



BA Group

REGIONAL ROAD 25 & BRITANNIA ROAD PROPOSED MIXED-USE DEVELOPMENT

Urban Transportation Considerations
Town of Milton

Prepared For: Mattamy (Milton West) Limited

July 2023



**MOVEMENT
IN URBAN
ENVIRONMENTS**

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July 25, 2023

Christine Chea, MCIP RPP (she/her)

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RE: Mattamy (Milton West) Limited Site, Transportation Considerations Report

Dear Christine:

Attached please find BA Group's Transportation Considerations Report (Traffic Impact Study) for the proposed development of a site that is located on the northwest quadrant of the intersection of Regional Road 25 and Britannia Road, in the Town of Milton, in the Region of Halton.

This Transportation Considerations Report (Traffic Impact Study) has been prepared as part of the Zoning By-law Amendment (ZBA) application being submitted to the Town of Milton.

I can confirm that the enclosed report has been prepared under my supervision and to the best of my knowledge is accurate and true.

I trust that the foregoing is satisfactory.

Sincerely,

BA Consulting Group Ltd.



Deanna Green, MSc. P.Eng.
Associate



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EXECUTIVE SUMMARY

Development Proposal

BA Group was retained by Mattamy (Milton West) Limited to provide transportation consulting services related to the proposed development of a site (herein referred to as “the site”) that is located on the northwest quadrant of the intersection of Regional Road 25 and Britannia Road, in the Town of Milton (“the Town”).

The development proposal includes 7 residential buildings (up to 15 stories) inclusive of a total of 1,768 residential units (1,029 units on the south block and 739 units on the north block) along with a total of 929 m² GFA of retail (454 m² on the south block and 475 m² on the north block). It is estimated at this time that the south block will be completed by 2029 and the north block will be completed by 2032. Resident parking is to be provided through a connected below-grade structure on each block, while non-resident parking (resident visitor and retail) is to be shared and provided at-grade on each block. Vehicle access and site circulation for each block is proposed via a driveway across each block that provides a connection between a new 4-legged intersection on Etheridge Avenue and a new right-in/ right-out only access (one on each block) at Regional Road 25.

Vehicle Parking Considerations

The site is subject to the Town of Milton Comprehensive Zoning By-law 016-2014 (HUSP Urban Area – June 2019) for parking considerations. Application of this By-law to the site results in a total minimum parking requirement for the site of 2,652 spaces, inclusive of 1,543 and 1,109 spaces for the south and north blocks, respectively.

A total parking supply of 2,167 parking spaces is proposed for the site, inclusive of 1,265 and 902 parking spaces for the south and north blocks, respectively. The development proposes a provision of a minimum resident parking rate of 1.0 space per unit, with non-resident shared parking proposed to be provided at a minimum rate of 0.22 spaces per unit. The proposed parking supply is appropriate for the site based upon the evolving transportation context, observed parking demands at the proxy sites and proposed TDM measures.

Bicycle Parking Considerations

Zoning By-law 016-2014 (HUSP Urban Area – June 2019) requires a minimum of 213 and 154 bicycle parking spaces for the south and north blocks, respectively. A total supply of 910 bicycle parking spaces is proposed for the site, inclusive of 534 and 376 spaces for the south and north blocks, respectively. The proposed bicycle parking supply exceeds the minimum requirements and will encourage a shift to sustainable travel.

Loading Considerations

Application of Zoning By-law 016-2014 to the site for loading considerations, results in the minimum requirement of 2 loading areas (1 loading area per block), with the minimum dimensions of 6.0 m (length) x 3.5 m (width) x 3.0 m (vertical clearance). The development proposes the following loading provisions for each block, with the following dimensions:

- **South Block:** 1 loading space with dimensions of 18 m (length) x 6 m (width) & 4 loading areas with dimensions of 8 m (length) x 4 m (width)
- **North Block:** 1 loading space with dimensions of 18 m (length) x 6 m (width) & 3 loading areas with dimensions of 8 m (length) x 4 m (width)



All of the proposed loading spaces are located at-grade, without any overhead obstructions, and meet the minimum heights required by the Zoning By-law. The proposed loading supply is appropriate.

Transportation Demand Management Plan

The proposed Transportation Demand Management (TDM) Plan aims to reduce automobile use through an on-going strategy that supports and promotes the use of non-auto transportation modes. Proposed TDM measures for the site include pedestrian facilities with a focus on connectivity, bicycle parking/ bicycle repair stations, an appropriate vehicle parking supply, resident traveller information and unbundled parking.

Travel Demand

For the purposes of a conservative analysis, although there are 1,768 proposed residential units, the total unit count considered for the analysis was rounded up 1,900 units to account for potential future adjustments to the development concept plan. The Phase 1 (south block) proposed development is anticipated to generate **250 and 300 two-way vehicle trips** during the weekday morning and afternoon peak hours, respectively. At full buildout, the proposed development is anticipated to generate in the order of **435 and 515 two-way vehicle trips** during the peak hours.

Traffic Operations Analysis

The traffic analysis was undertaken for the 2029, 2032 and 2037 horizon years. The 2029 horizon year represents the build-out of Phase 1 (south block). The 2032 horizon year represents the full build-out of the site (south block + north block). The 2037 horizon year represents the five-years beyond the build-out horizon of the site. The following analysis scenarios were undertaken for this study:

- 2023 Baseline existing traffic volumes
- 2029 Future background traffic conditions
- 2029 Future total traffic conditions (inclusive of Phase 1 - south block)
- 2032 Future background traffic conditions
- 2032 Future total traffic conditions (complete site build-out – inclusive of north block)
- 2037 Future background traffic conditions
- 2037 Future total traffic conditions (five years beyond complete site build-out)

The traffic analysis was completed for a typical weekday for both the morning and afternoon peak periods and indicated that in 2037, all study area intersections will operate acceptably, with the recommended optimization of traffic signal timings at the intersections of Regional Road 25 / Louis St. Laurent Avenue and at Regional Road 25 / Britannia Road.

The queuing review indicates no concerns at any of the signalized and unsignalized intersections in the study area. The impact of the site on queuing is only modest and can be accommodated on the existing and future road network.

Overall Conclusion

Based on the comprehensive traffic analysis, the proposed development can be accommodated on the future transportation network.



1.0 INTRODUCTION

BA Group was retained by Mattamy (Milton West) Limited to provide transportation consulting services related to the proposed development of a site (herein referred to as “the site”) that is located on the northwest quadrant of the intersection of Regional Road 25 and Britannia Road, in the Town of Milton (“the Town”), in the Region of Halton (“the Region”).

This Transportation Considerations Report (Traffic Impact Study) has been prepared as part of the **Zoning By-law Amendment (ZBA)** application being submitted to the Town of Milton.

1.1 EXISTING SITE CONTEXT

The site includes two adjacent blocks with frontage along the west side of Regional Road 25. The “south block” is on the south side of Etheridge Avenue and the north side of Britannia Road while the “north block” is on the north side of Etheridge Avenue. There are existing residential uses to the north and west of the site.

The site location and site context are illustrated in **Figure 1** and **Figure 2**, respectively.

1.2 DEVELOPMENT PROPOSAL

The development proposal includes 7 residential buildings (up to 15 stories) inclusive of a total of 1,768 residential units (1,029 units on the south block and 739 units on the north block) along with a total of 929 m² GFA of retail (454 m² on the south block and 475 m² on the north block).

It is estimated at this time that the south block will be completed by 2029 and the north block will be completed by 2032. The phasing of the construction of the south block is proposed to begin with Building 1 and then proceed with Buildings 2, 3 and 4 in that order. The phasing of the construction of the north block is proposed to begin with Building 5 and then proceed with Buildings 6 and 7 in that order.

Resident parking is to be provided through a connected below-grade structure on each block, while non-resident parking (resident visitor and retail) is to be shared and provided at-grade on each block.

Vehicle access and site circulation for each block is proposed via a driveway across each block that provides a connection between a new 4-legged intersection on Etheridge Avenue and a new right-in/ right-out only access (one on each block) at Regional Road 25.

As the proposed new 4-legged intersection of the north and south block driveways with Etheridge Avenue is just over 80 metres from the signalized intersection of Regional Road 25 at Etheridge Avenue, a pedestrian crossover is not recommended to be installed across Etheridge Avenue. The installation of pedestrian warning signs could however be considered.

The development statistics for the site are summarized in **Table 1**. The architectural drawings, along with the traffic signage and pavement marking plan, are provided in **Appendix A and Appendix B**, respectively.



TABLE 1 DEVELOPMENT PROPOSAL

Land Use	SOUTH BLOCK				NORTH BLOCK			Total Proposed
	Building 1	Building 2	Building 3	Building 4	Building 5	Building 6	Building 7	
Residential								
Residential (units)	327	238	223	241	223	193	323	1,768 units
Total Residential Units	1,029 units				739 units			
Non-Residential								
Retail (GFA)	454 m ²	--			--		475 m ²	929 m ²
Total Non-Residential GFA	454 m ²				475 m ²			
Vehicle Parking								
Resident (spaces)	1,040				739			1,779 spaces
Non-Resident (spaces)	225				163			388 spaces
Total Vehicle Parking	1,265				902			2,167 spaces
Bicycle Parking								
Resident (spaces)	526				370			896
Non-Resident (spaces)	8				6			14
Total Bicycle Parking (spaces)	534				376			910

Notes:

1. Site statistics based on site plans prepared by Core Architects dated July 25, 2023.



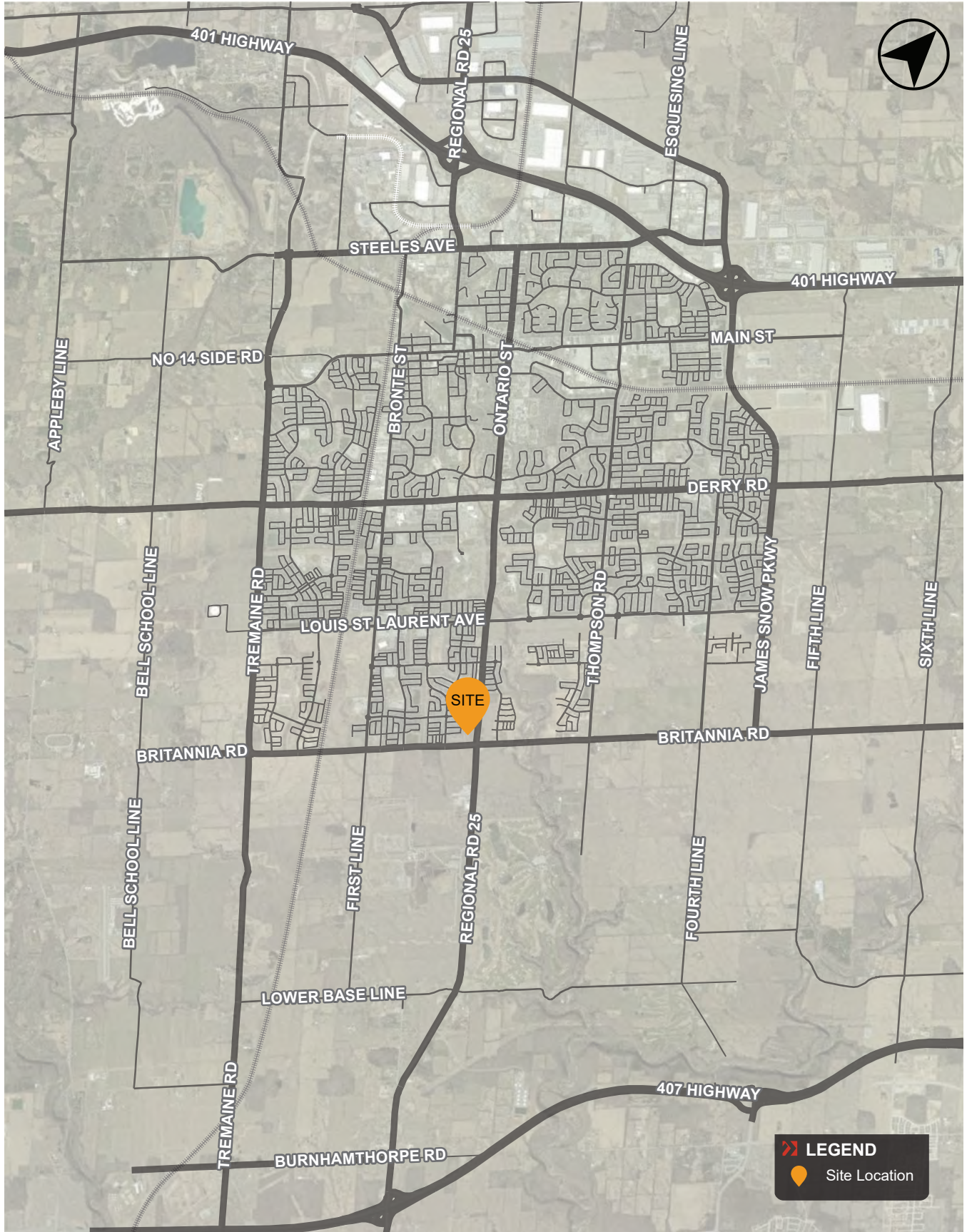


FIGURE 1 SITE LOCATION



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

FIGURE 2 SITE PLAN

1.3 STUDY SCOPE

The terms of reference for the Traffic Impact Study was submitted to both the Town and Region. The comments received regarding the scope of work are provided in **Appendix C**.

This report provides an assessment of the transportation-related aspects of the site, including:

- a summary of the existing land uses and proposed development;
- a review of the area transportation context, including planned area road network improvements; and
- a review of traffic operations on the road system following the development of the site.

The Town and Region have several planned improvements for the area surrounding the site including improvements to transit connectivity, new active transportation links, and the adjacent road network as identified in the:

- Town and Regional Official Plans (OP, ROP)
- Town and Regional Transportation Master Plans (TMP); and
- Boyne Survey Secondary Plan (MSPS);

Plans for road improvements approved and already underway by the Town and Region will provide for significantly improved connectivity and mobility options for future site residents and visitors. Planned area road, transit and active transportation improvements are outlined in **Section 3.0** of this report.

The study scope is outlined below.

Transportation Context

- A description of the existing transportation context with consideration for the area road network, transit system and active transportation facilities.
- A description of any future transportation changes and/or improvements to the area context such as transit improvements and other non-automobile dependent travel options.

Development Proposal

- A summary of the proposed development.
- An overview of the site and the area-wide transportation system that facilitates a shift towards non-automobile travel for prospective residents and visitors, while still being able to meet the practical and operational needs of the proposed development plan.
- A review of the transportation elements of the proposed development plan that includes vehicle access and circulation, loading and parking facilities.

Transportation Demand Management Framework

- An overview of potential Transportation Demand Management (TDM) measures and initiatives that are being considered to encourage prospective residents and visitors to use more active and sustainable modes of transportation.

Site Plan

- A review of the adequacy of the vehicle and bicycle parking supply, inclusive of a parking study.
- A review of the adequacy of the loading space provisions.
- A review of the functionality and appropriateness of the proposed vehicle, pedestrian and cycling facilities incorporated into the site plan, including loading/garbage collection facility arrangements.



Travel Demand Forecasting

- An assessment of the existing travel patterns and traffic volumes in the study area, during the key weekday morning and afternoon peak hours.
- A comprehensive review of future growth that may occur in the area, including corridor growth and consideration for a number of other area development projects.
- An assessment of the multi-modal trip generation potential of the proposed development.

Traffic Operations Review

- A review of traffic operations at intersections in the area, under existing and future conditions, including an assessment of the operational impacts of the proposed development.
- An assessment of any mitigative measures to accommodate the development traffic.

The findings of this review are summarized in the following sections.



2.0 POLICY & PLANNING CONTEXT

2.1 PROVINCIAL POLICIES

2020 Provincial Policy Statement

The *Provincial Policy Statement, May 1, 2020* (the “PPS”), establishes the foundational policy for directing land development in Ontario. There are a number of important transportation-related directives relevant to the site including:

- Optimize and re-using existing infrastructure before developing new infrastructure
- Providing transportation systems appropriate for projected needs which are safe, energy efficient, and facilitate the movement of people and goods
- Make efficient use of existing and planned infrastructure, including through the use of TDM strategies
- Improve the connectivity of transportation systems for all modes of travel
- Provide a density and mix of land uses to minimize the length and number of vehicle trips and encourage the use of transit and active transportation

Places to Grow: Growth Plan for the Greater Golden Horseshoe

A Place to Grow: Growth Plan for the Greater Golden Horseshoe, August 2020 (the “Growth Plan”), further expands upon the policy foundations established by the PPS by providing additional and more specific land use planning policies including:

- Prioritizing growth in major transit station areas (“MTSAs”). The site is 6 kilometres (10 minute travel by car) away from the Milton GO Station.
- Developments within MTSAs will be transit supportive, often referred to as a compact mixed-use development with a high level of residential and employment density in proximity to transit stations and corridors
- Developments within MTSAs will be supported, where appropriate, by providing alternative development standards, such as reduced parking standards
- That municipalities will develop and implement TDM policies that increases the modal share of alternatives to the automobile and prioritize active transportation, transit, and goods movement over single-occupant automobiles

2.2 HALTON REGION POLICIES

Halton Region Official Plan

Halton Region’s Official Plan provides direction regarding how physical development should occur in Halton Region to meet the current and future needs. The Official Plan outlines a long term vision for the Region’s physical form and community character. To pursue that vision, it sets forth goals and objectives, describes an urban structure for accommodating growth, states the policies to be followed, and outlines the means for implementing the policies.

Halton Region Transportation Master Plan

An updated *Halton Region Transportation Master Plan 2031* (the “Halton Region TMP”) was adopted by Halton Region in October 2011 defining the Region’s framework for growth from 2021 to 2031. The new TMP supports the policies and objectives arising out of Regional Official Plan Amendment No. 38 (ROPA 38) which



incorporate the results from the Sustainable Halton Official Plan Review process. The Halton Region TMP (2031) is focused on a sustainable approach that balances 'greenfield' development with intensification. The Halton Region TMP has identified a number of initiatives to accommodate future growth in the region including, but not limited to: an expanded road network, transportation demand management, active transportation and expanded transit options.

2.3 TOWN OF MILTON POLICIES

Town of Milton Official Plan

The *Town of Milton Official Plan Amendment (OPA 31), November 2018* sets the planning policy framework to guide the future growth and development of the Town by aligning with the Province's Growth Plan for the Greater Golden Horseshoe as well as Halton Region's Official Plan. It recognizes that the Town's settlement area is nearly built out and most of the future development in the Town will occur through intensification. A *new Official Plan project, We Make Milton*, launched in July 2019, focusses on reviewing and updating the Official Plan with policies to manage the Town's growth to the year 2051. This is a multi-year, multi-stage project that is currently at Stage Three, according to the latest June 2023 report. It considers the implementation of key transportation related directions as identified in the updated 2023 Transportation Master Plan (TMP). The Part 1 of this new Official Plan is anticipated to release in fall 2023.

Milton Transit Service Review and Master Plan

The *2019-2023 Milton Transit Service Review and Master Plan Update, June 2019* identifies the current and future transit needs for the Town of Milton. The Milton Transit Service Review acknowledges the rapid growth of population and employment triggering the need to expand public services. The updated Transit Master Plan focusses on :

- Improving Milton Transit's operation and management while positioning growth over the next 5-15 years
- Coordinating strategically with the Region and Milton's surrounding communities
- Recommending short to medium to long-term changes by increasing service productivity, introducing and expanding new mobility services and specialized transit services into new growth area, introducing cross-boundary services, extending local-fixed routes network, maintaining service reliability and assets to enhance connectivity, accessibility and mobility

The Transit Master Plan specifically talks about supporting the Regional Network as part of the long-term recommendations which includes locating the southern transit hub at Britannia Road and Regional Road 25. This transit hub will provide maximum flexibility for transfers among routes, reducing travel times and making transit a prime mode of travel for the wider variety of trip purposes.

Town of Milton Transportation Master Plan

In 2018, the Town of Milton developed a Transportation Master Plan (TMP) to guide investment in all modes of transportation in order to accommodate the travel future demand expected due to the expected significant population and economic growth. In March 2023, the Town of Milton retained a consultant to prepare the Transportation Master Plan Update. The TMP update intends to align transportation policy with Milton's



growth plan and priorities. It will also reflect recent policy directions from the Province of Ontario, which focuses Milton's future growth on intensification in the built boundary and developing complete communities through Secondary Plan Areas. The TMP Update will be the guide that considers all modes of transportation and identifies strategic improvements for each mode of travel in order to focus a shift towards sustainable travel in the Town.

Boyne Survey Secondary Plan

The Town of Milton will expand its urban core in three phases. The *Boyne Survey Secondary Plan*, in which the site is located, is part of the Milton Urban Expansion Area. It extends to the lands south of the Bristol Survey and Sherwood Survey Secondary Plan Areas, and forms phase 3 of the expansion.

The Boyne Survey is a rectangular block of land south of Milton's urban core in the area bounded by Louis St Laurent Avenue in the north, James Snow Parkway in the east, Tremaine Road in the west and Britannia Road in the south. Approximately 930 hectares in size, the Boyne Survey will include residential development with some mixed-use areas to accommodate an additional 50,000 residents when fully developed.

As per Schedule C.10.C *Boyne Survey Secondary Plan Land Use Plan*, the subject site is identified as a Major Node Area. These areas highlight key intersections with potential to integrate higher residential densities and concentrations of mixed-use developments. Major Node Areas focus on urban activities within residential neighbourhoods, creating pedestrian-oriented infrastructure and maximizing the use of areas transit.

The Regional Road 25 and Britannia Road intersection is also recognized as a Gateway, a key point of entry to the Milton Urban Area of the Town. These entry points may be required to include the highest form of roadway design features such as special signage and central medians.



3.0 TRANSPORTATION CONTEXT

A number of transportation network improvements are planned or underway within the vicinity of the site, that will significantly alter the way area residents and visitors are able to travel. Most significantly, these improvements will facilitate a shift from predominantly automobile-based travel to more sustainable modes of travel, including transit, cycling and walking.

The following sections provide a detailed discussion of the existing and evolving area transportation context of the site and network improvements.

3.1 AREA ROAD NETWORK

3.1.1 Existing Area Road Network

A detailed description of the area road network surrounding the site and the characteristics of the streets serving the site area is provided in **Table 2**.

The existing area road network is illustrated in **Figure 3**. The existing area road lane configuration and traffic control are illustrated in **Figure 4**.

TABLE 2 AREA ROAD NETWORK

Classification / Direction		Street Name	Roadway Limits	Description
Major Arterial	North-South	Regional Road 25 (Ontario Street)	Regional Road 25 extends from Steeles Avenue East in the north to its full interchange with the Ontario Highway 407 Express Toll Route ('407ETR') in the south. South of 407ETR it continues as Bronte Road that extends across Halton Region to the Town of Oakville in the south.	<p>The corridor has a basic four-lane urban cross, two-lanes in each direction. Both dedicated right and left turn lanes are provided in the northbound and southbound directions at Britannia Road and Louis St. Laurent Avenue. The posted speed limit is 70 km/h.</p> <p>In the vicinity of the site, on-street parking is not permitted along Regional Road 25.</p>
	East-West	Britannia Road (Regional Road 6)	<p>Britannia Road extends from Hurontario Street in the east (City of Mississauga), where it continues to Britannia Street West / Peel Regional Road 3, to Milborough Town Line in the west (City of Burlington).</p> <p>East of Hurontario Street, it continues as Britannia Road East to Kennedy Road (City of Mississauga).</p>	<p>The corridor has a two-lane urban cross-section, with one-lane in each direction. During construction, the corridor has a one-lane cross-section adjacent to the site with auxiliary turn lanes at Regional Road 25.</p> <p>The posted speed limit is 50 km/h.</p>
Minor Arterial	North-South	Bronte Street S/ First Line	<p>Bronte Street South extends from Main street in the north to Britannia Road in the south, where it continues as First Line.</p> <p>North of Main Street, it continues as Bronte Street North to Steeles Avenue.</p>	<p>The roadway has a basic four-lane urban cross-section with dedicated right and left turn lanes in the southbound direction at Britannia Road. Along Bronte Street South, through the study area, there are bicycle lanes on both sides indicated by pavement markings on the street and signs identifying the reserved lane.</p> <p>South of Britannia Road, Bronte Street South continues as First Line, a two-lane cross-section collector roadway with auxiliary left turn lanes.</p> <p>The posted speed limits is 70 km/h.</p>



		Thompson Road S / Third Line	Thompson Road South extends from Main street in the north to south of Britannia Road. North of Main Street, it continues as Thompson Road North to Steeles Avenue.	The roadway is classified as a minor arterial from Main Street in the north, and continues as a collector roadway south of Britannia Road. The corridor has a four-lane urban cross section, with two lanes in each direction. There are bicycle lanes indicated by pavement markings on the street and multi-use paths in the boulevard on both sides of the road. The posted speed limit is 70 km/h.
	East-West	Louis St. Laurent Avenue	Louis St. Laurent Avenue extends from James Snow Parkway South in the east to west of Tremaine Road, where it becomes Pan Am Boulevard.	The roadway has a four-lane basic cross-section with dedicated left turn lanes in the northbound and southbound directions at Regional Road 25. Additionally, Louis St, Laurent has a grade separation at the CN rail line. Along Louis St. Laurent Avenue through the study area, there are bicycle lanes on both sides indicated by pavement markings on the street and signs identifying the reserved lane. The posted speed limit is 60 km/h.
Collector	North-South	Farmstead Drive	Farmstead Drive extends from Laurier Avenue in the north to Britannia Road in the south.	The roadway has a two-lane cross-section, one-lane in each direction, with bicycle lanes on both sides indicated by pavement markings on the street and signs identifying the reserved lane. On-street parking is permitted. There is no posted speed limit so it is assumed that the statutory 50 km/h speed limit applies.
	East-West	Etheridge Avenue	Etheridge Avenue extends from Regional Road 25 in the east to Bronte Street South in the west.	The roadway has a two-lane cross-section, one-lane in each direction, with bicycle lanes on both sides indicated by pavement markings on the street and signs identifying the reserved lane. On-street parking is permitted. There is no posted speed limit so it is assumed that the statutory 50 km/h speed limit applies.
		Whitlock Avenue	Whitlock Avenue extends from Sweetfern Crescent / Basswood Drive east of Regional Road 25 to Bronte Street South in the west.	The roadway has a two-lane cross-section, one-lane in each direction, with bicycle lanes on both sides indicated by pavement markings on the street and signs identifying the reserved lane. On-street parking is permitted. There is no posted speed limit so it is assumed that the statutory 50 km/h speed limit applies.



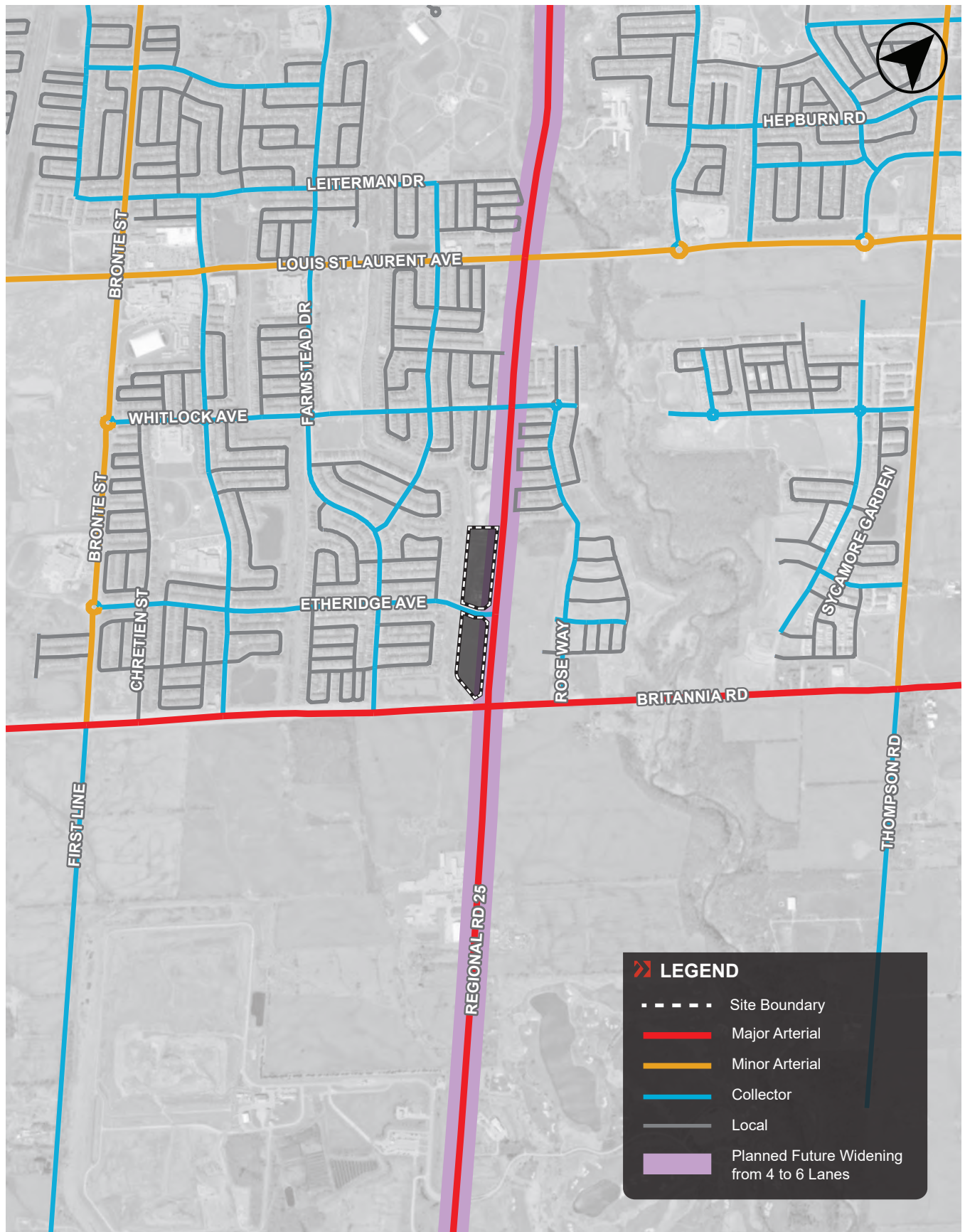


FIGURE 3 EXISTING AREA ROAD NETWORK

3.1.2 Planned Road Network Improvements

Halton Region has developed and is implementing an extensive roads development and improvement program. The Regional road improvement program is generally identified in the Halton TMP, where improvements in the immediate vicinity of the site area were identified for implementation in conjunction with development (intensification). Additionally, a review of the Town of Milton's construction project forecasts and the *2019 - 2023 Milton Transit Services Review & Master Plan Update* has identified other improvements in the study area. The planned road improvements are described below.

Britannia Road Corridor Improvements

As part of the planning study, the Region undertook a Schedule C Municipal Class Environmental Assessment (EA) Study, dated April 2014 (herein referred to as "2014 Britannia Road EA" or "EA Study") to further identify opportunities for improvements on the Britannia Road (Regional Road 6) corridor, from Tremaine Road to Highway 407. The study identified and evaluated alternative configurations for the Britannia Road corridor surrounding the site.

The EA study initially indicated that the first phase would include the widening of Britannia Road from 2 to 6 lanes from Tremaine Road to Regional Road 25 including a grade separation at the CN rail line, and from 2 to 4 lanes from Regional Road 25 to Highway 407. The second phase provided for the further widening of Britannia Road between Regional Road 25 and the Highway 407 interchange from 2 to 4 lanes starting in 2014, and from 4 to 6 lanes possibly in conjunction with the implementation of high occupancy vehicle lanes starting in 2028.

In January 2017, Halton Region completed an addendum to the EA study which essentially proposes to amend the Britannia road widening project to eliminate phasing to the project as originally contemplated. The addendum proposes that the widening from 2 to 6 lanes from Tremaine Road to the Highway 407 interchange occur in one phase.

After evaluating a range of alternatives, a recommended plan was approved to widen Britannia Road from 2 to 6 lanes between Tremaine Road and Highway 407. The project is planned to be completed in three Phases: **Phase 1** (Tremaine Road to Regional Road 25) began construction in September of 2019 and completed in February of 2022, **Phase 2** (James Snow Parkway to Highway 407) and, **Phase 3** (Regional Road 25 to James Snow Parkway) began construction in June 2021 and is anticipated to be completed by December 2024.

The key elements of the preferred *Britannia Road Corridor* between Tremaine Road and Highway 407 included:

- Road widening from four to six lanes
- New turn lanes
- New on-road bike lane
- New sidewalk/multi-use pathway
- New landscaping
- New traffic signals



Britannia Road is also identified as a “Priority Transit Corridor” (within the *Mobility Management Strategy for Halton Region*) and “With Transit in semi-exclusive/exclusive right-of-way” (within the Region’s TMP), with 4 and 2 lanes for Transit / Highway Occupancy Vehicle (“HOV”) between Tremaine Road and Highway 407.

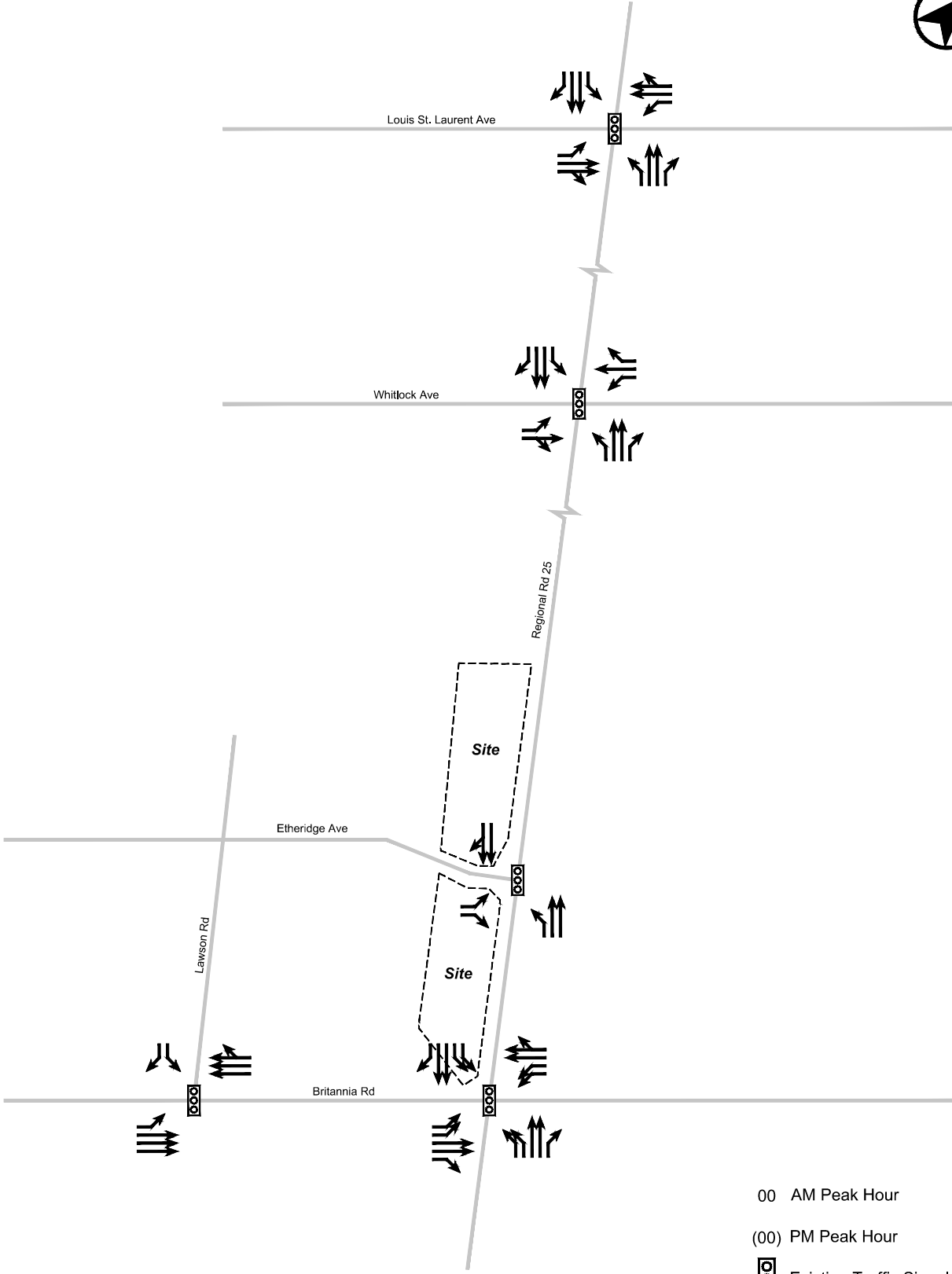
Regional Road 25 Corridor Improvements

A Notice of Study was filed by the Region in July 2022 for a Municipal Class EA Study to consider a range of options for corridor improvements to Regional Road 25. The Halton Region TMP identified the need for additional capacity in the Regional Road 25 corridor from Speers Road to Derry Road, in the Towns of Oakville and Milton. A number of multi-modal transportation improvements will be considered for Regional Road 25 including widening the roadway from 4 to 6 lanes to address forecasted travel demand to 2023. Additional improvements include cross-sectional requirements, intersection improvements, as well as various active transportation elements.

Regional Road 25 is also identified as a “Priority Transit Corridor” (within the *Mobility Management Strategy for Halton Region*) and “With Transit in semi-exclusive/exclusive right-of-way” (within the Region’s TMP), with 4 and 2 lanes for Transit / HOV between QEW and Derry Road; 4 and 2 lanes for Transit / HOV – other jurisdiction between Derry Road and Steeles Avenue.

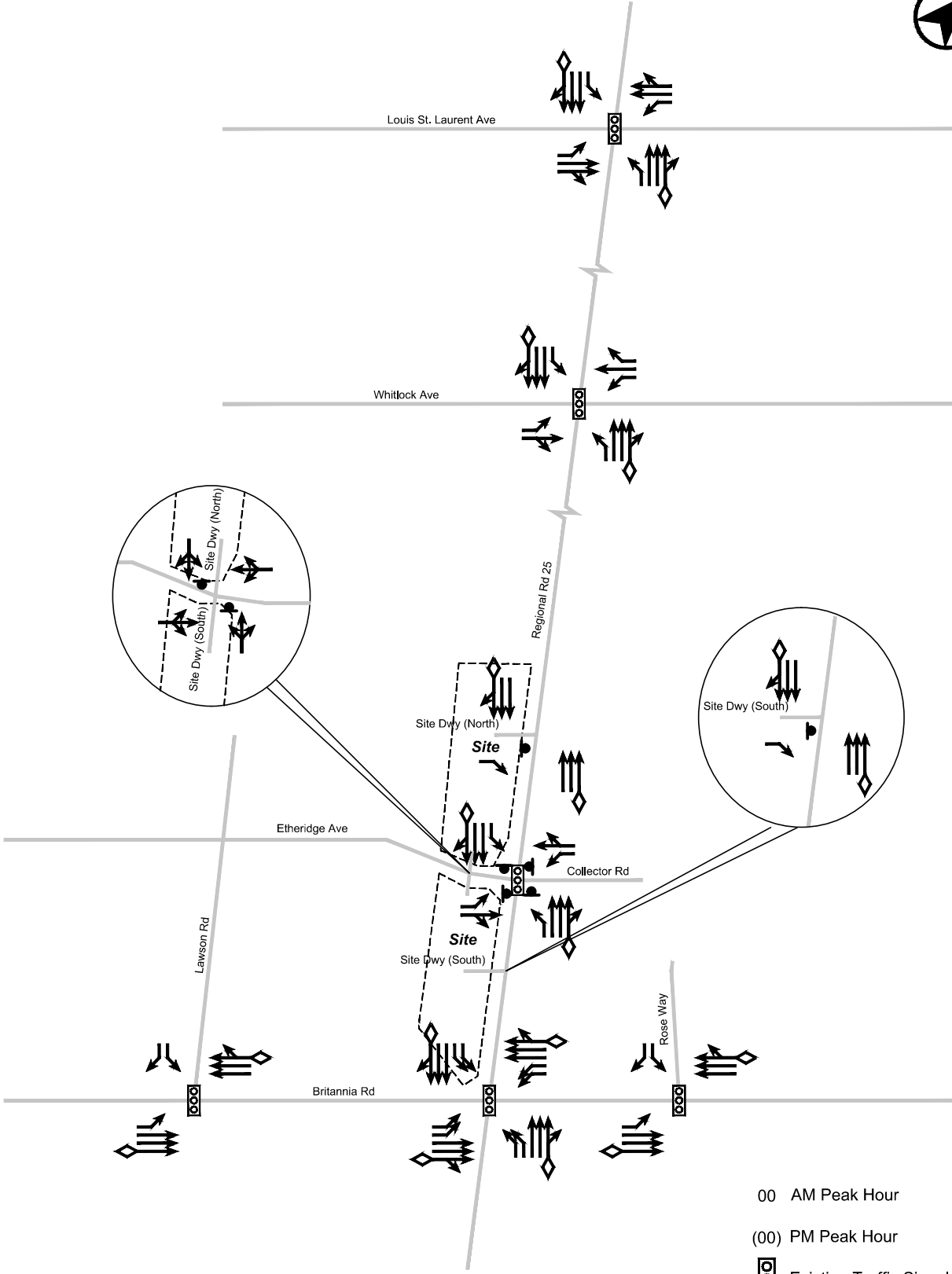
The future area road lane configuration and traffic control is illustrated in **Figure 5**.





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FIGURE 4 EXISTING LANE CONFIGURATION & TRAFFIC CONTROL



- 00 AM Peak Hour
- (00) PM Peak Hour
- 000 Existing Traffic Signal

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FIGURE 5 ULTIMATE LANE CONFIGURATION & TRAFFIC CONTROL

3.2 AREA TRANSIT NETWORK

3.2.1 Existing Transit Network

The site is currently served by local surface bus routes operated by Milton Transit. Specifically, the site is currently serviced by 2 regular bus routes, and 3 school special bus routes which collectively provide local connections to the higher-order GO Transit System. The nearest existing transit stop to the site is located adjacent to the site, on the north side of Etheridge Avenue, less than 100 m to the west.

The site is also serviced by Milton Transit OnDemand which is a flexible, shared-ride service that provides transit without following a fixed route or schedule, booked via a mobile app that operates on weekdays from 5:15 am to 10:11 pm and on Saturdays from 7:10 am to 7:40 pm. OnDemand transit connects passengers to/from available fixed route service at key transfer locations. Smaller-sized, fully accessible Milton Transit buses are used to deliver OnDemand services. The site is serviced within the “Boyne Zone 1” area.

GO Transit

The site is located within proximity to the Milton GO station, the western terminus of the Milton GO line. The Milton GO Train line provides commuter rail service connecting the greater Milton area to Downtown Toronto. The GO Station is located approximately 6.4 km north of the site.

Currently, the Milton GO line operates peak direction peak period service between Milton and Union Station. On a typical weekday, six eastbound trains depart from Milton GO Station during the morning peak period, and six westbound trains arrive at Milton GO Station during the afternoon peak period. Outside of these peak periods, GO buses provide additional service in both the eastbound and westbound directions.

A detailed overview of the existing area transit network is summarized in **Table 3** and illustrated in **Figure 6**.



TABLE 3 EXISTING AREA TRANSIT NETWORK

Route	Headway (peak periods)	Closest Stop Location	Description
8 Willmot	30 min. weekday peak periods (60 min. off peak)	Louis St. Laurent Avenue / Leger Way (1.8 Kilometres, 22 min. walk)	Operates generally in an east-west direction connecting neighbourhoods surrounded by Derry Road, Regional Road 25, Louis St. Laurent Avenue, and Bronte Street to the Milton GO Station, via Thompson Road and Derry Road.
9 Ontario South	30 min. weekday peak periods (60 min. off peak)	Etheridge Avenue / Orr Terrace (50 metres, 1 min. walk)	Operates generally in a north-south direction along Ontario Street / Regional Road 25. The bus route provides access to neighborhoods surrounded by Louis St. Laurent Avenue, Regional Road 25, Britannia Road, and Bronte Street, via Regional Road 25. The route was realigned in 2019 to serve a larger portion of Farmstead Road between Etheridge Avenue and Louis St. Laurent Avenue.
50 School Special	–	Louis St. Laurent Avenue / Leger Way (1.8 Kilometres, 22 min. walk)	Route 50, 51, and 52 are special secondary school connection routes provide student access to and from multiple secondary schools throughout Milton, during the school year.
51 School Special	–	Louis St. Laurent Avenue / Leger Way (1.8 Kilometres, 22 min. walk)	Route 50 – runs one trip in the morning from Derry Road at Scott Boulevard to Milton District High School. In the afternoon, the first trip runs between Jean Vanier Secondary School at Derry Road and Scott Boulevard, while the second trip leaves from Milton District High School.
52 School Special	–	Louis St. Laurent Avenue / Leger Way Bronte Street South / Lemieux Court (1.8 Kilometres, 22 min. walk)	Route 51 follows the same schedule but runs on a slightly different alignment serving neighbourhoods south of Derry Road. Route 52 – only operates one afternoon trip between Jean Vanier Secondary School and Milton GO Station.
53 School Special	–	Etheridge Avenue / Farmstead Drive (300 metres, 4 min. walk)	Route 53 – only operates one afternoon trip between Elsie Macgill Secondary School and Milton GO Station.



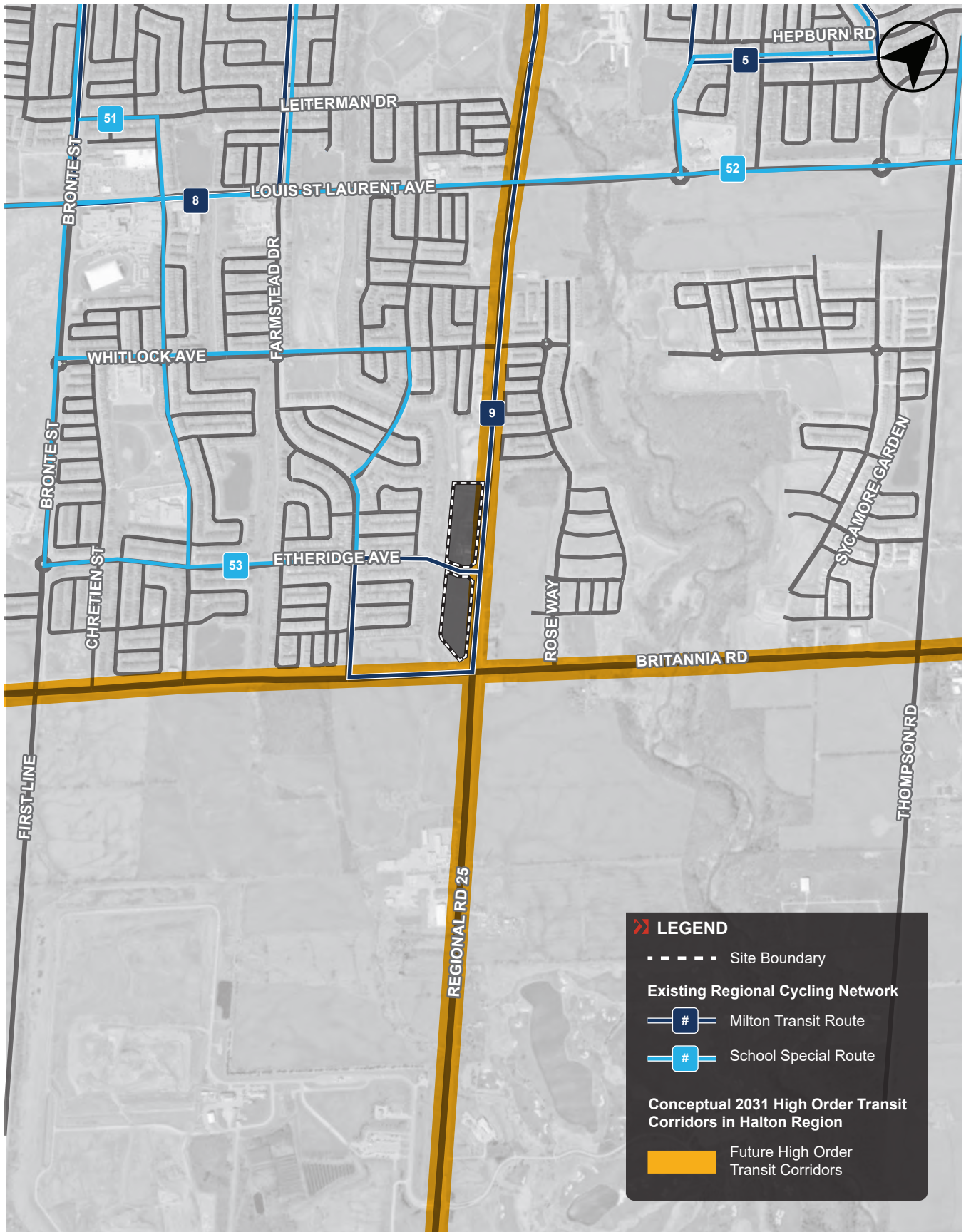


FIGURE 6 AREA TRANSIT NETWORK

3.2.2 Planned Transit Network Improvements

2019 – 2023 Milton Transit Services and Master Plan Update

The Town of Milton Master Plan Update recommends a rapid transit network for a long term horizon (2041). Key improvements within the Site's vicinity are outlined below:

- Medium Term Recommendations (2021 – 2024)
 - Implement **Home-to-Hub service** – a shared on-demand mobility service that allows residents in newly developed or underdeveloped areas to be picked up at home and dropped off at the closest transit hubs, with connections to regular fixed transit route services. The proposed mobility service addresses coverage gaps by serving low-density areas, as communities expand and continue to develop to include fixed route transit services.
- Long-term Recommendations (Beyond 2024)
 - Expand new mobility service, Home-to-Hub, to new growth areas as an initial transit service;
 - Extend fixed route transit service to south of Louis St. Laurent, while developing a new secondary transit hub at the Regional Road 25 and Britannia Road intersection to support the expansion.
 - Support regional network by providing vehicles to operate all routes at 30-minute headways all-day, along regional transit priority corridors – including Regional Road 25 and Britannia Road.

Milton GO Line Service Expansion

The Milton line is an existing GO Rail line that currently provides two-way, all-day service 7 days a week between Toronto and Milton. It also provides weekday rush-hour service from Milton GO to Union GO Station in the morning and back in the afternoon. Metrolinx has proposed expanded service characteristics to include 15-minute service or better frequencies, both-ways, throughout the day between Toronto and Milton, in addition to a 7-day a week, hourly service between Toronto and Milton. Milton Transit will look to expand the hours of service and increase frequency of service to facilitate efficient and reliable connectivity with the rail line.



3.3 AREA CYCLING NETWORK

3.3.1 Existing Cycling Network

On-street bike lanes are available along collector roads within the vicinity of the site including Farmstead Drive, Etheridge Avenue and Whitlock Avenue. There are presently no existing dedicated cycling facilities along Britannia Road. Regional Road 25 is considered a multi-use path (with provisions for cycling and pedestrians), as identified within the 2019-2023 Halton Region TMP.

3.3.2 Future Area Cycling Network Improvements

A number of cycling infrastructure improvements are planned within the vicinity of the site, including:

- Bike Lanes along Britannia Road, Regional Road 25 and Louis St Laurent Avenue; and
- Boulevard Multi-use Trail along Britannia Road and Regional Road 25.

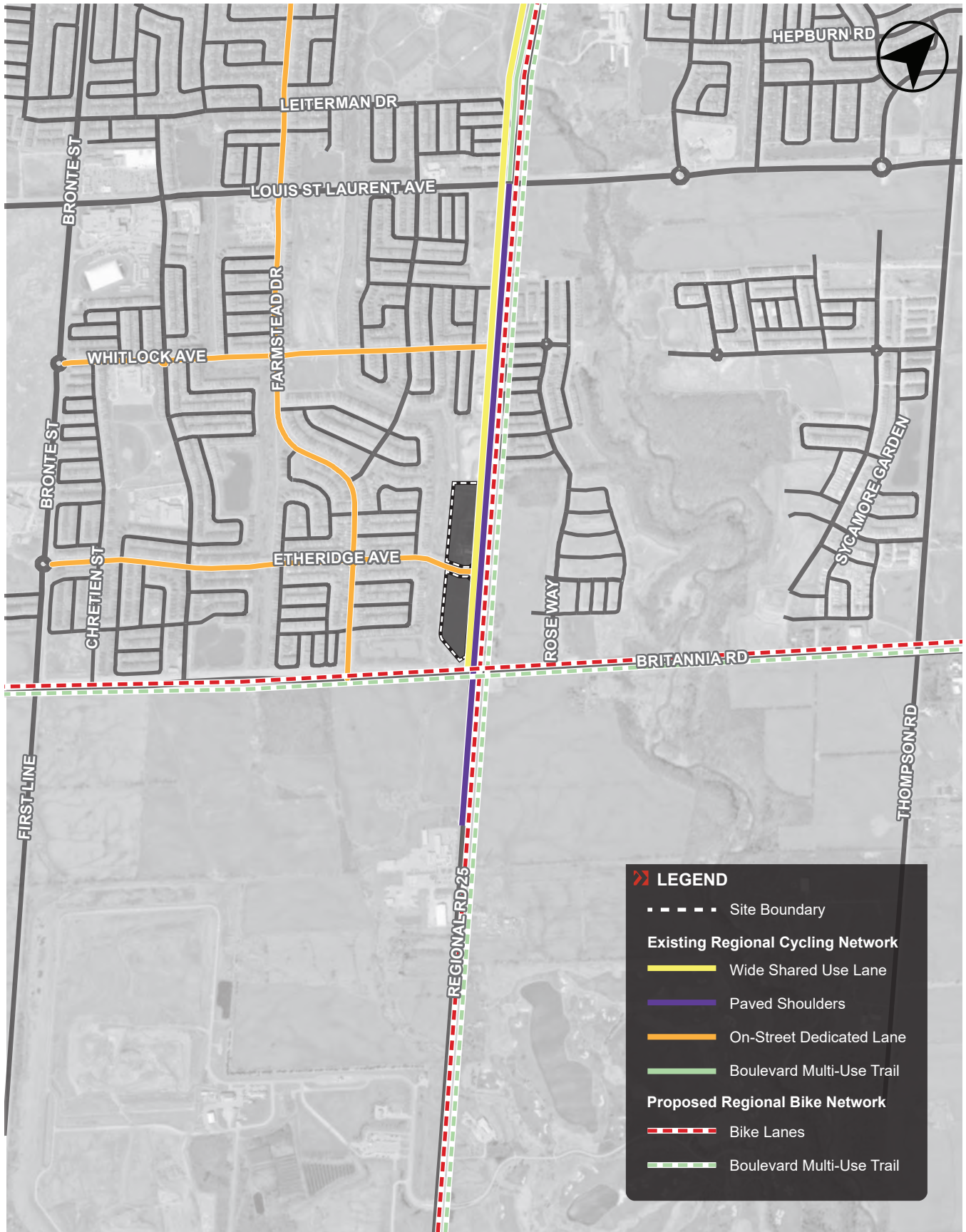
Elements of the Halton Region Transportation Master Plan have identified Britannia Road as a 47 metre right-of-way with an urban cross section, including 3.0 metre off road multi-use pathways and 1.8 metre on road cycling lanes on both sides of the roadway.

These cycling connections provide opportunities for residents and visitors of the site and surrounding area to travel using active forms of transportation.

The existing and future area cycling network is illustrated in **Figure 7**.



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

FIGURE 7 AREA CYCLING NETWORK

3.4 AREA PEDESTRIAN NETWORK

3.4.1 Existing Pedestrian Network

The site is located within the Ford neighbourhood and is situated northwest of the intersection of Britannia Road and Regional Road 25. The site is also located in proximity to a wide range of key destinations, including recreation facilities, institutional uses, parks and restaurants, that are accessible by walking.

Adjacent to the site, a recently installed traffic signal provides a protected pedestrian crossing of Regional Road 25 at Etheridge Avenue.

3.4.2 Future Pedestrian Network

The development of the site includes walkways throughout both the north and south blocks that will connect to a future sidewalk on the west side of Regional Road 25 as well as to the existing sidewalks along Etheridge Avenue. The pedestrian linkages to Etheridge Avenue will provide connectivity to an existing walking trail along the Natural Heritage System (NHS) as well as to the adjacent neighbourhood.

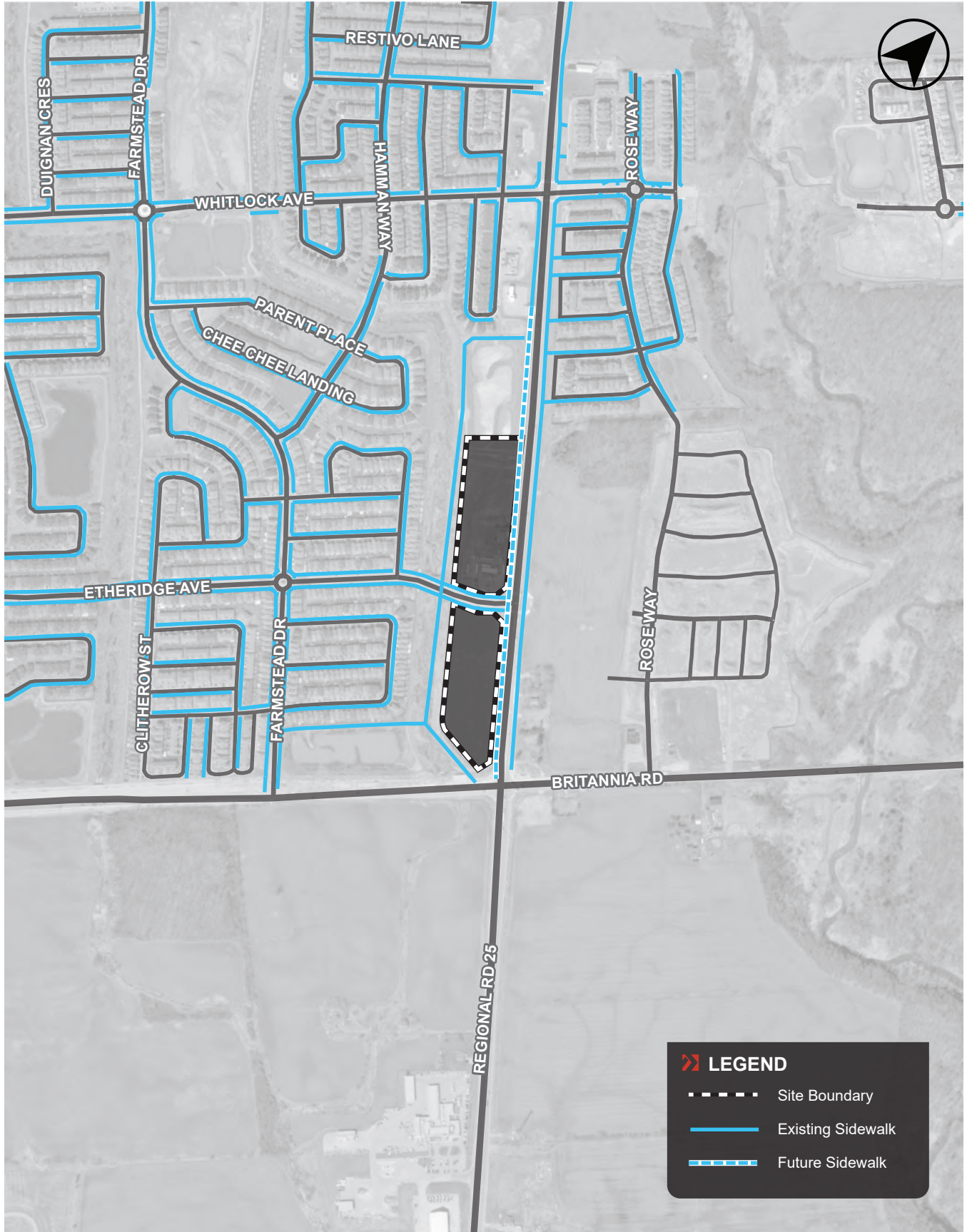
The walkways throughout the site with connectivity to sidewalks on Etheridge Avenue and to Regional Road 25 will also provide connectivity to transit stops in order to encourage transit trips to/from the site.

As the proposed new 4-legged intersection of the north and south block driveways with Etheridge Avenue is just over 80 metres from the signalized intersection of Regional Road 25 at Etheridge Avenue, a pedestrian crossover is not recommended to be installed across Etheridge Avenue. The installation of pedestrian warning signs could however be considered.

The existing and future area pedestrian network is illustrated in **Figure 8**.



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

FIGURE 8 AREA PEDESTRIAN NETWORK

4.0 VEHICLE PARKING CONSIDERATIONS

4.1 ZONING BY-LAW REQUIREMENTS

The site is subject to the Town of Milton Comprehensive Zoning By-law 016-2014 (HUSP Urban Area – June 2019) for parking considerations. Application of this By-law to the site is summarized in **Table 4** and results in a total minimum parking requirement for the site of 2,652 spaces, inclusive of 1,543 and 1,109 spaces for the south and north blocks, respectively.

The total minimum requirement of 2,652 spaces includes 2,211 resident spaces and 441 non-resident spaces to be shared between resident visitors and retail. As the resident visitor parking requirement is greater than the retail parking requirement, the minimum required non-resident parking is based on resident visitor parking.

TABLE 4 ZONING BY-LAW 016-2014 MINIMUM PARKING REQUIREMENT

Use	Minimum Parking Requirement	Phase 1 (South Block – Buildings 1-4)		Phase 2 (North Block – Buildings 5-7)		SITE TOTAL	
		Units/ GFA	Minimum Required Parking Spaces	Units/ GFA	Minimum Required Parking Spaces	Units/ GFA	Minimum Required Parking Spaces
MU (*2) Mixed-Use Buildings	1.25 spaces/unit	1,029 units	1,287	739 units	924	1,768 units	2,211
	Greater of 0.25 space/unit or 1 space/25 m² GFA non-res	454 m ² non-res	256	475 m ² non-res	185	929 m ²	441
Total		--	1,543	--	1,109	--	2,652

Notes:

1. Non-resident parking to be shared between resident visitor and retail. As the resident visitor requirement is greater than the retail requirement, the proposed non-resident rate is based on the resident visitor requirement.
2. Site statistics based on site plans prepared by Core Architects dated July 25, 2023.

4.2 PROPOSED PARKING SUPPLY

Table 5 summarizes the proposed parking supply for the site. A total parking supply of 2,167 parking spaces is proposed, inclusive of 1,265 and 902 parking spaces for the south and north blocks, respectively.

The development proposes a provision of a minimum resident parking rate of 1.0 space per unit, with non-resident shared parking proposed to be provided at a minimum rate of 0.22 spaces per unit. As the resident visitor parking requirement is greater than the retail parking requirement, the proposed non-resident rate is based on the resident visitor supply.



TABLE 5 PROPOSED PARKING SUPPLY

Use	Phase 1 (South Block – Buildings 1-4)		Phase 2 (North Block – Buildings 5-7)		SITE TOTAL	
	Units/ GFA	Number of Parking Spaces	Units/ GFA	Number of Parking Spaces	Units/ GFA	Number of Parking Spaces
Resident	1,029 units	1,040	739 units	739	1,768 units	1,779
	<i>1.0 space/unit</i>		<i>1.0 space/unit</i>		<i>1.0 space/unit</i>	
Non-Resident ¹	454 m ² non-res	225	475 m ² non-res	163	929 m ²	388
	<i>0.22 spaces/unit</i>		<i>0.22 spaces/unit</i>		<i>0.22 spaces/unit</i>	
Total	--	1,265	--	902	--	2,167

Notes:

1. Non-resident parking to be shared between resident visitor and retail. As the resident visitor requirement is greater than the retail requirement, the proposed non-resident rate is based on the resident visitor supply.
2. Site statistics based on site plans prepared by Core Architects dated July 25, 2023.

When compared to the minimum requirements of the Town of Milton Comprehensive Zoning By-law 016-2014 (HUSP Urban Area – June 2019), a reduced parking supply is being proposed for the site. As shown in **Table 6**, the proposed parking supply of 2,167 spaces represents a decrease of 18%, when compared to the minimum Zoning By-law requirement of 2,652 spaces. As the proposed parking supply is appropriate for the site but is less than the minimum requirements of the Zoning By-law, justification for the parking reduction is provided in **Section 4.4**.

TABLE 6 COMPARISON OF PARKING SUPPLY AND REQUIREMENTS

Land Use	Minimum Requirement Zoning By-law 016-2014 (HUSP Urban Area – June 2019) (spaces)	Proposed Parking Supply (spaces)
South Block		
Resident	1,287	1,040
Non-resident	256	225
Sub-Total	1,543	1,265
North Block		
Resident	924	739
Non-resident	185	163
Sub-Total	1,109	902
SITE TOTAL	2,652	2,167
<i>Reduction compared to Zoning By-law 016-2014 (HUSP Urban Area – June 2019)</i>		<i>-18%</i>



4.3 ACCESSIBLE PARKING

The minimum requirement for accessible parking spaces is outlined in the Town's By-law 016-2014 (HUSP Urban Area – June 2019). Since a reduced parking requirement is being sought for the site, the requirements for the accessible parking supply is determined by the proposed parking supply for the site. The site requires a total of 29 and 23 accessible spaces for the south and north blocks, respectively, as summarized in **Table 7**.

Where the minimum number of accessible parking spaces required is even, an equal number of Type A and Type B accessible parking spaces shall be provided. Where the minimum number of accessible parking spaces is odd, an equal number of Type A and Type B accessible parking spaces shall be provided but the last accessible parking space will be a Type B.

TABLE 7 ACCESSIBLE PARKING SUPPLY

Use	Phase 1 (South Block – Buildings 1-4)		Phase 2 (North Block – Buildings 5-7)		SITE TOTAL	
	Proposed Parking Supply (spaces)	Accessible Spaces	Proposed Parking Supply (spaces)	Accessible Spaces	Proposed Parking Supply (spaces)	Accessible Spaces
Resident	1,040	22	739	17	1,779	39
	<i>11 spaces + 1%</i>		<i>2 spaces + 2%</i>			
Non-Resident	225	7	163	6	388	13
	<i>2 spaces + 2%</i>		<i>1 space + 3%</i>			
Total	1,265	29	902	23	2,167	52

Notes:

1. Accessible parking requirement must be rounded up to nearest whole number.
2. Site statistics based on site plans prepared by Core Architects dated July 25, 2023.

4.4 ADEQUACY OF PROPOSED PARKING SUPPLY

4.4.1 Adequacy of Recommended Residential Parking Supply

Resident parking standards outlined in By-law 016-2014 (HUSP Urban Area – June 2019) could be considered to overstate the parking needs of a residential development based on the evolving transportation context, inclusive of a comprehensive Transportation Demand Management Plan.

The following sections provide an overview of the contextual factors that could influence parking demand at the site.

4.4.1.1 Ontario's Five-Year Climate Change Action Plan

Trends in urban transportation policy are leaning heavily towards reductions in mandatory minimum parking requirements. A reduced minimum parking supply requirement for the project would be in conformance with Ontario's current vision for transit corridors.



Ontario's Five-Year Climate Change Action Plan was announced in June 2016. Some of the key transportation / 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 bike 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 would provide grants to municipalities and large private employers to implement Transportation Demand Management 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 would be eliminated over the next five years for municipal zoning bylaws, 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, bylaws will encourage bike lanes, larger sidewalks, and enhanced tree canopies.

As of the submission date of this report, the website for the Action Plan has the following disclaimer at the top of the page: *"This page was published under a previous government and is available for archival and research purposes."*

The idea to eliminate minimum parking requirements in transit accessible areas is not new in North America. Residential developments proposing zero resident parking are being promoted, approved and developed across North America including Toronto, Calgary, Vancouver, Portland and Boston. Some cities are even going as far as to eliminate minimum residential parking requirements altogether (i.e. Toronto and Edmonton) or in downtown/core areas, including London, Guelph, and Ottawa in Canada, and San Francisco, Oakland, Sacramento, Santa Monica, Portland, Seattle, and Minneapolis in the United States.

Although zero parking has not been requested for the project, this shift away from providing excess residential parking highlights an evolving perspective toward automobile ownership, travel mode choice and the cost of living.

4.4.1.2 Proxy Site Observed Parking Demand

In order to assess the resident parking demand at other similar buildings in the area, BA Group conducted evening and overnight resident parking surveys at several residential buildings within Halton Region as described below.

Town of Milton Parking Demand Studies

Resident parking demand surveys were recently undertaken at a condominium development located at 1105 Leger Way in the Town of Milton. Parking surveys were conducted for a duration of 6 to 7 hours on a Friday and Saturday, as well as for 3:00 am weeknight spot counts.



As summarized in **Table 8**, the observed resident parking demand at the 1105 Leger Way property ranged from 0.63 to 0.96 spaces per resident unit.

TABLE 8 RESIDENT PARKING DEMAND STUDY – 1105 LEGER WAY, MILTON

Address (Major Intersection)	Study Date	Peak Hour of Parking Demand	Site Description	Resident Parking Demand	
				Demand (spaces)	Ratio (spaces/unit)
1105 Leger Way ¹ (Regional Road 25 / Britannia Road)	Friday, June 16, 2023	10:00 p.m.	213 units / 234 resident parking spaces (condominium)	134	0.63
	Saturday, June 17, 2023	11:00 p.m.		140	0.66
	Wednesday June 21 & Thursday June 22, 2023	3:00 a.m.		204 ²	0.96²

Notes:

1. The surveys were undertaken from 2:00 p.m. to 9:00 p.m. with 30-minute interval counts and 3:00 a.m. spot counts.
2. The summarized 3:00 a.m. results are “composite” – a conservative representation of parking demand where a car was parked in its particular space on either night of the survey.

Oakville Parking Demand Studies

BA Group undertook parking demand surveys at residential buildings in the Town of Oakville at 2379 Central Park Drive, 1229 Marlborough Court and at White Oaks Apartments (1297 Marlborough Court & 1360 White Oaks Boulevard) between October 9th, 2013, and October 28th, 2019.

As shown in **Table 9**, the observed overall resident parking demand at the proxy sites ranged from 0.46 to 0.83 spaces per resident unit.



