	40.2	
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)	323	1527		115	1975		64	257		352	638	
Starvation Cap Reductn	0	83		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	0.89		0.42	0.32		0.31	0.25		1.17	0.63	
<b>Intersection Summary</b>												
Area Type: CBD												
Cycle Length: 90												
Actuated Cycle Length: 88.8												
Natural Cycle: 90												
Control Type: Semi Act-Uncoord												
Maximum v/c Ratio: 1.17												
Intersection Signal Delay: 36.5												
Intersection LOS: D												

Lanes, Volumes, Timings  
13: GO Bus Terminal/Argus Rd & Cross Ave

Future Total 2032  
PM Peak Hour

Intersection Capacity Utilization 82.0%	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: 13: GO Bus Terminal/Argus Rd & Cross Ave



HCM Signalized Intersection Capacity Analysis  
13: GO Bus Terminal/Argus Rd & Cross Ave

Future Total 2032  
PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	49	1157	19	44	505	76	18	3	55	380	23	347
Future Volume (vph)	49	1157	19	44	505	76	18	3	55	380	23	347
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	0.86	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1559	3187		797	3170		781	709		1537	1350	
Flt Permitted	0.41	1.00		0.09	1.00		0.26	1.00		0.72	1.00	
Satd. Flow (perm)	676	3187		77	3170		212	709		1158	1350	
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)	53	1258	21	48	549	83	20	3	60	413	25	377
RTOR Reduction (vph)	0	1	0	0	13	0	0	42	0	0	228	0
Lane Group Flow (vph)	53	1278	0	48	619	0	20	21	0	413	174	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)	39.6	39.6		51.8	51.8		25.0	25.0		25.0	25.0	
Effective Green, g (s)	41.6	41.6		51.8	53.8		27.0	27.0		27.0	27.0	
Actuated g/C Ratio	0.47	0.47		0.58	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)	316	1493		111	1920		64	215		352	410	
v/s Ratio Prot		c0.40		c0.04	0.20			0.03			0.13	
v/s Ratio Perm	0.08			0.21			0.09			c0.36		
v/c Ratio	0.17	0.86		0.43	0.32		0.31	0.10		1.17	0.42	
Uniform Delay, d1	13.6	20.9		13.9	8.6		23.8	22.2		30.9	24.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.5	5.5		2.0	0.2		3.8	0.3		104.0	1.0	
Delay (s)	14.1	26.5		15.9	8.8		27.6	22.4		134.9	25.6	
Level of Service	B	C		B	A		C	C		F	C	
Approach Delay (s)		26.0			9.3			23.7			81.0	
Approach LOS		C			A			C			F	
<b>Intersection Summary</b>												
HCM 2000 Control Delay				37.4			HCM 2000 Level of Service				D	
HCM 2000 Volume to Capacity ratio				0.92								
Actuated Cycle Length (s)				88.8			Sum of lost time (s)				12.0	
Intersection Capacity Utilization				82.0%			ICU Level of Service				D	
Analysis Period (min)				15								
c Critical Lane Group												

Lanes, Volumes, Timings  
14: Lyons Lane/Street A & Cross Ave

Future Total 2032  
PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	45	257	15	17	467	14	279	5	188	18	3	75
Future Volume (vph)	45	257	15	17	467	14	279	5	188	18	3	75
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		0.992			0.996			0.854			0.855	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1525	2916	0	1570	3084	0	1570	1436	0	1570	1416	0
Flt Permitted	0.458			0.506			0.702			0.548		
Satd. Flow (perm)	733	2916	0	835	3084	0	1159	1436	0	903	1416	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		8			5			204			82	
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)	49	279	16	18	508	15	303	5	204	20	3	82
Shared Lane Traffic (%)												
Lane Group Flow (vph)	49	295	0	18	523	0	303	209	0	20	85	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

Future Total 2032  
PM Peak Hour

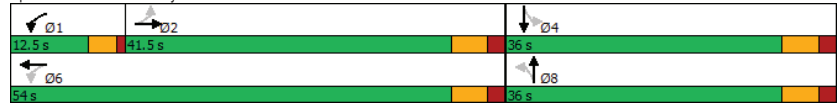
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6		8		8		4	
Permitted Phases		2		6			8		8		4	
Detector Phases		2		1	6		8		8		4	
Switch Phase												
Minimum Initial (s)	35.0	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	
Pedestrian Calls (#/hr)	0	0			0		0	0		0	0	
Act Effct Green (s)	37.1	37.1		49.2	49.2		27.8	27.8		27.8	27.8	
Actuated g/C Ratio	0.44	0.44		0.58	0.58		0.33	0.33		0.33	0.33	
v/c Ratio	0.15	0.23		0.03	0.29		0.80	0.34		0.07	0.16	
Control Delay	17.7	16.0		9.2	10.2		43.1	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	17.7	16.0		9.2	10.2		43.1	5.0		19.7	5.9	
LOS	B	B		A	B		D	A		B	A	
Approach Delay		16.2			10.2			27.5			8.6	
Approach LOS		B			B			C			A	
Queue Length 50th (m)	5.3	16.7		1.4	24.1		46.5	0.6		2.3	0.4	
Queue Length 95th (m)	13.2	26.4		4.4	34.7		#86.4	14.9		7.3	9.7	
Internal Link Dist (m)		16.1			185.8			45.1			46.9	
Turn Bay Length (m)				25.0			20.0					
Base Capacity (vph)	324	1295		556	1822		437	669		341	586	
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		0.69	0.31		0.06	0.15	
<b>Intersection Summary</b>												
Area Type: CBD												
Cycle Length: 90												
Actuated Cycle Length: 85												
Natural Cycle: 85												
Control Type: Semi Act-Uncoord												
Maximum v/c Ratio: 0.80												
Intersection Signal Delay: 17.4												
Intersection LOS: B												

Lanes, Volumes, Timings  
14: Lyons Lane/Street A & Cross Ave

Future Total 2032  
PM Peak Hour

Intersection Capacity Utilization 72.1% 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: 14: Lyons Lane/Street A & Cross Ave




HCM Signalized Intersection Capacity Analysis  
14: Lyons Lane/Street A & Cross Ave

Future Total 2032  
PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	45	257	15	17	467	14	279	5	188	18	3	75
Future Volume (vph)	45	257	15	17	467	14	279	5	188	18	3	75
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		0.55	1.00	
Satd. Flow (perm)	733	2915		835	3083		1159	1436		903	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)	49	279	16	18	508	15	303	5	204	20	3	82
RTOR Reduction (vph)	0	4	0	0	2	0	0	137	0	0	55	0
Lane Group Flow (vph)	49	291	0	18	521	0	303	72	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		25.8	25.8		25.8	25.8	
Effective Green, g (s)	37.2	37.2		47.2	49.2		27.8	27.8		27.8	27.8	
Actuated g/C Ratio	0.44	0.44		0.56	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	1275		532	1784		379	469		295	463	
v/s Ratio Prot		0.10		0.00	c0.17			0.05			0.02	
v/s Ratio Perm	0.07			0.02			c0.26			0.02		
v/c Ratio	0.15	0.23		0.03	0.29		0.80	0.15		0.07	0.06	
Uniform Delay, d1	14.4	14.9		8.6	9.1		26.1	20.3		19.7	19.7	
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		11.8	0.2		0.1	0.1	
Delay (s)	14.9	15.1		8.6	9.3		37.9	20.5		19.8	19.7	
Level of Service	B	B		A	A		D	C		B	B	
Approach Delay (s)		15.1			9.2			30.8			19.8	
Approach LOS		B			A			C			B	
<b>Intersection Summary</b>												
HCM 2000 Control Delay				18.7			HCM 2000 Level of Service				B	
HCM 2000 Volume to Capacity ratio				0.50								
Actuated Cycle Length (s)				85.0			Sum of lost time (s)				12.0	
Intersection Capacity Utilization				72.1%			ICU Level of Service				C	
Analysis Period (min)				15								
c Critical Lane Group												

Lanes, Volumes, Timings  
15: Cross Ave & Lyons Lane

Future Total 2032  
PM Peak Hour




Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↕↕	↕↕		↕↕	
Traffic Volume (vph)	58	275	745	72	37	67
Future Volume (vph)	58	275	745	72	37	67
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		0.913	
Flt Protected	0.950				0.983	
Satd. Flow (prot)	1388	2954	3121	0	1496	0
Flt Permitted	0.950				0.983	
Satd. Flow (perm)	1388	2954	3121	0	1496	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)	63	299	810	78	40	73
Shared Lane Traffic (%)						
Lane Group Flow (vph)	63	299	888	0	113	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	45.9%
Analysis Period (min)	15
	ICU Level of Service A

HCM Unsignalized Intersection Capacity Analysis  
15: Cross Ave & Lyons Lane

Future Total 2032  
PM Peak Hour



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↕↕	↕↕		↕↕	
Traffic Volume (veh/h)	58	275	745	72	37	67
Future Volume (Veh/h)	58	275	745	72	37	67
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)	63	299	810	78	40	73
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	889				1134	445
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	712				978	230
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	90
cM capacity (veh/h)	729				210	706
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	63	150	150	540	348	113
Volume Left	63	0	0	0	0	40
Volume Right	0	0	0	0	78	73
eSH	729	1700	1700	1700	1700	385
Volume to Capacity	0.09	0.09	0.09	0.32	0.20	0.29
Queue Length 95th (m)	2.3	0.0	0.0	0.0	0.0	9.6
Control Delay (s)	10.4	0.0	0.0	0.0	0.0	18.2
Lane LOS	B					C
Approach Delay (s)	1.8			0.0		18.2
Approach LOS						C

Intersection Summary	
Average Delay	2.0
Intersection Capacity Utilization	45.9%
Analysis Period (min)	15
	ICU Level of Service A

Lanes, Volumes, Timings

16: Speers Road/Cornwall Road & Cross Avenue

Future Total 2032

PM Peak Hour

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	350	828	910	57	29	521
Future Volume (vph)	350	828	910	57	29	521
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			0.991			0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1770	3539	3507	0	1770	2787
Flt Permitted	0.150				0.950	
Satd. Flow (perm)	279	3539	3507	0	1770	2787
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)			8			566
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	900	989	62	32	566
Shared Lane Traffic (%)						
Lane Group Flow (vph)	380	900	1051	0	32	566
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

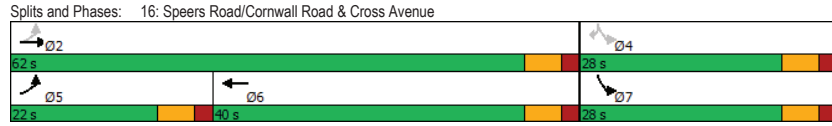
Future Total 2032

PM Peak Hour

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	34.5		7.6	7.6
Actuated g/C Ratio	0.74	0.74	0.46		0.10	0.10
v/c Ratio	0.74	0.34	0.66		0.18	0.72
Control Delay	21.8	4.1	18.8		33.0	8.8
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	21.8	4.1	18.8		33.0	8.8
LOS	C	A	B		C	A
Approach Delay		9.3	18.8		10.1	
Approach LOS		A	B		B	
Queue Length 50th (m)	25.2	17.9	60.4		4.5	0.0
Queue Length 95th (m)	#73.8	34.4	92.5		12.3	15.0
Internal Link Dist (m)		165.7	250.5		160.2	
Turn Bay Length (m)	75.0				55.0	
Base Capacity (vph)	522	2620	1604		514	1212
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	0.34	0.66		0.06	0.47
<b>Intersection Summary</b>						
Area Type:	Other					
Cycle Length:	90					
Actuated Cycle Length:	75.7					
Natural Cycle:	80					
Control Type:	Semi Act-Uncoord					
Maximum v/c Ratio:	0.74					
Intersection Signal Delay:	12.9			Intersection LOS: B		
Intersection Capacity Utilization	65.5%			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

Future Total 2032  
PM Peak Hour



HCM Signalized Intersection Capacity Analysis  
16: Speers Road/Cornwall Road & Cross Avenue



Future Total 2032  
PM Peak Hour

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↔↔	↔↔	↔	↔	↔↔
Traffic Volume (vph)	350	828	910	57	29	521
Future Volume (vph)	350	828	910	57	29	521
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	3508		1770	2787
Fit Permitted	0.15	1.00	1.00		0.95	1.00
Satd. Flow (perm)	280	3539	3508		1770	2787
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	380	900	989	62	32	566
RTOR Reduction (vph)	0	0	4	0	0	509
Lane Group Flow (vph)	380	900	1047	0	32	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	34.6		7.6	7.6
Effective Green, g (s)	56.1	56.1	34.6		7.6	7.6
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)	512	2622	1603		177	279
v/s Ratio Prot	c0.15	0.25	0.30		0.02	
v/s Ratio Perm	c0.40					c0.02
v/c Ratio	0.74	0.34	0.65		0.18	0.20
Uniform Delay, d1	13.5	3.4	15.9		31.2	31.3
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	5.7	0.4	2.1		0.5	0.4
Delay (s)	19.2	3.8	18.0		31.7	31.6
Level of Service	B	A	B		C	C
Approach Delay (s)		8.3	18.0		31.6	
Approach LOS		A	B		C	
<b>Intersection Summary</b>						
HCM 2000 Control Delay		16.6			HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio		0.71				
Actuated Cycle Length (s)		75.7			Sum of lost time (s)	18.0
Intersection Capacity Utilization		65.5%			ICU Level of Service	C
Analysis Period (min)		15				

c Critical Lane Group

Lanes, Volumes, Timings  
17: Driveway A & Street 1

Future Total 2032  
PM Peak Hour



						
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	0	0	110	0	0	69
Future Volume (vph)	0	0	110	0	0	69
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 <sub>t</sub>	0.865					
Fit Protected	0.950					
Satd. Flow (prot)	1863	0	0	1770	1611	0
Fit Permitted	0.950					
Satd. Flow (perm)	1863	0	0	1770	1611	0
Link Speed (k/h)	50		50		50	
Link Distance (m)	17.5		85.5		41.7	
Travel Time (s)	1.3		6.2		3.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	120	0	0	75
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	120	75	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	17.0%
Analysis Period (min)	15
	ICU Level of Service A

HCM Unsignalized Intersection Capacity Analysis  
17: Driveway A & Street 1

Future Total 2032  
PM Peak Hour

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	110	0	0	69
Future Volume (Veh/h)	0	0	110	0	0	69
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)	0	0	120	0	0	75
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				0		240
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0			240		0
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			100		93
cM capacity (veh/h)	1623			693		1085

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	0	120	75
Volume Left	0	120	0
Volume Right	0	0	75
eSH	1700	1623	1085
Volume to Capacity	0.00	0.07	0.07
Queue Length 95th (m)	0.0	1.9	1.8
Control Delay (s)	0.0	7.4	8.6
Lane LOS	A A A		
Approach Delay (s)	0.0	7.4	8.6
Approach LOS	A		

Intersection Summary

Average Delay	7.8		
Intersection Capacity Utilization	17.0%	ICU Level of Service	A
Analysis Period (min)	15		



Lanes, Volumes, Timings  
18: Street C & Driveway B

Future Total 2032  
PM Peak Hour

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	68	109	110	69	0
Future Volume (vph)	0	68	109	110	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
Fr <sub>t</sub>	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)	40.6			73.1	59.9	
Travel Time (s)	2.9			5.3	4.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	74	118	120	75	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	74	0	0	238	75	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	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
Sign Control	Stop			Free	Free	
<b>Intersection Summary</b>						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	29.4%		ICU Level of Service A			
Analysis Period (min)	15					

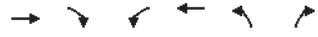

HCM Unsignalized Intersection Capacity Analysis  
18: Street C & Driveway B

Future Total 2032  
PM Peak Hour

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	68	109	110	69	0
Future Volume (Veh/h)	0	68	109	110	69	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	74	118	120	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)				73		
pX, platoon unblocked						
vC, conflicting volume	431	75	75			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	431	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	92	92			
cM capacity (veh/h)	536	986	1524			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	74	238	75			
Volume Left	0	118	0			
Volume Right	74	0	0			
eSH	986	1524	1700			
Volume to Capacity	0.08	0.08	0.04			
Queue Length 95th (m)	1.9	2.0	0.0			
Control Delay (s)	8.9	4.1	0.0			
Lane LOS	A	A				
Approach Delay (s)	8.9	4.1	0.0			
Approach LOS	A					
<b>Intersection Summary</b>						
Average Delay			4.2			
Intersection Capacity Utilization	29.4%		ICU Level of Service	A		
Analysis Period (min)	15					

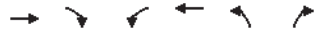

Lanes, Volumes, Timings  
19: Street C & South Service Road

Future Total 2032  
PM Peak Hour

						
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	130	0	0	224	0	0
Future Volume (vph)	130	0	0	224	0	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
<b>Fit</b>						
<b>Fit Protected</b>						
Satd. Flow (prot)	1863	0	0	1863	1863	0
<b>Fit Permitted</b>						
Satd. Flow (perm)	1863	0	0	1863	1863	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	264.4			306.3	164.3	
Travel Time (s)	19.0			22.1	11.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	141	0	0	243	0	0
<b>Shared Lane Traffic (%)</b>						
Lane Group Flow (vph)	141	0	0	243	0	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	
<b>Two way Left Turn Lane</b>						
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	
<b>Intersection Summary</b>						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	15.1%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis  
19: Street C & South Service Road

Future Total 2032  
PM Peak Hour

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	130	0	0	224	0	0
Future Volume (Veh/h)	130	0	0	224	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	141	0	0	243	0	0
<b>Pedestrians</b>						
<b>Lane Width (m)</b>						
Walking Speed (m/s)						
<b>Percent Blockage</b>						
<b>Right turn flare (veh)</b>						
Median type	None			None		
Median storage (veh)						
Upstream signal (m)						
<b>pX, platoon unblocked</b>						
vC, conflicting volume			141		384	141
<b>vC1, stage 1 conf vol</b>						
vC2, stage 2 conf vol						
vCu, unblocked vol			141		384	141
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			1442		619	907
<b>Direction, Lane #</b>						
	EB 1	WB 1	NB 1			
Volume Total	141	243	0			
Volume Left	0	0	0			
Volume Right	0	0	0			
eSH	1700	1442	1700			
Volume to Capacity	0.08	0.00	0.00			
Queue Length 95th (m)	0.0	0.0	0.0			
Control Delay (s)	0.0	0.0	0.0			
Lane LOS				A		
Approach Delay (s)	0.0	0.0	0.0			
Approach LOS				A		
<b>Intersection Summary</b>						
Average Delay				0.0		
Intersection Capacity Utilization	15.1%		ICU Level of Service		A	
Analysis Period (min)	15					

Lanes, Volumes, Timings  
20: Street A & South Service Road

Future Total 2032  
PM Peak Hour

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔			↔	↔	
Traffic Volume (vph)	85	0	0	104	0	0
Future Volume (vph)	85	0	0	104	0	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
<b>Fr</b>						
Fit Protected						
Satd. Flow (prot)	1863	0	0	1863	1863	0
Fit Permitted						
Satd. Flow (perm)	1863	0	0	1863	1863	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	255.1			264.4	119.8	
Travel Time (s)	18.4			19.0	8.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	92	0	0	113	0	0
<b>Shared Lane Traffic (%)</b>						
Lane Group Flow (vph)	92	0	0	113	0	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	
<b>Two way Left Turn Lane</b>						
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	

<b>Intersection Summary</b>	
Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	8.8%
ICU Level of Service A	
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis  
20: Street A & South Service Road

Future Total 2032  
PM Peak Hour

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔			↔	↔	
Traffic Volume (veh/h)	85	0	0	104	0	0
Future Volume (Veh/h)	85	0	0	104	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	92	0	0	113	0	0
<b>Pedestrians</b>						
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		205	92
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			92		205	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 %			100		100	100
cM capacity (veh/h)			1503		783	965

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	92	113	0
Volume Left	0	0	0
Volume Right	0	0	0
eSH	1700	1503	1700
Volume to Capacity	0.05	0.00	0.00
Queue Length 95th (m)	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0
Lane LOS	A		
Approach Delay (s)	0.0	0.0	0.0
Approach LOS	A		

<b>Intersection Summary</b>			
Average Delay		0.0	
Intersection Capacity Utilization	8.8%	ICU Level of Service	A
Analysis Period (min)	15		

Lanes, Volumes, Timings  
21: Argus Rd & Street 1

Future Total 2032  
PM Peak Hour

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	0	128	751	0
Future Volume (vph)	0	0	0	128	751	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
<b>Fr</b>						
<b>Fit Protected</b>						
Satd. Flow (prot)	1863	0	0	1863	1863	0
<b>Fit Permitted</b>						
Satd. Flow (perm)	1863	0	0	1863	1863	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	139	816	0
<b>Shared Lane Traffic (%)</b>						
Lane Group Flow (vph)	0	0	0	139	816	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	
<b>Two way Left Turn Lane</b>						
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	
<b>Intersection Summary</b>						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	42.9%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis  
21: Argus Rd & Street 1

Future Total 2032  
PM Peak Hour

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	0	128	751	0
Future Volume (Veh/h)	0	0	0	128	751	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	0	0	139	816	0
<b>Pedestrians</b>						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)				116		
<b>pX, platoon unblocked</b>						
vC, conflicting volume	955	816	816			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	955	816	816			
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)	287	377	812			
<b>Direction, Lane #</b>						
Volume Total	0	139	816			
Volume Left	0	0	0			
Volume Right	0	0	0			
eSH	1700	812	1700			
Volume to Capacity	0.00	0.00	0.48			
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					
<b>Intersection Summary</b>						
Average Delay			0.0			
Intersection Capacity Utilization			42.9%		ICU Level of Service	A
Analysis Period (min)			15			

Lanes, Volumes, Timings  
22: Street C & Street 1

Future Total 2032  
PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	0	0	69	0	0	0	110	0	0	0	0	0
Future Volume (vph)	0	0	69	0	0	0	110	0	0	0	0	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	0.865											
Flt Protected	0.950											
Satd. Flow (prot)	0	1611	0	0	1863	0	0	1770	0	0	1863	0
Flt Permitted	0.950											
Satd. Flow (perm)	0	1611	0	0	1863	0	0	1770	0	0	1863	0
Link Speed (k/h)	50		50		50		50		50		50	
Link Distance (m)	85.5		165.4		59.9		164.3					
Travel Time (s)	6.2		11.9		4.3		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	0	75	0	0	0	120	0	0	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	75	0	0	0	0	120	0	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	Right	Left	Left	Right	Right
Median Width(m)	0.0		0.0		0.0		0.0		0.0		0.0	
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
Sign Control	Stop		Stop		Free		Free		Free		Free	

Intersection Summary	
Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	17.0%
Analysis Period (min)	15
	ICU Level of Service A

HCM Unsignalized Intersection Capacity Analysis  
22: Street C & Street 1

Future Total 2032  
PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (veh/h)	0	0	69	0	0	0	110	0	0	0	0	0
Future Volume (Veh/h)	0	0	69	0	0	0	110	0	0	0	0	0
Sign Control	Stop		Stop		Free		Free		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	0	75	0	0	0	120	0	0	0	0	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None						None					
Median storage (veh)												
Upstream signal (m)	133											
pX, platoon unblocked												
vC, conflicting volume	240	240	0	315	240	0	0	0	0	0	0	0
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	240	240	0	315	240	0	0	0	0	0	0	0
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1	4.1	4.1	4.1	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	2.2	2.2	2.2	2.2
p0 queue free %	100	100	93	100	100	100	93	100	100	100	100	100
cM capacity (veh/h)	674	612	1085	560	612	1085	1623	1623	1623	1623	1623	1623
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	75	0	120	0								
Volume Left	0	0	120	0								
Volume Right	75	0	0	0								
eSH	1085	1700	1623	1700								
Volume to Capacity	0.07	0.00	0.07	0.00								
Queue Length 95th (m)	1.8	0.0	1.9	0.0								
Control Delay (s)	8.6	0.0	7.4	0.0								
Lane LOS	A	A	A	A								
Approach Delay (s)	8.6	0.0	7.4	0.0								
Approach LOS	A	A	A	A								

Intersection Summary	
Average Delay	7.8
Intersection Capacity Utilization	17.0%
Analysis Period (min)	15
	ICU Level of Service A

Lanes, Volumes, Timings

23: GO Station West Access/Street C & Cross Ave

Future Total 2032

PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔		↔		↔		↔		↔		↔	
Traffic Volume (vph)	24	580	53	289	386	195	90	0	445	122	0	15
Future Volume (vph)	24	580	53	289	386	195	90	0	445	122	0	15
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	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	0.988		0.966		0.850		0.850		0.850		0.850	
Flt Protected	0.998		0.984		0.950		0.950		0.950		0.950	
Satd. Flow (prot)	0	3490	0	0	3364	0	1770	1583	0	1770	1583	0
Flt Permitted	0.892		0.612		0.747		0.351		0.351		0.351	
Satd. Flow (perm)	0	3119	0	0	2092	0	1391	1583	0	654	1583	0
Right Turn on Red	Yes			Yes			Yes			Yes		
Satd. Flow (RTOR)	22		89		118		253		253		253	
Link Speed (k/h)	50		50		50		50		50		50	
Link Distance (m)	209.8		164.3		55.1		73.1		73.1		73.1	
Travel Time (s)	15.1		11.8		4.0		5.3		5.3		5.3	
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)	26	630	58	314	420	212	98	0	484	133	0	16
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	714	0	0	946	0	98	484	0	133	16	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		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	
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												
Detector 2 Extend (s)	0.0		0.0		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		8		2		2		6	
Permitted Phases	4		8		2		6		6		6	

Lanes, Volumes, Timings

23: GO Station West Access/Street C & Cross Ave

Future Total 2032

PM Peak Hour

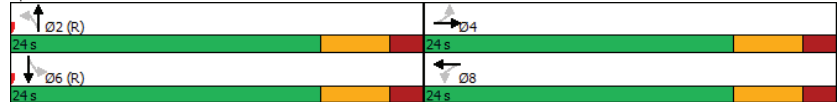
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4	8		8		2	2	6		6	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0
Total Split (s)	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	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%	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	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	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	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	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	C-Max	C-Max	C-Max	C-Max	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	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	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0	0	0	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	0.60		1.13		0.19		0.73		0.54		0.02	
Control Delay	14.3		90.4		11.3		18.0		22.7		0.1	
Queue Delay	0.0		0.0		0.0		0.0		0.0		0.0	
Total Delay	14.3		90.4		11.3		18.0		22.7		0.1	
LOS	B		F		B		B		C		A	
Approach Delay	14.3		90.4		16.9		20.3		20.3		20.3	
Approach LOS	B		F		B		C		C		C	
Queue Length 50th (m)	25.0		~51.5		5.6		25.9		8.9		0.0	
Queue Length 95th (m)	39.4		#83.8		13.6		#67.6		#28.3		0.0	
Internal Link Dist (m)	185.8		140.3		31.1		49.1		49.1		49.1	
Turn Bay Length (m)	1183		840		521		667		245		751	
Base Capacity (vph)	1183		840		521		667		245		751	
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	0.60		1.13		0.19		0.73		0.54		0.02	
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:	1.13											
Intersection Signal Delay:	45.4						Intersection LOS: D					
Intersection Capacity Utilization:	98.0%						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

Future Total 2032  
PM Peak Hour

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

Future Total 2032  
PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↔			↔↔		↔	↔		↔	↔	
Traffic Volume (vph)	24	580	53	289	386	195	90	0	445	122	0	15
Future Volume (vph)	24	580	53	289	386	195	90	0	445	122	0	15
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	0.85	
Fit Protected		1.00			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		3490			3364		1770	1583		1770	1583	
Fit Permitted		0.89			0.61		0.75	1.00		0.35	1.00	
Satd. Flow (perm)		3118			2095		1392	1583		654	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)	26	630	58	314	420	212	98	0	484	133	0	16
RTOR Reduction (vph)	0	14	0	0	56	0	0	74	0	0	10	0
Lane Group Flow (vph)	0	700	0	0	890	0	98	410	0	133	6	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)		1169			785		522	593		245	593	
v/s Ratio Prot								c0.26			0.00	
v/s Ratio Perm		0.22			c0.43		0.07			0.20		
v/c Ratio		0.60			1.13		0.19	0.69		0.54	0.01	
Uniform Delay, d1		12.1			15.0		10.1	12.7		11.8	9.4	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.8			75.8		0.8	6.5		8.4	0.0	
Delay (s)		12.9			90.8		10.9	19.2		20.2	9.4	
Level of Service		B			F		B	B		C	A	
Approach Delay (s)		12.9			90.8			17.8			19.0	
Approach LOS		B			F			B			B	
<b>Intersection Summary</b>												
HCM 2000 Control Delay				45.3			HCM 2000 Level of Service				D	
HCM 2000 Volume to Capacity ratio				0.91								
Actuated Cycle Length (s)				48.0			Sum of lost time (s)			12.0		
Intersection Capacity Utilization				98.0%			ICU Level of Service			F		
Analysis Period (min)				15								

c Critical Lane Group

Lanes, Volumes, Timings

1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd

Future Total 2037

AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	41	127	359	748	90	208	226	1295	929	194	1733	55
Future Volume (vph)	41	127	359	748	90	208	226	1295	929	194	1733	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	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	0.694			0.383			0.085			0.087		
Satd. Flow (perm)	1175	1693	1425	1234	1676	1366	128	4446	1377	143	4532	1398
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			218			226			646			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	390	813	98	226	246	1408	1010	211	1884	60
Shared Lane Traffic (%)												
Lane Group Flow (vph)	45	138	390	813	98	226	246	1408	1010	211	1884	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

1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd

Future Total 2037

AM Peak Hour

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		6	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	70.3	50.6	120.0	69.4	50.0	50.0
Actuated g/C Ratio	0.21	0.16	1.00	0.31	0.25	0.25	0.59	0.42	1.00	0.58	0.42	0.42
v/c Ratio	0.17	0.51	0.27	1.37	0.23	0.44	0.85	0.75	0.73	0.68	1.00	0.09
Control Delay	29.4	52.4	0.5	209.1	37.3	7.3	57.7	33.0	3.5	37.8	55.4	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	209.1	37.3	7.3	57.7	33.0	3.5	37.8	55.4	0.3
LOS	C	D	A	F	D	A	E	C	A	D	E	A
Approach Delay		15.3			154.2			24.1			52.1	
Approach LOS		B			F			C			D	
Queue Length 50th (m)	7.8	31.7	0.0	~137.2	19.9	0.0	45.2	108.6	0.0	32.3	168.1	0.0
Queue Length 95th (m)	15.8	50.2	0.0	#169.3	33.3	19.2	#110.0	130.6	0.0	#73.2	#208.5	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	291	1874	1377	312	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	1.37	0.18	0.38	0.85	0.75	0.73	0.68	1.00	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:	1.37											
Intersection Signal Delay:	55.2						Intersection LOS: E					



Lanes, Volumes, Timings  
1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd

Future Total 2037  
AM Peak Hour

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.	
# 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

Future Total 2037  
AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↑	↗	↖	↑	↗	↖	↖	↗	↖	↗	↖
Traffic Volume (vph)	41	127	359	748	90	208	226	1295	929	194	1733	55
Future Volume (vph)	41	127	359	748	90	208	226	1295	929	194	1733	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	144	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	390	813	98	226	246	1408	1010	211	1884	60
RTOR Reduction (vph)	0	0	0	0	0	170	0	0	0	0	0	35
Lane Group Flow (vph)	45	138	390	813	98	246	1408	1010	1010	211	1884	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	66.8	46.8	120.0	65.6	46.2	46.2
Effective Green, g (s)	21.6	19.8	120.0	35.8	30.0	30.0	66.8	49.8	120.0	65.6	49.2	49.2
Actuated g/C Ratio	0.18	0.17	1.00	0.30	0.25	0.25	0.56	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	1845	1377	307	1858	573
v/s Ratio Prot	0.01	0.08		c0.16	0.06		0.14	0.32		0.11	c0.42	
v/s Ratio Perm	0.03		0.27	c0.25		0.04	0.33		c0.73	0.26		0.02
v/c Ratio	0.20	0.49	0.27	1.40	0.23	0.17	0.86	0.76	0.73	0.69	1.01	0.04
Uniform Delay, d1	41.5	45.6	0.0	39.9	35.8	35.2	35.2	30.1	0.0	28.0	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	191.0	0.4	0.3	21.4	3.1	3.5	6.3	24.4	0.1
Delay (s)	41.9	47.4	0.5	230.9	36.2	35.5	56.6	33.1	3.5	34.3	59.8	21.4
Level of Service	D	D	A	F	D	D	E	C	A	C	E	C
Approach Delay (s)		15.0			175.3			24.1			56.2	
Approach LOS		B			F			C			E	

Intersection Summary			
HCM 2000 Control Delay	60.2	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	97.3%	ICU Level of Service	F
Analysis Period (min)	15		
c	Critical Lane Group		

Lanes, Volumes, Timings

Future Total 2037

2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp

AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	3	0	183	665	34	269	0	2182	557	0	2939	7
Future Volume (vph)	3	0	183	665	34	269	0	2182	557	0	2939	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
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	1457	1356	0	4446	1384	0	5711	0
Flt Permitted	0.950			0.950	0.957							
Satd. Flow (perm)	1570	0	1395	1421	1457	1356	0	4446	1353	0	5711	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			31			215			197			
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	199	723	37	292	0	2372	605	0	3195	8
Shared Lane Traffic (%)				48%								
Lane Group Flow (vph)	3	0	199	376	384	292	0	2372	605	0	3203	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

Future Total 2037

2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp

AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)												
Turn Type	Prot		Perm	Perm					Free		NA	NA
Protected Phases	3									4	6	2
Permitted Phases									Free		Free	
Detector Phases	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		57.0	45.0		45.0		140.0			75.0	140.0
Actuated g/C Ratio	0.06		0.41	0.32		0.32		1.00			0.54	1.00
v/c Ratio	0.03		0.34	0.82		0.82		0.22			1.00	0.45
Control Delay	63.3		25.8	60.1		59.4		0.4			43.1	0.4
Queue Delay	0.0		0.0	0.0		0.0		0.0			0.0	0.0
Total Delay	63.3		25.8	60.1		59.4		0.4			43.1	0.4
LOS	E		C	E		E		A			D	A
Approach Delay		26.3								43.3		34.4
Approach LOS		C								D		C
Queue Length 50th (m)	0.9		33.0	106.5		108.5		0.0			169.3	0.0
Queue Length 95th (m)	4.2		54.1	#162.7		#164.1		0.0			m165.4	m0.0
Internal Link Dist (m)			118.1			168.6					300.8	
Turn Bay Length (m)	50.0											
Base Capacity (vph)	213		586	456		468		1356			2381	1353
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	0.01		0.34	0.82		0.82		0.22			1.00	0.45
1.05												

Lanes, Volumes, Timings

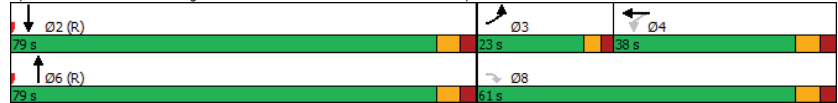
2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp

Future Total 2037

AM Peak Hour

Intersection Signal Delay: 47.5	Intersection LOS: D
Intersection Capacity Utilization 91.5%	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: 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

Future Total 2037

AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	3	0	183	665	34	269	0	2182	557	0	2939	7
Traffic Volume (vph)	3	0	183	665	34	269	0	2182	557	0	2939	7
Future Volume (vph)	3	0	183	665	34	269	0	2182	557	0	2939	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	1456	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	199	723	37	292	0	2372	605	0	3195	8
RTOR Reduction (vph)	0	0	18	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	3	0	181	376	384	292	0	2372	605	0	3203	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	468	1356		2381	1353		3058	
v/s Ratio Prot	0.00							0.53			c0.56	
v/s Ratio Perm			0.13	c0.26	0.26	0.22			c0.45			
v/c Ratio	0.03		0.32	0.82	0.82	0.22		1.00	0.45		1.05	
Uniform Delay, d1	62.3		28.3	43.9	43.8	0.0		32.4	0.0		32.5	
Progression Factor	1.00		1.00	1.00	1.00	1.00		1.02	1.00		1.00	
Incremental Delay, d2	0.2		0.3	11.5	11.0	0.4		10.2	0.4		30.4	
Delay (s)	62.5		28.6	55.4	54.8	0.4		43.2	0.4		62.9	
Level of Service	E		C	E	D	A		D	A		E	
Approach Delay (s)		29.1			39.9			34.5			62.9	
Approach LOS		C			D			C			E	
<b>Intersection Summary</b>												
HCM 2000 Control Delay		47.4						HCM 2000 Level of Service			D	
HCM 2000 Volume to Capacity ratio		0.94										
Actuated Cycle Length (s)		140.0						Sum of lost time (s)			12.0	
Intersection Capacity Utilization		91.5%						ICU Level of Service			F	
Analysis Period (min)		15										
c Critical Lane Group												

Lanes, Volumes, Timings  
3: Trafalgar Rd & QEW EB-Off Ramp

Future Total 2037  
AM Peak Hour

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔↔	↔		↑↑↑	↑↑↑	↔
Traffic Volume (vph)	940	819	0	1823	2069	496
Future Volume (vph)	940	819	0	1823	2069	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				185
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	890	0	1982	2249	539
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1022	890	0	1982	2249	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

Future Total 2037  
AM Peak Hour

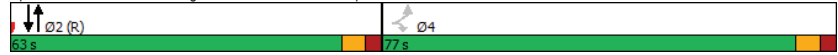
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Switch Phase						
Minimum Initial (s)	10.0	10.0		29.0	29.0	
Minimum Split (s)	38.0	38.0		36.0	36.0	
Total Split (s)	77.0	77.0		63.0	63.0	
Total Split (%)	55.0%	55.0%		45.0%	45.0%	
Maximum Green (s)	70.0	70.0		56.0	56.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	
All-Red Time (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	1.20		1.07	1.19	0.37
Control Delay	27.1	134.0		74.8	117.7	0.2
Queue Delay	0.0	0.0		0.0	0.0	0.0
Total Delay	27.1	134.0		74.8	117.7	0.2
LOS	C	F		E	F	A
Approach Delay	76.9			74.8	95.0	
Approach LOS	E			E	F	
Queue Length 50th (m)	109.1	~314.8		~231.6	~286.6	0.0
Queue Length 95th (m)	133.3	#397.7		m124.4	m#275.8	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	1.20		1.07	1.19	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:	1.20					
Intersection Signal Delay:	83.8					
Intersection Capacity Utilization:	107.4%					
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

Future Total 2037  
AM Peak Hour

- # 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

Future Total 2037  
AM Peak Hour

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔↔	↔		↑↑↑	↑↑↑	↔
Traffic Volume (vph)	940	819	0	1823	2069	496
Future Volume (vph)	940	819	0	1823	2069	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	890	0	1982	2249	539
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	1022	890	0	1982	2249	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				0.45	0.50	
v/s Ratio Perm	0.35	0.63				0.37
v/c Ratio	0.66	1.20		1.07	1.19	0.37
Uniform Delay, d1	24.5	33.5		40.5	40.5	0.0
Progression Factor	1.00	1.00		1.11	0.80	1.00
Incremental Delay, d2	1.1	102.9		32.1	86.8	0.2
Delay (s)	25.6	136.4		77.0	119.2	0.2
Level of Service	C	F		E	F	A
Approach Delay (s)	77.2			77.0	96.2	
Approach LOS	E			E	F	
<b>Intersection Summary</b>						
HCM 2000 Control Delay			85.0		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			107.4%		ICU Level of Service	G
Analysis Period (min)			15			
c Critical Lane Group						

Lanes, Volumes, Timings  
4: Trafalgar Rd & Argus Rd

Future Total 2037  
AM Peak Hour

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	164	0	3265	2217	672
Future Volume (vph)	0	164	0	3265	2217	672
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			0.965	
Flt Protected						
Satd. Flow (prot)	0	1367	0	4363	4351	0
Flt Permitted						
Satd. Flow (perm)	0	1367	0	4363	4351	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	178	0	3549	2410	730
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	178	0	3549	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	
<b>Intersection Summary</b>						
Area Type:	CBD					
Control Type:	Unsignalized					
Intersection Capacity Utilization	82.5%			ICU Level of Service E		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis  
4: Trafalgar Rd & Argus Rd

Future Total 2037  
AM Peak Hour

Movement	EBL	EBR	NBL	NBT	SBT	SBR	
Lane Configurations							
Traffic Volume (veh/h)	0	164	0	3265	2217	672	
Future Volume (Veh/h)	0	164	0	3265	2217	672	
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	178	0	3549	2410	730	
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	3969	1179	3151				
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol	1042	0	2196				
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	71	100				
cM capacity (veh/h)	166	620	141				
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>NB 1</b>	<b>NB 2</b>	<b>NB 3</b>	<b>SB 1</b>	<b>SB 2</b>	<b>SB 3</b>
Volume Total	178	1183	1183	1183	964	964	1212
Volume Left	0	0	0	0	0	0	0
Volume Right	178	0	0	0	0	0	730
eSH	620	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.29	0.70	0.70	0.70	0.57	0.57	0.71
Queue Length 95th (m)	9.5	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						
<b>Intersection Summary</b>							
Average Delay				0.3			
Intersection Capacity Utilization	82.5%			ICU Level of Service		E	
Analysis Period (min)	15						

Lanes, Volumes, Timings

5: Trafalgar Rd & Cross Ave/South Service Rd

Future Total 2037

AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	1516	83	120	46	48	114	129	1323	30	220	1761	300
Future Volume (vph)	1516	83	120	46	48	114	129	1323	30	220	1761	300
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	0.91	0.91	1.00	0.91	0.91	0.91
Ped Bike Factor	1.00	0.99		0.99		0.99		1.00		0.99		0.99
Frt	0.911					0.850		0.997			0.978	
Fit Protected	0.950			0.950		0.950		0.950		0.950		
Satd. Flow (prot)	2795	1404	0	1525	1583	1382	1428	4500	0	1525	4404	0
Fit Permitted	0.950			0.621		0.090		0.083		0.083		
Satd. Flow (perm)	2789	1404	0	990	1583	1362	135	4500	0	133	4404	0
Right Turn on Red			Yes			Yes		Yes			Yes	
Satd. Flow (RTOR)		56				179		3			28	
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			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)	1648	90	130	50	52	124	140	1438	33	239	1914	326
Shared Lane Traffic (%)												
Lane Group Flow (vph)	1648	220	0	50	52	124	140	1471	0	239	2240	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

5: Trafalgar Rd & Cross Ave/South Service Rd

Future Total 2037

AM Peak Hour

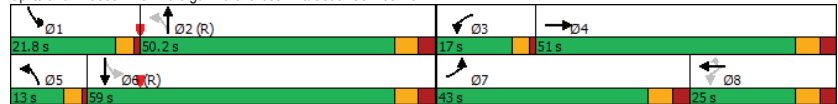
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases				8		8	2			6		
Detector Phases	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (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	41.7		26.7	14.7	14.7	62.7	47.4		74.3	55.0	
Actuated g/C Ratio	0.28	0.30		0.19	0.10	0.10	0.45	0.34		0.53	0.39	
v/c Ratio	2.12	0.48		0.21	0.31	0.41	0.70	0.96		0.80	1.28	
Control Delay	533.8	33.1		30.4	62.6	5.5	48.0	66.7		43.2	167.6	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	533.8	33.1		30.4	62.6	5.5	48.0	66.7		43.2	167.6	
LOS	F	C		C	E	A	D	E		D	F	
Approach Delay		474.8			24.2			65.1			155.6	
Approach LOS		F			C			E			F	
Queue Length 50th (m)	~392.3	39.4		8.9	14.4	0.0	32.4	136.2		56.1	~297.9	
Queue Length 95th (m)	#435.9	63.5		17.0	27.8	4.2	m39.4	m137.3		m49.2	m#225.2	
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)	778	508		245	237	356	201	1525		298	1748	
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	2.12	0.43		0.20	0.22	0.35	0.70	0.96		0.80	1.28	
<b>Intersection Summary</b>												
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:	2.12											

Lanes, Volumes, Timings  
5: Trafalgar Rd & Cross Ave/South Service Rd

Future Total 2037  
AM Peak Hour

Intersection Signal Delay: 223.7	Intersection LOS: F
Intersection Capacity Utilization 118.0%	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.	

Splits and Phases: 5: Trafalgar Rd & Cross Ave/South Service Rd



HCM Signalized Intersection Capacity Analysis  
5: Trafalgar Rd & Cross Ave/South Service Rd

Future Total 2037  
AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔		↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	1516	83	120	46	48	114	129	1323	30	220	1761	300
Future Volume (vph)	1516	83	120	46	48	114	129	1323	30	220	1761	300
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	0.91		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	1405		1518	1583	1362	1428	4498		1525	4405	
Flt Permitted	0.95	1.00		0.62	1.00	1.00	0.09	1.00		0.08	1.00	
Satd. Flow (perm)	2795	1405		992	1583	1362	135	4498		133	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)	1648	90	130	50	52	124	140	1438	33	239	1914	326
RTOR Reduction (vph)	0	39	0	0	0	111	0	2	0	0	17	0
Lane Group Flow (vph)	1648	181	0	50	52	13	140	1469	0	239	2223	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	38.7		23.7	11.7	11.7	59.7	44.4		71.3	52.0	
Effective Green, g (s)	39.0	41.7		23.7	14.7	14.7	59.7	47.4		71.3	55.0	
Actuated g/C Ratio	0.28	0.30		0.17	0.10	0.10	0.43	0.34		0.51	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	418		213	166	143	198	1522		295	1730	
v/s Ratio Prot	c0.59	c0.13		0.02	0.03		0.08	0.33		c0.13	c0.50	
v/s Ratio Perm				0.02		0.01	0.22			0.28		
v/c Ratio	2.12	0.43		0.23	0.31	0.09	0.71	0.97		0.81	1.28	
Uniform Delay, d1	50.5	39.6		50.0	58.0	56.6	32.9	45.5		40.4	42.5	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.21	1.27		1.16	1.19	
Incremental Delay, d2	507.6	1.0		0.7	1.5	0.4	5.7	10.0		1.6	128.7	
Delay (s)	558.1	40.6		50.6	59.5	57.0	45.5	67.6		48.4	179.3	
Level of Service	F	D		D	E	E	D	E		D	F	
Approach Delay (s)		497.1			56.1			65.7			166.7	
Approach LOS		F			E			E			F	
<b>Intersection Summary</b>												
HCM 2000 Control Delay		236.2									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		118.0%					ICU Level of Service			H		
Analysis Period (min)		15										
c Critical Lane Group												



Lanes, Volumes, Timings  
6: Trafalgar Rd & Cornwall Rd

Future Total 2037  
AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	347	591	93	72	616	552	116	552	79	771	876	280
Future Volume (vph)	347	591	93	72	616	552	116	552	79	771	876	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	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	1.00	0.99	0.99	0.98	1.00	1.00	0.98	1.00	0.98	0.98	0.98
Frt		0.980			0.850		0.981			0.850		0.850
Flt Protected	0.950		0.950		0.950		0.950		0.950		0.950	
Satd. Flow (prot)	2987	3059	0	1481	3154	1411	1540	2649	0	2929	1341	1356
Flt Permitted	0.950		0.950		0.950		0.950		0.950		0.950	
Satd. Flow (perm)	2946	3059	0	1473	3154	1384	1535	2649	0	2885	1341	1324
Right Turn on Red			Yes		Yes		Yes		Yes		Yes	
Satd. Flow (RTOR)		12			481		9				181	
Link Speed (k/h)	50		50		50		50		50		50	
Link Distance (m)	285.8		142.3		311.4		130.3		130.3		9.4	
Travel Time (s)	20.6		10.2		22.4		9.4		9.4		9.4	
Confl. Peds. (#/hr)	25		7	7	25	9	18	18	18	18	9	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	642	101	78	670	600	126	600	86	838	952	304
Shared Lane Traffic (%)												
Lane Group Flow (vph)	377	743	0	78	670	600	126	686	0	838	952	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		6.6		6.6	
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	1.19	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	24	14	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		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  
6: Trafalgar Rd & Cornwall Rd

Future Total 2037  
AM Peak Hour

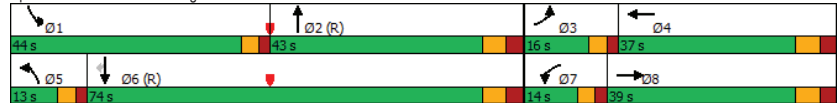
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0				0.0
Turn Type	Prot	NA		Prot	NA	Free	Prot	NA		Prot	NA	Perm
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases					Free							6
Detector Phase	3	8		7	4		5	2		1	6	6
Switch Phase												
Minimum Initial (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)	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	0.96		0.74	0.90	0.43	1.27	0.92		1.00	1.42	0.40
Control Delay	275.3	75.0		101.2	68.3	1.0	230.5	67.2		91.2	218.9	8.2
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	275.3	75.0		101.2	68.3	1.0	230.5	67.2		91.2	218.9	8.2
LOS	F	E		F	E	A	F	E		F	F	A
Approach Delay		142.4			40.2			92.5				137.2
Approach LOS		F			D			F				F
Queue Length 50th (m)	~77.6	111.7		22.7	100.5	0.0	~46.3	120.4		~134.4	~455.7	17.9
Queue Length 95th (m)	#111.2	#153.6		#50.9	#135.3	0.0	#89.8	#166.0		m109.0 m#321.1	m12.1	
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)	256	773		105	743	1384	99	744		836	670	752
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	0.96		0.74	0.90	0.43	1.27	0.92		1.00	1.42	0.40
<b>Intersection Summary</b>												
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:	1.47											

Lanes, Volumes, Timings  
6: Trafalgar Rd & Cornwall Rd

Future Total 2037  
AM Peak Hour

Intersection Signal Delay: 107.2	Intersection LOS: F
Intersection Capacity Utilization 107.7%	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

Future Total 2037  
AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↕	↔	↕	↔	↔	↕	↕
Traffic Volume (vph)	347	591	93	72	616	552	116	552	79	771	876	280
Future Volume (vph)	347	591	93	72	616	552	116	552	79	771	876	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	1.00		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	3057		1481	3154	1384	1540	2650		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	3057		1481	3154	1384	1540	2650		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	642	101	78	670	600	126	600	86	838	952	304
RTOR Reduction (vph)	0	9	0	0	0	0	0	6	0	0	0	91
Lane Group Flow (vph)	377	734	0	78	670	600	126	680	0	838	952	214
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	764		105	743	1384	99	738		836	670	662
v/s Ratio Prot	c0.13	c0.24		0.05	0.21		c0.08	0.26		0.29	c0.71	
v/s Ratio Perm						c0.43						0.16
v/c Ratio	1.47	0.96		0.74	0.90	0.43	1.27	0.92		1.00	1.42	0.32
Uniform Delay, d1	64.0	51.8		63.7	51.9	0.0	65.5	49.0		50.0	35.0	20.9
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.70	0.93	0.96
Incremental Delay, d2	232.7	24.3		37.4	16.3	1.0	180.4	18.6		9.9	190.2	0.1
Delay (s)	296.7	76.1		101.2	68.2	1.0	245.9	67.6		94.7	222.9	20.1
Level of Service	F	E		F	E	A	F	E		F	F	C
Approach Delay (s)		150.4			40.2			95.3			142.2	
Approach LOS		F			D			F			F	
<b>Intersection Summary</b>												
HCM 2000 Control Delay		111.2									F	
HCM 2000 Volume to Capacity ratio		1.31										
Actuated Cycle Length (s)		140.0				Sum of lost time (s)		16.0				
Intersection Capacity Utilization		107.7%				ICU Level of Service		G				
Analysis Period (min)		15										
c Critical Lane Group												

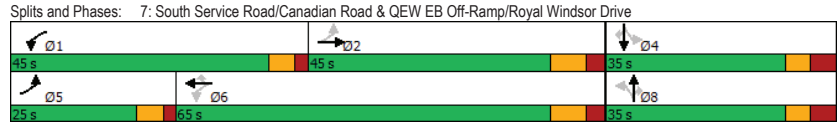
Lanes, Volumes, Timings  
 7: South Service Road/Canadian Road & QEW EB Off-Ramp/Royal Windsor Drive AM Peak Hour

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
Fr		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	Thru	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 AM Peak Hour

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)	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 Future Total 2037  
 7: South Service Road/Canadian Road & QEW EB Off-Ramp/Royal Windsor Drive AM Peak Hour



HCM Signalized Intersection Capacity Analysis Future Total 2037  
 7: South Service Road/Canadian Road & QEW EB Off-Ramp/Royal Windsor Drive AM Peak Hour

	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	
w/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	
<b>Intersection Summary</b>													
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

Future Total 2037  
AM Peak Hour

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	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	0.41			0.25	0.43	0.47

Lanes, Volumes, Timings  
8: QEW WB Off-Ramp & Kerr Street

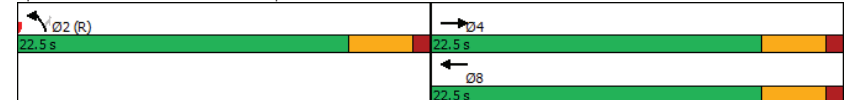
Future Total 2037  
AM Peak Hour

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

Future Total 2037  
AM Peak Hour

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
Frt	1.00			1.00	1.00	0.85
Flt Protected	1.00			1.00	0.95	1.00
Satd. Flow (prot)	3539			3539	1770	1583
Flt 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	
<b>Intersection Summary</b>						
HCM 2000 Control Delay			10.7		HCM 2000 Level of Service	
HCM 2000 Volume to Capacity ratio			0.42		B	
Actuated Cycle Length (s)			45.0		Sum of lost time (s)	
Intersection Capacity Utilization			41.7%		ICU Level of Service	
Analysis Period (min)			15		A	
c Critical Lane Group						

Lanes, Volumes, Timings  
9: Dorval Drive & QEW WB Off-Ramp

Future Total 2037  
AM Peak Hour

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
Frt	0.993	0.850				
Flt Protected	0.954					
Satd. Flow (prot)	3423	1441	3539	0	0	3539
Flt 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
<b>Two way Left Turn Lane</b>						
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
<b>Detector 1 Channel</b>						
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
<b>Detector 2 Channel</b>						
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

Future Total 2037  
AM Peak Hour

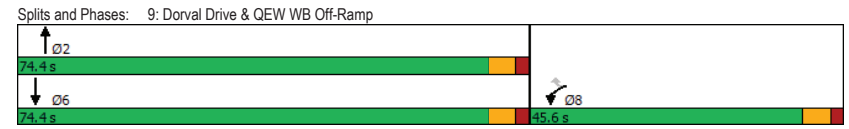
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Detector Phase	8	8	2			6
Switch Phase						
Minimum Initial (s)	10.0	10.0	20.0			20.0
Minimum Split (s)	24.0	24.0	26.0			26.0
Total Split (s)	45.6	45.6	74.4			74.4
Total Split (%)	38.0%	38.0%	62.0%			62.0%
Maximum Green (s)	39.6	39.6	68.4			68.4
Yellow Time (s)	4.0	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

Future Total 2037  
AM Peak Hour



HCM Signalized Intersection Capacity Analysis  
9: Dorval Drive & QEWB WB Off-Ramp

Future Total 2037  
AM Peak Hour

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

Future Total 2037  
AM Peak Hour

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	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	4			2	6	
Permitted Phases		4				



Lanes, Volumes, Timings  
10: Dorval Drive & QEW EB Off-Ramp

Future Total 2037  
AM Peak Hour

<b>Lane Group</b>	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

Future Total 2037  
AM Peak Hour

Split 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

Future Total 2037  
AM Peak Hour

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

Future Total 2037  
AM Peak Hour

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Volume (vph)	1	41	864	301	89	154
Future Volume (vph)	1	41	864	301	89	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						
Flt			0.965		0.915	
Flt Protected		0.999			0.982	
Satd. Flow (prot)	0	1672	1614	0	1536	0
Flt Permitted		0.999			0.982	
Satd. Flow (perm)	0	1672	1614	0	1536	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	45	939	327	97	167
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	46	1266	0	264	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	
<b>Intersection Summary</b>						
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  
11: Argus Rd & South Service Rd

Future Total 2037  
AM Peak Hour

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Volume (veh/h)	1	41	864	301	89	154
Future Volume (Veh/h)	1	41	864	301	89	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)	1	45	939	327	97	167
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	1267				1156	1104
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1267				1156	1104
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				55	35
cM capacity (veh/h)	317				218	258
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>WB 1</b>	<b>SB 1</b>			
Volume Total	46	1266	264			
Volume Left	1	0	97			
Volume Right	0	327	167			
eSH	317	1700	242			
Volume to Capacity	0.00	0.74	1.09			
Queue Length 95th (m)	0.1	0.0	91.4			
Control Delay (s)	0.4	0.0	128.5			
Lane LOS	A		F			
Approach Delay (s)	0.4	0.0	128.5			
Approach LOS			F			
<b>Intersection Summary</b>						
Average Delay			21.5			
Intersection Capacity Utilization		93.6%		ICU Level of Service		F
Analysis Period (min)		15				