TABLE 9 RESIDENT PARKING DEMAND STUDIES – TOWN OF OAKVILLE

Address (Major Intersection)	Study Date	Peak Hour of Parking Demand	Site Description	Resident Parking	
				Demand (spaces)	Ratio (spaces/unit)
2379 Central Park Drive ¹ (Dundas Street E / Sixth Line)	Tuesday, Nov. 27, 2018	6:00 a.m.	301 units / 344 resident parking spaces (condominium)	244	0.81
	Saturday, Dec. 1, 2018	6:00 a.m.		240	0.80
	Sunday, Dec. 2, 2018	6:00 a.m.		249	0.83
1229 Marlborough Court ² (Trafalgar Road / Queen Elizabeth Way)	Wed, Oct. 9, 2013	3:00 a.m.	227 units / 329 resident parking spaces (apartments)	161	0.71
	Thurs, Oct. 10, 2013	3:00 a.m.		155	0.68
1297 Marlborough Court & 1360 White Oaks Boulevard ³ (Trafalgar Road / Upper Middle Road E)	Friday, Oct. 25, 2019	3:00 a.m.	263 units/ 343 resident parking spaces (apartments)	181	0.69
	Friday, Oct. 25, 2019	9:00 p.m.		130	0.49
	Saturday, Oct. 26, 2019	3:00 a.m.		180	0.68
	Saturday, Oct. 26, 2019	9:00 p.m.		147	0.56
	Monday, Oct. 28, 2019	9:00 p.m.		121	0.46

Notes:

1. The surveys were undertaken from 6:00 a.m. to 5:30 p.m. with 30-minute interval counts.
2. The surveys were undertaken at 3:00 a.m. (spot counts).
3. The surveys were undertaken from 2:00 p.m. to 9:00 p.m. with 30-minute interval counts, and 3:00 a.m. spot counts.

4.4.1.3 Resident Parking Assessment Summary

As summarized in **Table 10**, the highest resident parking demand of 0.96 spaces per resident unit was observed at the 1105 Legere property in Milton. When considering the proxy site in Milton with the sites in Oakville, the average resident parking demand was 0.80 spaces per unit.

The proposed resident parking supply ratio of 1.0 spaces per unit is higher than the peak resident parking demand observed at 1105 Legere Way in Milton and is considered to be appropriate based upon the evolving transportation context, the observed parking demands at the proxy sites and the TDM measures proposed for the site.



TABLE 10 SUMMARY OF RESIDENT PARKING DEMAND SURVEYS

Property	Peak Resident Parking Demand (resident spaces/unit)
1105 Leger Way, Milton	0.96
2379 Central Park Drive, Oakville	0.83
1229 Marlborough Court, Oakville	0.71
1297 Marlborough Court & 1360 White Oaks Boulevard, Oakville	0.69
Average	0.80

4.4.2 Adequacy of Proposed Non-Resident Parking Supply

As outlined in the review of the proposed residential parking supply, the availability of existing and future travel alternatives available within the vicinity of the site, reduces the need for residents and visitors of the site to use a car on a day-to-day basis. As such, the non-resident parking standards outlined in Zoning By-law 016-2014 (HUSP Urban Area – June 2019) could also be considered to overstate the parking needs of the site.

4.4.2.1 Resident Visitor Parking Assessment

The development proposes a non-resident parking supply at a minimum rates of 0.22 spaces per unit to be shared between resident visitors and retail. As the resident visitor parking requirement is greater than the retail parking requirement, the proposed non-resident rate is based on the resident visitor supply.

In order to assess the visitor parking demand at similar buildings in the area, BA Group conducted evening and overnight visitor parking surveys at several residential locations within Halton Region. Resident visitor parking demand surveys were undertaken at the following locations in the Town of Milton and the Town of Oakville:

- 1105 Leger Way, Milton
- 2379 Central Park Drive, Oakville
- 216 Oak Park Boulevard, Oakville
- White Oaks Apartments (1297 Marlborough Court & 1360 White Oaks Boulevard), Oakville

As shown in **Table 11** the overall visitor parking demand at the proxy sites ranged from 0.07 to 0.16 spaces per resident unit.



TABLE 11 RESIDENT VISITOR PARKING DEMAND STUDIES

Address (Major Intersection)	Study Date	Peak Hour	Site Description	Visitor Parking	
				Demand (spaces)	Ratio (spaces / unit)
Town of Milton					
1105 Leger Way ³ (Regional Road 25 / Britannia Road)	Fri. June 16, 2023	8:00 & 9:00 p.m.	213 units / 49 parking spaces (condominium)	33	0.15
	Sat. June 17, 2023	8:00 p.m.		33	0.15
	Wed. June 21 & Thu June 22, 2023	3:00 a.m.		14 ⁴	0.07 ⁴
Town of Oakville					
2379 Central Park Drive ¹ (Dundas Street E / Sixth Line)	Tues, Nov. 27, 2018	6:00 a.m.	301 units / 68 resident visitor parking spaces	20	0.07
	Sat, Dec. 1, 2018	6:00 a.m.		31	0.10
	Sun, Dec. 2, 2018	6:00 a.m.		30	0.10
216 Oak Park Boulevard ² (Trafalgar Road / Glenashton Drive)	Tues, Nov. 27, 2018	5:30 p.m.	213 units / 38 resident visitor parking spaces	30	0.14
	Sat, Dec. 1, 2018	1:30 .m.		29	0.14
	Sun, Dec. 2, 2018	2:30 p.m.		29	0.14
1297 Marlborough Court & 1360 White Oaks Boulevard ³ (Trafalgar Road / Upper Middle Road E)	Fri, Oct. 25, 2019	3:00 a.m.	263 units / 56 resident visitor parking spaces	35	0.13
	Fri, Oct. 25, 2019	9:00 p.m.		42	0.16
	Sat, Oct. 26, 2019	3:00 a.m.		34	0.13
	Sat, Oct. 26, 2019	9:00 p.m.		33	0.13
	Mon, Oct. 28, 2019	9:00 p.m.		35	0.13

Notes:

1. The surveys were undertaken from 6:00 a.m. to 5:30 p.m. with 30 minute interval counts.
2. Visitor parking spaces surveyed were undertaken from 6:00 a.m. to 5:30 p.m. with 30 minute interval counts.
3. The surveys were undertaken from 2:00 p.m. to 9:00 p.m. with 30 minute interval counts, and 3:00 a.m. spot counts.
4. The summarized 3:00 a.m. results are “composite”, that is, a conservative representation of parking demand where a car was parked in its particular space on either night of the survey.

4.4.2.2 Non-Resident Parking Assessment Summary

As summarized in **Table 12**, the highest resident visitor parking demand of 0.16 spaces per resident unit was observed at 1297 Marlborough Court & 1360 White Oaks Boulevard in Oakville. When considering the proxy site in Milton with the sites in Oakville, the average peak resident parking demand was 0.14 spaces per unit.

The proposed resident visitor parking supply ratio of 0.22 spaces per unit (to be shared with retail) is higher than the peak resident visitor parking demand observed in the proxy studies and is considered to be appropriate based upon the evolving transportation context, observed parking demands at the proxy sites and proposed TDM measures.



TABLE 12 SUMMARY OF RESIDENT VISITOR PARKING DEMAND SURVEYS

Property	Peak Resident Visitor Parking Demand (resident visitor spaces/unit)
1105 Leger Way, Milton	0.15
2379 Central Park Drive, Oakville	0.10
216 Oak Park Boulevard, Oakville	0.14
1297 Marlborough Court & 1360 White Oaks Boulevard, Oakville	0.16
Average	0.14

4.5 PARKING SUMMARY

It is acknowledged that parking standards outlined in Zoning By-law 016-2014 (HUSP Urban Area – June 2019) could be considered to overstate the parking needs of a residential development based on the evolving transportation context, parking demand studies and a comprehensive Transportation Demand Management Plan.

As summarized in **Table 13**, a total parking supply of 2,167 parking spaces is proposed for the site, inclusive of 1,265 and 902 parking spaces for the south and north blocks, respectively. The development proposes a provision of a minimum resident parking rate of 1.0 space per unit, with non-resident shared parking proposed to be provided at a minimum rate of 0.22 spaces per unit. As the resident visitor parking requirement is greater than the retail parking requirement, the proposed non-resident rate is based on the resident visitor supply.

TABLE 13 PROPOSED PARKING SUPPLY

Use	Phase 1 (South Block – Buildings 1-4)		Phase 2 (North Block – Buildings 5-7)		SITE TOTAL	
	Units/ GFA	Number of Parking Spaces	Units/ GFA	Number of Parking Spaces	Units/ GFA	Number of Parking Spaces
Resident	1,029 units	1,040	739 units	739	1,768 units	1,779
	<i>1.0 space/unit</i>		<i>1.0 space/unit</i>		<i>1.0 space/unit</i>	
Non-Resident ¹	454 m ² non-res	225	475 m ² non-res	163	929 m ²	388
	<i>0.22 spaces/unit</i>		<i>0.22 spaces/unit</i>		<i>0.22 spaces/unit</i>	
Total	--	1,265	--	902	--	2,167

Notes:

1. Non-resident parking to be shared between resident visitor and retail. As the resident visitor requirement is greater than the retail requirement, the proposed non-resident rate is based on the resident visitor supply.
2. Site statistics based on site plans prepared by Core Architects dated July 25, 2023.



The highest resident parking demand of 0.96 spaces per resident unit was observed at the 1105 Legere property in Milton. When considering the proxy site in Milton with the sites in Oakville, the average resident parking demand was 0.83 spaces per unit. The proposed resident parking supply ratio of 1.0 spaces per unit is higher than the peak resident parking demand observed at 1105 Legere Way in Milton and is considered to be appropriate.

The highest resident visitor parking demand of 0.16 spaces per resident unit was observed at 1297 Marlborough Court & 1360 White Oaks Boulevard in Oakville. When considering the proxy site in Milton with the sites in Oakville, the average peak resident parking demand was 0.14 spaces per unit. The proposed resident visitor parking supply ratio of 0.22 spaces per unit (to be shared with retail) is higher than the peak resident visitor parking demand observed in the proxy studies and is considered to be appropriate

The proposed parking supply is appropriate for the site based upon the evolving transportation context, observed parking demands at the proxy sites and proposed TDM measures as outlined in **Section 7.0**



5.0 BICYCLE PARKING CONSIDERATIONS

5.1 ZONING BY-LAW REQUIREMENTS

As summarized in **Table 14**, Zoning By-law 016-2014 (HUSP Urban Area – June 2019) requires a minimum of 213 and 154 bicycle parking spaces for the south and north blocks, respectively.

TABLE 14 ZONING BY-LAW 016-2014 MINIMUM BICYCLE PARKING REQUIREMENT

Use	Minimum Parking Requirement	Phase 1 (South Block – Buildings 1-4)		Phase 2 (North Block – Buildings 5-7)		SITE TOTAL	
		Units/ Space	Minimum Spaces	Units/ Space	Minimum Spaces	Units/Space	Minimum Spaces
Dwelling, Apartment	0.2 spaces/unit	1,029 units	206	739 units	148	1,768 units	354
All other Commercial, Employment and Institutional Uses	3% of the required parking spaces for the use or lot	256 spaces ¹	8	185 spaces ¹	6	441 spaces	14
Total		--	214	--	154	--	368

Notes:

1. Non-residential bicycle parking requirements based upon the proposed non-residential parking requirements summarized per Table 4.
2. Site statistics based on site plans prepared by Core Architects dated July 25, 2023.



5.2 PROPOSED BICYCLE PARKING SUPPLY

As summarized in **Table 16**, a total supply of 910 bicycle parking spaces is proposed for the site, inclusive of 534 and 376 spaces for the south and north blocks, respectively. The proposed bicycle parking supply meets the minimum requirements noted in **Table 15** and will meet the needs of the site.

TABLE 15 PROPOSED BICYCLE PARKING SUPPLY

Use	Phase 1 (South Block – Buildings 1-4)		Phase 2 (North Block – Buildings 5-7)		SITE TOTAL	
	Units/ GFA	Number of Bike Parking Spaces	Units/ GFA	Number of Bike Parking Spaces	Units/ GFA	Number of Bike Parking Spaces
Dwelling, Apartment	1,029 units	526	739 units	370	1,768 units	896
All other Commercial, Employment and Institutional <i>Uses</i>	454 m ² non-res	8	475 m ² non-res	6	929 m ²	14
Total	--	534	--	376	--	910

Notes:

1. Site statistics based on site plans prepared by Core Architects dated July 25, 2023.



6.0 LOADING CONSIDERATIONS

As summarized in **Table 16**, application of Zoning By-law 016-2014 to the site for loading considerations, results in the minimum requirement of 2 loading areas (1 loading area per block), with the minimum dimensions of 6.0 m (length) x 3.5 m (width) x 3.0 m (vertical clearance).

The development proposes the following loading provisions for each block, with the following dimensions:

- **South Block:** 1 loading space with dimensions of 18 m (length) x 6 m (width) & 4 loading areas with dimensions of 8 m (length) x 4 m (width)
- **North Block:** 1 loading space with dimensions of 18 m (length) x 6 m (width) & 3 loading areas with dimensions of 8 m (length) x 4 m (width)

All of the proposed loading spaces are located at-grade, without any overhead obstructions, and meet the minimum heights required by the Zoning By-law.

The minimum loading requirements of the Zoning By-law are met and the loading supply will meet the practical needs of the site. Vehicle maneuvering figures are provided in **Appendix D**.

TABLE 16 LOADING SUPPLY SUMMARY

Building	Number of Units/GFA	Zoning By-law 016-2014 Minimum Requirement	Minimum Number of Required Loading Spaces / Area ²	Proposed Loading Supply
South Block				
Residential	1,029 units	-	0	4 loading areas 1 loading space
Retail	454 m ²	281 m ² to 930 m ² : 1 loading area	1 loading area	
North Block				
Residential	739 units	-	0	3 loading areas 1 loading spaces
Retail	475 m ²	281 m ² to 930 m ² : 1 loading area	1 loading area	
SITE TOTAL			2 loading areas	7 loading areas 2 loading spaces

Notes:

1. Site statistics based on site plans prepared by Core Architects dated July 25, 2023.
2. Requirements based on Table 5J of Zoning By-law 016-2014



7.0 TRANSPORTATION DEMAND MANAGEMENT (TDM)

7.1 TDM OBJECTIVES

The Transportation Demand Management (TDM) Plan strives to reduce automobile use through an on-going strategy that supports and promotes the use of non-auto transportation modes.

The key objective of the TDM Plan is to reduce peak hour single occupant automobile traffic by focusing on four specific policy areas:

1. Encourage the use of alternate travel modes (transit, cycling, walking);
2. Increase vehicle occupancy;
3. Shift travel to off-peak periods; and
4. Reduce vehicle kilometres travelled.

The physical infrastructure components or TDM measures outlined in this Plan (i.e. bicycle parking spaces) will be incorporated into the development design. The implementation of these elements and the associated costs will be the responsibility of the developer. The operational measures of the TDM plan (i.e. travel mode choice information packages) will be implemented by the developer.

7.2 PROPOSED TDM STRATEGIES

The existing and future area context provides for good public transit service as well as travel by active transportation. Proposed TDM strategies, including a reduced parking supply with “unbundled” parking, active transportation facilities and travel mode information packages, have been developed to further support the use of non-auto modes of travel.

7.2.1 Reduced Parking Supply

As discussed in Section 4.0, when compared to the minimum requirements of the Town of Milton Comprehensive Zoning By-law 016-2014 (HUSP Urban Area – June 2019), a reduced parking supply is being proposed for the site. As shown in **Table 6**, the proposed parking supply of 2,167 spaces represents a decrease of 18%, when compared to the minimum Zoning By-law requirement of 2,652 spaces.

7.2.2 Summary of Proposed TDM Strategies

Proposed TDM measures for the site are summarized in **Table 17**. The measures being proposed for the site are supportive of alternative transportation modes.



TABLE 17 TDM STRATEGIES

Measure	Description	Cost Estimate	Implementation Strategy
Physical Measures			
Pedestrian Facilities	Provide internal walkways that provide connectivity throughout the site and to the adjacent sidewalks on Etheridge Avenue and on Regional Road 25.	Integrated into overall development cost.	Construct as part of development.
Bicycle Parking	Bicycle parking spaces to be provided that exceeds the minimum requirements of Zoning By-law 016-2014.	Integrated into overall development cost.	Construct as part of development.
Bicycle Repair Stations	Provide bicycle repair stations in bicycle parking areas.	Integrated into overall development cost.	Construct as part of development.
Vehicle Parking	Proposed reduced parking supply is 18% less than the Zoning By-law 016-2014 requirement.	Integrated into overall development cost.	Construct as part of development.
Operational Measures			
Travel Mode Information Packages	Implement programs to inform new residents of available travel mode choices and existing mobile apps providing transit information.	To be determined.	Travel mode information packages to be distributed at the sales office.
Unbundled Parking	Parking spaces to be unbundled from condominium purchase to discourage car ownership.	n/a	Parking spaces to be sold separately from units.



8.0 TRAVEL DEMAND FORECASTING

8.1 EXISTING TRAFFIC VOLUMES

Turning movement counts were conducted by Spectrum Traffic Inc. on behalf of BA Group for the study area intersections. The counts were completed in November of 2022 during the weekday morning and afternoon peak periods (the busiest hours of traffic are between 7:30 a.m. to 9:30 a.m. and 4:00 p.m. to 6:00 p.m., respectively).

Additionally, pre-pandemic traffic counts were obtained from the Region for comparison purposes. The counts provided by the Region were adopted where the historical counts exceeded the recent traffic counts. Traffic volumes along the Britannia Road and Regional Road 25 corridors were then conservatively balanced (i.e. balanced upwards) to ensure consistency across the study area road network.

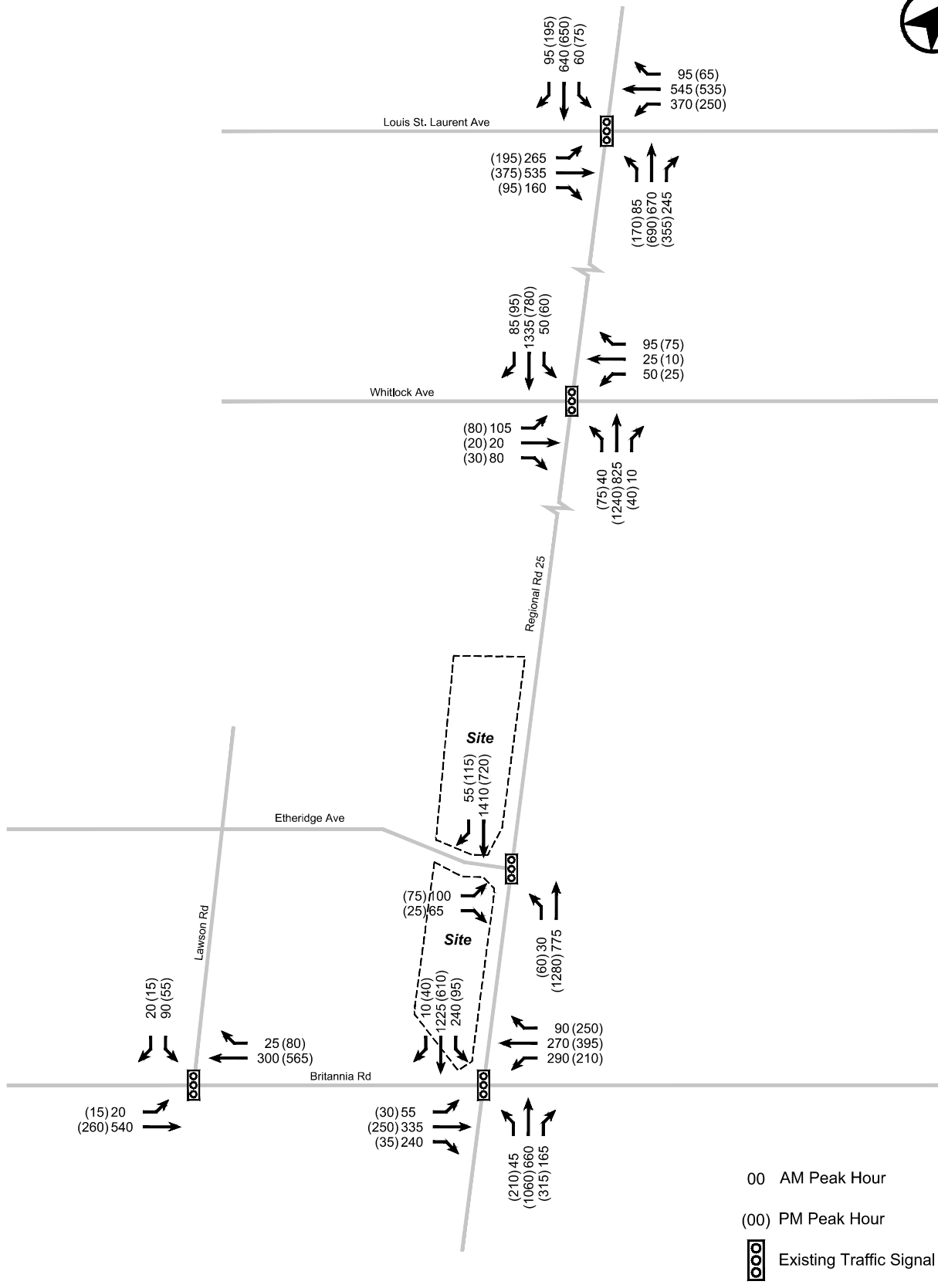
All surveyed traffic counts are summarized in **Table 18**. Detailed existing turning movement counts for all of the intersections are shown in **Appendix E**.

Figure 9 illustrates the existing traffic volumes adopted for analysis purposes on the study area road network.

TABLE 18 TRAFFIC DATA INFORMATION

Intersection	Date of Count
Spectrum Traffic Inc. (on behalf of BA Group)	
Regional Road 25 / Louis St Laurent Avenue	Tuesday, November 29, 2022
Regional Road 25 / Whitlock Avenue	
Regional Road 25 / Etheridge Avenue	
Regional Road 25 / Britannia Road	
Britannia Road / Farmstead Drive	
Halton Region	
Regional Road 25 / Louis St Laurent Avenue	Tuesday, December 6, 2016
Regional Road 25 / Britannia Road	Monday, December 9, 2019





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FIGURE 9 BASELINE EXISTING TRAFFIC VOLUMES

8.2 FUTURE HORIZON YEARS

The traffic analysis was undertaken for the 2029, 2032 and 2037 horizon years. The 2029 horizon year represents the build-out of Phase 1 (south block). The 2032 horizon year represents the full build-out of the site (south block + north block). The 2037 horizon year represents the five-years beyond the build-out horizon of the site. The following analysis scenarios were undertaken for this study:

- 2023 Baseline existing traffic volumes
- 2029 Future background traffic conditions
- 2029 Future total traffic conditions (inclusive of Phase 1 - south block)
- 2032 Future background traffic conditions
- 2032 Future total traffic conditions (complete site build-out – inclusive of north block)
- 2037 Future background traffic conditions
- 2037 Future total traffic conditions (five years beyond complete site build-out)

The traffic analysis was completed for a typical weekday for both the morning and afternoon peak periods.

8.3 FUTURE BACKGROUND TRAFFIC VOLUMES

Traffic growth in the site vicinity was considered based upon an evaluation of traffic volume changes related to:

- General corridor growth along major arterials in the study area (i.e. Britannia Road and Regional Road 25); and
- Background development traffic allowances.

Future background traffic volumes in each of the horizon years (2029, 2032, 2037) are illustrated in **Figure 14**, **Figure 15** and **Figure 16**.

8.3.1 Corridor Growth

Based on correspondence with Region staff, the growth rates summarized in **Table 19** were adopted for future horizon years.

Corridor growth traffic volumes in each of the horizon years (2029, 2032, 2037) are illustrated in **Figure 10**, **Figure 11**, and **Figure 12**.

TABLE 19 ADOPTED CORRIDOR GROWTH RATES (COMPOUNDED ANNUALLY)

Corridor	2023 to 2030	2030 to 2037
Britannia Road	2% for <i>all</i> movements	
Regional Road 25	2% for <i>all</i> movements	3.8% for <i>through</i> movements only



8.3.2 Background Developments

Allowances have been made for future traffic conditions to account for new traffic generated by other development proposals that are either under construction, approved, being reviewed or for which an application is expected to be submitted to the Town and Region.

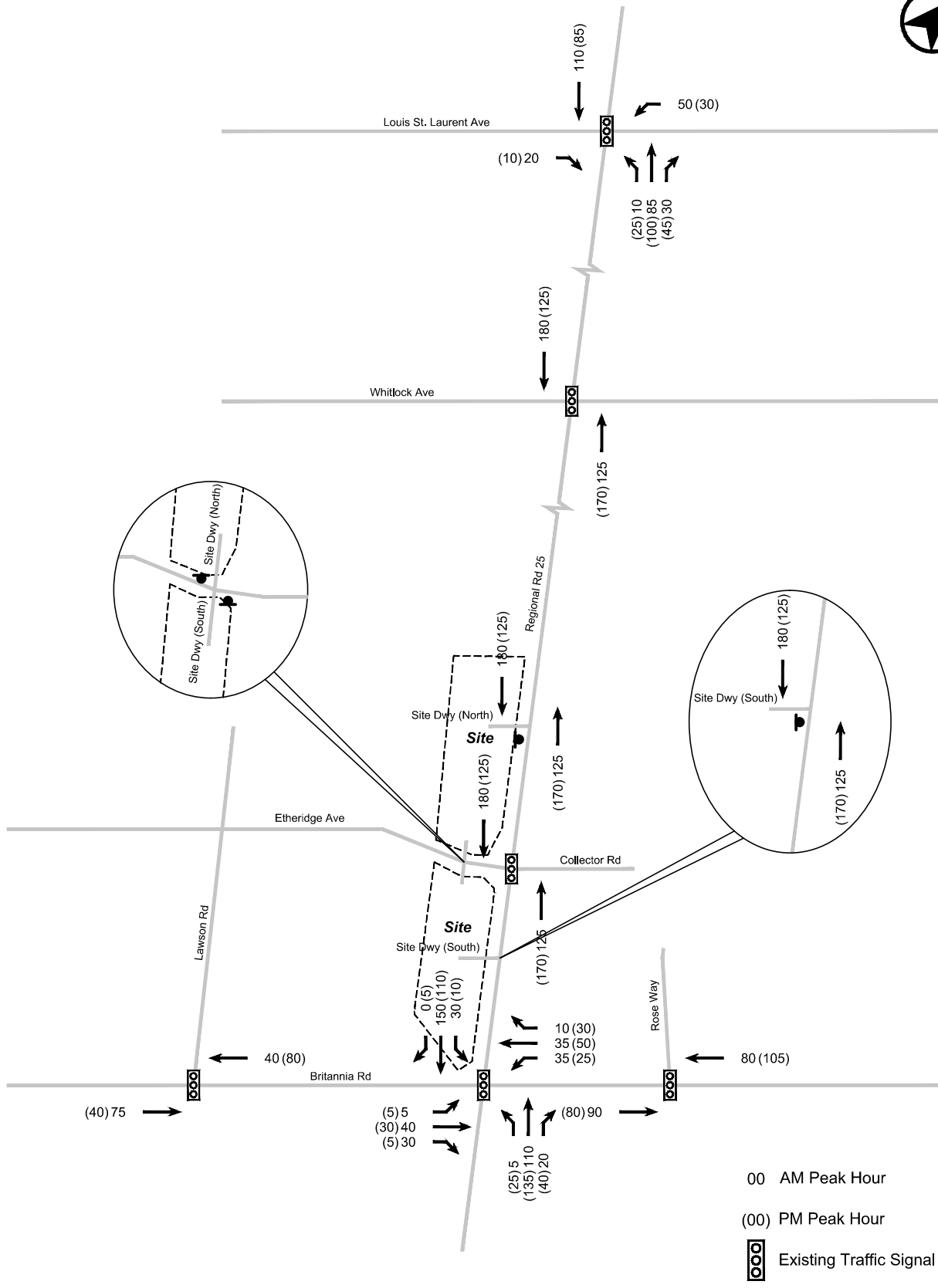
The list of background developments was developed in correspondence with Town staff. A total of 6 background developments have been considered that amount to a total of 1,665 residential units.

Table 20 summarizes the list of background developments considered in this study. Background development traffic volumes are illustrated in **Figure 13**.

TABLE 20 BACKGROUND DEVELOPMENTS

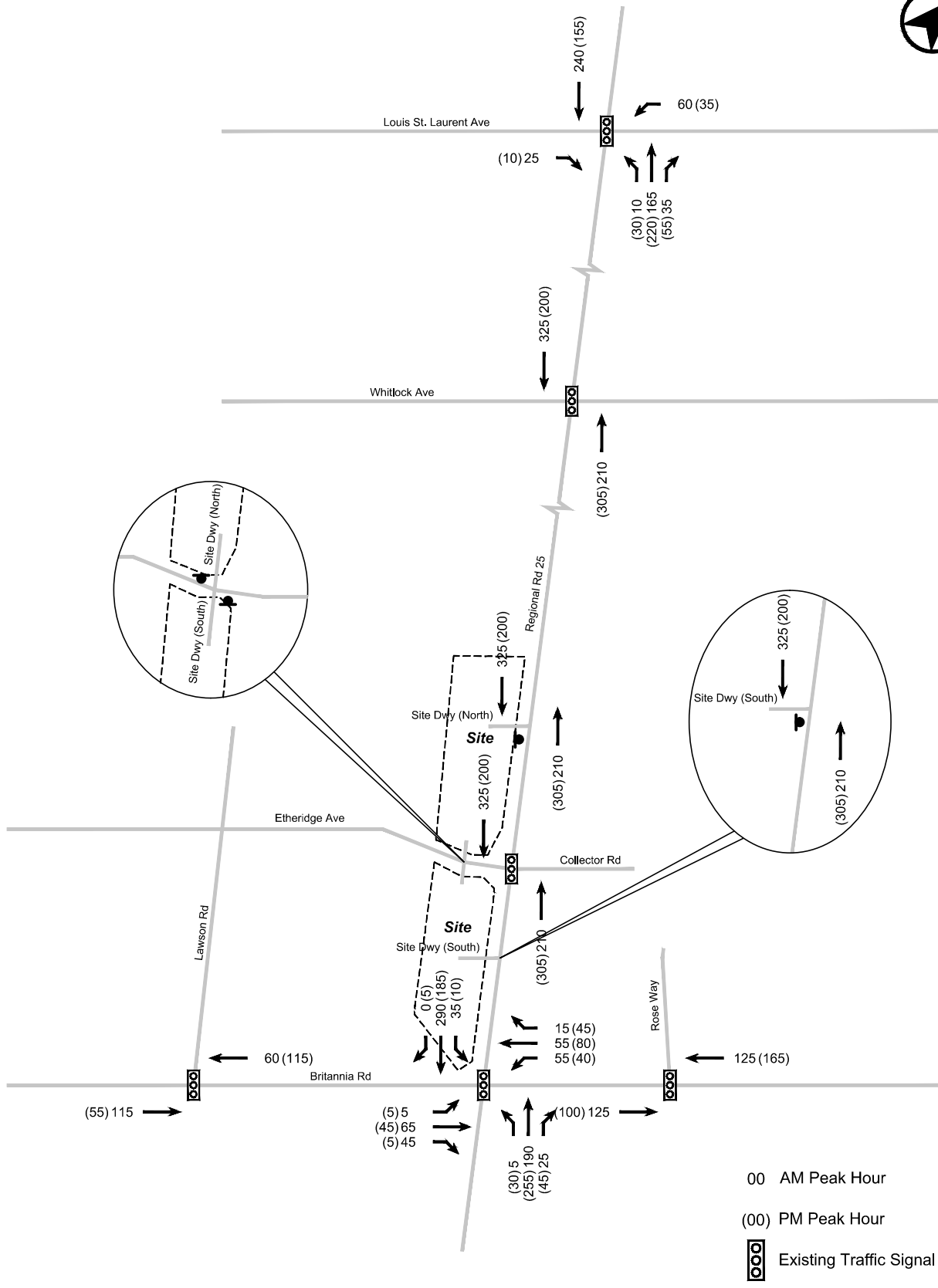
Development	Description	Report Source	Traffic Source
Primont Homes Residential Subdivision 24T-14004/M	665 residential units	GHD	TIS Report Excerpt
Fernbrook Residential Development (8175 Britannia Road) Z-10/20	254 residential units	Paradigm	
Mil Con Three Residential Subdivision	140 residential units	TMIG	
West Country Milton Properties Residential Development Z-21/21	227 residential units	GHD	
Gulfbeck Residential Development Z- 11/20	103 residential units	GHD	
Sixteen Mile Creek Residential Subdivision 24T-20007/M (6439 Regional Road 25)	276 residential units	Paradigm	
Total	1,665 residential units		





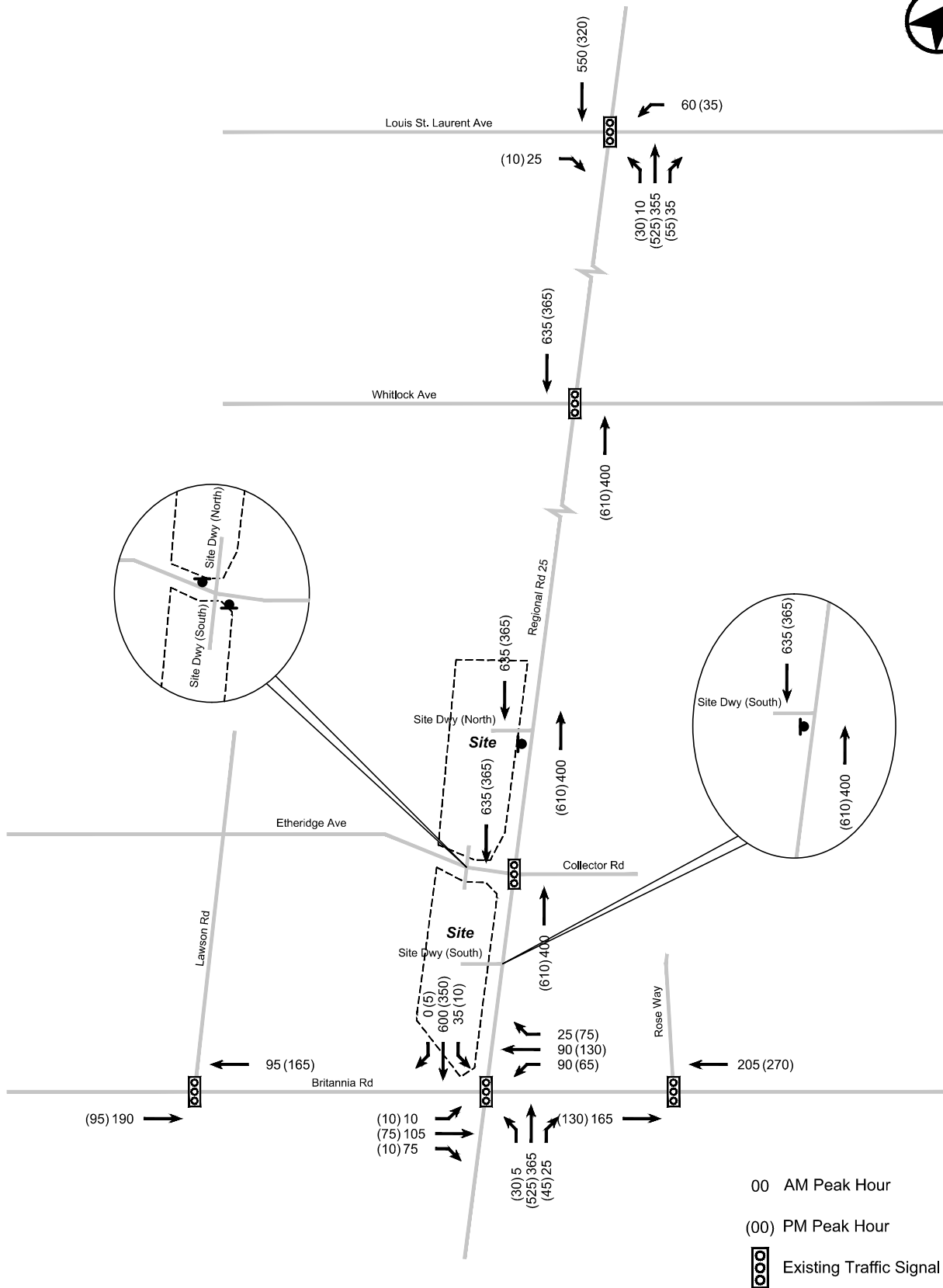
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FIGURE 10 CORRIDOR GROWTH TRAFFIC VOLUMES (2029 HORIZON)



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FIGURE 11 CORRIDOR GROWTH TRAFFIC VOLUMES (2032 HORIZON)



Date Plotted: July 25, 2023 Filename: P:\6374\70 - Britannia & 25 Milton\Graphics\CAD\Fig 12-00-CG2037.dwg

FIGURE 12 CORRIDOR GROWTH TRAFFIC VOLUMES (2037 HORIZON)

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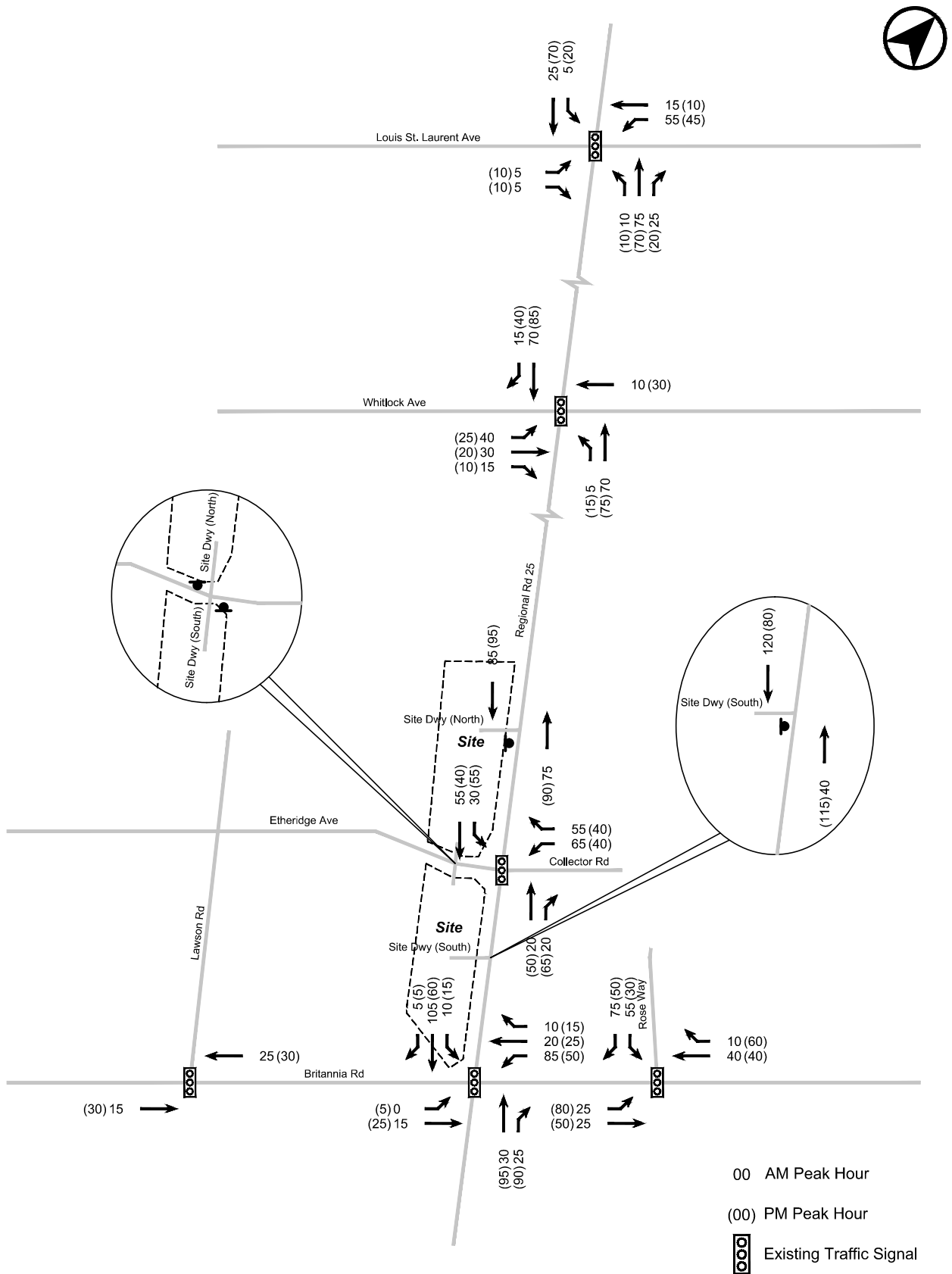
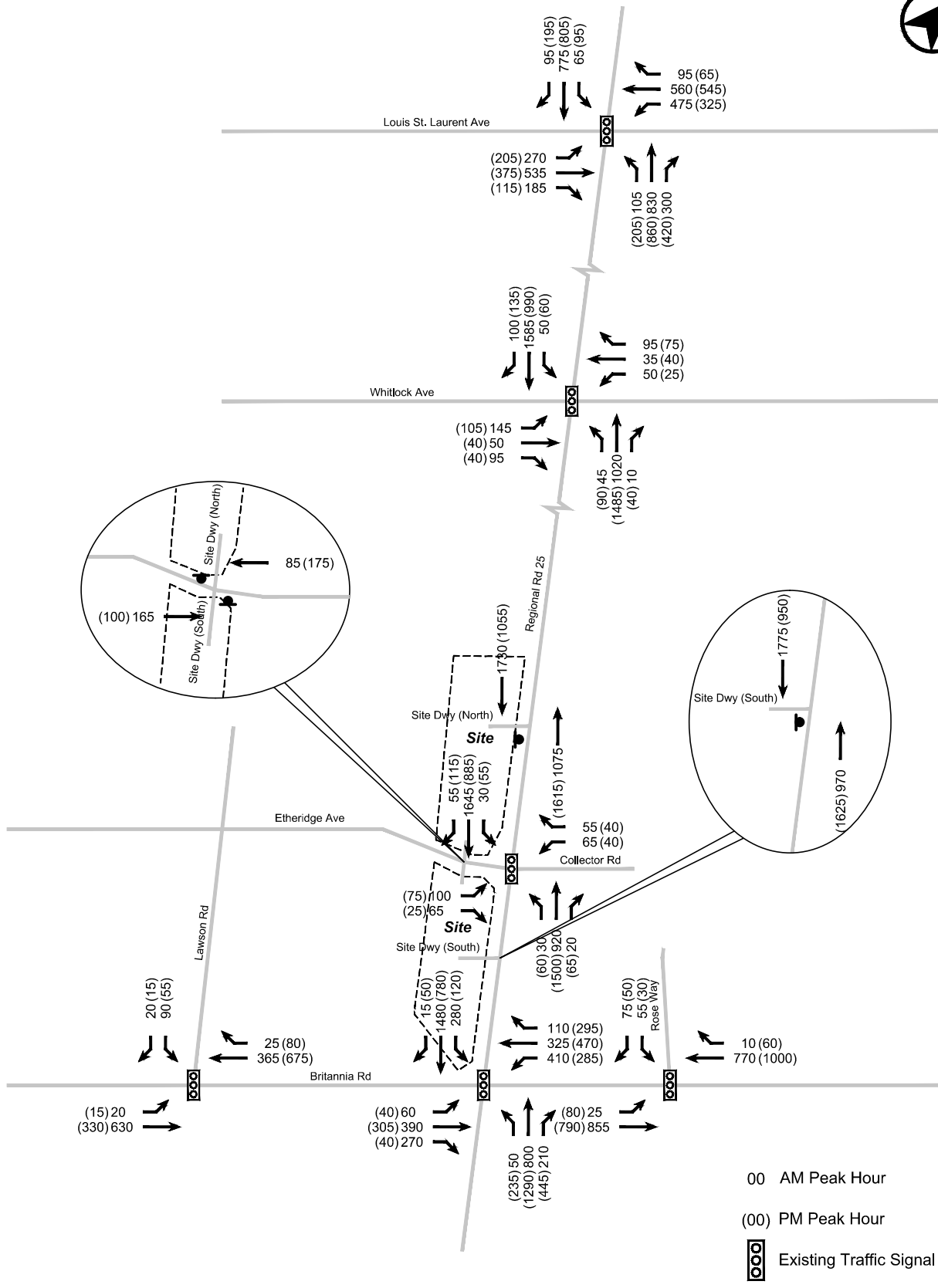
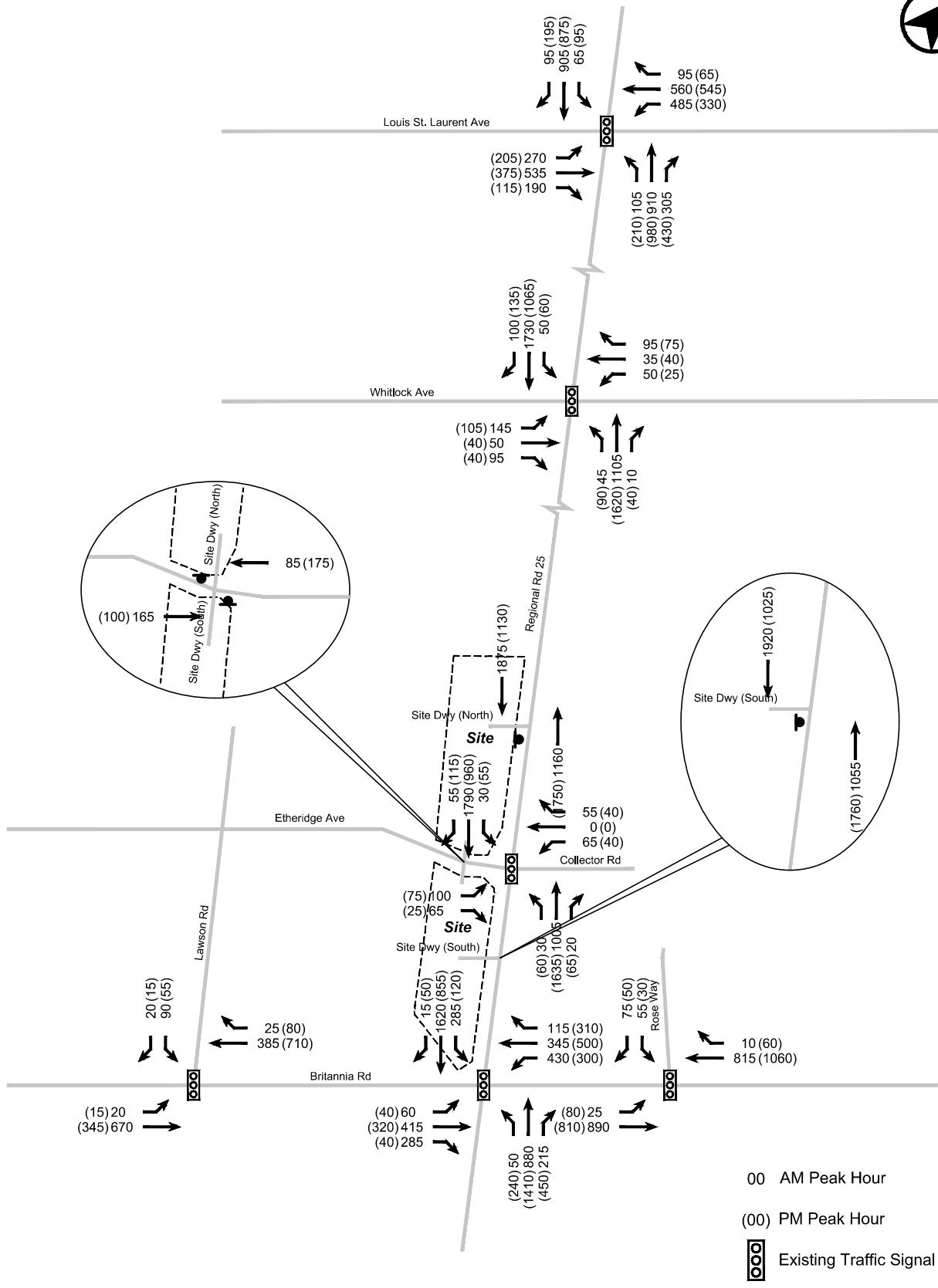


FIGURE 13 BACKGROUND DEVELOPMENT TRAFFIC VOLUMES



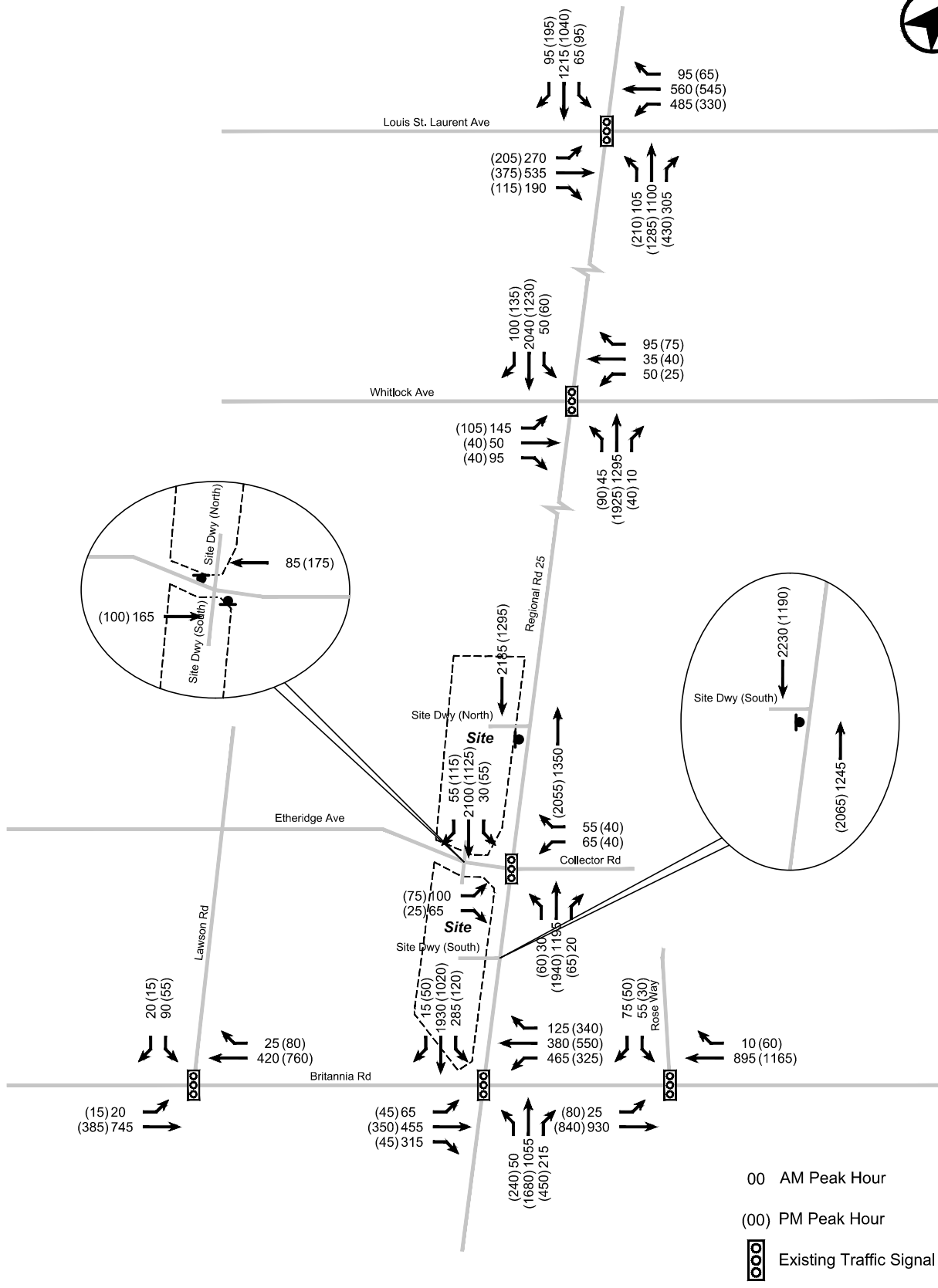
Date Plotted: July 25, 2023 Filename: P:\6374\70 - Britannia & 25 Milton\Graphics\CAD\Fig 14-00-FB2029.dwg

FIGURE 14 FUTURE BACKGROUND TRAFFIC VOLUMES (2029 HORIZON)



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FIGURE 15 FUTURE BACKGROUND TRAFFIC VOLUMES (2032 HORIZON)



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FIGURE 16 FUTURE BACKGROUND TRAFFIC VOLUMES (2037 HORIZON)

8.4 SITE TRAFFIC VOLUMES

8.4.1 Trip Generation

8.4.1.1 Residential Uses

Residential vehicle trip generation was established based upon a review of trip generation rates from the ITE Trip Generation Manual (11th Edition). The trip generation parameters adopted for the purposes of the traffic analysis are summarized in **Table 21**. For the purposes of a conservative analysis, although there are 1,768 proposed residential units, the total unit count considered for the analysis was **rounded up 1,900 units** to account for potential future adjustments to the development concept plan.

TABLE 21 TRIP GENERATION SUMMARY

	AM Peak Hour			PM Peak Hour		
	In	Out	2-Way	In	Out	2-Way
ITE LUC 222 (Multifamily Housing, High-Rise, General Urban / Suburban) – Not Close to Rail Transit						
Fitted Curve Trip Equation	T = 0.22(X) + 18.85			T = 0.26(X) + 23.12		
Directional Distribution	26%	74%	100%	62%	38%	100%
Resultant Trip Rate (1,900 residential units)	0.06	0.17	0.23	0.17	0.10	0.27
Residential Site Trips (Full Build)	115	320	435	320	195	515
Phase 1 – South Block Only (rounded up to 1,100 units)	65	185	250	185	115	300
Phase 2 – North Block Only (rounded up to 800 units)	50	135	185	135	80	215

Notes:

1. All site trips are rounded to the nearest 5.

The Phase 1 (south block) proposed development is anticipated to generate **250 and 300 two-way vehicle trips** during the weekday morning and afternoon peak hours, respectively. At full buildout, the proposed development is anticipated to generate in the order of **435 and 515 two-way vehicle trips** during the peak hours.

8.4.1.2 Retail Uses

The proposed retail uses are expected to operate ancillary to the site and to primarily service residents on the site and the immediate area. As such, new vehicle trips associated with the proposed retail uses were not included as part of the traffic analysis.



8.4.2 Trip Distribution and Assignment

Trip distribution patterns and traffic route assignment were derived from the 2016 Transportation Tomorrow Survey (TTS) for 2006 GTA Zones 4104, 4105 and 4108. Queries for residential trips are provided in **Appendix F**. The adopted distribution of inbound and outbound vehicle traffic is presented in **Table 22**.

TABLE 22 SITE TRIP DISTRIBUTION

Directions	Residential	
	Outbound ¹	Inbound ²
To/From North on Bronte Street South	5%	5%
To/From North on Regional Road 25	25%	25%
To/From North on Thompson Road South	5%	5%
To/From South on First Line	0%	0%
To/From South on Regional Road 25	20%	20%
To/From South on Thompson Road South	0%	0%
To/From East on Britannia Road	20%	20%
To/From East on Louis St. Laurent Avenue	15%	15%
To/From West on Britannia Road	5%	5%
To/From West on Louis St. Laurent Avenue	5%	5%
Total	100%	100%

Notes:

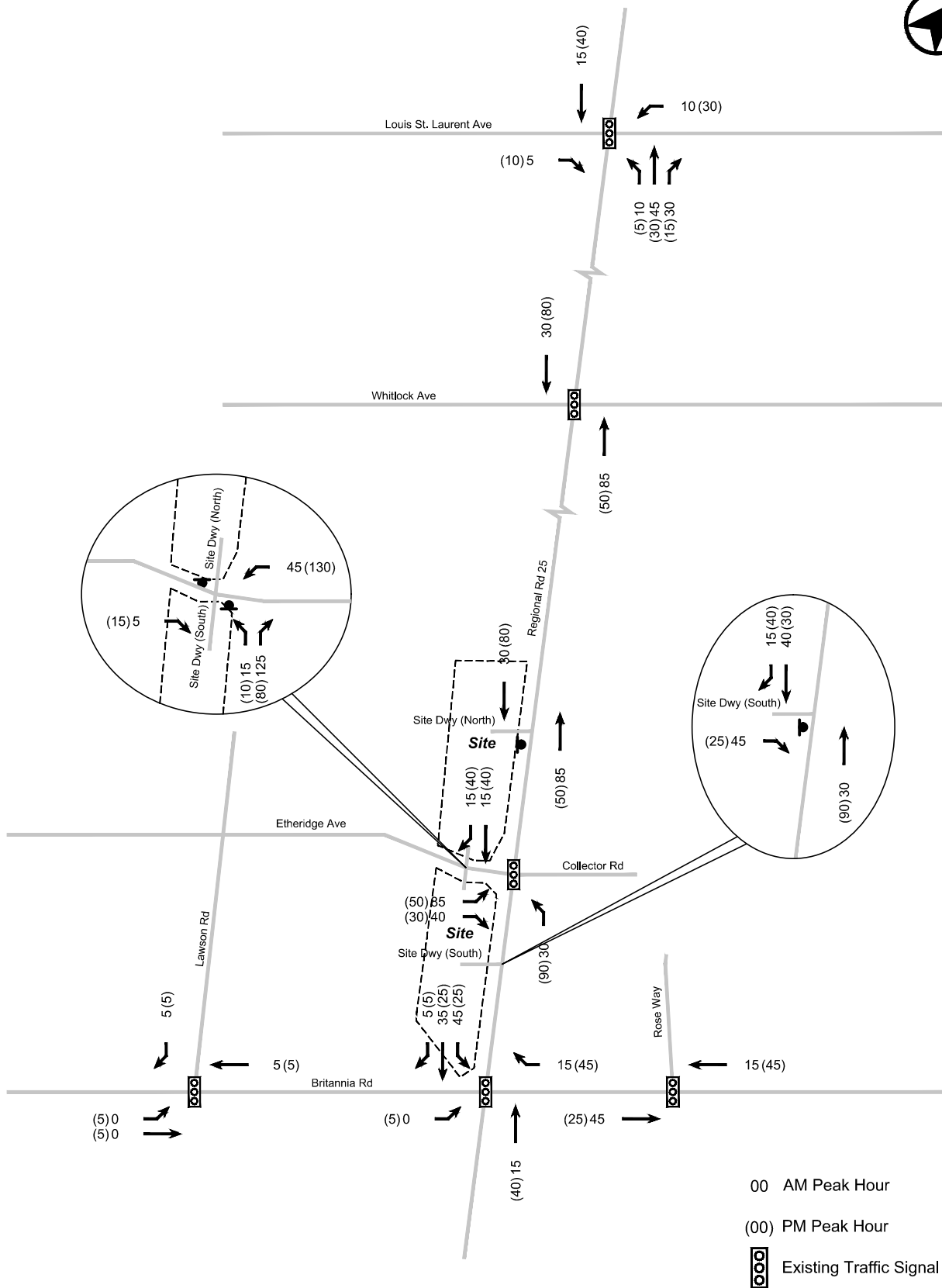
1. Based upon weekday morning, peak period, outbound, home-based trip data.
2. Based upon weekday afternoon, peak period, inbound, home-based trip data.
3. Based on trip data within TTS zones 4104, 4105 and 4108.

New residential site trips on the study area road network are illustrated in **Figure 17** and **Figure 18**, respectively.

8.5 FUTURE TOTAL TRAFFIC VOLUMES

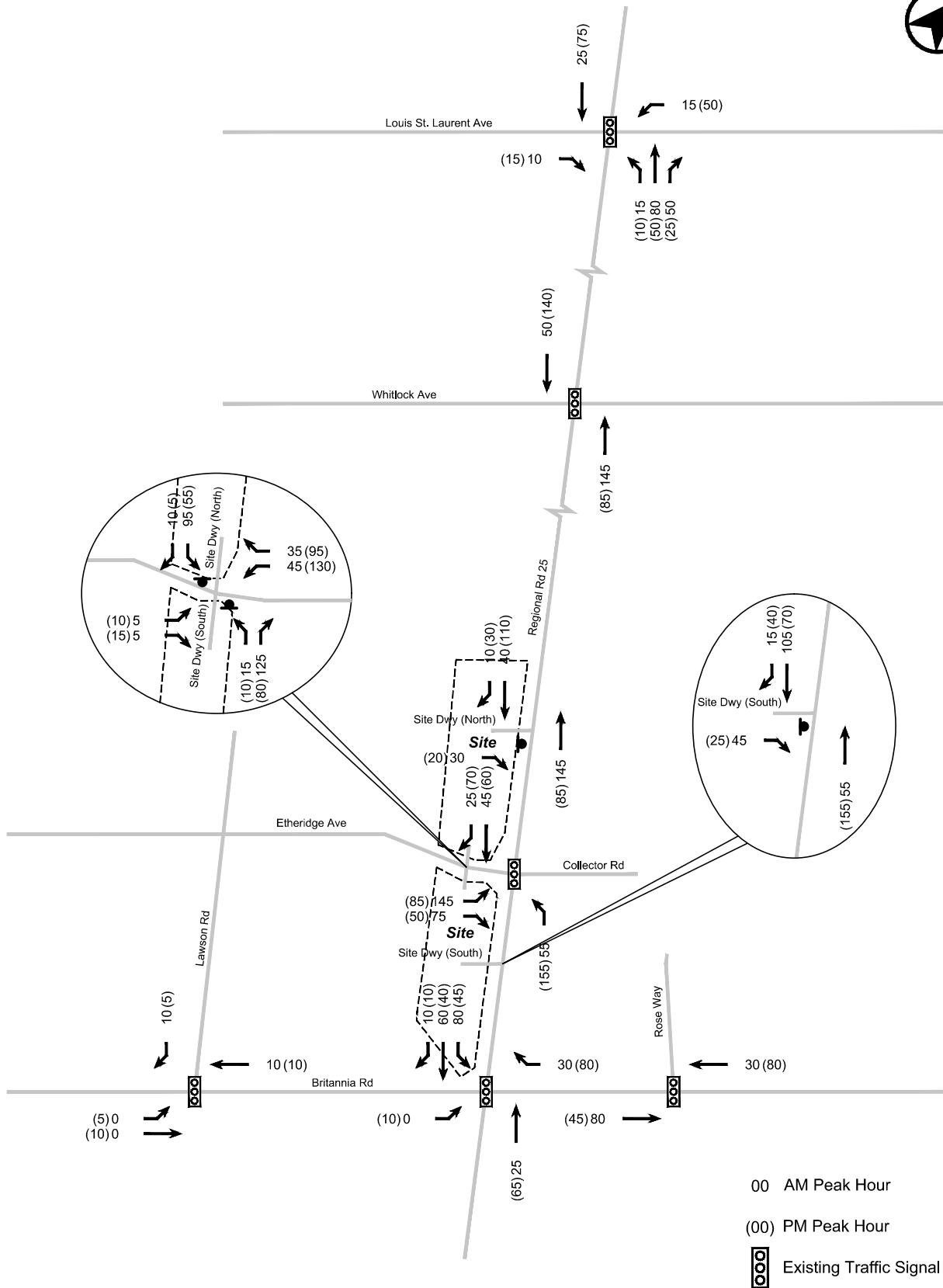
Future total traffic volumes during the weekday morning and afternoon peak hours, reflect the sum of future background traffic volumes and new site traffic volumes and are illustrated in **Figure 19**, **Figure 20** and **Figure 21** for each of the horizon years.





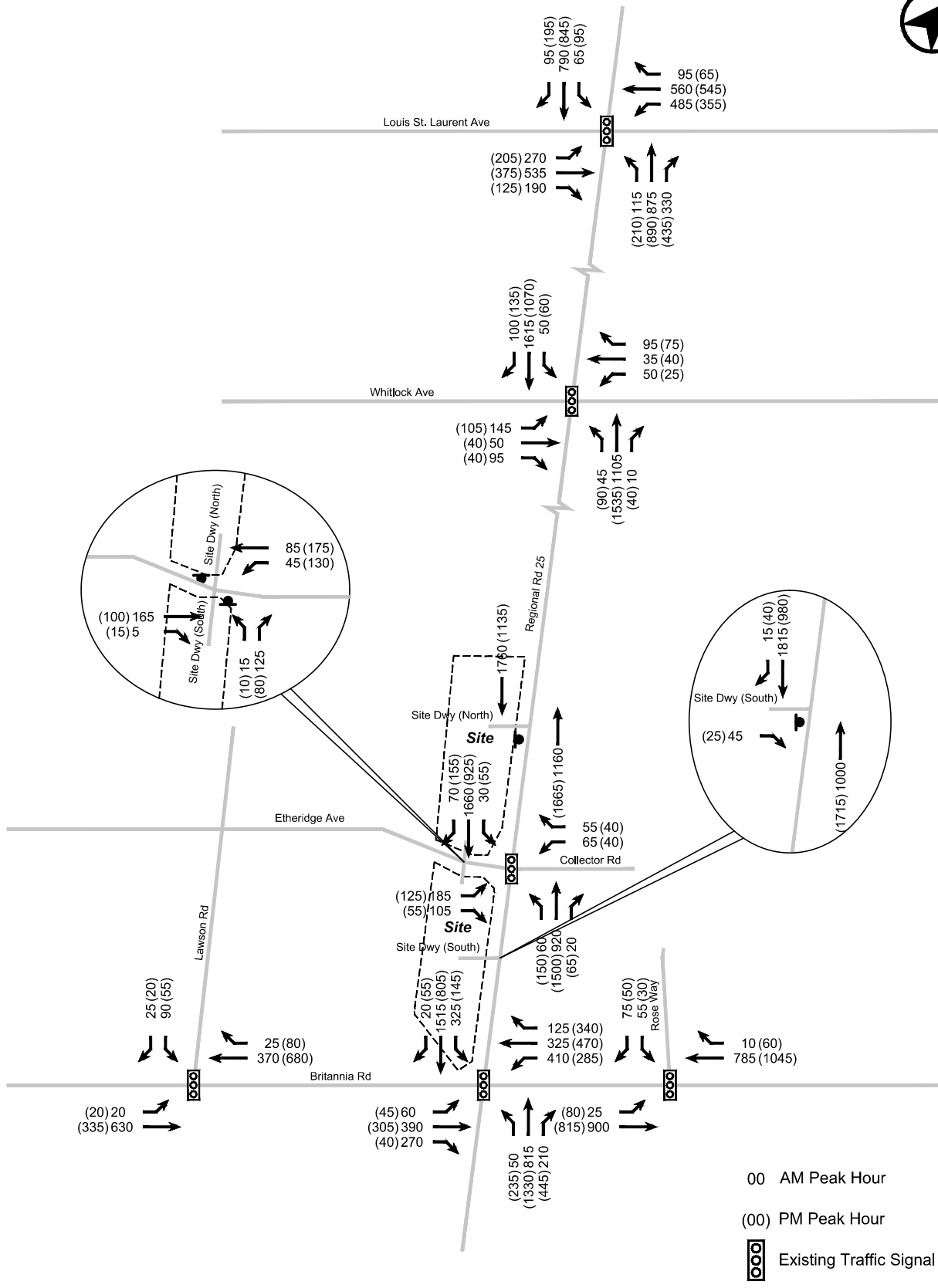
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FIGURE 17 PHASE 1 (SOUTH BLOCK) SITE TRAFFIC VOLUMES



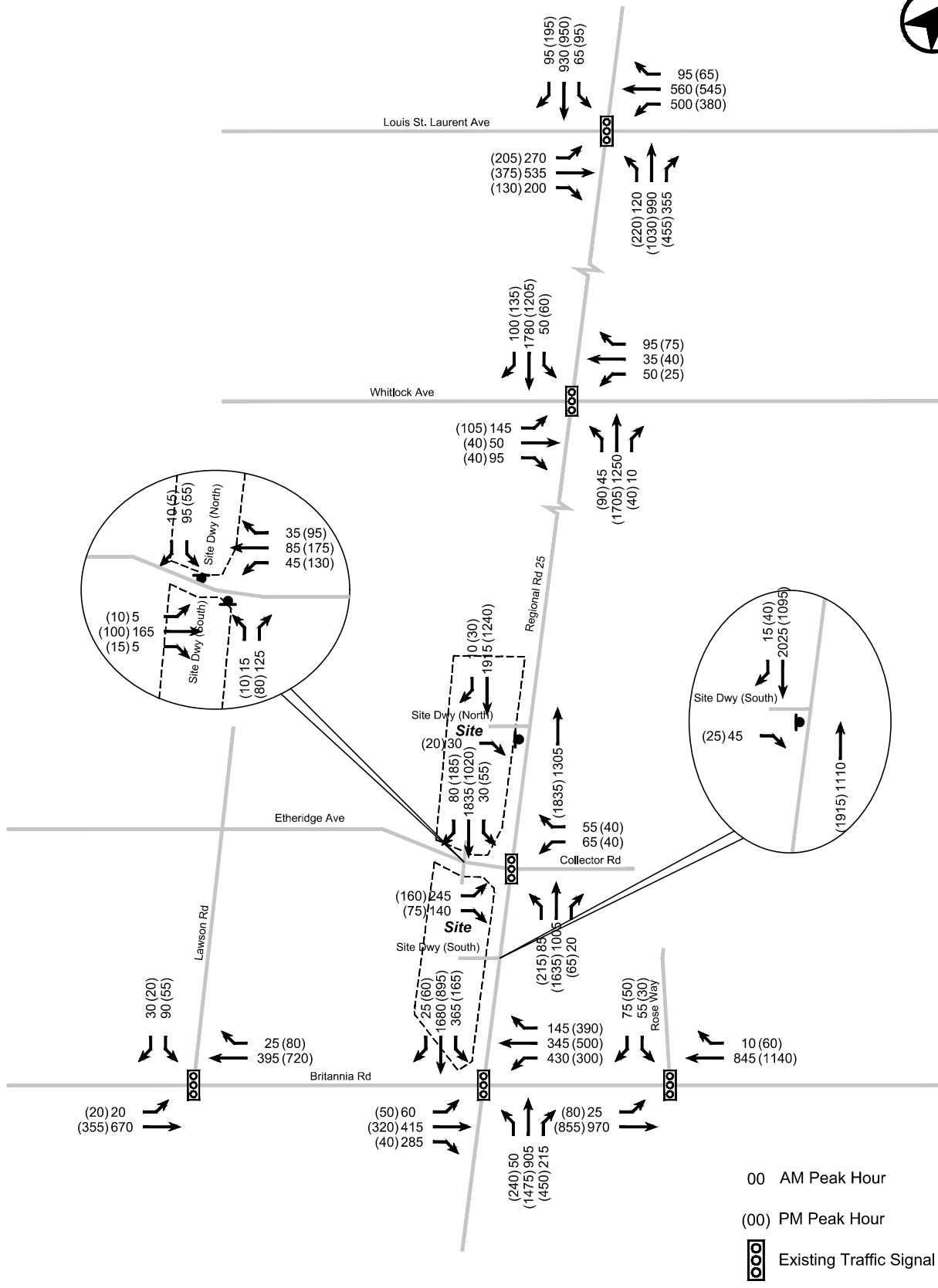
Date Plotted: July 25, 2023 Filename: P:\6374\170 - Britannia & 25 Milton\Graphics\CAD\Fig 18-00-FullIS.dwg

FIGURE 18 FULL BUILDOUT SITE TRAFFIC VOLUMES



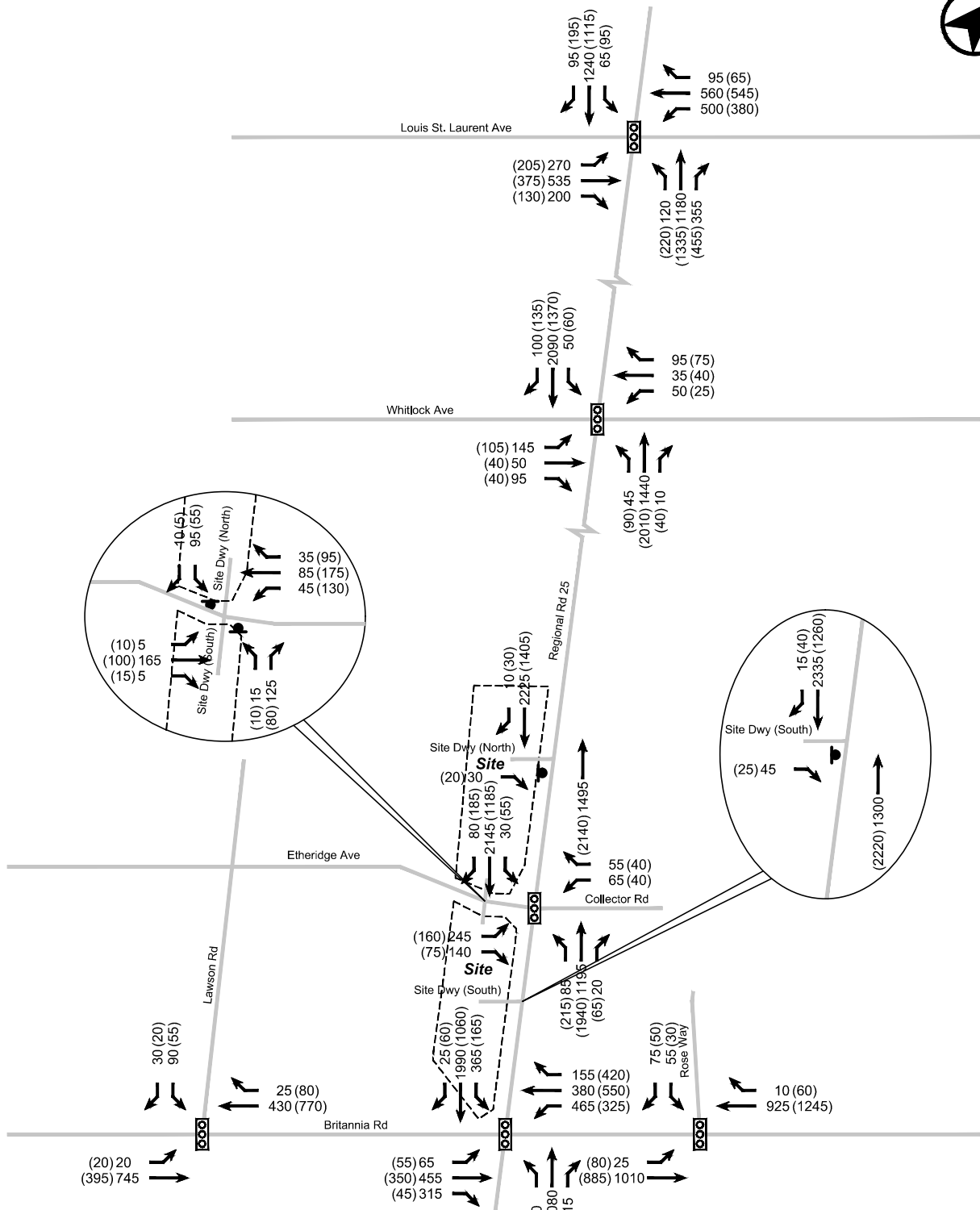
Date Plotted: July 25, 2023 Filename: P:\6374\170 - Britannia & 25 Milton\Graphics\CAD\Fig 19-00-FT2029.dwg

FIGURE 19 FUTURE TOTAL TRAFFIC VOLUMES (2029 HORIZON)



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FIGURE 20 FUTURE TOTAL TRAFFIC VOLUMES (2032 HORIZON)



◻◻◻ AM Peak Hour
 (◻◻◻) PM Peak Hour
 ◻◻◻ Existing Traffic Signal

Date Plotted: July 25, 2023 Filename: P:\6374\70 - Britannia & 25 Milton\Graphics\CAD\Fig 21-00-FT2037.dwg

FIGURE 21 FUTURE TOTAL TRAFFIC VOLUMES (2037 HORIZON)

9.0 TRAFFIC OPERATIONS ANALYSIS

9.1 ANALYSIS METHODOLOGY

The intersection capacity analysis was completed using Synchro Version 11.0 and the Highway Capacity Manual (HCM) methodology.