Lanes, Volumes, Timings  
12: Lyons Lane & South Service Road

Future Total 2037  
AM Peak Hour

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Volume (vph)	0	0	0	0	0	0
Future Volume (vph)	0	0	0	0	0	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
Ped Bike Factor						
Fr						
Fit Protected						
Satd. Flow (prot)	0	1710	1710	0	1286	0
Fit Permitted						
Satd. Flow (perm)	0	1710	1710	0	1286	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	0	0	0	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	0	0	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	
<b>Intersection Summary</b>						
Area Type:	CBD					
Control Type:	Unsignalized					
Intersection Capacity Utilization	8.5%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis  
12: Lyons Lane & South Service Road

Future Total 2037  
AM Peak Hour

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Volume (veh/h)	0	0	0	0	0	0
Future Volume (Veh/h)	0	0	0	0	0	0
Sign Control	Free		Free	Stop		
Grade	0%		0%	0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	0	0	0
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	6					6
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	6					6
tC, single (s)	4.1					6.2
tC, 2 stage (s)						
tF (s)	2.2					3.3
p0 queue free %	100					100
cM capacity (veh/h)	1620					1077
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	0	0	0			
Volume Left	0	0	0			
Volume Right	0	0	0			
sSH	1700	1700	1700			
Volume to Capacity	0.00	0.00	0.00			
Queue Length 95th (m)	0.0	0.0	0.0			
Control Delay (s)	0.0	0.0	0.0			
Lane LOS	A					
Approach Delay (s)	0.0	0.0	0.0			
Approach LOS	A					
<b>Intersection Summary</b>						
Average Delay	0.0					
Intersection Capacity Utilization	8.5%		ICU Level of Service		A	
Analysis Period (min)	15					

Lanes, Volumes, Timings  
13: GO Bus Terminal/Argus Rd & Cross Ave

Future Total 2037  
AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	↕	↕		↕	↕		↕	↕		↕	↕	↕	
Traffic Volume (vph)	41	1073	19	53	854	31	27	0	64	567	21	257	
Future Volume (vph)	41	1073	19	53	854	31	27	0	64	567	21	257	
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		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		0.995	0.850		0.861		0.98	0.99		
Ft	0.997		0.995		0.850		0.861						
Fit Protected	0.950	0.950		0.950		0.950		0.950					
Satd. Flow (prot)	1570	3151	0	818	3194	0	805	734	0	1570	1355	0	
Fit Permitted	0.298	0.095		0.408		0.711							
Satd. Flow (perm)	492	3151	0	82	3194	0	345	734	0	1150	1355	0	
Right Turn on Red	Yes		Yes		Yes		Yes						
Satd. Flow (RTOR)	3		7		159		141						
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)	45	1166	21	58	928	34	29	0	70	616	23	279	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	45	1187	0	58	962	0	29	70	0	616	302	0	
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No	
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right	
Median Width(m)	3.3		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	1	
Detector Template	Left	Thru	Left		Thru	Left		Thru	Left		Thru	Left	
Leading Detector (m)	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	
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  
13: GO Bus Terminal/Argus Rd & Cross Ave

Future Total 2037  
AM Peak Hour

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		52.3	52.3		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	0.20	0.83		0.50	0.51		0.27	0.21		1.69	0.58	
Control Delay	17.3	27.2		27.1	11.5		31.2	1.4		348.2	18.4	
Queue Delay	0.0	0.4		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	17.3	27.6		27.1	11.5		31.2	1.4		348.2	18.4	
LOS	B	C		C	B		C	A		F	B	
Approach Delay		27.2			12.4			10.1			239.7	
Approach LOS		C			B			B			F	
Queue Length 50th (m)	4.6	93.3		4.2	47.9		3.9	0.0		~165.8	23.2	
Queue Length 95th (m)	12.5	123.5		#16.1	63.2		12.4	0.0		#232.6	51.2	
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)	231	1482		119	1956		109	341		364	525	
Starvation Cap Reductn	0	56		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.19	0.83		0.49	0.49		0.27	0.21		1.69	0.58	

Intersection Summary

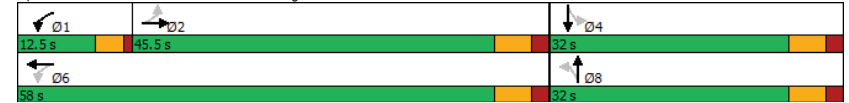
Area Type: CBD  
 Cycle Length: 90  
 Actuated Cycle Length: 88.4  
 Natural Cycle: 110  
 Control Type: Semi Act-Uncoord  
 Maximum v/c Ratio: 1.69  
 Intersection Signal Delay: 81.7  
 Intersection LOS: F

Lanes, Volumes, Timings  
13: GO Bus Terminal/Argus Rd & Cross Ave

Future Total 2037  
AM Peak Hour

Intersection Capacity Utilization 97.2%  
 Analysis Period (min) 15  
 ICU Level of Service F  
 ~ 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

Future Total 2037  
AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	41	1073	19	53	854	31	27	0	64	567	21	257
Future Volume (vph)	41	1073	19	53	854	31	27	0	64	567	21	257
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	0.86	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1570	3152		818	3193		804	735		1538	1356	
Flt Permitted	0.30	1.00		0.10	1.00		0.41	1.00		0.71	1.00	
Satd. Flow (perm)	492	3152		82	3193		345	735		1151	1356	
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	1166	21	58	928	34	29	0	70	616	23	279
RTOR Reduction (vph)	0	2	0	0	3	0	0	48	0	0	96	0
Lane Group Flow (vph)	45	1185	0	58	959	0	29	22	0	616	206	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)	38.1	38.1		50.3	50.3		26.0	26.0		26.0	26.0	
Effective Green, g (s)	40.1	40.1		50.3	52.3		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)	223	1431		115	1891		109	233		364	429	
v/s Ratio Prot		c0.38		0.05	c0.30			0.03			0.15	
v/s Ratio Perm	0.09			0.24			0.08			c0.54		
v/c Ratio	0.20	0.83		0.50	0.51		0.27	0.10		1.69	0.48	
Uniform Delay, d1	14.5	21.1		13.9	10.5		22.5	21.2		30.1	24.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.9	4.6		2.5	0.4		1.8	0.2		323.2	1.2	
Delay (s)	15.4	25.7		16.5	10.9		24.3	21.5		353.3	25.4	
Level of Service	B	C		B	B		C	C		F	C	
Approach Delay (s)		25.3			11.3			22.3			245.5	
Approach LOS		C			B			C			F	
<b>Intersection Summary</b>												
HCM 2000 Control Delay		82.7									F	
HCM 2000 Volume to Capacity ratio		1.12										
Actuated Cycle Length (s)		88.3			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  
14: Lyons Lane/Street A & Cross Ave

Future Total 2037  
AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	113	247	259	289	298	24	23	4	17	82	31	120
Future Volume (vph)	113	247	259	289	298	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
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		0.923			0.989			0.877			0.881	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1540	2814	0	1570	2727	0	1570	1481	0	1468	1453	0
Flt Permitted	0.542			0.363			0.563			0.743		
Satd. Flow (perm)	873	2814	0	600	2727	0	928	1481	0	1144	1453	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		282			19			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	268	282	314	324	26	25	4	18	89	34	130
<b>Shared Lane Traffic (%)</b>												
Lane Group Flow (vph)	123	550	0	314	350	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	
<b>Two way Left Turn Lane</b>												
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	
<b>Detector 1 Channel</b>												
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	
<b>Detector 2 Channel</b>												

Lanes, Volumes, Timings  
14: Lyons Lane/Street A & Cross Ave

Future Total 2037  
AM Peak Hour

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		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	0.29	0.36		0.56	0.18		0.14	0.07		0.40	0.42	
Control Delay	15.4	6.9		8.9	4.3		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	15.4	6.9		8.9	4.3		27.5	14.1		32.7	11.8	
LOS	B	A		A	A		C	B		C	B	
Approach Delay		8.4			6.5			21.2			19.1	
Approach LOS		A			A			C			B	
Queue Length 50th (m)	9.8	10.6		14.1	7.1		3.1	0.5		11.5	4.2	
Queue Length 95th (m)	27.5	26.9		31.6	15.0		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)	431	1533		638	2117		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	0.29	0.36		0.49	0.17		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:	0.56
Intersection Signal Delay:	9.7
Intersection LOS:	A

Lanes, Volumes, Timings  
14: Lyons Lane/Street A & Cross Ave

Future Total 2037  
AM Peak Hour

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

Future Total 2037  
AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	113	247	259	289	298	24	23	4	17	82	31	120
Future Volume (vph)	113	247	259	289	298	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	
Frbp, ped/bikes	1.00	0.99		1.00	1.00		1.00	0.99		1.00	0.99	
Fipb, 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	2815		1570	2726		1567	1482		1463	1454	
Flt Permitted	0.54	1.00		0.36	1.00		0.56	1.00		0.74	1.00	
Satd. Flow (perm)	874	2815		601	2726		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	268	282	314	324	26	25	4	18	89	34	130
RTOR Reduction (vph)	0	143	0	0	6	0	0	14	0	0	104	0
Lane Group Flow (vph)	123	408	0	314	344	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)	432	1392		547	1899		182	291		225	286	
v/s Ratio Prot		0.14		c0.09	0.13			0.01			0.04	
v/s Ratio Perm	0.14			c0.30			0.03			c0.08		
v/c Ratio	0.28	0.29		0.57	0.18		0.14	0.03		0.40	0.21	
Uniform Delay, d1	11.2	11.2		5.7	4.0		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	0.8	0.2		1.2	0.1		0.5	0.0		1.6	0.5	
Delay (s)	11.9	11.5		6.9	4.1		25.4	24.4		27.9	25.8	
Level of Service	B	B		A	A		C	C		C	C	
Approach Delay (s)		11.6			5.4			24.9			26.5	
Approach LOS		B			A			C			C	

Intersection Summary			
HCM 2000 Control Delay	11.8	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  
15: Cross Ave & Lyons Lane

Future Total 2037  
AM Peak Hour

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↕	↕	↕	↕	↕
Traffic Volume (vph)	0	617	465	0	0	0
Future Volume (vph)	0	617	465	0	0	0
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						
Flt Protected						
Satd. Flow (prot)	1710	3094	2801	0	1710	0
Flt Permitted						
Satd. Flow (perm)	1710	3094	2801	0	1710	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)	0	671	505	0	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	671	505	0	0	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	22.3%
Analysis Period (min)	15
ICU Level of Service	A



HCM Unsignalized Intersection Capacity Analysis  
15: Cross Ave & Lyons Lane

Future Total 2037  
AM Peak Hour

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↕↕	↕↕		↕	↕↕
Traffic Volume (veh/h)	0	617	465	0	0	0
Future Volume (Veh/h)	0	617	465	0	0	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	671	505	0	0	0
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	0.98			0.98	0.98	
vC, conflicting volume	509			852	256	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	450			801	192	
tC, single (s)	4.1			6.8	7.4	
tC, 2 stage (s)						
tF (s)	2.2			3.5	3.5	
p0 queue free %	100			100	100	
cM capacity (veh/h)	1092			316	731	
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	0	336	336	337	168	0
Volume Left	0	0	0	0	0	0
Volume Right	0	0	0	0	0	0
sSH	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.00	0.20	0.20	0.20	0.10	0.00
Queue Length 95th (m)	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS						A
Approach Delay (s)	0.0			0.0		0.0
Approach LOS						A
Intersection Summary						
Average Delay			0.0			
Intersection Capacity Utilization			22.3%		ICU Level of Service	A
Analysis Period (min)			15			

Lanes, Volumes, Timings  
16: Speers Road/Cornwall Road & Cross Avenue

Future Total 2037  
AM Peak Hour

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↕↕	↕↕		↕	↕↕
Traffic Volume (vph)	279	792	734	42	73	449
Future Volume (vph)	279	792	734	42	73	449
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
Fit Protected	0.950				0.950	
Satd. Flow (prot)	1770	3539	3511	0	1770	2787
Fit Permitted	0.237				0.950	
Satd. Flow (perm)	441	3539	3511	0	1770	2787
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)			7			488
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)	303	861	798	46	79	488
Shared Lane Traffic (%)						
Lane Group Flow (vph)	303	861	844	0	79	488
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

Future Total 2037

AM Peak Hour

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	37.4		8.7	8.7
Actuated g/C Ratio	0.73	0.73	0.49		0.11	0.11
v/c Ratio	0.58	0.33	0.49		0.39	0.65
Control Delay	8.6	4.4	15.2		36.6	7.7
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	8.6	4.4	15.2		36.6	7.7
LOS	A	A	B		D	A
Approach Delay		5.5	15.2		11.8	
Approach LOS		A	B		B	
Queue Length 50th (m)	12.0	19.5	40.5		11.2	0.0
Queue Length 95th (m)	24.2	31.7	73.2		23.9	14.2
Internal Link Dist (m)		204.9	251.4		159.9	
Turn Bay Length (m)	75.0				55.0	
Base Capacity (vph)	671	2571	1734		537	1186
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	0.45	0.33	0.49		0.15	0.41

Intersection Summary

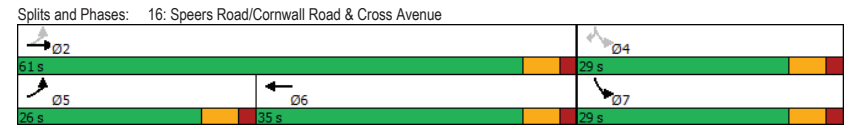
Area Type:	Other
Cycle Length:	90
Actuated Cycle Length:	75.8
Natural Cycle:	80
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.65
Intersection Signal Delay:	10.0
Intersection Capacity Utilization:	57.1%
Intersection LOS:	B
ICU Level of Service:	B
Analysis Period (min):	15

Lanes, Volumes, Timings

16: Speers Road/Cornwall Road & Cross Avenue

Future Total 2037

AM Peak Hour



HCM Signalized Intersection Capacity Analysis  
16: Speers Road/Cornwall Road & Cross Avenue

Future Total 2037  
AM Peak Hour

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↕	↕	↔	↔	↕
Traffic Volume (vph)	279	792	734	42	73	449
Future Volume (vph)	279	792	734	42	73	449
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 <sub>t</sub>	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	3510		1770	2787
Fit Permitted	0.24	1.00	1.00		0.95	1.00
Satd. Flow (perm)	442	3539	3510		1770	2787
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	303	861	798	46	79	488
RTOR Reduction (vph)	0	0	4	0	0	432
Lane Group Flow (vph)	303	861	840	0	79	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)	55.0	55.0	37.3		8.7	8.7
Effective Green, g (s)	55.0	55.0	37.3		8.7	8.7
Actuated g/C Ratio	0.73	0.73	0.49		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)	526	2571	1729		203	320
v/s Ratio Prot	c0.09	0.24	0.24		c0.04	
v/s Ratio Perm	c0.33					0.02
v/c Ratio	0.58	0.33	0.49		0.39	0.18
Uniform Delay, d1	5.5	3.7	12.8		31.0	30.3
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	1.5	0.4	1.0		1.2	0.3
Delay (s)	7.0	4.1	13.8		32.3	30.5
Level of Service	A	A	B		C	C
Approach Delay (s)		4.8	13.8		30.8	
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	0.58		
Actuated Cycle Length (s)	75.7	Sum of lost time (s)	18.0
Intersection Capacity Utilization	57.1%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings  
17: Driveway A & Street 1

Future Total 2037  
AM Peak Hour

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔			↕	↕	
Traffic Volume (vph)	0	0	36	0	0	205
Future Volume (vph)	0	0	36	0	0	205
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 <sub>t</sub>					0.865	
Fit Protected				0.950		
Satd. Flow (prot)	1863	0	0	1770	1611	0
Fit Permitted				0.950		
Satd. Flow (perm)	1863	0	0	1770	1611	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	39.1			82.7	58.5	
Travel Time (s)	2.8			6.0	4.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	39	0	0	223
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	39	223	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 22.7%	ICU Level of Service A
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis  
17: Driveway A & Street 1

Future Total 2037  
AM Peak Hour

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔			↔	↔	
Traffic Volume (veh/h)	0	0	36	0	0	205
Future Volume (Veh/h)	0	0	36	0	0	205
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	0	39	0	0	223
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			0		78	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			0		78	0
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			98		100	79
cM capacity (veh/h)			1623		903	1085
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	0	39	223			
Volume Left	0	39	0			
Volume Right	0	0	223			
eSH	1700	1623	1085			
Volume to Capacity	0.00	0.02	0.21			
Queue Length 95th (m)	0.0	0.6	6.2			
Control Delay (s)	0.0	7.3	9.2			
Lane LOS		A	A			
Approach Delay (s)	0.0	7.3	9.2			
Approach LOS			A			
<b>Intersection Summary</b>						
Average Delay			8.9			
Intersection Capacity Utilization		22.7%		ICU Level of Service		A
Analysis Period (min)			15			

Lanes, Volumes, Timings  
18: Street C & Driveway B

Future Total 2037  
AM Peak Hour

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔			↔	↔	
Traffic Volume (vph)	0	68	7	47	1014	29
Future Volume (vph)	0	68	7	47	1014	29
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 <sub>t</sub>	0.865				0.996	
Fit Protected				0.993		
Satd. Flow (prot)	1611	0	0	1850	1855	0
Fit Permitted				0.993		
Satd. Flow (perm)	1611	0	0	1850	1855	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	49.2			76.4	58.0	
Travel Time (s)	3.5			5.5	4.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	74	8	51	1102	32
<b>Shared Lane Traffic (%)</b>						
Lane Group Flow (vph)	74	0	0	59	1134	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	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	
<b>Two way Left Turn Lane</b>						
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	
<b>Intersection Summary</b>						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	66.0%			ICU Level of Service C		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis  
18: Street C & Driveway B

Future Total 2037  
AM Peak Hour

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	W			↑	↑	
Traffic Volume (veh/h)	0	68	7	47	1014	29
Future Volume (Veh/h)	0	68	7	47	1014	29
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	74	8	51	1102	32
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)				77		
pX, platoon unblocked						
vC, conflicting volume	1185	1118	1134			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1185	1118	1134			
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	99			
cM capacity (veh/h)	206	252	616			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	74	59	1134			
Volume Left	0	8	0			
Volume Right	74	0	32			
cSH	252	616	1700			
Volume to Capacity	0.29	0.01	0.67			
Queue Length 95th (m)	9.5	0.3	0.0			
Control Delay (s)	25.1	1.6	0.0			
Lane LOS	D	A				
Approach Delay (s)	25.1	1.6	0.0			
Approach LOS	D					
<b>Intersection Summary</b>						
Average Delay			1.5			
Intersection Capacity Utilization		66.0%		ICU Level of Service	C	
Analysis Period (min)		15				

Lanes, Volumes, Timings  
19: Street C & South Service Road

Future Total 2037  
AM Peak Hour

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑			↑	↑	
Traffic Volume (vph)	68	51	192	98	6	16
Future Volume (vph)	68	51	192	98	6	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
Fr <sub>t</sub>	0.942				0.904	
Fit Protected				0.968	0.986	
Satd. Flow (prot)	1755	0	0	1803	1660	0
Fit Permitted				0.968	0.986	
Satd. Flow (perm)	1755	0	0	1803	1660	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	235.2			305.2	159.9	
Travel Time (s)	16.9			22.0	11.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	74	55	209	107	7	17
<b>Shared Lane Traffic (%)</b>						
Lane Group Flow (vph)	129	0	0	316	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	
<b>Two way Left Turn Lane</b>						
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	
<b>Intersection Summary</b>						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	32.5%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis  
19: Street C & South Service Road

Future Total 2037  
AM Peak Hour

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔		↔		↔	
Traffic Volume (veh/h)	68	51	192	98	6	16
Future Volume (Veh/h)	68	51	192	98	6	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)	74	55	209	107	7	17
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None		None			
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			129		626	102
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			129		626	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 %			86		98	98
cM capacity (veh/h)			1457		383	954
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	129	316	24			
Volume Left	0	209	7			
Volume Right	55	0	17			
cSH	1700	1457	665			
Volume to Capacity	0.08	0.14	0.04			
Queue Length 95th (m)	0.0	4.0	0.9			
Control Delay (s)	0.0	5.6	10.6			
Lane LOS	A		B			
Approach Delay (s)	0.0	5.6	10.6			
Approach LOS	A		B			
<b>Intersection Summary</b>						
Average Delay			4.3			
Intersection Capacity Utilization			32.5%	ICU Level of Service		A
Analysis Period (min)	15					

Lanes, Volumes, Timings  
20: Street A & South Service Road

Future Total 2037  
AM Peak Hour

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 <sub>t</sub>	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		235.2		98.8	
Travel Time (s)	20.5		16.9		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
<b>Shared Lane Traffic (%)</b>						
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	
<b>Two way Left Turn Lane</b>						
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	
<b>Intersection Summary</b>						
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

Future Total 2037  
AM Peak Hour

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			
<b>Intersection Summary</b>						
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

Future Total 2037  
AM Peak Hour

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔		↔		↔	
Traffic Volume (vph)	0	191	0	73	653	469
Future Volume (vph)	0	191	0	73	653	469
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 <sub>t</sub>	0.865		0.944			
Fit Protected						
Satd. Flow (prot)	1611	0	0	1863	1758	0
Fit Permitted						
Satd. Flow (perm)	1611	0	0	1863	1758	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	208	0	79	710	510
Shared Lane Traffic (%)						
Lane Group Flow (vph)	208	0	0	79	1220	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	
<b>Intersection Summary</b>						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	81.5%			ICU Level of Service D		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis  
21: Argus Rd & Street 1

Future Total 2037  
AM Peak Hour

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	W			T	T	
Traffic Volume (veh/h)	0	191	0	73	653	469
Future Volume (Veh/h)	0	191	0	73	653	469
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	208	0	79	710	510
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	1044	965	1220			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1044	965	1220			
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	33	100			
cM capacity (veh/h)	254	309	571			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	208	79	1220			
Volume Left	0	0	0			
Volume Right	208	0	510			
eSH	309	571	1700			
Volume to Capacity	0.67	0.00	0.72			
Queue Length 95th (m)	36.3	0.0	0.0			
Control Delay (s)	37.6	0.0	0.0			
Lane LOS	E					
Approach Delay (s)	37.6	0.0	0.0			
Approach LOS	E					
<b>Intersection Summary</b>						
Average Delay			5.2			
Intersection Capacity Utilization		81.5%		ICU Level of Service		D
Analysis Period (min)		15				

Lanes, Volumes, Timings  
22: Street C & Street 1

Future Total 2037  
AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		T			T			T			T	
Traffic Volume (vph)	0	191	14	440	29	0	7	40	0	0	586	0
Future Volume (vph)	0	191	14	440	29	0	7	40	0	0	586	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 <sub>t</sub>		0.991										
Fit Protected					0.955			0.992				
Satd. Flow (prot)	0	1846	0	0	1779	0	0	1848	0	0	1863	0
Fit Permitted					0.955			0.992				
Satd. Flow (perm)	0	1846	0	0	1779	0	0	1848	0	0	1863	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		82.7			162.1			58.0			159.9	
Travel Time (s)		6.0			11.7			4.2			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	208	15	478	32	0	8	43	0	0	637	0
<b>Shared Lane Traffic (%)</b>												
Lane Group Flow (vph)	0	223	0	0	510	0	0	51	0	0	637	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
<b>Two way Left Turn Lane</b>												
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	
<b>Intersection Summary</b>												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	77.6%						ICU Level of Service D					
Analysis Period (min)	15											



HCM Unsignalized Intersection Capacity Analysis  
22: Street C & Street 1

Future Total 2037  
AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (veh/h)	0	191	14	440	29	0	7	40	0	0	586	0
Future Volume (Veh/h)	0	191	14	440	29	0	7	40	0	0	586	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	208	15	478	32	0	8	43	0	0	637	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	712	696	637	815	696	43	637			43		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	712	696	637	815	696	43	637			43		
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	43	97	0	91	100	99			100		
cM capacity (veh/h)	322	362	477	155	362	1027	947			1566		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	223	510	51	637								
Volume Left	0	478	8	0								
Volume Right	15	0	0	0								
cSH	368	161	947	1566								
Volume to Capacity	0.61	3.17	0.01	0.00								
Queue Length 95th (m)	30.5	Err	0.2	0.0								
Control Delay (s)	28.7	Err	1.5	0.0								
Lane LOS	D	F	A									
Approach Delay (s)	28.7	Err	1.5	0.0								
Approach LOS	D	F										
Intersection Summary												
Average Delay				3593.2								
Intersection Capacity Utilization			77.6%		ICU Level of Service				D			
Analysis Period (min)			15									

Lanes, Volumes, Timings  
23: GO Station West Access/Street C & Cross Ave

Future Total 2037  
AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	27	340	115	550	522	27	51	0	271	623	411	112
Future Volume (vph)	27	340	115	550	522	27	51	0	271	623	411	112
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			0.996			0.850			0.968	
Fit Protected		0.997			0.976		0.950			0.950		
Satd. Flow (prot)	0	3402	0	0	3440	0	1770	1583	0	1770	1803	0
Fit Permitted		0.756			0.632		0.253			0.577		
Satd. Flow (perm)	0	2579	0	0	2228	0	471	1583	0	1075	1803	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		96			6		308			32		
Link Speed (k/h)		50			50		50			50		
Link Distance (m)		211.2			162.8		81.1			76.4		
Travel Time (s)		15.2			11.7		5.8			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)	29	370	125	598	567	29	55	0	295	677	447	122
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	524	0	0	1194	0	55	295	0	677	569	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	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

Future Total 2037

AM Peak Hour

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			1.83dl			0.31	0.37		1.66	0.81
Control Delay		11.6			209.4			16.7	3.1		327.5	25.0
Queue Delay		0.0			0.0			0.0	0.0		0.0	0.0
Total Delay		11.6			209.4			16.7	3.1		327.5	25.0
LOS		B			F			B	A		F	C
Approach Delay		11.6			209.4				5.2			189.3
Approach LOS		B			F				A			F
Queue Length 50th (m)		15.0			~84.2			3.5	0.0		~96.8	43.0
Queue Length 95th (m)		26.6			#119.4			11.4	10.9		#149.8	#92.8
Internal Link Dist (m)		187.2			138.8				57.1			52.4
Turn Bay Length (m)											15.0	
Base Capacity (vph)		1039			850			178	792		408	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		0.50			1.40			0.31	0.37		1.66	0.81

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: 130  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 1.66  
 Intersection Signal Delay: 149.0 Intersection LOS: F  
 Intersection Capacity Utilization 116.4% ICU Level of Service H  
 Analysis Period (min) 15  
 ~ Volume exceeds capacity, queue is theoretically infinite.