For signalized intersections, the volume-to-capacity ratio (v/c) is an indicator of the capacity utilization for key movements in the intersection. A v/c of 1.00 indicates that certain governing traffic movements through the intersection are operating at or near maximum capacity. The primary overall level of service (LOS) indicator is delay, both on individual movements and expressed as an average for all vehicles processed. Many busy urban intersections operate at LOS D to E, which reflects average delays in the range of 35 to 80 seconds.

For unsignalized intersections, level of service (LOS) characterizes operational conditions for key movements in terms of delay within the traffic stream. LOS A represents a good level of service with short delays. LOS F represents a poor level of service with long delays. The volume to capacity ratio (v/c) is an indicator of the capacity utilization for key movements at the intersection and resultant residual capacity potential.

The LOS criteria provided by the HCM methodology is summarized as follows:

1. Signalized Intersection LOS
 - a. LOS A: Control Delay $\leq 10s$
 - b. LOS B: $10s < \text{Control Delay} \leq 20s$
 - c. LOS C: $20s < \text{Control Delay} \leq 35s$
 - d. LOS D: $35s < \text{Control Delay} \leq 55s$
 - e. LOS E: $55s < \text{Control Delay} \leq 80s$
 - f. LOS F: Control Delay $> 80s$

2. Unsignalized Intersection LOS
 - a. LOS A: Control Delay $\leq 10s$
 - b. LOS B: $10s < \text{Control Delay} \leq 15s$
 - c. LOS C: $15s < \text{Control Delay} \leq 25s$
 - d. LOS D: $25s < \text{Control Delay} \leq 35s$
 - e. LOS E: $35s < \text{Control Delay} \leq 50s$
 - f. LOS F: Control Delay $> 50s$



9.2 SYNCHRO MODEL CALIBRATION

9.2.1 Modelling Input and Calibration Parameters

Key parameters assumed in the Synchro analysis include:

Lane Configurations

Existing lane configurations are assumed for the existing conditions Synchro model.

Under future horizon models, the following road improvements have been incorporated based on direction from the Region:

- Regional Road 25 widening to six lanes: only in Synchro models for the 2032 and 2037 horizon years
- Britannia Road widening to six lanes east of Regional Road 25: in Synchro models for all future horizon years (2029, 2032 and 2037)
- The collector road network as illustrated in the Boyne Road Network Assessment (**Appendix G**) for road network) for all future horizon years, including Collector Road 'E' (Etheridge Avenue), Collector Road 'L' (Rose Way), and Collector Road 'K' (Farmstead Drive)

Lost Time Adjustment

For all signalized intersections, a lost time adjustment (LTA) of -1.0 seconds was applied to all movements in accordance with the recommendations published in the City of Toronto's *Guidelines for Using Synchro 11* (dated January 15, 2021). This lost time adjustment provides allowances in the capacity analysis to better account for drivers completing their movements during amber or all-red time (a common phenomenon especially at busy intersections).

Traffic Signal Timings

Traffic signal timings have been obtained from Halton Region. The existing timing parameters were adopted for existing conditions analysis. Traffic signal timings are provided in **Appendix H**.

Under future background and future total conditions, traffic signal timings have been optimized as required to best accommodate the forecasted future travel demands and patterns and to respond to evolving traffic conditions. Where signal optimization is recommended, it has been noted in the subsequent sections discussing intersection operations. It is noteworthy that existing cycle lengths and pedestrian minimum (i.e. walk and flash-don't-walk) times were maintained in all cases.

Lane Utilization Factors

As previously noted, in the Synchro models pertaining to the 2029 horizon year and beyond, the Britannia Road widening to six lanes was assumed. Consequently, a lane utilization factor of 0.80 was applied to the eastbound and westbound through lanes for any intersection along Britannia Road to account for 20% usage of the future HOV lanes. In the Synchro models pertaining to the 2032 horizon year and beyond, the Regional Road 25 widening to six lanes was assumed. A lane utilization factor of 0.80 was applied to the northbound and southbound through lanes for any intersection along Regional Road 25 to account for 20% usage of the future HOV lanes.



Peak Hour Factors

Existing peak hour factors were obtained from the turning movement counts discussed in **Section 8.1**. For all future conditions, peak hour factors were set to 1.00 as per the Region of Peel's Synchro Guidelines.

Protected Left Turn Factors

The protected left turn factor (LTF) in the Synchro model influences the headways between vehicles making a left-turn movement on protected left-turn green phases. Values closer to 1.00 represent vehicles making left turns with smaller headways.

Under all future traffic conditions, the operations of several left-turn lanes are approaching capacity. It is expected that drivers would modify their behaviour in near-capacity conditions and operate with reduced headways. As such, a protected LTF of 1.00 (rather than a default of 0.95) has been adopted for the westbound left-turning movements at Regional Road 25 / Louis St. Laurent Avenue and Regional Road 25 / Britannia Road in the peak hours.

Traffic Count Data Inputs

All data provided by the turning movement counts obtained from Spectrum Traffic Inc. or from the Region were incorporated into the Synchro models, including pedestrian and bicycle volumes and heavy vehicle percentages. Where the intersection is not existing, such as at the proposed site access driveways, Synchro default parameters were assumed.

Synchro Defaults

Synchro defaults have been adopted for all other parameters.

9.3 ANALYSIS SCENARIOS

The following analysis scenarios have been analyzed for the weekday morning and afternoon peak hours:

1. Baseline existing traffic conditions (as illustrated in **Figure 9**);
2. 2029 Future background traffic conditions (as illustrated in **Figure 14**);
3. 2029 Future total traffic conditions (Phase 1 – south block) (as illustrated in **Figure 19**);
4. 2032 Future background traffic conditions (as illustrated in **Figure 15**);
5. 2032 Future total traffic conditions (complete site build-out) (as illustrated in **Figure 20**);
6. 2037 Future background traffic conditions (as illustrated in **Figure 16**);
7. 2037 Future total traffic conditions (five years beyond complete site build-out) (as illustrated in **Figure 21**);

All Synchro worksheets for the scenarios are provided in **Appendix J**.



9.4 SIGNALIZED INTERSECTION ANALYSIS

9.4.1 Regional Road 25 / Louis St. Laurent Avenue

The Regional Road 25 / Louis St. Laurent Avenue intersection currently operates under traffic signal control in both the weekday morning and afternoon peak hours. Analysis results are summarized in **Table 23**.

Under existing traffic conditions, the intersection operates under capacity at overall v/c of 0.72 and 0.60 in the weekday morning and afternoon peak hours, respectively.

In the Synchro models pertaining to the 2032 horizon year and beyond, the Regional Road 25 widening to six lanes was assumed. Under all future conditions, traffic signal timings have been optimized within existing cycle lengths and pedestrian crossing allowances, as defined in the traffic signal timing plans provided by the Region.

South Block (Horizon Year of 2029)

With the buildout of the south block of the site in the horizon year of 2029, the intersection continues to operate under capacity at overall v/c of 0.83 and 0.72 in the weekday morning and afternoon peak hours, respectively.

Full Buildout (Horizon Year of 2032)

With the full buildout of the site in the horizon year of 2032, the intersection continues to operate under capacity at overall v/c of 0.91 and 0.82 in the weekday morning and afternoon peak hours, respectively.

5-Years Beyond Full Buildout (Horizon Year of 2037)

After five years beyond the site's full buildout, the intersection will continue to operate under capacity at overall v/c of 0.97 and 0.90 in the weekday morning and afternoon peak hours, respectively. During the weekday morning peak hour, the shared northbound through-right lane group will operate near capacity at v/c of 0.99. Traffic operations should continue to be monitored as the surrounding area develops and as travel demand evolves into the future.

Based on the foregoing, no mitigation measures or improvements, with the exception of traffic signal timing optimization, are recommended at the intersection.



TABLE 23 REGIONAL ROAD 25 / LOUIS ST. LAURENT AVENUE TRAFFIC OPERATIONS

Movement	Existing		2029 Horizon Year				2032 Horizon Year				2037 Horizon Year			
			Future Background		Future Total		Future Background		Future Total		Future Background		Future Total	
	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS
EBL	0.77 (0.78)	D (D)	0.68 (0.73)	D (D)	0.68 (0.72)	D (D)	0.69 (0.72)	D (D)	0.68 (0.69)	D (D)	0.68 (0.72)	D (D)	0.68 (0.69)	D (D)
EBTR	0.84 (0.72)	E (E)	0.92 (0.80)	E (E)	0.92 (0.83)	E (E)	0.93 (0.80)	E (E)	0.94 (0.83)	E (E)	0.92 (0.80)	E (E)	0.94 (0.83)	E (E)
WBL	0.93 (0.83)	E (E)	0.93 (0.82)	E (D)	0.94 (0.87)	E (E)	0.94 (0.83)	E (D)	0.95 (0.89)	E (E)	0.94 (0.83)	E (D)	0.95 (0.89)	E (E)
WBTR	0.61 (0.91)	D (E)	0.58 (0.79)	D (E)	0.57 (0.76)	D (D)	0.57 (0.79)	D (E)	0.56 (0.73)	D (D)	0.57 (0.79)	D (E)	0.56 (0.73)	D (D)
NBL	0.31 (0.40)	C (B)	0.45 (0.54)	C (B)	0.51 (0.60)	C (C)	0.58 (0.69)	C (C)	0.66 (0.76)	D (D)	0.66 (0.75)	D (D)	0.75 (0.82)	D (E)
NBT	0.57 (0.42)	D (C)	0.66 (0.53)	D (C)	0.70 (0.57)	D (C)	--							
NBR	0.19 (0.24)	C (C)	0.25 (0.29)	C (C)	0.29 (0.32)	C (C)								
NBTR	--						0.78 (0.69)	D (C)	0.86 (0.75)	D (C)	0.90 (0.85)	D (D)	0.99 (0.91)	E (D)
SBL	0.25 (0.19)	C (B)	0.33 (0.30)	C (C)	0.37 (0.33)	C (C)	0.58 (0.54)	D (C)	0.58 (0.62)	D (C)	0.58 (0.60)	D (C)	0.58 (0.63)	D (D)
SBT	0.58 (0.41)	D (C)	0.67 (0.54)	D (C)	0.69 (0.59)	D (C)	--							
SBR	0.06 (0.13)	C (C)	0.06 (0.12)	C (C)	0.06 (0.12)	C (C)								
SBTR	--						0.70 (0.58)	D (C)	0.71 (0.66)	D (D)	0.90 (0.68)	D (D)	0.93 (0.76)	E (D)
Overall	0.72 (0.60)	D (D)	0.80 (0.67)	D (D)	0.83 (0.72)	D (D)	0.87 (0.77)	D (D)	0.91 (0.82)	D (D)	0.92 (0.86)	D (D)	0.97 (0.90)	E (D)

Notes:

1. XX (XX) – Weekday Morning Peak Hour (Weekday Afternoon Peak Hour).



9.4.2 Regional Road 25 / Whitlock Avenue

The Regional Road 25 / Whitlock Avenue intersection currently operates under traffic signal control in both the weekday morning and afternoon peak hours. Analysis results are summarized in **Table 24**.

Under existing traffic conditions, the intersection operates under capacity at overall v/c of 0.58 and 0.49 in the weekday morning and afternoon peak hours, respectively.

In the Synchro models pertaining to the 2032 horizon year and beyond, the Regional Road 25 widening to six lanes was assumed.

South Block (Horizon Year of 2029)

With the buildout of the south block of the site in the horizon year of 2029, the intersection continues to operate under capacity at overall v/c of 0.66 and 0.62 in the weekday morning and afternoon peak hours, respectively.

Full Buildout (Horizon Year of 2032)

With the full buildout of the site in the horizon year of 2032, the intersection continues to operate under capacity at overall v/c of 0.63 and 0.56 in the weekday morning and afternoon peak hours, respectively.

5-Years Beyond Full Buildout (Horizon Year of 2037)

After five years beyond the site's full buildout, the intersection will continue to operate under capacity at overall v/c of 0.71 and 0.64 in the weekday morning and afternoon peak hours, respectively.

Based on the foregoing, no mitigation measures or improvements are recommended at the intersection.



TABLE 24 REGIONAL ROAD 25 / WHITLOCK AVENUE TRAFFIC OPERATIONS

Movement	Existing		2029 Horizon Year				2032 Horizon Year				2037 Horizon Year			
			Future Background		Future Total		Future Background		Future Total		Future Background		Future Total	
	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS
EBL	0.63 (0.53)	E (E)	0.69 (0.60)	E (E)	0.69 (0.61)	E (E)	0.71 (0.60)	E (E)	0.69 (0.60)	E (E)	0.69 (0.60)	E (E)	0.69 (0.60)	E (E)
EBTR	0.16 (0.13)	D (D)	0.36 (0.22)	D (D)	0.36 (0.23)	D (D)	0.39 (0.22)	D (D)	0.36 (0.22)	D (D)	0.36 (0.22)	D (D)	0.36 (0.22)	D (D)
WBL	0.36 (0.17)	D (D)	0.33 (0.15)	D (D)	0.33 (0.15)	D (D)	0.35 (0.15)	D (D)	0.33 (0.15)	D (D)	0.33 (0.15)	D (D)	0.33 (0.15)	D (D)
WBT	0.11 (0.05)	D (D)	0.13 (0.17)	D (D)	0.13 (0.17)	D (D)	0.13 (0.17)	D (D)	0.13 (0.17)	D (D)	0.13 (0.17)	D (D)	0.13 (0.17)	D (D)
WBR	0.07 (0.05)	D (D)	0.07 (0.05)	D (D)	0.07 (0.05)	D (D)	0.07 (0.05)	D (D)	0.07 (0.05)	D (D)	0.07 (0.05)	D (D)	0.07 (0.05)	D (D)
NBL	0.17 (0.14)	A (A)	0.21 (0.20)	A (A)	0.22 (0.23)	A (A)	0.34 (0.27)	C (A)	0.29 (0.30)	B (A)	0.32 (0.31)	C (A)	0.32 (0.35)	C (A)
NBT	0.37 (0.51)	A (A)	0.44 (0.61)	A (A)	0.47 (0.65)	A (A)	--							
NBR	0.01 (0.03)	A (A)	0.01 (0.03)	A (A)	0.01 (0.03)	A (A)								
NBTR	--						0.42 (0.54)	A (A)	0.43 (0.57)	A (A)	0.44 (0.64)	A (A)	0.49 (0.67)	A (A)
SBL	0.11 (0.18)	A (A)	0.12 (0.23)	A (A)	0.13 (0.26)	A (A)	0.18 (0.29)	A (A)	0.17 (0.31)	A (A)	0.18 (0.36)	A (A)	0.21 (0.39)	A (B)
SBT	0.60 (0.32)	B (A)	0.67 (0.42)	B (A)	0.69 (0.46)	B (A)	--							
SBR	0.07 (0.07)	A (A)	0.08 (0.10)	A (A)	0.08 (0.11)	A (A)								
SBTR	--						0.69 (0.40)	B (A)	0.64 (0.45)	B (A)	0.73 (0.46)	B (A)	0.74 (0.50)	B (A)



Movement	Existing		2029 Horizon Year				2032 Horizon Year				2037 Horizon Year			
			Future Background		Future Total		Future Background		Future Total		Future Background		Future Total	
	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS
Overall	0.58 (0.49)	B (B)	0.65 (0.59)	B (B)	0.66 (0.62)	B (B)	0.67 (0.54)	B (B)	0.63 (0.56)	B (B)	0.70 (0.62)	B (B)	0.71 (0.64)	B (B)

Notes:

1. XX (XX) – Weekday Morning Peak Hour (Weekday Afternoon Peak Hour).



9.4.3 Regional Road 25 / Etheridge Avenue / Future Collector Road

The Regional Road 25 / Etheridge Avenue / Future Collector Road intersection currently operates under traffic signal control in both the weekday morning and afternoon peak hours. Analysis results are summarized in **Table 25**.

Under existing traffic conditions, the intersection operates under capacity at overall v/c of 0.58 and 0.49 in the weekday morning and afternoon peak hours, respectively.

In the Synchro models pertaining to the 2032 horizon year and beyond, the Regional Road 25 widening to six lanes was assumed. Under all future conditions, given the new east leg that will connect to the intersection, traffic signal timings have been optimized within existing cycle lengths and pedestrian crossing allowances, as defined in the timing plans provided by the Region.

South Block (Horizon Year of 2029)

With the buildout of the south block of the site in the horizon year of 2029, the intersection continues to operate under capacity at overall v/c of 0.76 and 0.71 in the weekday morning and afternoon peak hours, respectively.

Full Buildout (Horizon Year of 2032)

With the full buildout of the site in the horizon year of 2032, the intersection continues to operate under capacity at overall v/c of 0.75 and 0.63 in the weekday morning and afternoon peak hours, respectively.

5-Years Beyond Full Buildout (Horizon Year of 2037)

After five years beyond the site's full buildout, the intersection will continue to operate under capacity at overall v/c of 0.83 and 0.70 in the weekday morning and afternoon peak hours, respectively.

Based on the foregoing, no mitigation measures or improvements are recommended at the intersection.



TABLE 25 REGIONAL ROAD 25 / ETHERIDGE AVENUE / COLLECTOR ROAD TRAFFIC OPERATIONS

Movement	Existing		2029 Horizon Year				2032 Horizon Year				2037 Horizon Year			
			Future Background		Future Total		Future Background		Future Total		Future Background		Future Total	
	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS
EBL	0.53 (0.54)	E (E)	0.40 (0.38)	D (D)	0.73 (0.57)	E (D)	0.41 (0.38)	D (D)	0.95 (0.68)	F (E)	0.40 (0.38)	D (D)	0.95 (0.68)	F (E)
EBR	0.04 (0.02)	D (D)	--											
EBTR	--		0.04 (0.02)	D (D)	0.07 (0.04)	D (D)	0.04 (0.02)	D (D)	0.16 (0.05)	D (D)	0.04 (0.02)	D (D)	0.16 (0.05)	D (D)
WBL			0.55 (0.38)	E (E)	0.56 (0.41)	E (E)	0.57 (0.38)	E (E)	0.57 (0.39)	E (E)	0.55 (0.38)	E (E)	0.57 (0.39)	E (E)
WBTR			0.03 (0.02)	D (E)	0.03 (0.03)	D (E)	0.04 (0.02)	D (E)	0.03 (0.02)	D (E)	0.03 (0.02)	D (E)	0.03 (0.02)	D (E)
NBL	0.13 (0.12)	A (A)	0.18 (0.14)	A (A)	0.34 (0.44)	E (B)	0.25 (0.17)	C (A)	0.48 (0.58)	D (C)	0.24 (0.20)	D (A)	0.48 (0.57)	E (C)
NBT	0.30 (0.48)	A (A)	--											
NBTR	--		0.38 (0.66)	A (A)	0.38 (0.73)	A (A)	0.34 (0.57)	A (A)	0.33 (0.58)	A (A)	0.39 (0.67)	A (A)	0.39 (0.69)	A (A)
SBT	0.61 (0.35)	A (A)	--											
SBL	--		0.08 (0.23)	A (A)	0.08 (0.29)	A (C)	0.12 (0.28)	A (B)	0.11 (0.29)	A (C)	0.13 (0.35)	A (C)	0.14 (0.36)	A (C)
SBTR			0.74 (0.42)	A (A)	0.77 (0.53)	B (A)	0.67 (0.36)	A (A)	0.70 (0.45)	B (A)	0.74 (0.41)	A (A)	0.81 (0.54)	B (B)
Overall	0.58 (0.49)	A (A)	0.68 (0.60)	B (A)	0.76 (0.71)	B (B)	0.63 (0.53)	A (A)	0.75 (0.63)	B (B)	0.68 (0.61)	A (A)	0.83 (0.70)	B (B)

Notes:

1. XX (XX) – Weekday Morning Peak Hour (Weekday Afternoon Peak Hour).



9.4.4 Regional Road 25 / Britannia Road

The Regional Road 25 / Britannia Road intersection currently operates under traffic signal control in both the weekday morning and afternoon peak hours. Analysis results are summarized in **Table 26**.

Under existing traffic conditions, the intersection operates under capacity at overall v/c of 0.73 and 0.71 in the weekday morning and afternoon peak hours, respectively.

In the Synchro models pertaining to the 2029 horizon year and beyond, the Britannia Road widening to six lanes was assumed. In the Synchro models pertaining to the 2032 horizon year and beyond, the Regional Road 25 widening to six lanes was assumed. Under all future conditions, traffic signal timings have been optimized within existing cycle lengths and pedestrian crossing allowances, as defined in the traffic signal timing plans provided by the Region.

South Block (Horizon Year of 2029)

With the buildout of the south block of the site in the horizon year of 2029, the intersection continues to operate under capacity at overall v/c of 0.85 and 0.80 in the weekday morning and afternoon peak hours, respectively.

Full Buildout (Horizon Year of 2032)

With the full buildout of the site in the horizon year of 2032, the intersection continues to operate under capacity at overall v/c of 0.82 and 0.89 in the weekday morning and afternoon peak hours, respectively.

5-Years Beyond Full Buildout (Horizon Year of 2037)

Prior to the site development in the 2037 horizon, given the extensive background growth that was considered (discussed in **Section 8.3**), the overall intersection and its movements will operate at near or over-capacity conditions in both peak hours. The shared southbound through-right lane group, the westbound left turn and the shared northbound through-right lane group will be constrained based on the adopted growth allowances at the intersection. Traffic operations should continue to be monitored prior to the recommendation of any improvements as the surrounding area develops and as travel demand evolves into the future horizon of 2037. As traffic operations at the intersection approach capacity in the future, non-local drivers in the area will have access to alternative corridors to bypass areas of congestion. Furthermore, lane utilization factors of 0.80 have been assumed in all directions at the intersection, with the assumption that only 20% of travel demand will be HOV users. Visitors and residents in the area are encouraged to carpool and to reduce congestion as well as vehicle emissions. Increased carpooling (versus the use of single-occupancy vehicles) will improve the lane utilization factors in all directions at the intersection as more drivers use the HOV lanes and will significantly improve the available capacity at the intersection.

Five years beyond the site's buildout, site-related impacts will be mostly minimal on the critical lane groups that are already operating near, at or over capacity.

Based on the foregoing, no mitigation measures or improvements aside from traffic signal timing optimization are recommended at the intersection.



TABLE 26 REGIONAL ROAD 25 / BRITANNIA ROAD TRAFFIC OPERATIONS

Movement	Existing		2029 Horizon Year				2032 Horizon Year				2037 Horizon Year			
			Future Background		Future Total		Future Background		Future Total		Future Background		Future Total	
	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS
EBL	0.31 (0.25)	E (E)	0.31 (0.24)	E (E)	0.31 (0.27)	E (E)	0.32 (0.24)	E (E)	0.31 (0.30)	E (E)	0.33 (0.27)	E (E)	0.33 (0.33)	E (E)
EBT	0.64 (0.39)	D (D)	--											
EBR	0.41 (0.02)	D (D)												
EBTR	--		0.71 (0.40)	D (D)	0.71 (0.39)	D (D)	0.72 (0.40)	D (D)	0.71 (0.37)	D (D)	0.87 (0.40)	D (D)	0.87 (0.38)	D (D)
WBL	0.96 (0.73)	F (E)	0.83 (0.93)	E (F)	0.83 (0.94)	E (F)	0.87 (0.98)	E (F)	0.86 (0.98)	E (F)	0.92 (1.07)	E (F)	0.92 (1.07)	E (F)
WBTR	0.52 (0.75)	D (D)	0.33 (0.71)	C (D)	0.34 (0.73)	C (D)	0.34 (0.73)	C (D)	0.35 (0.91)	C (D)	0.35 (0.76)	C (D)	0.36 (0.94)	C (D)
NBL	0.26 (0.58)	E (E)	0.26 (0.59)	E (E)	0.26 (0.59)	E (E)	0.27 (0.59)	E (E)	0.26 (0.60)	E (E)	0.26 (0.60)	E (E)	0.26 (0.62)	E (E)
NBT	0.45 (0.67)	C (C)	0.65 (0.74)	D (C)	0.70 (0.79)	D (C)	--							
NBR	0.12 (0.24)	B (B)	0.14 (0.33)	C (C)	0.14 (0.35)	C (C)								
NBTR	--						0.75 (0.87)	D (C)	0.78 (0.95)	D (D)	0.88 (1.04)	D (E)	0.90 (1.12)	D (F)
SBL	0.60 (0.38)	D (E)	0.49 (0.42)	D (E)	0.51 (0.46)	D (E)	0.50 (0.42)	D (E)	0.60 (0.51)	D (E)	0.54 (0.42)	D (E)	0.69 (0.53)	D (E)
SBT	0.72 (0.42)	C (B)	0.93 (0.48)	D (B)	0.95 (0.51)	E (B)	--							
SBR	0.01 (0.03)	B (B)	0.01 (0.03)	B (B)	0.02 (0.03)	B (A)								



SBTR	--						0.85 (0.45)	D (B)	0.87 (0.49)	D (B)	1.04 (0.56)	E (B)	1.08 (0.59)	F (C)
Overall	0.73 (0.71)	D (D)	0.84 (0.76)	D (D)	0.85 (0.80)	D (D)	0.80 (0.85)	D (D)	0.82 (0.89)	D (D)	0.91 (0.95)	E (E)	0.94 (0.99)	E (E)

Notes:

1. XX (XX) – Weekday Morning Peak Hour (Weekday Afternoon Peak Hour).



9.4.5 Britannia Road / Farmstead Drive

The Britannia Road / Farmstead Drive intersection currently operates under traffic signal control in both the weekday morning and afternoon peak hours. Analysis results are summarized in **Table 27**.

Under existing traffic conditions, the intersection operates under capacity at overall v/c of 0.19 and 0.20 in the weekday morning and afternoon peak hours, respectively.

In the Synchro models pertaining to the 2029 horizon year and beyond, the Britannia Road widening to six lanes was assumed.

South Block (Horizon Year of 2029)

With the buildout of the south block of the site in the horizon year of 2029, the intersection continues to operate under capacity at overall v/c of 0.22 and 0.25 in the weekday morning and afternoon peak hours, respectively.

Full Buildout (Horizon Year of 2032)

With the full buildout of the site in the horizon year of 2032, the intersection continues to operate under capacity at overall v/c of 0.23 and 0.24 in the weekday morning and afternoon peak hours, respectively.

5-Years Beyond Full Buildout (Horizon Year of 2037)

After five years beyond the site's full buildout, the intersection will continue to operate under capacity at overall v/c of 0.25 and 0.26 in the weekday morning and afternoon peak hours, respectively.

Based on the foregoing, no mitigation measures or improvements are recommended at the intersection.



TABLE 27 BRITANNIA ROAD / FARMSTEAD DRIVE TRAFFIC OPERATIONS

Movement	Existing		2029 Horizon Year				2032 Horizon Year				2037 Horizon Year			
			Future Background		Future Total		Future Background		Future Total		Future Background		Future Total	
	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS
EBL	0.03 (0.03)	A (A)	0.03 (0.03)	A (A)	0.03 (0.05)	A (A)	0.03 (0.03)	A (A)	0.03 (0.04)	A (A)	0.03 (0.03)	A (A)	0.03 (0.04)	A (A)
EBT	0.14 (0.07)	A (A)	0.18 (0.09)	A (A)	0.18 (0.10)	A (A)	0.19 (0.09)	A (A)	0.19 (0.10)	A (A)	0.21 (0.10)	A (A)	0.21 (0.11)	A (A)
WBTR	0.09 (0.18)	A (A)	0.12 (0.22)	A (A)	0.13 (0.24)	A (A)	0.14 (0.23)	A (A)	0.13 (0.24)	A (A)	0.14 (0.25)	A (A)	0.15 (0.25)	A (A)
SBL	0.53 (0.37)	D (D)	0.51 (0.35)	D (D)	0.51 (0.37)	D (D)	0.53 (0.35)	D (D)	0.51 (0.35)	D (D)	0.51 (0.35)	D (D)	0.51 (0.35)	D (D)
SBR	0.01 (0.01)	D (D)	0.01 (0.01)	D (D)	0.02 (0.01)	D (D)	0.01 (0.01)	D (D)	0.02 (0.01)	D (D)	0.01 (0.01)	D (D)	0.02 (0.01)	D (D)
Overall	0.19 (0.20)	A (A)	0.22 (0.23)	A (A)	0.22 (0.25)	A (A)	0.24 (0.24)	A (A)	0.23 (0.24)	A (A)	0.25 (0.25)	A (A)	0.25 (0.26)	A (A)

Notes:

1. XX (XX) – Weekday Morning Peak Hour (Weekday Afternoon Peak Hour).



9.4.6 Britannia Road / Rose Way

The Britannia Road / Rose Way intersection will operate under traffic signal control in both the weekday morning and afternoon peak hours. Analysis results are summarized in **Table 28**.

In the Synchro models pertaining to the 2029 horizon year and beyond, the Britannia Road widening to six lanes was assumed.

South Block (Horizon Year of 2029)

With the buildout of the south block of the site in the horizon year of 2029, the intersection operates under capacity at overall v/c of 0.26 and 0.33 in the weekday morning and afternoon peak hours, respectively.

Full Buildout (Horizon Year of 2032)

With the full buildout of the site in the horizon year of 2032, the intersection continues to operate under capacity at overall v/c of 0.27 and 0.33 in the weekday morning and afternoon peak hours, respectively.

5-Years Beyond Full Buildout (Horizon Year of 2037)

After five years beyond the site's full buildout, the intersection will continue to operate under capacity at overall v/c of 0.28 and 0.36 in the weekday morning and afternoon peak hours, respectively.

Based on the foregoing, no mitigation measures or improvements are recommended at the intersection.



TABLE 28 BRITANNIA ROAD / ROSE WAY TRAFFIC OPERATIONS

Movement	Existing		2029 Horizon Year				2032 Horizon Year				2037 Horizon Year			
			Future Background		Future Total		Future Background		Future Total		Future Background		Future Total	
	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS
EBL	--		0.05 (0.20)	A (A)	0.05 (0.24)	A (A)	0.06 (0.21)	A (A)	0.05 (0.23)	A (A)	0.06 (0.23)	A (A)	0.06 (0.25)	A (A)
EBT			0.23 (0.20)	A (A)	0.24 (0.23)	A (A)	0.26 (0.21)	A (A)	0.26 (0.22)	A (A)	0.25 (0.22)	A (A)	0.27 (0.23)	A (A)
WBTR			0.22 (0.30)	A (A)	0.23 (0.35)	A (A)	0.26 (0.32)	A (A)	0.25 (0.34)	A (A)	0.26 (0.35)	A (A)	0.27 (0.37)	A (A)
SBL			0.34 (0.24)	E (E)	0.34 (0.26)	E (E)	0.36 (0.24)	E (E)	0.34 (0.24)	E (E)	0.34 (0.24)	E (E)	0.34 (0.24)	E (E)
SBR			0.05 (0.03)	D (E)	0.05 (0.03)	D (E)	0.05 (0.03)	D (E)	0.05 (0.03)	D (E)	0.05 (0.03)	D (E)	0.05 (0.03)	D (E)
Overall			0.24 (0.29)	A (A)	0.26 (0.33)	A (A)	0.27 (0.31)	A (A)	0.27 (0.33)	A (A)	0.27 (0.34)	A (A)	0.28 (0.36)	A (A)

Notes:

1. XX (XX) – Weekday Morning Peak Hour (Weekday Afternoon Peak Hour).



9.5 UNSIGNALIZED INTERSECTION ANALYSIS

The traffic operations at unsignalized intersections in the study area (the proposed site access points), are summarized in **Table 29**.

Under all future conditions, the proposed site access points will operate at acceptable levels-of-service at LOS C or better.

9.6 TRAFFIC ANALYSIS SUMMARY

A summary of the comprehensive traffic analysis at key study area signalized intersections is provided below.

Regional Road 25 / Louis St. Laurent Avenue

After five years beyond the site's full buildout, the intersection will continue to operate under capacity at overall v/c of 0.97 and 0.90 in the weekday morning and afternoon peak hours, respectively. During the weekday morning peak hour, the shared northbound through-right lane group will operate near capacity at v/c of 0.99. Traffic operations should continue to be monitored as the surrounding area develops and as travel demand evolves into the future. Based on the foregoing, **no mitigation measures or improvements, with the exception of traffic signal timing optimization, are recommended** at the intersection.

Regional Road 25 / Whitlock Avenue

After five years beyond the site's full buildout, the intersection will continue to operate under capacity at overall v/c of 0.71 and 0.64 in the weekday morning and afternoon peak hours, respectively. Based on the foregoing, **no mitigation measures or improvements are recommended** at the intersection.

Regional Road 25 / Etheridge Avenue / Future Collector Road

After five years beyond the site's full buildout, the intersection will continue to operate under capacity at overall v/c of 0.83 and 0.70 in the weekday morning and afternoon peak hours, respectively. Based on the foregoing, **no mitigation measures or improvements are recommended** at the intersection.

Regional Road 25 / Britannia Road

In the Synchro models pertaining to the 2029 horizon year and beyond, the Britannia Road widening to six lanes was assumed. In the Synchro models pertaining to the 2032 horizon year and beyond, the Regional Road 25 widening to six lanes was assumed. Under all future conditions, traffic signal timings have been optimized within existing cycle lengths and pedestrian crossing allowances, as defined in the traffic signal timing plans provided by the Region.

Prior to the site development in the 2037 horizon, given the extensive background growth that was considered, the overall intersection and its movements will operate at near or over-capacity conditions in both peak hours. The shared southbound through-right lane group, the westbound left turn and the shared northbound through-right lane group will be constrained based on the adopted growth allowances at the intersection. Traffic operations should continue to be monitored prior to the recommendation of any improvements as the surrounding area develops and as travel demand evolves into the future horizon of 2037. Five years beyond the site's buildout, site-related impacts will be mostly minimal on the critical lane



groups that are already operating near, at or over capacity. Based on the foregoing, **no mitigation measures or improvements with the exception of traffic signal timing optimization are recommended** at the intersection.

Britannia Road / Farmstead Drive

In the Synchro models pertaining to the 2029 horizon year and beyond, the Britannia Road widening to six lanes was assumed. After five years beyond the site's full buildout, the intersection will continue to operate under capacity at overall v/c of 0.25 and 0.26 in the weekday morning and afternoon peak hours, respectively. Based on the foregoing, **no mitigation measures or improvements are recommended** at the intersection.

Britannia Road / Rose Way

In the Synchro models pertaining to the 2029 horizon year and beyond, the Britannia Road widening to six lanes was assumed. After five years beyond the site's full buildout, the intersection will continue to operate under capacity at overall v/c of 0.28 and 0.36 in the weekday morning and afternoon peak hours, respectively. Based on the foregoing, **no mitigation measures or improvements are recommended** at the intersection.

Based on the comprehensive traffic analysis, the proposed development can be accommodated on the future transportation network.



TABLE 29 UNSIGNALIZED INTERSECTION TRAFFIC OPERATIONS

Movement	Existing		2029 Horizon Year				2032 Horizon Year				2037 Horizon Year			
			Future Background		Future Total		Future Background		Future Total		Future Background		Future Total	
	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay
Regional Road 25 / North Block Site Access (Right-In / Right-Out)														
EBR	--		--				B (B)	14.2 (11.4)	--		C (B)		15.9 (12.0)	
Regional Road 25 / South Block Site Access (Right-In / Right-Out)														
EBR	--		B (B)	10.6 (11.0)	--		A (A)	9.8 (8.8)	--		B (A)	10.7 (9.1)		
Etheridge Avenue / Site Access Points (Full Movements)														
EBLTR	--		--		--		A (A)	0.2 (0.7)	--		A (A)	0.2 (0.7)		
WBLTR	--		A (A)	2.8 (3.8)	--		A (A)	2.3 (3.0)	--		A (A)	2.3 (3.0)		
NBLTR	--		B (A)	10.1 (9.9)	--		B (A)	10.2 (10.0)	--		B (A)	10.2 (10.0)		
SBLTR	--		--		--		C (C)	16.0 (18.4)	--		C (C)	16.0 (18.4)		

Notes:

1. XX (XX) – Weekday Morning Peak Hour (Weekday Afternoon Peak Hour).



9.7 TRAFFIC SIGNAL WARRANT ASSESSMENT

A traffic signal warrant assessment was undertaken at the intersection of the proposed site access driveways (new aligned 4-legged intersection) at Etheridge Avenue based on the Justification 7 methodology outlined in the Ontario Traffic Manual (OTM) Book 12. It is noted that the intersection is approximately 80 metres west of Regional Road 25 / Etheridge Avenue.

The results of the traffic signal warrant assessment are summarized in **Table 30**. The detailed calculation sheet is provided in **Appendix I**. As the traffic signal warrant based on Justification 7 is only met at 44% of the required 150%, a traffic signal at the Etheridge Avenue / Site Accesses is not warranted.

TABLE 30 TRAFFIC SIGNAL WARRANT – JUSTIFICATION 7 (2037 VOLUMES)

Justification	Description (Average Hourly Values ³)	Minimum Requirement (1 lane each direction/ restricted flow)	Compliance		
			Sectional		Entire % (≥150) ²
			Actual Traffic Volumes	% of Required	
Etheridge Avenue / Site Accesses					
1. Minimum Vehicular Volume	A. Vehicle volume, all approaches	720	315	44%	44%
	B. Vehicle volume, along minor streets	170	99	58%	
2. Delay to Cross Traffic	A. Vehicle volume, major street	720	216	30%	30%
	B. Combined volume crossing artery from minor streets	75	71	95%	

Notes:

1. The minimum requirement values are based on a four-legged intersection onto a single-lane corridor with restricted flow.
2. For future intersections, the OTM manual states that the warrant should be met at 150% (as opposed to 120% for an existing intersection with future volume estimates).
3. Average hourly volumes were derived based on the formula presented in the OTM Book 12.
 $AHV = (\text{weekday morning peak hour volumes} + \text{weekday afternoon peak hour volumes}) \div 4$



10.0 QUEUING ANALYSIS

For signalized intersections, the Synchro analysis provides results for two operational measures related to queuing and defines those measures as follows:

- 1) Mean (or 50th) percentile queue is defined as the maximum queue length during a typical cycle and has a 50% probability of being observed across the total number of cycles in the hour.
- 2) 95th percentile queue is defined as having a 5% probability of being observed over the total number of cycles in the hour.

For the site access points, the Synchro analysis only provides results for 95th percentile queues.

The following sections summarize the queue results for key storage lanes at the study area intersections.

10.1 SIGNALIZED INTERSECTION QUEUING ANALYSIS

10.1.1 Regional Road 25 / Louis St. Laurent Avenue

The storage lengths and queuing results for the movements at the Regional Road 25 / Louis St. Laurent Avenue intersection are summarized in **Table 31**.

Most of the typical (or 50th percentile) queues at the intersection are contained within the provided storage lengths. Under existing conditions, the westbound left-turn queuing exceeds the provided storage lengths. All queues that exceed storage lengths are contained within adjacent lane groups (i.e. the through lanes).

Site-related impacts (i.e. the difference in queue lengths between future background and future total conditions in any horizon year) are minimal on most movements. The site will generate an additional 4 to 5 car-lengths on the westbound left-turn queue in the weekday afternoon peak hour, and only 1 additional car-length in the weekday morning peak hour. The site will also generate an additional 1 to 2 car-lengths on the northbound left turn queue in any peak hour.



TABLE 31 REGIONAL ROAD 25 / LOUIS ST. LAURENT AVENUE QUEUING SUMMARY

Movement (Available Storage Length)	Existing		2029 Horizon Year				2032 Horizon Year				2037 Horizon Year			
			Future Background		Future Total		Future Background		Future Total		Future Background		Future Total	
	50 th %	95 th %	50 th %	95 th %	50 th %	95 th %	50 th %	95 th %	50 th %	95 th %	50 th %	95 th %	50 th %	95 th %
EBL (90m)	46.4 (42.8)	63.5 (73.6)	43.2 (41.0)	62.6 (60.2)	43.2 (40.1)	62.6 (58.8)	43.8 (40.9)	63.4 (59.7)	43.2 (38.7)	62.6 (58.3)	43.2 (40.9)	62.6 (59.7)	43.2 (38.7)	62.6 (58.3)
WBL (35m)	89.2 (56.0)	142.2 (83.7)	112.7 (68.5)	172.4 (96.4)	116.5 (77.6)	179.3 (113.6)	118.4 (69.7)	183.0 (98.6)	121.8 (83.3)	188.6 (130.4)	116.5 (69.7)	179.3 (98.6)	121.8 (83.3)	188.6 (130.4)
NBL (65m)	15.2 (21.9)	27.8 (33.7)	18.2 (28.0)	30.9 (45.8)	20.0 (30.5)	33.5 (47.3)	18.3 (28.9)	31.2 (52.9)	21.0 (35.1)	35.6 (65.1)	18.2 (34.0)	38.0 (65.0)	21.0 (45.4)	49.4 (81.9)
NBR (65m)	4.6 (0.0)	26.5 (16.6)	10.4 (5.0)	34.5 (26.9)	14.3 (8.1)	41.3 (32.5)	--							
SBL (80m)	10.6 (9.1)	21.1 (16.5)	11.0 (12.1)	20.8 (22.7)	11.0 (12.9)	20.8 (23.0)	11.2 (12.2)	21.1 (28.3)	11.0 (13.2)	20.8 (35.4)	11.0 (12.2)	20.8 (38.5)	11.0 (13.2)	20.8 (36.6)
SBR (90m)	0.0 (0.0)	10.8 (14.8)	0.0 (0.0)	8.3 (16.8)	0.0 (0.0)	8.3 (17.0)	--							

Notes:

1. XX (XX) – Weekday Morning Peak Hour (Weekday Afternoon Peak Hour).
2. All values shown above are in metres (m).
3. Yellow shaded queues identifies where queue length exceeds available storage length.



10.1.2 Regional Road 25 / Whitlock Avenue

The storage lengths and queuing results for the movements at the Regional Road 25 / Whitlock Avenue intersection are summarized in **Table 32**.

Most of the typical (or 50th percentile) queues at the intersection are contained within the provided storage lengths. Under existing conditions, the eastbound left turn queuing exceeds the provided storage lengths. All queues that exceed storage lengths are contained within adjacent lane groups (i.e. the through lanes).

Site-related impacts (i.e. the difference in queue lengths between future background and future total conditions in any horizon year) are minimal on all movements.



TABLE 32 REGIONAL ROAD 25 / WHITLOCK AVENUE QUEUING SUMMARY

Movement (Available Storage Length)	Existing		2029 Horizon Year				2032 Horizon Year				2037 Horizon Year			
			Future Background		Future Total		Future Background		Future Total		Future Background		Future Total	
	50 th %	95 th %	50 th %	95 th %	50 th %	95 th %	50 th %	95 th %	50 th %	95 th %	50 th %	95 th %	50 th %	95 th %
EBL (35m)	29.5 (21.3)	47.6 (37.2)	37.5 (27.2)	57.3 (45.1)	37.5 (28.0)	57.3 (45.9)	40.7 (27.2)	61.3 (45.1)	37.5 (27.2)	57.3 (45.1)	37.5 (27.2)	57.3 (45.1)	37.5 (27.2)	57.3 (45.1)
WBL (65m)	13.4 (6.5)	26.0 (15.3)	12.1 (6.1)	23.8 (14.4)	12.1 (6.3)	23.8 (14.8)	13.0 (6.1)	25.1 (14.4)	12.1 (6.1)	23.8 (14.4)	12.1 (6.1)	23.8 (14.4)	12.1 (6.1)	23.8 (14.4)
WBR (65m)	0.0 (0.0)	16.1 (14.7)	0.0 (0.0)	14.7 (14.0)	0.0 (0.0)	14.7 (14.2)	0.0 (0.0)	15.2 (14.0)	0.0 (0.0)	14.7 (14.0)	0.0 (0.0)	14.7 (14.0)	0.0 (0.0)	14.7 (14.0)
NBL (100m)	0.0 (3.7)	1.8 (6.9)	0.8 (1.4)	3.7 (3.4)	0.9 (1.4)	3.1 (2.5)	2.9 (1.6)	8.8 (4.5)	1.2 (1.6)	4.8 (3.9)	3.0 (1.4)	9.6 (3.4)	2.1 (1.3)	6.9 (3.2)
NBR (25m)	0.0 (0.0)	0.7 (0.5)	0.0 (0.4)	0.1 (1.7)	0.0 (0.3)	0.0 (1.2)	--							
SBL (100m)	2.5 (2.3)	6.7 (6.2)	2.6 (2.6)	7.2 (6.9)	2.6 (2.7)	7.2 (7.2)	3.0 (2.6)	8.1 (6.9)	2.6 (2.6)	7.2 (6.9)	2.6 (2.6)	7.2 (10.1)	2.6 (2.6)	7.2 (13.2)
SBR (25m)	2.2 (2.4)	9.1 (8.9)	3.1 (4.8)	11.2 (13.8)	3.1 (5.6)	11.2 (15.2)	--							

Notes:

1. XX (XX) – Weekday Morning Peak Hour (Weekday Afternoon Peak Hour).
2. All values shown above are in metres (m)
3. Yellow shaded queues identifies where queue length exceeds available storage length.



10.1.3 Regional Road 25 / Etheridge Avenue / Future Collector Road

The storage lengths and queuing results for the movements at the Regional Road 25 / Etheridge Avenue intersection are summarized in **Table 33**.

Most of the typical (or 50th percentile) queues at the intersection are contained within the provided storage lengths. Under existing conditions, the eastbound left-turn queuing exceeds the provided storage lengths. Although the site traffic results in longer eastbound left-turn queues, the future queues that exceed storage lengths could be contained within adjacent lane groups (i.e. the through lanes).



TABLE 33 REGIONAL ROAD 25 / ETHERIDGE AVENUE / COLLECTOR ROAD QUEUING SUMMARY

Movement (Available Storage Length)	Existing		2029 Horizon Year				2032 Horizon Year				2037 Horizon Year			
			Future Background		Future Total		Future Background		Future Total		Future Background		Future Total	
	50 th %	95 th %	50 th %	95 th %	50 th %	95 th %	50 th %	95 th %	50 th %	95 th %	50 th %	95 th %	50 th %	95 th %
EBL (40m)	27.3 (21.1)	45.3 (37.1)	22.9 (17.2)	37.9 (31.1)	44.5 (31.9)	65.7 (50.8)	24.0 (17.2)	39.5 (31.1)	61.1 (38.7)	92.9 (59.6)	22.9 (17.2)	37.9 (31.1)	61.1 (38.7)	92.9 (59.6)
WBL (40m)	--		16.9 (10.3)	31.7 (22.4)	16.9 (11.2)	31.7 (23.4)	17.7 (10.3)	32.4 (22.4)	16.9 (10.4)	31.7 (22.4)	16.9 (10.3)	31.7 (22.4)	16.9 (10.4)	31.7 (22.4)
NBL (70m)	0.9 (0.6)	2.1 (1.7)	0.3 (1.5)	1.0 (3.4)	3.8 (4.6)	9.2 (16.2)	0.5 (1.5)	3.0 (3.0)	10.8 (19.6)	20.4 (34.5)	0.4 (1.8)	1.5 (2.4)	11.0 (31.9)	16.6 (35.5)
SBL (70m)	--		0.8 (0.8)	1.0 (4.5)	0.8 (1.8)	1.0 (7.7)	0.7 (1.5)	1.0 (7.1)	0.9 (3.1)	1.9 (9.6)	0.7 (2.1)	0.8 (14.5)	0.8 (4.0)	1.6 (14.4)

Notes:

1. XX (XX) – Weekday Morning Peak Hour (Weekday Afternoon Peak Hour).
2. All values shown above are in metres (m).
3. Yellow shaded queues identifies where queue length exceeds available storage length.



10.1.4 Regional Road 25 / Britannia Road

The storage lengths and queuing results for the movements at the Regional Road 25 / Britannia Road intersection are summarized in **Table 34**.

All queues will be contained under existing storage lengths. Site-related impact on any movement is up to 3 car-lengths.



TABLE 34 REGIONAL ROAD 25 / BRITANNIA ROAD QUEUING SUMMARY

Movement (Available Storage Length)	Existing		2029 Horizon Year				2032 Horizon Year				2037 Horizon Year			
			Future Background		Future Total		Future Background		Future Total		Future Background		Future Total	
	50 th %	95 th %	50 th %	95 th %	50 th %	95 th %	50 th %	95 th %	50 th %	95 th %	50 th %	95 th %	50 th %	95 th %
EBL (60m)	8.0 (4.4)	15.3 (10.2)	8.0 (5.3)	15.3 (11.7)	8.0 (6.0)	15.3 (12.7)	8.1 (5.3)	15.6 (11.7)	8.0 (6.7)	15.3 (13.7)	8.7 (6.0)	16.3 (12.7)	8.7 (7.4)	16.3 (14.6)
WBL (120m)	44.3 (31.3)	74.5 (47.5)	55.9 (42.4)	80.0 (70.1)	56.0 (42.7)	79.8 (71.1)	59.8 (44.6)	87.4 (74.9)	59.0 (44.6)	86.1 (75.2)	64.6 (51.0)	97.4 (83.4)	64.7 (51.4)	97.2 (83.6)
NBL (90m)	6.5 (30.5)	13.2 (43.0)	6.7 (31.4)	13.4 (44.1)	6.7 (31.7)	13.4 (44.3)	6.8 (32.1)	13.7 (44.8)	6.7 (32.1)	13.4 (45.3)	6.7 (32.1)	13.4 (45.5)	6.7 (32.1)	13.4 (46.7)
NBR (90m)	0.0 (4.2)	14.6 (25.3)	0.0 (10.8)	17.3 (39.5)	0.0 (13.6)	17.3 (45.4)	--							
SBL (90m)	36.0 (15.2)	52.5 (25.7)	40.6 (17.0)	56.9 (28.0)	47.4 (20.7)	62.7 (33.0)	42.6 (17.1)	58.2 (28.5)	53.2 (23.5)	75.3 (36.8)	42.3 (17.3)	62.4 (28.7)	53.4 (23.9)	83.7 (36.8)
SBR (90m)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	--							

Notes:

1. XX (XX) – Weekday Morning Peak Hour (Weekday Afternoon Peak Hour).
2. All values shown above are in metres (m)
3. Yellow shaded queues identifies where queue length exceeds available storage length.



10.1.5 Britannia Road / Farmstead Drive

The storage lengths and queuing results for the movements at the Britannia Road / Farmstead Drive intersection are summarized in **Table 35**.

All queues will be contained under existing storage lengths. Site-related impact on any movement is up to 1 car-length.



TABLE 35 BRITANNIA ROAD / FARMSTEAD DRIVE QUEUING SUMMARY

Movement (Available Storage Length)	Existing		2029 Horizon Year				2032 Horizon Year				2037 Horizon Year			
			Future Background		Future Total		Future Background		Future Total		Future Background		Future Total	
	50 th %	95 th %	50 th %	95 th %	50 th %	95 th %	50 th %	95 th %	50 th %	95 th %	50 th %	95 th %	50 th %	95 th %
EBL (20m)	0.6 (0.5)	2.4 (1.7)	0.6 (0.4)	2.3 (1.6)	0.6 (0.6)	2.3 (2.1)	0.6 (0.4)	2.4 (1.6)	0.6 (0.6)	2.3 (1.9)	0.6 (0.4)	2.3 (1.6)	0.6 (0.6)	2.3 (1.9)
SBL	19.0 (12.0)	33.9 (24.5)	18.4 (11.1)	33.1 (23.1)	18.4 (12.0)	33.1 (24.5)	19.0 (11.1)	33.9 (23.1)	18.4 (11.1)	33.1 (23.1)	18.4 (11.1)	33.1 (23.1)	18.4 (11.1)	33.1 (23.1)
SBR	0.0 (0.0)	7.2 (6.6)	0.0 (0.0)	7.0 (6.3)	0.0 (0.0)	7.7 (7.4)	0.0 (0.0)	7.2 (6.3)	0.0 (0.0)	8.5 (7.2)	0.0 (0.0)	7.0 (6.3)	0.0 (0.0)	8.5 (7.2)

Notes:

1. XX (XX) – Weekday Morning Peak Hour (Weekday Afternoon Peak Hour).
2. All values shown above are in metres (m).
3. Yellow shaded queues identifies where queue length exceeds available storage length.



10.1.6 Britannia Road / Rose Way

The storage lengths and queuing results for the movements at the Britannia Road / Farmstead Drive intersection are summarized in **Table 36**.

All queues will be contained under existing storage lengths. Site-related impact on any movement is negligible.



TABLE 36 BRITANNIA ROAD / ROSE WAY QUEUING SUMMARY

Movement (Available Storage Length)	Existing		2029 Horizon Year				2032 Horizon Year				2037 Horizon Year			
			Future Background		Future Total		Future Background		Future Total		Future Background		Future Total	
	50 th %	95 th %	50 th %	95 th %	50 th %	95 th %	50 th %	95 th %	50 th %	95 th %	50 th %	95 th %	50 th %	95 th %
EBL (50m)	--		2.3 (1.3)	5.0 (2.5)	2.2 (1.4)	4.7 (4.1)	2.1 (2.9)	4.2 (4.5)	1.9 (2.6)	3.2 (4.3)	2.0 (2.6)	3.3 (4.3)	1.8 (2.6)	2.8 (4.1)
SBL (50m)			14.3 (7.7)	27.8 (18.0)	14.3 (8.5)	27.8 (19.6)	15.6 (7.7)	29.6 (18.0)	14.3 (7.7)	27.8 (18.0)	14.3 (7.7)	27.8 (18.0)	14.3 (7.7)	27.8 (18.0)
SBR			0.0 (0.0)	15.3 (13.0)	0.0 (0.0)	15.3 (13.4)	0.0 (0.0)	15.7 (13.0)	0.0 (0.0)	15.3 (13.0)	0.0 (0.0)	15.3 (13.0)	0.0 (0.0)	15.3 (13.0)

Notes:

1. XX (XX) – Weekday Morning Peak Hour (Weekday Afternoon Peak Hour).
2. All values shown above are in metres (m)
3. Yellow shaded queues identifies where queue length exceeds available storage length.



10.2 UNSIGNALIZED INTERSECTION ANALYSIS

The queue lengths at the proposed site access driveways are summarized in **Table 37**. Under all future conditions, the site access driveways will operate at queues of up to 1 car length.

TABLE 37 SITE ACCESS QUEUING SUMMARY

	Movement	2029 Future Total	2032 Future Total	2037 Future Total
Regional Road 25 / North Block Site Driveway (RIRO)	EBR	--	1.8 (0.9)	2.2 (0.9)
Regional Road 25 / South Block Site Driveway (RIRO)	EBR	1.7 (1.1)	1.4 (0.6)	1.7 (0.7)
Etheridge Avenue / Site Accesses (Full Moves)	EBLTR	--	0.1 (0.2)	0.1 (0.2)
	WBLTR	0.8 (2.5)	0.8 (2.3)	0.8 (2.3)
	NBLTR	4.7 (3.2)	4.8 (3.0)	4.8 (3.0)
	SBLTR	--	7.5 (5.3)	7.5 (5.3)

Notes:

1. XX (XX) – Weekday Morning Peak Hour (Weekday Afternoon Peak Hour).
2. All values shown above are in metres (m).

10.3 QUEUING SUMMARY

A summary of the queuing analysis is provided as follows:

Regional Road 25 / Louis St. Laurent Avenue

Site-related impacts (i.e. the difference in queue lengths between future background and future total conditions in any horizon year) are minimal on most movements. The site will generate an additional 4 to 5 car-lengths on the westbound left-turn queue in the weekday afternoon peak hour, and only 1 additional car-length in the weekday morning peak hour. The site will also generate an additional 1 to 2 car-lengths on the northbound left turn queue in any peak hour.

Regional Road 25 / Whitlock Avenue

Most of the typical (or 50th percentile) queues at the intersection are contained within the provided storage lengths. Site-related impacts (i.e. the difference in queue lengths between future background and future total conditions in any horizon year) are minimal on all movements.

Regional Road 25 / Etheridge Avenue / Future Collector Road

Although the site traffic results in longer eastbound left-turn queues, the future queues that exceed storage lengths could be contained within adjacent lane groups (i.e. the through lanes).



Regional Road 25 / Britannia Road

All future queues will be contained under existing storage lengths. Site-related impact on any movement is up to 3 car-lengths.

Britannia Road / Farmstead Drive

All future queues will be contained under existing storage lengths. Site-related impact on any movement is up to 1 car-length.

Britannia Road / Rose Way

All future queues will be contained under existing storage lengths. Site-related impact on any movement is negligible.

Unsignalized Driveways

At the unsignalized intersections in the study area (Region Road right-in/right-out access points on each block and on Etheridge Avenue at the site driveways), under all future conditions, the site access driveways will operate at queues of up to 1 car length.

Based on the foregoing queuing review, the proposed development can be accommodated on the future transportation network.



11.0 RECOMMENDATIONS AND CONCLUSIONS

As outlined in the previous sections, the following provides the conclusions of the study and recommendations that are proposed as part of the development of the site:

- Vehicle access and site circulation for each block is proposed via a driveway across each block that provides a connection between a new 4-legged intersection on Etheridge Avenue and a new right-in/right-out only access (one on each block) at Regional Road 25.
- As the proposed new 4-legged intersection of the north and south block driveways with Etheridge Avenue is just over 80 metres from the signalized intersection of Regional Road 25 at Etheridge Avenue, a pedestrian crossover is not recommended to be installed across Etheridge Avenue. The installation of pedestrian warning signs could however be considered.
- The development of the site includes walkways throughout both the north and south blocks that will connect to a future sidewalk on the west side of Regional Road 25 as well as to the existing sidewalks along Etheridge Avenue. The pedestrian linkages to Etheridge Avenue will provide connectivity to an existing walking trail along the Natural Heritage System (NHS) as well as to the adjacent neighbourhood. The walkways throughout the site with connectivity to sidewalks on Etheridge Avenue and to Regional Road 25 will also provide connectivity to transit stops in order to encourage transit trips to/from the site.
- Resident parking is to be provided through a connected below-grade structure on each block, while non-resident parking (resident visitor and retail) is to be shared and provided at-grade on each block.
- It is acknowledged that parking standards outlined in Zoning By-law 016-2014 (HUSP Urban Area – June 2019) could be considered to overstate the parking needs of a residential development based on the evolving transportation context, parking demand studies and a comprehensive Transportation Demand Management Plan.
- A total parking supply of 2,167 parking spaces is proposed for the site, inclusive of 1,265 and 902 parking spaces for the south and north blocks, respectively. The development proposes a provision of a minimum resident parking rate of 1.0 space per unit, with non-resident shared parking proposed to be provided at a minimum rate of 0.22 spaces per unit. As the resident visitor parking requirement is greater than the retail parking requirement, the proposed non-resident rate is based on the resident visitor supply. The proposed parking supply is appropriate for the site based upon the evolving transportation context, observed parking demands at the proxy sites and proposed TDM measures.
- A total supply of 910 bicycle parking spaces is proposed for the site, inclusive of 534 and 376 spaces for the south and north blocks, respectively. The proposed bicycle parking supply exceeds the Zoning By-law minimum requirements and will meet the needs of the site.



- The development proposes the following loading provisions for each block, with the following dimensions:
 - **South Block:** 1 loading space with dimensions of 18 m (length) x 6 m (width) & 4 loading areas with dimensions of 8 m (length) x 4 m (width)
 - **North Block:** 1 loading space with dimensions of 18 m (length) x 6 m (width) & 3 loading areas with dimensions of 8 m (length) x 4 m (width)
- All of the proposed loading spaces are located at-grade, without any overhead obstructions, and meet the minimum heights required by the Zoning By-law. The minimum loading requirements of the Zoning By-law are met and the loading supply will meet the practical needs of the site.
- The proposed Transportation Demand Management (TDM) Plan aims to reduce automobile use through an on-going strategy that supports and promotes the use of non-auto transportation modes. Proposed TDM measures for the site include pedestrian facilities with a focus on connectivity, bicycle parking/ bicycle repair stations, an appropriate vehicle parking supply, resident traveller information and unbundled parking.
- For the purposes of a conservative analysis, although there are 1,768 proposed residential units, the total unit count considered for the analysis was rounded up 1,900 units to account for potential future adjustments to the development concept plan. The Phase 1 (south block) proposed development is anticipated to generate **250 and 300 two-way vehicle trips** during the weekday morning and afternoon peak hours, respectively. At full buildout, the proposed development is anticipated to generate in the order of **435 and 515 two-way vehicle trips** during the peak hours.
- The traffic analysis was completed for a typical weekday for both the morning and afternoon peak periods and indicated that in 2037, all study area intersections will operate acceptably, with the recommended optimization of traffic signal timings at the intersections of Regional Road 25 / Louis St. Laurent Avenue and at Regional Road 25 / Britannia Road.
- A traffic signal warrant assessment was undertaken at the intersection of the proposed site access driveways (new aligned 4-legged intersection) at Etheridge Avenue based on the Justification 7 methodology outlined in the Ontario Traffic Manual (OTM) Book 12. It is noted that the intersection is approximately 80 metres west of Regional Road 25 / Etheridge Avenue. As the traffic signal warrant is only met at 44% of the required 150%, a traffic signal at the Etheridge Avenue / Site Accesses is not warranted.
- The queuing review indicates no concerns at any of the signalized and unsignalized intersections in the study area. The impact of the site on queuing is only modest and can be accommodated on the existing and future road network.

Based on the comprehensive traffic analysis, the proposed development can be accommodated on the future transportation network.



Appendix A

Architectural Drawings



FRAMGARD

ISSUED FOR ZBA 25-JULY-2023

FRAMGARD MATTAMY

MELDOWEST, ONTARIO

Client: N/A, N/A
Date: N/A, N/A
Drawn: N/A, N/A
Title: TITLE PAGE

Project No. 22-210
Drawing No. A000

DATE: 25 JUL 2023

FILE: 22-210
JOB: 22-210

PROJECT: 22-210

DESCRIPTION: 22-210

DATE: 25 JUL 2023

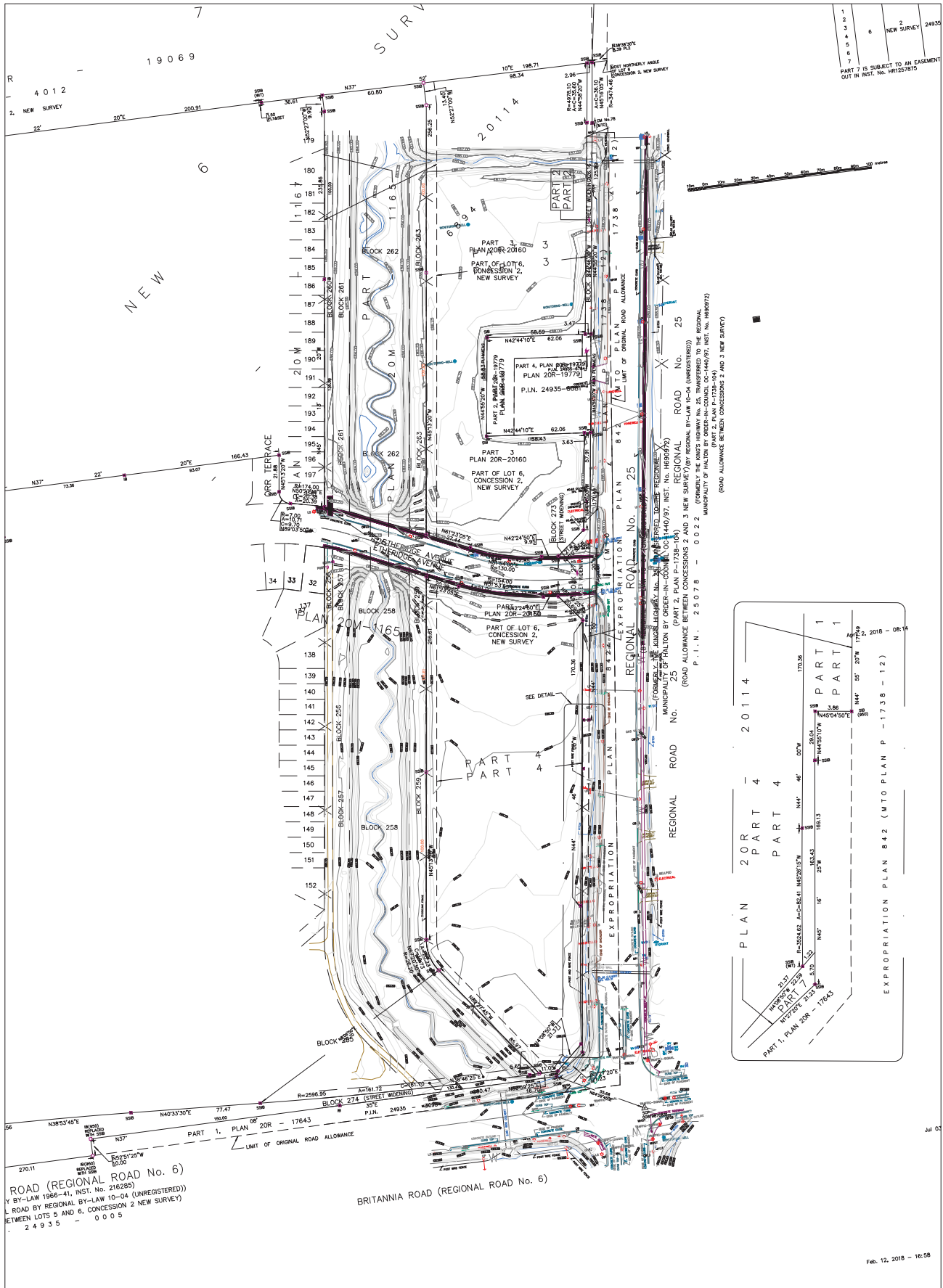
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JOB: 22-210

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DESCRIPTION: 22-210

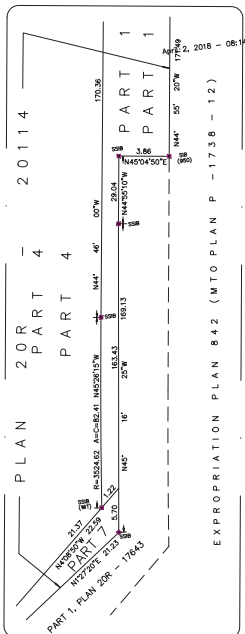
DATE: 25 JUL 2023



ROAD (REGIONAL ROAD No. 6)
 BY-LAW 1988-41, INST. No. 216285)
 ROAD BY-LAW 10-04 (UNREGISTERED)
 BETWEEN LOTS 5 AND 6, CONCESSION 2 NEW SURVEY
 2 4 9 3 5 - 0 0 5

BRITANNIA ROAD (REGIONAL ROAD No. 6)

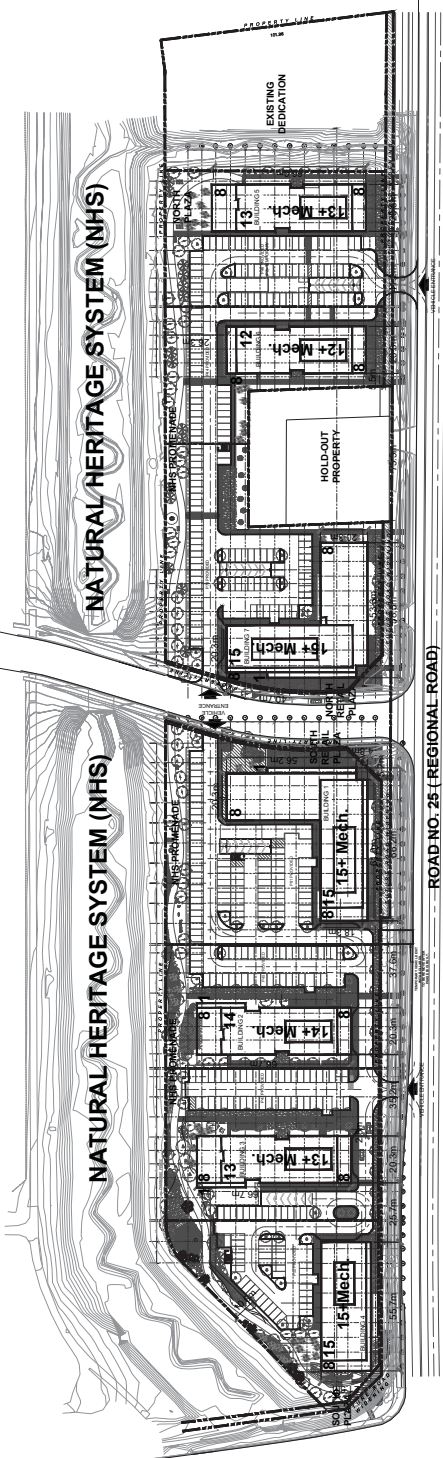
REGIONAL ROAD No. 25
 (FORMERLY THE KING'S HIGHWAY No. 25, TRANSFERRED TO THE REGIONAL
 MUNICIPALITY OF HALTON BY ORDER-IN-COUNCIL No. 1440/97, INST. No. H890792)
 (PART 2, PLAN P-1738-104)
 P.I.N. - 2 5 0 7 6 - 0 0 2 2
 (FORMERLY OF THE KING'S HIGHWAY No. 25, TRANSFERRED TO THE REGIONAL
 MUNICIPALITY OF HALTON BY-LAW 10-04 (UNREGISTERED)
 (PART 2, PLAN P-1738-104)
 P.I.N. - 2 5 0 7 6 - 0 0 2 2
 (FORMERLY OF THE KING'S HIGHWAY No. 25, TRANSFERRED TO THE REGIONAL
 MUNICIPALITY OF HALTON BY ORDER-IN-COUNCIL No. 1440/97, INST. No. H890792)
 (PART 2, PLAN P-1738-104)
 P.I.N. - 2 5 0 7 6 - 0 0 2 2



1	NEW SURVEY	24935
2	NEW SURVEY	24935
3	NEW SURVEY	24935
4	NEW SURVEY	24935
5	NEW SURVEY	24935
6	NEW SURVEY	24935
7	NEW SURVEY	24935

PART 7 IS SUBJECT TO AN EASEMENT
 OUT IN INST. No. H1257815

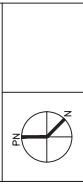
<p>COREARCHITECTS 175 GERRARD STREET EAST, SUITE 200 TORONTO, ONTARIO M5E 1B3 TEL: (416) 593-8888 WWW.COREARCHITECTS.COM</p>	
<p>DATE: 2018.02.12 DRAWN BY: [Name] CHECKED BY: [Name]</p>	<p>PROJECT: [Name] CLIENT: [Name]</p>
<p>FRAMGARD MATTAMY MELTOWNWEST, ONTARIO</p>	
<p>Scale: 1:1000 Date: 2018.02.12</p>	
<p>Survey plan</p>	
<p>Project No.: 22-210</p>	<p>Drawing No.: A003</p>



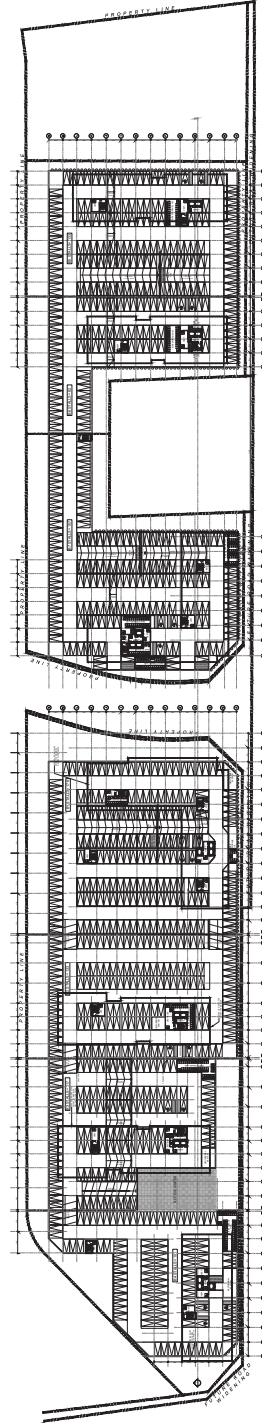
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Location	MELTOWEST, ONTARIO	Date	2022-03-25
Drawn		Checked	
Site	OVERALL SITE PLAN		

COREARCHITECTS
 125 COLLEGE AVENUE, SUITE 100
 WILLOWDALE, ONTARIO M2H 1P7
 TEL: 416-491-1111
 WWW.COREARCHITECTS.COM

FRAMGARD MATTAMY
 MELTOWEST, ONTARIO



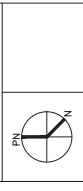
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Client	FRAMGARD MATTAMY
Location	MELTOWEST, ONTARIO
Scale	1:1000
Date	2022-03-25
Drawn	
Checked	
Site	OVERALL SITE PLAN



PROJECT NO. 22-210
 DATE 2022-07-20
 DRAWN BY J.M.M.
 CHECKED BY J.M.M.
 PROJECT NAME
 PROJECT LOCATION
 PROJECT DESCRIPTION

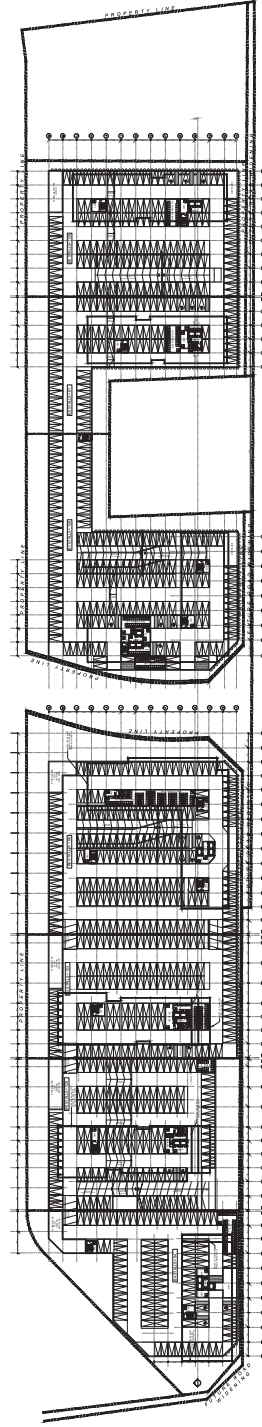
COREARCHITECTS
 ARCHITECTS
 1100 SHEPPARD AVENUE EAST
 SUITE 100
 SCARBOROUGH, ONTARIO M1B 4Y1
 TEL: (416) 291-1100
 WWW.COREARCHITECTS.COM

FRAMGARD MATTAMY
 MELTOWEST, ONTARIO



Scale: 1:1000
 Date: 2022-07-20
 Drawn: J.M.M.
 Checked: J.M.M.

OVERALL PARKING LEVEL P2
 Drawing No. A101



PROJECT NO. 22-210
 DATE 11/10/20
 DRAWN BY J. M. W. K.
 CHECKED BY J. M. W. K.
 TITLE OVERALL PARKING LEVEL P1

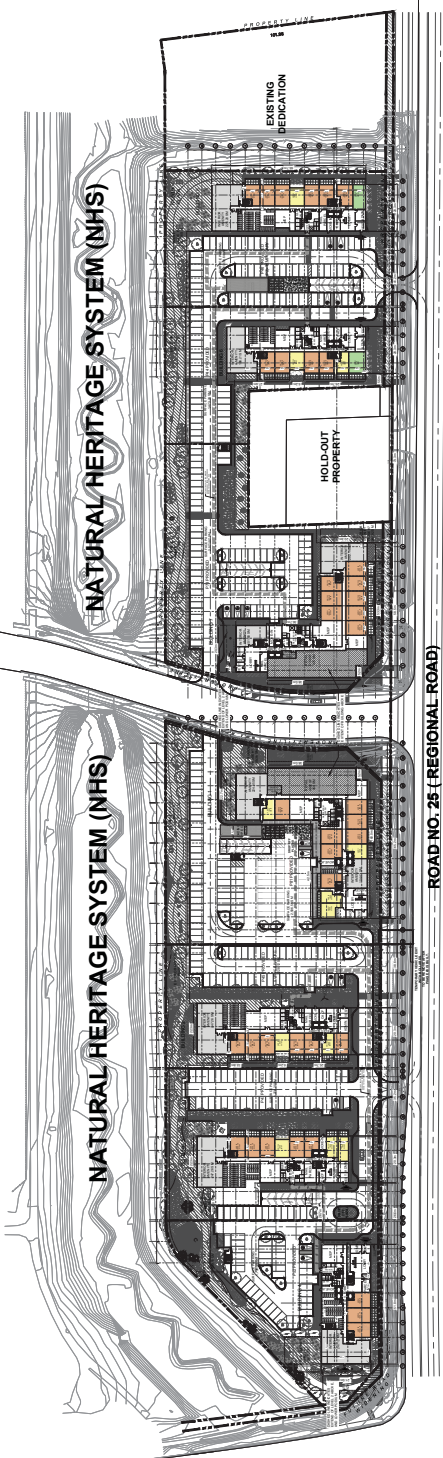
COREARCHITECTS
 ARCHITECTS
 1100 BAYVIEW AVE. SUITE 100
 SCARBOROUGH, ONTARIO M1H 2C9
 TEL: (416) 291-1100
 WWW.COREARCHITECTS.COM

FRAMGARD MATTAMY
 MELTOWEST, ONTARIO



PROJECT NO. 22-210
 DATE 11/10/20
 DRAWN BY J. M. W. K.
 CHECKED BY J. M. W. K.
 TITLE OVERALL PARKING LEVEL P1

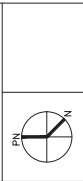
DRAWING NO. A102



PROJECT NO. 22-210
 DATE 2022-07-20

COREARCHITECTS
 175 COMMUNITY ST. TORONTO
 ONTARIO M5S 1A5
 TEL: 416-924-1111
 WWW.COREARCHITECTS.COM

FRAMGARD MATTAMY
 MELTOWEST, ONTARIO



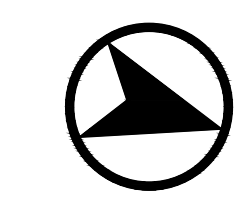
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Scale	1:500
Drawn	2022-07-20
Size	

GROUND FLOOR PLAN
 Drawing No. **A108**

Appendix B

Traffic Signage and Pavement Marking Plan



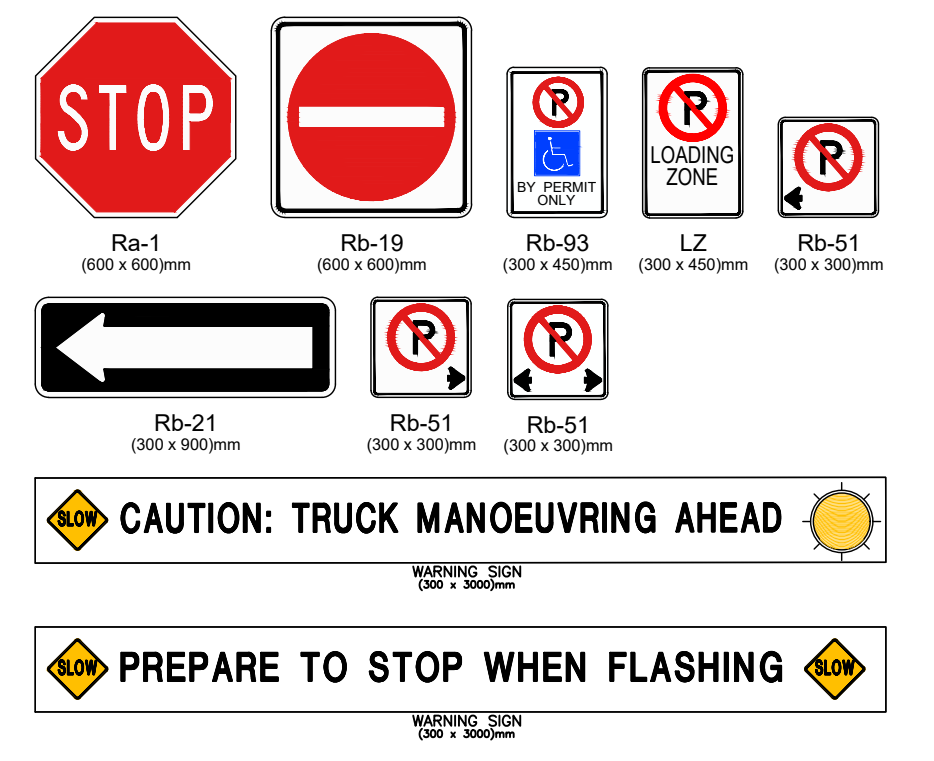


NATURAL HERITAGE SYSTEM (NHS)

- PAVEMENT MARKING:**
- (NOTE-ALL MARKINGS MUST CONFORM TO THE ONTARIO TRAFFIC MANUAL (OTM) BOOK 11)
- 10cm (4 in.) YELLOW SOLID
 - THROUGH ARROW (3m (10 ft.))
 - ALL STOP BARS TO BE 60cm (2 ft.) WHITE SOLID
- ZONE PAINTING**
- 10cm SOLID TRAFFIC YELLOW
 - 45° ANGLE
 - 80cm O/C
- PEDESTRIAN CROSSING**
- COLD PLASTIC "POLYMERIC"
 - WIDTH AS SHOWN
 - PATTERN: 60cm PAINTED, 60cm GAP
 - TRAFFIC WHITE
- INTERNATIONAL SYMBOL OF ACCESS**
- 1.5m x 1.5m
 - 10cm BORDER - TRAFFIC WHITE
 - SYMBOL - TRAFFIC WHITE
 - BLUE BACKGROUND

- SIGN MOUNT LEGEND:**
- ALL SIGNS ARE SHOWN IN APPROXIMATE LOCATIONS AND TO BE DETERMINED ON SITE. SIGNS MUST BE VISIBLE TO DRIVER AND NOT OBSTRUCTED BY LANDSCAPE.
- PROPOSED POST
 - PROPOSED POST PROTECTION
 - PROPOSED WALL/COLUMN MOUNT SIGN
 - PROPOSED WALL/COLUMN PERPENDICULAR
 - SUSPENDED SIGN
 - CONVEX MIRROR

- SIGNAGE LEGEND:**
- (NOTE-ALL SIGNAGE MUST CONFORM TO THE ONTARIO TRAFFIC MANUAL (OTM) BOOK 5 AND 6)



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www.bagroup@bagroup.com

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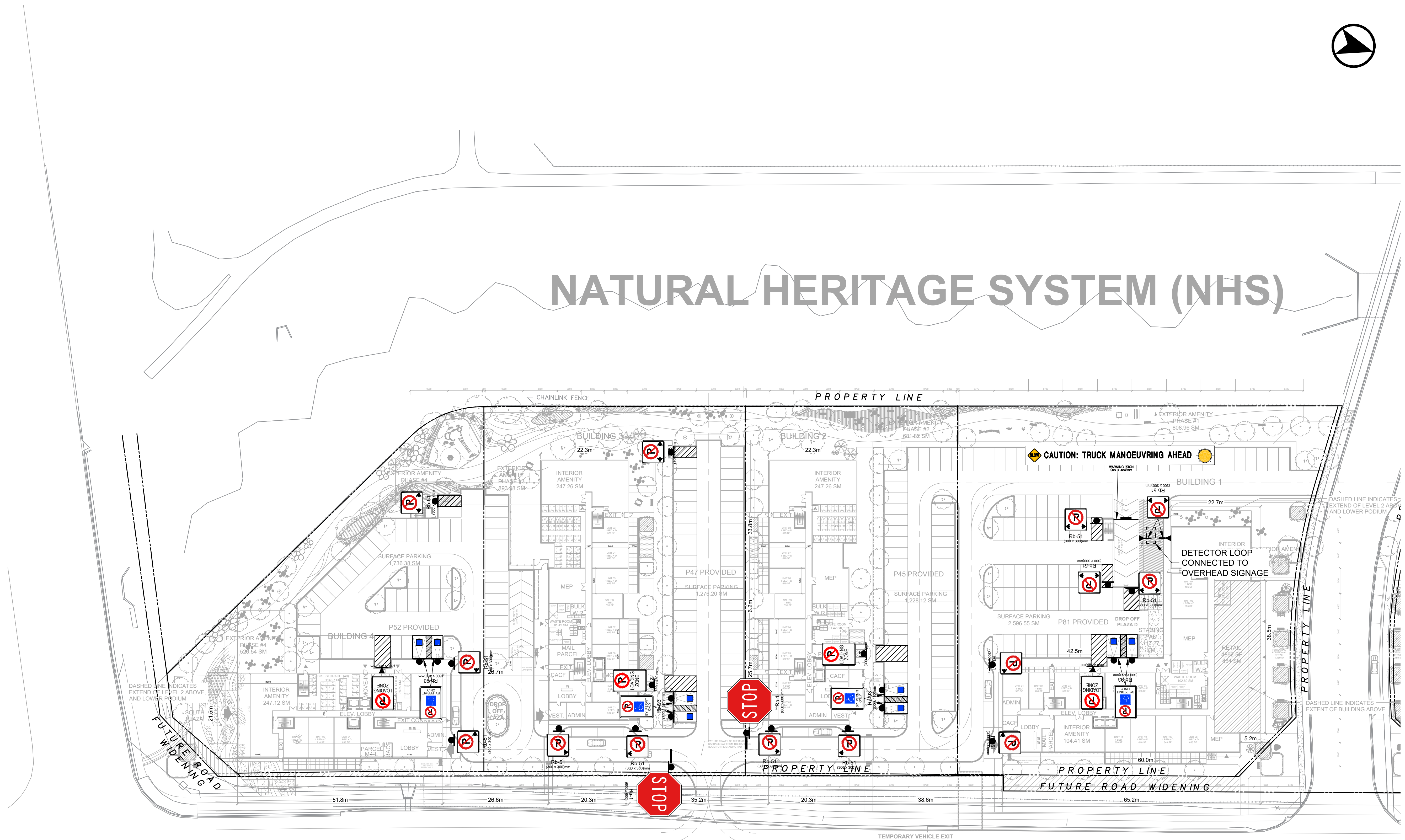
REGIONAL ROAD 25 & BRITANNIA ROAD

SIGNAGE AND PAVEMENT MARKING PLAN

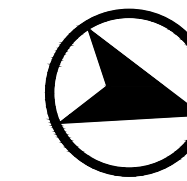
SOUTH BLOCK - GROUND FLOOR

Date: July 24, 2023
Project No.: 6374-70
Scale: 1:500

SN-01



ROAD NO. 25 (REGIONAL R



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(NOTE-ALL MARKINGS MUST CONFORM TO THE ONTARIO TRAFFIC MANUAL (OTM) BOOK 11)

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- THROUGH ARROW (3m (10 ft.))
- ALL STOP BARS TO BE 60cm (2 ft.) WHITE SOLID
- ZONE PAINTING
 - 10cm SOLID TRAFFIC YELLOW
 - 45° ANGLE
 - 80cm O/C
- PEDESTRIAN CROSSING
 - COLD PLASTIC "POLYMERIC"
 - WIDTH AS SHOWN
 - PATTERN: 60cm PAINTED, 60cm GAP
 - TRAFFIC WHITE
- INTERNATIONAL SYMBOL OF ACCESS
 - 1.5m x 1.5m
 - 10cm BORDER - TRAFFIC WHITE
 - SYMBOL - TRAFFIC WHITE
 - BLUE BACKGROUND

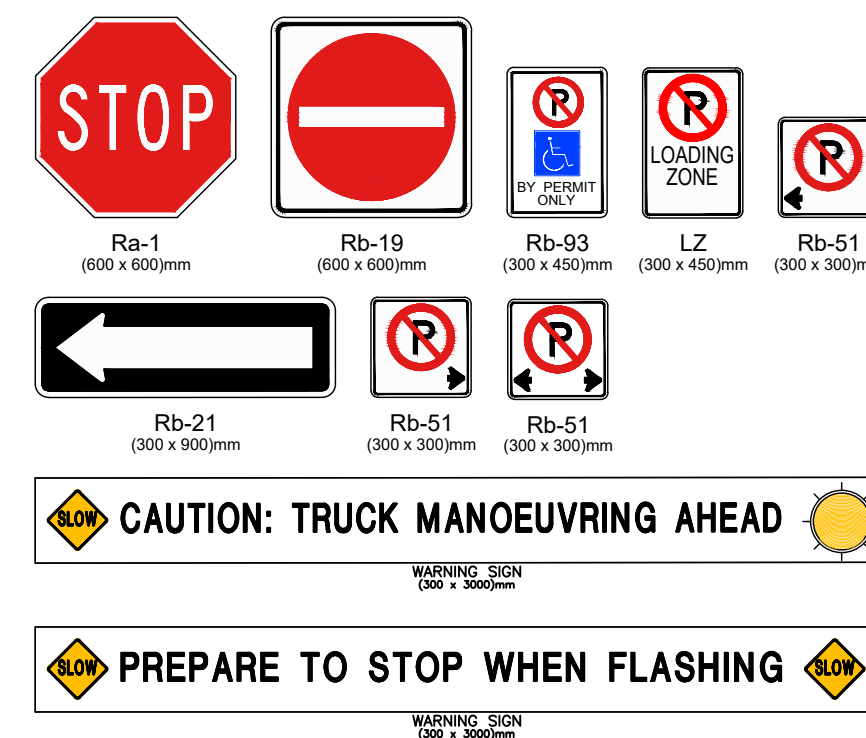
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- PROPOSED POST
- PROPOSED POST PROTECTION
- PROPOSED WALL/COLUMN MOUNT SIGN
- PROPOSED WALL/COLUMN PERPENDICULAR
- SUSPENDED SIGN
- CONVEX MIRROR

SIGNAGE LEGEND:

(NOTE-ALL SIGNAGE MUST CONFORM TO THE ONTARIO TRAFFIC MANUAL (OTM) BOOK 5 AND 6)



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REGIONAL ROAD 25 & BRITANNIA ROAD

SIGNAGE AND PAVEMENT MARKING PLAN

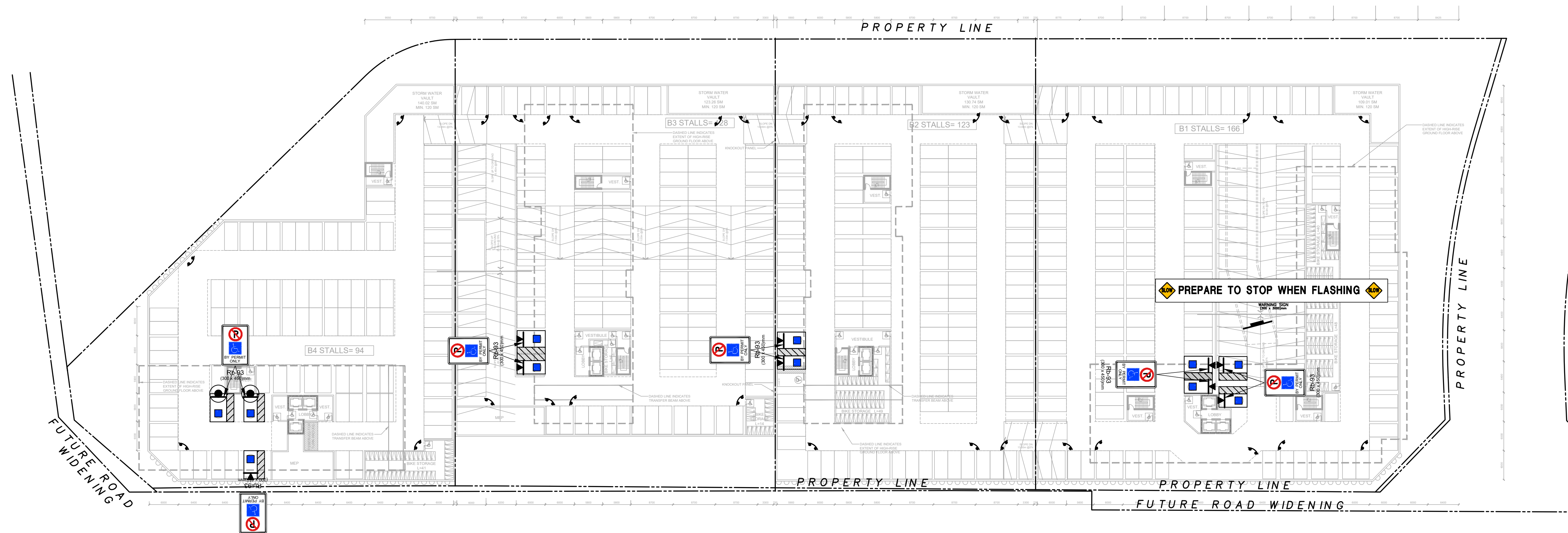
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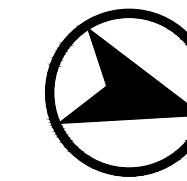
Date: July 24, 2023

Project No.: 6374-70

Scale: 1:500

SN-02





PAVEMENT MARKING:

(NOTE-ALL MARKINGS MUST CONFORM TO THE ONTARIO TRAFFIC MANUAL (OTM) BOOK 11)

- 10cm (4 in.) YELLOW SOLID
- THROUGH ARROW (3m (10 ft.))
- ALL STOP BARS TO BE 60cm (2 ft.) WHITE SOLID
- ZONE PAINTING
 - 10cm SOLID TRAFFIC YELLOW
 - 45° ANGLE
 - 60cm O/C
- PEDESTRIAN CROSSING
 - COLD PLASTIC "POLYMERIC"
 - WIDTH AS SHOWN
 - PATTERN: 60cm PAINTED, 60cm GAP
 - TRAFFIC WHITE
- INTERNATIONAL SYMBOL OF ACCESS
 - 1.5m x 1.5m
 - 10cm BORDER - TRAFFIC WHITE
 - SYMBOL - TRAFFIC WHITE
 - BLUE BACKGROUND

SIGN MOUNT LEGEND:

ALL SIGNS ARE SHOWN IN APPROXIMATE LOCATIONS AND TO BE DETERMINED ON SITE. SIGNS MUST BE VISIBLE TO DRIVER AND NOT OBSTRUCTED BY LANDSCAPE.

- PROPOSED POST
- PROPOSED POST PROTECTION
- PROPOSED WALL/COLUMN MOUNT SIGN
- PROPOSED WALL/COLUMN PERPENDICULAR
- SUSPENDED SIGN
- CONVEX MIRROR

SIGNAGE LEGEND:

(NOTE-ALL SIGNAGE MUST CONFORM TO THE ONTARIO TRAFFIC MANUAL (OTM) BOOK 5 AND 6)

- Rb-1 (600 x 600mm)
- Rb-19 (600 x 600mm)
- Rb-93 (300 x 450mm)
- LZ (300 x 450mm)
- Rb-51 (300 x 300mm)
- Rb-21 (300 x 900mm)
- Rb-51 (300 x 300mm)
- Rb-51 (300 x 300mm)
- CAUTION: TRUCK MANOEUVRING AHEAD (WARNING SIGN 100 x 300mm)
- PREPARE TO STOP WHEN FLASHING (WARNING SIGN 100 x 300mm)

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REGIONAL ROAD 25 & BRITANNIA ROAD

SIGNAGE AND PAVEMENT MARKING PLAN

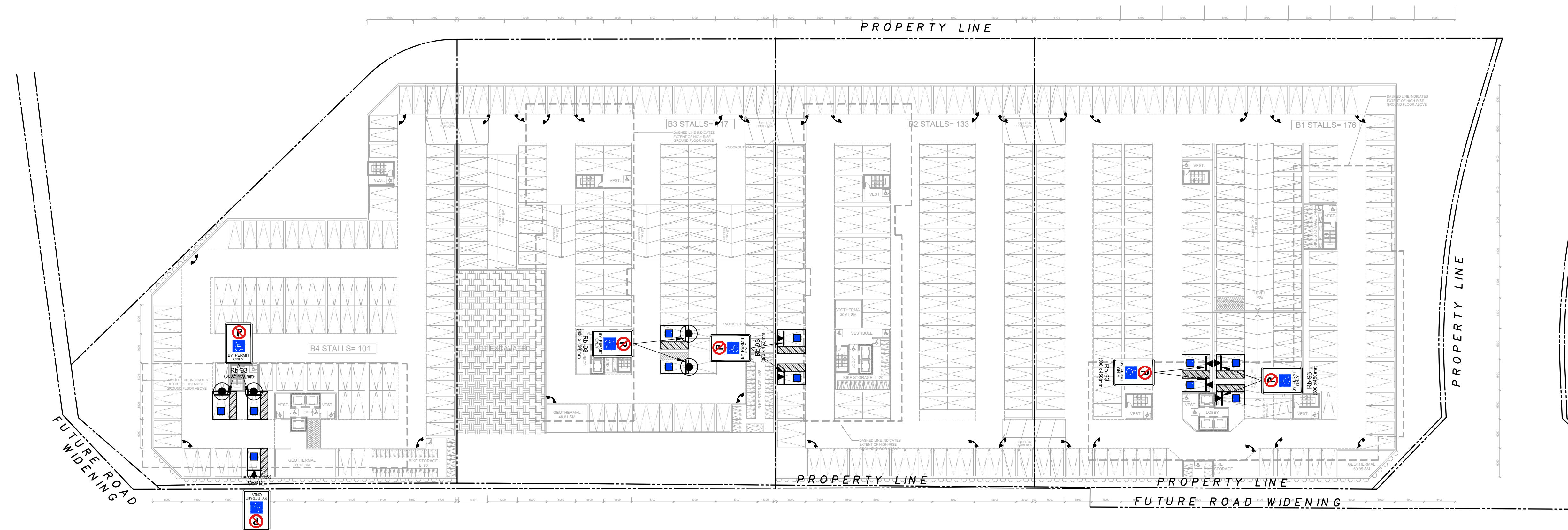
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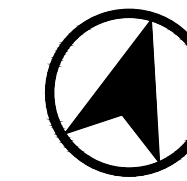
Date: July 24, 2023

Project No.: 6374-70

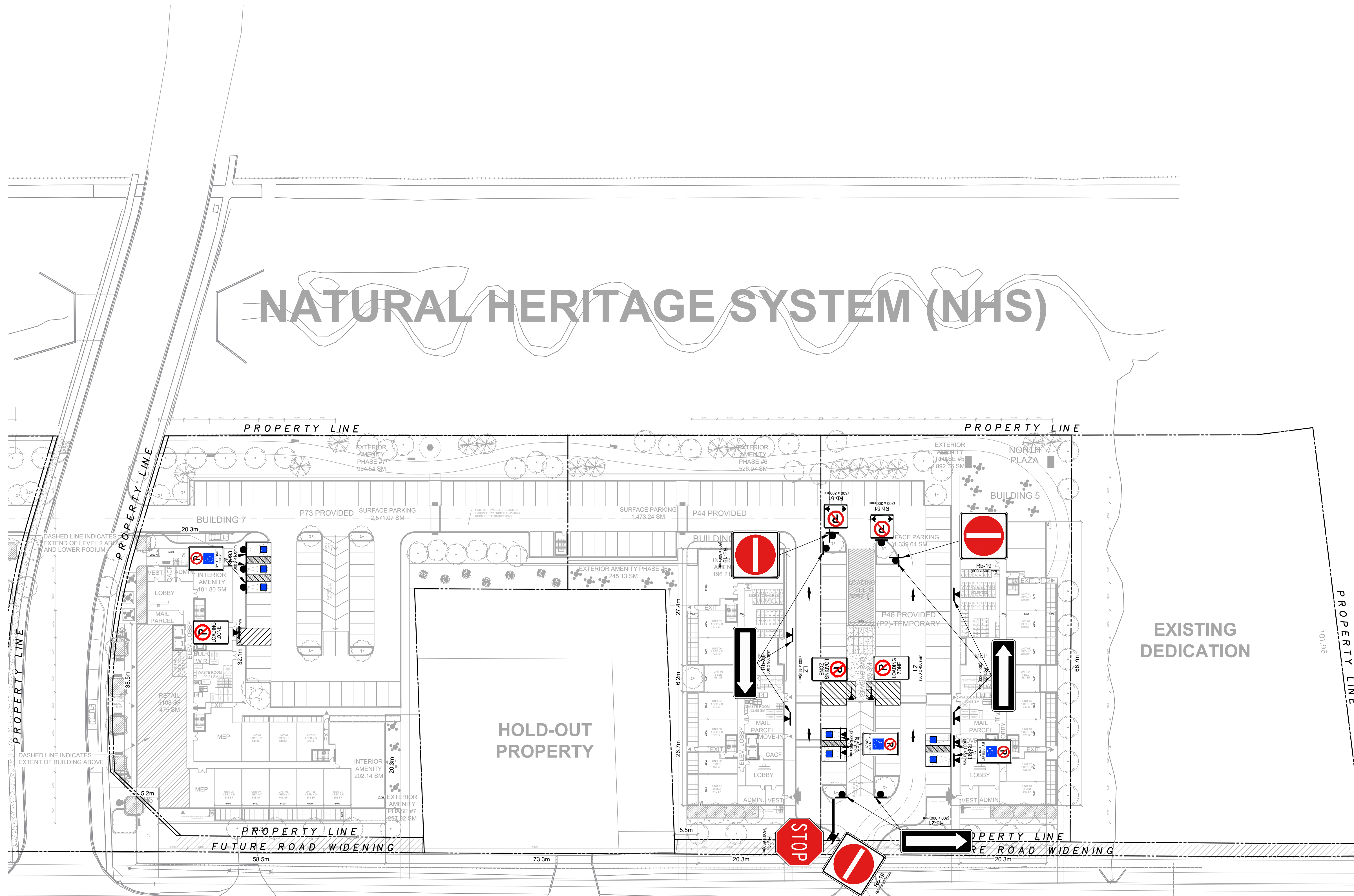
Scale: 1:500

SN-03





NATURAL HERITAGE SYSTEM (NHS)



PAVEMENT MARKING:

(NOTE-ALL MARKINGS MUST CONFORM TO THE ONTARIO TRAFFIC MANUAL (OTM) BOOK 11)

- 10cm (4 in.) YELLOW SOLID
- THROUGH ARROW (3m (10 ft.))
- ALL STOP BARS TO BE 60cm (2 ft.) WHITE SOLID
- ZONE PAINTING**
 - 10cm SOLID TRAFFIC YELLOW
 - 45° ANGLE
 - 60cm O/C
- PEDESTRIAN CROSSING
 - COLD PLASTIC "POLYMERIC"
 - WIDTH AS SHOWN
 - PATTERN: 60cm PAINTED, 60cm GAP
 - TRAFFIC WHITE
- INTERNATIONAL SYMBOL OF ACCESS
 - 1.5m x 1.5m
 - 10cm BORDER - TRAFFIC WHITE
 - SYMBOL - TRAFFIC WHITE
 - BLUE BACKGROUND

SIGN MOUNT LEGEND:

ALL SIGNS ARE SHOWN IN APPROXIMATE LOCATIONS AND TO BE DETERMINED ON SITE. SIGNS MUST BE VISIBLE TO DRIVER AND NOT OBSTRUCTED BY LANDSCAPE.

- PROPOSED POST
- PROPOSED POST PROTECTION
- PROPOSED WALL/COLUMN MOUNT SIGN
- PROPOSED WALL/COLUMN PERPENDICULAR
- SUSPENDED SIGN
- CONVEX MIRROR

SIGNAGE LEGEND:

(NOTE-ALL SIGNAGE MUST CONFORM TO THE ONTARIO TRAFFIC MANUAL (OTM) BOOK 5 AND 6)

00 MM-YY-RR INT REVISION NOTE

IONAL ROAD)

BA Consulting Group Ltd.
300 - 45 St. Clair Ave. W.
Toronto ON M4V 1K3
tel. 416-961-7110
www.baingroup.com

MOVEMENT IN URBAN ENVIRONMENTS
BAGROUP.COM

REGIONAL ROAD 25 & BRITANNIA ROAD

SIGNAGE AND PAVEMENT MARKING PLAN

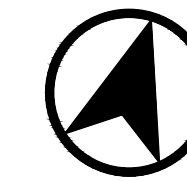
NORTH BLOCK - GROUND FLOOR

Date: July 24, 2023

Project No.: 6374-70

Scale: 1:500

SN-04



PAVEMENT MARKING:

(NOTE-ALL MARKINGS MUST CONFORM TO THE ONTARIO TRAFFIC MANUAL (OTM) BOOK 11)

- 10cm (4 in.) YELLOW SOLID
- THROUGH ARROW (3m (10 ft.))
- ALL STOP BARS TO BE 60cm (2 ft.) WHITE SOLID
- ZONE PAINTING**
 - 10cm SOLID TRAFFIC YELLOW
 - 45° ANGLE
 - 60cm O/C
- PEDESTRIAN CROSSING
 - COLD PLASTIC "POLYMERIC"
 - WIDTH AS SHOWN
 - PATTERN: 60cm PAINTED, 60cm GAP
 - TRAFFIC WHITE
- INTERNATIONAL SYMBOL OF ACCESS
 - 1.5m x 1.5m
 - 10cm BORDER - TRAFFIC WHITE
 - SYMBOL - TRAFFIC WHITE
 - BLUE BACKGROUND

SIGN MOUNT LEGEND:

ALL SIGNS ARE SHOWN IN APPROXIMATE LOCATIONS AND TO BE DETERMINED ON SITE. SIGNS MUST BE VISIBLE TO DRIVER AND NOT OBSTRUCTED BY LANDSCAPE.

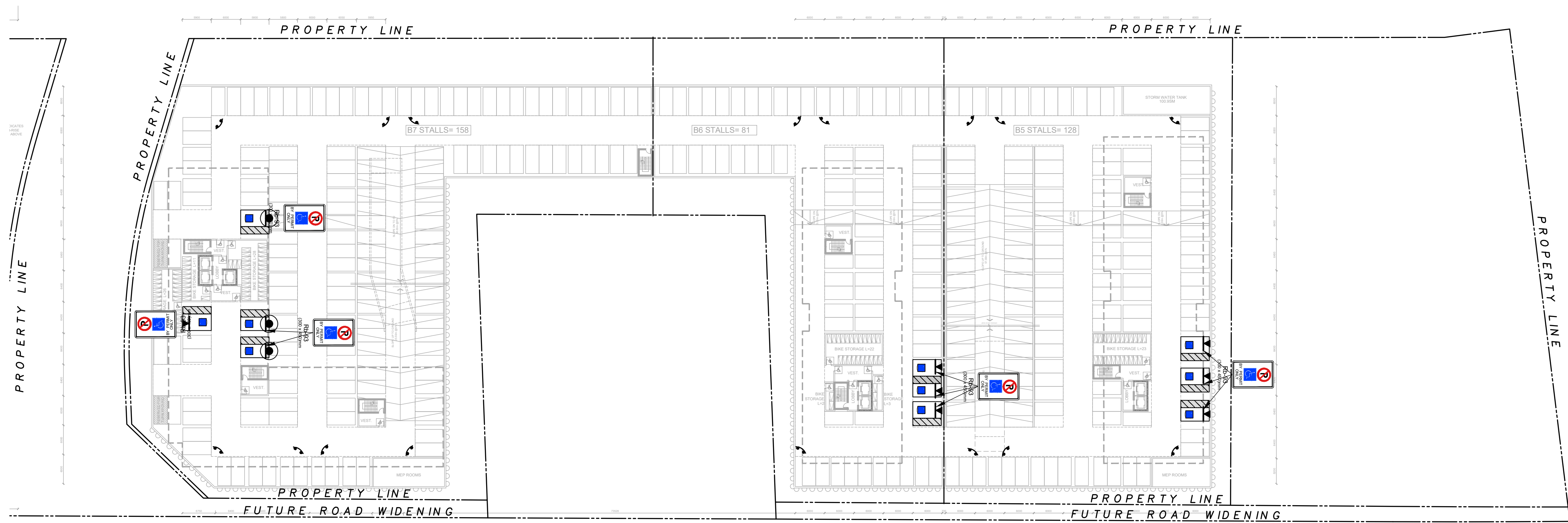
- PROPOSED POST
- PROPOSED POST PROTECTION
- PROPOSED WALL/COLUMN MOUNT SIGN
- PROPOSED WALL/COLUMN PERPENDICULAR
- SUSPENDED SIGN
- CONVEX MIRROR

SIGNAGE LEGEND:

(NOTE-ALL SIGNAGE MUST CONFORM TO THE ONTARIO TRAFFIC MANUAL (OTM) BOOK 5 AND 6)

- Rb-1 (600 x 600mm)
- Rb-19 (600 x 600mm)
- Rb-93 (300 x 450mm)
- LZ (300 x 450mm)
- Rb-51 (300 x 300mm)
- Rb-21 (300 x 900mm)
- Rb-51 (300 x 300mm)
- Rb-51 (300 x 300mm)
- CAUTION: TRUCK MANOEUVRING AHEAD (WARNING SIGN 100 x 300mm)
- PREPARE TO STOP WHEN FLASHING (WARNING SIGN 100 x 300mm)

00 MM-DD-YR INT REVISION NOTE



BA Group
 BA Consulting Group Ltd.
 300 - 45 St. Clair Ave. W.
 Toronto ON M4V 1K3
 tel. 416-961-7110
 www.bagroup@bagroup.com

MOVEMENT IN URBAN ENVIRONMENTS
 BAGROUP.COM

REGIONAL ROAD 25 & BRITANNIA ROAD

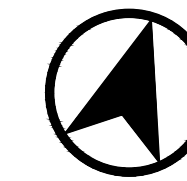
SIGNAGE AND PAVEMENT MARKING PLAN

NORTH BLOCK - P1 LEVEL

Date: July 24, 2023

Project No.: 6374-70

Scale: 1:500



PAVEMENT MARKING:

(NOTE-ALL MARKINGS MUST CONFORM TO THE ONTARIO TRAFFIC MANUAL (OTM) BOOK 11)

- 10cm (4 in.) YELLOW SOLID
- THROUGH ARROW (3m (10 ft.))
- ALL STOP BARS TO BE 60cm (2 ft.) WHITE SOLID
- ZONE PAINTING**
 - 10cm SOLID TRAFFIC YELLOW
 - 45° ANGLE
 - 60cm O/C
- PEDESTRIAN CROSSING
 - COLD PLASTIC "POLYMERIC"
 - WIDTH AS SHOWN
 - PATTERN: 60cm PAINTED, 60cm GAP
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 - 10cm BORDER - TRAFFIC WHITE
 - SYMBOL - TRAFFIC WHITE
 - BLUE BACKGROUND

SIGN MOUNT LEGEND:

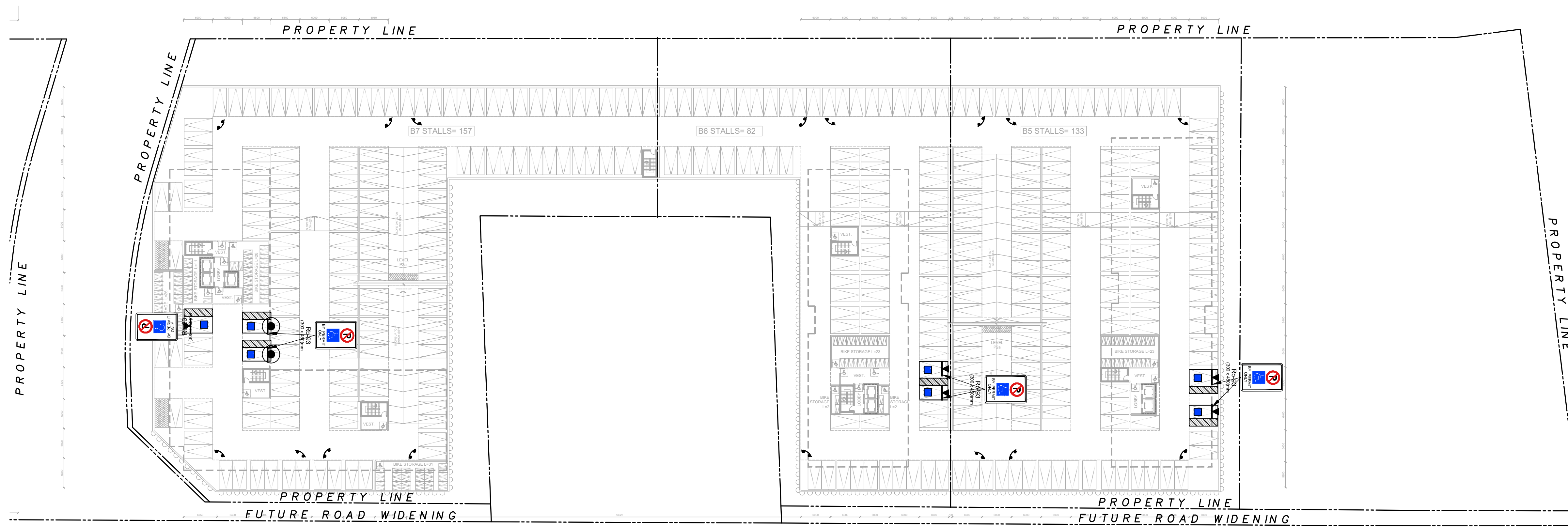
ALL SIGNS ARE SHOWN IN APPROXIMATE LOCATIONS AND TO BE DETERMINED ON SITE. SIGNS MUST BE VISIBLE TO DRIVER AND NOT OBSTRUCTED BY LANDSCAPE.

- PROPOSED POST
- PROPOSED POST PROTECTION
- PROPOSED WALL/COLUMN MOUNT SIGN
- PROPOSED WALL/COLUMN PERPENDICULAR
- SUSPENDED SIGN
- CONVEX MIRROR

SIGNAGE LEGEND:

(NOTE-ALL SIGNAGE MUST CONFORM TO THE ONTARIO TRAFFIC MANUAL (OTM) BOOK 5 AND 6)

00 MM-DD-YR INT REVISION NOTE



REGIONAL ROAD 25 & BRITANNIA ROAD

SIGNAGE AND PAVEMENT MARKING PLAN

NORTH BLOCK - P2 LEVEL

Date: July 24, 2023

Project No.: 6374-70

Scale: 1:500

Appendix C

Town and Region Comments



Memorandum

TO:

Matt Krusto

Supervisor, Transportation Development Review
Infrastructure Planning & Policy
Public Works, Halton Region
matt.krusto@halton.ca

Heide Schlegl

Manager, Traffic
Town of Milton
heide.schlegl@milton.ca

FROM:

Deanna Green, P.Eng.

PROJECT:

Proposed Mixed-Use
Development

DATE:

December 9, 2022

**SUBJECT: Traffic Impact Study Terms of Reference – Proposed Mixed-Use Development
Regional Road 25 & Britannia Road, Town of Milton, Region of Halton**

1.0 INTRODUCTION

BA Group has been retained by Mattamy Corporation to provide transportation consulting services related to the proposed development of a site (herein referred to as “the site”) on the northwest quadrant of the intersection of Regional Road 25 & Britannia Road, in the Town of Milton (“the Town”), in the Region of Halton.

The preliminary development concept includes five residential buildings (up to 15 levels) with a total GFA that could range from approximately 93,000 m² to 148,000 m², along with some retail. The development would likely be developed in phases over two blocks. Parking is to be provided both at-grade and through a below-grade structure. Access and site circulation is proposed via a new north-south driveway that would run across the rear of both blocks and create a new 4-legged intersection on Etheridge Avenue. Vehicle access for each of the two blocks will also be considered along Regional Road 25.

The traffic impact study will be completed in accordance with Halton Region’s Transportation Impact Study Guidelines as outlined in the following sections.

Traffic study should also follow Town of Milton Transportation Impact Study Terms of Reference for Development Applications.

2.0 PROPOSED SCOPE OF WORK

2.1 DESCRIPTION OF THE PROPOSAL

The Transportation Impact Study will provide a full description of the proposed redevelopment and will include elements such as:

- Municipal address;
- Existing land uses or permitted use provisions in an Official Plan, Official Plan Amendments, Zoning By-law etc.;
- Proposed land uses and relevant planning regulations to be used in the study;
- Total building sizes and building locations;
- A summary of each type of use with the proposed number of residential units and non-residential Gross Floor Area (GFA) for each building;
- Expected date of occupancy;
- Nearby intersections and accesses to adjacent developments and those on the opposite side of the road, including type of traffic control;
- Proposed access points and type of access (full movement, right-in-right-out, turning movement restrictions, etc.);
- Nearby transit facilities/stops;
- Near-by Active Transportation Facilities – sidewalks, multi-use trails, bike lanes, etc.,

2.2 STUDY AREA

The study area and traffic analysis will include the following intersections:

1. Regional Road 25 & Britannia Road
2. Regional Road 25 & Etheridge Avenue
3. Regional Road 25 & Whitlock Avenue
4. Regional Road 25 & Louis St.Laurent Avenue
5. Britannia Road & Farmstead Drive
6. Britannia Road & Bronte Street S/ First Line
7. Britannia Road & Thompson Road S/ Third Line
8. Proposed site access on Etheridge Drive (proposed new 4-legged intersection)

Include Britannia Rd at Rose Way and Regional Road 25 at Site accesses.



2.3 TRANSPORTATION CONTEXT

A description of the existing transportation system in the study area, will identify relevant information, such as the following:

- All adjacent and nearby roads, indicating the number of lanes, and posted speed;
- All adjacent/across and affected intersections/access, indicating type of control, access type, lane configurations, lane widths, and any turning or similar restrictions;
- If appropriate, on-street parking spaces/standing/stopping restrictions in the vicinity of the site and those which would affect the operation of key intersections being analyzed;
- Transit routes and stops;
- Heavy vehicle prohibitions and restrictions;
- All pedestrian and cyclist routes; and
- Other transportation facilities as appropriate.

Potential future transportation improvements that are currently being considered that may facilitate the traffic demand generated by the site will be identified. These improvements will be described to a level of detail sufficient to assess implications for travel to/from the site. In each case, the status and expected date of implementation will be identified.

2.4 PARKING & LOADING CONTEXT

2.4.1.1 Parking

The requirements of the prevailing Town Zoning By-law will be reviewed for both motor vehicles and bicycles in order to confirm the parking needs of the proposed development. If reduced parking rates are proposed, appropriate proxy data will be provided along with justification for any reductions.

Terms of reference for the parking study should also be circulated to Town Staff.

2.4.1.2 Loading

The requirements of the prevailing Town Zoning By-law will be reviewed to confirm the development's loading supply requirements. An appropriate loading facility supply for site will be provided.

2.5 TRANSPORTATION DEMAND MANAGEMENT (TDM)

The TDM Plan will be included with the TIS and will include a wide variety of initiatives aimed at reducing the amount of travel by single occupant vehicles to achieve a more sustainable travel mode share, particularly during the peak travel hours of the day.

The TDM Plan will consider initiatives such as but not limited to the following:



- Promotion and support for reduced single occupant vehicle use through carpool programs;
- Promotion of transit;
- Consideration of bicycle/pedestrian facilities and connectivity;
- Information for residents regarding sustainable travel options;
- Potential for a reduced parking supply.

2.6 HORIZON YEAR AND TIME PERIODS FOR ANALYSIS

The site build-out year will be confirmed as part of the study. It is proposed that the traffic analysis include the following scenarios:

- Existing conditions;
- Future background conditions (build-out year to be determined) – with corridor growth and area background development traffic;
- Future total conditions (build-out year to be determined) – at build-out of site and inclusive of site generated traffic;
- Future total conditions – 5-years beyond build-out with site generated traffic.

Horizon years must also be identified for any interim phases of development where phasing, temporary access measures, and planned transportation system improvements are anticipated. Improvements required for each phase must also be identified.

The analysis will be completed for both the AM and PM peak periods of the day, during a typical weekday.

2.7 TRAFFIC ANALYSIS

2.7.1 Existing Traffic Conditions

The traffic analysis will include a representative picture of the existing transportation conditions with exhibits that show the existing traffic volumes and turning movements for all modes of transportation for roadways and intersections in the study area including pedestrian/cyclist volumes and heavy truck movements.

All traffic data collection undertaken will include pedestrians, cyclists and motor vehicles on a typical weekday, during typical morning and afternoon peak periods. BA Group will work with the Town & Region to obtain historical counts and supplement available data with new traffic counts recently completed by Spectrum, on behalf of BA Group on November 29, 2022.

2.7.2 Background Traffic

2.7.2.1 Corridor Growth

The background traffic growth rate in traffic along corridors in the study area, will be established in consultation with Town & Region staff.

2.7.2.2 Background Developments

All significant developments under construction, approved, or in the approval process within the study area and are likely to occur by the specific horizon years will be identified and recognized in the study. The land-



use type and magnitude of the probable future developments in the horizon years will be identified through consultation with Town staff.

2.7.2.3 Transportation Network Improvements

Changes to the present or planned transportation network will be determined from the approved Town & Region capital improvement programs. A realistic assessment of timing and certainty will be made. The impacts of the transportation system changes will be identified.

2.7.2.4 Transit/HOV Considerations

The TIS will evaluate the impacts of site generated transit demand for the relevant time periods and scenarios on all transit services and transit stops/stations/terminals where ridership will be increased by 5% or more by site generated transit demand.

For HOV analysis, the lane analysis must use a lane utilization factor of 0.80 for the assumption that 20% is assumed as the HOV lane usage.

2.7.3 Estimation of Travel Demand

2.7.3.1 Trip Generation

Traffic volumes expected to be generated by the site will be forecast using the latest edition of the ITE Trip Generation Manual, unless local & more reliable trip generation data is available.

Trip generation parameters will be selected using the principles as described in Chapter 3 of the ITE Trip Generation Handbook. The estimation of traffic volumes generated by the site will be based on the full build-out of the proposed residential redevelopment.

All trip generation assumptions and adjustments assumed in the calculation of "new" vehicle trips will be documented and justified in terms of previous research or proxy surveys.

2.7.3.2 Trip Distribution

All trip distribution assumptions will be documented and justified. Due consideration will be given to potential differences in trip distribution patterns associated with different time periods.

2.7.3.3 Trip Assignments

Traffic assignments will consider logical routings, available and projected roadway capacities and travel times. Traffic assignments will be estimated using "hand assignment" based on knowledge of the proposed/future road network in the study area.

2.7.3.4 Summary of Traffic Demand Estimates

Traffic volume figures will be provided that illustrate the assignment of all site-generated traffic volumes and pass-by volumes (if applicable) separately to the local road network, as well as to the individual site access locations by direction and by turning movement where required.

For both the AM and PM peak period, the traffic volumes figures will summarize:

- Existing Conditions: existing traffic/transit volumes;
- Future Background: existing plus background growth for each horizon year; and
- Future Total: existing plus background growth plus site generated volumes for each horizon year.

A summary of the future traffic demands (each combination of horizon year and peak period for both site generated and total future traffic conditions) will be provided in the figures. Pass-by traffic assumptions will be clearly identified and illustrated on the figures.

2.7.3.5 Evaluation of Impacts of Site Traffic

The evaluation of the impacts of site traffic will be undertaken for both the AM and PM Peak of each horizon year. The existing volumes, existing plus background growth and existing plus background growth plus site-generated traffic by direction and by turning movement will be included, as well as the scenarios with and without any relevant major transportation system improvements.

2.7.4 Capacity Analysis

A capacity analysis at the study intersections will assess the operations of individual intersections and movements expected to be impacted by the proposed redevelopment. The evaluation of signalized and unsignalized intersections impacted by site traffic volumes will be provided in a tabular format. The objective will be to maintain existing levels of service as best as possible.

The intersection capacity analysis will be completed using Synchro Version 11 and a combination of Highway Capacity Manual (HCM) 2000 and HCM 6 methodologies. A saturation flow rate of 1,900 vehicles per hour will be utilized in the analysis.

The analysis will include the mitigation of impacts to signalized intersection operations where:

- Volume/capacity (v/c) ratios for overall intersection operations, through movements, or shared through/turning movements increased to 0.85 or above;
- V/C ratios for exclusive movements increased to 0.95 or above; or
- Queues for an individual movement are projected to exceed available turning lane storage.

The analysis will also include mitigation at unsignalized intersections where:

- Level of service (LOS), based on average delay per vehicle, on individual movements exceeds LOS "D", or
- The estimated 95th percentile queue length for an individual movement exceeds the available queue storage.



Regional staff will be contacted to obtain current traffic signal timings at existing signalized intersections in the study area. All proposed adjustments to traffic signal timings, phasing and cycle lengths will be evaluated in terms of pedestrian crossing time, effect on queue lengths, adequacy of existing storage and effects on the existing traffic signal co-ordination.

2.7.5 Safety Analysis

Potential safety or operational issues associated with the following, as applicable, will be identified:

- Weaving;
- Merging;
- Transit operational conflicts
- Corner clearances;
- Sight distances;
- Vehicle-pedestrian conflicts;
- Traffic infiltration;
- Access conflicts;
- Cyclist movements;
- Heavy truck movement conflicts;
- Queuing

2.7.6 Collision Analysis

If requested by the Town & Region, if there is a collision history at any of the study area intersections that could be impacted by site generated traffic, a request to the Town & Region will be made to obtain the relevant collision data. The collision data will be reviewed and assessed, with respect to the impact of the proposed redevelopment.

2.7.7 Site Access and Circulation

All proposed site access points on Town & Region roads will be evaluated in terms of capacity, safety and sight distance & adequacy of queue storage capacity. This evaluation will be similar in scope to that for the signalized and unsignalized intersections described previously.

Proposed access points will be evaluated with respect to existing access points and intersections, on-street weaving problems, need for acceleration or deceleration lanes and pedestrian and cycling safety.

On-site parking and circulation systems will be evaluated to demonstrate appropriate clear throat distances and avoid any possible queuing onto Town & Region roads.

Sight lines will be evaluated based on the Transportation Association of Canada (TAC Manual).



Proposed truck/courier loading facilities and access to these facilities will be evaluated to ensure that they are adequately sized, designed and provided with suitable access so that they will not adversely affect traffic and transit operations on Town & Region roads.

Any required turning or other restrictions will be identified.

2.7.8 Transportation System Mitigation Measures

2.7.8.1 Required Roadway Improvements

If any physical and operational road network deficiencies are identified in the TIS, solutions will be provided that are feasible and economic to implement.

Functional design plans will be provided for any recommended physical improvements.

2.7.8.2 Traffic Signal Improvements

Any traffic signal operational deficiencies that are identified in the TIS will be addressed and solutions will be provided that are feasible to implement.

2.7.8.3 Preliminary Cost Estimate

A preliminary cost estimate will be provided for all recommended infrastructure improvements.

2.8 RECOMMENDATIONS

A summary of the key findings with respect to the transportation impact of the proposed redevelopment will be presented along with a summary of the recommended improvements if necessary.

Any recommendations for improvements will consider the following:

- Timing of short-range and long-range network improvements that are already planned and scheduled;
- Expected time schedule of adjacent developments;
- Logical sequencing of various improvements or segments;
- Right-of-way needs and availability of additional right-of-way within the appropriate time frames;



2.9 DOCUMENTATION AND REPORTING

The structure and format of the TIS will adhere to the scope of work outlined in this document and include the following:

- Executive Summary
- Site/Development Description (Site plan to be provided);
- Study Area (Map identifying the study area and site to be provided);
- Parking and Loading Context
- Transportation Demand Management (TDM) Plan
- Existing Conditions (Exhibit to be provided);
- Analysis Periods;
- Background Traffic Demand – Existing and Future Background (Exhibits to be provided);
- Site Generated Traffic (Exhibits to be provided);
- Level of Service Analysis;
- Total Traffic Demand – Future Background plus Site Generated Traffic (Exhibits to be provided);
- Improvement Alternatives Required to Mitigate Traffic Impacts
- Traffic Impacts for Future Background and Total Traffic with and without mitigation measures (Tabular summaries to be provided);
- Access Considerations; and
- Recommendations.

The TIS will include a main document, supplemented by a technical appendices containing detailed analysis worksheets, traffic counts data, traffic signal timings and other data as required.



Transportation study must be prepared under the supervision of a qualified, experienced and registered Professional Engineer in the Province of Ontario with specific training in traffic and transportation engineering and several years of experience related to preparing traffic studies for existing or proposed developments. All reports must be signed and stamped by the Engineer.

For any modal trip reductions, include a section detailing the recommended proportion (as a percentage) of trip reduction (if any) applied to gross trips to account for transit or alternate modes and identifies land uses subject to modal split. Justification and rationale for the trip reductions should also be discussed. Any modal split assumption must be reviewed and approved by Town staff prior to applying the reduction to the trip generation.

A safety review should also be included:

The safety review section identifies the potential of safety or operational issues associated with the following, as applicable:

- Weaving;
- Merging;
- Collision history;
- Corner clearances;
- Sight distances;
- Vehicle-pedestrian conflicts;
- School crossings;
- Traffic infiltration;
- Access conflicts;
- Cyclist movements;
- Heavy truck movement conflicts; and,
- Any other issue identified by Town staff or the consultant.

The Safety Review must include all modes of transportation that might access or travel through, and in the proximity of, the proposed development.

In addition, a detailed review of the roadway geometry related to MTO/TAC guidelines for:

- Sight distances (stopping distance, intersection sight triangles, departure sight distance, decision sight distance) utilizing MTO guidelines for approach and departure sight distances for all existing roadways to be impacted directly by the development, accesses, entrances, new roadways, etc.;
- Roadway curves (vertical and horizontal) standards;
- Roadway cross-sections & lane widths;
- Clear zone;
- Conflicting vehicle movements within and adjacent to the development; and,
- On-site vehicle swept path analysis (AutoTurn) utilizing the proper design vehicles (buses, fire trucks, garbage trucks, etc., as appropriate).

If Transportation Demand Management (TDM) reductions are being applied to trip generation, a TDM plan should be prepared that identifies existing and future (proposed) sustainable forms of transportation, routes, and infrastructure within the study area. Plan should describe and evaluate the potential impacts and changes to pedestrian, cycling, and transit modal split associated with the development/redevelopment.

From: [Deanna Green](#)
To: [Deanna Green](#)
Subject: Updated Methodology from Region Darren LornMarch 15, 2023 TIS for Britannia & Regional Road 25 proposed development
Date: March 15, 2023 1:28:52 PM
Attachments: [image001.png](#)
[image002.jpg](#)

From: Loro, Darren <Darren.Loro@halton.ca>
Sent: March 15, 2023 10:57 AM
To: Deanna Green <Deanna.Green@bagroup.com>; Nathan H. Yau <yau@bagroup.com>
Cc: Krusto, Matt <Matt.Krusto@halton.ca>; kavleen.sachdeva@milton.ca
Subject: RE: Terms of Reference - TIS for Britannia & Regional Road 25 proposed development

Hi Deanna and Nathan,

Thanks for a very productive discussion this morning about the future background volume forecasting methodology, and for bringing up the issues now rather than later to discuss.

As mentioned in the meeting, Kavleen and I have discussed and agreed upon an alternate future background volume forecasting methodology for you to follow that uses the latest information and data available in the area. This should [hopefully] help mitigate the issues that you identified.

We've noted the updates in the e-mail chain below in **red**. If you have any further questions or concerns, please let me know and we can discuss further.

Cheers,
Darren

From: Loro, Darren
Sent: Thursday, December 22, 2022 9:11 AM
To: 'Deanna Green' <Deanna.Green@bagroup.com>
Cc: Nathan H. Yau <yau@bagroup.com>; 'Christine.Chea@mattamycorp.com' <Christine.Chea@mattamycorp.com>; 'Anthony.Sotomayor@mattamycorp.com' <Anthony.Sotomayor@mattamycorp.com>; Krusto, Matt <Matt.Krusto@halton.ca>; heide.schlegl@milton.ca; kavleen.sachdeva@milton.ca
Subject: RE: Terms of Reference - TIS for Britannia & Regional Road 25 proposed development

Hi Deanna,

Thank you for the preliminary trip generation forecasts. Please see Transportation Planning's comments in **blue** on the proposed Terms of Reference below.

Let me know if you have any questions or want to discuss further.

Cheers, and have a happy holiday!
Darren

1.0 INTRODUCTION

BA Group has been retained by Mattamy Corporation to provide transportation consulting services related to the proposed development of a site (herein referred to as "the site") on the northwest quadrant of the intersection of Regional Road 25 & Britannia Road, in the Town of Milton ("the Town"), in the Region of Halton.

The preliminary development concept includes five residential buildings (up to 15 levels) with a total GFA that could range from approximately 93,000 m² to 148,000 m², along with some retail. The development would likely be developed in phases over two blocks. Parking is to be provided both at-grade and through a below-grade structure. Access and site circulation is proposed via a new north-south driveway that would run across the rear of both blocks and create a new 4-legged intersection on Etheridge Avenue. Vehicle access for each of the two blocks will also be considered along Regional Road 25. *As discussed in Halton Region's pre-consultation comments for this development proposal, Halton Region's Access By-law (NO.32-17) Section 6.1 (a) states that "access to a Regional Road from private property shall be permitted only where such access is necessary because access to a local road is not feasible." As access to Regional Road 25 can be provided via Etheridge Avenue, any proposed access to Regional Road*

25 would need to be justified via a Transportation Impact Study (TIS) and will need to be approved by Halton Region's Senior Management. See comments below for further discussion.

The traffic impact study will be completed in accordance with Halton Region's Transportation Impact Study Guidelines as outlined in the following sections. The Region's TIS Guidelines are available online at: <https://www.halton.ca/Repository/Transportation-Impact-Study-Guidelines>.

2.0 PROPOSED SCOPE OF WORK

2.1 DESCRIPTION OF THE PROPOSAL

The Transportation Impact Study will provide a full description of the proposed redevelopment and will include elements such as:

- Municipal address;
- Existing land uses or permitted use provisions in an Official Plan, Official Plan Amendments, Zoning By-law etc.;
- Proposed land uses and relevant planning regulations to be used in the study;
- Total building sizes and building locations;
- A summary of each type of use with the proposed number of residential units and non-residential Gross Floor Area (GFA) for each building;
- Expected date of occupancy; [Development phasing and expected timing of each major phase build-out should be identified in this section.](#)
- Nearby intersections and accesses to adjacent developments and those on the opposite side of the road, including type of traffic control;
- Proposed access points and type of access (full movement, right-in-right-out, turning movement restrictions, etc.);
- Nearby transit facilities/stops;
- Near-by Active Transportation Facilities – sidewalks, multi-use trails, bike lanes, etc.,

2.2 STUDY AREA

The study area and traffic analysis will include the following intersections:

1. Regional Road 25 & Britannia Road [Acceptable.](#)
2. Regional Road 25 & Etheridge Avenue [Acceptable.](#)
3. Regional Road 25 & Whitlock Avenue [Acceptable.](#)
4. Regional Road 25 & Louis St. Laurent Avenue [Acceptable.](#)
5. Britannia Road & Farmstead Drive [Acceptable.](#)
6. ~~Britannia Road & Bronte Street 5/ First Line~~ [Britannia Road & Rose Way \(future background and total conditions only\).](#)
7. ~~Britannia Road & Thompson Road 5/ Third Line~~ [This intersection can be omitted from the study scope.](#)
8. Proposed site access on Etheridge Drive (proposed new 4-legged intersection) [Acceptable.](#)
9. [Any proposed site access\(es\) to Regional Road 25 \(to be approved by Halton Region\).](#)

2.3 TRANSPORTATION CONTEXT

A description of the existing transportation system in the study area, will identify relevant information, such as the following:

- All adjacent and nearby roads, indicating the number of lanes, and posted speed;
- All adjacent/across and affected intersections/access, indicating type of control, access type, lane configurations, lane widths, and any turning or similar restrictions;
- If appropriate, on-street parking spaces/standing/stopping restrictions in the vicinity of the site and those which would affect the operation of key intersections being analyzed;
- Transit routes and stops;
- Heavy vehicle prohibitions and restrictions;
- All pedestrian and cyclist routes; and
- Other transportation facilities as appropriate.

Potential future transportation improvements that are currently being considered that may facilitate the traffic demand generated by the site will be identified. These improvements will be described to a level of detail sufficient to assess implications for travel to/from the site. In each case, the status and expected date of implementation will be identified.

2.4 PARKING & LOADING CONTEXT

2.4.1.1 Parking

The requirements of the prevailing Town Zoning By-law will be reviewed for both motor vehicles and bicycles in order to confirm the parking needs of the proposed development. If reduced parking rates are proposed, appropriate proxy data will be provided along with justification for any reductions.

2.4.1.2 Loading

The requirements of the prevailing Town Zoning By-law will be reviewed to confirm the development's loading supply requirements. An appropriate loading facility supply for site will be provided.

2.5 TRANSPORTATION DEMAND MANAGEMENT (TDM)

The TDM Plan will be included with the TIS and will include a wide variety of initiatives aimed at reducing the amount of travel by single occupant vehicles to achieve a more sustainable travel mode share, particularly during the peak travel hours of the day.

The TDM Plan will consider initiatives such as but not limited to the following:

- Promotion and support for reduced single occupant vehicle use through carpool programs;
- Promotion of transit;
- Consideration of bicycle/pedestrian facilities and connectivity;
- Information for residents regarding sustainable travel options;
- Potential for a reduced parking supply.

The proposed TDM analysis is acceptable as long as no modal split reductions are applied to the site trip generation forecasts.