Lanes, Volumes, Timings

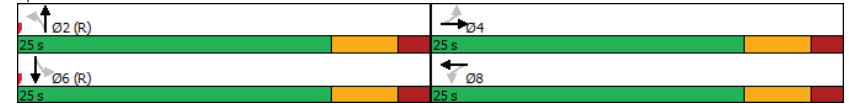
23: GO Station West Access/Street C & Cross Ave

Future Total 2037

AM Peak Hour

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

Future Total 2037  
AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔	↔		↔	↔		↔	↔	
Traffic Volume (vph)	27	340	115	550	522	27	51	0	271	623	411	112
Future Volume (vph)	27	340	115	550	522	27	51	0	271	623	411	112
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		0.96			1.00		1.00	0.85		1.00		0.97
Flt Protected		1.00			0.98		0.95	1.00		0.95		1.00
Satd. Flow (prot)		3403			3440		1770	1583		1770		1803
Flt Permitted		0.76			0.63		0.25	1.00		0.58		1.00
Satd. Flow (perm)		2580			2228		471	1583		1075		1803
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)	29	370	125	598	567	29	55	0	295	677	447	122
RTOR Reduction (vph)	0	60	0	0	4	0	0	183	0	0	20	0
Lane Group Flow (vph)	0	464	0	0	1190	0	55	112	0	677	549	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)		980			846		178	601		408	685	
v/s Ratio Prot								0.07			0.30	
v/s Ratio Perm		0.18			c0.53		0.12			c0.63		
v/c Ratio		0.47			1.83dl		0.31	0.19		1.66	0.80	
Uniform Delay, d1		11.7			15.5		10.9	10.3		15.5	13.8	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.4			190.2		4.5	0.7		307.4	9.6	
Delay (s)		12.1			205.7		15.3	11.0		322.9	23.4	
Level of Service		B			F		B	B		F	C	
Approach Delay (s)		12.1			205.7		11.7			186.1		
Approach LOS		B			F		B			F		

Intersection Summary			
HCM 2000 Control Delay	147.2	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.53		
Actuated Cycle Length (s)	50.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	116.4%	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

Future Total 2037  
PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔	↔		↔	↔		↔	↔	
Traffic Volume (vph)	156	131	394	1106	250	207	496	2147	812	157	1419	130
Future Volume (vph)	156	131	394	1106	250	207	496	2147	812	157	1419	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
Flt			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			151			341		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	428	1202	272	225	539	2334	883	171	1542	141
Shared Lane Traffic (%)												
Lane Group Flow (vph)	170	142	428	1202	272	225	539	2334	883	171	1542	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

1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd

Future Total 2037

PM Peak Hour

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	0.30	1.49	0.54	0.44	1.49	1.18	0.63	0.91	1.05	0.24
Control Delay	44.3	52.1	0.5	253.3	39.3	14.0	262.8	117.5	2.2	75.3	76.6	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	253.3	39.3	14.0	262.8	117.5	2.2	75.3	76.6	2.3
LOS	D	D	A	F	D	B	F	F	A	E	E	A
Approach Delay		20.5			187.3			111.2			70.8	
Approach LOS		C			F			F			E	
Queue Length 50th (m)	28.3	32.4	0.0	~177.5	56.1	13.6	~171.8	~253.5	0.0	25.8	~152.1	0.0
Queue Length 95th (m)	43.7	52.2	0.0	#214.9	81.2	35.2	#252.9	#283.4	0.0	#82.4	#183.1	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	0.30	1.49	0.49	0.41	1.49	1.18	0.63	0.91	1.05	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:	140
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	1.49
Intersection Signal Delay:	109.6
Intersection LOS:	F

Lanes, Volumes, Timings

1: Trafalgar Rd & Leighland Ave/Iroquois Shore Rd

Future Total 2037

PM Peak Hour

Intersection Capacity Utilization	118.6%	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

Future Total 2037  
PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	
Traffic Volume (vph)	156	131	394	1106	250	207	496	2147	812	157	1419	130	
Future Volume (vph)	156	131	394	1106	250	207	496	2147	812	157	1419	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	
Frbp, 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	428	1202	272	225	539	2334	883	171	1542	141	
RTOR Reduction (vph)	0	0	0	0	0	106	0	0	0	0	0	95	
Lane Group Flow (vph)	170	142	428	1202	272	119	539	2334	883	171	1542	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		c0.28	0.16		c0.28	0.51		0.07	0.34		
v/s Ratio Perm	0.10		0.30	c0.27		0.09	c0.50		0.63	0.28		0.03	
v/c Ratio	0.74	0.51	0.30	1.53	0.54	0.30	1.51	1.18	0.63	0.93	1.05	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	242.9	2.0	0.9	243.5	85.3	2.2	47.6	37.0	0.4	
Delay (s)	55.6	49.1	0.5	277.6	37.4	33.5	281.0	119.3	2.2	78.2	77.5	28.7	
Level of Service	E	D	A	F	D	C	F	F	A	E	E	C	
Approach Delay (s)		22.5			206.8			115.0			73.8		
Approach LOS		C			F			F			E		
<b>Intersection Summary</b>													
HCM 2000 Control Delay		116.4			HCM 2000 Level of Service				F				
HCM 2000 Volume to Capacity ratio		1.52											
Actuated Cycle Length (s)		120.0			Sum of lost time (s)				17.0				
Intersection Capacity Utilization		118.6%			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

Future Total 2037  
PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	28	0	339	1129	129	400	0	3027	634	0	2959	12
Future Volume (vph)	28	0	339	1129	129	400	0	3027	634	0	2959	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	3.5	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	1.00					0.99			0.97		1.00	
Frt			0.850			0.850			0.850		0.999	
Flt Protected	0.950			0.950	0.962							
Satd. Flow (prot)	1570	0	1437	1463	1535	1409	0	4577	1439	0	4780	0
Flt Permitted	0.950			0.950	0.962							
Satd. Flow (perm)	1569	0	1437	1463	1535	1391	0	4577	1400	0	4780	0
Right Turn on Red			Yes			Yes			Yes		Yes	Yes
Satd. Flow (RTOR)			31			178			162			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%	2%	0%	23%
Adj. Flow (vph)	30	0	368	1227	140	435	0	3290	689	0	3216	13
Shared Lane Traffic (%)				45%								
Lane Group Flow (vph)	30	0	368	675	692	435	0	3290	689	0	3229	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	
<b>Two way Left Turn Lane</b>												
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	
<b>Detector 1 Channel</b>												
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	
<b>Detector 2 Channel</b>												

Lanes, Volumes, Timings

Future Total 2037

2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp

PM Peak Hour

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		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		0.61	1.49	1.45	0.31		1.34	0.49			1.26
Control Delay	68.1		35.0	265.9	251.1	0.6		184.5	0.1			150.9
Queue Delay	0.0		0.0	0.0	0.0	0.0		0.0	0.0			0.0
Total Delay	68.1		35.0	265.9	251.1	0.6		184.5	0.1			150.9
LOS	E		C	F	F	A		F	A			F
Approach Delay		37.5						152.6				150.9
Approach LOS		D				F		F				F
Queue Length 50th (m)	8.5		77.0	~283.6	~287.2	0.0		~457.2	0.0			~344.1
Queue Length 95th (m)	19.2		112.9	#375.4	#379.5	0.0		m#411.9	m0.0			#362.7
Internal Link Dist (m)		118.1			168.6			300.8				256.4
Turn Bay Length (m)	50.0											
Base Capacity (vph)	213		603	454	476	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		0.61	1.49	1.45	0.31		1.34	0.49			1.26

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: 1.49

Lanes, Volumes, Timings

Future Total 2037

2: Trafalgar Rd & North Service Rd/QEW WB Off-Ramp

PM Peak Hour

Intersection Signal Delay: 155.5  
 Intersection Capacity Utilization 119.7%  
 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.

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

Future Total 2037  
 PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	28	0	339	1129	129	400	0	3027	634	0	2959	12
Future Volume (vph)	28	0	339	1129	129	400	0	3027	634	0	2959	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	0.96	1.00		1.00	1.00		1.00	
Satd. Flow (prot)	1570		1437	1463	1535	1391		4577	1400		4782	
Flt Permitted	0.95		1.00	0.95	0.96	1.00		1.00	1.00		1.00	
Satd. Flow (perm)	1570		1437	1463	1535	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	368	1227	140	435	0	3290	689	0	3216	13
RTOR Reduction (vph)	0	0	18	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	30	0	350	675	692	435	0	3290	689	0	3229	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	476	1391		2451	1400		2561	
v/s Ratio Prot	0.02							c0.72			0.68	
v/s Ratio Perm			0.24	c0.46	0.45	0.31			c0.49			
v/c Ratio	0.28		0.60	1.49	1.45	0.31		1.34	0.49		1.26	
Uniform Delay, d1	62.0		32.5	48.2	48.2	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		1.6	230.6	215.7	0.6		154.3	0.1		120.6	
Delay (s)	63.5		34.2	278.8	263.9	0.6		188.3	0.1		153.1	
Level of Service	E		C	F	F	A		F	A		F	
Approach Delay (s)		36.4				205.9			155.7			153.1
Approach LOS		D				F			F			F

Intersection Summary			
HCM 2000 Control Delay	159.4	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.34		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	119.7%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings  
 3: Trafalgar Rd & QEW EB-Off Ramp

Future Total 2037  
 PM Peak Hour

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	1126	544	0	2515	2814	369
Future Volume (vph)	1126	544	0	2515	2814	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)						101
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	591	0	2734	3059	401
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1224	591	0	2734	3059	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

Future Total 2037  
PM Peak Hour

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	1.07		1.09	1.22	0.28
Control Delay	73.8	100.5		70.1	120.7	0.0
Queue Delay	0.0	0.0		0.0	0.0	0.0
Total Delay	73.8	100.5		70.1	120.7	0.0
LOS	E	F		E	F	A
Approach Delay	82.5			70.1	106.7	
Approach LOS	F			E	F	
Queue Length 50th (m)	~195.0	~190.8		~323.8	~398.4	0.0
Queue Length 95th (m)	#238.6	#265.8		m219.5	m204.6	m0.0
Internal Link Dist (m)	175.2			27.4	300.8	
Turn Bay Length (m)						
Base Capacity (vph)	1196	550		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	1.07		1.09	1.22	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:	1.22
Intersection Signal Delay:	88.7
Intersection Capacity Utilization:	104.7%
Analysis Period (min):	15
Intersection LOS:	F
ICU Level of Service G	

Lanes, Volumes, Timings  
3: Trafalgar Rd & QEW EB-Off Ramp

Future Total 2037  
PM Peak Hour

- 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

Future Total 2037  
PM Peak Hour

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↖ ↗	↗		↖ ↗	↖ ↗	↗
Traffic Volume (vph)	1126	544	0	2515	2814	369
Future Volume (vph)	1126	544	0	2515	2814	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
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)	1224	591	0	2734	3059	401
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	1224	591	0	2734	3059	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				0.60	0.67	
v/s Ratio Perm	0.40	0.42				0.28
w/c Ratio	1.02	1.07		1.09	1.22	0.28
Uniform Delay, d1	42.5	42.5		31.5	31.5	0.0
Progression Factor	1.00	1.00		0.98	0.69	1.00
Incremental Delay, d2	32.1	59.9		39.6	97.3	0.0
Delay (s)	74.6	102.4		70.5	118.9	0.0
Level of Service	E	F		E	F	A
Approach Delay (s)	83.7			70.5	105.1	
Approach LOS	F			E	F	

Intersection Summary			
HCM 2000 Control Delay	88.4	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.18		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	104.7%	ICU Level of Service	G
Analysis Period (min)	15		

Lanes, Volumes, Timings  
4: Trafalgar Rd & Argus Rd

Future Total 2037  
PM Peak Hour

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗		↖ ↗	↖ ↗	
Traffic Volume (vph)	0	111	0	3628	2114	1243
Future Volume (vph)	0	111	0	3628	2114	1243
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)		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			0.944	
Flt Protected						
Satd. Flow (prot)	0	1354	0	4577	4305	0
Flt Permitted						
Satd. Flow (perm)	0	1354	0	4577	4305	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	121	0	3943	2298	1351
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	121	0	3943	3649	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 91.4%	ICU Level of Service F
Analysis Period (min) 15	

HCM Unsignalized Intersection Capacity Analysis  
4: Trafalgar Rd & Argus Rd

Future Total 2037  
PM Peak Hour

Movement	EBL	EBR	NBL	NBT	SBT	SBR	
Lane Configurations		↗		↖↖	↗↗		
Traffic Volume (veh/h)	0	111	0	3628	2114	1243	
Future Volume (Veh/h)	0	111	0	3628	2114	1243	
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	121	0	3943	2298	1351	
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	4312	1466	3673				
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol	119	0	2688				
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	75	100				
cM capacity (veh/h)	559	477	70				
Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	121	1314	1314	1314	919	919	1811
Volume Left	0	0	0	0	0	0	0
Volume Right	121	0	0	0	0	0	1351
sSH	477	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.25	0.77	0.77	0.77	0.54	0.54	1.07
Queue Length 95th (m)	8.0	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			0.2				
Intersection Capacity Utilization			91.4%		ICU Level of Service		F
Analysis Period (min)			15				

Lanes, Volumes, Timings  
5: Trafalgar Rd & Cross Ave/South Service Rd

Future Total 2037  
PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖↖	↖	↗	↖	↖	↗	↖↖	↖↖	↗	↖↖	↖↖	↖↖
Traffic Volume (vph)	1224	49	150	86	86	215	226	1746	42	95	1600	358
Future Volume (vph)	1224	49	150	86	86	215	226	1746	42	95	1600	358
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			0.973	
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2958	1346	0	1540	1644	1423	1496	4573	0	1570	4438	0
Fit Permitted	0.950			0.623			0.077			0.083		
Satd. Flow (perm)	2958	1346	0	983	1644	1423	121	4573	0	137	4438	0
Right Turn on Red			Yes			Yes		Yes		Yes		Yes
Satd. Flow (RTOR)		140				148		3			40	
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)	1330	53	163	93	93	234	246	1898	46	103	1739	389
Shared Lane Traffic (%)												
Lane Group Flow (vph)	1330	216	0	93	93	234	246	1944	0	103	2128	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

Future Total 2037

PM Peak Hour

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	59.5		16.5	19.5	19.5	72.5	60.6		58.9	51.0	
Actuated g/C Ratio	0.26	0.42		0.12	0.14	0.14	0.52	0.43		0.42	0.36	
v/c Ratio	1.75	0.33		0.81	0.41	0.72	1.05	0.98		0.75	1.30	
Control Delay	374.6	10.6		103.2	60.1	34.4	77.7	54.2		37.2	175.0	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	374.6	10.6		103.2	60.1	34.4	77.7	54.2		37.2	175.0	
LOS	F	B		F	E	C	E	D		D	F	
Approach Delay		323.7			55.3			56.8			168.6	
Approach LOS		F			E			E			F	
Queue Length 50th (m)	~295.9	13.1		26.5	24.7	23.5	~69.6	~178.9		20.7	~284.7	
Queue Length 95th (m)	#339.9	32.3		#56.1	43.3	55.5	m#63.8	m144.5		m17.3	m#214.4	
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	665		126	246	339	234	1981		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	1.75	0.32		0.74	0.38	0.69	1.05	0.98		0.75	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:	1.75

Lanes, Volumes, Timings

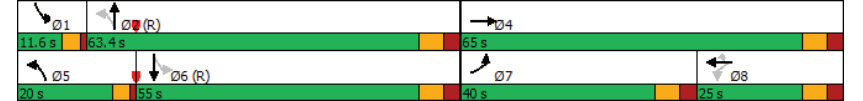
5: Trafalgar Rd & Cross Ave/South Service Rd

Future Total 2037

PM Peak Hour

Intersection Signal Delay: 160.4	Intersection LOS: F
Intersection Capacity Utilization 117.9%	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

Future Total 2037  
PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	
Traffic Volume (vph)	1224	49	150	86	86	215	226	1746	42	95	1600	358	
Future Volume (vph)	1224	49	150	86	86	215	226	1746	42	95	1600	358	
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	0.97		1.00	1.00	1.00	1.00	0.99		1.00	0.99		
Fipb, 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	0.97		
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00		
Satd. Flow (prot)	2958	1346		1500	1644	1423	1496	4575		1570	4436		
Flt Permitted	0.95	1.00		0.62	1.00	1.00	0.08	1.00		0.08	1.00		
Satd. Flow (perm)	2958	1346		984	1644	1423	121	4575		138	4436		
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)	1330	53	163	93	93	234	246	1898	46	103	1739	389	
RTOR Reduction (vph)	0	81	0	0	0	127	0	2	0	0	25	0	
Lane Group Flow (vph)	1330	136	0	93	93	107	246	1942	0	103	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	8	5	2	1		6	6		
Permitted Phases				8	8	2		6					
Actuated Green, G (s)	33.0	56.5		16.5	16.5	16.5	69.5	57.6		55.9	48.0		
Effective Green, g (s)	36.0	59.5		16.5	19.5	19.5	69.5	60.6		55.9	51.0		
Actuated g/C Ratio	0.26	0.42		0.12	0.14	0.14	0.50	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	572		115	228	198	231	1980		135	1615		
v/s Ratio Prot	c0.45	0.10		0.06			c0.13	0.42		0.04	c0.47		
v/s Ratio Perm				c0.09		0.07	0.39			0.26			
v/c Ratio	1.75	0.24		0.81	0.41	0.54	1.06	0.98		0.76	1.30		
Uniform Delay, d1	52.0	25.7		60.2	55.0	56.1	45.4	39.1		33.2	44.5		
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.22	1.32		1.30	1.19		
Incremental Delay, d2	342.9	0.3		34.1	1.6	3.6	38.1	3.1		2.4	136.3		
Delay (s)	394.9	26.0		94.3	56.6	59.6	93.5	54.9		45.7	189.3		
Level of Service	F	C		F	E	E	F	D		D	F		
Approach Delay (s)	343.4			66.6			59.3			182.7			
Approach LOS	F			E			E			F			
<b>Intersection Summary</b>													
HCM 2000 Control Delay		171.6		HCM 2000 Level of Service				F					
HCM 2000 Volume to Capacity ratio		1.30											
Actuated Cycle Length (s)		140.0		Sum of lost time (s)				16.0					
Intersection Capacity Utilization		117.9%		ICU Level of Service				H					
Analysis Period (min)		15											
c Critical Lane Group													

Lanes, Volumes, Timings  
6: Trafalgar Rd & Cornwall Rd

Future Total 2037  
PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	566	591	55	109	913	518	74	912	98	657	755	420
Future Volume (vph)	566	591	55	109	913	518	74	912	98	657	755	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		0.985				0.850
Flt Protected	0.950			0.950		0.950		0.950		0.950		
Satd. Flow (prot)	3016	3105	0	1570	3217	1439	1540	2688	0	2987	1368	1409
Flt Permitted	0.950			0.950		0.950		0.950		0.950		
Satd. Flow (perm)	2994	3105	0	1551	3217	1413	1529	2688	0	2973	1368	1361
Right Turn on Red			Yes			Yes		Yes		Yes		Yes
Satd. Flow (RTOR)		7				305		7				286
Link Speed (k/h)		50			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	642	60	118	992	563	80	991	107	714	821	457
<b>Shared Lane Traffic (%)</b>												
Lane Group Flow (vph)	615	702	0	118	992	563	80	1098	0	714	821	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	
<b>Two way Left Turn Lane</b>												
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
<b>Detector 1 Channel</b>												
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		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
<b>Detector 2 Channel</b>												

Lanes, Volumes, Timings  
6: Trafalgar Rd & Cornwall Rd

Future Total 2037  
PM Peak Hour

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	0.81		0.75	1.23	0.40	0.91	1.19		1.46	1.33	0.59
Control Delay	315.3	54.9		89.4	159.6	0.8	137.9	134.9		259.1	177.8	5.8
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	54.9		89.4	159.6	0.8	137.9	134.9		259.1	177.8	5.8
LOS	F	D		F	F	A	F	F		F	F	A
Approach Delay		176.5			101.2			135.1				167.5
Approach LOS		F			F			F				F
Queue Length 50th (m)	~131.2	99.7		34.0	~187.7	0.0	23.6	~240.0		~150.3	~378.0	20.3
Queue Length 95th (m)	#170.2	124.8		#66.2	#231.6	0.0	#58.1	#293.3		m#109.7	m#267.2	m13.4
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	870		157	804	1413	88	926		490	615	769
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	0.81		0.75	1.23	0.40	0.91	1.19		1.46	1.33	0.59

Intersection Summary

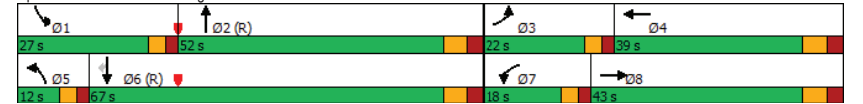
Area Type:	CBD
Cycle Length:	140
Actuated Cycle Length:	140
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green, Master Intersection	
Natural Cycle:	150
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	1.59

Lanes, Volumes, Timings  
6: Trafalgar Rd & Cornwall Rd

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Intersection Signal Delay: 145.2	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

Future Total 2037  
PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	566	591	55	109	913	518	74	912	98	657	755	420
Future Volume (vph)	566	591	55	109	913	518	74	912	98	657	755	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	3105		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	3105		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)	615	642	60	118	992	563	80	991	107	714	821	457
RTOR Reduction (vph)	0	5	0	0	0	0	0	5	0	0	0	157
Lane Group Flow (vph)	615	697	0	118	992	563	80	1093	0	714	821	300
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	921		490	615	612
v/s Ratio Prot	c0.20	0.22		0.08	c0.31		0.05	0.41		c0.24	c0.60	
v/s Ratio Perm					c0.40							0.22
v/c Ratio	1.59	0.81		0.75	1.23	0.40	0.91	1.19		1.46	1.33	0.49
Uniform Delay, d1	61.0	47.0		61.3	52.5	0.0	65.6	46.0		58.5	38.5	27.2
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.43	0.68	0.55
Incremental Delay, d2	277.1	8.0		27.8	115.9	0.8	64.9	95.2		206.8	151.8	0.3
Delay (s)	338.1	55.0		89.1	168.4	0.8	130.5	141.2		290.5	178.0	15.1
Level of Service	F	D		F	F	A	F	F		F	F	B
Approach Delay (s)	187.2			106.4			140.5			180.9		
Approach LOS	F			F			F			F		

Intersection Summary			
HCM 2000 Control Delay	154.3	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.37		
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  
7: South Service Road/Canadian Road & QEW EB Off-Ramp/Royal Windsor Drive

Future Total 2037  
PM Peak Hour

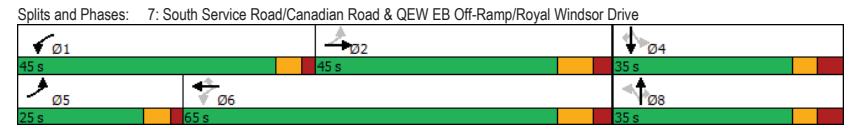
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	366	638	20	214	763	32	16	55	117	16	140	498
Future Volume (vph)	366	638	20	214	763	32	16	55	117	16	140	498
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	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	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	0.6	2.0	0.6	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 Future Total 2037  
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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%
Intersection LOS:	B
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 Future Total 2037  
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HCM Signalized Intersection Capacity Analysis  
 7: South Service Road/Canadian Road & QEW EB Off-Ramp/Royal Windsor Drive PM Peak Hour

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
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)	3502	3396		1752	3505	1615	1805	1900	1615	1805	1900	1599
Fit 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			

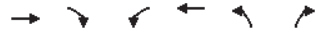
Lanes, Volumes, Timings  
 8: QEW WB Off-Ramp & Kerr Street Future Total 2037 PM Peak Hour

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
Fit Protected					0.950	
Satd. Flow (prot)	3574	0	0	3574	1805	1599
Fit 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

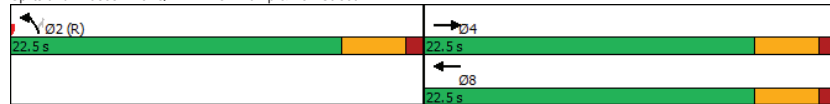
Future Total 2037  
PM Peak Hour



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



HCM Signalized Intersection Capacity Analysis  
8: QEW WB Off-Ramp & Kerr Street

Future Total 2037  
PM Peak Hour



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
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)	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

Future Total 2037  
PM Peak Hour

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

Future Total 2037  
PM Peak Hour

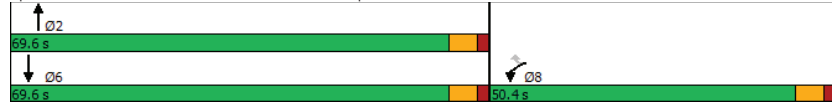
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Permitted Phases		8				
Detector Phase	8	8	2			6
Switch Phase						
Minimum Initial (s)	10.0	10.0	20.0			20.0
Minimum Split (s)	24.0	24.0	26.0			26.0
Total Split (s)	50.4	50.4	69.6			69.6
Total Split (%)	42.0%	42.0%	58.0%			58.0%
Maximum Green (s)	44.4	44.4	63.6			63.6
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-Uncoord					
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

Future Total 2037  
PM Peak Hour

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

Future Total 2037  
PM Peak Hour

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
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)	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
<b>Intersection Summary</b>						
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

Future Total 2037  
PM Peak Hour

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
Frt	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

Future Total 2037  
PM Peak Hour

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

Future Total 2037  
PM Peak Hour

Splits and Phases: 10: Dorval Drive & QEW EB Off-Ramp

↑ Ø2 74.4 s	↘ Ø4 45.6 s
↓ Ø6 74.4 s	

HCM Signalized Intersection Capacity Analysis  
10: Dorval Drive & QEW EB Off-Ramp

Future Total 2037  
PM Peak Hour

Movement	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
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)	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, d1	35.1	34.9		9.3	9.0	
Progression Factor	1.00	1.00		1.00	1.00	
Incremental Delay, d2	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	
<b>Intersection Summary</b>						
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

Future Total 2037  
PM Peak Hour

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Volume (vph)	13	24	684	671	57	78
Future Volume (vph)	13	24	684	671	57	78
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			0.933		0.922	
Flt Protected		0.983			0.979	
Satd. Flow (prot)	0	1550	1519	0	1544	0
Flt Permitted		0.983			0.979	
Satd. Flow (perm)	0	1550	1519	0	1544	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	26	743	729	62	85
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	40	1472	0	147	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	101.1%				ICU Level of Service G	
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis  
11: Argus Rd & South Service Rd

Future Total 2037  
PM Peak Hour

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Volume (veh/h)	13	24	684	671	57	78
Future Volume (Veh/h)	13	24	684	671	57	78
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	26	743	729	62	85
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	1472				1166	1108
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1472				1166	1108
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				70	67
cM capacity (veh/h)	464				209	258

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	40	1472	147
Volume Left	14	0	62
Volume Right	0	729	85
eSH	464	1700	235
Volume to Capacity	0.03	0.87	0.63
Queue Length 95th (m)	0.7	0.0	30.0
Control Delay (s)	4.8	0.0	43.0
Lane LOS	A		E
Approach Delay (s)	4.8	0.0	43.0
Approach LOS			E

Intersection Summary			
Average Delay		3.9	
Intersection Capacity Utilization	101.1%	ICU Level of Service	G
Analysis Period (min)	15		

Lanes, Volumes, Timings  
12: Lyons Lane & South Service Road

Future Total 2037  
PM Peak Hour

	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Volume (vph)	0	0	0	0	0	0
Future Volume (vph)	0	0	0	0	0	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
Ped Bike Factor						
Fr t						
Fit Protected						
Satd. Flow (prot)	0	1710	1710	0	1710	0
Fit Permitted						
Satd. Flow (perm)	0	1710	1710	0	1710	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)	0	0	0	0	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	0	0	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	
<b>Intersection Summary</b>						
Area Type:	CBD					
Control Type:	Unsignalized					
Intersection Capacity Utilization	8.7%		ICU Level of Service A			
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis  
12: Lyons Lane & South Service Road

Future Total 2037  
PM Peak Hour

	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Volume (veh/h)	0	0	0	0	0	0
Future Volume (Veh/h)	0	0	0	0	0	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	0	0	0
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	7				7	7
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	7				7	7
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	1617				1013	1075
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	0	0	0			
Volume Left	0	0	0			
Volume Right	0	0	0			
eSH	1700	1700	1700			
Volume to Capacity	0.00	0.00	0.00			
Queue Length 95th (m)	0.0	0.0	0.0			
Control Delay (s)	0.0	0.0	0.0			
Lane LOS					A	
Approach Delay (s)	0.0	0.0	0.0			
Approach LOS					A	
<b>Intersection Summary</b>						
Average Delay					0.0	
Intersection Capacity Utilization		8.7%		ICU Level of Service		A
Analysis Period (min)		15				

Lanes, Volumes, Timings  
13: GO Bus Terminal/Argus Rd & Cross Ave

Future Total 2037  
PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	19	1377	21	48	576	56	20	3	61	405	26	62
Future Volume (vph)	19	1377	21	48	576	56	20	3	61	405	26	62
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		0.99	0.97		0.98	0.98	
Frt		0.998			0.987			0.857			0.894	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1570	3193	0	797	3196	0	785	708	0	1570	1159	0
Flt Permitted	0.390			0.090			0.695			0.712		
Satd. Flow (perm)	640	3193	0	76	3196	0	567	708	0	1152	1159	0
Right Turn on Red			Yes		Yes			Yes			Yes	
Satd. Flow (RTOR)		2		21			66			67		
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)	21	1497	23	52	626	61	22	3	66	440	28	67
Shared Lane Traffic (%)												
Lane Group Flow (vph)	21	1520	0	52	687	0	22	69	0	440	95	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