2.6 HORIZON YEAR AND TIME PERIODS FOR ANALYSIS

The site build-out year will be confirmed as part of the study. It is proposed that the traffic analysis include the following scenarios:

- Existing conditions;
- Future background conditions (build-out year to be determined) – with corridor growth and area background development traffic;
- Future total conditions (build-out year to be determined) – at build-out of site and inclusive of site generated traffic;
- Future total conditions – 5-years beyond build-out with site generated traffic.

The TIS should analyze the following scenarios:

- 2022 Existing Conditions
- Future background conditions for each major phase build-out horizon year and the five-year horizon beyond full build-out.
- Future total conditions for each major phase build-out horizon year and the five-year horizon beyond full build-out.

The analysis will be completed for both the AM and PM peak periods of the day, during a typical weekday. Acceptable.

2.7 TRAFFIC ANALYSIS

2.7.1 Existing Traffic Conditions

The traffic analysis will include a representative picture of the existing transportation conditions with exhibits that show the existing traffic volumes and turning movements for all modes of transportation for roadways and intersections in the study area including pedestrian/cyclist volumes and heavy truck movements.

All traffic data collection undertaken will include pedestrians, cyclists and motor vehicles on a typical weekday, during typical morning and afternoon peak periods. BA Group will work with the Town & Region to obtain historical counts and supplement available data with new traffic counts recently completed by Spectrum, on behalf of BA Group on November 29, 2022. Acceptable. However, given the ongoing construction on Britannia Road east of Regional Road 25 for the road widening to six lanes (discussed

further below) and the potential impacts to typical travel patterns, 2022 traffic counts at the intersection of Regional Road 25 and Britannia Road should be compared to historical traffic counts. Specifically, traffic volumes for movements entering and exiting the “east leg” of the intersection (SBL, EBT, NBR, WBL, WBT, WBR) should be compared. If the traffic volumes for these specific movements are greater in the historical counts compared to the 2022 counts, then the historical traffic volumes should be used for these specific movements.

Historical traffic data can be requested at accesshalton@halton.ca.

2.7.2 Background Traffic

Halton Region’s Transportation Master Plan identified the need to widen Regional Road 25 to six lanes from Highway 407 to Derry Road, with construction currently scheduled to begin in 2027 per Halton Region’s 2022 Budget and Business Plan which can be accessed online at: <https://www.halton.ca/Repository/2022-Budget-and-Business-Plan-Capital-Report>. It is reasonable to assume that the road widening construction for this segment may take a couple of years at a minimum. Therefore, this improvement should only be accounted for under a 2030 horizon or beyond.

Halton Region’s Transportation Master Plan identified the need to widen Britannia Road to six lanes from Tremaine Road to Highway 407. The segment between Tremaine Road and Regional Road 25 has already been widened, while the segment between Regional Road 25 and James Snow Parkway is currently under construction with construction expected to be completed by the end of 2024 per Halton Region’s Roads Capital Projects In Progress. The widening of Britannia Road east of Regional Road 25 should be accounted for under a 2025 horizon year or beyond.

The following growth rates can be applied to **the existing traffic volumes** to forecast future background traffic volumes:

- 2% compounded annually on Britannia Road for all movements
- 2% compounded annually on Regional Road 25 for all movements up until the 2030 horizon, after which a growth rate of 3.8% compounded annually must be applied to **through movements only** on Regional Road 25. This higher growth rate should be applied to the 2030 horizon and beyond regardless if the TIS is analyzing the 2030 horizon year or not.
 - For example, if the TIS is analyzing the 2028 and 2033 horizon years, the 2% growth rate should be applied up until 2030 in the volume calculations after which the higher growth rate would be applied to the 2030 horizon year up until 2033 for through movements on Regional Road 25.

Background development traffic associated with the following properties within the Boyne Survey area should be **accounted for in the future background traffic volume forecasts:**

- Primont Homes residential subdivision 24T-14004/M (fronting Britannia Road, east of Regional Road 25)
- Fernbrook residential development Z-10/20 (fronting Britannia Road, east of Regional Road 25)
- **Mil Con III Fieldgate residential subdivision 24T-20005/M (fronting Britannia Road, east of Regional Road 25)**
- West Country Milton Properties Residential Major Node Z-21/21 (south-west corner of Regional Road 25 and Whitlock Avenue)
- Gulfbeck Developments Residential Major Node Z-11/20 (south-west corner of Regional Road 25 and Whitlock Avenue)
- Sixteen Mile Creek residential subdivision 24T-20007/M at 6439 Regional Road 25 (north-east corner of Regional Road 25 and Louis St. Laurent Avenue)
- **any outstanding development build-out within the Martin East subdivision 24T-17002/M (please co-ordinate with the Town’s Planning Department to confirm outstanding development build-out status and obtain the related studies)**

2.7.2.1 Corridor Growth **See comments above under 2.7.2. Header.**

The background traffic growth rate in traffic along corridors in the study area, will be established in consultation with Town & Region staff.

2.7.2.2 Background Developments

All significant developments under construction, approved, or in the approval process within the study area and are likely to occur by the specific horizon years will be identified and recognized in the study. The land-use type and magnitude of the probable future developments in the horizon years will be identified through consultation with Town staff.

2.7.2.3 Transportation Network Improvements **See comments above under 2.7.2. Header.**

Changes to the present or planned transportation network will be determined from the approved Town & Region capital

improvement programs. A realistic assessment of timing and certainty will be made. The impacts of the transportation system changes will be identified.

2.7.2.4 Transit/HOV Considerations [See comments above under 2.7.2. Header.](#)

The TIS will evaluate the impacts of site generated transit demand for the relevant time periods and scenarios on all transit services and transit stops/stations/terminals where ridership will be increased by 5% or more by site generated transit demand. [Acceptable, as long as no modal split reductions are applied to the site trip generation forecasts.](#)

For HOV analysis, the lane analysis must use a lane utilization factor of 0.80 for the assumption that 20% is assumed as the HOV lane usage.

2.7.3 Estimation of Travel Demand

2.7.3.1 Trip Generation

Traffic volumes expected to be generated by the site will be forecast using the latest edition of the ITE Trip Generation Manual, unless local & more reliable trip generation data is available.

Trip generation parameters will be selected using the principles as described in Chapter 3 of the ITE Trip Generation Handbook. The estimation of traffic volumes generated by the site will be based on the full build-out of the proposed residential redevelopment.

All trip generation assumptions and adjustments assumed in the calculation of "new" vehicle trips will be documented and justified in terms of previous research or proxy surveys. [Acceptable, as long as all relevant trip generation data excerpts are appended to the TIS.](#)

[Please provide a trip generation comparison between the current development proposal and the trip generation forecasts associated with the subject property from the Boyne RNA.](#)

2.7.3.2 Trip Distribution

All trip distribution assumptions will be documented and justified. Due consideration will be given to potential differences in trip distribution patterns associated with different time periods. [Trip distribution for the residential use should be derived from the latest Transportation Tomorrow Survey \(TTS\) data. All relevant trip distribution data excerpts should be appended to the TIS.](#)

2.7.3.3 Trip Assignments

Traffic assignments will consider logical routings, available and projected roadway capacities and travel times. Traffic assignments will be estimated using "hand assignment" based on knowledge of the proposed/future road network in the study area.

2.7.3.4 Summary of Traffic Demand Estimates

Traffic volume figures will be provided that illustrate the assignment of all site-generated traffic volumes and pass-by volumes (if applicable) separately to the local road network, as well as to the individual site access locations by direction and by turning movement where required.

For both the AM and PM peak period, the traffic volumes figures will summarize:

- Existing Conditions: existing traffic/transit volumes;
- Future Background: existing plus background growth for each horizon year; and
- Future Total: existing plus background growth plus site generated volumes for each horizon year.

A summary of the future traffic demands (each combination of horizon year and peak period for both site generated and total future traffic conditions) will be provided in the figures. Pass-by traffic assumptions will be clearly identified and illustrated on the figures.

2.7.3.5 Evaluation of Impacts of Site Traffic

The evaluation of the impacts of site traffic will be undertaken for both the AM and PM Peak of each horizon year. The existing volumes, existing plus background growth and existing plus background growth plus site-generated traffic by direction and by turning movement will be included, as well as the scenarios with and without any relevant major transportation system improvements.

2.7.4 Capacity Analysis

A capacity analysis at the study intersections will assess the operations of individual intersections and movements expected to be impacted by the proposed redevelopment. The evaluation of signalized and unsignalized intersections impacted by site traffic volumes will be provided in a tabular format. The objective will be to maintain existing levels of service as best as possible.

The intersection capacity analysis will be completed using Synchro Version 11 and a combination of Highway Capacity Manual (HCM) 2000 and HCM 6 methodologies. A saturation flow rate of 1,900 vehicles per hour will be utilized in the analysis. [A consistent methodology \(e.g. HCM2000 or HCM6\) should be applied to all capacity analysis within the TIS where the intersection control is the same \(e.g. a consistent methodology should be applied for analysis of all signalized intersections\).](#)

The analysis will include the mitigation of impacts to signalized intersection operations where:

- Volume/capacity (v/c) ratios for overall intersection operations, through movements, or shared through/turning movements increased to 0.85 or above;
- V/C ratios for exclusive movements increased to 0.95 or above; or
- Queues for an individual movement are projected to exceed available turning lane storage.

[These critical movements as defined in the Region's TIS Guidelines should be bolded or highlighted in the results tables.](#)

The analysis will also include mitigation at unsignalized intersections where:

- Level of service (LOS), based on average delay per vehicle, on individual movements exceeds LOS "D", or
- The estimated 95th percentile queue length for an individual movement exceeds the available queue storage.

[These critical movements as defined in the Region's TIS Guidelines should be bolded or highlighted in the results tables.](#)

Regional staff will be contacted to obtain current traffic signal timings at existing signalized intersections in the study area. All proposed adjustments to traffic signal timings, phasing and cycle lengths will be evaluated in terms of pedestrian crossing time, effect on queue lengths, adequacy of existing storage and effects on the existing traffic signal co-ordination. [Signal timing plans can be requested at \[accesshalton@halton.ca\]\(mailto:accesshalton@halton.ca\).](#)

2.7.5 Safety Analysis

Potential safety or operational issues associated with the following, as applicable, will be identified:

- Weaving;
- Merging;
- Transit operational conflicts
- Corner clearances [on Etheridge Avenue between Regional Road 25 and the proposed site access](#);
- Sight distances;
- Vehicle-pedestrian conflicts;
- Traffic infiltration;
- Access conflicts;
- Cyclist movements;
- Heavy truck movement conflicts;
- Queuing

2.7.6 Collision Analysis

If requested by the Town & Region, if there is a collision history at any of the study area intersections that could be impacted by site generated traffic, a request to the Town & Region will be made to obtain the relevant collision data. The collision data will be reviewed and assessed, with respect to the impact of the proposed redevelopment.

2.7.7 Site Access and Circulation

All proposed site access points on Town & Region roads will be evaluated in terms of capacity, safety and sight distance & adequacy of queue storage capacity. This evaluation will be similar in scope to that for the signalized and unsignalized intersections described previously.

Proposed access points will be evaluated with respect to existing access points and intersections, on-street weaving problems, need for acceleration or deceleration lanes and pedestrian and cycling safety.

On-site parking and circulation systems will be evaluated to demonstrate appropriate clear throat distances and avoid any possible queuing onto Town & Region roads.

Sight lines will be evaluated based on the Transportation Association of Canada (TAC Manual).

Proposed truck/courier loading facilities and access to these facilities will be evaluated to ensure that they are adequately sized, designed and provided with suitable access so that they will not adversely affect traffic and transit operations on Town & Region roads.

Any required turning or other restrictions will be identified.

As discussed in Halton Region's pre-consultation comments for this development proposal, Halton Region's Access By-law (NO.32-17) Section 6.1 (a) states that "access to a Regional Road from private property shall be permitted only where such access is necessary because access to a local road is not feasible." As access to Regional Road 25 can be provided via Etheridge Avenue, any proposed access to Regional Road 25 would need to be justified via a TIS and will need to be approved by Halton Region's Senior Management. The justification should demonstrate that any proposed access conforms to Halton Region's Access Management Guideline (spacing, geometrics, sightlines, etc.), demonstrate the benefits of permitting access to Regional Road 25 (e.g. traffic operations, safety, circulation, etc.) and highlight any negative impacts of not permitting access to Regional Road 25.

Given the available site frontage to Regional Road 25, any proposed access on Regional Road 25 to the north or south blocks would have to operate as a right-in/right-out (RI/RO) access to conform to Halton Region's Access Management Guideline spacing requirements. The access(es) would have to be RI/RO restricted by a raised centre median on Regional Road 25.

The TIS must analyze traffic safety components associated with the proposed access(es) to Regional Road 25 including (but not limited to):

- o Sightlines along Regional Road 25,
- o Auxiliary right-turn lane requirements on Regional Road 25 at the site access(es);
- o the proposed clear throat length at the access(es); and
- o swept path analysis for the largest design vehicle anticipated to use the proposed access(es) to Regional Road 25. The access(es) should be designed to allow a simultaneous inbound movement from the design vehicle and outbound movement from a passenger car, and vice versa.

2.7.8 Transportation System Mitigation Measures

2.7.8.1 Required Roadway Improvements

If any physical and operational road network deficiencies are identified in the TIS, solutions will be provided that are feasible and economic to implement. If traffic operations issues are identified under future background or total conditions, then the TIS will need to recommend mitigation measures to address these issues (even if not necessarily triggered by the proposed development) or at the very least, rationalize the traffic operations issues if there are no feasible mitigation measures. The TIS should identify who is responsible for each recommended mitigation measure, if required.

Functional design plans will be provided for any recommended physical improvements.

2.7.8.2 Traffic Signal Improvements

Any traffic signal operational deficiencies that are identified in the TIS will be addressed and solutions will be provided that are feasible to implement.

2.7.8.3 Preliminary Cost Estimate

A preliminary cost estimate will be provided for all recommended infrastructure improvements.

2.8 RECOMMENDATIONS

A summary of the key findings with respect to the transportation impact of the proposed redevelopment will be presented along with a summary of the recommended improvements if necessary.

Any recommendations for improvements will consider the following:

- Timing of short-range and long-range network improvements that are already planned and scheduled;
- Expected time schedule of adjacent developments;
- Logical sequencing of various improvements or segments;
- Right-of-way needs and availability of additional right-of-way within the appropriate time frames;

Halton Region's Transportation Master Plan (TMP) identified the need to widen Regional Road 25 to six lanes from Highway 407 to Derry Road, and Britannia Road from Tremaine Road to Highway 407. These roadways have been identified as "C4" Corridors with an ultimate 47 metre right-of-way.

As noted in Halton Region's pre-consultation comments, any lands within 23.5 metres of the centreline of the original right-of-way of Regional Road 25 that are part of the subject property shall be dedicated to the Regional Municipality of Halton for the purpose of road right-of-way widening and future road improvements. Any **additional** lands that are part of the subject property and have been identified as required for the future widening of Regional Road 25 per a Municipal Class Environmental Assessment Study / Environmental Study Report or Detail Design Project shall be dedicated to the Regional Municipality of Halton for the purpose of road right-of-way widening and future road improvements. Any lands within 23.5m of the centreline of the existing right-of-way of Britannia Road (Regional Road 6) that are part of the subject property shall be dedicated to the Regional Municipality of Halton for the purpose of road right-of-way widening and future road improvements.

2.9 DOCUMENTATION AND REPORTING

The structure and format of the TIS will adhere to the scope of work outlined in this document and include the following:

- Executive Summary
- Site/Development Description (Site plan to be provided);
- Study Area (Map identifying the study area and site to be provided);
- Parking and Loading Context
- Transportation Demand Management (TDM) Plan
- Existing Conditions (Exhibit to be provided);
- Analysis Periods;
- Background Traffic Demand – Existing and Future Background (Exhibits to be provided);
- Site Generated Traffic (Exhibits to be provided);
- Level of Service Analysis;
- Total Traffic Demand – Future Background plus Site Generated Traffic (Exhibits to be provided);
- Improvement Alternatives Required to Mitigate Traffic Impacts
- Traffic Impacts for Future Background and Total Traffic with and without mitigation measures (Tabular summaries to be provided);
- Access Considerations; and
- Recommendations.

The TIS will include a main document, supplemented by a technical appendices containing detailed analysis worksheets, traffic counts data, traffic signal timings and other data as required.

From: Deanna Green <Deanna.Green@bagroup.com>

Sent: Wednesday, December 21, 2022 3:30 PM

To: Loro, Darren <Darren.Loro@halton.ca>

Cc: Nathan H. Yau <yau@bagroup.com>

Subject: RE: Terms of Reference - TIS for Britannia & Regional Road 25 proposed development



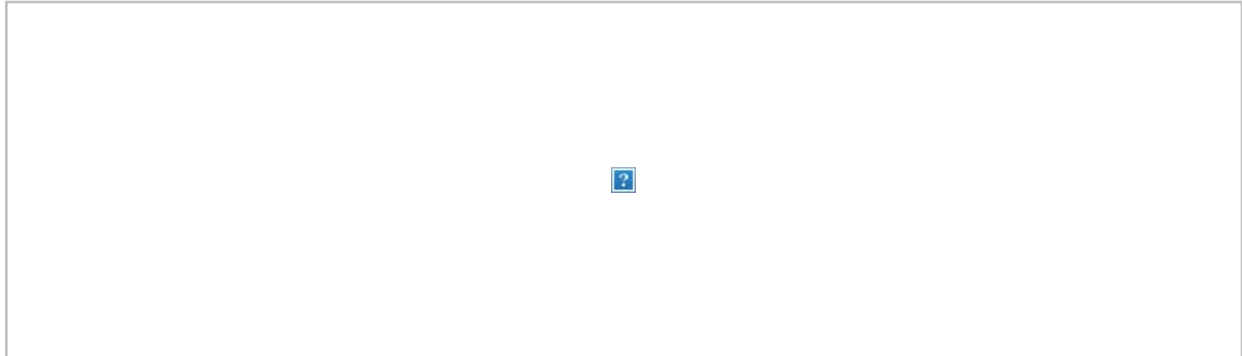
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Darren,

To assist with your review of the TIS terms of reference, please see the trip generation table below for the proposed development at Regional Road 25 & Britannia Road. Please let us know if you need anything else.

Thanks,

Deanna



From: Loro, Darren <Darren.Loro@halton.ca>
Sent: December 21, 2022 7:46 AM
To: Deanna Green <Deanna.Green@bagroup.com>
Cc: Nathan H. Yau <yau@bagroup.com>
Subject: RE: Terms of Reference - TIS for Britannia & Regional Road 25 proposed development

Hi Deanna,

Appreciate it! Look forward to hearing from you.

Cheers,
Darren

From: Deanna Green <Deanna.Green@bagroup.com>
Sent: Tuesday, December 20, 2022 4:09 PM
To: Loro, Darren <Darren.Loro@halton.ca>
Cc: Nathan H. Yau <yau@bagroup.com>
Subject: RE: Terms of Reference - TIS for Britannia & Regional Road 25 proposed development

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Darren,

Great to meet you virtually as well!☺ We have followed up with the client and requested the preliminary unit count proposed for both the south and north block so that we can estimate the vehicle trips to be generated. We hope to be able to get back to you shortly.

Thank you.

Deanna

From: Loro, Darren <Darren.Loro@halton.ca>

Sent: December 20, 2022 1:57 PM

To: Deanna Green <Deanna.Green@bagroup.com>

Cc: Krusto, Matt <Matt.Krusto@halton.ca>; heide.schlegl@milton.ca

Subject: RE: Terms of Reference - TIS for Britannia & Regional Road 25 proposed development

Hi Deanna,

I am the Regional Transportation Planning Coordinator for Development Applications within Milton – nice to meet you!

Thank you for circulating this Terms of Reference for the proposed development along Regional Road 25 between Britannia Road and Etheridge Avenue. Transportation Planning is currently reviewing your proposed Terms of Reference and will provide you with comments by the end of this week before the Holiday closure. In the meantime, however, could you please provide us with preliminary trip generation forecasts for the north and south blocks of the proposed development? Appreciate it!

Cheers,
Darren

Darren Loro, C.E.T.

Project Manager I – Transportation Planning Coordination

Infrastructure Planning & Policy

Public Works

Halton Region

905-825-6000, ext. 2694 | 1-866-442-5866



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From: Deanna Green <Deanna.Green@bagroup.com>

Sent: December 9, 2022 7:39 AM

To: heide.schlegl@milton.ca; Krusto, Matt <Matt.Krusto@halton.ca>

Cc: Christine Chea <Christine.Chea@mattamycorp.com>; Anthony Sotomayor <Anthony.Sotomayor@mattamycorp.com>

Subject: Terms of Reference - TIS for Britannia & Regional Road 25 proposed development

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Good morning Heide & Matt,

BA Group has been retained by Mattamy Corporation to provide transportation consulting services related to the proposed development of a site on the northwest quadrant of the intersection of Regional Road 25 & Britannia Road, in the Town of Milton.

The preliminary development concept includes five residential buildings (up to 15 levels) with a total GFA that could range from approximately 93,000 m² to 148,000 m², along with some retail. Access and site circulation is proposed via a new north-south driveway that would run across the rear of both blocks and create a new 4-legged intersection on Etheridge Avenue. Vehicle access for each of the two blocks will also be considered along Regional Road 25.

The traffic impact study will be completed in accordance with Halton Region's Transportation Impact Study Guidelines as outlined in the attached Terms of Reference. Can you please let us know if the attached Terms of Reference would be acceptable for the TIS?

Thanks very much.

Deanna

Deanna Green, MSc.P.Eng.
Associate

BA Consulting Group Ltd.

300 - 45 St. Clair Ave. W.
Toronto, ON M4V 1K9

TEL 416 961 7110 x149

EMAIL Deanna.Green@bagroup.com

Image removed by sender. BA Consulting Group Ltd



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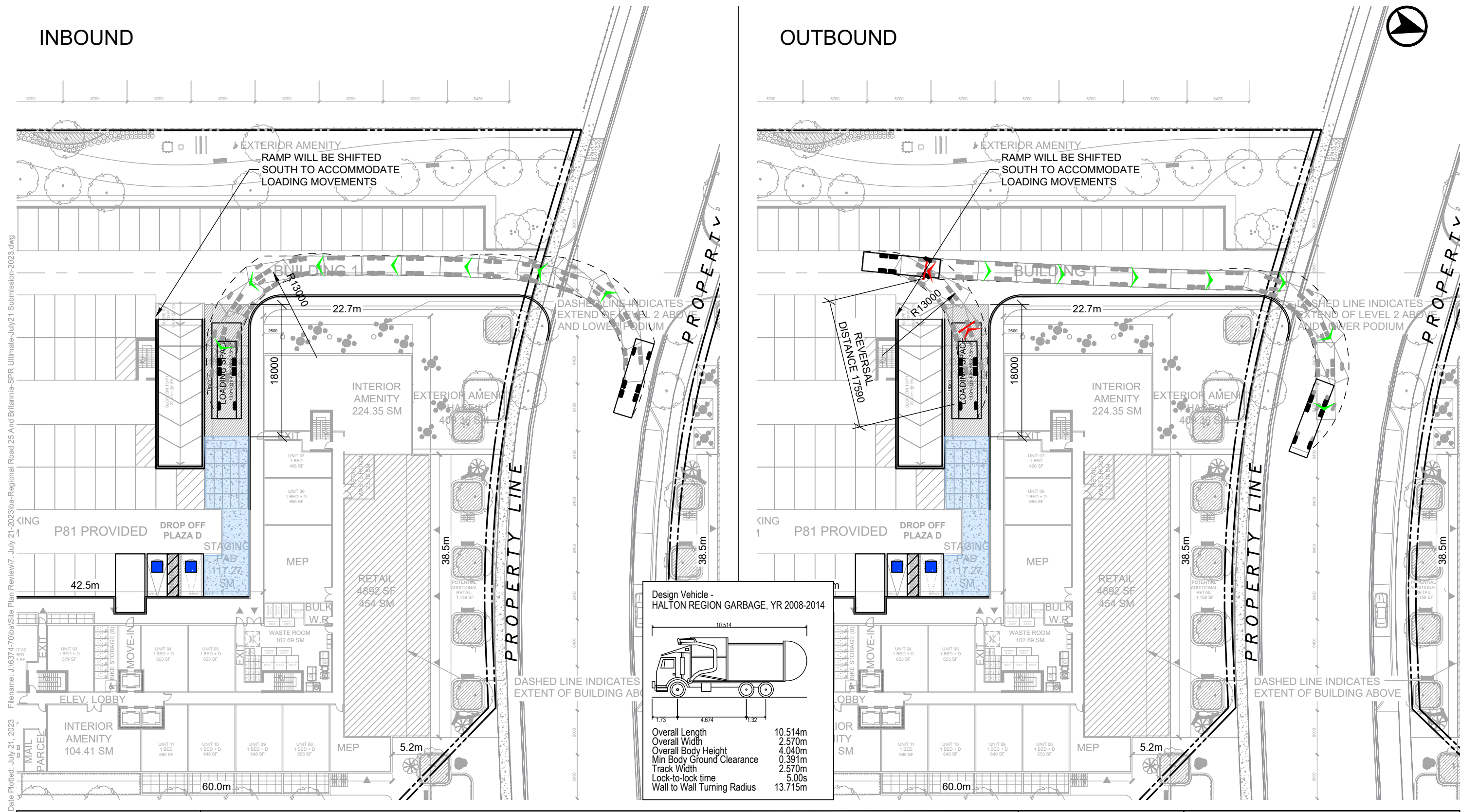
Appendix D

Vehicle Manoeuvring Diagrams



INBOUND

OUTBOUND



Filename: J:\6374-70\ba\Site Plan Review\7. July 21-2023\ba-Regional Road 25 And Britannia-SPR Ultimate-July21 Submission-2023.dwg
 Date Plotted: July 21, 2023

REGIONAL ROAD 25 & BRITANNIA ROAD
 VEHICLE MANOEUVRING DIAGRAM
 HALTON REGION GARBAGE TRUCK
 SOUTH BLOCK



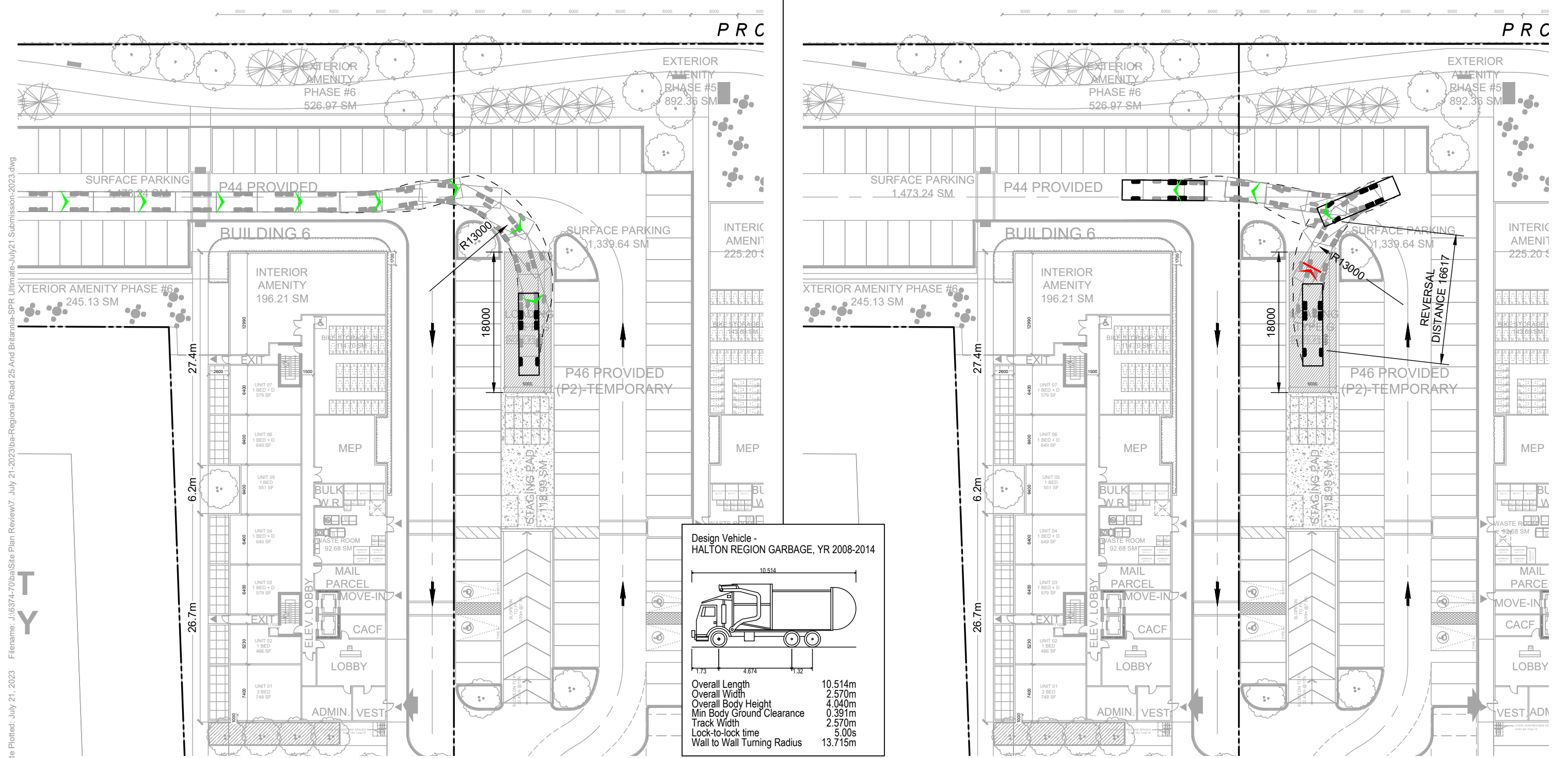
Project: RR 25 & BRITANNIA
 Project No. 6374-70
 Date: July 21, 2023
 Revised: --

Scale 1:500

Drawing No. VMD-01

INBOUND

OUTBOUND



Date Plotted: July 21, 2023. Filename: J:\6374-70\ba\Site Plan Review\7. July 21-2023\ba-Regional Road 25 And Britannia-SPR Ultimate-July21 Submission-2023.dwg

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REGIONAL ROAD 25 & BRITANNIA ROAD
VEHICLE MANOEUVRING DIAGRAM
HALTON REGION GARBAGE TRUCK
NORTH BLOCK



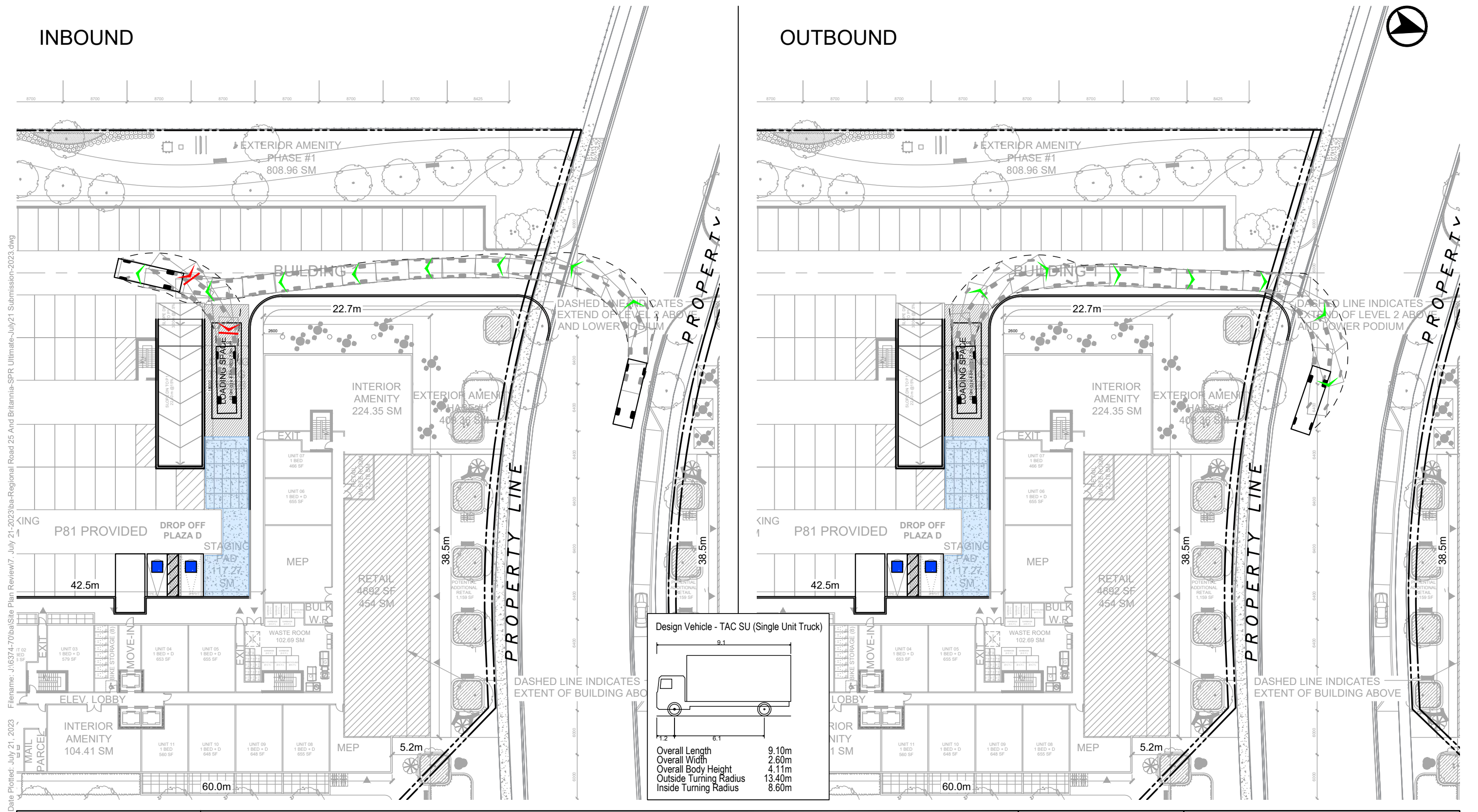
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 Project No. 6374-70
 Date: July 21, 2023
 Revised: --

Scale 1:500

Drawing No. **VMD-02**

INBOUND

OUTBOUND



Filename: J:\6374-70\ba\Site Plan Review\7. July 21-2023\ba-Regional Road 25 And Britannia-SPR Ultimate-July21 Submission-2023.dwg
 Date Plotted: July 21, 2023

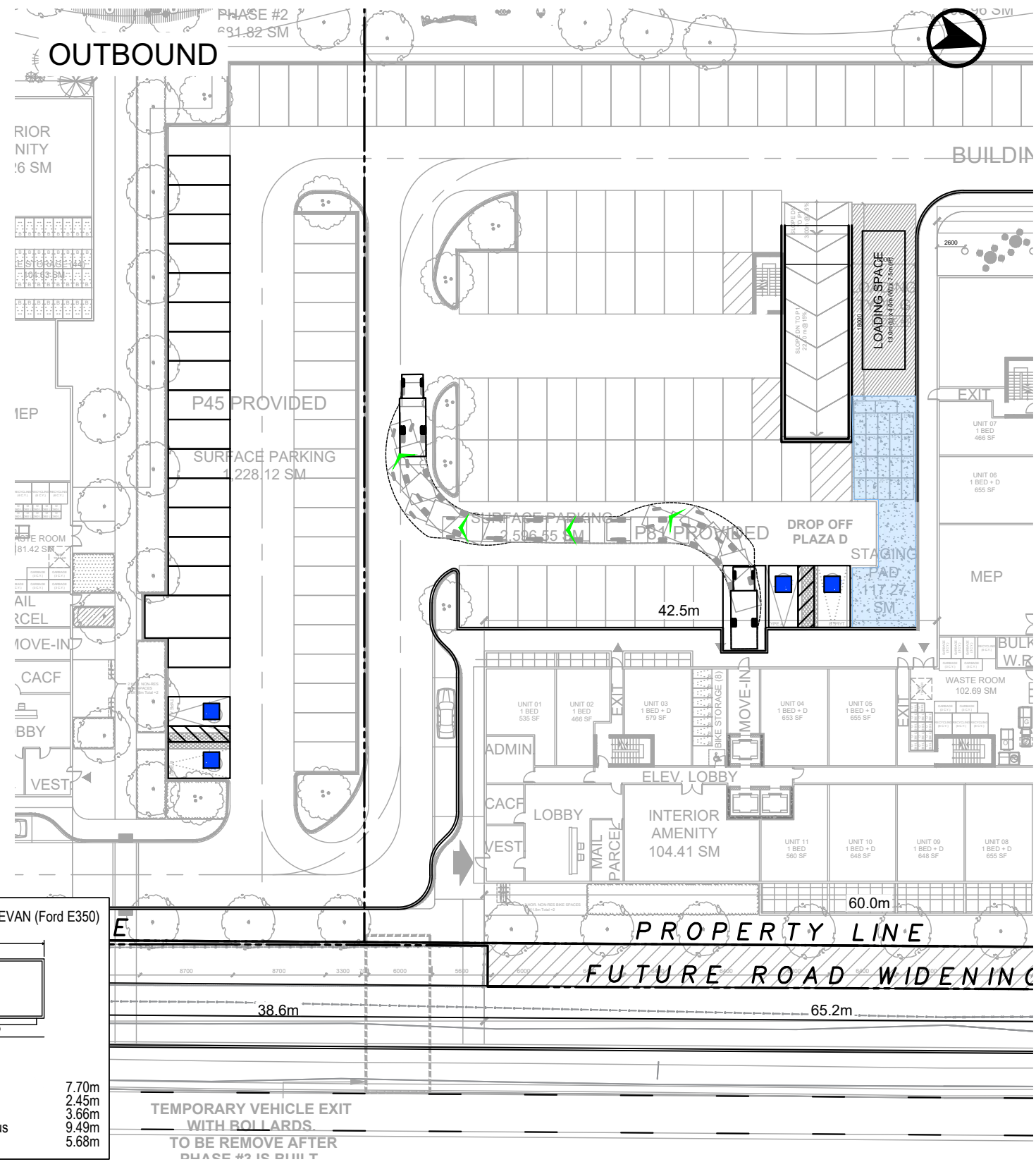
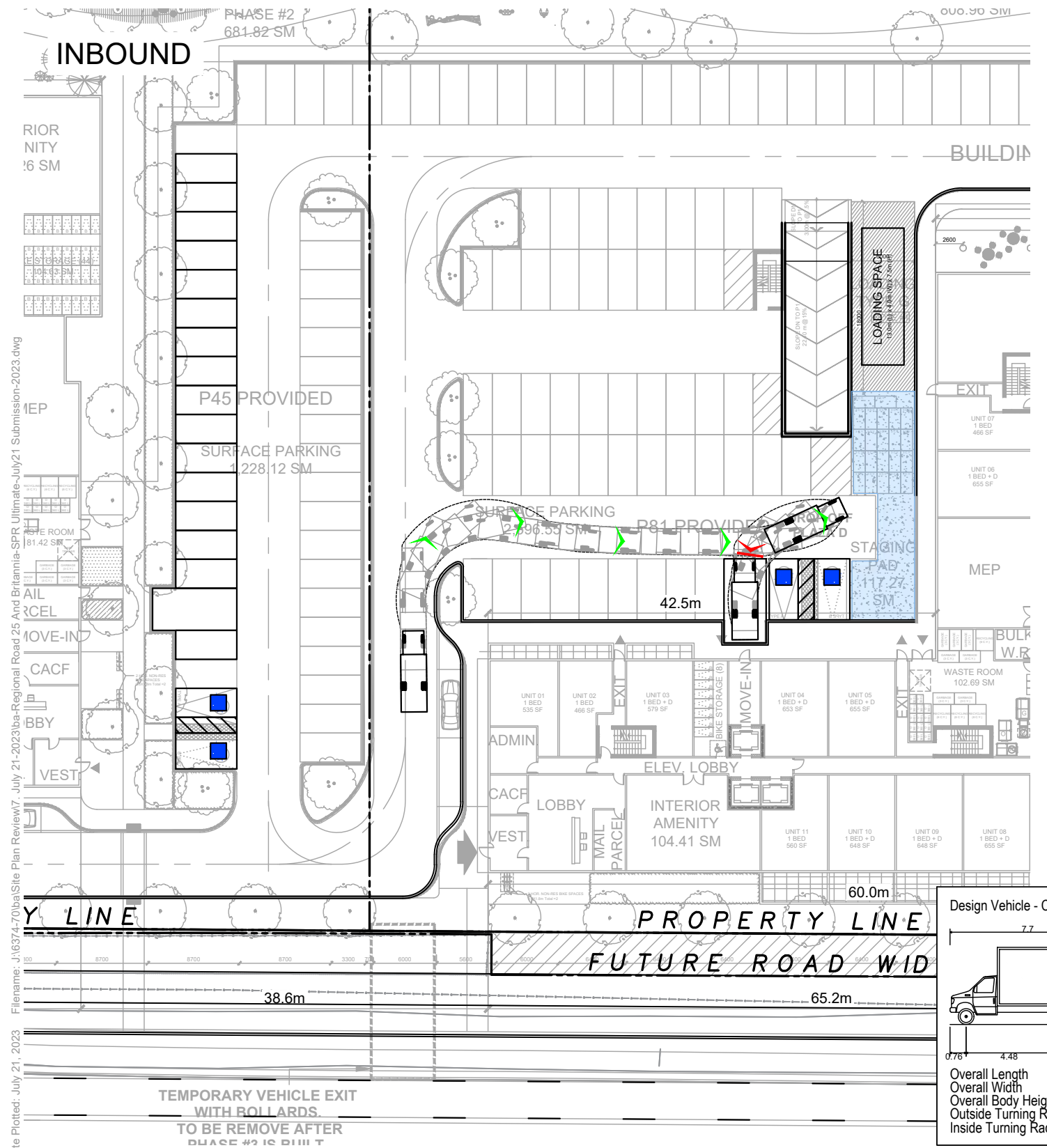
REGIONAL ROAD 25 & BRITANNIA ROAD
VEHICLE MANOEUVRING DIAGRAM
SINGLE UNIT TRUCK
SOUTH BLOCK

Project: RR 25 & BRITANNIA
 Project No. 6374-70
 Date: July 21, 2023
 Revised: --

Scale 1:500

 Drawing No. **VMD-03**





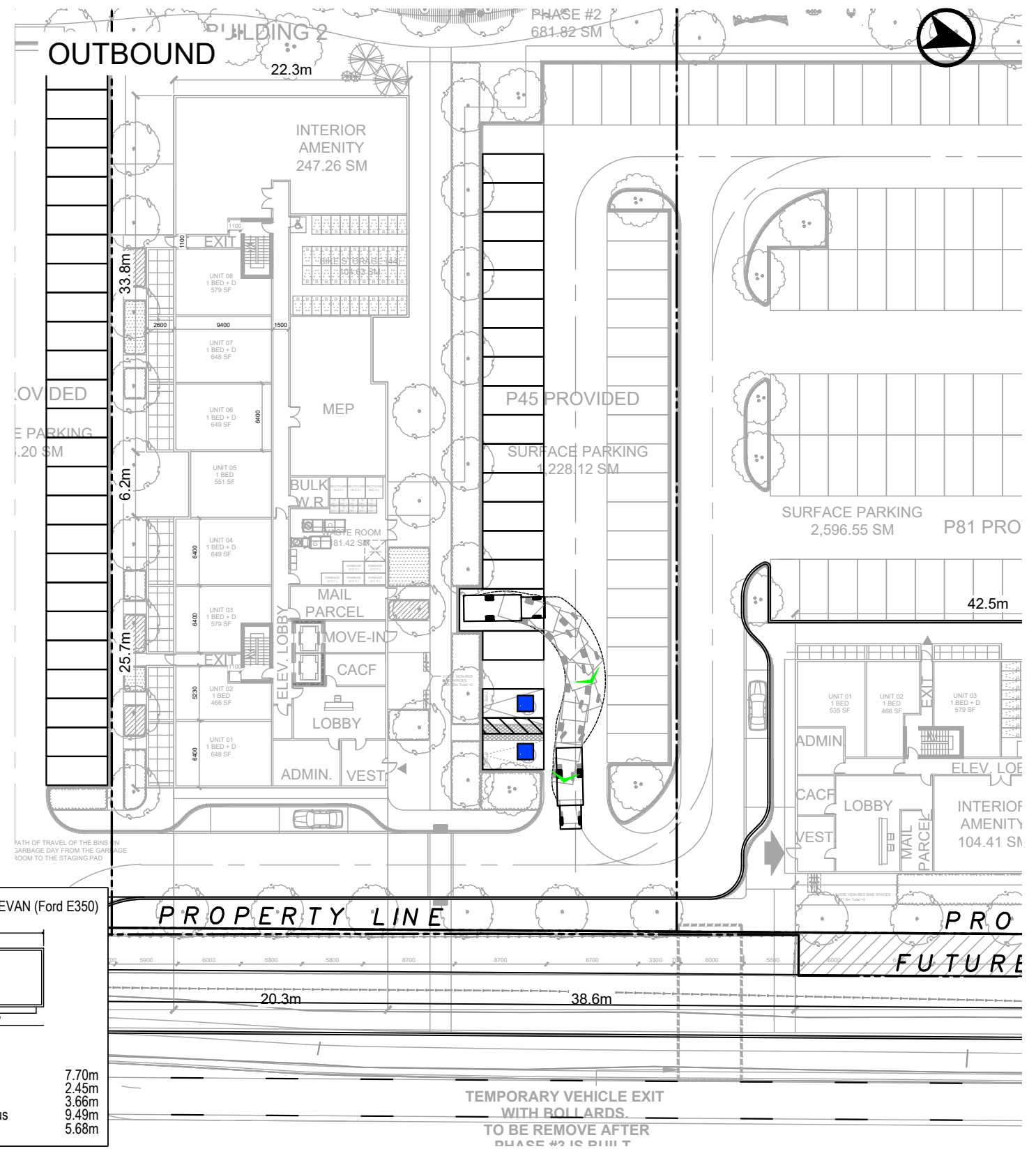
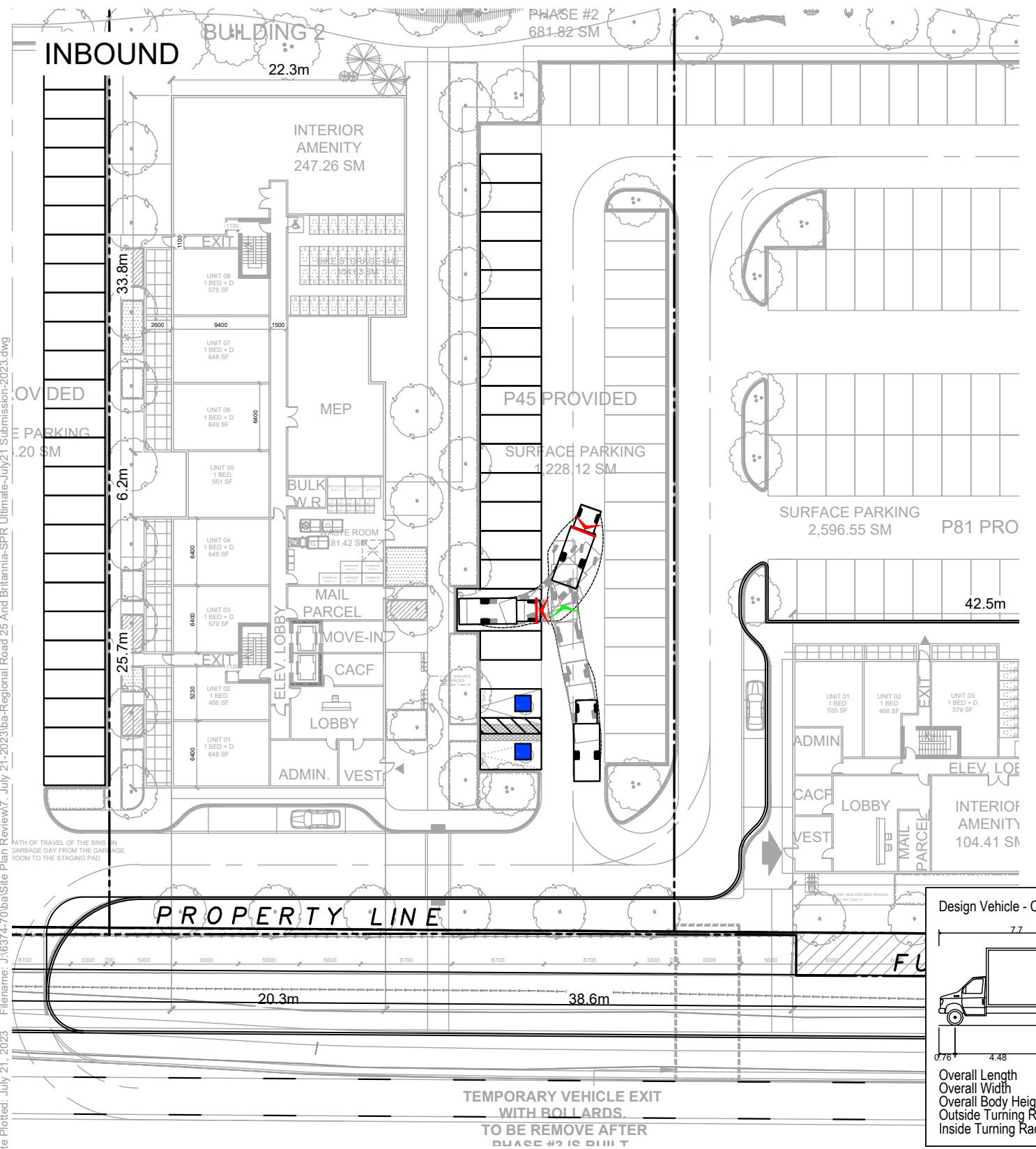
Design Vehicle - CUBEVAN (Ford E350)

Overall Length	7.70m
Overall Width	2.45m
Overall Body Height	3.66m
Outside Turning Radius	9.49m
Inside Turning Radius	5.68m

Date Plotted: July 21, 2023
 Filename: J:\6374-70\ba\Site Plan Review\7. July 21-2023\ba-Regional Road 25 And Britannia-SPR Ultimate-July21 Submission-2023.dwg

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		Project No. 6374-70	0 5 10 15 20m
Date: July 21, 2023		Revised: --	1:500
			Drawing No. VMD-04

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 Date Plotted: July 21, 2023



Design Vehicle - CUBEVAN (Ford E350)

Overall Length	7.70m
Overall Width	2.45m
Overall Body Height	3.66m
Outside Turning Radius	9.49m
Inside Turning Radius	5.68m

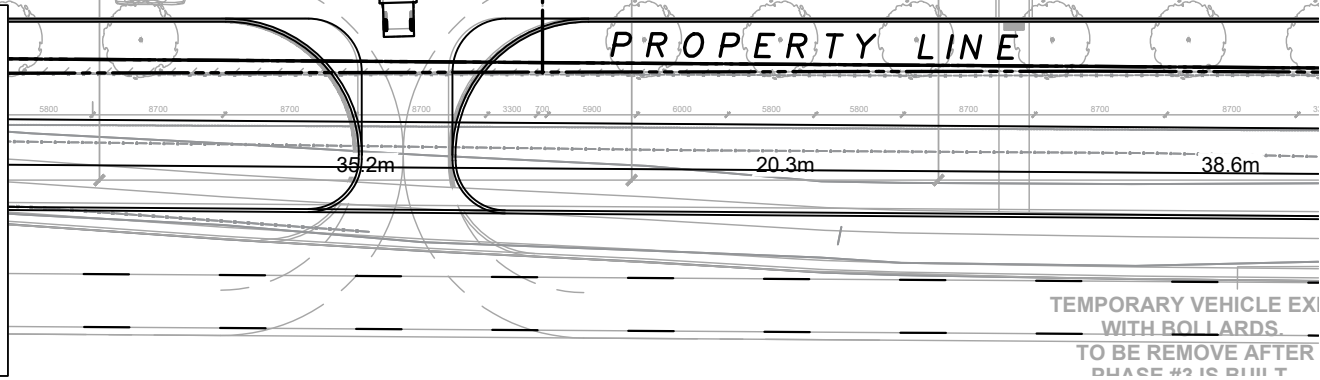
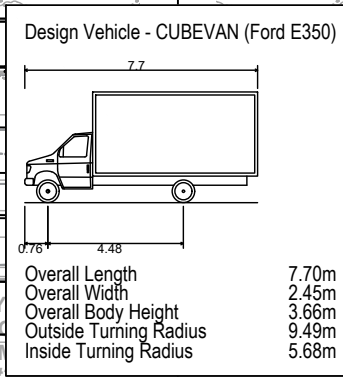
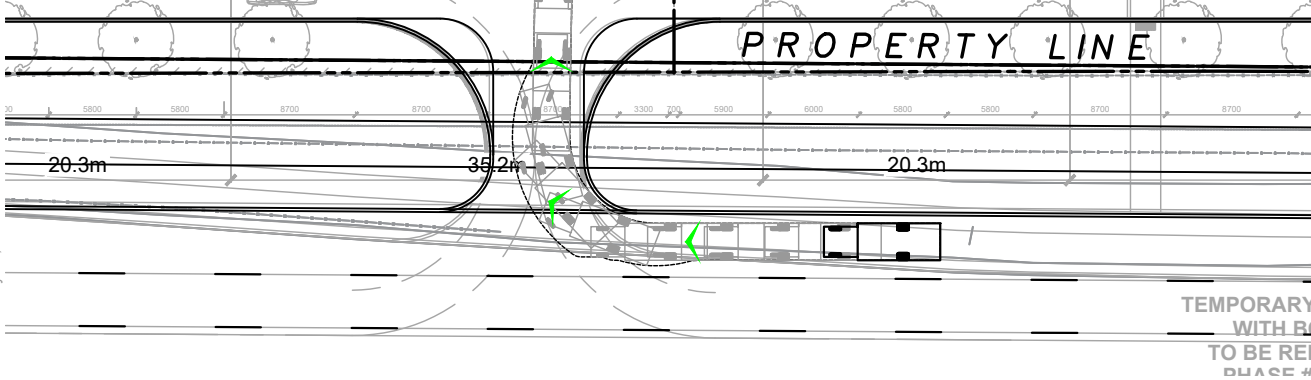
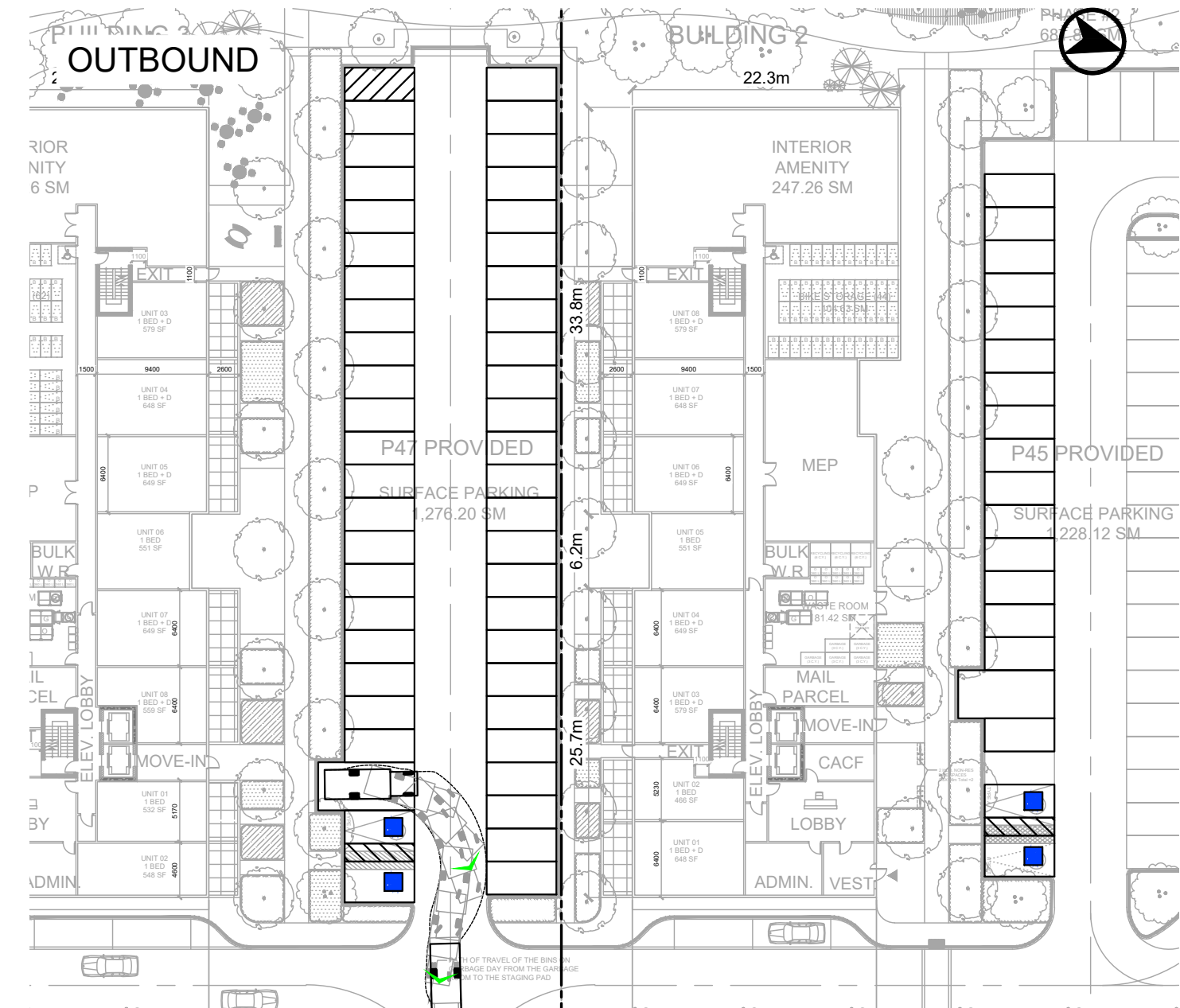
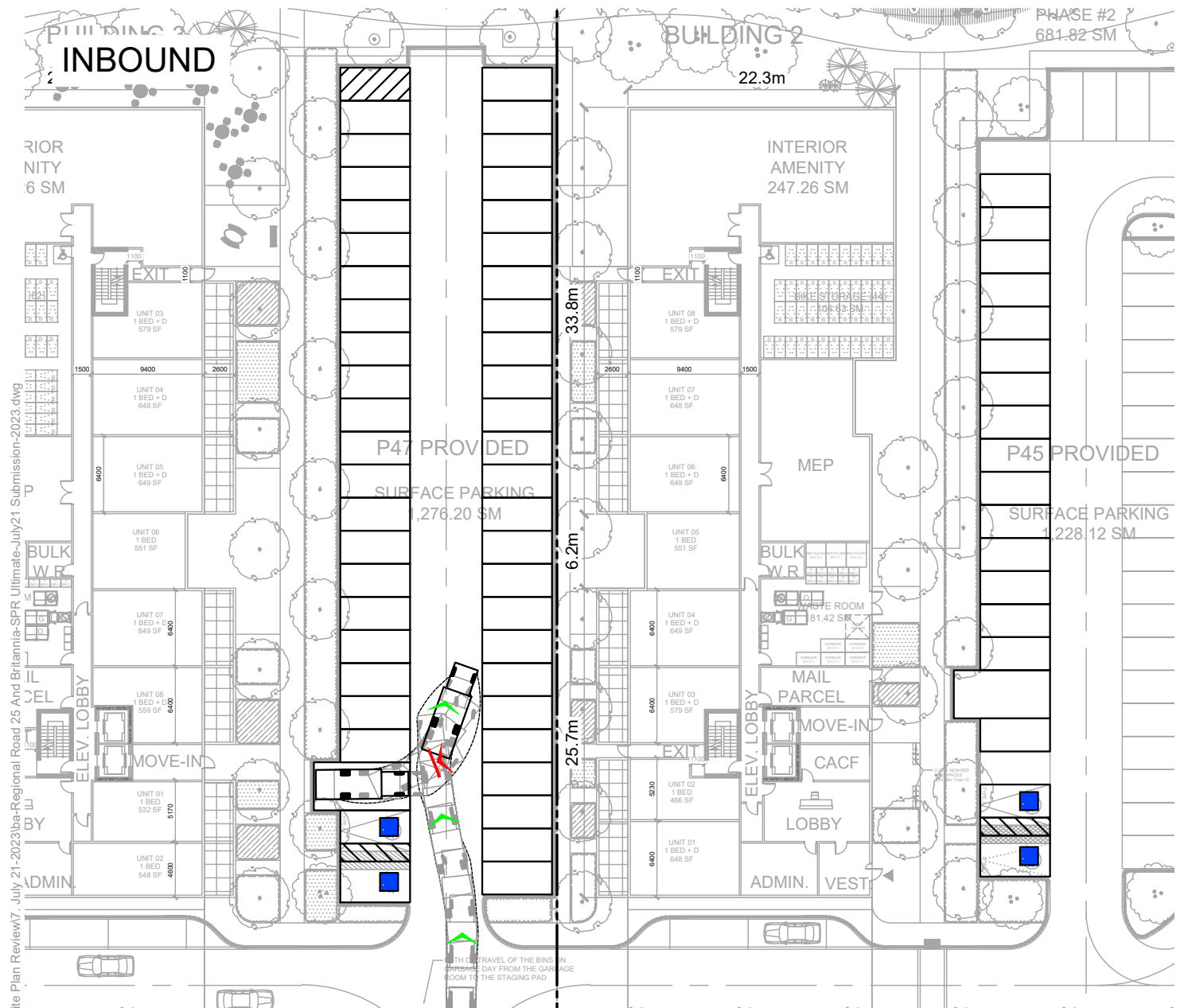


REGIONAL ROAD 25 & BRITANNIA ROAD
VEHICLE MANOEUVRING DIAGRAM
 CUBE VAN
 BUILDING 2

Project: RR 25 & BRITANNIA
 Project No. 6374-70
 Date: July 21, 2023
 Revised: --

Scale: 1:500

 Drawing No. **VMD-05**



Filename: J:\6374-70\ba\Site Plan Review\7. July 21-2023\ba-Regional Road 25 And Britannia-SPR Ultimate-July21 Submission-2023.dwg
 Date Plotted: July 21, 2023

TEMPORARY
WITH ROLLARDS
TO BE REMOVED
AFTER PHASE #2 IS BUILT

TEMPORARY VEHICLE EXITS
WITH ROLLARDS
TO BE REMOVED AFTER
PHASE #2 IS BUILT



REGIONAL ROAD 25 & BRITANNIA ROAD
VEHICLE MANOEUVRING DIAGRAM
CUBE VAN
BUILDING 3

Project: RR 25 & BRITANNIA
 Project No. 6374-70
 Date: July 21, 2023
 Revised: --

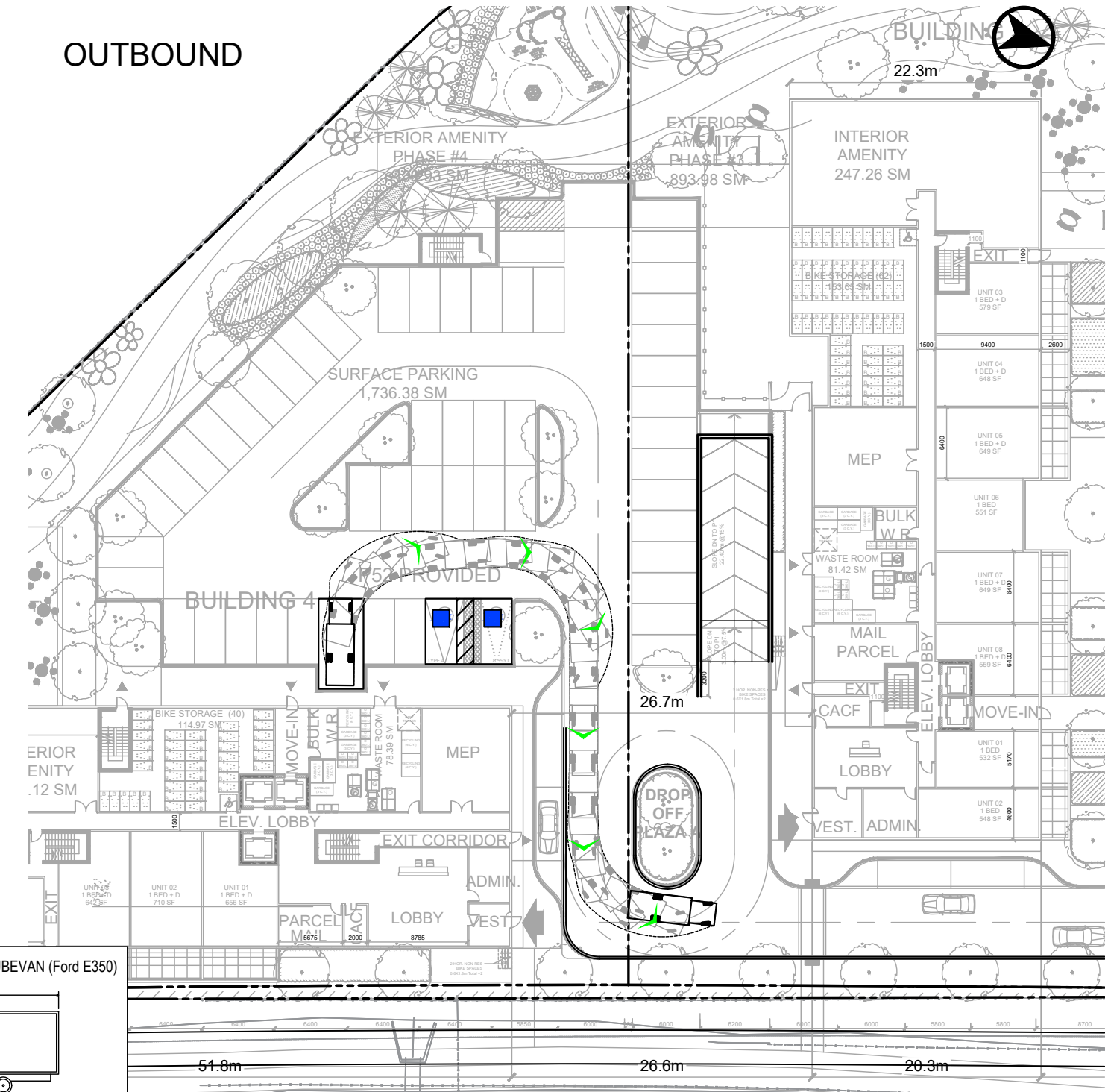
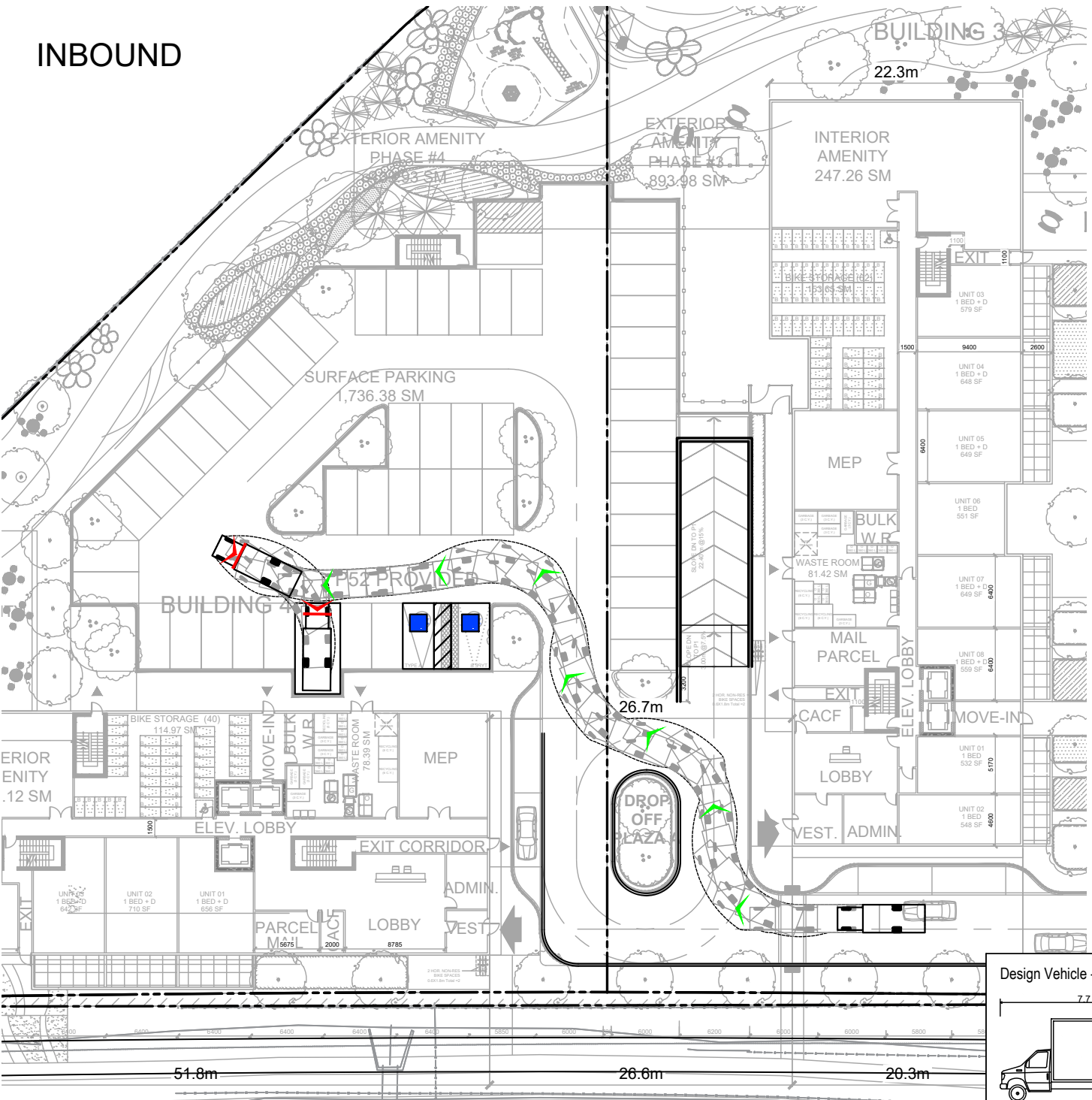
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 Drawing No. **VMD-06**

INBOUND

OUTBOUND

Filename: J:\6374-70\ba\Site Plan Review\7. July 21-2023\ba-Regional Road 25 And Britannia-SPR Ultimate-July21 Submission-2023.dwg
Date Plotted: July 21, 2023



Design Vehicle - CUBEVAN (Ford E350)

Overall Length	7.70m
Overall Width	2.45m
Overall Body Height	3.66m
Outside Turning Radius	9.49m
Inside Turning Radius	5.68m