Future Total 2037  
PM Peak Hour

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	0.07	1.00		0.46	0.35		0.13	0.27		1.27	0.24	
Control Delay	13.8	49.0		25.2	9.0		25.4	9.8		172.7	11.2	
Queue Delay	0.0	17.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	13.8	66.0		25.2	9.0		25.4	9.8		172.7	11.2	
LOS	B	E		C	A		C	A		F	B	
Approach Delay		65.3			10.1			13.6			144.1	
Approach LOS		E			B			B			F	
Queue Length 50th (m)	2.0	~139.6		3.6	28.5		2.9	0.4		~101.2	3.6	
Queue Length 95th (m)	6.3	#197.8		13.2	39.0		9.1	10.6		#160.3	15.3	
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)	303	1513		114	1968		171	259		346	395	
Starvation Cap Reductn	0	73		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.07	1.06		0.46	0.35		0.13	0.27		1.27	0.24	
<b>Intersection Summary</b>												
Area Type:	CBD											
Cycle Length:	90											
Actuated Cycle Length:	89.7											
Natural Cycle:	140											
Control Type:	Semi Act-Uncoord											
Maximum v/c Ratio:	1.27											
Intersection Signal Delay:	64.1						Intersection LOS: E					

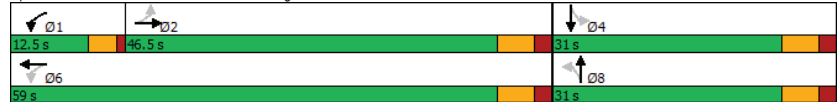


Lanes, Volumes, Timings  
13: GO Bus Terminal/Argus Rd & Cross Ave

Future Total 2037  
PM Peak Hour

Intersection Capacity Utilization 82.6%	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: 13: GO Bus Terminal/Argus Rd & Cross Ave



HCM Signalized Intersection Capacity Analysis  
13: GO Bus Terminal/Argus Rd & Cross Ave

Future Total 2037  
PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	19	1377	21	48	576	56	20	3	61	405	26	62
Future Volume (vph)	19	1377	21	48	576	56	20	3	61	405	26	62
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	0.99		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)	1560	3192		797	3195		776	708		1537	1160	
Flt Permitted	0.39	1.00		0.09	1.00		0.70	1.00		0.71	1.00	
Satd. Flow (perm)	641	3192		75	3195		568	708		1152	1160	
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	1497	23	52	626	61	22	3	66	440	28	67
RTOR Reduction (vph)	0	1	0	0	8	0	0	46	0	0	47	0
Lane Group Flow (vph)	21	1519	0	52	679	0	22	23	0	440	48	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)	303	1512		110	1948		170	213		346	349	
v/s Ratio Prot		c0.48		c0.04	0.21			0.03			0.04	
v/s Ratio Perm	0.03			0.23			0.04			c0.38		
v/c Ratio	0.07	1.00		0.47	0.35		0.13	0.11		1.27	0.14	
Uniform Delay, d1	12.8	23.6		17.0	8.7		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	0.2	24.3		2.3	0.2		0.5	0.3		143.1	0.2	
Delay (s)	13.0	47.9		19.4	8.9		23.3	22.9		174.4	23.1	
Level of Service	B	D		B	A		C	C		F	C	
Approach Delay (s)		47.4			9.6			23.0			147.5	
Approach LOS		D			A			C			F	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			55.5				HCM 2000 Level of Service				E	
HCM 2000 Volume to Capacity ratio			1.04									
Actuated Cycle Length (s)			89.7			Sum of lost time (s)				12.0		
Intersection Capacity Utilization			82.6%			ICU Level of Service				E		
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings  
14: Lyons Lane/Street A & Cross Ave

Future Total 2037  
PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	62	308	17	19	468	26	308	6	208	42	3	123
Future Volume (vph)	62	308	17	19	468	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		1.00	0.98		1.00	0.99	
Frt	0.992			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	0.452			0.460			0.654			0.524		
Satd. Flow (perm)	723	2915	0	760	3073	0	1080	1438	0	863	1412	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		7			10			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	335	18	21	509	28	335	7	226	46	3	134
Shared Lane Traffic (%)												
Lane Group Flow (vph)	67	353	0	21	537	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

Future Total 2037  
PM Peak Hour

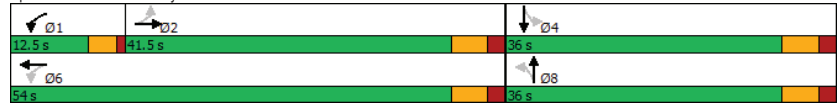
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6		8		8		4	
Permitted Phases		2		6			8		8		4	
Detector Phases		2	2	1	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	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	0.22	0.29		0.04	0.31		0.89	0.36		0.15	0.24	
Control Delay	19.3	17.4		9.4	11.0		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	19.3	17.4		9.4	11.0		54.3	4.9		21.0	5.0	
LOS	B	B		A	B		D	A		C	A	
Approach Delay		17.7			10.9			34.1			9.1	
Approach LOS		B			B			C			A	
Queue Length 50th (m)	7.6	21.1		1.6	25.3		55.1	0.8		5.5	0.3	
Queue Length 95th (m)	17.4	31.5		4.9	35.4		#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)	309	1252		503	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	0.22	0.28		0.04	0.31		0.85	0.35		0.15	0.23	
<b>Intersection Summary</b>												
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: B					

Lanes, Volumes, Timings  
14: Lyons Lane/Street A & Cross Ave

Future Total 2037  
PM Peak Hour

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

Future Total 2037  
PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	62	308	17	19	468	26	308	6	208	42	3	123
Future Volume (vph)	62	308	17	19	468	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	2916		1570	3074		1569	1438		1565	1413	
Flt Permitted	0.45	1.00		0.46	1.00		0.65	1.00		0.52	1.00	
Satd. Flow (perm)	723	2916		760	3074		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	335	18	21	509	28	335	7	226	46	3	134
RTOR Reduction (vph)	0	4	0	0	4	0	0	147	0	0	87	0
Lane Group Flow (vph)	67	349	0	21	533	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	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)	305	1231		481	1719		377	502		301	493	
v/s Ratio Prot		0.12		0.00	c0.17			0.06			0.04	
v/s Ratio Perm	0.09			0.02			c0.31			0.05		
v/c Ratio	0.22	0.28		0.04	0.31		0.89	0.17		0.15	0.10	
Uniform Delay, d1	16.1	16.6		9.7	10.3		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	0.8	0.3		0.0	0.2		22.0	0.2		0.3	0.1	
Delay (s)	16.9	16.9		9.8	10.5		48.9	19.9		19.9	19.3	
Level of Service	B	B		A	B		D	B		B	B	
Approach Delay (s)		16.9			10.5			37.0			19.5	
Approach LOS		B			B			D			B	
<b>Intersection Summary</b>												
HCM 2000 Control Delay				21.7			HCM 2000 Level of Service				C	
HCM 2000 Volume to Capacity ratio				0.56								
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  
15: Cross Ave & Lyons Lane

Future Total 2037  
PM Peak Hour

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	0	379	894	0	0	0
Future Volume (vph)	0	379	894	0	0	0
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						
<b>Fr</b>						
Fit Protected						
Satd. Flow (prot)	1462	2954	3154	0	1710	0
Fit Permitted						
Satd. Flow (perm)	1462	2954	3154	0	1710	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)	0	412	972	0	0	0
<b>Shared Lane Traffic (%)</b>						
Lane Group Flow (vph)	0	412	972	0	0	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	
<b>Two way Left Turn Lane</b>						
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	

<b>Intersection Summary</b>	
Area Type:	CBD
Control Type:	Unsignalized
Intersection Capacity Utilization	30.8%
ICU Level of Service	A
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis  
15: Cross Ave & Lyons Lane

Future Total 2037  
PM Peak Hour

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	379	894	0	0	0
Future Volume (Veh/h)	0	379	894	0	0	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	412	972	0	0	0
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	973				1188	487
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCU, unblocked vol	788				1022	257
tC, single (s)	4.4				6.8	7.0
tC, 2 stage (s)						
tF (s)	2.4				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	675				214	674
<b>Direction, Lane #</b>						
Volume Total	0	206	206	648	324	0
Volume Left	0	0	0	0	0	0
Volume Right	0	0	0	0	0	0
eSH	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.00	0.12	0.12	0.38	0.19	0.00
Queue Length 95th (m)	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS						A
Approach Delay (s)	0.0			0.0		0.0
Approach LOS						A

<b>Intersection Summary</b>			
Average Delay		0.0	
Intersection Capacity Utilization	30.8%	ICU Level of Service	A
Analysis Period (min)	15		

Lanes, Volumes, Timings

16: Speers Road/Cornwall Road & Cross Avenue

Future Total 2037

PM Peak Hour

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↕↕	↕↕		↕	↕↕
Traffic Volume (vph)	394	905	995	68	5	10
Future Volume (vph)	394	905	995	68	5	10
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			0.990			0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1770	3539	3504	0	1770	2787
Flt Permitted	0.136				0.950	
Satd. Flow (perm)	253	3539	3504	0	1770	2787
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)			9			11
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)	428	984	1082	74	5	11
Shared Lane Traffic (%)						
Lane Group Flow (vph)	428	984	1156	0	5	11
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

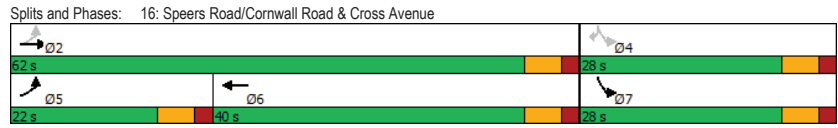
Future Total 2037

PM Peak Hour

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)	56.3	61.3	34.2		5.8	5.7
Actuated g/C Ratio	0.87	0.95	0.53		0.09	0.09
v/c Ratio	0.71	0.29	0.62		0.03	0.04
Control Delay	19.2	1.1	13.1		29.4	17.1
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	19.2	1.1	13.1		29.4	17.1
LOS	B	A	B		C	B
Approach Delay		6.6	13.1		20.9	
Approach LOS		A	B		C	
Queue Length 50th (m)	20.6	0.0	44.0		0.6	0.0
Queue Length 95th (m)	#84.6	26.5	91.8		3.9	2.6
Internal Link Dist (m)		165.7	250.5		160.2	
Turn Bay Length (m)	75.0				55.0	
Base Capacity (vph)	599	3365	1862		607	963
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	0.29	0.62		0.01	0.01
<b>Intersection Summary</b>						
Area Type:	Other					
Cycle Length:	90					
Actuated Cycle Length:	64.5					
Natural Cycle:	90					
Control Type:	Semi Act-Uncoord					
Maximum v/c Ratio:	0.71					
Intersection Signal Delay:	9.6			Intersection LOS: A		
Intersection Capacity Utilization:	70.7%			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

Future Total 2037  
PM Peak Hour



HCM Signalized Intersection Capacity Analysis  
16: Speers Road/Cornwall Road & Cross Avenue

Future Total 2037  
PM Peak Hour

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↕	↕	↔	↔	↕
Traffic Volume (vph)	394	905	995	68	5	10
Future Volume (vph)	394	905	995	68	5	10
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	3505		1770	2787
Fit Permitted	0.14	1.00	1.00		0.95	1.00
Satd. Flow (perm)	253	3539	3505		1770	2787
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	428	984	1082	74	5	11
RTOR Reduction (vph)	0	0	5	0	0	11
Lane Group Flow (vph)	428	984	1151	0	5	0
Turn Type	pm+pt	NA	NA		pm+pt	Perm
Protected Phases	5	2	6		7	
Permitted Phases	2				4	4
Actuated Green, G (s)	56.3	56.3	34.2		1.1	1.1
Effective Green, g (s)	56.3	56.3	34.2		1.1	1.1
Actuated g/C Ratio	0.81	0.81	0.49		0.02	0.02
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)	557	2870	1727		28	44
v/s Ratio Prot	c0.18	0.28	0.33		c0.00	
v/s Ratio Perm	c0.45					0.00
v/c Ratio	0.77	0.34	0.67		0.18	0.00
Uniform Delay, d1	14.2	1.7	13.3		33.7	33.6
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	6.3	0.3	2.1		3.0	0.0
Delay (s)	20.5	2.0	15.4		36.8	33.6
Level of Service	C	A	B		D	C
Approach Delay (s)		7.6	15.4		34.6	
Approach LOS		A	B		C	
<b>Intersection Summary</b>						
HCM 2000 Control Delay		11.3		HCM 2000 Level of Service		B
HCM 2000 Volume to Capacity ratio		0.80				
Actuated Cycle Length (s)		69.4		Sum of lost time (s)		18.0
Intersection Capacity Utilization		70.7%		ICU Level of Service		C
Analysis Period (min)		15				

c Critical Lane Group

Lanes, Volumes, Timings  
17: Driveway A & Street 1

Future Total 2037  
PM Peak Hour

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↘			↘	↗	
Traffic Volume (vph)	0	0	110	0	0	103
Future Volume (vph)	0	0	110	0	0	103
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				0.950		
Satd. Flow (prot)	1863	0	0	1770	1611	0
Fit Permitted				0.950		
Satd. Flow (perm)	1863	0	0	1770	1611	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	28.7			89.9	45.0	
Travel Time (s)	2.1			6.5	3.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	120	0	0	112
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	120	112	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	
<b>Intersection Summary</b>						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	19.1%		ICU Level of Service A			
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis  
17: Driveway A & Street 1

Future Total 2037  
PM Peak Hour

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↘			↘	↗	
Traffic Volume (veh/h)	0	0	110	0	0	103
Future Volume (Veh/h)	0	0	110	0	0	103
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	0	120	0	0	112
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			0		240	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			0		240	0
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		100	90
cM capacity (veh/h)			1623		693	1085
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	0	120	112			
Volume Left	0	120	0			
Volume Right	0	0	112			
eSH	1700	1623	1085			
Volume to Capacity	0.00	0.07	0.10			
Queue Length 95th (m)	0.0	1.9	2.8			
Control Delay (s)	0.0	7.4	8.7			
Lane LOS		A	A			
Approach Delay (s)	0.0	7.4	8.7			
Approach LOS			A			
<b>Intersection Summary</b>						
Average Delay			8.0			
Intersection Capacity Utilization	19.1%		ICU Level of Service		A	
Analysis Period (min)	15					

Lanes, Volumes, Timings  
18: Street C & Driveway B

Future Total 2037  
PM Peak Hour

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	34	22	170	381	88
Future Volume (vph)	0	34	22	170	381	88
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				0.975	
Fit Protected				0.994		
Satd. Flow (prot)	1611	0	0	1852	1816	0
Fit Permitted				0.994		
Satd. Flow (perm)	1611	0	0	1852	1816	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	63.9			72.9	59.9	
Travel Time (s)	4.6			5.2	4.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	37	24	185	414	96
Shared Lane Traffic (%)						
Lane Group Flow (vph)	37	0	0	209	510	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	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
Sign Control	Stop			Free	Free	
<b>Intersection Summary</b>						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	37.4%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis  
18: Street C & Driveway B

Future Total 2037  
PM Peak Hour

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	34	22	170	381	88
Future Volume (Veh/h)	0	34	22	170	381	88
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	37	24	185	414	96
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)				73		
pX, platoon unblocked						
vC, conflicting volume	695	462	510			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	695	462	510			
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	94	98			
cM capacity (veh/h)	399	600	1055			
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>NB 1</b>	<b>SB 1</b>			
Volume Total	37	209	510			
Volume Left	0	24	0			
Volume Right	37	0	96			
eSH	600	1055	1700			
Volume to Capacity	0.06	0.02	0.30			
Queue Length 95th (m)	1.6	0.6	0.0			
Control Delay (s)	11.4	1.2	0.0			
Lane LOS	B	A				
Approach Delay (s)	11.4	1.2	0.0			
Approach LOS	B					
<b>Intersection Summary</b>						
Average Delay		0.9				
Intersection Capacity Utilization	37.4%			ICU Level of Service		A
Analysis Period (min)	15					



Lanes, Volumes, Timings  
19: Street C & South Service Road

Future Total 2037  
PM Peak Hour

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↘			↘	↗	↗
Traffic Volume (vph)	38	0	75	370	19	54
Future Volume (vph)	38	0	75	370	19	54
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					0.900	
Flt Protected				0.992	0.987	
Satd. Flow (prot)	1863	0	0	1848	1655	0
Flt Permitted				0.992	0.987	
Satd. Flow (perm)	1863	0	0	1848	1655	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	264.4			306.3	164.3	
Travel Time (s)	19.0			22.1	11.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	41	0	82	402	21	59
Shared Lane Traffic (%)						
Lane Group Flow (vph)	41	0	0	484	80	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	41.3%
Analysis Period (min)	15
	ICU Level of Service A

HCM Unsignalized Intersection Capacity Analysis  
19: Street C & South Service Road

Future Total 2037  
PM Peak Hour

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↘			↘	↗	↗
Traffic Volume (veh/h)	38	0	75	370	19	54
Future Volume (Veh/h)	38	0	75	370	19	54
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	0	82	402	21	59
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			41		607	41
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			41		607	41
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		95	94
cM capacity (veh/h)			1568		436	1030



Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	41	484	80
Volume Left	0	82	21
Volume Right	0	0	59
eSH	1700	1568	758
Volume to Capacity	0.02	0.05	0.11
Queue Length 95th (m)	0.0	1.3	2.8
Control Delay (s)	0.0	1.7	10.3
Lane LOS		A	B
Approach Delay (s)	0.0	1.7	10.3
Approach LOS			B

Intersection Summary

Average Delay		2.7	
Intersection Capacity Utilization	41.3%		ICU Level of Service A
Analysis Period (min)		15	

Lanes, Volumes, Timings  
20: Street A & South Service Road



Future Total 2037  
PM Peak Hour

						
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
Fr <sub>t</sub>	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		264.4		119.8	
Travel Time (s)	18.4		19.0		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

Future Total 2037  
PM Peak Hour

						
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			

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

Future Total 2037  
PM Peak Hour

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	96	0	77	397	288
Future Volume (vph)	0	96	0	77	397	288
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				0.943	
Fit Protected						
Satd. Flow (prot)	1611	0	0	1863	1757	0
Fit Permitted						
Satd. Flow (perm)	1611	0	0	1863	1757	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	104	0	84	432	313
Shared Lane Traffic (%)						
Lane Group Flow (vph)	104	0	0	84	745	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	
<b>Intersection Summary</b>						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	51.1%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis  
21: Argus Rd & Street 1

Future Total 2037  
PM Peak Hour

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	96	0	77	397	288
Future Volume (Veh/h)	0	96	0	77	397	288
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	104	0	84	432	313
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	672	588	745			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	672	588	745			
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	80	100			
cM capacity (veh/h)	421	509	863			
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>NB 1</b>	<b>SB 1</b>			
Volume Total	104	84	745			
Volume Left	0	0	0			
Volume Right	104	0	313			
eSH	509	863	1700			
Volume to Capacity	0.20	0.00	0.44			
Queue Length 95th (m)	6.1	0.0	0.0			
Control Delay (s)	13.9	0.0	0.0			
Lane LOS	B					
Approach Delay (s)	13.9	0.0	0.0			
Approach LOS	B					
<b>Intersection Summary</b>						
Average Delay				1.5		
Intersection Capacity Utilization	51.1%			ICU Level of Service		A
Analysis Period (min)	15					

Lanes, Volumes, Timings  
22: Street C & Street 1

Future Total 2037  
PM Peak Hour

	↖	→	↘	↙	←	↖	↙	↑	↘	↙	↓	↘
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (vph)	0	96	7	201	88	0	22	148	0	0	261	0
Future Volume (vph)	0	96	7	201	88	0	22	148	0	0	261	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	0.990											
Flt Protected					0.966		0.994					
Satd. Flow (prot)	0	1844	0	0	1799	0	0	1852	0	0	1863	0
Flt Permitted					0.966		0.994					
Satd. Flow (perm)	0	1844	0	0	1799	0	0	1852	0	0	1863	0
Link Speed (k/h)	50		50		50		50		50		50	
Link Distance (m)	89.9		165.4		165.4		59.9		164.3		164.3	
Travel Time (s)	6.5		11.9		11.9		4.3		11.8		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	104	8	218	96	0	24	161	0	0	284	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	112	0	0	314	0	0	185	0	0	284	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		0.0		0.0		0.0		0.0	
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	25	15	25	25	15	25	25	15	15
Sign Control	Stop		Stop		Stop		Free		Free		Free	
<b>Intersection Summary</b>												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	55.2%				ICU Level of Service B							
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis  
22: Street C & Street 1

Future Total 2037  
PM Peak Hour

	↖	→	↘	↙	←	↖	↙	↑	↘	↙	↓	↘
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (veh/h)	0	96	7	201	88	0	22	148	0	0	261	0
Future Volume (Veh/h)	0	96	7	201	88	0	22	148	0	0	261	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	104	8	218	96	0	24	161	0	0	284	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	541	493	284	553	493	161	284				161	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	541	493	284	553	493	161	284				161	
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	78	99	39	79	100	98				100	
cM capacity (veh/h)	375	468	755	359	468	884	1278				1418	
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>WB 1</b>	<b>NB 1</b>	<b>SB 1</b>								
Volume Total	112	314	185	284								
Volume Left	0	218	24	0								
Volume Right	8	0	0	0								
cSH	481	386	1278	1418								
Volume to Capacity	0.23	0.81	0.02	0.00								
Queue Length 95th (m)	7.1	57.8	0.5	0.0								
Control Delay (s)	14.7	44.2	1.2	0.0								
Lane LOS	B	E	A									
Approach Delay (s)	14.7	44.2	1.2	0.0								
Approach LOS	B	E										
<b>Intersection Summary</b>												
Average Delay				17.6								
Intersection Capacity Utilization	55.2%				ICU Level of Service				B			
Analysis Period (min)	15											

Lanes, Volumes, Timings

23: GO Station West Access/Street C & Cross Ave

Future Total 2037

PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔			↔			↔			↔		
Traffic Volume (vph)	95	616	58	206	355	97	99	0	491	252	113	50
Future Volume (vph)	95	616	58	206	355	97	99	0	491	252	113	50
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	15.0		0.0
Storage Lanes	0		0	0		0	1		0	1		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	0.989				0.978				0.850		0.954	
Flt Protected	0.994				0.985				0.950		0.950	
Satd. Flow (prot)	0	3479	0	0	3409	0	1770	1583	0	1770	1777	0
Flt Permitted	0.719				0.576				0.646		0.297	
Satd. Flow (perm)	0	2517	0	0	1994	0	1203	1583	0	553	1777	0
Right Turn on Red	Yes			Yes			Yes			Yes		
Satd. Flow (RTOR)	20				46				102		53	
Link Speed (k/h)	50			50			50			50		
Link Distance (m)	209.8			164.3			55.1			72.9		
Travel Time (s)	15.1			11.8			4.0			5.2		
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)	103	670	63	224	386	105	108	0	534	274	123	54
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	836	0	0	715	0	108	534	0	274	177	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

Future Total 2037

PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4					8	8			2	2
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	
Act Effct Green (s)	17.8			17.8			18.2		18.2		18.2	
Actuated g/C Ratio	0.37			0.37			0.38		0.38		0.38	
v/c Ratio	0.88			1.06dl			0.24		0.81		1.31	
Control Delay	27.9			36.5			12.1		23.4		192.0	
Queue Delay	0.0			0.0			0.0		0.0		0.0	
Total Delay	27.9			36.5			12.1		23.4		192.0	
LOS	C			D			B		C		F	
Approach Delay	27.9			36.5			21.5				120.0	
Approach LOS	C			D			C				F	
Queue Length 50th (m)	34.1			28.7			6.3		32.8		~33.4	
Queue Length 95th (m)	#66.5			#60.9			15.2		#82.0		#69.6	
Internal Link Dist (m)	185.8			140.3			31.1				48.9	
Turn Bay Length (m)											15.0	
Base Capacity (vph)	956			776			456		663		209	
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			0.92			0.24		0.81		1.31	
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:	1.31											
Intersection Signal Delay:	44.4						Intersection LOS: D					
Intersection Capacity Utilization:	104.9%						ICU Level of Service G					
Analysis Period (min):	15											
~ Volume exceeds capacity, queue is theoretically infinite.												

Lanes, Volumes, Timings

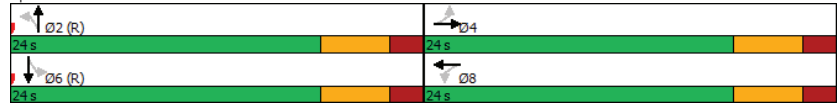
23: GO Station West Access/Street C & Cross Ave

Future Total 2037

PM Peak Hour

- 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

Future Total 2037

PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↔			↔↔		↔	↔		↔	↔	
Traffic Volume (vph)	95	616	58	206	355	97	99	0	491	252	113	50
Future Volume (vph)	95	616	58	206	355	97	99	0	491	252	113	50
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 <sub>t</sub>		0.99			0.98		1.00	0.85		1.00	0.95	
Fit Protected		0.99			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		3478			3408		1770	1583		1770	1778	
Fit Permitted		0.72			0.58		0.65	1.00		0.30	1.00	
Satd. Flow (perm)		2516			1993		1203	1583		554	1778	
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)	103	670	63	224	386	105	108	0	534	274	123	54
RTOR Reduction (vph)	0	13	0	0	29	0	63	0	0	0	33	0
Lane Group Flow (vph)	0	823	0	0	686	0	108	471	0	274	144	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)		933			739		456	600		210	674	
v/s Ratio Prot								0.30			0.08	
v/s Ratio Perm		0.33			c0.34		0.09			c0.49		
v/c Ratio		0.88			1.06dl		0.24	0.78		1.30	0.21	
Uniform Delay, d1		14.1			14.5		10.2	13.2		14.9	10.1	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		9.9			17.8		1.2	9.9		167.2	0.7	
Delay (s)		24.0			32.2		11.4	23.1		182.1	10.8	
Level of Service		C			C		B	C		F	B	
Approach Delay (s)		24.0			32.2			21.1			114.9	
Approach LOS		C			C			C			F	

Intersection Summary			
HCM 2000 Control Delay	41.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.12		
Actuated Cycle Length (s)	48.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	104.9%	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

# Appendix H

## Synchro Analysis - Sensitivity



Lanes, Volumes, Timings  
11: Argus Rd & South Service Road

Future Total 2037 - Sensitivity  
AM Peak Hour

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↕	↕↔		↕	↕
Traffic Volume (vph)	1	41	864	301	89	154
Future Volume (vph)	1	41	864	301	89	154
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			0.961			0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	902	1900	3375	0	1805	1615
Flt Permitted	0.138				0.950	
Satd. Flow (perm)	131	1900	3375	0	1790	1594
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)			124			106
Link Speed (k/h)		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)	1	45	939	327	97	167
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1	45	1266	0	97	167
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

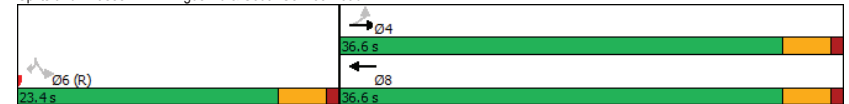
Future Total 2037 - Sensitivity  
AM Peak Hour

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	0.01	0.04	0.68		0.17	0.29
Control Delay	7.0	6.9	11.4		16.0	8.2
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	7.0	6.9	11.4		16.0	8.2
LOS	A	A	B		B	A
Approach Delay		6.9	11.4		11.1	
Approach LOS		A	B		B	
Queue Length 50th (m)	0.1	2.2	45.4		8.0	5.0
Queue Length 95th (m)	0.7	6.1	65.8		17.6	17.1
Internal Link Dist (m)		160.1	115.4		76.5	
Turn Bay Length (m)	30.0					
Base Capacity (vph)	70	1016	1863		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	0.01	0.04	0.68		0.17	0.29

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:	55
Control Type:	Pretimed
Maximum v/c Ratio:	0.68
Intersection Signal Delay:	11.2
Intersection LOS:	B
Intersection Capacity Utilization:	56.0%
ICU Level of Service:	B
Analysis Period (min):	15

Splits and Phases: 11: Argus Rd & South Service Road





HCM Signalized Intersection Capacity Analysis  
11: Argus Rd & South Service Road