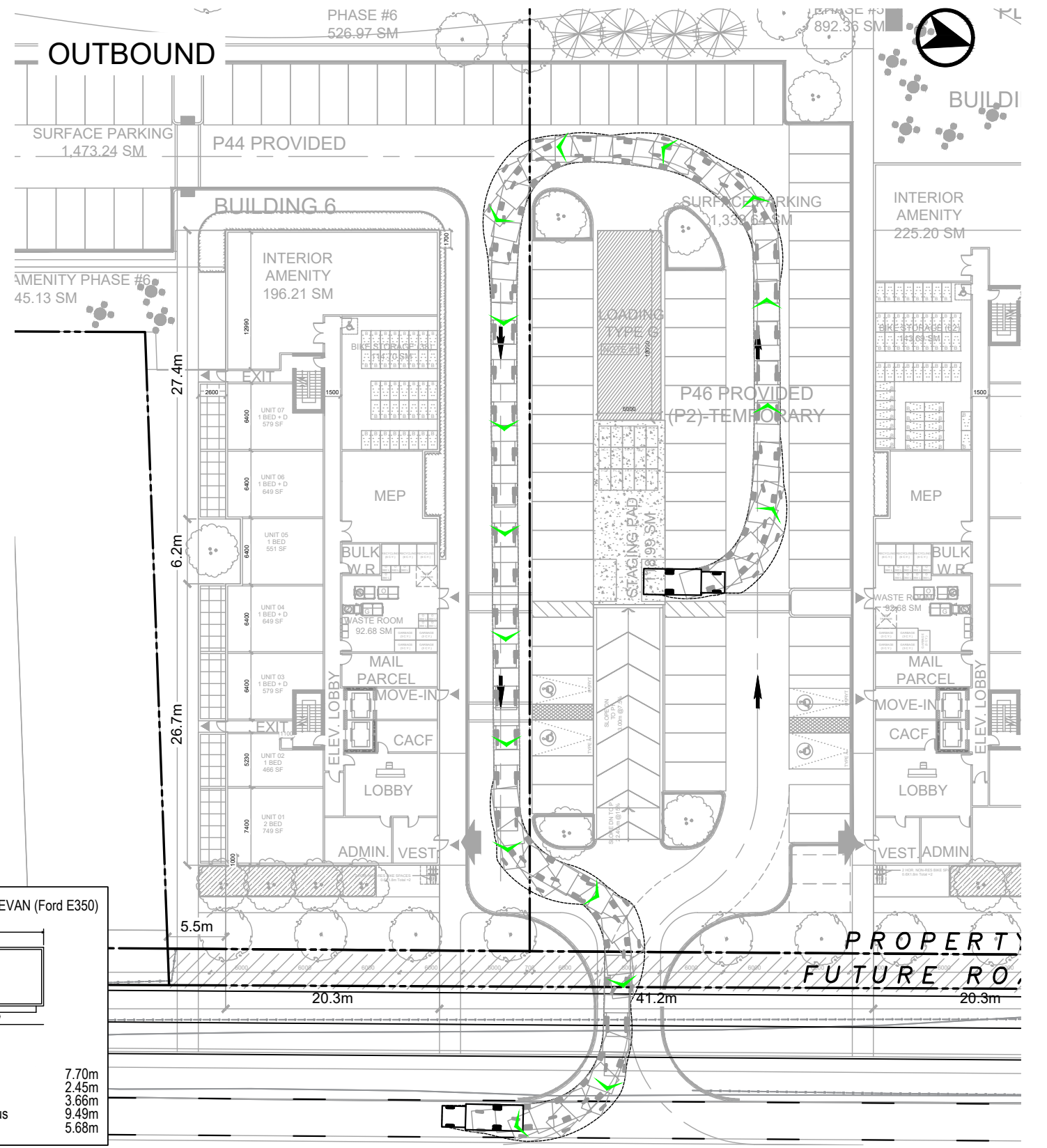
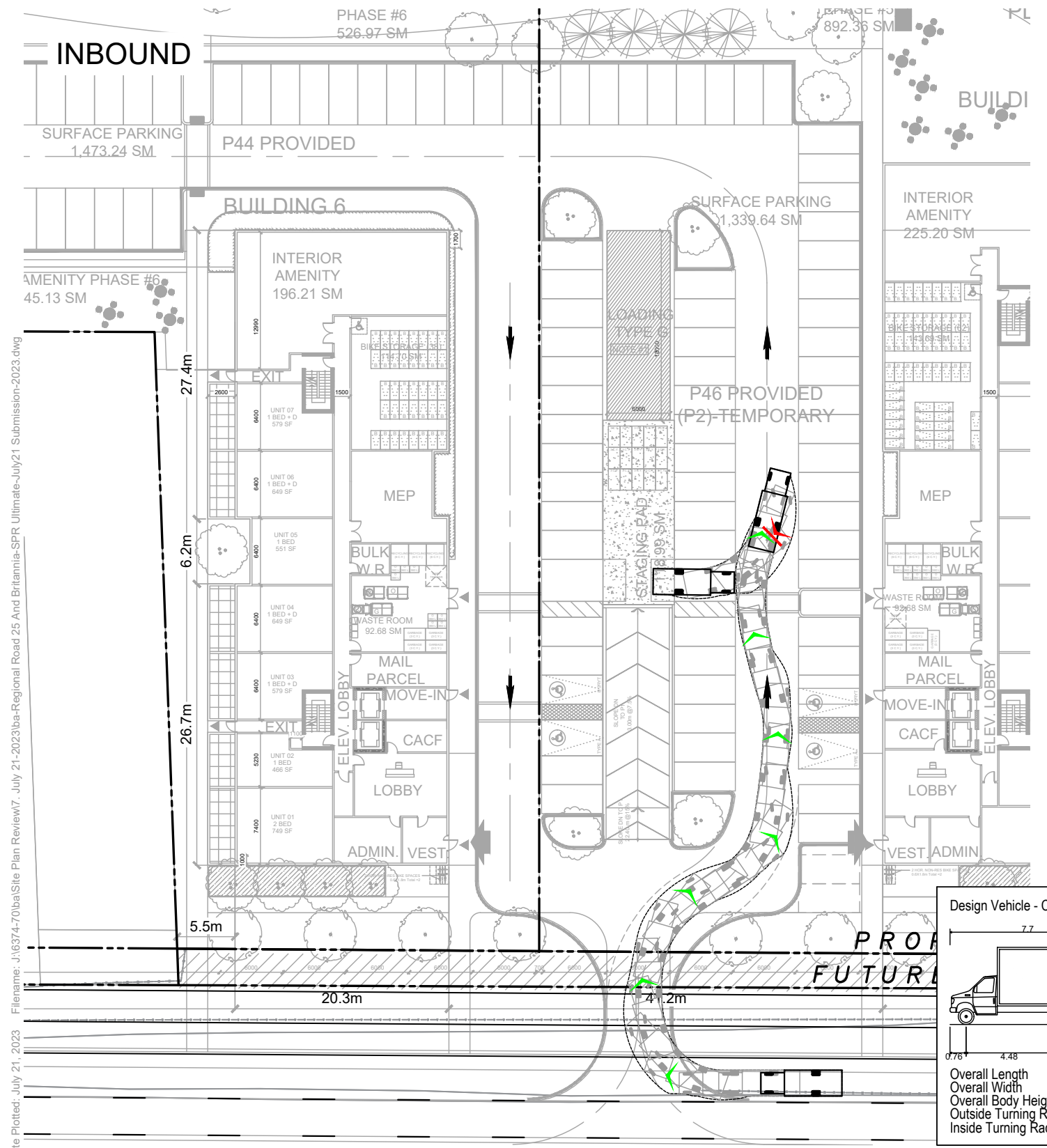


REGIONAL ROAD 25 & BRITANNIA ROAD
VEHICLE MANOEUVRING DIAGRAM
CUBE VAN
BUILDING 4

Project: RR 25 & BRITANNIA
 Project No. 6374-70
 Date: July 21, 2023
 Revised: --

Scale: 1:500

Drawing No. **VMD-07**

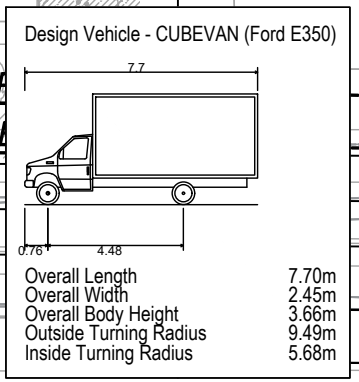
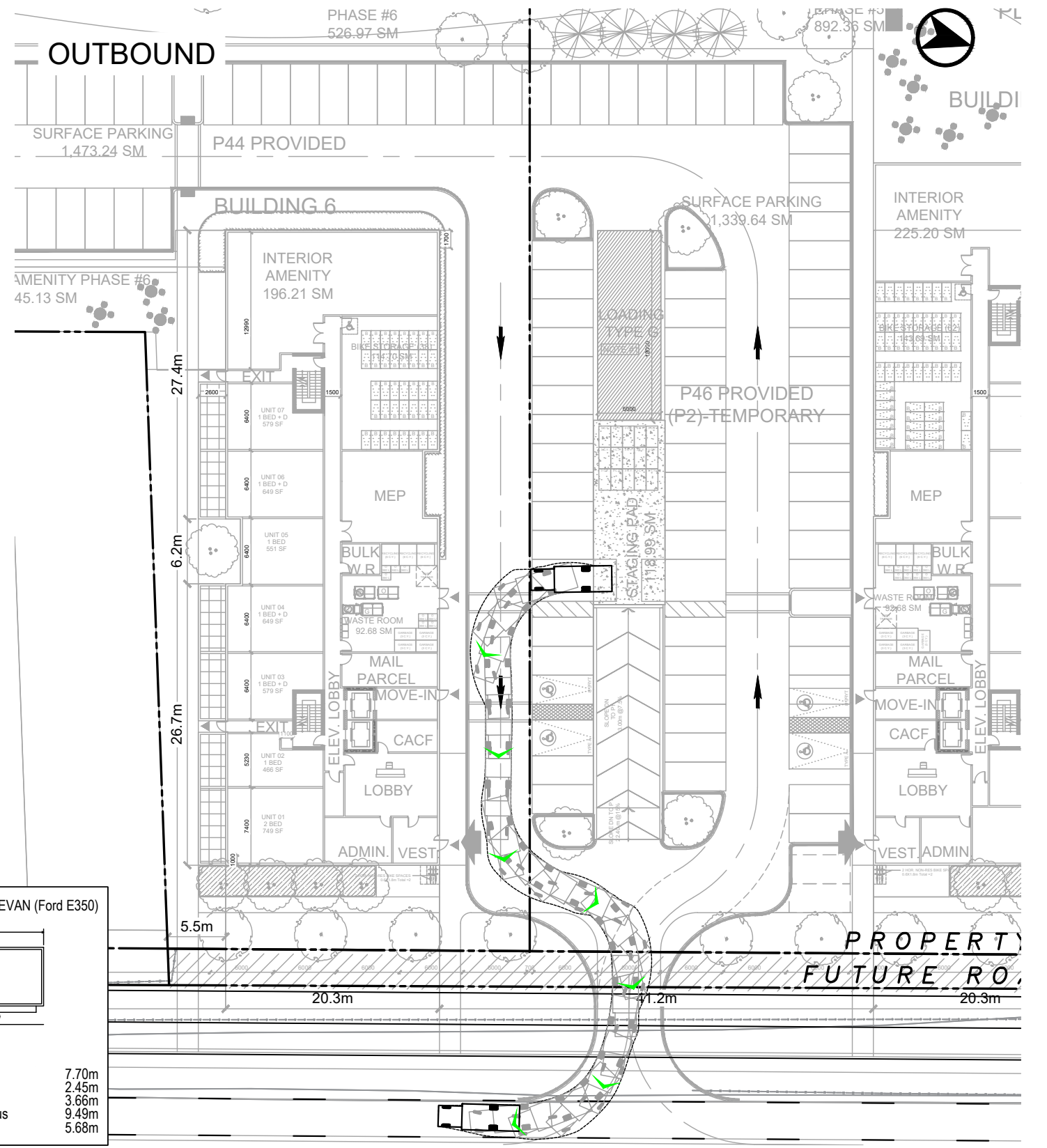
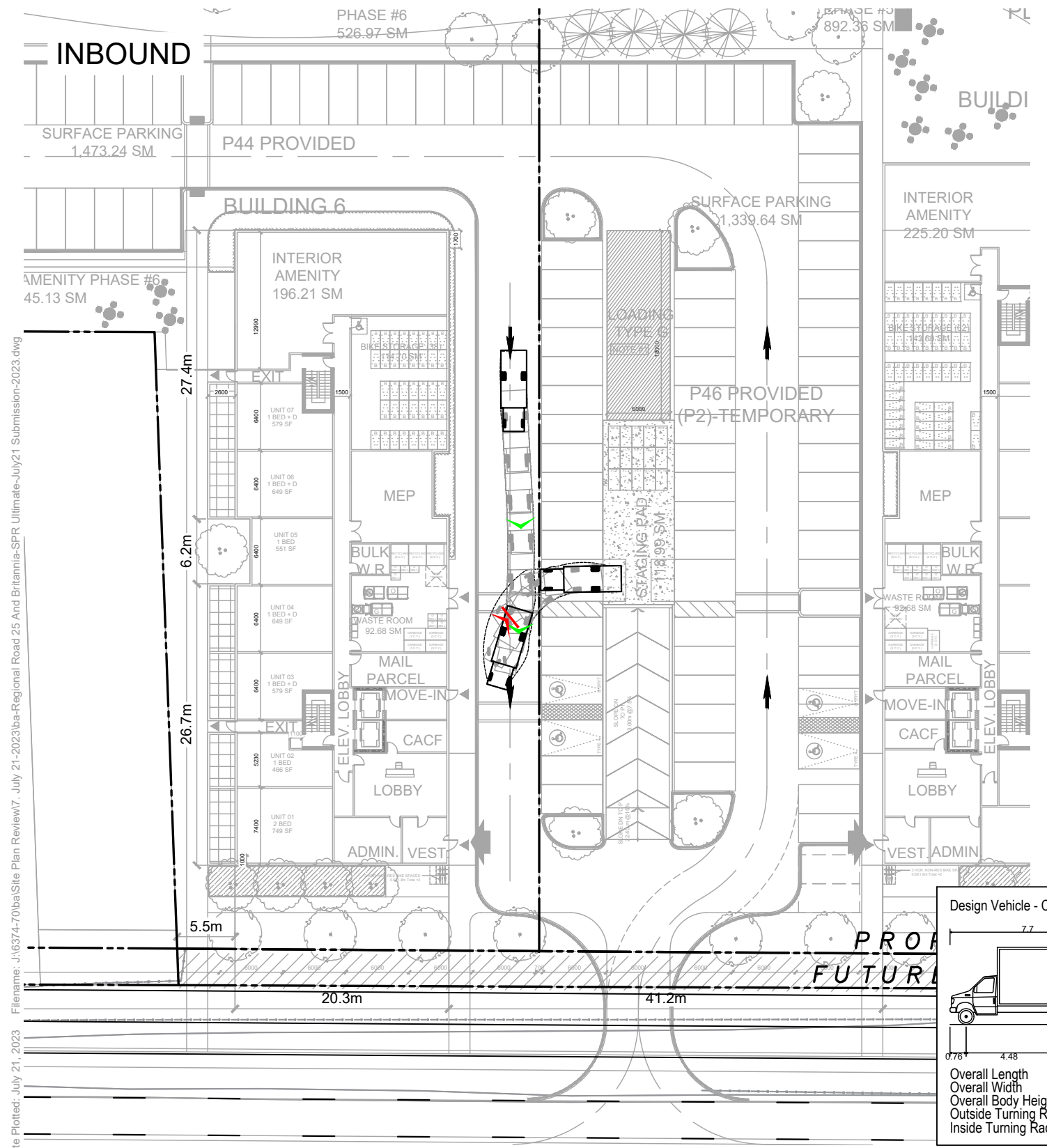


Design Vehicle - CUBEVAN (Ford E350)

Overall Length	7.70m
Overall Width	2.45m
Overall Body Height	3.66m
Outside Turning Radius	9.49m
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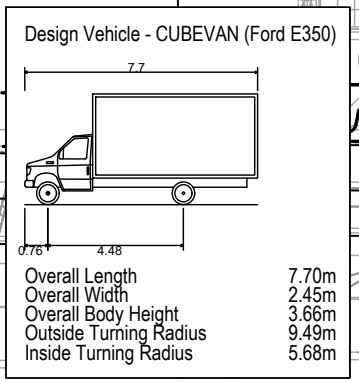
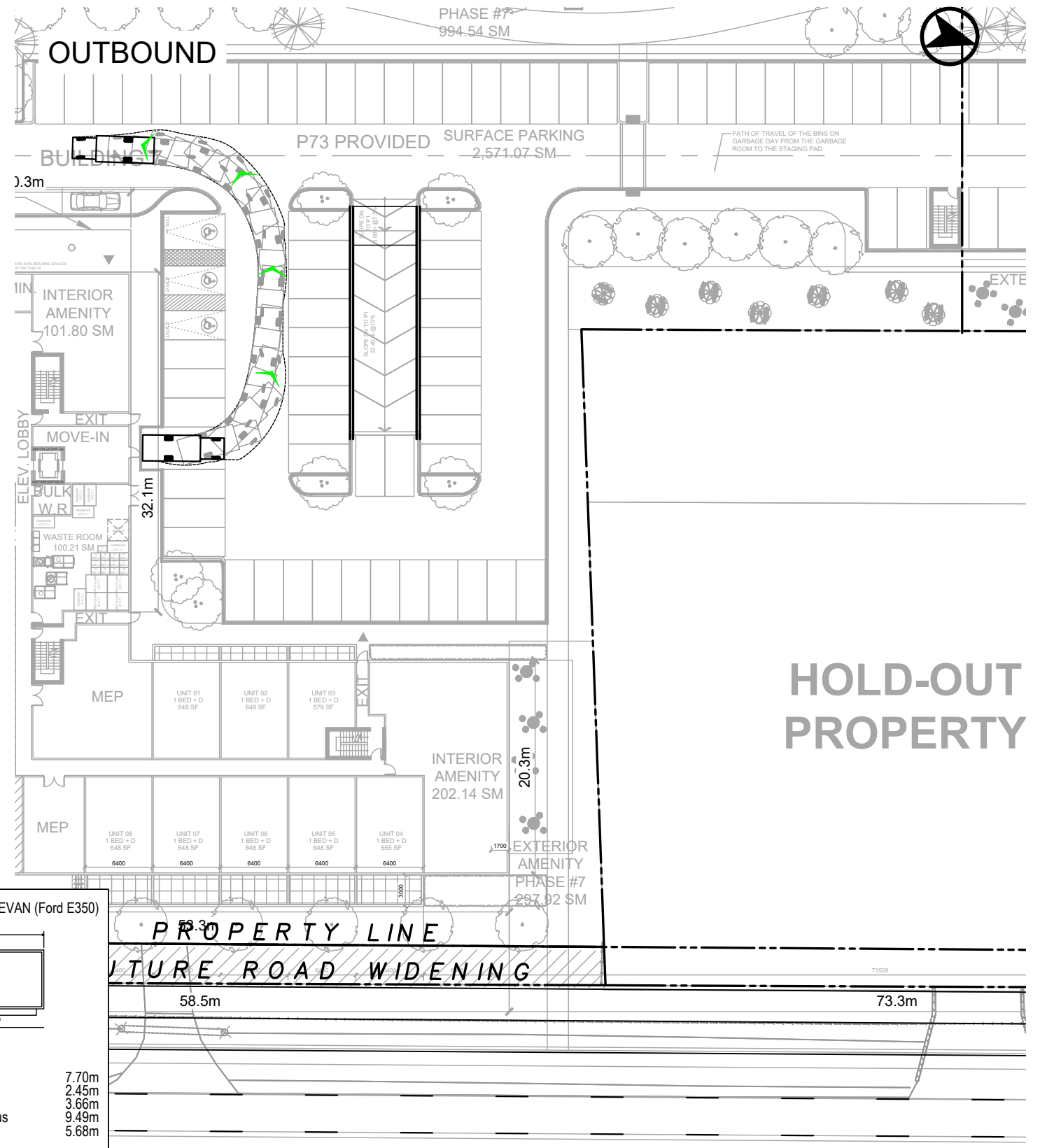
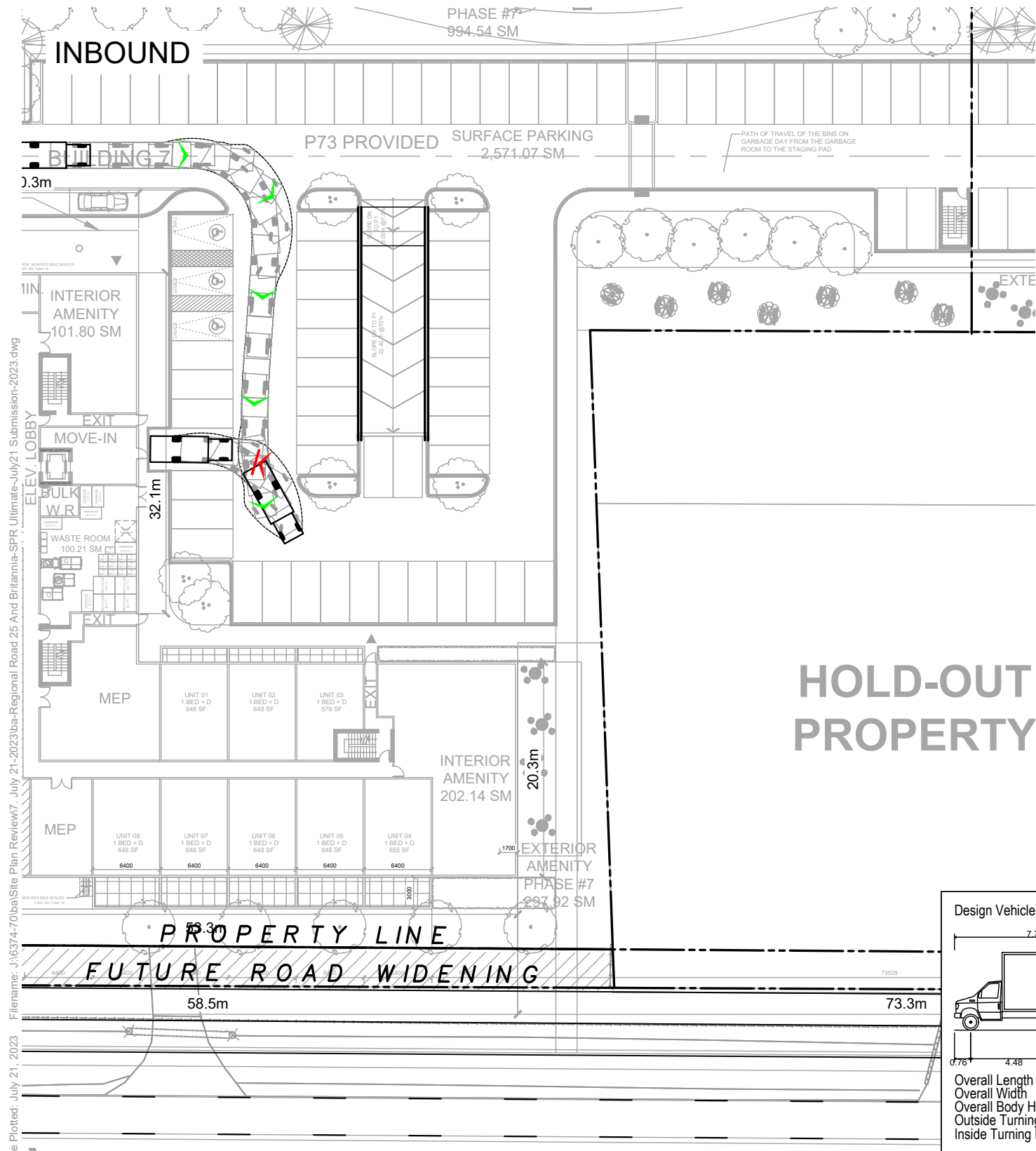
Date Plotted: July 21, 2023
 Filename: J:\6374-70\ba\Site Plan Review\7. July 21-2023\ba-Regional Road 25 And Britannia-SPR Ultimate-July21 Submission-2023.dwg

	REGIONAL ROAD 25 & BRITANNIA ROAD VEHICLE MANOEUVRING DIAGRAM CUBE VAN BUILDING 5	Project: RR 25 & BRITANNIA	Scale
		Project No. 6374-70	0 5 10 15 20m
Date: July 21, 2023		Revised: --	1:500
			Drawing No. VMD-08



Date Plotted: July 21, 2023
 Filename: J:\6374-70\ba\Site Plan Review\7. July 21-2023\ba-Regional Road 25 And Britannia-SPR Ultimate-July21 Submission-2023.dwg

	REGIONAL ROAD 25 & BRITANNIA ROAD VEHICLE MANOEUVRING DIAGRAM CUBE VAN BUILDING 6	Project: RR 25 & BRITANNIA	Scale
		Project No. 6374-70	0 5 10 15 20m
Date: July 21, 2023		Revised: --	1:500
			Drawing No. VMD-09



Filename: J:\6374-70\ba\Site Plan Review\7 July 21-2023\ba-Regional Road 25 And Britannia-SPR Ultimate-July21 Submission-2023.dwg
 Date Plotted: July 21, 2023

	REGIONAL ROAD 25 & BRITANNIA ROAD VEHICLE MANOEUVRING DIAGRAM CUBE VAN BUILDING 7	Project: RR 25 & BRITANNIA Project No. 6374-70 Date: July 21, 2023 Revised: --	Scale 1:500
			Drawing No. VMD-10

Appendix E Traffic Counts





Turning Movement Count (5 . BRITANNIA RD & FARMSTEAD DR)

Start Time	N Approach FARMSTEAD DR					E Approach BRITANNIA RD					W Approach BRITANNIA RD					Int. Total (15 min)	Int. Total (1 hr)
	Right N:W	Left N:E	UTurn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	UTurn E:E	Peds E:	Approach Total	Thru W:E	Left W:N	UTurn W:W	Peds W:	Approach Total		
07:00:00	4	14	0	0	18	0	24	0	0	24	50	0	0	0	50	92	
07:15:00	4	30	0	0	34	6	18	0	0	24	86	3	0	0	89	147	
07:30:00	3	31	0	0	34	2	40	1	0	43	114	6	0	0	120	197	
07:45:00	5	27	0	0	32	1	64	0	0	65	110	4	0	0	114	211	647
08:00:00	9	29	0	0	38	6	67	0	0	73	100	6	0	0	106	217	772
08:15:00	3	25	0	0	28	1	70	0	0	71	99	6	0	0	105	204	829
08:30:00	2	14	0	0	16	7	89	0	0	96	93	7	0	0	100	212	844
08:45:00	8	21	0	0	29	10	72	0	2	82	97	3	0	0	100	211	844
BREAK																	
16:00:00	6	12	0	0	18	15	102	0	0	117	64	0	0	2	64	199	
16:15:00	3	13	0	0	16	23	137	0	0	160	65	3	0	0	68	244	
16:30:00	5	17	0	0	22	18	117	0	0	135	44	4	1	0	49	206	
16:45:00	3	11	0	1	14	22	117	0	0	139	74	3	0	0	77	230	879
17:00:00	5	12	0	0	17	18	106	0	0	124	79	3	0	0	82	223	903
17:15:00	3	9	0	0	12	16	112	0	0	128	68	7	0	0	75	215	874
17:30:00	5	10	0	0	15	21	94	0	0	115	64	5	0	0	69	199	867
17:45:00	4	5	0	0	9	20	105	1	0	126	66	4	0	0	70	205	842
Grand Total	72	280	0	1	352	186	1334	2	2	1522	1273	64	1	2	1338	3212	-
Approach%	20.5%	79.5%	0%	-	-	12.2%	87.6%	0.1%	-	-	95.1%	4.8%	0.1%	-	-	-	-
Totals %	2.2%	8.7%	0%	11%	-	5.8%	41.5%	0.1%	47.4%	-	39.6%	2%	0%	41.7%	-	-	-
Heavy	1	12	0	-	-	3	53	0	-	-	18	2	0	-	-	-	-
Heavy %	1.4%	4.3%	0%	-	-	1.6%	4%	0%	-	-	1.4%	3.1%	0%	-	-	-	-
Bicycles	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bicycle %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Peak Hour: 08:00 AM - 09:00 AM Weather: Overcast Clouds (1.73 °C)

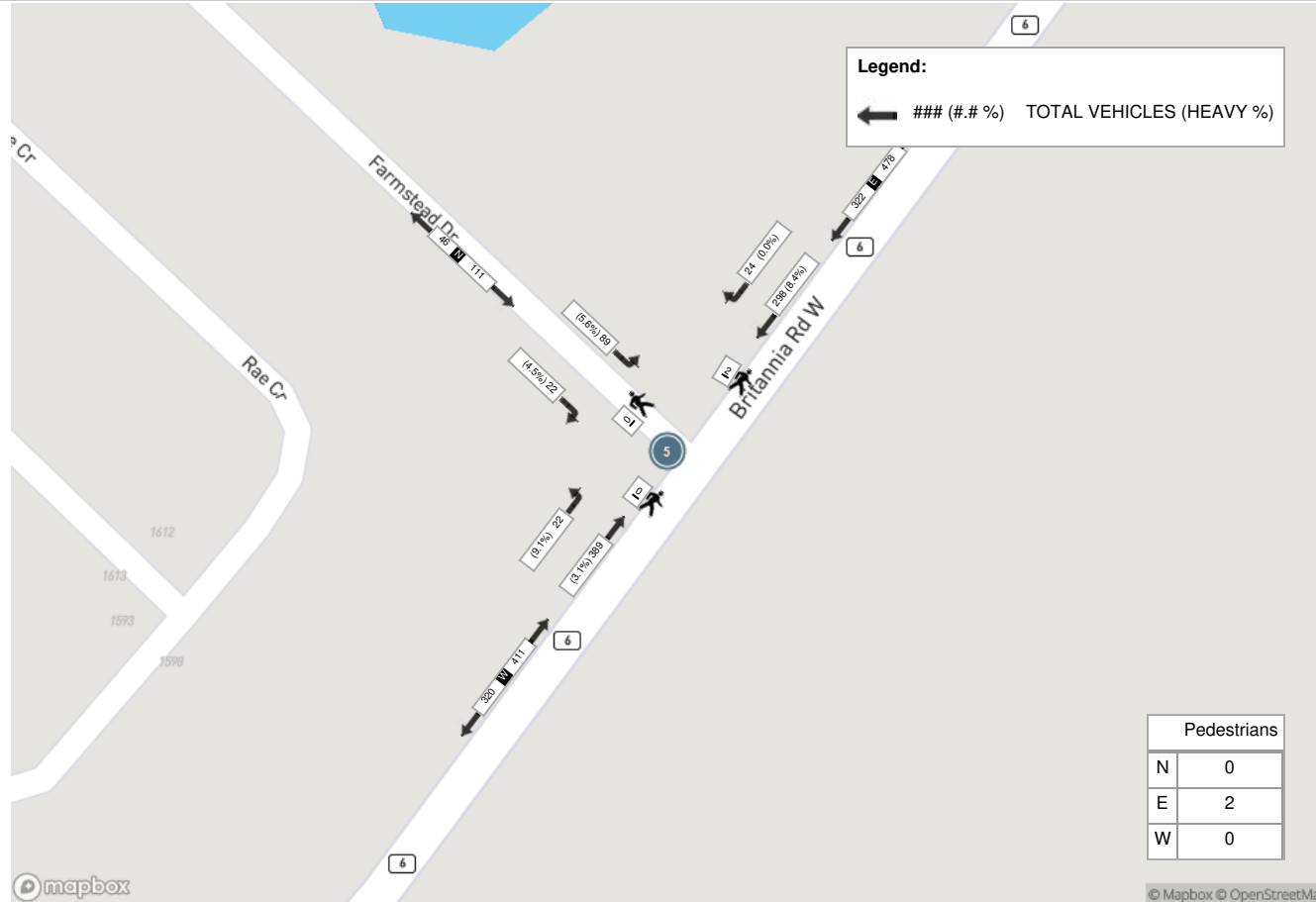
Start Time	N Approach FARMSTEAD DR					E Approach BRITANNIA RD					W Approach BRITANNIA RD					Int. Total (15 min)
	Right	Left	UTurn	Peds	Approach Total	Right	Thru	UTurn	Peds	Approach Total	Thru	Left	UTurn	Peds	Approach Total	
08:00:00	9	29	0	0	38	6	67	0	0	73	100	6	0	0	106	217
08:15:00	3	25	0	0	28	1	70	0	0	71	99	6	0	0	105	204
08:30:00	2	14	0	0	16	7	89	0	0	96	93	7	0	0	100	212
08:45:00	8	21	0	0	29	10	72	0	2	82	97	3	0	0	100	211
Grand Total	22	89	0	0	111	24	298	0	2	322	389	22	0	0	411	844
Approach%	19.8%	80.2%	0%		-	7.5%	92.5%	0%		-	94.6%	5.4%	0%		-	-
Totals %	2.6%	10.5%	0%		13.2%	2.8%	35.3%	0%		38.2%	46.1%	2.6%	0%		48.7%	-
PHF	0.61	0.77	0		0.73	0.6	0.84	0		0.84	0.97	0.79	0		0.97	-
Heavy	1	5	0		6	0	25	0		25	12	2	0		14	-
Heavy %	4.5%	5.6%	0%		5.4%	0%	8.4%	0%		7.8%	3.1%	9.1%	0%		3.4%	-
Lights	21	84	0		105	24	273	0		297	377	20	0		397	-
Lights %	95.5%	94.4%	0%		94.6%	100%	91.6%	0%		92.2%	96.9%	90.9%	0%		96.6%	-
Single-Unit Trucks	1	1	0		2	0	11	0		11	2	0	0		2	-
Single-Unit Trucks %	4.5%	1.1%	0%		1.8%	0%	3.7%	0%		3.4%	0.5%	0%	0%		0.5%	-
Buses	0	4	0		4	0	9	0		9	4	2	0		6	-
Buses %	0%	4.5%	0%		3.6%	0%	3%	0%		2.8%	1%	9.1%	0%		1.5%	-
Articulated Trucks	0	0	0		0	0	5	0		5	6	0	0		6	-
Articulated Trucks %	0%	0%	0%		0%	0%	1.7%	0%		1.6%	1.5%	0%	0%		1.5%	-
Pedestrians	-	-	-	0	-	-	-	-	2	-	-	-	-	0	-	-
Pedestrians%	-	-	-	0%	-	-	-	-	100%	-	-	-	-	0%	-	-



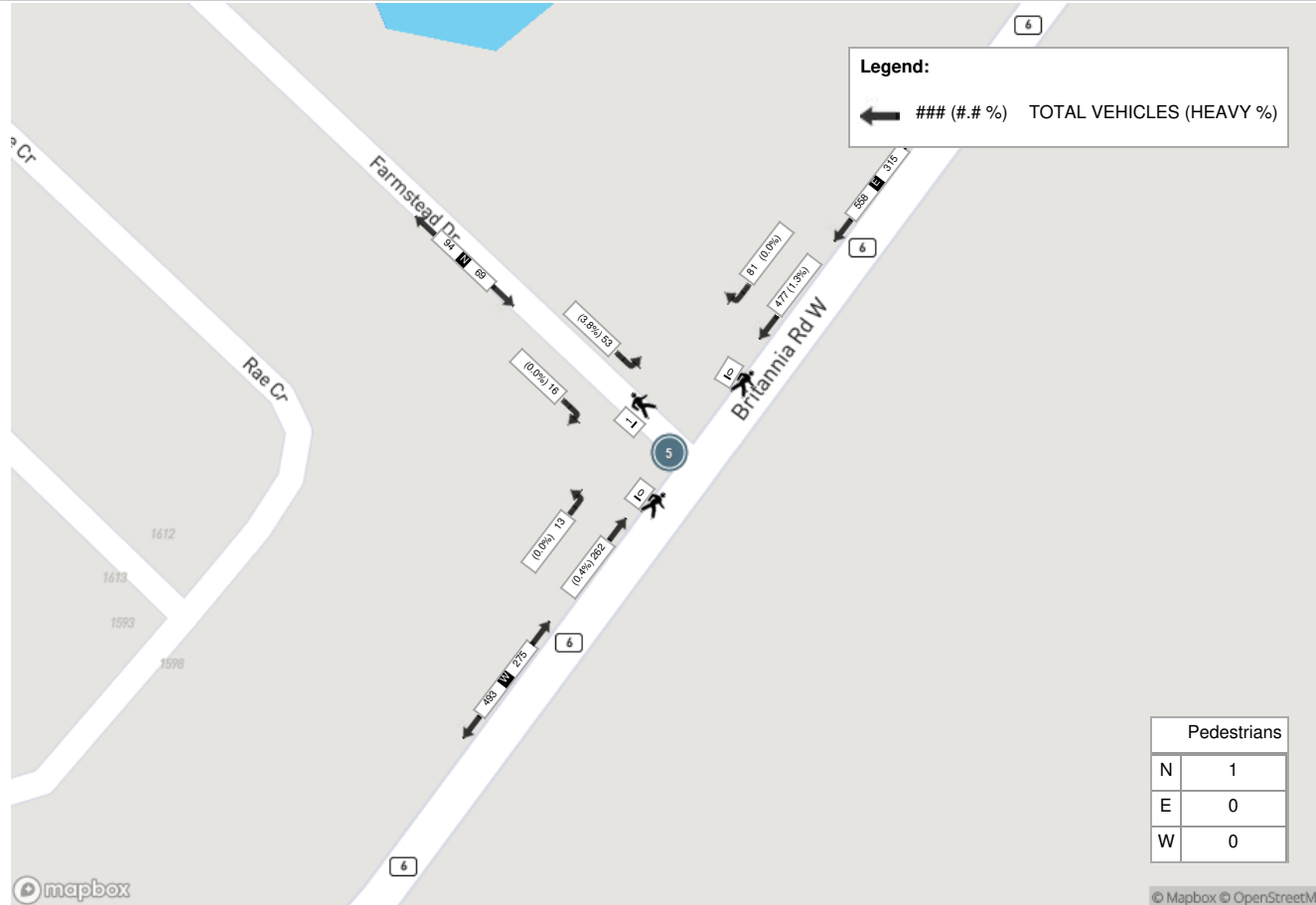
Peak Hour: 04:15 PM - 05:15 PM Weather: Overcast Clouds (6.01 °C)

Start Time	N Approach FARMSTEAD DR					E Approach BRITANNIA RD					W Approach BRITANNIA RD					Int. Total (15 min)
	Right	Left	UTurn	Peds	Approach Total	Right	Thru	UTurn	Peds	Approach Total	Thru	Left	UTurn	Peds	Approach Total	
16:15:00	3	13	0	0	16	23	137	0	0	160	65	3	0	0	68	244
16:30:00	5	17	0	0	22	18	117	0	0	135	44	4	1	0	49	206
16:45:00	3	11	0	1	14	22	117	0	0	139	74	3	0	0	77	230
17:00:00	5	12	0	0	17	18	106	0	0	124	79	3	0	0	82	223
Grand Total	16	53	0	1	69	81	477	0	0	558	262	13	1	0	276	903
Approach%	23.2%	76.8%	0%	-	-	14.5%	85.5%	0%	-	-	94.9%	4.7%	0.4%	-	-	-
Totals %	1.8%	5.9%	0%	7.6%	7.6%	9%	52.8%	0%	61.8%	61.8%	29%	1.4%	0.1%	30.6%	30.6%	-
PHF	0.8	0.78	0	0.78	0.78	0.88	0.87	0	0.87	0.87	0.83	0.81	0.25	0.84	0.84	-
Heavy	0	2	0	2	2	0	6	0	6	6	1	0	0	1	1	-
Heavy %	0%	3.8%	0%	2.9%	2.9%	0%	1.3%	0%	1.1%	1.1%	0.4%	0%	0%	0.4%	0.4%	-
Lights	16	51	0	67	67	81	471	0	552	552	261	13	1	275	275	-
Lights %	100%	96.2%	0%	97.1%	97.1%	100%	98.7%	0%	98.9%	98.9%	99.6%	100%	100%	99.6%	99.6%	-
Single-Unit Trucks	0	0	0	0	0	0	4	0	4	4	0	0	0	0	0	-
Single-Unit Trucks %	0%	0%	0%	0%	0%	0%	0.8%	0%	0.7%	0.7%	0%	0%	0%	0%	0%	-
Buses	0	2	0	2	2	0	2	0	2	2	1	0	0	1	1	-
Buses %	0%	3.8%	0%	2.9%	2.9%	0%	0.4%	0%	0.4%	0.4%	0.4%	0%	0%	0.4%	0.4%	-
Articulated Trucks	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%	-
Pedestrians	-	-	-	1	-	-	-	-	0	-	-	-	-	0	-	-
Pedestrians%	-	-	-	100%	-	-	-	-	0%	-	-	-	-	0%	-	-

Peak Hour: 08:00 AM - 09:00 AM Weather: Overcast Clouds (1.73 °C)



Peak Hour: 04:15 PM - 05:15 PM Weather: Overcast Clouds (6.01 °C)





Turning Movement Count (1 . REGIONAL RD 25 & BRITANNIA RD)

Start Time	N Approach REGIONAL RD 25						E Approach BRITANNIA RD						S Approach REGIONAL RD 25						W Approach BRITANNIA RD						Int. Total (15 min)	Int. Total (1 hr)
	Right N:W	Thru N:S	Left N:E	UTurn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	Left E:S	UTurn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	Left S:W	UTurn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	Left W:N	UTurn W:W	Peds W:	Approach Total		
07:00:00	4	211	20	0	0	235	7	14	29	0	0	50	26	102	4	0	0	132	19	44	2	0	0	65	482	
07:15:00	6	247	32	0	0	285	10	21	34	0	0	65	37	130	5	0	0	172	24	78	6	1	0	109	631	
07:30:00	11	293	25	0	0	329	14	17	53	0	0	84	36	159	10	0	0	205	41	86	12	0	0	139	757	
07:45:00	10	274	30	0	0	314	14	39	40	0	0	93	28	168	13	0	0	209	43	71	20	0	0	134	750	2620
08:00:00	7	245	18	0	0	270	12	53	57	0	1	122	24	140	12	0	0	176	35	75	19	0	0	129	697	2835
08:15:00	16	282	11	0	0	309	17	43	57	0	0	117	19	193	12	0	0	224	32	69	18	0	0	119	769	2973
08:30:00	20	235	29	0	1	284	9	64	63	0	0	136	25	155	13	0	0	193	31	70	12	0	0	113	726	2942
08:45:00	7	210	19	0	0	236	14	67	38	0	0	119	25	134	9	0	0	168	32	65	14	0	0	111	634	2826
BREAK																										
16:00:00	21	158	13	0	0	192	31	80	27	0	0	138	47	220	19	0	0	286	15	56	11	0	0	82	698	
16:15:00	19	167	13	0	0	199	42	118	35	0	0	195	51	228	30	0	0	309	18	51	13	0	0	82	785	
16:30:00	13	173	10	0	0	196	22	104	30	0	0	156	71	276	12	0	0	359	6	40	12	0	0	58	769	
16:45:00	12	157	12	0	1	181	27	97	40	0	0	164	67	239	31	0	0	337	12	65	10	0	0	87	769	3021
17:00:00	10	138	17	0	0	165	26	96	39	0	0	161	84	239	21	0	0	344	10	70	10	0	0	90	760	3083
17:15:00	17	164	9	0	0	190	37	91	42	0	0	170	70	259	20	0	0	349	14	50	10	0	0	74	783	3081
17:30:00	9	164	16	0	0	189	33	84	37	0	0	154	57	283	28	0	0	368	17	39	9	0	0	65	776	3088
17:45:00	12	138	14	0	0	164	32	85	33	0	0	150	35	219	28	0	0	282	15	51	4	0	0	70	666	2985
Grand Total	194	3256	288	0	2	3738	347	1073	654	0	1	2074	702	3144	267	0	0	4113	364	980	182	1	0	1527	11452	-
Approach%	5.2%	87.1%	7.7%	0%	-	-	16.7%	51.7%	31.5%	0%	-	-	17.1%	76.4%	6.5%	0%	-	23.8%	64.2%	11.9%	0.1%	-	-	-	-	
Totals %	1.7%	28.4%	2.5%	0%	32.6%	-	3%	9.4%	5.7%	0%	18.1%	-	6.1%	27.5%	2.3%	0%	35.9%	3.2%	8.6%	1.6%	0%	13.3%	-	-	-	
Heavy	10	151	9	0	-	-	11	37	47	0	-	-	50	173	9	0	-	9	13	10	0	-	-	-	-	
Heavy %	5.2%	4.6%	3.1%	0%	-	-	3.2%	3.4%	7.2%	0%	-	-	7.1%	5.5%	3.4%	0%	-	2.5%	1.3%	5.5%	0%	-	-	-	-	
Bicycles	0	1	0	0	-	-	0	0	0	0	-	-	0	0	0	0	-	0	0	0	0	-	-	-	-	
Bicycle %	0%	0%	0%	0%	-	-	0%	0%	0%	0%	-	-	0%	0%	0%	0%	-	0%	0%	0%	0%	-	-	-	-	



Peak Hour: 07:30 AM - 08:30 AM Weather: Overcast Clouds (1.73 °C)

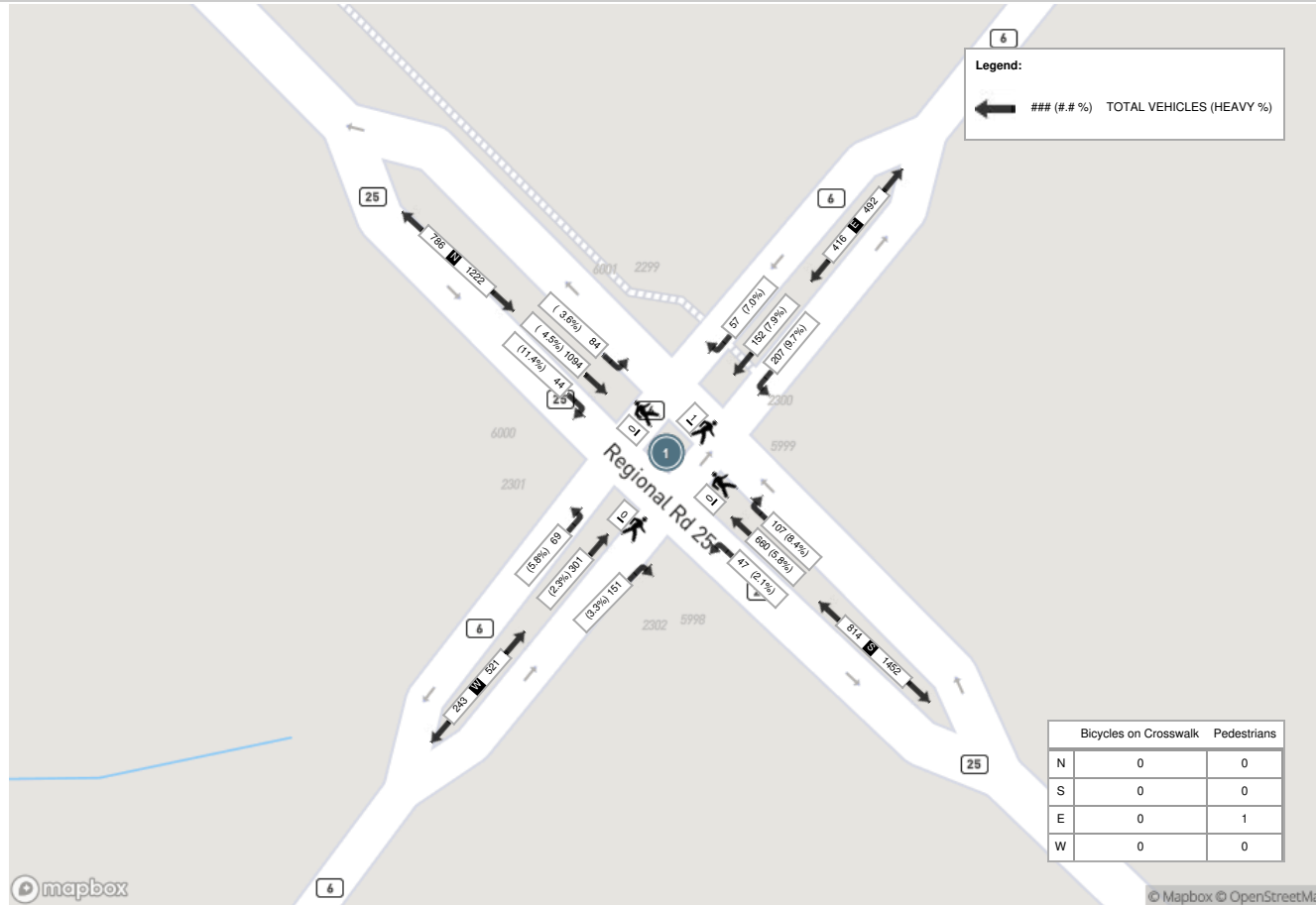
Start Time	N Approach REGIONAL RD 25						E Approach BRITANNIA RD						S Approach REGIONAL RD 25						W Approach BRITANNIA RD						Int. Total (15 min)
	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	
07:30:00	11	293	25	0	0	329	14	17	53	0	0	84	36	159	10	0	0	205	41	86	12	0	0	139	757
07:45:00	10	274	30	0	0	314	14	39	40	0	0	93	28	168	13	0	0	209	43	71	20	0	0	134	750
08:00:00	7	245	18	0	0	270	12	53	57	0	1	122	24	140	12	0	0	176	35	75	19	0	0	129	697
08:15:00	16	282	11	0	0	309	17	43	57	0	0	117	19	193	12	0	0	224	32	69	18	0	0	119	769
Grand Total	44	1094	84	0	0	1222	57	152	207	0	1	416	107	660	47	0	0	814	151	301	69	0	0	521	2973
Approach%	3.6%	89.5%	6.9%	0%	-	-	13.7%	36.5%	49.8%	0%	-	-	13.1%	81.1%	5.8%	0%	-	-	29%	57.8%	13.2%	0%	-	-	-
Totals %	1.5%	36.8%	2.8%	0%	41.1%	1.9%	5.1%	7%	0%	14%	3.6%	22.2%	1.6%	0%	27.4%	5.1%	10.1%	2.3%	0%	17.5%	-	-	-	-	-
PHF	0.69	0.93	0.7	0	0.93	0.84	0.72	0.91	0	0.85	0.74	0.85	0.9	0	0.91	0.88	0.88	0.86	0	0.94	-	-	-	-	-
Heavy	5	49	3	0	57	4	12	20	0	36	9	38	1	0	48	5	7	4	0	16	-	-	-	-	-
Heavy %	11.4%	4.5%	3.6%	0%	4.7%	7%	7.9%	9.7%	0%	8.7%	8.4%	5.8%	2.1%	0%	5.9%	3.3%	2.3%	5.8%	0%	3.1%	-	-	-	-	-
Lights	39	1045	81	0	1165	53	140	187	0	380	98	622	46	0	766	146	294	65	0	505	-	-	-	-	-
Lights %	88.6%	95.5%	96.4%	0%	95.3%	93%	92.1%	90.3%	0%	91.3%	91.6%	94.2%	97.9%	0%	94.1%	96.7%	97.7%	94.2%	0%	96.9%	-	-	-	-	-
Single-Unit Trucks	1	15	0	0	16	1	9	6	0	16	3	14	0	0	17	2	0	1	0	3	-	-	-	-	-
Single-Unit Trucks %	2.3%	1.4%	0%	0%	1.3%	1.8%	5.9%	2.9%	0%	3.8%	2.8%	2.1%	0%	0%	2.1%	1.3%	0%	1.4%	0%	0.6%	-	-	-	-	-
Buses	4	6	1	0	11	3	0	4	0	7	0	4	0	0	4	3	3	3	0	9	-	-	-	-	-
Buses %	9.1%	0.5%	1.2%	0%	0.9%	5.3%	0%	1.9%	0%	1.7%	0%	0.6%	0%	0%	0.5%	2%	1%	4.3%	0%	1.7%	-	-	-	-	-
Articulated Trucks	0	28	2	0	30	0	3	10	0	13	6	20	1	0	27	0	4	0	0	4	-	-	-	-	-
Articulated Trucks %	0%	2.6%	2.4%	0%	2.5%	0%	2%	4.8%	0%	3.1%	5.6%	3%	2.1%	0%	3.3%	0%	1.3%	0%	0%	0.8%	-	-	-	-	-
Pedestrians	-	-	-	-	0	-	-	-	-	1	-	-	-	-	0	-	-	-	-	0	-	-	-	-	-
Pedestrians%	-	-	-	-	0%	-	-	-	-	100%	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-	-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	-
Bicycles on Crosswalk%	-	-	-	-	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
Bicycles on Road%	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-	-



Peak Hour: 04:45 PM - 05:45 PM Weather: Overcast Clouds (6.01 °C)

Start Time	N Approach REGIONAL RD 25						E Approach BRITANNIA RD						S Approach REGIONAL RD 25						W Approach BRITANNIA RD						Int. Total (15 min)
	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	
16:45:00	12	157	12	0	1	181	27	97	40	0	0	164	67	239	31	0	0	337	12	65	10	0	0	87	769
17:00:00	10	138	17	0	0	165	26	96	39	0	0	161	84	239	21	0	0	344	10	70	10	0	0	90	760
17:15:00	17	164	9	0	0	190	37	91	42	0	0	170	70	259	20	0	0	349	14	50	10	0	0	74	783
17:30:00	9	164	16	0	0	189	33	84	37	0	0	154	57	283	28	0	0	368	17	39	9	0	0	65	776
Grand Total	48	623	54	0	1	725	123	368	158	0	0	649	278	1020	100	0	0	1398	53	224	39	0	0	316	3088
Approach%	6.6%	85.9%	7.4%	0%	-	-	19%	56.7%	24.3%	0%	-	-	19.9%	73%	7.2%	0%	-	-	16.8%	70.9%	12.3%	0%	-	-	-
Totals %	1.6%	20.2%	1.7%	0%	23.5%	4%	11.9%	5.1%	0%	21%	9%	33%	3.2%	0%	45.3%	1.7%	7.3%	1.3%	0%	10.2%	-	-	-		
PHF	0.71	0.95	0.79	0	0.95	0.83	0.95	0.94	0	0.95	0.83	0.9	0.81	0	0.95	0.78	0.8	0.98	0	0.88	-	-	-		
Heavy	0	23	2	0	25	1	1	6	0	8	9	42	2	0	53	0	1	1	0	2	-	-	-		
Heavy %	0%	3.7%	3.7%	0%	3.4%	0.8%	0.3%	3.8%	0%	1.2%	3.2%	4.1%	2%	0%	3.8%	0%	0.4%	2.6%	0%	0.6%	-	-	-		
Lights	48	600	52	0	700	122	367	152	0	641	269	978	98	0	1345	53	223	38	0	314	-	-	-		
Lights %	100%	96.3%	96.3%	0%	96.6%	99.2%	99.7%	96.2%	0%	98.8%	96.8%	95.9%	98%	0%	96.2%	100%	99.6%	97.4%	0%	99.4%	-	-	-		
Single-Unit Trucks	0	9	1	0	10	1	1	1	0	3	3	14	1	0	18	0	0	0	0	0	-	-	-		
Single-Unit Trucks %	0%	1.4%	1.9%	0%	1.4%	0.8%	0.3%	0.6%	0%	0.5%	1.1%	1.4%	1%	0%	1.3%	0%	0%	0%	0%	0%	-	-	-		
Buses	0	0	0	0	0	0	0	0	0	0	0	3	0	0	3	0	1	1	0	2	-	-	-		
Buses %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0.3%	0%	0%	0.2%	0%	0.4%	2.6%	0%	0.6%	-	-	-		
Articulated Trucks	0	14	1	0	15	0	0	5	0	5	6	25	1	0	32	0	0	0	0	0	-	-	-		
Articulated Trucks %	0%	2.2%	1.9%	0%	2.1%	0%	0%	3.2%	0%	0.8%	2.2%	2.5%	1%	0%	2.3%	0%	0%	0%	0%	0%	-	-	-		
Pedestrians	-	-	-	-	1	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-		
Pedestrians%	-	-	-	-	100%	-	-	-	0%	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-		
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-		
Bicycles on Crosswalk%	-	-	-	-	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 Road%	-	-	-	-	0%	-	-	-	0%	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-		

Peak Hour: 07:30 AM - 08:30 AM Weather: Overcast Clouds (1.73 °C)



mapbox

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Turning Movement Count (2 . REGIONAL RD 25 & ETHERIDGE AVE)

Start Time	N Approach REGIONAL RD 25						E Approach ETHERIDGE AVE						S Approach REGIONAL RD 25						W Approach ETHERIDGE AVE						Int. Total (15 min)	Int. Total (1 hr)	
	Right N:W	Thru N:S	Left N:E	UTurn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	Left E:S	UTurn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	Left S:W	UTurn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	Left W:N	UTurn W:W	Peds W:	Approach Total			
07:00:00	10	223	0	0	0	233	0	0	0	0	0	0	0	102	8	0	1	110	14	0	16	0	0	30	373		
07:15:00	4	268	0	0	0	272	0	0	0	0	0	0	0	139	5	0	0	144	17	0	23	0	0	40	456		
07:30:00	12	325	0	0	0	337	0	0	0	0	0	0	0	184	8	0	0	192	15	0	17	0	0	32	561		
07:45:00	13	284	0	0	0	297	0	0	0	0	0	0	0	191	9	0	0	200	17	0	22	0	0	39	536	1926	
08:00:00	12	261	0	0	0	273	0	0	0	0	1	0	0	169	8	0	0	177	17	0	32	0	0	49	499	2052	
08:15:00	16	288	0	1	0	305	0	0	0	0	0	0	0	215	6	0	0	221	16	0	30	0	0	46	572	2168	
08:30:00	21	259	0	1	0	281	0	1	0	0	1	1	1	178	5	0	0	184	19	0	22	0	0	41	507	2114	
08:45:00	15	217	0	0	0	232	0	0	0	0	1	0	0	157	6	0	0	163	18	0	21	0	0	39	434	2012	
BREAK																											
16:00:00	28	175	0	0	0	203	0	0	0	0	0	0	0	235	21	0	1	256	7	0	14	0	0	21	480		
16:15:00	29	206	0	0	0	235	0	0	0	0	0	0	0	273	15	0	0	288	10	0	14	0	0	24	547		
16:30:00	22	181	0	0	0	203	0	0	0	0	0	0	0	294	16	0	0	310	5	0	19	0	0	24	537		
16:45:00	29	177	0	0	0	206	0	0	0	0	1	0	0	275	10	0	0	285	4	0	23	0	0	27	518	2082	
17:00:00	33	150	0	0	0	183	0	0	0	0	0	0	0	264	13	0	0	277	7	0	22	0	0	29	489	2091	
17:15:00	24	178	0	1	0	203	0	0	0	0	0	0	0	289	15	0	0	304	6	0	12	0	0	18	525	2069	
17:30:00	29	186	0	0	0	215	0	0	0	0	0	0	0	299	23	0	0	322	7	0	20	0	0	27	564	2096	
17:45:00	28	156	0	0	0	184	0	0	0	0	0	0	0	240	18	0	0	258	6	0	22	0	0	28	470	2048	
Grand Total	325	3534	0	3	0	3862	0	1	0	0	4	1	1	3504	186	0	2	3691	185	0	329	0	0	514	8068	-	
Approach%	8.4%	91.5%	0%	0.1%	-	-	0%	100%	0%	0%	-	-	0%	94.9%	5%	0%	-	-	36%	0%	64%	0%	-	-	-	-	
Totals %	4%	43.8%	0%	0%	-	47.9%	0%	0%	0%	0%	-	0%	0%	43.4%	2.3%	0%	-	45.7%	2.3%	0%	4.1%	0%	-	6.4%	-	-	
Heavy	11	169	0	0	-	-	0	0	0	0	-	-	0	188	4	0	-	-	0	0	7	0	-	-	-	-	
Heavy %	3.4%	4.8%	0%	0%	-	-	0%	0%	0%	0%	-	-	0%	5.4%	2.2%	0%	-	-	0%	0%	2.1%	0%	-	-	-	-	
Bicycles	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Bicycle %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	



Peak Hour: 07:30 AM - 08:30 AM Weather: Overcast Clouds (1.73 °C)

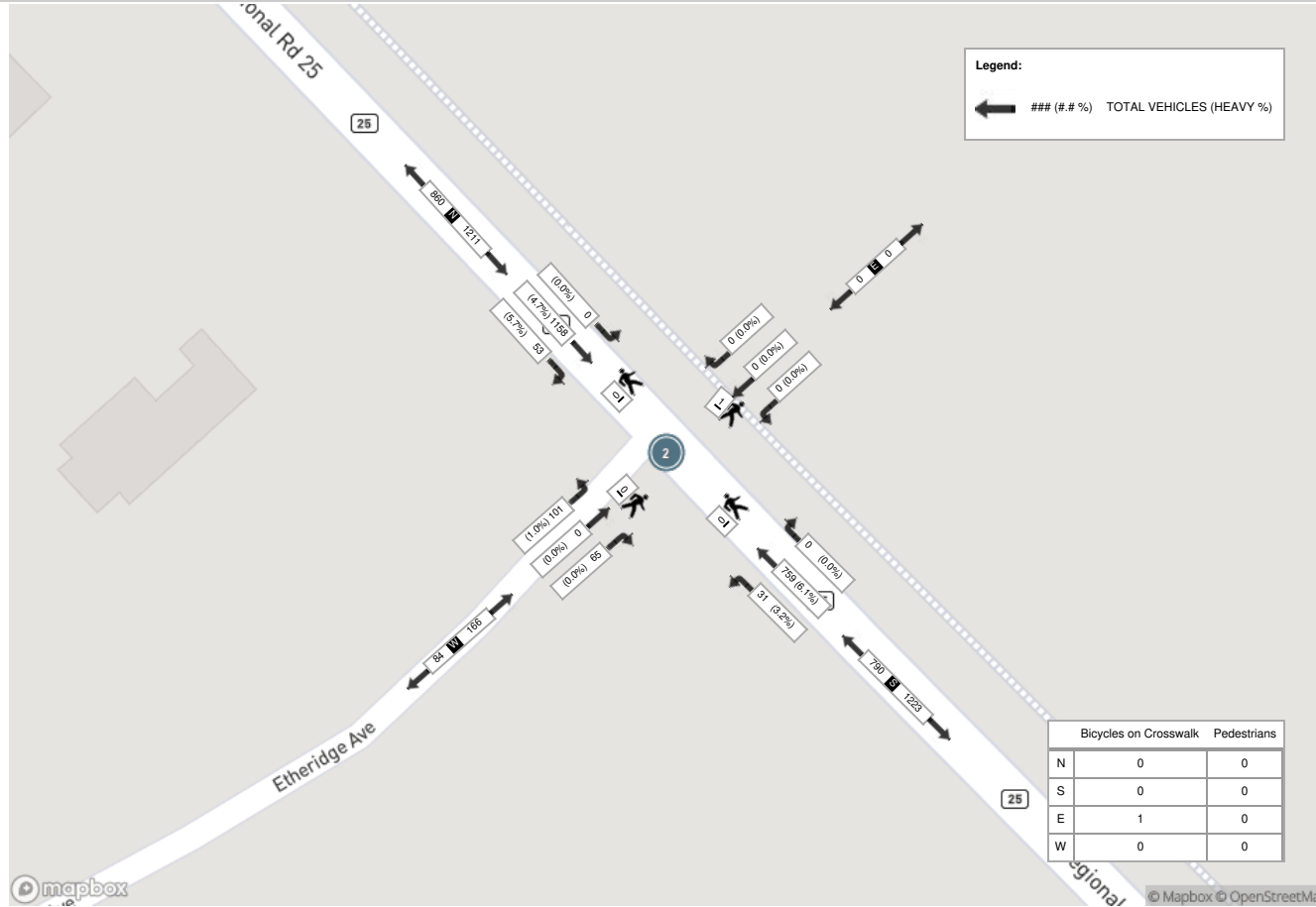
Start Time	N Approach REGIONAL RD 25						E Approach ETHERIDGE AVE						S Approach REGIONAL RD 25						W Approach ETHERIDGE AVE						Int. Total (15 min)
	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	
07:30:00	12	325	0	0	0	337	0	0	0	0	0	0	0	184	8	0	0	192	15	0	17	0	0	32	561
07:45:00	13	284	0	0	0	297	0	0	0	0	0	0	0	191	9	0	0	200	17	0	22	0	0	39	536
08:00:00	12	261	0	0	0	273	0	0	0	0	1	0	0	169	8	0	0	177	17	0	32	0	0	49	499
08:15:00	16	288	0	1	0	305	0	0	0	0	0	0	0	215	6	0	0	221	16	0	30	0	0	46	572
Grand Total	53	1158	0	1	0	1212	0	0	0	0	1	0	0	759	31	0	0	790	65	0	101	0	0	166	2168
Approach%	4.4%	95.5%	0%	0.1%	-	-	0%	0%	0%	0%	-	-	0%	96.1%	3.9%	0%	-	-	39.2%	0%	60.8%	0%	-	-	-
Totals %	2.4%	53.4%	0%	0%	55.9%	0%	0%	0%	0%	0%	0%	0%	0%	35%	1.4%	0%	36.4%	3%	0%	4.7%	0%	7.7%	-	-	-
PHF	0.83	0.89	0	0.25	0.9	0	0	0	0	0	0	0	0	0.88	0.86	0	0.89	0.96	0	0.79	0	0.85	-	-	-
Heavy	3	54	0	0	57	0	0	0	0	0	0	0	0	46	1	0	47	0	0	1	0	1	-	-	-
Heavy %	5.7%	4.7%	0%	0%	4.7%	0%	0%	0%	0%	0%	0%	0%	0%	6.1%	3.2%	0%	5.9%	0%	0%	1%	0%	0.6%	-	-	-
Lights	50	1104	0	1	1155	0	0	0	0	0	0	0	0	713	30	0	743	65	0	100	0	165	-	-	-
Lights %	94.3%	95.3%	0%	100%	95.3%	0%	0%	0%	0%	0%	0%	0%	0%	93.9%	96.8%	0%	94.1%	100%	0%	99%	0%	99.4%	-	-	-
Single-Unit Trucks	0	14	0	0	14	0	0	0	0	0	0	0	0	17	0	0	17	0	0	0	0	0	-	-	-
Single-Unit Trucks %	0%	1.2%	0%	0%	1.2%	0%	0%	0%	0%	0%	0%	0%	0%	2.2%	0%	0%	2.2%	0%	0%	0%	0%	0%	-	-	-
Buses	3	11	0	0	14	0	0	0	0	0	0	0	0	9	1	0	10	0	0	1	0	1	-	-	-
Buses %	5.7%	0.9%	0%	0%	1.2%	0%	0%	0%	0%	0%	0%	0%	0%	1.2%	3.2%	0%	1.3%	0%	0%	1%	0%	0.6%	-	-	-
Articulated Trucks	0	29	0	0	29	0	0	0	0	0	0	0	0	20	0	0	20	0	0	0	0	0	-	-	-
Articulated Trucks %	0%	2.5%	0%	0%	2.4%	0%	0%	0%	0%	0%	0%	0%	0%	2.6%	0%	0%	2.5%	0%	0%	0%	0%	0%	-	-	-
Pedestrians	-	-	-	-	0	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	0	-	-	-
Pedestrians%	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-	-	-	0%	-	-	-	-	0%	-	-	-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	1	-	-	-	-	-	-	0	-	-	-	-	0	-	-	-
Bicycles on Crosswalk%	-	-	-	-	0%	-	-	-	-	100%	-	-	-	-	-	-	0%	-	-	-	-	0%	-	-	-



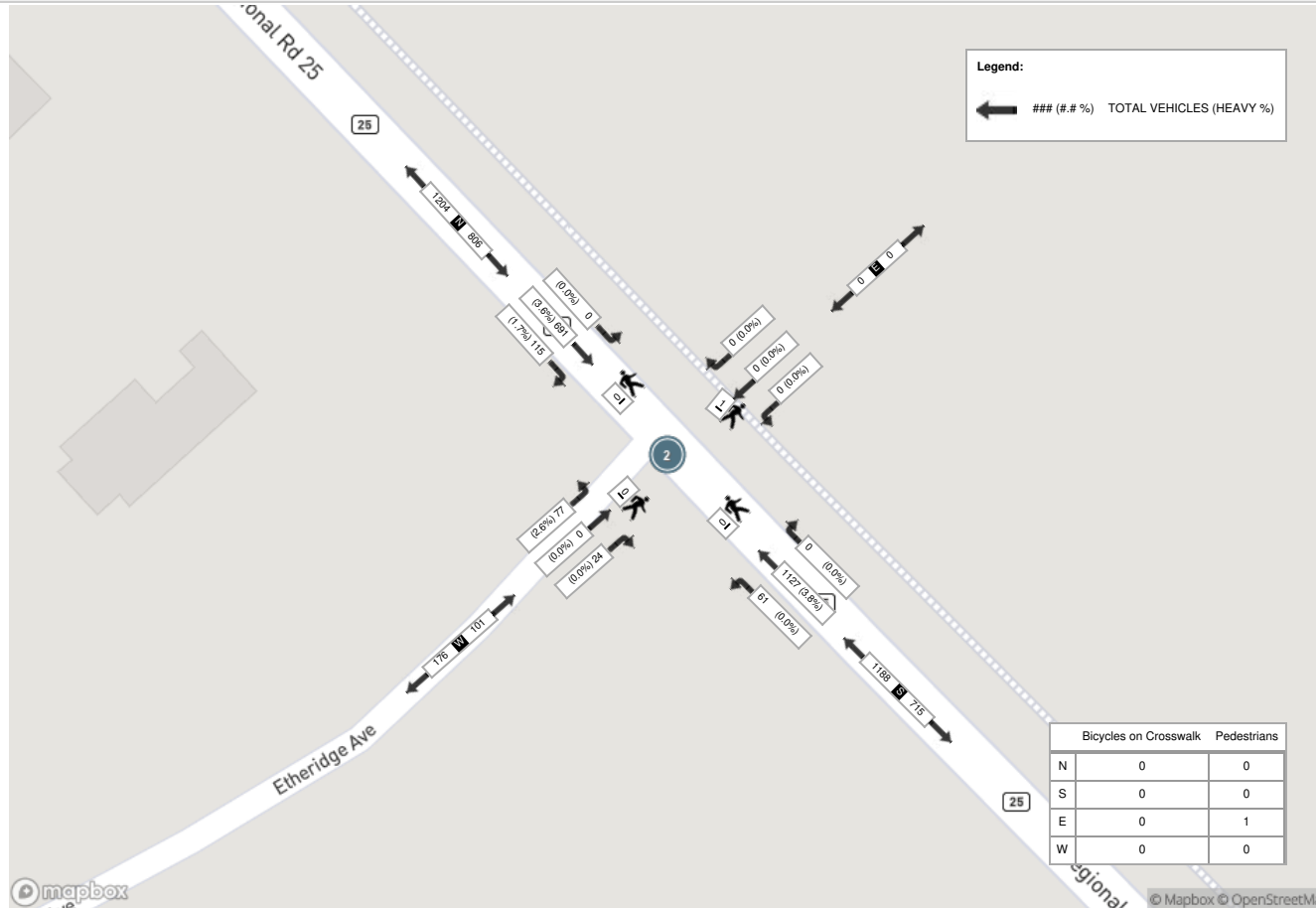
Peak Hour: 04:45 PM - 05:45 PM Weather: Overcast Clouds (6.01 °C)

Start Time	N Approach REGIONAL RD 25						E Approach ETHERIDGE AVE						S Approach REGIONAL RD 25						W Approach ETHERIDGE AVE						Int. Total (15 min)
	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	
16:45:00	29	177	0	0	0	206	0	0	0	0	1	0	0	275	10	0	0	285	4	0	23	0	0	27	518
17:00:00	33	150	0	0	0	183	0	0	0	0	0	0	0	264	13	0	0	277	7	0	22	0	0	29	489
17:15:00	24	178	0	1	0	203	0	0	0	0	0	0	0	289	15	0	0	304	6	0	12	0	0	18	525
17:30:00	29	186	0	0	0	215	0	0	0	0	0	0	0	299	23	0	0	322	7	0	20	0	0	27	564
Grand Total	115	691	0	1	0	807	0	0	0	0	1	0	0	1127	61	0	0	1188	24	0	77	0	0	101	2096
Approach%	14.3%	85.6%	0%	0.1%	-	-	0%	0%	0%	0%	-	-	0%	94.9%	5.1%	0%	-	-	23.8%	0%	76.2%	0%	-	-	-
Totals %	5.5%	33%	0%	0%	38.5%	0%	0%	0%	0%	0%	0%	0%	0%	53.8%	2.9%	0%	56.7%	1.1%	0%	3.7%	0%	4.8%	0%	0%	-
PHF	0.87	0.93	0	0.25	0.94	0	0	0	0	0	0	0	0	0.94	0.66	0	0.92	0.86	0	0.84	0	0.87	0	0.87	-
Heavy	2	25	0	0	27	0	0	0	0	0	0	0	0	43	0	0	43	0	0	2	0	0	2	-	
Heavy %	1.7%	3.6%	0%	0%	3.3%	0%	0%	0%	0%	0%	0%	0%	0%	3.8%	0%	0%	3.6%	0%	0%	2.6%	0%	2%	0%	-	
Lights	113	666	0	1	780	0	0	0	0	0	0	0	0	1084	61	0	1145	24	0	75	0	0	99	-	
Lights %	98.3%	96.4%	0%	100%	96.7%	0%	0%	0%	0%	0%	0%	0%	0%	96.2%	100%	0%	96.4%	100%	0%	97.4%	0%	0%	98%	-	
Single-Unit Trucks	1	10	0	0	11	0	0	0	0	0	0	0	0	13	0	0	13	0	0	1	0	0	1	-	
Single-Unit Trucks %	0.9%	1.4%	0%	0%	1.4%	0%	0%	0%	0%	0%	0%	0%	0%	1.2%	0%	0%	1.1%	0%	0%	1.3%	0%	0%	1%	-	
Buses	1	0	0	0	1	0	0	0	0	0	0	0	0	4	0	0	4	0	0	1	0	0	1	-	
Buses %	0.9%	0%	0%	0%	0.1%	0%	0%	0%	0%	0%	0%	0%	0%	0.4%	0%	0%	0.3%	0%	0%	1.3%	0%	0%	1%	-	
Articulated Trucks	0	15	0	0	15	0	0	0	0	0	0	0	0	26	0	0	26	0	0	0	0	0	0	-	
Articulated Trucks %	0%	2.2%	0%	0%	1.9%	0%	0%	0%	0%	0%	0%	0%	0%	2.3%	0%	0%	2.2%	0%	0%	0%	0%	0%	0%	-	
Pedestrians	-	-	-	-	0	-	-	-	-	1	-	-	-	-	-	-	0	-	-	-	-	0	-	-	
Pedestrians%	-	-	-	-	0%	-	-	-	-	100%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-	
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	
Bicycles on Crosswalk%	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-	

Peak Hour: 07:30 AM - 08:30 AM Weather: Overcast Clouds (1.73 °C)



Peak Hour: 04:45 PM - 05:45 PM Weather: Overcast Clouds (6.01 °C)





Turning Movement Count (4 . REGIONAL RD 25 & LOUIS ST LAURENT AVE)

Start Time	N Approach REGIONAL RD 25						E Approach LOUIS ST LAURENT AVE					S Approach REGIONAL RD 25					W Approach LOUIS ST LAURENT AVE					Int. Total (15 min)	Int. Total (1 hr)			
	Right N:W	Thru N:S	Left N:E	UTurn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	Left E:S	UTurn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	Left S:W	UTurn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	Left W:N			UTurn W:W	Peds W:	Approach Total
07:00:00	19	136	7	0	0	162	6	22	55	0	0	83	25	110	6	0	0	141	31	61	47	0	0	139	525	
07:15:00	18	173	11	0	0	202	13	32	69	0	0	114	39	118	14	0	0	171	32	60	39	0	0	131	618	
07:30:00	16	186	12	0	3	214	11	56	79	0	0	146	50	137	18	0	1	205	30	104	59	1	0	194	759	
07:45:00	18	167	23	0	2	208	22	97	85	0	0	204	60	161	25	0	0	246	41	155	60	0	0	256	914	2816
08:00:00	30	155	12	0	1	197	32	211	87	0	0	330	66	149	18	0	1	233	38	137	69	0	2	244	1004	3295
08:15:00	14	167	15	0	2	196	28	131	107	0	0	266	65	191	18	0	1	274	48	142	70	0	0	260	996	3673
08:30:00	32	153	12	1	1	198	15	105	91	0	0	211	56	167	25	0	0	248	31	103	66	0	0	200	857	3771
08:45:00	13	136	12	0	0	161	23	82	74	0	0	179	55	148	19	0	0	222	25	132	65	1	0	223	785	3642
BREAK																										
16:00:00	36	147	19	0	0	202	19	121	75	0	0	215	74	161	40	0	0	275	15	93	36	0	0	144	836	
16:15:00	40	159	17	0	6	216	20	121	76	0	0	217	67	179	59	0	0	305	22	72	32	0	0	126	864	
16:30:00	36	161	22	1	0	220	18	119	65	0	0	202	79	196	46	0	0	321	17	85	46	0	1	148	891	
16:45:00	32	141	15	0	0	188	20	140	75	0	1	235	81	158	44	0	1	283	17	79	50	1	0	147	853	3444
17:00:00	52	148	16	0	1	216	15	127	71	0	0	213	90	162	37	0	3	289	23	83	44	0	3	150	868	3476
17:15:00	52	167	24	0	2	243	19	117	68	0	4	204	82	191	38	0	2	311	27	94	55	0	0	176	934	3546
17:30:00	55	188	15	0	2	258	18	138	50	0	0	206	89	195	46	0	0	330	24	95	39	0	0	158	952	3607
17:45:00	34	145	20	0	1	199	11	151	63	0	0	225	92	140	50	0	0	282	20	101	58	1	1	180	886	3640
Grand Total	497	2529	252	2	21	3280	290	1770	1190	0	5	3250	1070	2563	503	0	9	4136	441	1596	835	4	7	2876	13542	-
Approach%	15.2%	77.1%	7.7%	0.1%	-	-	8.9%	54.5%	36.6%	0%	-	-	25.9%	62%	12.2%	0%	-	-	15.3%	55.5%	29%	0.1%	-	-	-	
Totals %	3.7%	18.7%	1.9%	0%	-	24.2%	2.1%	13.1%	8.8%	0%	-	24%	7.9%	18.9%	3.7%	0%	-	30.5%	3.3%	11.8%	6.2%	0%	-	21.2%	-	
Heavy	3	156	11	0	-	-	19	31	22	0	-	-	27	173	10	0	-	-	3	39	16	0	-	-	-	
Heavy %	0.6%	6.2%	4.4%	0%	-	-	6.6%	1.8%	1.8%	0%	-	-	2.5%	6.7%	2%	0%	-	-	0.7%	2.4%	1.9%	0%	-	-	-	
Bicycles	0	0	0	0	-	-	0	0	0	0	-	-	0	0	0	0	-	-	0	1	0	0	-	-	-	
Bicycle %	0%	0%	0%	0%	-	-	0%	0%	0%	0%	-	-	0%	0%	0%	0%	-	-	0%	0.1%	0%	0%	-	-	-	



Peak Hour: 07:45 AM - 08:45 AM Weather: Overcast Clouds (1.73 °C)

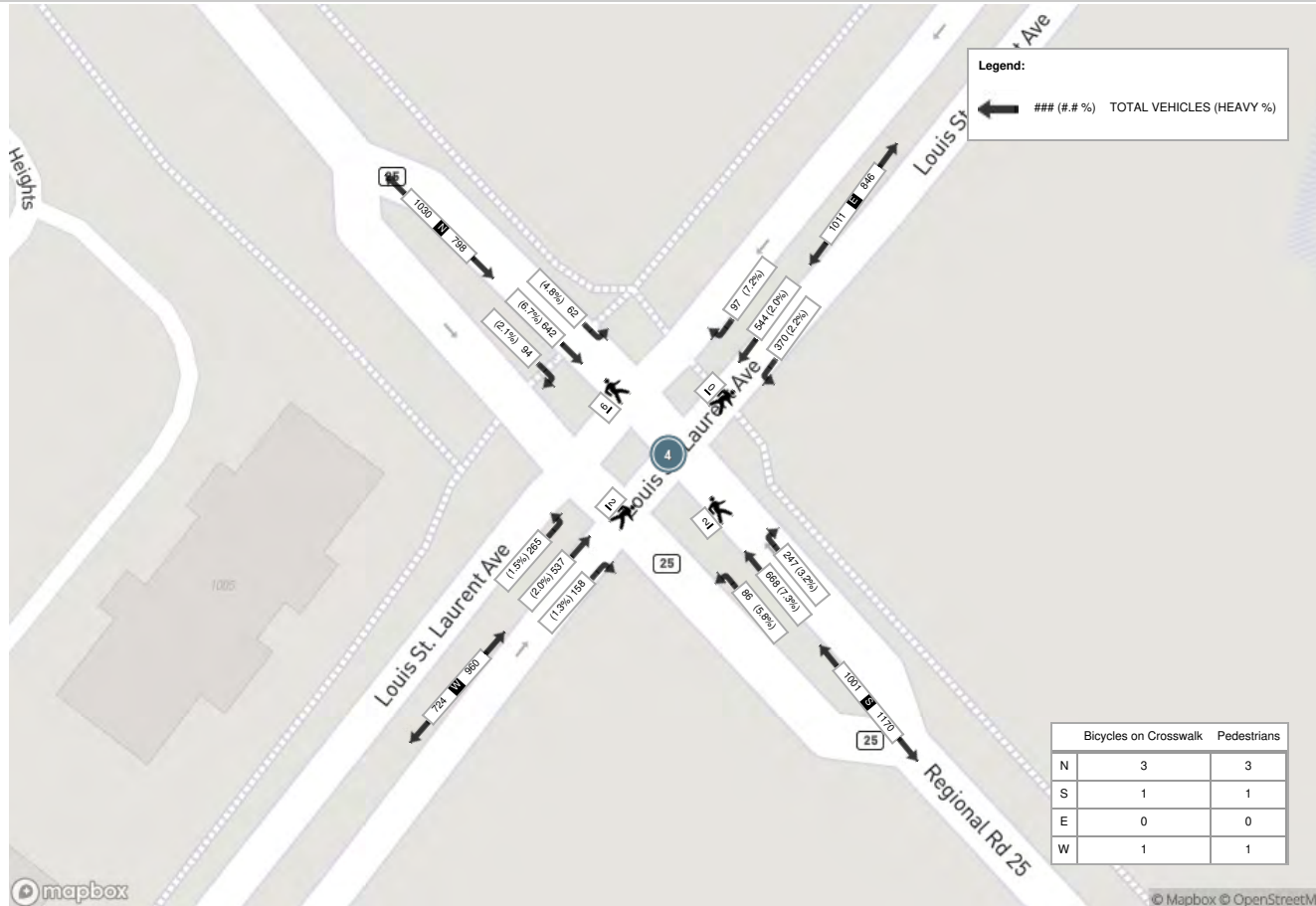
Start Time	N Approach REGIONAL RD 25						E Approach LOUIS ST LAURENT AVE						S Approach REGIONAL RD 25						W Approach LOUIS ST LAURENT AVE						Int. Total (15 min)
	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	
07:45:00	18	167	23	0	2	208	22	97	85	0	0	204	60	161	25	0	0	246	41	155	60	0	0	256	914
08:00:00	30	155	12	0	1	197	32	211	87	0	0	330	66	149	18	0	1	233	38	137	69	0	2	244	1004
08:15:00	14	167	15	0	2	196	28	131	107	0	0	266	65	191	18	0	1	274	48	142	70	0	0	260	996
08:30:00	32	153	12	1	1	198	15	105	91	0	0	211	56	167	25	0	0	248	31	103	66	0	0	200	857
Grand Total	94	642	62	1	6	799	97	544	370	0	0	1011	247	668	86	0	2	1001	158	537	265	0	2	960	3771
Approach%	11.8%	80.4%	7.8%	0.1%	-	-	9.6%	53.8%	36.6%	0%	-	-	24.7%	66.7%	8.6%	0%	-	-	16.5%	55.9%	27.6%	0%	-	-	-
Totals %	2.5%	17%	1.6%	0%	21.2%	2.6%	14.4%	9.8%	0%	26.8%	6.5%	17.7%	2.3%	0%	26.5%	4.2%	14.2%	7%	0%	25.5%	-	-	-	-	-
PHF	0.73	0.96	0.67	0.25	0.96	0.76	0.64	0.86	0	0.77	0.94	0.87	0.86	0	0.91	0.82	0.87	0.95	0	0.92	-	-	-	-	-
Heavy	2	43	3	0	48	7	11	8	0	26	8	49	5	0	62	2	11	4	0	17	-	-	-	-	-
Heavy %	2.1%	6.7%	4.8%	0%	6%	7.2%	2%	2.2%	0%	2.6%	3.2%	7.3%	5.8%	0%	6.2%	1.3%	2%	1.5%	0%	1.8%	-	-	-	-	-
Lights	92	599	59	1	751	90	533	362	0	985	239	619	81	0	939	156	526	261	0	943	-	-	-	-	-
Lights %	97.9%	93.3%	95.2%	100%	94%	92.8%	98%	97.8%	0%	97.4%	96.8%	92.7%	94.2%	0%	93.8%	98.7%	98%	98.5%	0%	98.2%	-	-	-	-	-
Single-Unit Trucks	1	13	1	0	15	5	1	2	0	8	3	17	2	0	22	0	6	0	0	6	-	-	-	-	-
Single-Unit Trucks %	1.1%	2%	1.6%	0%	1.9%	5.2%	0.2%	0.5%	0%	0.8%	1.2%	2.5%	2.3%	0%	2.2%	0%	1.1%	0%	0%	0.6%	-	-	-	-	-
Buses	1	7	1	0	9	1	9	6	0	16	5	9	3	0	17	2	5	4	0	11	-	-	-	-	-
Buses %	1.1%	1.1%	1.6%	0%	1.1%	1%	1.7%	1.6%	0%	1.6%	2%	1.3%	3.5%	0%	1.7%	1.3%	0.9%	1.5%	0%	1.1%	-	-	-	-	-
Articulated Trucks	0	23	1	0	24	1	1	0	0	2	0	23	0	0	23	0	0	0	0	0	-	-	-	-	-
Articulated Trucks %	0%	3.6%	1.6%	0%	3%	1%	0.2%	0%	0%	0.2%	0%	3.4%	0%	0%	2.3%	0%	0%	0%	0%	0%	-	-	-	-	-
Pedestrians	-	-	-	-	3	-	-	-	0	-	-	-	-	1	-	-	-	-	1	-	-	-	-	-	-
Pedestrians%	-	-	-	-	30%	-	-	-	0%	-	-	-	-	10%	-	-	-	-	10%	-	-	-	-	-	-
Bicycles on Crosswalk	-	-	-	-	3	-	-	-	0	-	-	-	-	1	-	-	-	-	1	-	-	-	-	-	-
Bicycles on Crosswalk%	-	-	-	-	30%	-	-	-	0%	-	-	-	-	10%	-	-	-	-	10%	-	-	-	-	-	-
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
Bicycles on Road%	-	-	-	-	0%	-	-	-	0%	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-	-	-



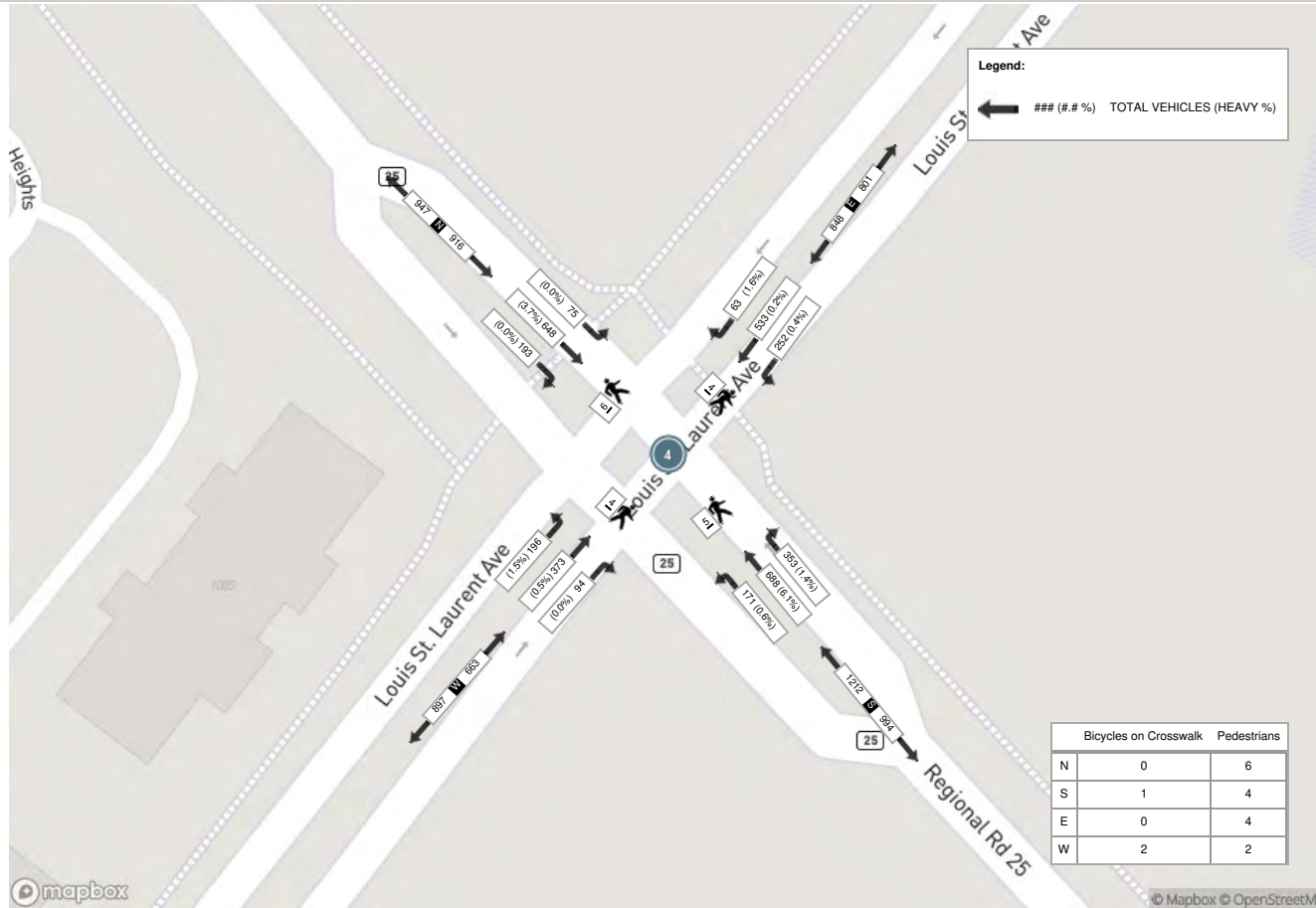
Peak Hour: 05:00 PM - 06:00 PM Weather: Overcast Clouds (6.01 °C)

Start Time	N Approach REGIONAL RD 25						E Approach LOUIS ST LAURENT AVE						S Approach REGIONAL RD 25						W Approach LOUIS ST LAURENT AVE						Int. Total (15 min)
	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	
17:00:00	52	148	16	0	1	216	15	127	71	0	0	213	90	162	37	0	3	289	23	83	44	0	3	150	868
17:15:00	52	167	24	0	2	243	19	117	68	0	4	204	82	191	38	0	2	311	27	94	55	0	0	176	934
17:30:00	55	188	15	0	2	258	18	138	50	0	0	206	89	195	46	0	0	330	24	95	39	0	0	158	952
17:45:00	34	145	20	0	1	199	11	151	63	0	0	225	92	140	50	0	0	282	20	101	58	1	1	180	886
Grand Total	193	648	75	0	6	916	63	533	252	0	4	848	353	688	171	0	5	1212	94	373	196	1	4	664	3640
Approach%	21.1%	70.7%	8.2%	0%	-	-	7.4%	62.9%	29.7%	0%	-	-	29.1%	56.8%	14.1%	0%	-	-	14.2%	56.2%	29.5%	0.2%	-	-	-
Totals %	5.3%	17.8%	2.1%	0%	25.2%	1.7%	14.6%	6.9%	0%	23.3%	9.7%	18.9%	4.7%	0%	33.3%	2.6%	10.2%	5.4%	0%	18.2%	-	-	-		
PHF	0.88	0.86	0.78	0	0.89	0.83	0.88	0.89	0	0.94	0.96	0.88	0.86	0	0.92	0.87	0.92	0.84	0.25	0.92	-	-	-		
Heavy	0	24	0	0	24	1	1	1	0	3	5	42	1	0	48	0	2	3	0	5	-	-	-		
Heavy %	0%	3.7%	0%	0%	2.6%	1.6%	0.2%	0.4%	0%	0.4%	1.4%	6.1%	0.6%	0%	4%	0%	0.5%	1.5%	0%	0.8%	-	-	-		
Lights	193	624	75	0	892	62	532	251	0	845	348	646	170	0	1164	94	371	193	1	659	-	-	-		
Lights %	100%	96.3%	100%	0%	97.4%	98.4%	99.8%	99.6%	0%	99.6%	98.6%	93.9%	99.4%	0%	96%	100%	99.5%	98.5%	100%	99.2%	-	-	-		
Single-Unit Trucks	0	8	0	0	8	1	0	1	0	2	5	13	1	0	19	0	2	0	0	4	-	-	-		
Single-Unit Trucks %	0%	1.2%	0%	0%	0.9%	1.6%	0%	0.4%	0%	0.2%	1.4%	1.9%	0.6%	0%	1.6%	0%	0.5%	1%	0%	0.6%	-	-	-		
Buses	0	2	0	0	2	0	1	0	0	1	0	4	0	0	4	0	0	0	0	0	-	-	-		
Buses %	0%	0.3%	0%	0%	0.2%	0%	0.2%	0%	0%	0.1%	0%	0.6%	0%	0%	0.3%	0%	0%	0%	0%	0%	-	-	-		
Articulated Trucks	0	14	0	0	14	0	0	0	0	0	0	25	0	0	25	0	0	1	0	1	-	-	-		
Articulated Trucks %	0%	2.2%	0%	0%	1.5%	0%	0%	0%	0%	0%	0%	3.6%	0%	0%	2.1%	0%	0.5%	0%	0%	0.2%	-	-	-		
Pedestrians	-	-	-	-	6	-	-	-	-	4	-	-	-	-	4	-	-	-	-	2	-	-	-		
Pedestrians%	-	-	-	-	31.6%	-	-	-	-	21.1%	-	-	-	-	21.1%	-	-	-	-	10.5%	-	-	-		
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	0	-	-	-	-	1	-	-	-	-	2	-	-	-		
Bicycles on Crosswalk%	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-	5.3%	-	-	-	-	10.5%	-	-	-		
Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Bicycles on Road%	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-	0%	-	-	-		

Peak Hour: 07:45 AM - 08:45 AM Weather: Overcast Clouds (1.73 °C)



Peak Hour: 05:00 PM - 06:00 PM Weather: Overcast Clouds (6.01 °C)





Turning Movement Count (3 . REGIONAL RD 25 & WHITLOCK AVE)

Start Time	N Approach REGIONAL RD 25						E Approach WHITLOCK AVE						S Approach REGIONAL RD 25						W Approach WHITLOCK AVE						Int. Total (15 min)	Int. Total (1 hr)
	Right N:W	Thru N:S	Left N:E	UTurn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	Left E:S	UTurn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	Left S:W	UTurn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	Left W:N	UTurn W:W	Peds W:	Approach Total		
07:00:00	6	213	2	0	0	221	11	1	8	0	0	20	1	118	1	0	1	120	17	0	8	0	0	25	386	
07:15:00	7	253	6	0	1	266	14	0	6	0	0	20	2	161	4	0	0	167	19	0	15	0	0	34	487	
07:30:00	6	302	3	0	2	311	18	0	9	0	0	27	1	177	7	0	2	185	25	3	15	0	0	43	566	
07:45:00	13	261	7	0	1	281	26	1	11	0	0	38	1	216	9	0	0	226	18	2	14	0	0	34	579	2018
08:00:00	26	233	8	0	1	267	23	9	9	0	1	41	2	168	11	0	0	181	24	3	32	0	0	59	548	2180
08:15:00	24	272	17	0	2	313	20	8	8	0	0	36	6	221	9	0	3	236	19	7	33	0	0	59	644	2337
08:30:00	21	240	16	0	1	277	24	8	21	1	0	54	3	207	11	0	0	221	21	7	26	0	0	54	606	2377
08:45:00	25	208	12	0	0	245	17	4	9	0	1	30	8	163	4	0	3	175	21	4	40	0	1	65	515	2313
BREAK																										
16:00:00	16	191	18	0	0	225	14	2	2	0	2	18	11	236	17	0	1	264	7	3	21	0	0	31	538	
16:15:00	23	221	13	0	1	257	20	3	2	0	2	25	8	265	23	0	2	296	9	4	21	0	0	34	612	
16:30:00	18	192	14	0	1	224	21	3	5	0	1	29	12	286	18	0	1	316	6	6	20	0	0	32	601	
16:45:00	26	191	20	0	2	237	16	1	11	0	0	28	11	276	15	0	2	302	12	5	20	0	0	37	604	2355
17:00:00	29	176	11	0	1	216	18	1	5	1	0	25	7	262	21	0	0	290	5	6	21	0	0	32	563	2380
17:15:00	20	199	23	0	1	242	12	1	3	0	0	16	9	267	18	0	1	294	13	3	18	0	0	34	586	2354
17:30:00	30	185	20	0	1	235	20	3	7	2	1	32	9	287	23	0	0	319	12	6	20	0	0	38	624	2377
17:45:00	25	184	18	0	1	227	16	2	3	0	0	21	6	243	19	0	0	268	15	3	26	0	0	44	560	2333
Grand Total	315	3521	208	0	16	4044	290	47	119	4	8	460	97	3553	210	0	16	3860	243	62	350	0	1	655	9019	-
Approach%	7.8%	87.1%	5.1%	0%		-	63%	10.2%	25.9%	0.9%		-	2.5%	92%	5.4%	0%		-	37.1%	9.5%	53.4%	0%		-	-	-
Totals %	3.5%	39%	2.3%	0%		44.8%	3.2%	0.5%	1.3%	0%		5.1%	1.1%	39.4%	2.3%	0%		42.8%	2.7%	0.7%	3.9%	0%		7.3%	-	-
Heavy	6	174	5	0		-	14	3	4	0		-	5	189	5	0		-	3	9	8	0		-	-	-
Heavy %	1.9%	4.9%	2.4%	0%		-	4.8%	6.4%	3.4%	0%		-	5.2%	5.3%	2.4%	0%		-	1.2%	14.5%	2.3%	0%		-	-	-
Bicycles	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-
Bicycle %	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-



Peak Hour: 07:45 AM - 08:45 AM Weather: Overcast Clouds (1.73 °C)

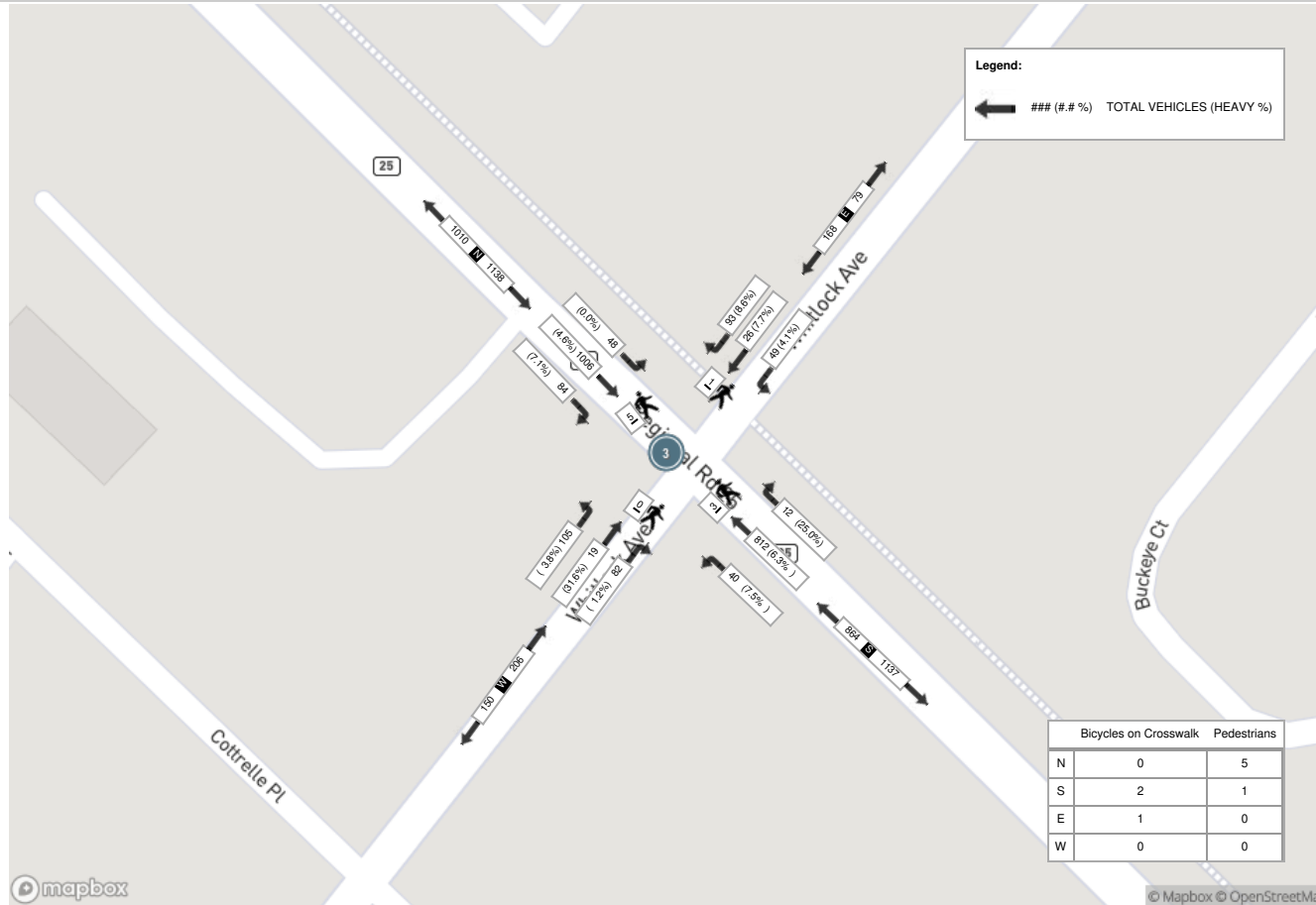
Start Time	N Approach REGIONAL RD 25						E Approach WHITLOCK AVE						S Approach REGIONAL RD 25						W Approach WHITLOCK AVE						Int. Total (15 min)
	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	
07:45:00	13	261	7	0	1	281	26	1	11	0	0	38	1	216	9	0	0	226	18	2	14	0	0	34	579
08:00:00	26	233	8	0	1	267	23	9	9	0	1	41	2	168	11	0	0	181	24	3	32	0	0	59	548
08:15:00	24	272	17	0	2	313	20	8	8	0	0	36	6	221	9	0	3	236	19	7	33	0	0	59	644
08:30:00	21	240	16	0	1	277	24	8	21	1	0	54	3	207	11	0	0	221	21	7	26	0	0	54	606
Grand Total	84	1006	48	0	5	1138	93	26	49	1	1	169	12	812	40	0	3	864	82	19	105	0	0	206	2377
Approach%	7.4%	88.4%	4.2%	0%	-	-	55%	15.4%	29%	0.6%	-	-	1.4%	94%	4.6%	0%	-	-	39.8%	9.2%	51%	0%	-	-	-
Totals %	3.5%	42.3%	2%	0%	47.9%	3.9%	1.1%	2.1%	0%	7.1%	0.5%	34.2%	1.7%	0%	36.3%	3.4%	0.8%	4.4%	0%	8.7%	-	-	-	-	-
PHF	0.81	0.92	0.71	0	0.91	0.89	0.72	0.58	0.25	0.78	0.5	0.92	0.91	0	0.92	0.85	0.68	0.8	0	0.87	-	-	-	-	-
Heavy	6	46	0	0	52	8	2	2	0	12	3	51	3	0	57	1	6	4	0	11	-	-	-	-	-
Heavy %	7.1%	4.6%	0%	0%	4.6%	8.6%	7.7%	4.1%	0%	7.1%	25%	6.3%	7.5%	0%	6.6%	1.2%	31.6%	3.8%	0%	5.3%	-	-	-	-	-
Lights	78	960	48	0	1086	85	24	47	1	157	9	761	37	0	807	81	13	101	0	195	-	-	-	-	-
Lights %	92.9%	95.4%	100%	0%	95.4%	91.4%	92.3%	95.9%	100%	92.9%	75%	93.7%	92.5%	0%	93.4%	98.8%	68.4%	96.2%	0%	94.7%	-	-	-	-	-
Single-Unit Trucks	2	12	0	0	14	2	0	0	0	2	0	17	2	0	19	1	0	3	0	4	-	-	-	-	-
Single-Unit Trucks %	2.4%	1.2%	0%	0%	1.2%	2.2%	0%	0%	0%	1.2%	0%	2.1%	5%	0%	2.2%	1.2%	0%	2.9%	0%	1.9%	-	-	-	-	-
Buses	4	11	0	0	15	6	2	2	0	10	3	11	1	0	15	0	6	1	0	7	-	-	-	-	-
Buses %	4.8%	1.1%	0%	0%	1.3%	6.5%	7.7%	4.1%	0%	5.9%	25%	1.4%	2.5%	0%	1.7%	0%	31.6%	1%	0%	3.4%	-	-	-	-	-
Articulated Trucks	0	23	0	0	23	0	0	0	0	0	0	23	0	0	23	0	0	0	0	0	-	-	-	-	-
Articulated Trucks %	0%	2.3%	0%	0%	2%	0%	0%	0%	0%	0%	0%	2.8%	0%	0%	2.7%	0%	0%	0%	0%	0%	-	-	-	-	-
Pedestrians	-	-	-	-	5	-	-	-	-	0	-	-	-	-	1	-	-	-	-	0	-	-	-	-	-
Pedestrians%	-	-	-	-	55.6%	-	-	-	-	0%	-	-	-	-	11.1%	-	-	-	-	0%	-	-	-	-	-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	1	-	-	-	-	2	-	-	-	-	0	-	-	-	-	-
Bicycles on Crosswalk%	-	-	-	-	0%	-	-	-	-	11.1%	-	-	-	-	22.2%	-	-	-	-	0%	-	-	-	-	-



Peak Hour: 04:15 PM - 05:15 PM Weather: Overcast Clouds (6.01 °C)

Start Time	N Approach REGIONAL RD 25						E Approach WHITLOCK AVE						S Approach REGIONAL RD 25						W Approach WHITLOCK AVE						Int. Total (15 min)
	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	
16:15:00	23	221	13	0	1	257	20	3	2	0	2	25	8	265	23	0	2	296	9	4	21	0	0	34	612
16:30:00	18	192	14	0	1	224	21	3	5	0	1	29	12	286	18	0	1	316	6	6	20	0	0	32	601
16:45:00	26	191	20	0	2	237	16	1	11	0	0	28	11	276	15	0	2	302	12	5	20	0	0	37	604
17:00:00	29	176	11	0	1	216	18	1	5	1	0	25	7	262	21	0	0	290	5	6	21	0	0	32	563
Grand Total	96	780	58	0	5	934	75	8	23	1	3	107	38	1089	77	0	5	1204	32	21	82	0	0	135	2380
Approach%	10.3%	83.5%	6.2%	0%		-	70.1%	7.5%	21.5%	0.9%		-	3.2%	90.4%	6.4%	0%		-	23.7%	15.6%	60.7%	0%		-	-
Totals %	4%	32.8%	2.4%	0%		39.2%	3.2%	0.3%	1%	0%		4.5%	1.6%	45.8%	3.2%	0%		50.6%	1.3%	0.9%	3.4%	0%		5.7%	-
PHF	0.83	0.88	0.73	0		0.91	0.89	0.67	0.52	0.25		0.92	0.79	0.95	0.84	0		0.95	0.67	0.88	0.98	0		0.91	-
Heavy	0	43	1	0		44	2	0	0	0		2	0	51	1	0		52	0	1	1	0		2	-
Heavy %	0%	5.5%	1.7%	0%		4.7%	2.7%	0%	0%	0%		1.9%	0%	4.7%	1.3%	0%		4.3%	0%	4.8%	1.2%	0%		1.5%	-
Lights	96	737	57	0		890	73	8	23	1		105	38	1038	76	0		1152	32	20	81	0		133	-
Lights %	100%	94.5%	98.3%	0%		95.3%	97.3%	100%	100%	100%		98.1%	100%	95.3%	98.7%	0%		95.7%	100%	95.2%	98.8%	0%		98.5%	-
Single-Unit Trucks	0	19	0	0		19	1	0	0	0		1	0	19	0	0		19	0	1	0	0		1	-
Single-Unit Trucks %	0%	2.4%	0%	0%		2%	1.3%	0%	0%	0%		0.9%	0%	1.7%	0%	0%		1.6%	0%	4.8%	0%	0%		0.7%	-
Buses	0	5	1	0		6	1	0	0	0		1	0	7	1	0		8	0	0	1	0		1	-
Buses %	0%	0.6%	1.7%	0%		0.6%	1.3%	0%	0%	0%		0.9%	0%	0.6%	1.3%	0%		0.7%	0%	0%	1.2%	0%		0.7%	-
Articulated Trucks	0	19	0	0		19	0	0	0	0		0	0	25	0	0		25	0	0	0	0		0	-
Articulated Trucks %	0%	2.4%	0%	0%		2%	0%	0%	0%	0%		0%	0%	2.3%	0%	0%		2.1%	0%	0%	0%	0%		0%	-
Pedestrians	-	-	-	-	5	-	-	-	-	-	3	-	-	-	-	-	5	-	-	-	-	-	0	-	-
Pedestrians%	-	-	-	-	38.5%	-	-	-	-	-	23.1%	-	-	-	-	-	38.5%	-	-	-	-	-	0%	-	-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-

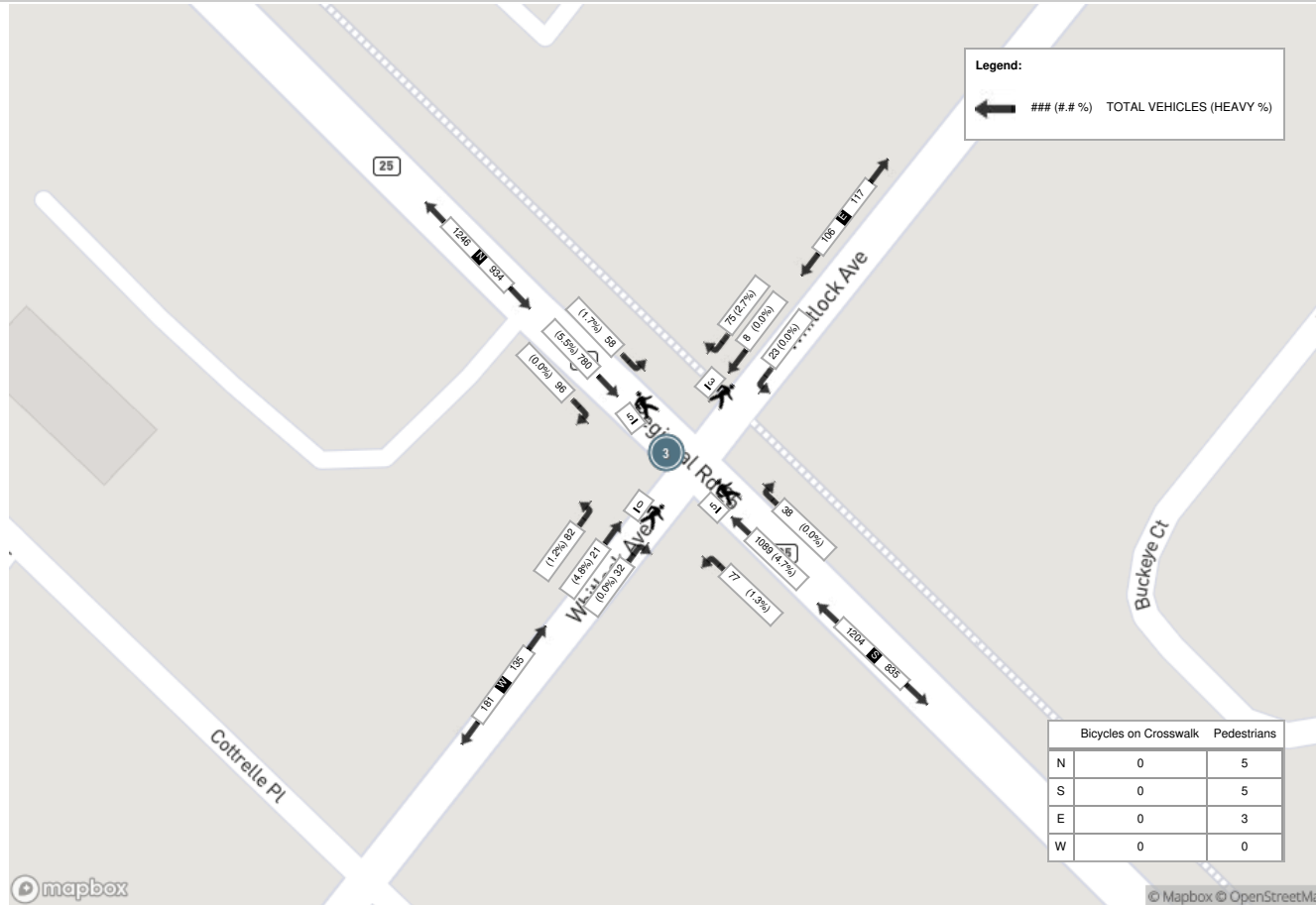
Peak Hour: 07:45 AM - 08:45 AM Weather: Overcast Clouds (1.73 °C)



mapbox

© Mapbox © OpenStreetMap

Peak Hour: 04:15 PM - 05:15 PM Weather: Overcast Clouds (6.01 °C)



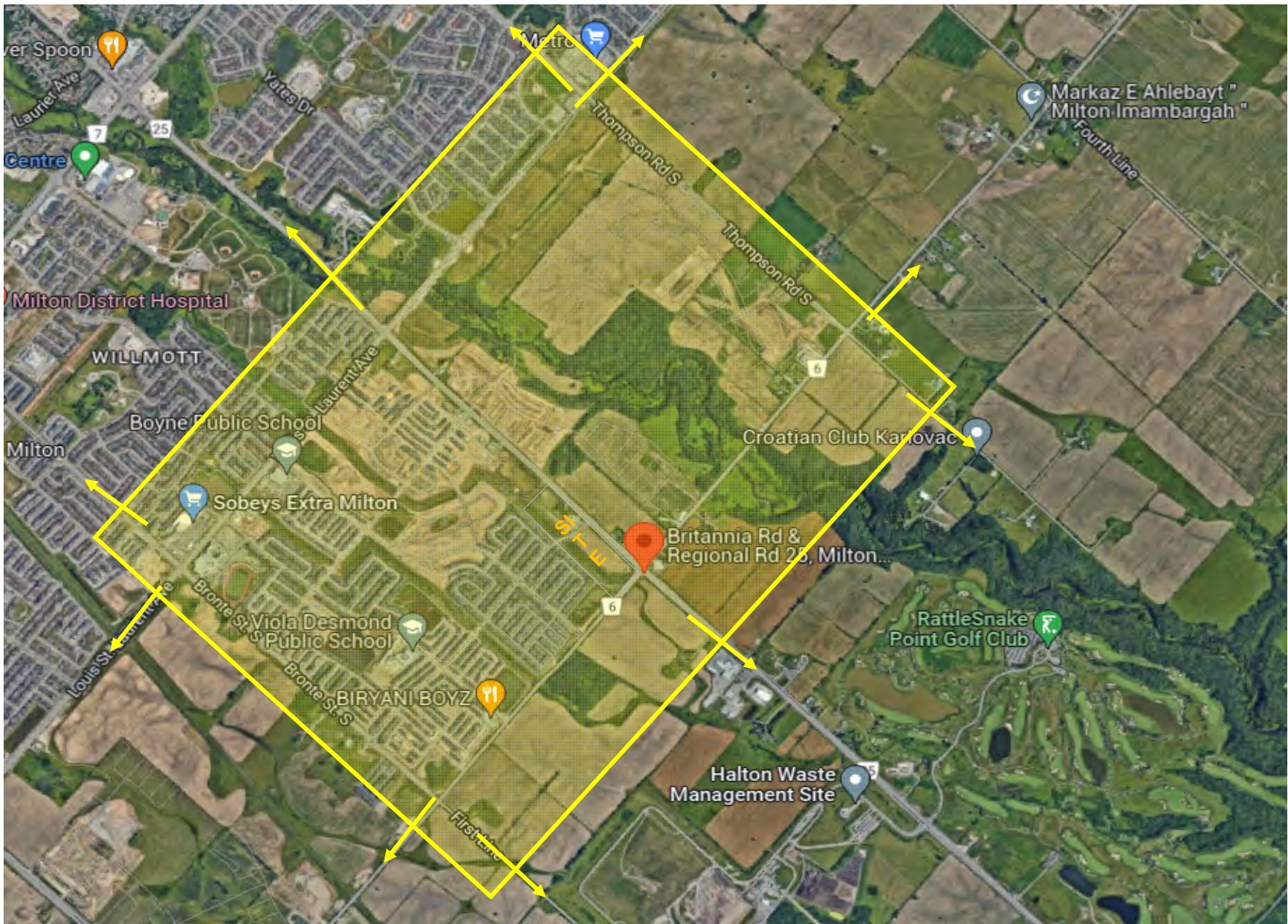
mapbox

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Appendix F

TTS Data





Wed Dec 21 2022 14:51:49 GMT-0500 (Eastern Standard Time) - Run Time: 2577ms

Cross Tabulation Query Form - Trip - 2016 v1.1

Row: Planning district of destination - pd_dest
 Column: 2006 GTA zone of origin - gta06_orig

Filters:

(Start time of trip - start_time In 600-859

and

Trip purpose of origin - purp_orig In H

and

Primary travel mode of trip - mode_prime In D

and

2006 GTA zone of origin - gta06_orig In 4104

Trip 2016

Table:

	M	P	T	U	
	4105 4108)				
	4104	4105	4108	TOTAL	
PD 1 of Toronto	0	15	72	87	
PD 2 of Toronto	0	16	0	16	
PD 3 of Toronto	0	0	45	45	
PD 5 of Toronto	0	0	11	11	
PD 7 of Toronto	0	0	18	18	
PD 8 of Toronto	0	87	0	87	
PD 9 of Toronto	0	99	9	108	
PD 10 of Toronto	0	17	0	17	
PD 11 of Toronto	0	40	46	86	
PD 13 of Toronto	0	20	0	20	
PD 16 of Toronto	0	13	0	13	
Ajax	0	0	15	15	
Whitby	0	14	0	14	
Richmond Hill	0	29	0	29	
Markham	0	80	31	111	
Vaughan	0	131	34	165	
Brampton	45	232	277	554	
Mississauga	34	1147	755	1936	
Halton Hills	0	93	0	93	
Oakville	83	206	295	584	
Burlington	79	116	126	321	
Hamilton	0	73	91	164	
Waterloo	0	20	60	80	
Kitchener	0	14	22	36	
Woolwich	0	0	16	16	
City of Guelph	0	30	34	64	
Puslinch	0	0	15	15	
Barrie	0	22	0	22	
Milton	72	1645	789	2506	

Wed Dec 21 2022 15:33:37 GMT-0500 (Eastern Standard Time) - Run Time: 2376ms

Cross Tabulation Query Form - Trip - 2016 v1.1

Row: 2006 GTA zone of destination - gta06_dest
 Column: 2006 GTA zone of origin - gta06_orig

Filters:

(Start time of trip - start_time In 600-859

and

Trip purpose of origin - purp_orig In H

and

Primary travel mode of trip - mode_prime In D

and

2006 GTA zone of origin - gta06_orig In 4104

Trip 2016

Table:

	M	P	T	U	
	4105 4108)
	4104	4105	4108	TOTAL	
	4101	0	47	0	47
	4103	0	62	0	62
	4104	0	104	14	118
	4105	0	331	10	341
	4108	0	55	377	432
	4109	0	89	62	151
	4110	0	20	87	107
	4117	0	34	0	34
	4119	0	81	18	99
	4122	0	35	0	35
	4123	0	12	0	12
	4124	19	56	46	121
	4125	52	448	159	659
	4126	0	63	0	63
	4127	0	67	0	67
	4144	0	12	0	12
	4145	0	14	15	29
	4147	0	60	0	60
	4148	0	31	0	31
	4192	0	25	0	25

Wed Dec 21 2022 15:38:39 GMT-0500 (Eastern Standard Time) - Run Time: 2664ms

Cross Tabulation Query Form - Trip - 2016 v1.1

Row: Planning district of origin - pd_orig
 Column: 2006 GTA zone of destination - gta06_dest

Filters:
 (Start time of trip - start_time In 1500-1759
 and
 Trip purpose of destination - purp_dest In H
 and
 Primary travel mode of trip - mode_prime In D
 and
 2006 GTA zone of destination - gta06_dest In 4104

Trip 2016
 Table:

	M	P	T	U	
	4104	4108			
	4105	4108			
					TOTAL
PD 1 of Toronto	0	124	59		183
PD 2 of Toronto	0	46	0		46
PD 3 of Toronto	0	0	45		45
PD 5 of Toronto	0	14	11		25
PD 7 of Toronto	0	42	0		42
PD 8 of Toronto	0	91	0		91
PD 9 of Toronto	0	49	27		76
PD 10 of Toronto	0	17	0		17
PD 11 of Toronto	0	40	17		57
PD 12 of Toronto	0	17	0		17
Ajax	0	0	15		15
Whitby	0	14	37		51
Oshawa	0	0	18		18
Georgina	0	27	0		27
Richmond Hill	0	29	26		55
Vaughan	0	178	78		256
Brampton	11	186	175		372
Mississauga	34	1049	586		1669
Halton Hills	0	64	48		112
Oakville	99	281	308		688
Burlington	46	160	104		310
Hamilton	0	59	59		118
Waterloo	0	0	60		60
Kitchener	0	14	0		14
Woolwich	0	0	16		16
City of Guelph	0	30	34		64
Puslinch	0	0	15		15
Barrie	0	17	0		17
New Tecumseth	0	0	30		30
External	0	0	7		7
Milton	26	1290	675		1991

Wed Dec 21 2022 15:34:52 GMT-0500 (Eastern Standard Time) - Run Time: 2696ms

Cross Tabulation Query Form - Trip - 2016 v1.1

Row: 2006 GTA zone of origin - gta06_orig
 Column: 2006 GTA zone of destination - gta06_dest

Filters:
 (Start time of trip - start_time In 1500-1759
 and
 Trip purpose of destination - purp_dest In H
 and
 Primary travel mode of trip - mode_prime In D
 and
 2006 GTA zone of destination - gta06_dest In 4104
 and
 Planning district of origin - pd_orig In 38

Trip 2016
 Table:

	M	P	T	U	
	4105	4108			
	4104	4105	4108		TOTAL
4103	0	82	0		82
4104	0	84	0		84
4105	0	314	10		324
4108	0	63	200		263
4109	0	0	26		26
4110	0	62	72		134
4119	0	87	0		87
4120	0	0	32		32
4122	0	24	0		24
4123	0	27	27		54
4124	0	35	37		72
4125	26	235	257		518
4126	0	55	0		55
4127	0	67	0		67
4144	0	12	0		12
4145	0	14	15		29
4148	0	103	0		103
4192	0	25	0		25

AM
Outbound
2023-07-25

RESIDENTIAL VEHICLE TRIP DISTRIBUTION

		Traffic Volume Allocation												
		NORTH		NORTH		SOUTH		SOUTH		EAST		WEST		
Zone	Trips	%	Bronte St S	RR25	Thompson Rd S	First Line	RR25	Thompson Rd S	Britannia Rd	Louis St Laurent Ave	Britannia Rd	Louis St Laurent Ave	TOTAL	
PD 1 of Toronto	87	1%		10%			50%		20%	20%			100.00%	
PD 2 of Toronto	16	0%		10%			50%		20%	20%			100.00%	
PD 3 of Toronto	45	1%		10%			50%		20%	20%			100.00%	
PD 5 of Toronto	11	0%		20%			40%		20%	20%			100.00%	
PD 7 of Toronto	18	0%					50%		50%				100.00%	
PD 8 of Toronto	87	1%		20%			40%		20%	20%			100.00%	
PD 9 of Toronto	108	1%		40%			20%		20%	20%			100.00%	
PD 10 of Toronto	17	0%		40%					30%	30%			100.00%	
PD 11 of Toronto	86	1%		40%					30%	30%			100.00%	
PD 13 of Toronto	20	0%		20%			40%		20%	20%			100.00%	
PD 16 of Toronto	13	0%		40%					30%	30%			100.00%	
Ajax	15	0%		40%					30%	30%			100.00%	
Whitby	14	0%		40%					30%	30%			100.00%	
Richmond Hill	29	0%		40%					30%	30%			100.00%	
Markham	111	2%		40%					30%	30%			100.00%	
Vaughan	165	2%		40%					30%	30%			100.00%	
Brampton	554	8%		40%					30%	30%			100.00%	
Mississauga	1936	27%					40%		30%	30%			100.00%	
Halton Hills	93	1%		70%					15%	15%			100.00%	
Oakville	584	8%					50%						100.00%	
Burlington	321	4%				20%	40%				40%		100.00%	
Hamilton	164	2%				20%	40%				40%		100.00%	
Waterloo	80	1%	10%	50%					20%	20%			100.00%	
Kitchener	36	0%	10%	50%					20%	20%			100.00%	
Woodwich	16	0%	10%	50%					20%	20%			100.00%	
City of Guelph	64	1%	10%	50%					20%	20%			100.00%	
Puslinch	15	0%	10%	50%					20%	20%			100.00%	
Barrie	22	0%		40%					30%	30%			100.00%	
4101	47	1%		40%					30%	30%			100.00%	
4103	62	1%		40%					30%	30%			100.00%	
4104	118	2%		30%					30%	30%			100.00%	
4105	341	5%		40%						30%	30%		100.00%	
4108	432	6%		40%	40%					20%			100.00%	
4109	151	2%							50%	50%			100.00%	
4110	107	1%		30%	30%				20%	20%			100.00%	
4117	34	0%		30%	30%				20%	20%			100.00%	
4119	99	1%		40%	40%				10%	10%			100.00%	
4122	35	0%	20%	40%						20%	20%		100.00%	
4123	12	0%		50%	50%								100.00%	
4124	121	2%		50%	50%								100.00%	
4125	659	9%		50%	50%								100.00%	
4126	63	1%		50%	50%								100.00%	
4127	67	1%		30%	30%					20%	20%		100.00%	
4144	12	0%	30%	30%						20%	20%		100.00%	
4145	29	0%	30%	30%						20%	20%		100.00%	
4147	60	1%	30%	30%						20%	20%		100.00%	
4148	31	0%	30%		30%				20%	20%			100.00%	
4192	25	0%		50%	50%								100.00%	
7232	7232	100%											100.00%	

Route Split Totals											
NORTH	NORTH	NORTH	SOUTH	SOUTH	SOUTH	EAST	EAST	WEST	WEST	WEST	TOTAL
Bronte St S	RR25	Thompson Rd S	First Line	RR25	Thompson Rd S	Britannia Rd	Louis St Laurent Ave	Britannia Rd	Louis St Laurent Ave	Louis St Laurent Ave	TOTAL
0.00%	0.12%	0.00%	0.00%	0.60%	0.00%	0.24%	0.24%	0.00%	0.00%	1.2%	
0.00%	0.02%	0.00%	0.00%	0.11%	0.00%	0.04%	0.04%	0.00%	0.00%	0.2%	
0.00%	0.06%	0.00%	0.00%	0.31%	0.00%	0.12%	0.12%	0.00%	0.00%	0.6%	
0.00%	0.03%	0.00%	0.00%	0.06%	0.00%	0.03%	0.03%	0.00%	0.00%	0.2%	
0.00%	0.00%	0.00%	0.00%	0.12%	0.00%	0.12%	0.00%	0.00%	0.00%	0.2%	
0.00%	0.24%	0.00%	0.00%	0.48%	0.00%	0.24%	0.24%	0.00%	0.00%	1.2%	
0.00%	0.02%	0.00%	0.00%	0.30%	0.00%	0.30%	0.30%	0.00%	0.00%	1.5%	
0.00%	0.09%	0.00%	0.00%	0.00%	0.00%	0.07%	0.07%	0.00%	0.00%	0.2%	
0.00%	0.48%	0.00%	0.00%	0.00%	0.00%	0.36%	0.36%	0.00%	0.00%	1.2%	
0.00%	0.06%	0.00%	0.00%	0.11%	0.00%	0.06%	0.06%	0.00%	0.00%	0.3%	
0.00%	0.07%	0.00%	0.00%	0.00%	0.00%	0.05%	0.05%	0.00%	0.00%	0.2%	
0.00%	0.08%	0.00%	0.00%	0.00%	0.00%	0.06%	0.06%	0.00%	0.00%	0.2%	
0.00%	0.08%	0.00%	0.00%	0.00%	0.00%	0.06%	0.06%	0.00%	0.00%	0.2%	
0.00%	0.16%	0.00%	0.00%	0.00%	0.00%	0.12%	0.12%	0.00%	0.00%	0.4%	
0.00%	0.81%	0.00%	0.00%	0.00%	0.00%	0.46%	0.46%	0.00%	0.00%	1.5%	
0.00%	0.91%	0.00%	0.00%	0.00%	0.00%	0.68%	0.68%	0.00%	0.00%	2.3%	
0.00%	3.06%	0.00%	0.00%	0.00%	0.00%	2.30%	2.30%	0.00%	0.00%	7.7%	
0.00%	0.00%	0.00%	0.00%	10.71%	0.00%	8.03%	8.03%	0.00%	0.00%	26.8%	
0.00%	0.90%	0.00%	0.00%	0.00%	0.00%	0.19%	0.19%	0.00%	0.00%	1.3%	
0.00%	0.00%	0.00%	0.00%	4.04%	0.00%	4.04%	0.00%	0.00%	0.00%	8.1%	
0.00%	0.00%	0.00%	0.89%	1.78%	0.00%	0.00%	0.00%	1.78%	0.00%	4.4%	
0.00%	0.00%	0.00%	0.45%	0.91%	0.00%	0.00%	0.00%	0.91%	0.00%	2.3%	
0.11%	0.55%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.22%	0.22%	1.1%	
0.05%	0.25%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.10%	0.10%	0.5%	
0.02%	0.11%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.04%	0.04%	0.2%	
0.09%	0.44%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.18%	0.18%	0.9%	
0.02%	0.10%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.04%	0.04%	0.2%	
0.00%	0.12%	0.00%	0.00%	0.00%	0.00%	0.09%	0.09%	0.00%	0.00%	0.3%	
0.00%	0.26%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.19%	0.19%	0.6%	
0.00%	0.34%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.26%	0.26%	0.9%	
0.00%	0.65%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.49%	0.49%	1.6%	
0.00%	1.89%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.41%	1.41%	4.7%	
0.00%	2.39%	2.39%	0.00%	0.00%	0.00%	0.00%	1.19%	0.00%	0.00%	6.0%	
0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.04%	1.04%	0.00%	0.00%	2.1%	
0.00%	0.44%	0.44%	0.00%	0.00%	0.00%	0.30%	0.30%	0.00%	0.00%	1.5%	
0.00%	0.14%	0.14%	0.00%	0.00%	0.00%	0.09%	0.09%	0.00%	0.00%	0.5%	
0.00%	0.55%	0.55%	0.00%	0.00%	0.00%	0.14%	0.14%	0.00%	0.00%	1.4%	
0.10%	0.19%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.10%	0.10%	0.5%	
0.00%	0.08%	0.08%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.2%	
0.00%	0.84%	0.84%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.7%	
4.56%	4.56%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	9.1%	
0.44%	0.44%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.9%	
0.28%	0.28%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.19%	0.19%	0.9%	
0.06%	0.05%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.03%	0.03%	0.2%	
0.12%	0.12%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.08%	0.08%	0.4%	
0.25%	0.25%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.17%	0.17%	0.8%	
0.13%	0.00%	0.13%	0.00%	0.00%	0.00%	0.09%	0.09%	0.00%	0.00%	0.4%	
0.00%	0.17%	0.17%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.3%	
6.2%	22.8%	4.7%	1.3%	19.5%	0.0%	19.3%	16.4%	6.2%	3.5%	100.0%	

5.00%	25.00%	5.00%	0.00%	20.00%	0.00%	20.00%	15.00%	5.00%	5.00%	100%
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PM Inbound 2023-07-25	RESIDENTIAL VEHICLE TRIP DISTRIBUTION
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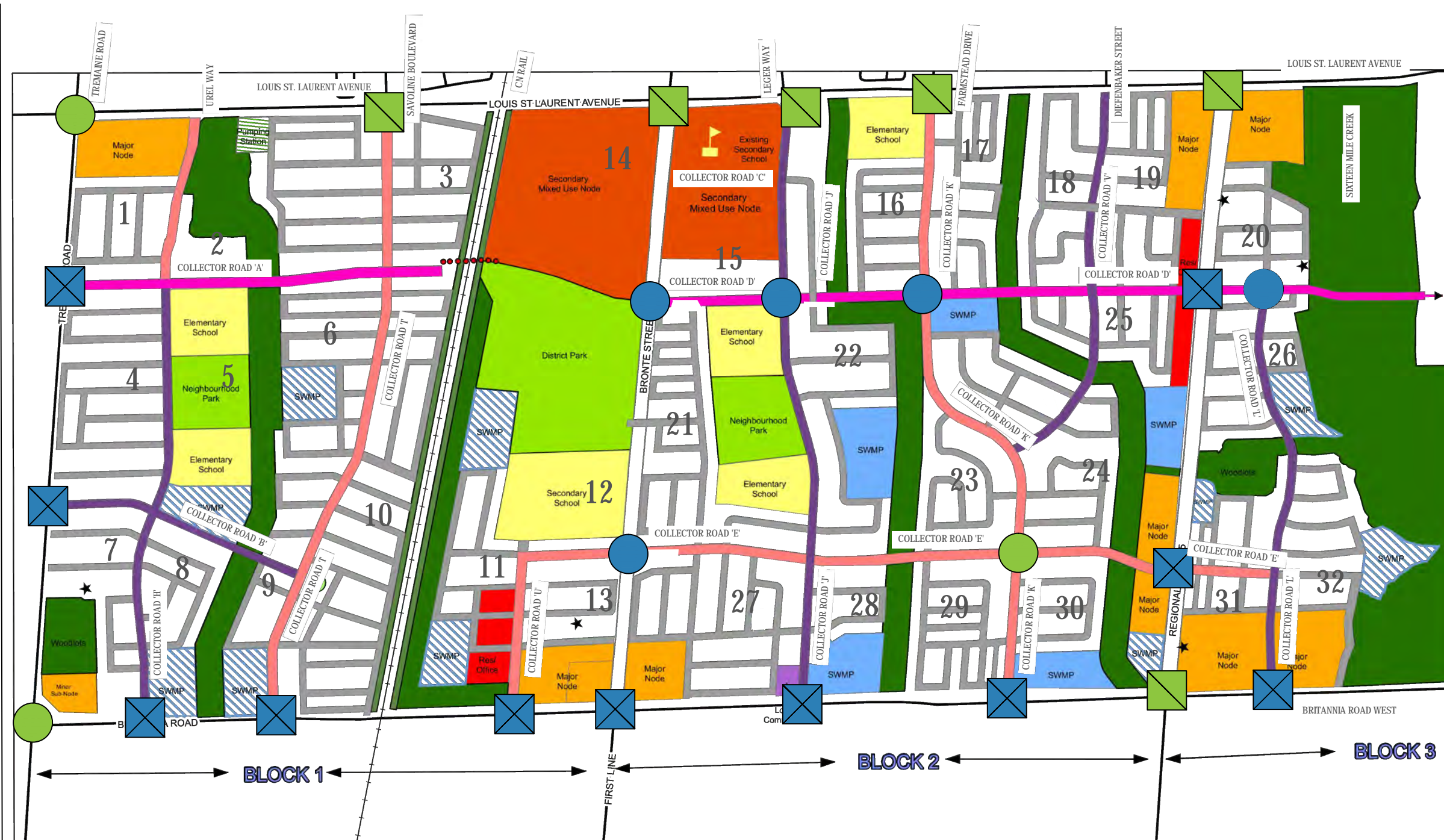
		Traffic Volume Allocation														
		NORTH		NORTH		SOUTH		SOUTH		EAST		WEST		WEST		
Zone	Trips	%	Bronte St S	RR25	Thompson Rd S	First Line	RR25	Thompson Rd S	Britannia Rd	Louis St Laurent Ave	Britannia Rd	Louis St Laurent Ave	WEST	WEST	TOTAL	
PD 1 of Toronto	183	3%		10%			50%		20%	20%					100.00%	
PD 2 of Toronto	46	1%		10%			50%		20%	20%					100.00%	
PD 3 of Toronto	45	1%		10%			50%		20%	20%					100.00%	
PD 5 of Toronto	25	0%		20%			40%		20%	20%					100.00%	
PD 7 of Toronto	42	1%					50%		50%						100.00%	
PD 8 of Toronto	91	1%		20%			40%		20%	20%					100.00%	
PD 9 of Toronto	78	1%		40%			20%		20%	20%					100.00%	
PD 10 of Toronto	17	0%		40%					30%	30%					100.00%	
PD 11 of Toronto	57	1%		40%					30%	30%					100.00%	
PD 12 of Toronto	17	0%		40%					30%	30%					100.00%	
Ajax	15	0%		40%					30%	30%					100.00%	
Whitby	51	1%		40%					30%	30%					100.00%	
Oshawa	18	0%		40%					30%	30%					100.00%	
Georgina	27	0%		40%					30%	30%					100.00%	
Richmond Hill	55	1%		40%					30%	30%					100.00%	
Vaughan	256	4%		40%					30%	30%					100.00%	
Brampton	372	6%		40%					30%	30%					100.00%	
Mississauga	1669	26%					40%		30%	30%					100.00%	
Halton Hills	112	2%		70%					15%	15%					100.00%	
Oakville	688	11%					50%		50%						100.00%	
Burlington	310	5%				20%	40%				40%				100.00%	
Hamilton	118	2%				20%	40%				40%				100.00%	
Waterloo	60	1%	10%	50%					20%	20%		20%			100.00%	
Kitchener	14	0%	10%	50%					20%	20%		20%			100.00%	
Woolwich	16	0%	10%	50%							20%	20%			100.00%	
City of Guelph	64	1%	10%	50%					20%	20%		20%			100.00%	
Puslinch	15	0%	10%	50%							20%	20%			100.00%	
Barrie	17	0%		40%					30%	30%					100.00%	
New Tecumseth	30	0%		40%					30%	30%					100.00%	
External																
4103	82	1%		40%							30%	30%			100.00%	
4104	84	1%		40%							30%	30%			100.00%	
4105	324	5%		40%							30%	30%			100.00%	
4108	263	4%		40%	40%					20%					100.00%	
4109	28	0%							50%	50%					100.00%	
4110	134	2%		30%	30%				20%	20%					100.00%	
4119	87	1%		40%	40%				10%	10%					100.00%	
4120	32	0%		40%	40%				10%	10%					100.00%	
4122	24	0%	20%	40%							20%	20%			100.00%	
4123	64	1%		50%	50%										100.00%	
4124	72	1%		50%	50%										100.00%	
4125	518	8%	50%	50%											100.00%	
4126	55	1%	50%	50%											100.00%	
4127	67	1%	30%	30%							20%	20%			100.00%	
4144	12	0%	30%	30%							20%	20%			100.00%	
4145	29	0%	30%	30%							20%	20%			100.00%	
4148	103	2%	30%	30%	30%				20%	20%					100.00%	
4192	25	0%		50%	50%										100.00%	
6497		100%													100.00%	

Route Split Totals											
NORTH	NORTH	NORTH	SOUTH	SOUTH	SOUTH	EAST	EAST	WEST	WEST	WEST	TOTAL
Bronte St S	RR25	Thompson Rd S	First Line	RR25	Thompson Rd S	Britannia Rd	Louis St Laurent Ave	Britannia Rd	Louis St Laurent Ave	Britannia Rd	Louis St Laurent Ave
0.00%	0.28%	0.00%	0.00%	1.41%	0.00%	0.56%	0.56%	0.00%	0.00%	2.8%	
0.00%	0.07%	0.00%	0.00%	0.35%	0.00%	0.14%	0.14%	0.00%	0.00%	0.7%	
0.00%	0.07%	0.00%	0.00%	0.35%	0.00%	0.14%	0.14%	0.00%	0.00%	0.7%	
0.00%	0.08%	0.00%	0.00%	0.15%	0.00%	0.08%	0.08%	0.00%	0.00%	0.4%	
0.00%	0.00%	0.00%	0.00%	0.32%	0.00%	0.32%	0.00%	0.00%	0.00%	0.6%	
0.00%	0.28%	0.00%	0.00%	0.56%	0.00%	0.28%	0.28%	0.00%	0.00%	1.4%	
0.00%	0.47%	0.00%	0.00%	0.23%	0.00%	0.23%	0.23%	0.00%	0.00%	1.2%	
0.00%	0.10%	0.00%	0.00%	0.00%	0.00%	0.08%	0.08%	0.00%	0.00%	0.3%	
0.00%	0.35%	0.00%	0.00%	0.00%	0.00%	0.26%	0.26%	0.00%	0.00%	0.9%	
0.00%	0.10%	0.00%	0.00%	0.00%	0.00%	0.08%	0.08%	0.00%	0.00%	0.3%	
0.00%	0.09%	0.00%	0.00%	0.00%	0.00%	0.07%	0.07%	0.00%	0.00%	0.2%	
0.00%	0.31%	0.00%	0.00%	0.00%	0.00%	0.24%	0.24%	0.00%	0.00%	0.8%	
0.00%	0.11%	0.00%	0.00%	0.00%	0.00%	0.08%	0.08%	0.00%	0.00%	0.3%	
0.00%	0.17%	0.00%	0.00%	0.00%	0.00%	0.12%	0.12%	0.00%	0.00%	0.4%	
0.00%	0.34%	0.00%	0.00%	0.00%	0.00%	0.25%	0.25%	0.00%	0.00%	0.8%	
0.00%	1.58%	0.00%	0.00%	0.00%	0.00%	1.18%	1.18%	0.00%	0.00%	3.9%	
0.00%	2.29%	0.00%	0.00%	0.00%	0.00%	1.72%	1.72%	0.00%	0.00%	5.7%	
0.00%	0.00%	0.00%	0.00%	10.28%	0.00%	7.71%	7.71%	0.00%	0.00%	25.7%	
0.00%	1.21%	0.00%	0.00%	0.00%	0.00%	0.26%	0.26%	0.00%	0.00%	1.7%	
0.00%	0.00%	0.00%	0.00%	5.29%	0.00%	5.29%	0.00%	0.00%	0.00%	10.6%	
0.00%	0.00%	0.00%	0.00%	0.95%	1.91%	0.00%	0.00%	1.91%	0.00%	4.8%	
0.00%	0.00%	0.00%	0.36%	0.73%	0.00%	0.00%	0.00%	0.73%	0.00%	1.8%	
0.09%	0.46%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.18%	0.18%	0.9%	
0.02%	0.11%	0.00%	0.00%	0.00%	0.00%	0.04%	0.04%	0.00%	0.00%	0.2%	
0.02%	0.12%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.05%	0.05%	0.2%	
0.1%	0.49%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.20%	0.20%	1.0%	
0.02%	0.12%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.05%	0.05%	0.2%	
0.00%	0.10%	0.00%	0.00%	0.00%	0.00%	0.08%	0.08%	0.00%	0.00%	0.3%	
0.00%	0.18%	0.00%	0.00%	0.00%	0.00%	0.14%	0.14%	0.00%	0.00%	0.5%	
0.00%	0.50%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.38%	0.38%	1.3%	
0.00%	0.52%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.39%	0.39%	1.3%	
0.00%	1.99%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.50%	1.50%	5.0%	
0.00%	1.62%	1.62%	0.00%	0.00%	0.00%	0.00%	0.81%	0.00%	0.00%	4.0%	
0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.20%	0.20%	0.00%	0.00%	0.4%	
0.00%	0.62%	0.62%	0.00%	0.00%	0.00%	0.41%	0.41%	0.00%	0.00%	2.1%	
0.00%	0.54%	0.54%	0.00%	0.00%	0.00%	0.13%	0.13%	0.00%	0.00%	1.3%	
0.00%	0.20%	0.20%	0.00%	0.00%	0.00%	0.05%	0.05%	0.00%	0.00%	0.5%	
0.07%	0.15%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.07%	0.07%	0.4%	
0.00%	0.42%	0.42%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.8%	
0.00%	0.55%	0.55%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.1%	
3.99%	3.99%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	8.0%	
0.42%	0.42%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.8%	
0.31%	0.31%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.21%	0.21%	1.0%	
0.06%	0.06%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.04%	0.04%	0.2%	
0.13%	0.13%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.09%	0.09%	0.4%	
0.48%	0.00%	0.48%	0.00%	0.00%	0.00%	0.32%	0.32%	0.00%	0.00%	1.6%	
0.00%	0.19%	0.19%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.4%	
5.7%	21.7%	4.6%	1.3%	21.6%	0.0%	20.4%	15.6%	5.8%	3.2%	100.0%	
5.00%	25.00%	5.00%	0.00%	20.00%	0.00%	20.00%	15.00%	5.00%	5.00%	100%	

Appendix G

Boyne Road Network Assessment





- INTERNAL ROAD
- 26m ROAD
- 24m ROAD
- 20m ROAD
- ACTIVE TRANSPORTATION LINK
- HERITAGE FEATURE
- SWMP - CONCEPTUAL SUBJECT TO FINAL APPROVAL BY CONSERVATION HALTON & THE TOWN OF MILTON
- SWMP - SUBJECT TO FURTHER REVIEW

Boyne Survey (Phase 3A) West Tertiary Plan
Appendix C.10.D

August 7th 2015
 Copyright 2015: Town of Milton, Teranet Inc.