Future Total 2037 - Sensitivity  
AM Peak Hour

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↗	↗↔		↖	↖
Traffic Volume (vph)	1	41	864	301	89	154
Future Volume (vph)	1	41	864	301	89	154
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	3376		1790	1594
Flt Permitted	0.14	1.00	1.00		0.95	1.00
Satd. Flow (perm)	131	1900	3376		1790	1594
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1	45	939	327	97	167
RTOR Reduction (vph)	0	0	58	0	0	73
Lane Group Flow (vph)	1	45	1208	0	97	94
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)	70	1016	1806		563	502
v/s Ratio Prot		0.02	c0.36			
v/s Ratio Perm	0.01				0.05	c0.06
v/c Ratio	0.01	0.04	0.67		0.17	0.19
Uniform Delay, d1	6.5	6.6	10.1		14.9	15.0
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.4	0.1	2.0		0.7	0.8
Delay (s)	6.9	6.7	12.1		15.5	15.8
Level of Service	A	A	B		B	B
Approach Delay (s)		6.7	12.1		15.7	
Approach LOS		A	B		B	
<b>Intersection Summary</b>						
HCM 2000 Control Delay		12.5		HCM 2000 Level of Service		B
HCM 2000 Volume to Capacity ratio		0.49				
Actuated Cycle Length (s)		60.0		Sum of lost time (s)		9.0
Intersection Capacity Utilization		56.0%		ICU Level of Service		B
Analysis Period (min)		15				
c Critical Lane Group						

Lanes, Volumes, Timings  
13: GO Bus Terminal/Argus Rd & Cross Ave

Future Total 2037 - Sensitivity  
AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕	↗	↖	↕↕			↕	↕	↖↖	↖	↖
Traffic Volume (vph)	41	1073	19	53	854	31	27	0	64	567	21	257
Future Volume (vph)	41	1073	19	53	854	31	27	0	64	567	21	257
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		
Lane Util. Factor	0.95	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		1.00	0.97		1.00		1.00	0.96		0.97	0.98	
Frt			0.850		0.995			0.850			0.861	
Flt Protected		0.998		0.950		0.950		0.950		0.950		
Satd. Flow (prot)	0	3212	727	818	3194	0	805	727	0	3046	1354	0
Flt Permitted		0.865		0.089		0.950		0.950		0.950		
Satd. Flow (perm)	0	2784	706	77	3194	0	803	727	0	2956	1354	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			139		4			139			199	
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)	45	1166	21	58	928	34	29	0	70	616	23	279
<b>Shared Lane Traffic (%)</b>												
Lane Group Flow (vph)	0	1211	21	58	962	0	29	70	0	616	302	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			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	
<b>Two way Left Turn Lane</b>												
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	1	2	1	2	1	2	1	2	2
Detector Template	Left	Thru	Right	Left	Thru	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	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	
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	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	
<b>Detector 1 Channel</b>												
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		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
<b>Detector 2 Channel</b>												

Lanes, Volumes, Timings  
13: GO Bus Terminal/Argus Rd & Cross Ave

Future Total 2037 - Sensitivity  
AM Peak Hour

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	pm+pt	NA	Prot	NA	Prot	NA	Prot	NA	
Protected Phases		2		1	6		3	8		7	4	
Permitted Phases		2	2	6								
Detector Phase		2	2	1	6		3	8		7	4	
Switch Phase												
Minimum Initial (s)	22.0	22.0	22.0	8.0	22.0		5.0	10.0		5.0	10.0	
Minimum Split (s)	45.0	45.0	45.0	12.5	29.0		9.5	29.0		9.5	29.0	
Total Split (s)	57.3	57.3	57.3	12.5	69.8		14.9	29.0		26.7	40.8	
Total Split (%)	45.7%	45.7%	45.7%	10.0%	55.6%		11.9%	23.1%		21.3%	32.5%	
Maximum Green (s)	51.3	51.3	51.3	8.5	63.8		10.4	23.0		22.2	34.8	
Yellow Time (s)	4.0	4.0	4.0	3.0	4.0		3.5	4.0		3.5	4.0	
All-Red Time (s)	2.0	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	Lag	Lead			Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes			Yes	Yes		Yes	Yes	
Vehicle Extension (s)	5.0	5.0	5.0	2.5	5.0		3.0	4.0		3.0	4.0	
Recall Mode	Min	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	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)	53.3	53.3	65.7	65.7			10.6	13.3		24.2	31.3	
Actuated g/C Ratio	0.47	0.47	0.58	0.58			0.09	0.12		0.21	0.28	
v/c Ratio	0.93	0.05	0.59	0.52			0.39	0.34		0.95	0.58	
Control Delay	42.0	0.3	40.7	16.0			64.1	4.4		69.9	18.5	
Queue Delay	15.8	0.0	0.0	0.0			0.0	0.0		0.0	0.0	
Total Delay	57.9	0.3	40.7	16.0			64.1	4.4		69.9	18.5	
LOS	E	A	D	B			E	A		E	B	
Approach Delay	56.9			17.4			21.9			53.0		
Approach LOS	E			B			C			D		
Queue Length 50th (m)	133.3	0.0	5.7	65.2			6.4	0.0		72.7	20.6	
Queue Length 95th (m)	#202.6	0.0	#24.4	95.2			17.2	0.0		#118.1	52.8	
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)	1305	404	100	1850			87	268		648	580	
Starvation Cap Reductn	121	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	1.02	0.05	0.58	0.52			0.33	0.26		0.95	0.52	

Intersection Summary

Area Type: CBD  
 Cycle Length: 125.5  
 Actuated Cycle Length: 113.7  
 Natural Cycle: 130  
 Control Type: Semi Act-Uncoord  
 Maximum v/c Ratio: 0.95  
 Intersection Signal Delay: 42.4  
 Intersection LOS: D

Lanes, Volumes, Timings  
13: GO Bus Terminal/Argus Rd & Cross Ave

Future Total 2037 - Sensitivity  
AM Peak Hour

Intersection Capacity Utilization 96.5%  
 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

Future Total 2037 - Sensitivity  
AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR		
Lane Configurations		↑↑	↑	↓	↓	↑↑	↓	↓		↓	↓	↓		
Traffic Volume (vph)	41	1073	19	53	854	31	27	0	64	567	21	257		
Future Volume (vph)	41	1073	19	53	854	31	27	0	64	567	21	257		
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	1.00			1.00	0.96		1.00	0.98			
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	0.99			1.00	0.85		1.00	0.86			
Flt Protected	1.00	1.00	0.95	1.00			0.95	1.00		0.95	1.00			
Satd. Flow (prot)	3212	707	818	3193			805	729		3046	1355			
Flt Permitted	0.87	1.00	0.09	1.00			0.95	1.00		0.95	1.00			
Satd. Flow (perm)	2784	707	76	3193			805	729		3046	1355			
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	1166	21	58	928	34	29	0	70	616	23	279		
RTOR Reduction (vph)	0	0	11	0	2	0	0	61	0	0	145	0		
Lane Group Flow (vph)	0	1211	10	58	960	0	29	9	0	616	157	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	Perm	pm+pt	NA		Prot	NA		Prot	NA			
Protected Phases		2		1	6		3	8		7	4			
Permitted Phases	2		2	6										
Actuated Green, G (s)		51.3	51.3	63.7	63.7		6.0	13.2		22.2	29.4			
Effective Green, g (s)		53.3	53.3	63.7	65.7		8.0	15.2		24.2	31.4			
Actuated g/C Ratio		0.46	0.46	0.55	0.57		0.07	0.13		0.21	0.27			
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)		1283	325	95	1814		55	95		637	368			
v/s Ratio Prot				0.04	c0.30		0.04	0.01		c0.20	c0.12			
v/s Ratio Perm		c0.43	0.01	0.29										
v/c Ratio		0.94	0.03	0.61	0.53		0.53	0.10		0.97	0.43			
Uniform Delay, d1		29.7	17.0	19.6	15.4		52.0	44.2		45.3	34.7			
Progression Factor		1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00			
Incremental Delay, d2		14.2	0.1	9.5	0.5		8.8	0.6		27.3	1.1			
Delay (s)		43.9	17.1	29.2	15.9		60.8	44.8		72.6	35.8			
Level of Service		D	B	C	B		E	D		E	D			
Approach Delay (s)		43.5			16.7			49.5			60.5			
Approach LOS		D			B			D			E			
<b>Intersection Summary</b>														
HCM 2000 Control Delay		40.1					HCM 2000 Level of Service				D			
HCM 2000 Volume to Capacity ratio		0.86												
Actuated Cycle Length (s)		115.6			Sum of lost time (s)		14.5							
Intersection Capacity Utilization		96.5%			ICU Level of Service		F							
Analysis Period (min)		15												
c Critical Lane Group														

Lanes, Volumes, Timings  
14: Lyons Lane/Street A & Cross Ave

Future Total 2037 - Sensitivity  
AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR		
Lane Configurations		↑↑	↑	↓	↓	↑↑	↓	↓		↓	↓	↓		
Traffic Volume (vph)	113	247	259	289	298	24	23	4	17	82	31	120		
Future Volume (vph)	113	247	259	289	298	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		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		0.923			0.989			0.877			0.881			
Flt Protected	0.950			0.950			0.950			0.950				
Satd. Flow (prot)	1540	2814	0	1570	2727	0	1570	1481	0	1468	1453	0		
Flt Permitted	0.542			0.363			0.563			0.743				
Satd. Flow (perm)	873	2814	0	600	2727	0	928	1481	0	1144	1453	0		
Right Turn on Red			Yes			Yes			Yes			Yes		
Satd. Flow (RTOR)		282			19			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	268	282	314	324	26	25	4	18	89	34	130		
<b>Shared Lane Traffic (%)</b>														
Lane Group Flow (vph)	123	550	0	314	350	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			
<b>Two way Left Turn Lane</b>														
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			
<b>Detector 1 Channel</b>														
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			
<b>Detector 2 Channel</b>														

Lanes, Volumes, Timings  
14: Lyons Lane/Street A & Cross Ave

Future Total 2037 - Sensitivity  
AM Peak Hour

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		1	6		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)	41.0	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	0.29	0.36		0.56	0.18		0.14	0.07		0.40	0.42	
Control Delay	15.4	6.9		8.9	4.3		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	15.4	6.9		8.9	4.3		27.5	14.1		32.7	11.8	
LOS	B	A		A	A		C	B		C	B	
Approach Delay		8.4			6.5			21.2			19.1	
Approach LOS		A			A			C			B	
Queue Length 50th (m)	9.8	10.6		14.1	7.1		3.1	0.5		11.5	4.2	
Queue Length 95th (m)	27.5	26.9		31.6	15.0		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)	431	1533		638	2117		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	0.29	0.36		0.49	0.17		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:	0.56
Intersection Signal Delay:	9.7
Intersection LOS:	A

Lanes, Volumes, Timings  
14: Lyons Lane/Street A & Cross Ave

Future Total 2037 - Sensitivity  
AM Peak Hour

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

Future Total 2037 - Sensitivity  
AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	113	247	259	289	298	24	23	4	17	82	31	120
Future Volume (vph)	113	247	259	289	298	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	
Frbp, ped/bikes	1.00	0.99		1.00	1.00		1.00	0.99		1.00	0.99	
Fipb, 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	
Fit Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1531	2815		1570	2726		1567	1482		1463	1454	
Fit Permitted	0.54	1.00		0.36	1.00		0.56	1.00		0.74	1.00	
Satd. Flow (perm)	874	2815		601	2726		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	268	282	314	324	26	25	4	18	89	34	130
RTOR Reduction (vph)	0	143	0	0	6	0	0	14	0	0	104	0
Lane Group Flow (vph)	123	408	0	314	344	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)	432	1392		547	1899		182	291		225	286	
v/s Ratio Prot		0.14		c0.09	0.13			0.01			0.04	
v/s Ratio Perm	0.14			c0.30			0.03			c0.08		
v/c Ratio	0.28	0.29		0.57	0.18		0.14	0.03		0.40	0.21	
Uniform Delay, d1	11.2	11.2		5.7	4.0		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	0.8	0.2		1.2	0.1		0.5	0.0		1.6	0.5	
Delay (s)	11.9	11.5		6.9	4.1		25.4	24.4		27.9	25.8	
Level of Service	B	B		A	A		C	C		C	C	
Approach Delay (s)		11.6			5.4			24.9			26.5	
Approach LOS		B			A			C			C	

Intersection Summary			
HCM 2000 Control Delay	11.8	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  
21: Argus Rd & Street 1

Future Total 2037 - Sensitivity  
AM Peak Hour

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	0	191	0	73	653	469
Future Volume (vph)	0	191	0	73	653	469
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)	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	208	0	79	710	510
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	208	0	79	710	510
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	7.2			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 52.9%	ICU Level of Service A
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis  
21: Argus Rd & Street 1

Future Total 2037 - Sensitivity  
AM Peak Hour

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔	↔		↑	↑	↔
Traffic Volume (veh/h)	0	191	0	73	653	469
Future Volume (Veh/h)	0	191	0	73	653	469
Sign Control	Stop		Free			
Grade	0%		0%			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	208	0	79	710	510
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	251		
pX, platoon unblocked	0.77	0.77	0.77			
vC, conflicting volume	789	710	1220			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	580	478	1138			
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	54	100			
cM capacity (veh/h)	368	454	475			
Direction, Lane #	EB 1	EB 2	NB 1	SB 1	SB 2	
Volume Total	0	208	79	710	510	
Volume Left	0	0	0	0	0	
Volume Right	0	208	0	0	510	
cSH	1700	454	475	1700	1700	
Volume to Capacity	0.00	0.46	0.00	0.42	0.30	
Queue Length 95th (m)	0.0	18.8	0.0	0.0	0.0	
Control Delay (s)	0.0	19.5	0.0	0.0	0.0	
Lane LOS	A		C			
Approach Delay (s)	19.5		0.0		0.0	
Approach LOS	C					
Intersection Summary						
Average Delay			2.7			
Intersection Capacity Utilization			52.9%		ICU Level of Service A	
Analysis Period (min)			15			

Lanes, Volumes, Timings  
22: Street C & Street 1

Future Total 2037 - Sensitivity  
AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	0	123	14	440	29	0	7	40	68	0	586	0
Future Volume (vph)	0	123	14	440	29	0	7	40	68	0	586	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0	0.0	0.0	60.0	0.0	0.0	0.0	0.0	0.0	0.0	60.0	0.0
Storage Lanes	1		0	1		0	0		0	0	1	
Taper Length (m)	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	0.985						0.920					
Fit Protected			0.950				0.997					
Satd. Flow (prot)	1863	1835	0	1770	1863	0	0	1709	0	0	1863	0
Fit Permitted			0.407				0.963					
Satd. Flow (perm)	1863	1835	0	758	1863	0	0	1650	0	0	1863	0
Right Turn on Red			Yes				Yes		Yes			
Satd. Flow (RTOR)			6				74		Yes			
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	134	15	478	32	0	8	43	74	0	637	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	149	0	478	32	0	0	125	0	0	637	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	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		pm+pt	NA		Perm	NA		NA	NA	
Protected Phases	4				3		2		2		6	
Permitted Phases	4				8		2		6			

Lanes, Volumes, Timings  
22: Street C & Street 1

Future Total 2037 - Sensitivity  
AM Peak Hour

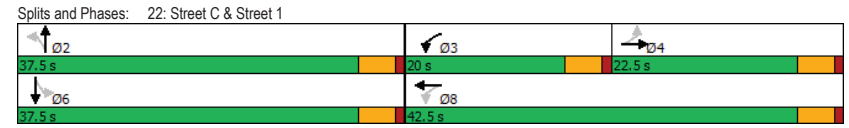
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4		3	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	22.5	22.5		9.5	22.5		22.5	22.5		22.5	22.5	
Total Split (s)	22.5	22.5		20.0	42.5		37.5	37.5		37.5	37.5	
Total Split (%)	28.1%	28.1%		25.0%	53.1%		46.9%	46.9%		46.9%	46.9%	
Maximum Green (s)	18.0	18.0		15.5	38.0		33.0	33.0		33.0	33.0	
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	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)		10.9		27.2	27.2		27.2	27.2		27.2	27.2	
Actuated g/C Ratio		0.17		0.42	0.42		0.42	0.42		0.42	0.42	
v/c Ratio		0.47		0.85	0.04		0.17	0.81		0.81	0.81	
Control Delay		31.5		32.5	11.7		7.1	27.3		27.3	27.3	
Queue Delay		0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay		31.5		32.5	11.7		7.1	27.3		27.3	27.3	
LOS		C		C	B		A	C		C	C	
Approach Delay		31.5			31.1		7.1	27.3		27.3	27.3	
Approach LOS		C			C		A	C		C	C	
Queue Length 50th (m)		17.9		46.5	2.3		4.0	73.0		73.0	73.0	
Queue Length 95th (m)		36.2		#89.3	7.2		14.3	#141.4		#141.4	#141.4	
Internal Link Dist (m)		61.9			138.1		110.3	135.9		135.9	135.9	
Turn Bay Length (m)				60.0								
Base Capacity (vph)		558		601	1180		946	1031		1031	1031	
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		0.27		0.80	0.03		0.13	0.62		0.62	0.62	

Intersection Summary

Area Type: Other  
 Cycle Length: 80  
 Actuated Cycle Length: 64  
 Natural Cycle: 80  
 Control Type: Actuated-Uncoordinated  
 Maximum v/c Ratio: 0.85  
 Intersection Signal Delay: 27.3  
 Intersection Capacity Utilization 73.8%  
 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

Future Total 2037 - Sensitivity  
AM Peak Hour



HCM Signalized Intersection Capacity Analysis  
22: Street C & Street 1

Future Total 2037 - Sensitivity  
AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	0	123	14	440	29	0	7	40	68	0	586	0
Future Volume (vph)	0	123	14	440	29	0	7	40	68	0	586	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
Lane Util. Factor		1.00		1.00		1.00		1.00		1.00		1.00
Fr		0.98		1.00		1.00		0.92		1.00		1.00
Flt Protected		1.00		0.95		1.00		1.00		1.00		1.00
Satd. Flow (prot)		1835		1770		1863		1708		1863		1863
Flt Permitted		1.00		0.41		1.00		0.96		1.00		1.00
Satd. Flow (perm)		1835		758		1863		1651		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	134	15	478	32	0	8	43	74	0	637	0
RTOR Reduction (vph)	0	5	0	0	0	0	0	43	0	0	0	0
Lane Group Flow (vph)	0	144	0	478	32	0	0	82	0	0	637	0
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		NA		NA
Protected Phases		4		3	8			2				6
Permitted Phases		4		8			2			6		
Actuated Green, G (s)		8.6		28.3	28.3			27.2				27.2
Effective Green, g (s)		8.6		28.3	28.3			27.2				27.2
Actuated g/C Ratio		0.13		0.44	0.44			0.42				0.42
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)		244		571	817			696				785
v/s Ratio Prot		0.08		c0.20	0.02							c0.34
v/s Ratio Perm				c0.17				0.05				
v/c Ratio		0.59		0.84	0.04			0.12				0.81
Uniform Delay, d1		26.3		14.2	10.3			11.4				16.4
Progression Factor		1.00		1.00	1.00			1.00				1.00
Incremental Delay, d2		3.6		10.3	0.0			0.1				6.4
Delay (s)		29.9		24.6	10.4			11.4				22.8
Level of Service		C		C	B			B				C
Approach Delay (s)		29.9			23.7			11.4				22.8
Approach LOS		C			C			B				C

Intersection Summary			
HCM 2000 Control Delay	22.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	64.5	Sum of lost time (s)	13.5
Intersection Capacity Utilization	73.8%	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

Future Total 2037 - Sensitivity  
AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	27	340	115	550	522	27	51	0	271	555	411	112
Future Volume (vph)	27	340	115	550	522	27	51	0	271	555	411	112
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			0.850		0.993			0.850			0.968	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1863	1583	3433	1850	0	1770	1583	0	1770	1803	0
Flt Permitted	0.950			0.950			0.451			0.175		
Satd. Flow (perm)	1770	1863	1583	3433	1850	0	840	1583	0	326	1803	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			143		2		314				15	
Link Speed (k/h)		50			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)	29	370	125	598	567	29	55	0	295	603	447	122
Shared Lane Traffic (%)												
Lane Group Flow (vph)	29	370	125	598	596	0	55	295	0	603	569	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

Future Total 2037 - Sensitivity

AM Peak Hour

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	31.0	31.0	26.5	47.2		26.1	26.1		42.5	68.6	
Total Split (%)	8.2%	24.6%	24.6%	21.0%	37.4%		20.7%	20.7%		33.7%	54.4%	
Maximum Green (s)	5.8	25.0	25.0	22.0	41.2		20.1	20.1		38.0	62.6	
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		
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	25.0	25.0	22.0	45.3		20.1	20.1		64.1	62.6	
Actuated g/C Ratio	0.05	0.20	0.20	0.17	0.36		0.16	0.16		0.51	0.50	
v/c Ratio	0.36	1.00	0.29	1.00	0.90		0.41	0.57		1.00	0.63	
Control Delay	71.1	98.1	6.6	88.8	56.5		58.3	8.7		71.7	26.5	
Queue Delay	0.0	0.0	0.0	0.0	17.6		0.0	0.0		33.5	23.9	
Total Delay	71.1	98.1	6.6	88.8	74.1		58.3	8.7		105.1	50.4	
LOS	E	F	A	F	E		E	A		F	D	
Approach Delay		74.7			81.5			16.5			78.6	
Approach LOS		E			F			B			E	
Queue Length 50th (m)	7.5	~97.8	0.0	81.3	153.7		13.1	0.0		~139.2	103.3	
Queue Length 95th (m)	18.0	#163.0	12.7	#121.0	#232.6		27.6	20.5		#219.3	143.2	
Internal Link Dist (m)		187.2			138.8			57.1			110.3	
Turn Bay Length (m)				70.0						15.0		
Base Capacity (vph)	81	369	428	598	665		133	516		600	902	
Starvation Cap Reductn	0	0	0	0	77		0	0		102	342	
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	0.36	1.00	0.29	1.00	1.01		0.41	0.57		1.21	1.02	

Intersection Summary

Area Type: Other  
 Cycle Length: 126.1  
 Actuated Cycle Length: 126.1  
 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: 1.00  
 Intersection Signal Delay: 72.3 Intersection LOS: E  
 Intersection Capacity Utilization 98.6% ICU Level of Service F  
 Analysis Period (min) 15  
 ~ Volume exceeds capacity, queue is theoretically infinite.

Lanes, Volumes, Timings

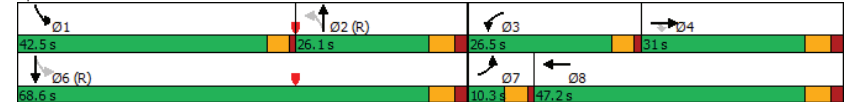
23: GO Station West Access/Street C & Cross Ave

Future Total 2037 - Sensitivity

AM Peak Hour

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

Future Total 2037 - Sensitivity  
AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↗	↗	↗	↗	↗	↗	↗	↗	↗	↗
Traffic Volume (vph)	27	340	115	550	522	27	51	0	271	555	411	112
Future Volume (vph)	27	340	115	550	522	27	51	0	271	555	411	112
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	
Frnt	1.00	1.00	0.85	1.00	0.99		1.00	0.85		1.00	0.97	
Flt 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	1849		1770	1583		1770	1803	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.45	1.00		0.18	1.00	
Satd. Flow (perm)	1770	1863	1583	3433	1849		839	1583		327	1803	
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)	29	370	125	598	567	29	55	0	295	603	447	122
RTOR Reduction (vph)	0	0	98	0	1	0	0	252	0	0	8	0
Lane Group Flow (vph)	29	370	27	598	595	0	55	43	0	603	561	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	26.8	26.8	22.0	45.3		18.3	18.3		60.8	60.8	
Effective Green, g (s)	3.5	26.8	26.8	22.0	45.3		18.3	18.3		60.8	60.8	
Actuated g/C Ratio	0.03	0.21	0.21	0.17	0.36		0.15	0.15		0.48	0.48	
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)	49	395	336	598	664		121	229		592	869	
v/s Ratio Prot	0.02	0.20		c0.17	c0.32			0.03		c0.31	0.31	
v/s Ratio Perm			0.02				0.07			c0.18		
v/c Ratio	0.59	0.94	0.08	1.00	0.90		0.45	0.19		1.02	0.65	
Uniform Delay, d1	60.6	48.8	39.8	52.0	38.2		49.3	47.4		35.4	24.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	17.7	29.4	0.1	36.8	14.6		11.8	1.8		41.7	3.7	
Delay (s)	78.3	78.3	39.9	88.9	52.8		61.2	49.2		77.2	28.2	
Level of Service	E	E	D	F	D		E	D		E	C	
Approach Delay (s)		69.1			70.9			51.0			53.4	
Approach LOS		E			E			D			D	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			62.1				HCM 2000 Level of Service				E	
HCM 2000 Volume to Capacity ratio			1.03									
Actuated Cycle Length (s)			126.1				Sum of lost time (s)				21.0	
Intersection Capacity Utilization			98.6%				ICU Level of Service				F	
Analysis Period (min)			15									

c Critical Lane Group

Lanes, Volumes, Timings  
11: Argus Rd & South Service Rd

Future Total 2037 - Sensitivity  
PM Peak Hour

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↕	↗	↗	↗	↗
Traffic Volume (vph)	13	24	684	671	57	78
Future Volume (vph)	13	24	684	671	57	78
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	
Frnt			0.926			0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1624	1513	2864	0	1624	1454
Flt Permitted	0.182				0.950	
Satd. Flow (perm)	311	1513	2864	0	1611	1454
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)			601			85
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	26	743	729	62	85
Shared Lane Traffic (%)						
Lane Group Flow (vph)	14	26	1472	0	62	85
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	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			6	6

Lanes, Volumes, Timings  
11: Argus Rd & South Service Rd

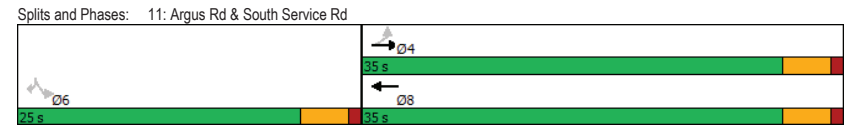
Future Total 2037 - Sensitivity  
PM Peak Hour

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)	22.0	22.0	22.0		7.3	7.3
Actuated g/C Ratio	0.57	0.57	0.57		0.19	0.19
v/c Ratio	0.08	0.03	0.78		0.21	0.25
Control Delay	4.8	3.5	6.9		17.6	7.3
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	4.8	3.5	6.9		17.6	7.3
LOS	A	A	A		B	A
Approach Delay		4.0	6.9		11.6	
Approach LOS		A	A		B	
Queue Length 50th (m)	0.3	0.6	14.8		3.6	0.0
Queue Length 95th (m)	2.0	2.6	36.5		12.9	8.8
Internal Link Dist (m)		153.7	121.7		79.5	
Turn Bay Length (m)						
Base Capacity (vph)	249	1214	2418		892	843
Starvation Cap Reductn	0	0	0		0	0
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.06	0.02	0.61		0.07	0.10

Intersection Summary	
Area Type:	CBD
Cycle Length:	60
Actuated Cycle Length:	38.7
Natural Cycle:	60
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.78
Intersection Signal Delay:	7.3
Intersection Capacity Utilization:	57.8%
Analysis Period (min):	15
Intersection LOS:	A
ICU Level of Service:	B

Lanes, Volumes, Timings  
11: Argus Rd & South Service Rd

Future Total 2037 - Sensitivity  
PM Peak Hour



HCM Signalized Intersection Capacity Analysis  
 11: Argus Rd & South Service Rd

Future Total 2037 - Sensitivity  
 PM Peak Hour

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↗	↗↘		↖	↖
Traffic Volume (vph)	13	24	684	671	57	78
Future Volume (vph)	13	24	684	671	57	78
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		0.99	1.00
Frt	1.00	1.00	0.93		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1624	1513	2863		1616	1454
Flt Permitted	0.18	1.00	1.00		0.95	1.00
Satd. Flow (perm)	311	1513	2863		1616	1454
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	14	26	743	729	62	85
RTOR Reduction (vph)	0	0	256	0	0	69
Lane Group Flow (vph)	14	26	1216	0	62	16
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 6					
Actuated Green, G (s)	22.0	22.0	22.0		7.3	7.3
Effective Green, g (s)	22.0	22.0	22.0		7.3	7.3
Actuated g/C Ratio	0.57	0.57	0.57		0.19	0.19
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)	178	869	1644		308	277
v/s Ratio Prot	0.02 c0.42					
v/s Ratio Perm	0.05 c0.04 0.01					
v/c Ratio	0.08	0.03	0.74		0.20	0.06
Uniform Delay, d1	3.6	3.5	6.0		13.0	12.7
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.2	0.0	1.8		0.3	0.1
Delay (s)	3.8	3.5	7.8		13.4	12.8
Level of Service	A		A		B	
Approach Delay (s)	3.6		7.8		13.0	
Approach LOS	A		A		B	
<b>Intersection Summary</b>						
HCM 2000 Control Delay	8.2		HCM 2000 Level of Service			A
HCM 2000 Volume to Capacity ratio	0.61					
Actuated Cycle Length (s)	38.3					
Intersection Capacity Utilization	57.8%		ICU Level of Service			B
Analysis Period (min)	15					
c Critical Lane Group						

Lanes, Volumes, Timings  
 13: GO Bus Terminal/Argus Rd & Cross Ave

Future Total 2037 - Sensitivity  
 PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↗↘	↗	↖	↗↘	↖	↖	↗	↖	↖↗	↖	↖
Traffic Volume (vph)	0	1377	21	48	576	56	20	3	61	405	26	62
Future Volume (vph)	0	1377	21	48	576	56	20	3	61	405	26	62
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	1.00	1.00	1.00	0.97	1.00	0.97	1.00
Ped Bike Factor		0.97		1.00		0.98	0.96		0.95	0.98		0.98
Frt		0.850		0.987		0.857			0.894			0.894
Flt Protected			0.950		0.950		0.950		0.950			0.950
Satd. Flow (prot)	0	3249	727	797	3195	0	785	703	0	3046	1155	0
Flt Permitted			0.071		0.950		0.950		0.950			0.950
Satd. Flow (perm)	0	3249	705	60	3195	0	772	703	0	2902	1155	0
Right Turn on Red	Yes						Yes			Yes		
Satd. Flow (RTOR)	145						14			66		
Link Speed (k/h)	50						50			50		
Link Distance (m)	164.3						72.9			81.9		
Travel Time (s)	11.8						5.2			5.9		
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%	100%	0%	100%
Adj. Flow (vph)	0	1497	23	52	626	61	22	3	66	440	28	67
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1497	23	52	687	0	22	69	0	440	95	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		
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	1.14	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	
Number of Detectors	2		1		1		2		1		2	
Detector Template	Thru	Right	Left	Thru	Left	Thru	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	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)	0.6	2.0	2.0	0.6	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	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	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		
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  
13: GO Bus Terminal/Argus Rd & Cross Ave

Future Total 2037 - Sensitivity  
PM Peak Hour

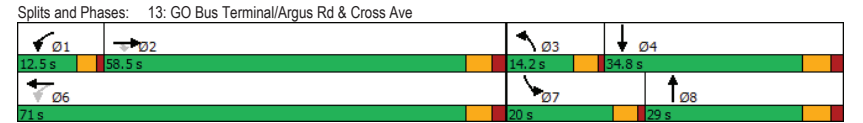
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)	0.0				0.0			0.0			0.0	
Turn Type	NA	Perm	pm+pt	NA	Prot	NA	Prot	NA	Prot	NA	Prot	NA
Protected Phases	2		1	6	3	8	7	4				
Permitted Phases		2	6									
Detector Phase	2	2	1	6	3	8	7	4				
Switch Phase												
Minimum Initial (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)	58.5	58.5	12.5	71.0	14.2	29.0	20.0	34.8				
Total Split (%)	48.8%	48.8%	10.4%	59.2%	11.8%	24.2%	16.7%	29.0%				
Maximum Green (s)	52.5	52.5	8.5	65.0	9.7	23.0	15.5	28.8				
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				
Pedestrian Calls (#/hr)	0	0		0		0		0				
Act Effct Green (s)	54.5	54.5	66.9	66.9	10.0	13.5	17.5	28.0				
Actuated g/C Ratio	0.50	0.50	0.62	0.62	0.09	0.12	0.16	0.26				
v/c Ratio	0.92	0.05	0.56	0.35	0.31	0.48	0.89	0.27				
Control Delay	35.3	0.2	41.1	10.7	57.7	22.8	66.8	16.3				
Queue Delay	39.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0				
Total Delay	75.0	0.2	41.1	10.7	57.7	22.8	66.8	16.3				
LOS	E	A	D	B	E	C	E	B				
Approach Delay	73.8			12.9		31.2		57.9				
Approach LOS	E			B		C		E				
Queue Length 50th (m)	151.2	0.0	4.2	34.0	4.6	0.6	49.2	4.4				
Queue Length 95th (m)	#230.0	0.0	#22.6	53.2	13.7	14.7	#85.0	20.6				
Internal Link Dist (m)	140.3			48.9		57.9		91.7				
Turn Bay Length (m)			20.0					15.0				
Base Capacity (vph)	1634	426	95	1981	84	212	492	383				
Starvation Cap Reductn	255	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	0.55	0.35	0.26	0.33	0.89	0.25				

Intersection Summary	
Area Type:	CBD
Cycle Length:	120
Actuated Cycle Length:	108.4
Natural Cycle:	120
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.92
Intersection Signal Delay:	53.9
Intersection LOS:	D

Lanes, Volumes, Timings  
13: GO Bus Terminal/Argus Rd & Cross Ave

Future Total 2037 - Sensitivity  
PM Peak Hour

Intersection Capacity Utilization 70.5%  
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.



HCM Signalized Intersection Capacity Analysis  
13: GO Bus Terminal/Argus Rd & Cross Ave

Future Total 2037 - Sensitivity  
PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↑↑	↑	↑	↑↑		↑	↑		↑	↑	↑	
Traffic Volume (vph)	0	1377	21	48	576	56	20	3	61	405	26	62	
Future Volume (vph)	0	1377	21	48	576	56	20	3	61	405	26	62	
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	2.5	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	1.00	0.97	1.00	
Frbp, ped/bikes	1.00	0.97	1.00	1.00	1.00	1.00	0.96	1.00	0.98	1.00	0.98	1.00	
Fpb, 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	1.00	0.86	1.00	0.89	1.00	0.89	1.00	
Fit 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)	3249	705	797	3194	785	704	3046	1157					
Fit Permitted	1.00	1.00	0.07	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	
Satd. Flow (perm)	3249	705	59	3194	785	704	3046	1157					
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	1497	23	52	626	61	22	3	66	440	28	67	
RTOR Reduction (vph)	0	0	12	0	6	0	0	56	0	0	50	0	
Lane Group Flow (vph)	0	1497	11	52	681	0	22	13	0	440	45	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	Prot	NA	Prot	NA	Prot	NA	Prot	NA	
Protected Phases	2		1	6	3	8	7	4					
Permitted Phases		2	6										
Actuated Green, G (s)	52.5	52.5	64.8	64.8	3.8	14.3	15.5	26.0					
Effective Green, g (s)	54.5	54.5	64.8	66.8	5.8	16.3	17.5	28.0					
Actuated g/C Ratio	0.49	0.49	0.58	0.60	0.05	0.15	0.16	0.25					
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)	1593	345	89	1920	40	103	479	291					
v/s Ratio Prot	c0.46		c0.04	0.21	0.03	0.02	c0.14	c0.04					
v/s Ratio Perm		0.02	0.29										
v/c Ratio	0.94	0.03	0.58	0.35	0.55	0.12	0.92	0.15					
Uniform Delay, d1	26.7	14.7	21.1	11.2	51.4	41.2	46.1	32.3					
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00					
Incremental Delay, d2	11.5	0.1	7.9	0.2	15.3	0.7	22.5	0.3					
Delay (s)	38.3	14.7	29.0	11.5	66.7	41.9	68.6	32.7					
Level of Service	D	B	C	B	E	D	E	C					
Approach Delay (s)	37.9		12.7		47.9		62.2						
Approach LOS	D		B		D		E						
<b>Intersection Summary</b>													
HCM 2000 Control Delay		36.3		HCM 2000 Level of Service				D					
HCM 2000 Volume to Capacity ratio		0.78											
Actuated Cycle Length (s)		111.1		Sum of lost time (s)				14.5					
Intersection Capacity Utilization		70.5%		ICU Level of Service				C					
Analysis Period (min)		15											
c Critical Lane Group													

Lanes, Volumes, Timings  
14: Lyons Lane/Street A & Cross Ave

Future Total 2037 - Sensitivity  
PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↑	↑	↑↑		↑	↑		↑	↑	↑
Traffic Volume (vph)	62	308	17	19	468	26	308	6	208	42	3	123
Future Volume (vph)	62	308	17	19	468	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	0.98	1.00	1.00	0.98	1.00
Ped Bike Factor	1.00	1.00		1.00	1.00		1.00	0.98	1.00	0.98	1.00	0.99
Frt		0.992			0.992			0.855			0.853	
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1525	2915	0	1570	3073	0	1570	1438	0	1570	1412	0
Fit Permitted	0.409			0.530			0.507			0.613		
Satd. Flow (perm)	655	2915	0	875	3073	0	837	1438	0	1010	1412	0
Right Turn on Red			Yes		Yes			Yes				Yes
Satd. Flow (RTOR)		7		7			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	335	18	21	509	28	335	7	226	46	3	134
<b>Shared Lane Traffic (%)</b>												
Lane Group Flow (vph)	67	353	0	21	537	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	
<b>Two way Left Turn Lane</b>												
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	
<b>Detector 1 Channel</b>												
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	
<b>Detector 2 Channel</b>												

Lanes, Volumes, Timings  
14: Lyons Lane/Street A & Cross Ave

Future Total 2037 - Sensitivity  
PM Peak Hour

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			6			3	8			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	0.21	0.25		0.05	0.37		0.64	0.32		0.27	0.39	
Control Delay	15.2	12.9		13.7	14.1		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	15.2	12.9		13.7	14.1		21.6	3.6		33.0	9.5	
LOS	B	B		B	B		C	A		C	A	
Approach Delay		13.3			14.0			14.2			15.4	
Approach LOS		B			B			B			B	
Queue Length 50th (m)	5.8	16.0		1.8	26.1		35.5	0.6		6.4	0.4	
Queue Length 95th (m)	15.5	27.3		6.3	41.7		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)	314	1402		397	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	0.21	0.25		0.05	0.36		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:	14.1
Intersection LOS:	B

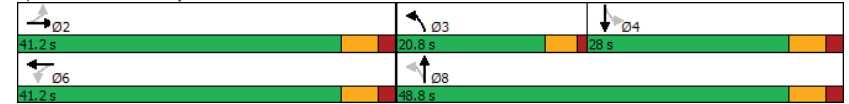
Lanes, Volumes, Timings  
14: Lyons Lane/Street A & Cross Ave

Future Total 2037 - Sensitivity  
PM Peak Hour

Intersection Capacity Utilization 95.3%  
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

Future Total 2037 - Sensitivity  
PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	62	308	17	19	468	26	308	6	208	42	3	123
Future Volume (vph)	62	308	17	19	468	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	
Ftbp, 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	2916		1569	3074		1570	1438		1566	1413	
Fit Permitted	0.41	1.00		0.53	1.00		0.51	1.00		0.61	1.00	
Satd. Flow (perm)	654	2916		875	3074		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	335	18	21	509	28	335	7	226	46	3	134
RTOR Reduction (vph)	0	4	0	0	4	0	0	131	0	0	111	0
Lane Group Flow (vph)	67	349	0	21	533	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		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)	312	1392		395	1467	510	603			171	240	
v/s Ratio Prot		0.12			c0.17		c0.14	0.07			0.02	
v/s Ratio Perm	0.10			0.02			c0.13			0.05		
v/c Ratio	0.21	0.25		0.05	0.36	0.66	0.17			0.27	0.11	
Uniform Delay, d1	11.8	12.1		12.0	12.8	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)	12.5	12.3		12.1	13.2	19.8	14.3			29.2	27.5	
Level of Service	B	B		B	B	B	B			C	C	
Approach Delay (s)		12.3			13.1		17.5				28.0	
Approach LOS		B			B		B				C	
<b>Intersection Summary</b>												
HCM 2000 Control Delay		15.9										B
HCM 2000 Volume to Capacity ratio		0.52										
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										
c Critical Lane Group												

Lanes, Volumes, Timings  
21: Argus Rd & Street 1

Future Total 2037 - Sensitivity  
PM Peak Hour

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔	↕	↔	↕	↕	↕
Traffic Volume (vph)	0	96	0	77	397	288
Future Volume (vph)	0	96	0	77	397	288
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	104	0	84	432	313
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	104	0	84	432	313
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	
<b>Intersection Summary</b>						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	33.5%			ICU Level of Service A		
Analysis Period (min)	15					



HCM Unsignalized Intersection Capacity Analysis  
21: Argus Rd & Street 1

Future Total 2037 - Sensitivity  
PM Peak Hour

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔	↔		↕	↕	↕
Traffic Volume (veh/h)	0	96	0	77	397	288
Future Volume (Veh/h)	0	96	0	77	397	288
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	104	0	84	432	313
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	516	432	745			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	516	432	745			
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	100			
cM capacity (veh/h)	519	624	863			
Direction, Lane #	EB 1	EB 2	NB 1	SB 1	SB 2	
Volume Total	0	104	84	432	313	
Volume Left	0	0	0	0	0	
Volume Right	0	104	0	0	313	
cSH	1700	624	863	1700	1700	
Volume to Capacity	0.00	0.17	0.00	0.25	0.18	
Queue Length 95th (m)	0.0	4.8	0.0	0.0	0.0	
Control Delay (s)	0.0	11.9	0.0	0.0	0.0	
Lane LOS	A	B				
Approach Delay (s)	11.9		0.0	0.0		
Approach LOS	B					
Intersection Summary						
Average Delay			1.3			
Intersection Capacity Utilization			33.5%	ICU Level of Service	A	
Analysis Period (min)			15			

Lanes, Volumes, Timings  
22: Street C & Street 1

Future Total 2037 - Sensitivity  
PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↕	↕	↕	↕	↕	↕
Traffic Volume (vph)	0	62	7	201	88	0	22	148	34	0	261	0
Future Volume (vph)	0	62	7	201	88	0	22	148	34	0	261	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		0.984						0.977				
Fit Protected				0.950				0.995				
Satd. Flow (prot)	1863	1833	0	1770	1863	0	0	1811	0	0	1863	0
Fit Permitted				0.708				0.947				
Satd. Flow (perm)	1863	1833	0	1319	1863	0	0	1723	0	0	1863	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		8						14				
Link Speed (k/h)		50			50			50				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	67	8	218	96	0	24	161	37	0	284	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	75	0	218	96	0	0	222	0	0	284	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			8			2			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	

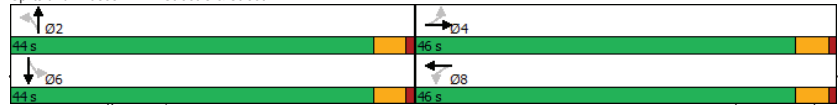
Lanes, Volumes, Timings  
22: Street C & Street 1

Future Total 2037 - Sensitivity  
PM Peak Hour

	↖	→	↘	↙	←	↖	↙	↑	↘	↙	↓	↘
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)	46.0	46.0		46.0	46.0		44.0	44.0		44.0	44.0	
Total Split (%)	51.1%	51.1%		51.1%	51.1%		48.9%	48.9%		48.9%	48.9%	
Maximum Green (s)	41.5	41.5		41.5	41.5		39.5	39.5		39.5	39.5	
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)		11.4		11.4	11.4			12.8			12.8	
Actuated g/C Ratio	0.34	0.34		0.34	0.34			0.38			0.38	
v/c Ratio	0.12	0.49		0.15	0.15			0.33			0.40	
Control Delay	7.1	12.5		7.9	7.9			9.3			10.3	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	7.1	12.5		7.9	7.9			9.3			10.3	
LOS	A	B		A	A			A			B	
Approach Delay	7.1			11.1				9.3			10.3	
Approach LOS	A			B				A			B	
Queue Length 50th (m)	2.1			7.7	3.0			7.2			10.2	
Queue Length 95th (m)	8.2			23.8	10.4			22.2			29.0	
Internal Link Dist (m)	59.7			141.4				108.8			140.3	
Turn Bay Length (m)												
Base Capacity (vph)	1833			1319	1863			1710			1848	
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			0.17	0.05			0.13			0.15	

Intersection Summary	
Area Type:	Other
Cycle Length:	90
Actuated Cycle Length:	33.4
Natural Cycle:	45
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.49
Intersection Signal Delay:	10.1
Intersection Capacity Utilization:	53.9%
Intersection LOS:	B
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

Future Total 2037 - Sensitivity  
PM Peak Hour

	↖	→	↘	↙	←	↖	↙	↑	↘	↙	↓	↘
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↖		↖	↖		↖	↖		↖	↖	
Traffic Volume (vph)	0	62	7	201	88	0	22	148	34	0	261	0
Future Volume (vph)	0	62	7	201	88	0	22	148	34	0	261	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 <sub>t</sub>		0.98		1.00	1.00			0.98			1.00	
Fit Protected		1.00		0.95	1.00			0.99			1.00	
Satd. Flow (prot)		1833		1770	1863			1811			1863	
Fit Permitted		1.00		0.71	1.00			0.95			1.00	
Satd. Flow (perm)		1833		1319	1863			1723			1863	
Peak-hour factor, PHF	0.92	0.92		0.92	0.92		0.92	0.92		0.92	0.92	
Adj. Flow (vph)	0	67	8	218	96	0	24	161	37	0	284	0
RTOR Reduction (vph)	0	5	0	0	0	0	0	9	0	0	0	0
Lane Group Flow (vph)	0	70	0	218	96	0	0	213	0	0	284	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		NA	NA	
Protected Phases				4				2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		11.4		11.4	11.4			12.8			12.8	
Effective Green, g (s)		11.4		11.4	11.4			12.8			12.8	
Actuated g/C Ratio		0.34		0.34	0.34			0.39			0.39	
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)		629		452	639			664			718	
v/s Ratio Prot		0.04			0.05						c0.15	
v/s Ratio Perm				c0.17				0.12				
v/c Ratio		0.11		0.48	0.15			0.32			0.40	
Uniform Delay, d1		7.4		8.6	7.5			7.2			7.4	
Progression Factor		1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2		0.1		0.8	0.1			0.3			0.4	
Delay (s)		7.5		9.4	7.7			7.4			7.8	
Level of Service		A		A	A			A			A	
Approach Delay (s)		7.5			8.9			7.4			7.8	
Approach LOS		A			A			A			A	

Intersection Summary	
HCM 2000 Control Delay	8.0
HCM 2000 Volume to Capacity ratio	0.44
HCM 2000 Level of Service	A
Actuated Cycle Length (s)	33.2
Sum of lost time (s)	9.0
Intersection Capacity Utilization	53.9%
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

Future Total 2037 - Sensitivity

PM Peak Hour

	↖	→	↘	↙	←	↖	↙	↘	↙	↘	↙	↘
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↖	↖	↖	↖		↖	↖	↖	↖	↖	↖
Traffic Volume (vph)	95	616	58	206	355	97	99	0	491	252	113	50
Future Volume (vph)	95	616	58	206	355	97	99	0	491	252	113	50
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	15.0		0.0
Storage Lanes	1		1	2		0	1		0	1		0
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	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.968		0.850			0.954		
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1863	1583	3433	1803	0	1770	1583	0	1770	1777	0
Fit Permitted	0.950			0.950			0.646			0.151		
Satd. Flow (perm)	1770	1863	1583	3433	1803	0	1203	1583	0	281	1777	0
Right Turn on Red			Yes		Yes			Yes			Yes	
Satd. Flow (RTOR)			139		16		232			28		
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)	103	670	63	224	386	105	108	0	534	274	123	54
Shared Lane Traffic (%)												
Lane Group Flow (vph)	103	670	63	224	491	0	108	534	0	274	177	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

Future Total 2037 - Sensitivity

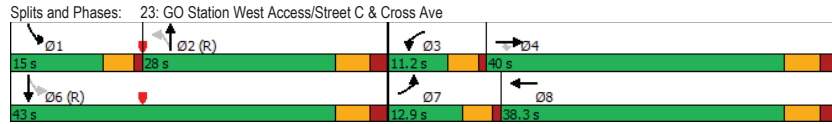
PM Peak Hour

	↖	→	↘	↙	←	↖	↙	↘	↙	↘	↙	↘
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)	12.9	40.0	40.0	11.2	38.3		28.0	28.0		15.0	43.0	
Total Split (%)	13.7%	42.5%	42.5%	11.9%	40.7%		29.7%	29.7%		15.9%	45.6%	
Maximum Green (s)	8.4	34.0	34.0	6.7	32.3		22.0	22.0		10.5	37.0	
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)	8.1	34.0	34.0	6.7	32.6		22.0	22.0		38.5	37.0	
Actuated g/C Ratio	0.09	0.36	0.36	0.07	0.35		0.23	0.23		0.41	0.39	
v/c Ratio	0.68	1.00	0.10	0.92	0.78		0.39	0.98		0.98	0.25	
Control Delay	64.7	65.6	0.3	85.0	36.7		35.3	55.0		73.0	17.2	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	64.7	65.6	0.3	85.0	36.7		35.3	55.0		73.0	17.2	
LOS	E	E	A	F	D		D	D		E	B	
Approach Delay		60.6			51.8			51.7			51.1	
Approach LOS		E			D			D			D	
Queue Length 50th (m)	19.4	126.2	0.0	22.3	80.9		17.5	62.4		35.8	18.5	
Queue Length 95th (m)	#42.6	#202.1	0.0	#44.6	#130.2		33.8	#131.8		#86.9	33.8	
Internal Link Dist (m)		185.8			140.3			31.1			108.8	
Turn Bay Length (m)											15.0	
Base Capacity (vph)	157	672	660	244	633		280	547		280	714	
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	1.00	0.10	0.92	0.78		0.39	0.98		0.98	0.25	
<b>Intersection Summary</b>												
Area Type:	Other											
Cycle Length:	94.2											
Actuated Cycle Length:	94.2											
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:	1.00											
Intersection Signal Delay:	54.4						Intersection LOS: D					
Intersection Capacity Utilization:	100.2%						ICU Level of Service G					
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

Future Total 2037 - Sensitivity  
PM Peak Hour

Queue shown is maximum after two cycles.



HCM Signalized Intersection Capacity Analysis  
23: GO Station West Access/Street C & Cross Ave

Future Total 2037 - Sensitivity  
PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↑	↘	↘	↘	↘	↘	↘	↘	↘	↘	↘
Traffic Volume (vph)	95	616	58	206	355	97	99	0	491	252	113	50
Future Volume (vph)	95	616	58	206	355	97	99	0	491	252	113	50
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	
Flt	1.00	1.00	0.85	1.00	0.97		1.00	0.85		1.00	0.95	
Flt 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	1803		1770	1583		1770	1778	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.65	1.00		0.15	1.00	
Satd. Flow (perm)	1770	1863	1583	3433	1803		1203	1583		281	1778	
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)	103	670	63	224	386	105	108	0	534	274	123	54
RTOR Reduction (vph)	0	0	40	0	10	0	0	178	0	0	17	0
Lane Group Flow (vph)	103	670	23	224	481	0	108	356	0	274	160	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)	8.1	34.0	34.0	6.7	32.6		22.0	22.0		37.0	37.0	
Effective Green, g (s)	8.1	34.0	34.0	6.7	32.6		22.0	22.0		37.0	37.0	
Actuated g/C Ratio	0.09	0.36	0.36	0.07	0.35		0.23	0.23		0.39	0.39	
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)	152	672	571	244	623		280	369		276	698	
v/s Ratio Prot	0.06	c0.36		c0.07	0.27			0.22		c0.11	0.09	
v/s Ratio Perm			0.01				0.09			c0.28		
v/c Ratio	0.68	1.00	0.04	0.92	0.77		0.39	0.97		0.99	0.23	
Uniform Delay, d1	41.8	30.0	19.5	43.5	27.5		30.4	35.7		23.7	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	11.4	33.7	0.0	35.9	5.9		4.0	38.9		51.9	0.8	
Delay (s)	53.1	63.8	19.5	79.3	33.4		34.4	74.6		75.6	19.8	
Level of Service	D	E	B	E	C		C	E		E	B	
Approach Delay (s)		59.1			47.8			67.8			53.7	
Approach LOS		E			D			E			D	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			57.3			HCM 2000 Level of Service		E				
HCM 2000 Volume to Capacity ratio			1.03									
Actuated Cycle Length (s)			94.2			Sum of lost time (s)		21.0				
Intersection Capacity Utilization			100.2%			ICU Level of Service		G				
Analysis Period (min)			15									

c Critical Lane Group

# Appendix I

## Synchro Analysis – Interim Design



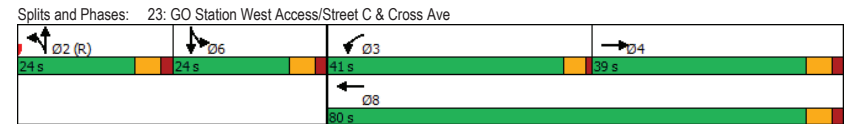
Lanes, Volumes, Timings  
23: GO Station West Access/Street C & Cross Ave  
Future Total 2032 - Option A  
AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	313	104	871	495	64	46	0	245	243	0	30
Future Volume (vph)	0	313	104	871	495	64	46	0	245	243	0	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	40.0			0.0		0.0	15.0		0.0
Storage Lanes	0		0	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	0.97	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.966			0.983			0.850			0.985	
Flt Protected				0.950			0.950				0.957	
Satd. Flow (prot)	0	1799	0	3433	1831	0	1770	1583	0	0	1756	0
Flt Permitted				0.950			0.950				0.957	
Satd. Flow (perm)	0	1799	0	3433	1831	0	1770	1583	0	0	1756	0
Right Turn on Red			Yes		Yes			Yes			Yes	
Satd. Flow (RTOR)		13			9			546			115	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		211.2			162.8			81.1			128.3	
Travel Time (s)		15.2			11.7			5.8			9.2	
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	340	113	947	538	70	50	0	266	264	0	33
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	453	0	947	608	0	50	266	0	0	297	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Right	Left	Left	Right	Left	Left	Right	
Median Width(m)		10.5			10.5			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			-30.0	
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		2		1	2		1	2		1	2	
Detector Template		Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)		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	
Detector 1 Position(m)		0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)		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	
Detector 1 Channel												
Detector 1 Extend (s)		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	
Detector 1 Delay (s)		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		Prot	NA		Split	NA		Split	NA	
Protected Phases		4		3	8		2	2		6	6	
Permitted Phases												

Lanes, Volumes, Timings  
23: GO Station West Access/Street C & Cross Ave  
Future Total 2032 - Option A  
AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Detector Phase		4			3			8			2	2	
Switch Phase												6	6
Minimum Initial (s)		5.0			5.0			5.0			5.0	5.0	
Minimum Split (s)		24.0			9.5			24.0			24.0	24.0	
Total Split (s)		39.0			41.0			80.0			24.0	24.0	
Total Split (%)		30.5%			32.0%			62.5%			18.8%	18.8%	
Maximum Green (s)		33.0			36.5			74.0			18.0	18.0	
Yellow Time (s)		4.0			3.5			4.0			4.0	4.0	
All-Red Time (s)		2.0			1.0			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			4.5			6.0			6.0	6.0	
Lead/Lag		Lag			Lead								
Lead-Lag Optimize?		Yes			Yes								
Vehicle Extension (s)		3.0			3.0			3.0			3.0	3.0	
Recall Mode		None			None			C-Max		C-Max	Max	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)		32.7			36.4			73.6			18.4	18.0	
Actuated g/C Ratio		0.26			0.28			0.58			0.14	0.14	
v/c Ratio		0.97			0.97			0.58			0.20	0.38	
Control Delay		80.2			67.8			19.6			51.0	1.6	
Queue Delay		0.0			2.5			4.5			0.0	0.0	
Total Delay		80.2			70.3			24.1			51.0	1.6	
LOS		F			E			C			D	A	
Approach Delay		80.2						52.3			9.4	56.6	
Approach LOS		F						D			A	E	

Intersection Summary	
Area Type:	Other
Cycle Length:	128
Actuated Cycle Length:	128
Offset:	0 (0%), Referenced to phase 2:NBTL, Start of Green
Natural Cycle:	115
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.97
Intersection Signal Delay:	52.4
Intersection Capacity Utilization:	96.9%
ICU Level of Service:	F
Intersection LOS:	D
Analysis Period (min):	15



Queues  
23: GO Station West Access/Street C & Cross Ave

Future Total 2032 - Option A  
AM Peak Hour

	→	↖	←	↗	↑	↓
Lane Group	EBT	WBL	WBT	NBL	NBT	SBT
Lane Group Flow (vph)	453	947	608	50	266	297
v/c Ratio	0.97	0.97	0.58	0.20	0.38	0.86
Control Delay	80.2	67.8	19.6	51.0	1.6	56.6
Queue Delay	0.0	2.5	4.5	0.0	0.0	0.0
Total Delay	80.2	70.3	24.1	51.0	1.6	56.6
Queue Length 50th (m)	116.1	128.0	95.6	11.9	0.0	48.8
Queue Length 95th (m)	#184.7	#171.8	131.1	24.7	0.0	#98.7
Internal Link Dist (m)	187.2		138.8		57.1	104.3
Turn Bay Length (m)		40.0				
Base Capacity (vph)	473	978	1062	254	694	345
Starvation Cap Reductn	0	15	370	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	0.96	0.98	0.88	0.20	0.38	0.86

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis  
23: GO Station West Access/Street C & Cross Ave

Future Total 2032 - Option A  
AM Peak Hour

	↖	→	↗	↖	←	↗	↖	↑	↗	↖	↓	↗
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↖		↖	↖		↖	↖			↖	
Traffic Volume (vph)	0	313	104	871	495	64	46	0	245	243	0	30
Future Volume (vph)	0	313	104	871	495	64	46	0	245	243	0	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0		4.5	6.0		6.0	6.0			6.0	
Lane Util. Factor		1.00		0.97	1.00		1.00	1.00			1.00	
Fr		0.97		1.00	0.98		1.00	0.85			0.98	
Fit Protected		1.00		0.95	1.00		0.95	1.00			0.96	
Satd. Flow (prot)		1800		3433	1831		1770	1583			1757	
Fit Permitted		1.00		0.95	1.00		0.95	1.00			0.96	
Satd. Flow (perm)		1800		3433	1831		1770	1583			1757	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	340	113	947	538	70	50	0	266	264	0	33
RTOR Reduction (vph)	0	10	0	0	4	0	0	228	0	0	99	0
Lane Group Flow (vph)	0	443	0	947	604	0	50	38	0	0	198	0
Turn Type	NA			Prot	NA		Split	NA		Split	NA	
Protected Phases		4		3	8		2	2		6	6	
Permitted Phases												
Actuated Green, G (s)		32.7		36.4	73.6		18.4	18.4			18.0	
Effective Green, g (s)		32.7		36.4	73.6		18.4	18.4			18.0	
Actuated g/C Ratio		0.26		0.28	0.57		0.14	0.14			0.14	
Clearance Time (s)		6.0		4.5	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)		459		976	1052		254	227			247	
v/s Ratio Prot		c0.25		c0.28	0.33		c0.03	0.02			c0.11	
v/s Ratio Perm												
v/c Ratio		0.97		0.97	0.57		0.20	0.17			0.80	
Uniform Delay, d1		47.1		45.3	17.3		48.3	48.1			53.3	
Progression Factor		1.00		1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2		33.0		21.8	0.8		1.7	1.6			23.4	
Delay (s)		80.1		67.1	18.0		50.0	49.7			76.7	
Level of Service		F		E	B		D	D			E	
Approach Delay (s)		80.1			47.9			49.7			76.7	
Approach LOS		F			D			D			E	

Intersection Summary

HCM 2000 Control Delay	56.9	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	128.0	Sum of lost time (s)	22.5
Intersection Capacity Utilization	96.9%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings  
7: GO Flexible Driveway & Cross Ave

Future Total 2032 - Option B  
AM Peak Hour

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔		↔	↔	↔	
Traffic Volume (vph)	250	52	435	571	0	0
Future Volume (vph)	250	52	435	571	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	0.95	1.00	1.00
Fr <sub>t</sub>	0.977					
Fit Protected			0.950			
Satd. Flow (prot)	1820	0	1770	3539	1863	0
Fit Permitted			0.950			
Satd. Flow (perm)	1820	0	1770	3539	1863	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	59.7			72.3	99.8	
Travel Time (s)	4.3			5.2	7.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	272	57	473	621	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	329	0	473	621	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	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)		15	25		25	15
Sign Control	Free			Free	Stop	

Intersection Summary	
Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	47.1%
Analysis Period (min)	15
	ICU Level of Service A

HCM Unsignalized Intersection Capacity Analysis  
7: GO Flexible Driveway & Cross Ave

Future Total 2032 - Option B  
AM Peak Hour

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔		↔	↔	↔	
Traffic Volume (veh/h)	250	52	435	571	0	0
Future Volume (Veh/h)	250	52	435	571	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	272	57	473	621	0	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (m)	139			72		
pX, platoon unblocked						
vC, conflicting volume			329		1557	300
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			329		1557	300
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			61		100	100
cM capacity (veh/h)			1227		64	696

Direction, Lane #	EB 1	WB 1	WB 2	WB 3	NB 1
Volume Total	329	473	310	310	0
Volume Left	0	473	0	0	0
Volume Right	57	0	0	0	0
eSH	1700	1227	1700	1700	1700
Volume to Capacity	0.19	0.39	0.18	0.18	0.00
Queue Length 95th (m)	0.0	14.8	0.0	0.0	0.0
Control Delay (s)	0.0	9.8	0.0	0.0	0.0
Lane LOS	A	A	A	A	A
Approach Delay (s)	0.0	4.2			0.0
Approach LOS					A

Intersection Summary	
Average Delay	3.2
Intersection Capacity Utilization	47.1%
Analysis Period (min)	15
	ICU Level of Service A



Lanes, Volumes, Timings

23: GO Station West Access/Street C & Cross Ave

Future Total 2032 - Option B

AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	0	313	52	435	930	64	46	0	245	243	0	30
Future Volume (vph)	0	313	52	435	930	64	46	0	245	243	0	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	0.0	40.0	0.0	0.0	0.0	0.0	0.0	15.0	0.0	0.0
Storage Lanes	0	0	0	1	0	0	1	0	0	0	0	0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.981			0.990			0.850			0.985	
Flt Protected				0.950			0.950				0.957	
Satd. Flow (prot)	0	1827	0	1770	3504	0	1770	1583	0	0	1756	0
Flt Permitted				0.132			0.950				0.957	
Satd. Flow (perm)	0	1827	0	246	3504	0	1770	1583	0	0	1756	0
Right Turn on Red			Yes		Yes			Yes			Yes	
Satd. Flow (RTOR)		7			9		521				128	
Link Speed (k/h)		50			50		50				50	
Link Distance (m)		72.3			162.8		81.1				128.3	
Travel Time (s)		5.2			11.7		5.8				9.2	
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	340	57	473	1011	70	50	0	266	264	0	33
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	397	0	473	1081	0	50	266	0	0	297	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				-30.0	
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		2		1	2		1	2		1	2	
Detector Template		Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)		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	
Detector 1 Position(m)		0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)		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	
Detector 1 Channel												
Detector 1 Extend (s)		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	
Detector 1 Delay (s)		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		pm+pt	NA		Split	NA		Split	NA	
Protected Phases		4		3	8		2	2		6	6	
Permitted Phases				8								

Lanes, Volumes, Timings

23: GO Station West Access/Street C & Cross Ave

Future Total 2032 - Option B

AM Peak Hour

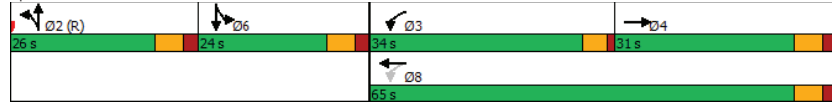
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase		4		3	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)		5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)		24.0		9.5	24.0		24.0	24.0		24.0	24.0	
Total Split (s)		31.0		34.0	65.0		26.0	26.0		24.0	24.0	
Total Split (%)		27.0%		29.6%	56.5%		22.6%	22.6%		20.9%	20.9%	
Maximum Green (s)		25.0		29.5	59.0		20.0	20.0		18.0	18.0	
Yellow Time (s)		4.0		3.5	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)		2.0		1.0	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	0.0	
Total Lost Time (s)		6.0		4.5	6.0		6.0	6.0		6.0	6.0	
Lead/Lag		Lag		Lead								
Lead-Lag Optimize?		Yes		Yes								
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode		None		None	None		C-Max	C-Max		Max	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)		25.7		59.9	58.4		20.6	20.6			18.0	
Actuated g/C Ratio		0.22		0.52	0.51		0.18	0.18			0.16	
v/c Ratio		0.96		0.95	0.61		0.16	0.37			0.78	
Control Delay		79.6		59.6	21.6		42.0	1.5			41.2	
Queue Delay		0.0		0.0	1.4		0.0	0.0			0.0	
Total Delay		79.6		59.6	23.1		42.0	1.5			41.2	
LOS		E		E	C		D	A			D	
Approach Delay		79.6			34.2			7.9			41.2	
Approach LOS		E			C			A			D	
Queue Length 50th (m)		93.0			91.0		10.2	0.0			39.1	
Queue Length 95th (m)		#157.9			#154.5		112.1	21.9		0.0	#80.6	
Internal Link Dist (m)		48.3			138.8			57.1			104.3	
Turn Bay Length (m)				40.0								
Base Capacity (vph)		414		519	1802		317	711			382	
Starvation Cap Reductn		0		0	491		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		0.96		0.91	0.82		0.16	0.37			0.78	
Intersection Summary												
Area Type:	Other											
Cycle Length:	115											
Actuated Cycle Length:	115											
Offset:	0 (0%), Referenced to phase 2:NBL, Start of Green											
Natural Cycle:	105											
Control Type:	Actuated-Coordinated											
Maximum v/c Ratio:	0.96											
Intersection Signal Delay:	38.8						Intersection LOS: D					
Intersection Capacity Utilization:	92.9%						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

Future Total 2032 - Option B  
AM Peak Hour

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

Future Total 2032 - Option B  
AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔	↔		↔	↔		↔	↔	↔
Traffic Volume (vph)	0	313	52	435	930	64	46	0	245	243	0	30
Future Volume (vph)	0	313	52	435	930	64	46	0	245	243	0	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0		4.5	6.0		6.0	6.0		6.0		6.0
Lane Util. Factor		1.00		1.00	0.95		1.00	1.00		1.00		1.00
Frt		0.98		1.00	0.99		1.00	0.85		0.98		0.98
Fit Protected		1.00		0.95	1.00		0.95	1.00		0.96		0.96
Satd. Flow (prot)		1827		1770	3505		1770	1583		1757		1757
Fit Permitted		1.00		0.13	1.00		0.95	1.00		0.96		0.96
Satd. Flow (perm)		1827		246	3505		1770	1583		1757		1757
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	340	57	473	1011	70	50	0	266	264	0	33
RTOR Reduction (vph)	0	5	0	0	4	0	0	218	0	0	108	0
Lane Group Flow (vph)	0	392	0	473	1077	0	50	48	0	0	189	0
Turn Type		NA		pm+pt	NA		Split	NA		Split		NA
Protected Phases		4		3	8		2	2		6		6
Permitted Phases				8								
Actuated Green, G (s)		25.8		58.4	58.4		20.6	20.6		18.0		18.0
Effective Green, g (s)		25.8		58.4	58.4		20.6	20.6		18.0		18.0
Actuated g/C Ratio		0.22		0.51	0.51		0.18	0.18		0.16		0.16
Clearance Time (s)		6.0		4.5	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		3.0
Lane Grp Cap (vph)		409		497	1779		317	283		275		275
v/s Ratio Prot		0.21		c0.23	0.31		0.03	c0.03		c0.11		c0.11
v/s Ratio Perm				c0.25								
v/c Ratio		0.96		0.95	0.61		0.16	0.17		0.69		0.69
Uniform Delay, d1		44.1		32.7	20.1		39.9	39.9		45.8		45.8
Progression Factor		1.00		1.00	1.00		1.00	1.00		1.00		1.00
Incremental Delay, d2		33.3		28.4	0.6		1.1	1.3		13.2		13.2
Delay (s)		77.3		61.1	20.7		40.9	41.2		59.0		59.0
Level of Service		E		E	C		D	D		E		E
Approach Delay (s)		77.3			33.0			41.2		59.0		59.0
Approach LOS		E			C			D		E		E
<b>Intersection Summary</b>												
HCM 2000 Control Delay				43.9			HCM 2000 Level of Service					D
HCM 2000 Volume to Capacity ratio				0.75								
Actuated Cycle Length (s)				115.0			Sum of lost time (s)				22.5	
Intersection Capacity Utilization				92.9%			ICU Level of Service				F	
Analysis Period (min)				15								

c Critical Lane Group

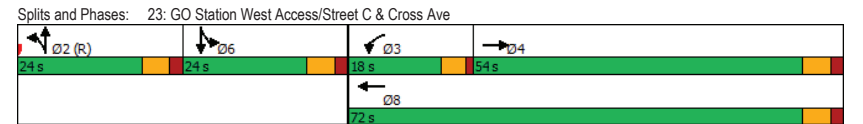
Lanes, Volumes, Timings  
23: GO Station West Access/Street C & Cross Ave  
Future Total 2032 -Option A  
PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	580	53	289	386	195	90	0	445	122	0	15
Future Volume (vph)	0	580	53	289	386	195	90	0	445	122	0	15
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	2			0	1		0	0		0
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	1.00	1.00	1.00	1.00	1.00
Frt		0.989			0.950			0.850			0.986	
Flt Protected				0.950			0.950				0.957	
Satd. Flow (prot)	0	1842	0	3433	1770	0	1770	1583	0	0	1758	0
Flt Permitted				0.950			0.950				0.957	
Satd. Flow (perm)	0	1842	0	3433	1770	0	1770	1583	0	0	1758	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5			34			346				123
Link Speed (k/h)		50			50			50				50
Link Distance (m)		209.8			164.3			55.1				133.9
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	630	58	314	420	212	98	0	484	133	0	16
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	688	0	314	632	0	98	484	0	0	149	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Right	Left	Left	Right	Left	Left	Right	
Median Width(m)		10.5			10.5			3.6				3.6
Link Offset(m)		0.0			0.0			5.0				-30.0
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
Number of Detectors		2		1	2		1	2		1		2
Detector Template		Thru		Left	Thru		Left	Thru		Left		Thru
Leading Detector (m)		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
Detector 1 Position(m)		0.0		0.0	0.0		0.0	0.0		0.0		0.0
Detector 1 Size(m)		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
Detector 1 Channel												
Detector 1 Extend (s)		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
Detector 1 Delay (s)		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		Prot	NA		Split	NA		Split		NA
Protected Phases		4		3	8		2	2		6		6
Permitted Phases												

Lanes, Volumes, Timings  
23: GO Station West Access/Street C & Cross Ave  
Future Total 2032 -Option A  
PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase		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	
Minimum Split (s)		24.0		9.5	24.0		24.0	24.0		24.0	24.0	
Total Split (s)		54.0		18.0	72.0		24.0	24.0		24.0	24.0	
Total Split (%)		45.0%		15.0%	60.0%		20.0%	20.0%		20.0%	20.0%	
Maximum Green (s)		48.0		13.5	66.0		18.0	18.0		18.0	18.0	
Yellow Time (s)		4.0		3.5	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)		2.0		1.0	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	0.0	
Total Lost Time (s)		6.0		4.5	6.0		6.0	6.0		6.0	6.0	
Lead/Lag		Lag		Lead								
Lead-Lag Optimize?		Yes		Yes								
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode		None		None	None		C-Max	C-Max		Max	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)		46.7		13.3	64.5		19.5	19.5		18.0	18.0	
Actuated g/C Ratio		0.39		0.11	0.54		0.16	0.16		0.15	0.15	
v/c Ratio		0.96		0.83	0.65		0.34	0.88		0.40	0.40	
Control Delay		60.3		70.9	22.2		49.3	33.7		15.5	15.5	
Queue Delay		4.2		0.0	4.9		0.0	0.0		0.0	0.0	
Total Delay		64.5		70.9	27.1		49.3	33.7		15.5	15.5	
LOS		E		E	C		D	C		B	B	
Approach Delay		64.5			41.6			36.3		15.5	15.5	
Approach LOS		E			D			D		B	B	

Intersection Summary	
Area Type:	Other
Cycle Length:	120
Actuated Cycle Length:	120
Offset:	0 (0%), Referenced to phase 2:NBL, Start of Green
Natural Cycle:	105
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.96
Intersection Signal Delay:	45.3
Intersection Capacity Utilization:	96.0%
ICU Level of Service:	F
Intersection LOS:	D
Analysis Period (min):	15



Queues

23: GO Station West Access/Street C & Cross Ave

Future Total 2032 -Option A

PM Peak Hour

	→	↖	←	↗	↑	↓
Lane Group	EBT	WBL	WBT	NBL	NBT	SBT
Lane Group Flow (vph)	688	314	632	98	484	149
v/c Ratio	0.96	0.83	0.65	0.34	0.88	0.40
Control Delay	60.3	70.9	22.2	49.3	33.7	15.5
Queue Delay	4.2	0.0	4.9	0.0	0.0	0.0
Total Delay	64.5	70.9	27.1	49.3	33.7	15.5
Queue Length 50th (m)	159.8	39.7	98.5	22.1	35.9	5.6
Queue Length 95th (m)	#238.4	#62.2	139.3	39.6	#101.9	25.2
Internal Link Dist (m)	185.8		140.3		31.1	109.9
Turn Bay Length (m)						
Base Capacity (vph)	739	386	988	288	547	368
Starvation Cap Reductn	27	0	282	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	0.97	0.81	0.90	0.34	0.88	0.40

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

23: GO Station West Access/Street C & Cross Ave

Future Total 2032 -Option A

PM Peak Hour

	↖	→	↗	↖	←	↗	↖	↑	↗	↘	↓	↖
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↖		↖	↖		↖	↖			↖	
Traffic Volume (vph)	0	580	53	289	386	195	90	0	445	122	0	15
Future Volume (vph)	0	580	53	289	386	195	90	0	445	122	0	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0		4.5	6.0		6.0	6.0			6.0	
Lane Util. Factor		1.00		0.97	1.00		1.00	1.00			1.00	
Fr		0.99		1.00	0.95		1.00	0.85			0.99	
Fit Protected		1.00		0.95	1.00		0.95	1.00			0.96	
Satd. Flow (prot)		1842		3433	1769		1770	1583			1757	
Fit Permitted		1.00		0.95	1.00		0.95	1.00			0.96	
Satd. Flow (perm)		1842		3433	1769		1770	1583			1757	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	630	58	314	420	212	98	0	484	133	0	16
RTOR Reduction (vph)	0	3	0	0	16	0	0	290	0	0	105	0
Lane Group Flow (vph)	0	685	0	314	616	0	98	194	0	0	44	0
Turn Type	NA			Prot	NA		Split	NA		Split	NA	
Protected Phases		4		3	8		2	2		6	6	
Permitted Phases												
Actuated Green, G (s)		46.7		13.3	64.5		19.5	19.5			18.0	
Effective Green, g (s)		46.7		13.3	64.5		19.5	19.5			18.0	
Actuated g/C Ratio		0.39		0.11	0.54		0.16	0.16			0.15	
Clearance Time (s)		6.0		4.5	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)		716		380	950		287	257			263	
v/s Ratio Prot		c0.37		c0.09	0.35		0.06	c0.12			c0.03	
v/s Ratio Perm												
v/c Ratio		0.96		0.83	0.65		0.34	0.76			0.17	
Uniform Delay, d1		35.7		52.2	19.7		44.6	48.0			44.5	
Progression Factor		1.00		1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2		23.3		13.7	1.5		3.2	18.5			1.4	
Delay (s)		58.9		65.9	21.2		47.8	66.5			45.9	
Level of Service		E		E	C		D	E			D	
Approach Delay (s)		58.9			36.1			63.4			45.9	
Approach LOS		E			D			E			D	

Intersection Summary

HCM 2000 Control Delay	50.1	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	22.5
Intersection Capacity Utilization	96.0%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings

Future Total 2032 - Option B

23: GO Station West Access/Street C & Cross Ave

PM Peak Hour

	↖	→	↘	↙	←	↖	↙	↑	↘	↙	↓	↘
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↖	↘	↖	↖	↖	↖	↖	↖	↖	↖	↖
Traffic Volume (vph)	0	580	53	289	386	195	90	0	445	122	0	15
Future Volume (vph)	0	580	53	289	386	195	90	0	445	122	0	15
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	1			0	1		0	0		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.989			0.950			0.850			0.986	
Flt Protected				0.950			0.950				0.957	
Satd. Flow (prot)	0	1842	0	1770	3362	0	1770	1583	0	0	1758	0
Flt Permitted				0.076			0.950				0.957	
Satd. Flow (perm)	0	1842	0	142	3362	0	1770	1583	0	0	1758	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		4			111			381			114	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		209.8			164.3			55.1			133.9	
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	630	58	314	420	212	98	0	484	133	0	16
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	688	0	314	632	0	98	484	0	0	149	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)		6.9			6.9			3.6			3.6	
Link Offset(m)		0.0			0.0			5.0			-30.0	
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		2		1	2		1	2		1	2	
Detector Template		Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)		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	
Detector 1 Position(m)		0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)		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	
Detector 1 Channel												
Detector 1 Extend (s)		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	
Detector 1 Delay (s)		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		pm+pt	NA		Split	NA		Split	NA	
Protected Phases		4		3	8		2	2		6	6	
Permitted Phases				8								

Lanes, Volumes, Timings

Future Total 2032 - Option B

23: GO Station West Access/Street C & Cross Ave

PM Peak Hour

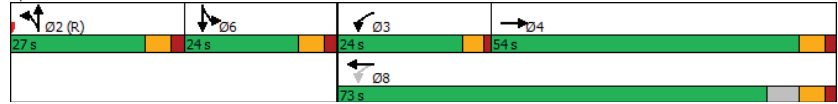
	↖	→	↘	↙	←	↖	↙	↑	↘	↙	↓	↘
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase		4		3	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)		5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)		24.0		9.5	24.0		24.0	24.0		24.0	24.0	
Total Split (s)		54.0		24.0	73.0		27.0	27.0		24.0	24.0	
Total Split (%)		41.9%		18.6%	56.6%		20.9%	20.9%		18.6%	18.6%	
Maximum Green (s)		48.0		19.5	67.0		21.0	21.0		18.0	18.0	
Yellow Time (s)		4.0		3.5	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)		2.0		1.0	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	0.0	
Total Lost Time (s)		6.0		4.5	6.0		6.0	6.0		6.0	6.0	
Lead/Lag		Lag		Lead								
Lead-Lag Optimize?		Yes		Yes								
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode		None		None	None		C-Max	C-Max		Max	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)		48.0		73.5	72.0		21.0	21.0		18.0	18.0	
Actuated g/C Ratio		0.37		0.57	0.56		0.16	0.16		0.14	0.14	
v/c Ratio		1.00		0.96	0.33		0.34	0.84		0.43	0.43	
Control Delay		75.1		77.7	12.9		51.7	26.0		19.1	19.1	
Queue Delay		11.1		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay		86.2		77.7	12.9		51.7	26.0		19.1	19.1	
LOS		F		E	B		D	C		B	B	
Approach Delay		86.2			34.4			30.3			19.1	
Approach LOS		F			C			C			B	
Queue Length 50th (m)		~182.1		67.1	37.2		23.5	26.4			8.3	
Queue Length 95th (m)		#267.3		#126.9	49.5		41.5	#86.5			29.4	
Internal Link Dist (m)		185.8			140.3			31.1			109.9	
Turn Bay Length (m)												
Base Capacity (vph)		687		327	1925		288	576			343	
Starvation Cap Reductn		25		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		1.04		0.96	0.33		0.34	0.84			0.43	
Intersection Summary												
Area Type:		Other										
Cycle Length:		129										
Actuated Cycle Length:		129										
Offset:		0 (0%), Referenced to phase 2:NBLT, Start of Green										
Natural Cycle:		125										
Control Type:		Actuated-Coordinated										
Maximum v/c Ratio:		1.00										
Intersection Signal Delay:		47.5					Intersection LOS: D					
Intersection Capacity Utilization:		103.7%					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

Future Total 2032 - Option B  
 PM Peak Hour

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



Phasings  
 23: GO Station West Access/Street C & Cross Ave

Future Total 2032 - Option B  
 PM Peak Hour

	→	↖	←	↗	↑	↓
Lane Group	EBT	WBL	WBT	NBL	NBT	SBT
Protected Phases	4	3	8	2	2	6
Permitted Phases	8					
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	24.0	9.5	24.0	24.0	24.0	24.0
Total Split (s)	54.0	24.0	73.0	27.0	27.0	24.0
Total Split (%)	41.9%	18.6%	56.6%	20.9%	20.9%	18.6%
Maximum Green (s)	48.0	19.5	67.0	21.0	21.0	18.0
Yellow Time (s)	4.0	3.5	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	1.0	2.0	2.0	2.0	2.0
Lead/Lag	Lag	Lead				
Lead-Lag Optimize?	Yes	Yes				
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	None	None	C-Max	C-Max	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
90th %ile Green (s)	48.0	19.5	72.0	21.0	21.0	18.0
90th %ile Term Code	Max	Max	Hold	Coord	Coord	MaxR
70th %ile Green (s)	48.0	19.5	72.0	21.0	21.0	18.0
70th %ile Term Code	Max	Max	Hold	Coord	Coord	MaxR
50th %ile Green (s)	48.0	19.5	72.0	21.0	21.0	18.0
50th %ile Term Code	Max	Max	Hold	Coord	Coord	MaxR
30th %ile Green (s)	48.0	19.5	72.0	21.0	21.0	18.0
30th %ile Term Code	Max	Max	Hold	Coord	Coord	MaxR
10th %ile Green (s)	48.0	19.5	72.0	21.0	21.0	18.0
10th %ile Term Code	Max	Max	Hold	Coord	Coord	MaxR

Intersection Summary

Cycle Length: 129  
 Actuated Cycle Length: 129  
 Offset: 0 (0%), Referenced to phase 2.NBTL, Start of Green  
 Control Type: Actuated-Coordinated

HCM Signalized Intersection Capacity Analysis  
 23: GO Station West Access/Street C & Cross Ave

Future Total 2032 - Option B  
 PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔	↔		↔	↔		↔	↔	
Traffic Volume (vph)	0	580	53	289	386	195	90	0	445	122	0	15
Future Volume (vph)	0	580	53	289	386	195	90	0	445	122	0	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0		4.5	6.0		6.0	6.0		6.0		6.0
Lane Util. Factor		1.00		1.00	0.95		1.00	1.00		1.00		1.00
Frt		0.99		1.00	0.95		1.00	0.85		0.99		0.99
Flt Protected		1.00		0.95	1.00		0.95	1.00		0.96		0.96
Satd. Flow (prot)		1842		1770	3361		1770	1583		1757		1757
Flt Permitted		1.00		0.08	1.00		0.95	1.00		0.96		0.96
Satd. Flow (perm)		1842		142	3361		1770	1583		1757		1757
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	630	58	314	420	212	98	0	484	133	0	16
RTOR Reduction (vph)	0	3	0	0	49	0	0	319	0	0	98	0
Lane Group Flow (vph)	0	685	0	314	583	0	98	165	0	0	51	0
Turn Type	NA			pm+pt	NA		Split	NA		Split	NA	
Protected Phases		4		3	8		2	2		6		6
Permitted Phases				8								
Actuated Green, G (s)		48.0		72.0	72.0		21.0	21.0		18.0		18.0
Effective Green, g (s)		48.0		72.0	72.0		21.0	21.0		18.0		18.0
Actuated g/C Ratio		0.37		0.56	0.56		0.16	0.16		0.14		0.14
Clearance Time (s)		6.0		4.5	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		3.0
Lane Grp Cap (vph)		685		325	1875		288	257		245		245
v/s Ratio Prot		0.37		c0.15	0.17		0.06	c0.10		c0.03		c0.03
v/s Ratio Perm				c0.39								
v/c Ratio		1.00		0.97	0.31		0.34	0.64		0.21		0.21
Uniform Delay, d1		40.5		41.8	15.2		47.9	50.5		49.2		49.2
Progression Factor		1.00		1.00	1.00		1.00	1.00		1.00		1.00
Incremental Delay, d2		34.6		40.5	0.1		3.2	11.7		1.9		1.9
Delay (s)		75.1		82.2	15.3		51.0	62.2		51.1		51.1
Level of Service		E		F	B		D	E		D		D
Approach Delay (s)		75.1			37.5			60.3		51.1		51.1
Approach LOS		E			D			E		D		D
<b>Intersection Summary</b>												
HCM 2000 Control Delay				54.9			HCM 2000 Level of Service					D
HCM 2000 Volume to Capacity ratio				0.80								
Actuated Cycle Length (s)				129.0			Sum of lost time (s)					22.5
Intersection Capacity Utilization				103.7%			ICU Level of Service					G
Analysis Period (min)				15								
c Critical Lane Group												