* NOT TO SCALE
 *VILLAGE SQUARE LOCATIONS CONCEPTUAL
 *CHANNEL WIDTHS & STORM WATER MANAGEMENT POND CONFIGURATION SUBJECT TO FINAL APPROVAL OF SUBWATERSHED IMPACT STUDIES

- Legend**
- Existing Traffic Signal
 - Proposed Traffic Signal
 - 2015 Roundabout
 - Proposed Roundabout



Milton Phase 3 Landowners Group
 Boyne Survey
 Road Network Assessment
 West Block
 Boyne Survey Road Network

Job Number | 28-21522
 Revision | C
 Date | Sept 2017

Figure 01

- DRAFT - Framework Plan Boyne East

WORKING COPY FOR
DISCUSSION PURPOSES

ROADS

- Regional (47m)
- Minor Arterial (35m)
- Community Connector (26m)
- Collector Road (24m)
- Collector Road (20m)

SCHOOLS

- PES Public Elementary School (3)
- CES Catholic Elementary School (2)
- FCS French Catholic Elementary School (1)
- PHS Public High School (1)
- CHS Catholic High School (1)

PARKS (16.5 ha)

- DP District Park (1 @ 8.0 ha)
- NP Neighbourhood Park (2 @ 3.5 ha)
- VS Village Square (5 @ 0.3 ha)

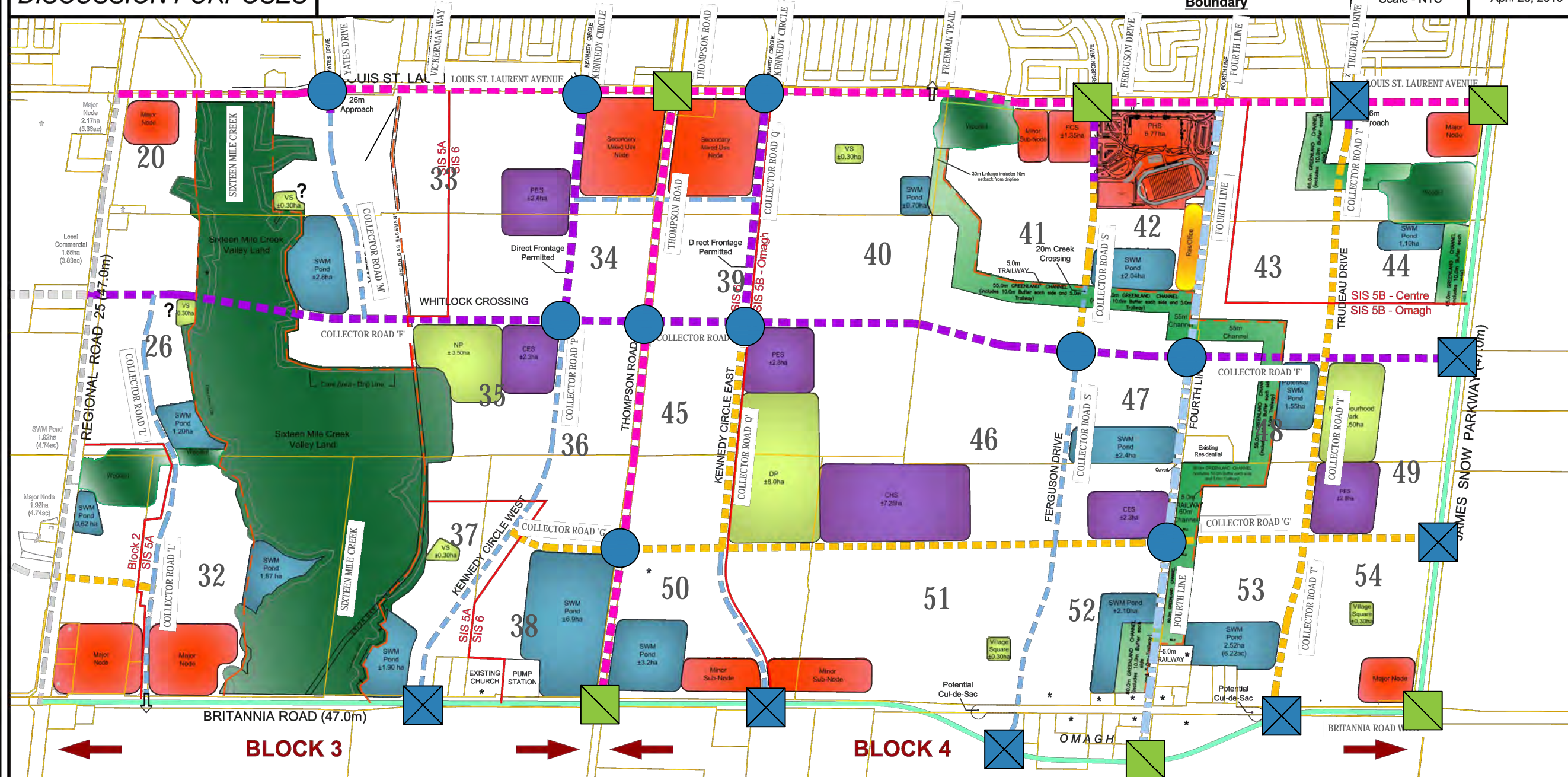
SWM Pond

- Natural Heritage System
- Node
- Residential/Office
- Trails
- * Heritage Feature
- Approximate Drainage Boundary

KORSIAK Urban Planning
206-277 Lakeshore Road East
Oakville, Ontario L6J 1H9
T: 905-257-0227
info@korsiak.com

SCENARIO 6

Scale - NTS April 28, 2016



Legend

- Existing Traffic Signal
- Proposed Traffic Signal
- 2015 Roundabout
- Proposed Roundabout



Future draft plans will confirm a final recommended design criteria.

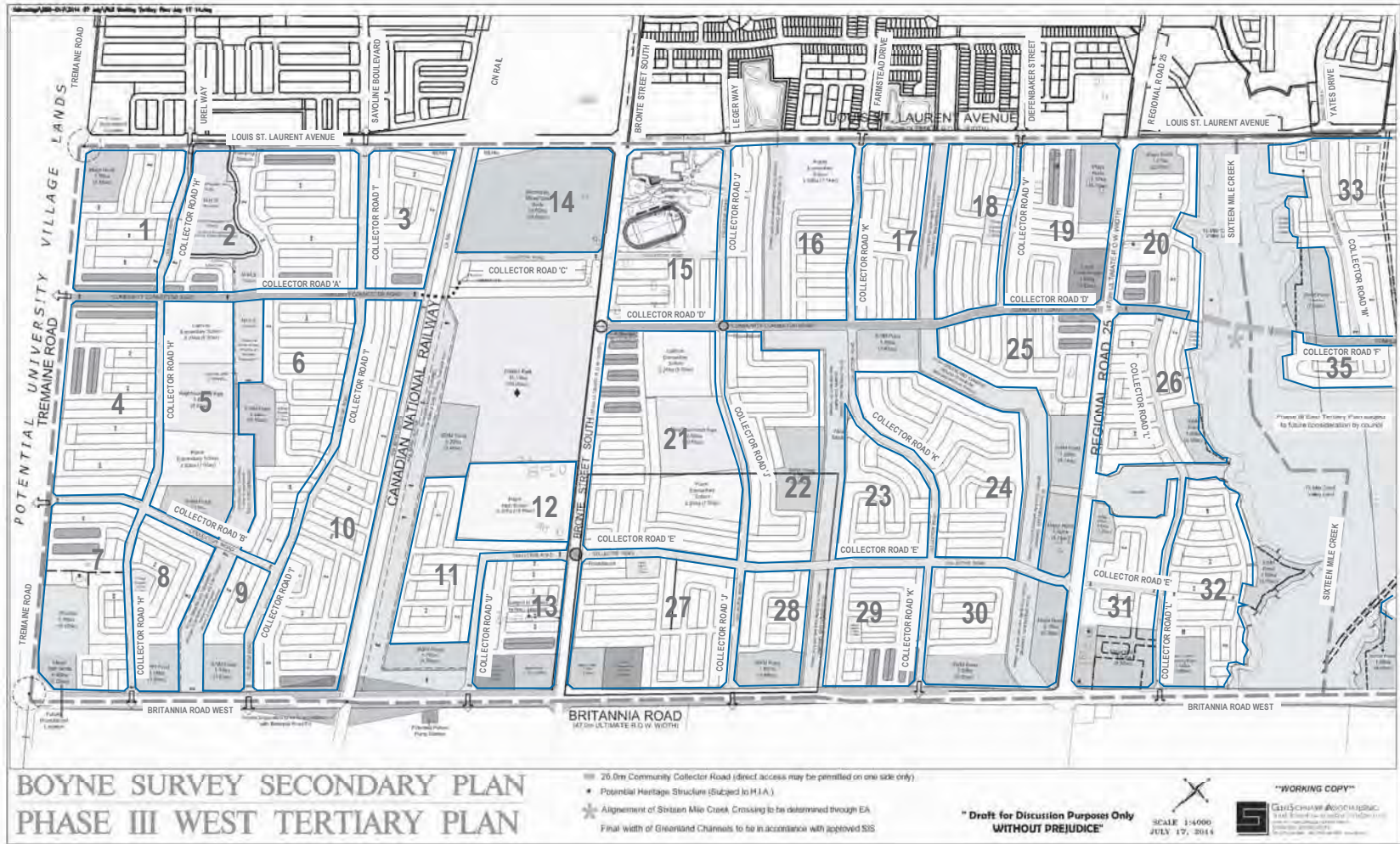


Milton Phase 3 Landowners Group
Boyne Survey
Road Network Assessment
East Block
Boyne Survey Road Network

Job Number | 28-21522
Revision | C
Date | Sept 2017

Figure 02

ik & Company\MATTAM\Milton Phase 3\Tertiary\East\Framework Plan\April 16\BoyneEast\Framework-Plan_sc6_2016Apr28_crdwg_CR



Milton Phase 3 Landowners Group
 Boyne Survey
 Road Network Assessment
 West Block
 Boyne Survey Road Network

Job Number 28-21522
 Revision B
 Date Aug 2014
Figure 01

Appendix H

Traffic Signal Timings





Date: 28-Sep-2021

Intersection: Britannia Rd @ Farmstead Dr.

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	WBL	EB	SBL	NB	EBL	WB	NBL	SB				
Min Green		20			7	20		10				
Veh Ext.		3.0				3.0		3.0				
Yellow		4.2			3	4.2		3.3				
Red		2.2			1	2.2		2				
Walk		7				7		7				
Don't Walk		16				16		27				
Max 1		64			11	53		41				
Max 2												
Max 3												
Veh Recall												
Ped Recall												
Notes:	Pedestrian Re-service Active Local Zero Over-ride Active Rest in Don't Walk EB/WB Set Sync Reference 3:15											





Date: #####

Intersection: Regional Road 25 @ Britannia Road

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				
Direction	SBLT	NB	WBLT	EB	NBLT	SB	EBLT	WB				
Min Green	7	20	7	10	7	20	7	10				
Veh Ext.	3.0	3.2	3.0	4.0	3.0	3.2	3.0	4.0				
Yellow	3	4.2	3	4.2	3	4.2	3	4.2				
Red	1	3.5	1	3.3	1	3.5	1	3.3				
Walk		7		7		7		7				
Don't Walk		35		31		35		31				
Max 1	11	50	11	50	11	50	11	50				
Max 2												
Max 3												
Veh Recall		x				x						
Ped Recall												
Notes:	Use Max 1 (22:00-6:00) Local Zero Override Active Set Sync Reference to 3:15 Ped Reservice On Sync Reference 3:15											

Pattern 1

Time: 6:00
 Cycle Length: 130
 Offset (%): 99%

Direction	SBL	NB	WBL	EB
Phase	1	2	3	4
%	12	40	12	36
Direction	NBL	SB	EBL	WB
Phase	5	6	7	8
%	12	40	12	36

Pattern 2

Time: 9:30
 Cycle Length: 120
 Offset (%): 12%

Direction	SBLT	NB	WBLT	EB
Phase	1	2	3	4
%	8	44	13	35
Direction	NBLT	SB	EBLT	WB
Phase	5	6	7	8
%	8	44	13	35

Pattern 3

Time: 15:00
 Cycle Length: 130
 Offset (%): 80%

Direction	SBLT	NB	WBLT	EB
Phase	1	2	3	4
%	9	44	12	35
Direction	NBLT	SB	EBLT	WB
Phase	5	6	7	8
%	12	40	8	39

Pattern 4

Time: 20:00
 Cycle Length: 120
 Offset (%): 12%

Direction	SBLT	NB	WBLT	EB
Phase	1	2	3	4
%	8	44	13	35
Direction	NBLT	SB	EBLT	WB
Phase	5	6	7	8
%	8	44	13	35

Pattern 5

Time: 22:00
 Cycle Length: Local
 Offset (%):

Direction	SBLT	NB	WBLT	EB
Phase	1	2	3	4
%				
Direction	NBLT	SB	EBLT	WB
Phase	5	6	7	8
%				

Pattern 6

Time:
 Cycle Length:
 Offset (%):

Direction				
Phase	1	2	3	4
%				
Direction				
Phase	5	6	7	8
%				



Date: 04-Oct-21

Intersection: Regional Road 25 @ Etheridge Avenue

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		NB		EB	NBLT	SB		WB				
Min Green		20		10	7	20		10				
Veh Ext.		5.0		3.0	3.0	5.0		3.0				
Yellow		4.2		3.3	3	4.2		3.3				
Red		2.2		2.9	1	2.2		2.9				
Walk		7		7		7		7				
Don't Walk		25		23		25		23				
Max 1		81		39	11	70		39				
Max 2												
Max 3												
Veh Recall		x				x						
Ped Recall												
Notes:	Use Max 1 (22:00-6:00) Local Zero Override Active Set Sync Reference to 3:15 Ped Reservice On											

Pattern 1

Time: 6:00
 Cycle Length: 130
 Offset (%): 89%

Direction		NB		EB
Phase	1	2	3	4
%	0	69	0	31
Direction	NBLT	SB		WB
Phase	5	6	7	8
%	10	59	0	31

Pattern 2

Time: 9:30
 Cycle Length: 120
 Offset (%): 99%

Direction		NB		EB
Phase	1	2	3	4
%	0	68	0	32
Direction	NBLT	SB		WB
Phase	5	6	7	8
%	11	58	0	32

Pattern 3

Time: 15:00
 Cycle Length: 130
 Offset (%): 79%

Direction		NB		EB
Phase	1	2	3	4
%	0	69	0	31
Direction	NBLT	SB		WB
Phase	5	6	7	8
%	10	59	0	31

Pattern 4

Time: 20:00
 Cycle Length: 120
 Offset (%): 99%

Direction		NB		EB
Phase	1	2	3	4
%	0	68	0	32
Direction	NBLT	SB		WB
Phase	5	6	7	8
%	11	58	0	32

Pattern 5

Time: 22:00
 Cycle Length: Local
 Offset (%):

Direction		NB		EB
Phase	1	2	3	4
%				
Direction	NBLT	SB		WB
Phase	5	6	7	8
%				

Pattern 6

Time:
 Cycle Length:
 Offset (%):

Direction				
Phase	1	2	3	4
%				
Direction				
Phase	5	6	7	8
%				



Date: 04-Oct-21

Intersection: Regional Road 25 @ Whitlock Avenue

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				
Direction	SBLT	NB		EB	NBLT	SB		WB				
Min Green	7	20		10	7	20		10				
Veh Ext.	3.0	5.0		3.0	3.0	5.0		3.0				
Yellow	3	4.2		3.3	3	4.2		3.3				
Red	1	2.3		3.2	1	2.3		3.2				
Walk		7		7		7		7				
Don't Walk		22		24		22		24				
Max 1	12	70		38	12	70		38				
Max 2												
Max 3												
Veh Recall		x				x						
Ped Recall												
Notes:	Use Max 1 (22:00-6:00) Local Zero Override Active Set Sync Reference to 3:15 Ped Reservice On											

Pattern 1 Time: 6:00 Cycle Length: 130 Offset (%): 49%					Pattern 2 Time: 9:30 Cycle Length: 120 Offset (%): 69%				
Direction	SBLT	NB		EB	Direction	SBLT	NB		EB
Phase	1	2	3	4	Phase	1	2	3	4
%	9	62	0	29	%	10	59	0	32
Direction	NBLT	SB		WB	Direction	NBLT	SB		WB
Phase	5	6	7	8	Phase	5	6	7	8
%	9	62	0	29	%	10	59	0	32
Pattern 3 Time: 15:00 Cycle Length: 130 Offset (%): 31%					Pattern 4 Time: 20:00 Cycle Length: 120 Offset (%): 69%				
Direction	SBLT	NB		EB	Direction	SBLT	NB		EB
Phase	1	2	3	4	Phase	1	2	3	4
%	9	62	0	29	%	10	59	0	32
Direction	NBLT	SB		WB	Direction	NBLT	SB		WB
Phase	5	6	7	8	Phase	5	6	7	8
%	9	62	0	29	%	10	59	0	32
Pattern 5 Time: 22:00 Cycle Length: Local Offset (%):					Pattern 6 Time: Cycle Length: Offset (%):				
Direction	SBLT	NB		EB	Direction				
Phase	1	2	3	4	Phase	1	2	3	4
%					%				
Direction	NBLT	SB		WB	Direction				
Phase	5	6	7	8	Phase	5	6	7	8
%					%				



Date: 25-Jan-21

Intersection: Regional Rd 25 @ Louis St Laurent

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				
Direction	SBLT	NB	WBLT	EB	NBLT	SB	EBLT	WB				
Min Green	5	20	10	10	5	20	5	10				
Veh Ext.	3.0	3.2	5.0	3.0	3.0	3.2	3.0	3.0				
Yellow	3	4.2	3	4	3	4.2	3	4				
Red	1	3		3	1	3	1	3				
Walk		7		7		7		7				
Don't Walk		18		16		18		16				
Max 1	12	50	33	45	16	56	22	46				
Max 2	12	75	20	33	30	57	20	33				
Max 3												
Veh Recall		x				x						
Ped Recall												
Notes:	Local Zero Override Active Set Sync Reference to 3:15 Max 1 (6:00-15:00, 21:00-6:00) Max 2 (15:00-21:00)											

Appendix I

OTM Book 12 Excerpts – Traffic Signal Warrants



OTM BOOK 12 - JUSTIFICATION 7 - ETHERIDGE SITE ACCESS

STEP 1

Fill in yellow cells
Do not touch other cells

	All Approaches	Minor Streets	Major Street	Combined Vehicle and Pedestrian Crossing Artery from Minor Streets	
amPHV	585	245	340	130	Lefts + 20 peds
pmPHV	675	150	525	155	Lefts + 20 peds
AHV	315	99	216	71	AHV = (amPHV+pmPHV)/4
		Just. 1B		Just. 2B	

STEP 2

Need to highlight which column applies
Link formulas in "%" column to the highlighted column
(ex. Minimum Requirement 2 or more lanes, restricted flow)

JUSTIFICATION 7

Justification	Description	Minimum Requirement 1 Lane Highways		Minimum Requirement 2 or more lanes		Compliance		ENTIRE
		Free Flow	Restr. Flow	Free Flow	Restr. Flow	Numerical	%	
1. Minimum Vehicular Volume	A. Vehicle volume, all approaches (average hour)	480	720	600	900	315	44%	44%
	B. Vehicle volume, along minor streets (average hour)*	120	170	120	170	99	58%	
2. Delay to cross traffic	A. Vehicle volume, major street (average hour)	480	720	600	900	216	30%	30%
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)	50	75	50	75	71	95%	

* For "T" intersections, these values should be increased by 50%. (Justification 1B ONLY)

100%

Analysis Using Average Hour Volume

For traffic signals to be considered, Justification 7 as per Table 21 is used but with a 20% increase over the required volumes for an existing intersection and a 50% increase for a future intersection or roadway.

Result: 44%
Required: 150%
Not Warranted

Appendix J

Synchro Worksheets



Timings
1: Regional Rd 25 & Louis St Laurent Ave

Existing AM
07-17-2023

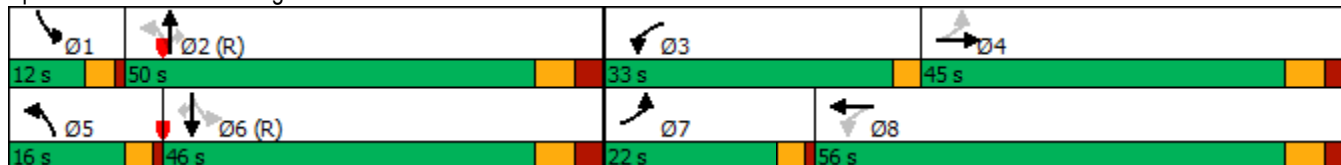


Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	265	535	370	545	85	670	245	60	640	95
Future Volume (vph)	265	535	370	545	85	670	245	60	640	95
Turn Type	pm+pt	NA	pm+pt	NA	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4	3	8	5	2		1	6	
Permitted Phases	4		8		2		2	6		6
Detector Phase	7	4	3	8	5	2	2	1	6	6
Switch Phase										
Minimum Initial (s)	5.0	10.0	10.0	10.0	5.0	20.0	20.0	5.0	20.0	20.0
Minimum Split (s)	9.0	30.0	14.0	30.0	9.0	32.2	32.2	9.0	32.2	32.2
Total Split (s)	22.0	45.0	33.0	56.0	16.0	50.0	50.0	12.0	46.0	46.0
Total Split (%)	15.7%	32.1%	23.6%	40.0%	11.4%	35.7%	35.7%	8.6%	32.9%	32.9%
Yellow Time (s)	3.0	4.0	3.0	4.0	3.0	4.2	4.2	3.0	4.2	4.2
All-Red Time (s)	1.0	3.0	0.0	3.0	1.0	3.0	3.0	1.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	3.0	6.0	2.0	6.0	3.0	6.2	6.2	3.0	6.2	6.2
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Act Effct Green (s)	56.1	35.0	69.7	44.6	64.6	52.5	52.5	60.3	48.5	48.5
Actuated g/C Ratio	0.40	0.25	0.50	0.32	0.46	0.38	0.38	0.43	0.35	0.35
v/c Ratio	0.74	0.84	0.92	0.62	0.30	0.56	0.35	0.22	0.58	0.16
Control Delay	34.6	57.4	64.2	41.6	25.9	39.0	7.2	25.1	41.7	4.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.6	57.4	64.2	41.6	25.9	39.0	7.2	25.1	41.7	4.9
LOS	C	E	E	D	C	D	A	C	D	A
Approach Delay		51.1		49.9		30.1			36.0	
Approach LOS		D		D		C			D	

Intersection Summary

Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.92
 Intersection Signal Delay: 42.0
 Intersection LOS: D
 Intersection Capacity Utilization 79.9%
 ICU Level of Service D
 Analysis Period (min) 15

Splits and Phases: 1: Regional Rd 25 & Louis St Laurent Ave



Queues
1: Regional Rd 25 & Louis St Laurent Ave

Existing AM
07-17-2023



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	282	739	394	681	90	713	261	64	681	101
v/c Ratio	0.74	0.84	0.92	0.62	0.30	0.56	0.35	0.22	0.58	0.16
Control Delay	34.6	57.4	64.2	41.6	25.9	39.0	7.2	25.1	41.7	4.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.6	57.4	64.2	41.6	25.9	39.0	7.2	25.1	41.7	4.9
Queue Length 50th (m)	46.4	103.4	89.2	84.4	15.2	92.6	4.6	10.6	88.6	0.0
Queue Length 95th (m)	63.5	125.0	#142.2	101.8	27.8	118.3	26.5	21.1	117.2	10.8
Internal Link Dist (m)		126.1		117.1		481.0			113.5	
Turn Bay Length (m)	90.0		35.0		65.0		65.0	80.0		90.0
Base Capacity (vph)	392	973	454	1233	321	1265	736	293	1169	625
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	0.72	0.76	0.87	0.55	0.28	0.56	0.35	0.22	0.58	0.16

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
1: Regional Rd 25 & Louis St Laurent Ave

Existing AM
07-17-2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	265	535	160	370	545	95	85	670	245	60	640	95
Future Volume (vph)	265	535	160	370	545	95	85	670	245	60	640	95
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0		2.0	6.0		3.0	6.2	6.2	3.0	6.2	6.2
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00
Frbp, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.97		1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1768	3425		1770	3425		1703	3374	1568	1719	3374	1583
Flt Permitted	0.30	1.00		0.12	1.00		0.24	1.00	1.00	0.27	1.00	1.00
Satd. Flow (perm)	561	3425		225	3425		437	3374	1568	492	3374	1583
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	282	569	170	394	580	101	90	713	261	64	681	101
RTOR Reduction (vph)	0	21	0	0	11	0	0	0	150	0	0	66
Lane Group Flow (vph)	282	718	0	394	670	0	90	713	111	64	681	35
Confl. Peds. (#/hr)	5					5						
Heavy Vehicles (%)	2%	2%	1%	2%	2%	7%	6%	7%	3%	5%	7%	2%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	51.1	34.0		64.7	43.6		60.3	50.7	50.7	53.9	47.5	47.5
Effective Green, g (s)	53.1	35.0		65.7	44.6		62.1	51.7	51.7	55.9	48.5	48.5
Actuated g/C Ratio	0.38	0.25		0.47	0.32		0.44	0.37	0.37	0.40	0.35	0.35
Clearance Time (s)	4.0	7.0		3.0	7.0		4.0	7.2	7.2	4.0	7.2	7.2
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	368	856		422	1091		289	1245	579	261	1168	548
v/s Ratio Prot	0.10	c0.21		c0.19	0.20		c0.02	c0.21		0.01	0.20	
v/s Ratio Perm	0.19			0.25			0.11		0.07	0.08		0.02
v/c Ratio	0.77	0.84		0.93	0.61		0.31	0.57	0.19	0.25	0.58	0.06
Uniform Delay, d1	32.5	49.8		40.4	40.4		24.4	35.3	30.0	27.0	37.5	30.6
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	9.2	7.2		27.7	1.0		0.6	1.9	0.7	0.5	2.1	0.2
Delay (s)	41.7	57.1		68.1	41.4		25.1	37.2	30.7	27.5	39.6	30.8
Level of Service	D	E		E	D		C	D	C	C	D	C
Approach Delay (s)		52.8			51.2			34.6			37.6	
Approach LOS		D			D			C			D	
Intersection Summary												
HCM 2000 Control Delay			44.3								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)	18.2
Intersection Capacity Utilization			79.9%								ICU Level of Service	D
Analysis Period (min)			15									

c Critical Lane Group

Timings
2: Regional Rd 25 & Whitlock Ave

Existing AM
07-17-2023



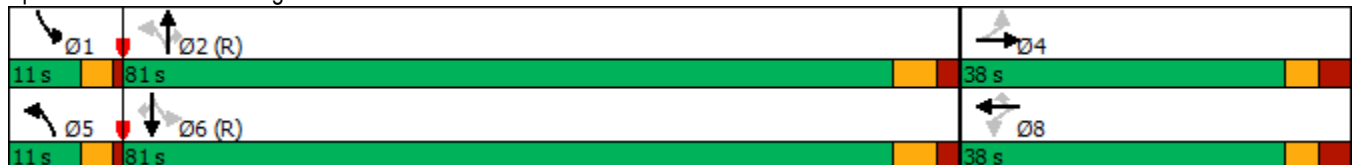
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗	↖	↗	↗	↖	↕	↗	↖	↕	↗
Traffic Volume (vph)	105	20	50	25	95	40	825	10	50	1335	85
Future Volume (vph)	105	20	50	25	95	40	825	10	50	1335	85
Turn Type	Perm	NA	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases		4		8		5	2		1	6	
Permitted Phases	4		8		8	2		2	6		6
Detector Phase	4	4	8	8	8	5	2	2	1	6	6
Switch Phase											
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	7.0	20.0	20.0	7.0	20.0	20.0
Minimum Split (s)	37.5	37.5	37.5	37.5	37.5	11.0	35.5	35.5	11.0	35.5	35.5
Total Split (s)	38.0	38.0	38.0	38.0	38.0	11.0	81.0	81.0	11.0	81.0	81.0
Total Split (%)	29.2%	29.2%	29.2%	29.2%	29.2%	8.5%	62.3%	62.3%	8.5%	62.3%	62.3%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.0	4.2	4.2	3.0	4.2	4.2
All-Red Time (s)	3.2	3.2	3.2	3.2	3.2	1.0	2.3	2.3	1.0	2.3	2.3
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5	3.0	5.5	5.5	3.0	5.5	5.5
Lead/Lag						Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?						Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Act Effct Green (s)	17.5	17.5	17.5	17.5	17.5	101.6	92.7	92.7	101.7	92.7	92.7
Actuated g/C Ratio	0.13	0.13	0.13	0.13	0.13	0.78	0.71	0.71	0.78	0.71	0.71
v/c Ratio	0.63	0.39	0.36	0.11	0.36	0.15	0.37	0.01	0.11	0.59	0.08
Control Delay	68.1	18.3	56.1	48.0	12.1	2.6	9.7	0.4	3.8	11.7	3.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	68.1	18.3	56.1	48.0	12.1	2.6	9.7	0.4	3.8	11.7	3.2
LOS	E	B	E	D	B	A	A	A	A	B	A
Approach Delay		43.7		30.3			9.3			11.0	
Approach LOS		D		C			A			B	

Intersection Summary

Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 64 (49%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 95
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.63
 Intersection Signal Delay: 14.1
 Intersection Capacity Utilization 65.3%
 Analysis Period (min) 15

Intersection LOS: B
 ICU Level of Service C

Splits and Phases: 2: Regional Rd 25 & Whitlock Ave



Queues
2: Regional Rd 25 & Whitlock Ave

Existing AM
07-17-2023



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	114	109	54	27	103	43	897	11	54	1451	92
v/c Ratio	0.63	0.39	0.36	0.11	0.36	0.15	0.37	0.01	0.11	0.59	0.08
Control Delay	68.1	18.3	56.1	48.0	12.1	2.6	9.7	0.4	3.8	11.7	3.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	68.1	18.3	56.1	48.0	12.1	2.6	9.7	0.4	3.8	11.7	3.2
Queue Length 50th (m)	29.5	5.3	13.4	6.5	0.0	0.0	74.1	0.0	2.5	98.0	2.2
Queue Length 95th (m)	47.6	21.8	26.0	15.0	16.1	1.8	114.6	0.7	6.7	142.0	9.1
Internal Link Dist (m)		62.9		68.1			696.9			481.0	
Turn Bay Length (m)	35.0		65.0		65.0	100.0		25.0	100.0		25.0
Base Capacity (vph)	336	449	280	439	441	278	2427	938	507	2451	1093
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	0.24	0.19	0.06	0.23	0.15	0.37	0.01	0.11	0.59	0.08

Intersection Summary

HCM Signalized Intersection Capacity Analysis
2: Regional Rd 25 & Whitlock Ave

Existing AM
07-17-2023



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	105	20	80	50	25	95	40	825	10	50	1335	85
Future Volume (vph)	105	20	80	50	25	95	40	825	10	50	1335	85
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5		5.5	5.5	5.5	3.0	5.5	5.5	3.0	5.5	5.5
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frbp, ped/bikes	1.00	0.99		1.00	1.00	0.98	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	0.99	1.00		0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.88		1.00	1.00	0.85	1.00	1.00	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)	1725	1537		1726	1759	1455	1671	3406	1292	1805	3438	1509
Flt Permitted	0.74	1.00		0.62	1.00	1.00	0.14	1.00	1.00	0.29	1.00	1.00
Satd. Flow (perm)	1343	1537		1123	1759	1455	242	3406	1292	549	3438	1509
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	114	22	87	54	27	103	43	897	11	54	1451	92
RTOR Reduction (vph)	0	75	0	0	0	89	0	0	3	0	0	18
Lane Group Flow (vph)	114	34	0	54	27	14	43	897	8	54	1451	74
Confl. Peds. (#/hr)	5		5	5		5						
Heavy Vehicles (%)	4%	32%	1%	4%	8%	9%	8%	6%	25%	0%	5%	7%
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases		4			8		5	2		1		6
Permitted Phases	4			8		8	2		2	6		6
Actuated Green, G (s)	16.5	16.5		16.5	16.5	16.5	96.4	90.8	90.8	96.6	90.9	90.9
Effective Green, g (s)	17.5	17.5		17.5	17.5	17.5	98.4	91.8	91.8	98.6	91.9	91.9
Actuated g/C Ratio	0.13	0.13		0.13	0.13	0.13	0.76	0.71	0.71	0.76	0.71	0.71
Clearance Time (s)	6.5	6.5		6.5	6.5	6.5	4.0	6.5	6.5	4.0	6.5	6.5
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
Lane Grp Cap (vph)	180	206		151	236	195	255	2405	912	481	2430	1066
v/s Ratio Prot		0.02			0.02		c0.01	0.26		0.01	c0.42	
v/s Ratio Perm	c0.08			0.05		0.01	0.12		0.01	0.08		0.05
v/c Ratio	0.63	0.16		0.36	0.11	0.07	0.17	0.37	0.01	0.11	0.60	0.07
Uniform Delay, d1	53.2	49.8		51.1	49.4	49.1	6.2	7.6	5.6	4.2	9.7	5.9
Progression Factor	1.00	1.00		1.00	1.00	1.00	0.41	1.11	1.00	1.00	1.00	1.00
Incremental Delay, d2	7.1	0.4		1.5	0.2	0.2	0.3	0.4	0.0	0.1	1.1	0.1
Delay (s)	60.3	50.2		52.6	49.7	49.3	2.8	8.9	5.7	4.3	10.8	6.0
Level of Service	E	D		D	D	D	A	A	A	A	B	A
Approach Delay (s)		55.3			50.3			8.6			10.3	
Approach LOS		E			D			A			B	

Intersection Summary

HCM 2000 Control Delay	15.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	65.3%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Timings
5: Regional Rd 25 & Etheridge Ave

Existing AM
07-17-2023

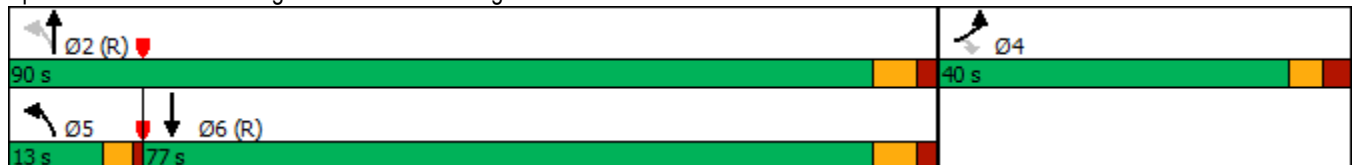


Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Configurations	↖	↗	↖	↑↑	↑↑
Traffic Volume (vph)	100	65	30	775	1410
Future Volume (vph)	100	65	30	775	1410
Turn Type	Prot	Perm	pm+pt	NA	NA
Protected Phases	4		5	2	6
Permitted Phases		4	2		
Detector Phase	4	4	5	2	6
Switch Phase					
Minimum Initial (s)	10.0	10.0	7.0	20.0	20.0
Minimum Split (s)	36.2	36.2	11.0	38.4	38.4
Total Split (s)	40.0	40.0	13.0	90.0	77.0
Total Split (%)	30.8%	30.8%	10.0%	69.2%	59.2%
Yellow Time (s)	3.3	3.3	3.0	4.2	4.2
All-Red Time (s)	2.9	2.9	1.0	2.2	2.2
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	5.2	5.2	3.0	5.4	5.4
Lead/Lag			Lead		Lag
Lead-Lag Optimize?			Yes		Yes
Recall Mode	None	None	None	C-Max	C-Max
Act Effct Green (s)	14.4	14.4	107.4	105.0	98.4
Actuated g/C Ratio	0.11	0.11	0.83	0.81	0.76
v/c Ratio	0.53	0.28	0.11	0.30	0.60
Control Delay	64.0	14.5	2.3	1.7	3.0
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	64.0	14.5	2.3	1.7	3.0
LOS	E	B	A	A	A
Approach Delay	44.5			1.8	3.0
Approach LOS	D			A	A

Intersection Summary

Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 116 (89%), Referenced to phase 2:NBT and 6:SBT, Start of Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.60
 Intersection Signal Delay: 5.4
 Intersection Capacity Utilization 57.9%
 Analysis Period (min) 15
 Intersection LOS: A
 ICU Level of Service B

Splits and Phases: 5: Regional Rd 25 & Etheridge Ave



Queues
5: Regional Rd 25 & Etheridge Ave

Existing AM
07-17-2023



Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Group Flow (vph)	105	68	32	816	1542
v/c Ratio	0.53	0.28	0.11	0.30	0.60
Control Delay	64.0	14.5	2.3	1.7	3.0
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	64.0	14.5	2.3	1.7	3.0
Queue Length 50th (m)	27.3	0.0	0.9	12.3	19.3
Queue Length 95th (m)	45.3	13.8	m2.1	15.0	24.7
Internal Link Dist (m)	53.9			292.1	696.9
Turn Bay Length (m)	40.0		70.0		
Base Capacity (vph)	478	482	307	2751	2586
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	0.22	0.14	0.10	0.30	0.60

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
5: Regional Rd 25 & Etheridge Ave

Existing AM
07-17-2023



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	100	65	30	775	1410	55
Future Volume (vph)	100	65	30	775	1410	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.2	5.2	3.0	5.4	5.4	
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	
Frt	1.00	0.85	1.00	1.00	0.99	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1787	1615	1752	3406	3417	
Flt Permitted	0.95	1.00	0.12	1.00	1.00	
Satd. Flow (perm)	1787	1615	230	3406	3417	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	105	68	32	816	1484	58
RTOR Reduction (vph)	0	60	0	0	1	0
Lane Group Flow (vph)	105	8	32	816	1541	0
Heavy Vehicles (%)	1%	0%	3%	6%	5%	6%
Turn Type	Prot	Perm	pm+pt	NA	NA	
Protected Phases	4		5	2	6	
Permitted Phases		4	2			
Actuated Green, G (s)	13.4	13.4	104.0	104.0	95.8	
Effective Green, g (s)	14.4	14.4	105.0	105.0	96.8	
Actuated g/C Ratio	0.11	0.11	0.81	0.81	0.74	
Clearance Time (s)	6.2	6.2	4.0	6.4	6.4	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	197	178	246	2751	2544	
v/s Ratio Prot	c0.06		0.01	c0.24	c0.45	
v/s Ratio Perm		0.00	0.10			
v/c Ratio	0.53	0.04	0.13	0.30	0.61	
Uniform Delay, d1	54.6	51.6	5.1	3.2	7.7	
Progression Factor	1.00	1.00	0.64	0.44	0.27	
Incremental Delay, d2	2.8	0.1	0.2	0.3	0.9	
Delay (s)	57.4	51.7	3.5	1.6	3.0	
Level of Service	E	D	A	A	A	
Approach Delay (s)	55.2			1.7	3.0	
Approach LOS	E			A	A	

Intersection Summary

HCM 2000 Control Delay	6.1	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	13.6
Intersection Capacity Utilization	57.9%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Timings
7: Regional Rd 25 & Britannia Rd

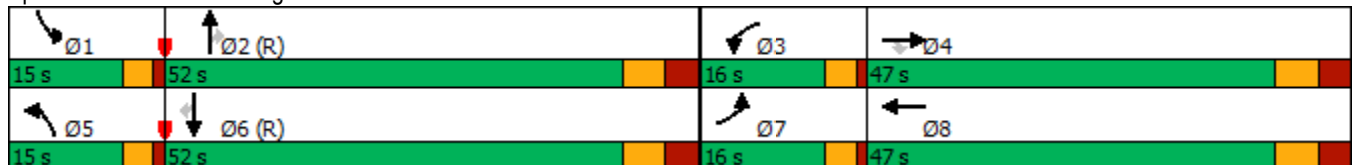
Existing AM
07-17-2023

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations												
Traffic Volume (vph)	55	335	240	290	270	45	660	165	240	1225	10	
Future Volume (vph)	55	335	240	290	270	45	660	165	240	1225	10	
Turn Type	Prot	NA	Perm	Prot	NA	Prot	NA	Perm	Prot	NA	Perm	
Protected Phases	7	4		3	8	5	2		1	6		
Permitted Phases			4					2			6	
Detector Phase	7	4	4	3	8	5	2	2	1	6	6	
Switch Phase												
Minimum Initial (s)	7.0	10.0	10.0	7.0	10.0	7.0	20.0	20.0	7.0	20.0	20.0	
Minimum Split (s)	11.0	45.5	45.5	11.0	45.5	11.0	49.7	49.7	11.0	49.7	49.7	
Total Split (s)	16.0	47.0	47.0	16.0	47.0	15.0	52.0	52.0	15.0	52.0	52.0	
Total Split (%)	12.3%	36.2%	36.2%	12.3%	36.2%	11.5%	40.0%	40.0%	11.5%	40.0%	40.0%	
Yellow Time (s)	3.0	4.2	4.2	3.0	4.2	3.0	4.2	4.2	3.0	4.2	4.2	
All-Red Time (s)	1.0	3.3	3.3	1.0	3.3	1.0	3.5	3.5	1.0	3.5	3.5	
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	
Total Lost Time (s)	3.0	6.5	6.5	3.0	6.5	3.0	6.7	6.7	3.0	6.7	6.7	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Recall Mode	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max	
Act Effct Green (s)	9.0	20.0	20.0	13.0	26.2	8.7	61.6	61.6	16.2	71.3	71.3	
Actuated g/C Ratio	0.07	0.15	0.15	0.10	0.20	0.07	0.47	0.47	0.12	0.55	0.55	
v/c Ratio	0.26	0.66	0.65	0.96	0.54	0.22	0.44	0.22	0.60	0.71	0.01	
Control Delay	59.9	57.5	23.3	99.3	45.5	59.6	24.9	3.9	54.8	26.1	0.0	
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	59.9	57.5	23.3	99.3	45.5	59.6	24.9	3.9	54.8	26.1	0.0	
LOS	E	E	C	F	D	E	C	A	D	C	A	
Approach Delay		44.7			69.5		22.7			30.6		
Approach LOS		D			E		C			C		

Intersection Summary

Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 104 (80%), Referenced to phase 2:NBT and 6:SBT, Start of Green
 Natural Cycle: 120
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.96
 Intersection Signal Delay: 38.1
 Intersection LOS: D
 Intersection Capacity Utilization 74.9%
 ICU Level of Service D
 Analysis Period (min) 15

Splits and Phases: 7: Regional Rd 25 & Britannia Rd



Queues
7: Regional Rd 25 & Britannia Rd

Existing AM
07-17-2023



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	60	364	261	315	391	49	717	179	261	1332	11
v/c Ratio	0.26	0.66	0.65	0.96	0.54	0.22	0.44	0.22	0.60	0.71	0.01
Control Delay	59.9	57.5	23.3	99.3	45.5	59.6	24.9	3.9	54.8	26.1	0.0
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	59.9	57.5	23.3	99.3	45.5	59.6	24.9	3.9	54.8	26.1	0.0
Queue Length 50th (m)	8.0	49.4	18.5	44.3	46.5	6.5	65.8	0.0	36.0	98.8	0.0
Queue Length 95th (m)	15.3	63.4	46.7	#74.5	62.0	13.2	94.6	14.6	52.5	146.1	m0.0
Internal Link Dist (m)		377.9			362.1		165.3			292.1	
Turn Bay Length (m)	60.0			120.0		90.0		90.0	90.0		90.0
Base Capacity (vph)	330	1113	625	327	1093	310	1628	830	437	1885	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	0.18	0.33	0.42	0.96	0.36	0.16	0.44	0.22	0.60	0.71	0.01

Intersection Summary
































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.

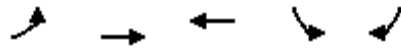
HCM Signalized Intersection Capacity Analysis
7: Regional Rd 25 & Britannia Rd

Existing AM
07-17-2023

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	 	 		 	 		 	 		 	 		
Traffic Volume (vph)	55	335	240	290	270	90	45	660	165	240	1225	10	
Future Volume (vph)	55	335	240	290	270	90	45	660	165	240	1225	10	
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	3.0	6.5	6.5	3.0	6.5		3.0	6.7	6.7	3.0	6.7	6.7	
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95		0.97	0.95	1.00	0.97	0.95	1.00	
Frt	1.00	1.00	0.85	1.00	0.96		1.00	1.00	0.85	1.00	1.00	0.85	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	3303	3574	1599	3273	3431		3367	3438	1553	3502	3438	1272	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	
Satd. Flow (perm)	3303	3574	1599	3273	3431		3367	3438	1553	3502	3438	1272	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	60	364	261	315	293	98	49	717	179	261	1332	11	
RTOR Reduction (vph)	0	0	155	0	29	0	0	0	95	0	0	5	
Lane Group Flow (vph)	60	364	106	315	362	0	49	717	84	261	1332	6	
Heavy Vehicles (%)	6%	1%	1%	7%	1%	2%	4%	5%	4%	0%	5%	27%	
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	
Protected Phases	7	4		3	8		5	2		1	6		
Permitted Phases			4						2			6	
Actuated Green, G (s)	6.6	19.8	19.8	12.0	25.2		6.3	59.8	59.8	15.2	68.7	68.7	
Effective Green, g (s)	7.6	20.8	20.8	13.0	26.2		7.3	60.8	60.8	16.2	69.7	69.7	
Actuated g/C Ratio	0.06	0.16	0.16	0.10	0.20		0.06	0.47	0.47	0.12	0.54	0.54	
Clearance Time (s)	4.0	7.5	7.5	4.0	7.5		4.0	7.7	7.7	4.0	7.7	7.7	
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	
Lane Grp Cap (vph)	193	571	255	327	691		189	1607	726	436	1843	681	
v/s Ratio Prot	0.02	c0.10		c0.10	0.11		0.01	0.21		c0.07	c0.39		
v/s Ratio Perm			0.07						0.05			0.00	
v/c Ratio	0.31	0.64	0.41	0.96	0.52		0.26	0.45	0.12	0.60	0.72	0.01	
Uniform Delay, d1	58.7	51.1	49.1	58.3	46.3		58.8	23.3	19.5	53.8	22.8	14.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	0.93	1.03	1.00	
Incremental Delay, d2	0.9	2.3	1.1	39.7	0.7		0.7	0.9	0.3	1.9	2.1	0.0	
Delay (s)	59.6	53.4	50.2	98.0	47.1		59.5	24.2	19.8	52.0	25.7	14.1	
Level of Service	E	D	D	F	D		E	C	B	D	C	B	
Approach Delay (s)		52.7			69.8			25.2			29.9		
Approach LOS		D			E			C			C		
Intersection Summary													
HCM 2000 Control Delay			39.9									HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio			0.73										
Actuated Cycle Length (s)			130.0									Sum of lost time (s)	19.2
Intersection Capacity Utilization			74.9%									ICU Level of Service	D
Analysis Period (min)			15										
c Critical Lane Group													

Timings
10: Britannia Rd & Farmstead Dr

Existing AM
07-17-2023

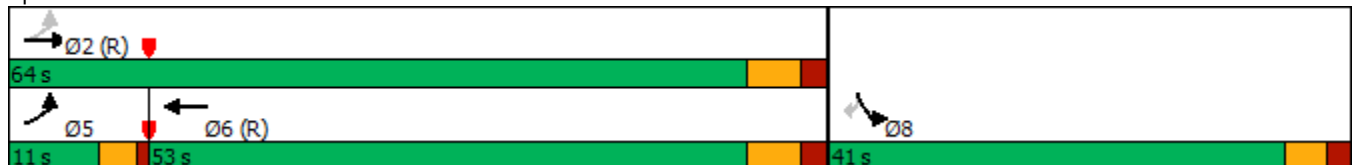


Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Configurations	↖	↑↑↑	↑↑↑	↖	↗
Traffic Volume (vph)	20	540	300	90	20
Future Volume (vph)	20	540	300	90	20
Turn Type	pm+pt	NA	NA	Prot	Perm
Protected Phases	5	2	6	8	
Permitted Phases	2				8
Detector Phase	5	2	6	8	8
Switch Phase					
Minimum Initial (s)	7.0	20.0	20.0	10.0	10.0
Minimum Split (s)	11.0	29.4	29.4	15.3	15.3
Total Split (s)	11.0	64.0	53.0	41.0	41.0
Total Split (%)	10.5%	61.0%	50.5%	39.0%	39.0%
Yellow Time (s)	3.0	4.2	4.2	3.3	3.3
All-Red Time (s)	1.0	2.2	2.2	2.0	2.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	3.0	5.4	5.4	4.3	4.3
Lead/Lag	Lead		Lag		
Lead-Lag Optimize?	Yes		Yes		
Recall Mode	None	C-Max	C-Max	None	None
Act Effct Green (s)	87.8	86.5	82.1	12.9	12.9
Actuated g/C Ratio	0.84	0.82	0.78	0.12	0.12
v/c Ratio	0.03	0.13	0.09	0.44	0.10
Control Delay	2.5	2.7	4.2	49.0	16.6
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	2.5	2.7	4.2	49.0	16.6
LOS	A	A	A	D	B
Approach Delay		2.7	4.2	43.1	
Approach LOS		A	A	D	

Intersection Summary

Cycle Length: 105
 Actuated Cycle Length: 105
 Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.44
 Intersection Signal Delay: 7.7
 Intersection LOS: A
 Intersection Capacity Utilization 33.1%
 ICU Level of Service A
 Analysis Period (min) 15

Splits and Phases: 10: Britannia Rd & Farmstead Dr



Queues
10: Britannia Rd & Farmstead Dr

Existing AM
07-17-2023



Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	21	557	335	93	21
v/c Ratio	0.03	0.13	0.09	0.44	0.10
Control Delay	2.5	2.7	4.2	49.0	16.6
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	2.5	2.7	4.2	49.0	16.6
Queue Length 50th (m)	0.6	8.0	4.3	19.0	0.0
Queue Length 95th (m)	2.4	13.5	12.4	33.9	7.2
Internal Link Dist (m)		101.0	377.9	199.3	
Turn Bay Length (m)	20.0				
Base Capacity (vph)	817	4148	3735	595	551
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	0.13	0.09	0.16	0.04
Intersection Summary					

HCM Signalized Intersection Capacity Analysis
10: Britannia Rd & Farmstead Dr

Existing AM
07-17-2023



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↙	↑↑↑	↑↑↑		↙	↗
Traffic Volume (vph)	20	540	300	25	90	20
Future Volume (vph)	20	540	300	25	90	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	5.4	5.4		4.3	4.3
Lane Util. Factor	1.00	0.91	0.91		1.00	1.00
Frt	1.00	1.00	0.99		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1656	5036	4774		1703	1538
Flt Permitted	0.52	1.00	1.00		0.95	1.00
Satd. Flow (perm)	910	5036	4774		1703	1538
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	21	557	309	26	93	21
RTOR Reduction (vph)	0	0	4	0	0	19
Lane Group Flow (vph)	21	557	331	0	93	2
Heavy Vehicles (%)	9%	3%	8%	0%	6%	5%
Turn Type	pm+pt	NA	NA		Prot	Perm
Protected Phases	5	2	6		8	
Permitted Phases	2					8
Actuated Green, G (s)	83.4	83.4	76.6		9.9	9.9
Effective Green, g (s)	84.4	84.4	77.6		10.9	10.9
Actuated g/C Ratio	0.80	0.80	0.74		0.10	0.10
Clearance Time (s)	4.0	6.4	6.4		5.3	5.3
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	758	4047	3528		176	159
v/s Ratio Prot	0.00	c0.11	0.07		c0.05	
v/s Ratio Perm	0.02					0.00
v/c Ratio	0.03	0.14	0.09		0.53	0.01
Uniform Delay, d1	2.1	2.3	3.8		44.6	42.2
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.0	0.1	0.1		2.8	0.0
Delay (s)	2.1	2.3	3.9		47.5	42.3
Level of Service	A	A	A		D	D
Approach Delay (s)		2.3	3.9		46.5	
Approach LOS		A	A		D	

Intersection Summary

HCM 2000 Control Delay	7.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.19		
Actuated Cycle Length (s)	105.0	Sum of lost time (s)	12.7
Intersection Capacity Utilization	33.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Timings
1: Regional Rd 25 & Louis St Laurent Ave

Existing PM
07-17-2023



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	195	375	250	535	170	690	355	75	650	195
Future Volume (vph)	195	375	250	535	170	690	355	75	650	195
Turn Type	pm+pt	NA	pm+pt	NA	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4	3	8	5	2		1	6	
Permitted Phases	4		8		2		2	6		6
Detector Phase	7	4	3	8	5	2	2	1	6	6
Switch Phase										
Minimum Initial (s)	5.0	10.0	10.0	10.0	5.0	20.0	20.0	5.0	20.0	20.0
Minimum Split (s)	9.0	30.0	14.0	30.0	9.0	32.2	32.2	9.0	32.2	32.2
Total Split (s)	20.0	33.0	20.0	33.0	30.0	75.0	75.0	12.0	57.0	57.0
Total Split (%)	14.3%	23.6%	14.3%	23.6%	21.4%	53.6%	53.6%	8.6%	40.7%	40.7%
Yellow Time (s)	3.0	4.0	3.0	4.0	3.0	4.2	4.2	3.0	4.2	4.2
All-Red Time (s)	1.0	3.0	0.0	3.0	1.0	3.0	3.0	1.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	3.0	6.0	2.0	6.0	3.0	6.2	6.2	3.0	6.2	6.2
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Act Effct Green (s)	45.7	26.4	48.4	26.8	84.8	70.3	70.3	77.8	66.1	66.1
Actuated g/C Ratio	0.33	0.19	0.35	0.19	0.61	0.50	0.50	0.56	0.47	0.47
v/c Ratio	0.77	0.73	0.80	0.92	0.39	0.42	0.38	0.19	0.41	0.24
Control Delay	53.7	58.4	52.9	73.9	14.8	23.2	3.0	13.0	25.8	3.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	53.7	58.4	52.9	73.9	14.8	23.2	3.0	13.0	25.8	3.6
LOS	D	E	D	E	B	C	A	B	C	A
Approach Delay		57.0		67.8		16.2			20.0	
Approach LOS		E		E		B			C	

Intersection Summary

Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.92
 Intersection Signal Delay: 36.6
 Intersection LOS: D
 Intersection Capacity Utilization 75.3%
 ICU Level of Service D
 Analysis Period (min) 15

Splits and Phases: 1: Regional Rd 25 & Louis St Laurent Ave



Queues
1: Regional Rd 25 & Louis St Laurent Ave

Existing PM
07-17-2023



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	203	490	260	625	177	719	370	78	677	203
v/c Ratio	0.77	0.73	0.80	0.92	0.39	0.42	0.38	0.19	0.41	0.24
Control Delay	53.7	58.4	52.9	73.9	14.8	23.2	3.0	13.0	25.8	3.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	53.7	58.4	52.9	73.9	14.8	23.2	3.0	13.0	25.8	3.6
Queue Length 50th (m)	42.8	68.3	56.0	93.7	21.9	69.5	0.0	9.1	67.7	0.0
Queue Length 95th (m)	#73.6	89.1	#83.7	#128.6	33.7	86.2	16.6	16.5	88.6	14.8
Internal Link Dist (m)		126.1		117.1		481.0			113.5	
Turn Bay Length (m)	90.0		35.0		65.0		65.0	80.0		90.0
Base Capacity (vph)	274	683	330	689	583	1710	971	426	1639	854
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	0.74	0.72	0.79	0.91	0.30	0.42	0.38	0.18	0.41	0.24

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
1: Regional Rd 25 & Louis St Laurent Ave

Existing PM
07-17-2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	195	375	95	250	535	65	170	690	355	75	650	195
Future Volume (vph)	195	375	95	250	535	65	170	690	355	75	650	195
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0		2.0	6.0		3.0	6.2	6.2	3.0	6.2	6.2
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00
Frbp, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	0.98	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	0.97		1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1769	3458		1804	3535		1786	3406	1567	1804	3471	1582
Flt Permitted	0.15	1.00		0.24	1.00		0.31	1.00	1.00	0.33	1.00	1.00
Satd. Flow (perm)	281	3458		453	3535		580	3406	1567	628	3471	1582
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	203	391	99	260	557	68	177	719	370	78	677	203
RTOR Reduction (vph)	0	16	0	0	6	0	0	0	184	0	0	107
Lane Group Flow (vph)	203	474	0	260	619	0	177	719	186	78	677	96
Confl. Peds. (#/hr)	5		5	5		5	5		5	5		5
Heavy Vehicles (%)	2%	1%	0%	0%	0%	2%	1%	6%	1%	0%	4%	0%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	40.8	25.5		42.4	25.8		80.7	69.2	69.2	72.6	65.1	65.1
Effective Green, g (s)	42.8	26.5		44.4	26.8		81.7	70.2	70.2	74.6	66.1	66.1
Actuated g/C Ratio	0.31	0.19		0.32	0.19		0.58	0.50	0.50	0.53	0.47	0.47
Clearance Time (s)	4.0	7.0		3.0	7.0		4.0	7.2	7.2	4.0	7.2	7.2
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	259	654		313	676		447	1707	785	406	1638	746
v/s Ratio Prot	0.09	0.14		c0.10	c0.17		c0.04	c0.21		0.01	0.20	
v/s Ratio Perm	0.15			0.16			0.20		0.12	0.09		0.06
v/c Ratio	0.78	0.72		0.83	0.91		0.40	0.42	0.24	0.19	0.41	0.13
Uniform Delay, d1	39.7	53.3		39.0	55.5		14.5	22.1	19.7	16.2	24.2	20.8
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	14.3	4.0		16.8	17.0		0.6	0.8	0.7	0.2	0.8	0.4
Delay (s)	54.1	57.3		55.8	72.5		15.1	22.8	20.4	16.5	25.0	21.1
Level of Service	D	E		E	E		B	C	C	B	C	C
Approach Delay (s)		56.4			67.6			21.1			23.5	
Approach LOS		E			E			C			C	
Intersection Summary												
HCM 2000 Control Delay			38.9				HCM 2000 Level of Service			D		
HCM 2000 Volume to Capacity ratio			0.60									
Actuated Cycle Length (s)			140.0			Sum of lost time (s)			18.2			
Intersection Capacity Utilization			75.3%			ICU Level of Service			D			
Analysis Period (min)			15									

c Critical Lane Group

Timings
2: Regional Rd 25 & Whitlock Ave

Existing PM
07-17-2023

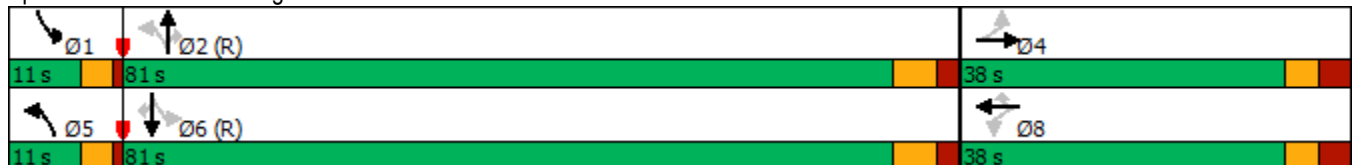


Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗	↖	↗	↗	↖	↗	↗	↖	↗	↗
Traffic Volume (vph)	80	20	25	10	75	75	1240	40	60	780	95
Future Volume (vph)	80	20	25	10	75	75	1240	40	60	780	95
Turn Type	Perm	NA	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases		4		8		5	2		1	6	
Permitted Phases	4		8		8	2		2	6		6
Detector Phase	4	4	8	8	8	5	2	2	1	6	6
Switch Phase											
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	7.0	20.0	20.0	7.0	20.0	20.0
Minimum Split (s)	37.5	37.5	37.5	37.5	37.5	11.0	35.5	35.5	11.0	35.5	35.5
Total Split (s)	38.0	38.0	38.0	38.0	38.0	11.0	81.0	81.0	11.0	81.0	81.0
Total Split (%)	29.2%	29.2%	29.2%	29.2%	29.2%	8.5%	62.3%	62.3%	8.5%	62.3%	62.3%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.0	4.2	4.2	3.0	4.2	4.2
All-Red Time (s)	3.2	3.2	3.2	3.2	3.2	1.0	2.3	2.3	1.0	2.3	2.3
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5	3.0	5.5	5.5	3.0	5.5	5.5
Lead/Lag						Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?						Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Act Effct Green (s)	14.5	14.5	14.5	14.5	14.5	104.7	95.7	95.7	104.6	95.6	95.6
Actuated g/C Ratio	0.11	0.11	0.11	0.11	0.11	0.81	0.74	0.74	0.80	0.74	0.74
v/c Ratio	0.53	0.24	0.17	0.05	0.32	0.14	0.51	0.04	0.17	0.32	0.08
Control Delay	66.1	28.4	53.3	49.7	14.2	3.1	5.8	0.9	3.6	7.1	2.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	66.1	28.4	53.3	49.7	14.2	3.1	5.8	0.9	3.6	7.1	2.8
LOS	E	C	D	D	B	A	A	A	A	A	A
Approach Delay		51.5		26.3			5.5			6.4	
Approach LOS		D		C			A			A	

Intersection Summary

Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 40 (31%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 85
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.53
 Intersection Signal Delay: 9.1
 Intersection Capacity Utilization 67.4%
 Analysis Period (min) 15
 Intersection LOS: A
 ICU Level of Service C

Splits and Phases: 2: Regional Rd 25 & Whitlock Ave



Queues
2: Regional Rd 25 & Whitlock Ave

Existing PM
07-17-2023



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	82	52	26	10	77	77	1278	41	62	804	98
v/c Ratio	0.53	0.24	0.17	0.05	0.32	0.14	0.51	0.04	0.17	0.32	0.08
Control Delay	66.1	28.4	53.3	49.7	14.2	3.1	5.8	0.9	3.6	7.1	2.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	66.1	28.4	53.3	49.7	14.2	3.1	5.8	0.9	3.6	7.1	2.8
Queue Length 50th (m)	21.3	5.2	6.5	2.5	0.0	3.7	35.1	0.0	2.3	36.7	2.4
Queue Length 95th (m)	37.2	17.5	15.3	7.8	14.7	6.9	40.6	0.5	6.2	55.5	8.9
Internal Link Dist (m)		62.9		68.1			696.9			481.0	
Turn Bay Length (m)	35.0		65.0		65.0	100.0		25.0	100.0		25.0
Base Capacity (vph)	351	442	341	475	442	570	2529	1168	361	2504	1203
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	0.23	0.12	0.08	0.02	0.17	0.14	0.51	0.04	0.17	0.32	0.08

Intersection Summary

HCM Signalized Intersection Capacity Analysis

2: Regional Rd 25 & Whitlock Ave

Existing PM
07-17-2023



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	80	20	30	25	10	75	75	1240	40	60	780	95
Future Volume (vph)	80	20	30	25	10	75	75	1240	40	60	780	95
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5		5.5	5.5	5.5	3.0	5.5	5.5	3.0	5.5	5.5
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frbp, ped/bikes	1.00	0.99		1.00	1.00	0.98	1.00	1.00	0.97	1.00	1.00	1.00
Flpb, ped/bikes	0.99	1.00		0.99	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	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)	1776	1677		1794	1900	1539	1787	3438	1565	1769	3406	1615
Flt Permitted	0.75	1.00		0.72	1.00	1.00	0.33	1.00	1.00	0.18	1.00	1.00
Satd. Flow (perm)	1404	1677		1366	1900	1539	617	3438	1565	338	3406	1615
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	82	21	31	26	10	77	77	1278	41	62	804	98
RTOR Reduction (vph)	0	28	0	0	0	68	0	0	11	0	0	17
Lane Group Flow (vph)	82	24	0	26	10	9	77	1278	30	62	804	81
Confl. Peds. (#/hr)	5		5	5		5			5	5		
Heavy Vehicles (%)	1%	5%	0%	0%	0%	3%	1%	5%	0%	2%	6%	0%
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8	2		2	6		6
Actuated Green, G (s)	13.5	13.5		13.5	13.5	13.5	99.6	93.8	93.8	99.4	93.7	93.7
Effective Green, g (s)	14.5	14.5		14.5	14.5	14.5	101.6	94.8	94.8	101.4	94.7	94.7
Actuated g/C Ratio	0.11	0.11		0.11	0.11	0.11	0.78	0.73	0.73	0.78	0.73	0.73
Clearance Time (s)	6.5	6.5		6.5	6.5	6.5	4.0	6.5	6.5	4.0	6.5	6.5
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
Lane Grp Cap (vph)	156	187		152	211	171	543	2507	1141	337	2481	1176
v/s Ratio Prot		0.01			0.01		0.01	c0.37		c0.01	0.24	
v/s Ratio Perm	c0.06			0.02		0.01	0.10		0.02	0.13		0.05
v/c Ratio	0.53	0.13		0.17	0.05	0.05	0.14	0.51	0.03	0.18	0.32	0.07
Uniform Delay, d1	54.5	52.1		52.3	51.6	51.6	3.4	7.6	4.9	4.3	6.3	5.0
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.06	0.64	1.29	1.00	1.00	1.00
Incremental Delay, d2	3.2	0.3		0.5	0.1	0.1	0.1	0.7	0.0	0.3	0.3	0.1
Delay (s)	57.7	52.4		52.8	51.7	51.7	3.7	5.5	6.3	4.6	6.6	5.2
Level of Service	E	D		D	D	D	A	A	A	A	A	A
Approach Delay (s)		55.6			52.0			5.4			6.3	
Approach LOS		E			D			A			A	

Intersection Summary

HCM 2000 Control Delay	10.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	67.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Timings
5: Regional Rd 25 & Etheridge Ave

Existing PM
07-17-2023



Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Configurations	↖	↗	↖	↑↑	↑↑
Traffic Volume (vph)	75	25	60	1280	720
Future Volume (vph)	75	25	60	1280	720
Turn Type	Prot	Perm	pm+pt	NA	NA
Protected Phases	4		5	2	6
Permitted Phases		4	2		
Detector Phase	4	4	5	2	6
Switch Phase					
Minimum Initial (s)	10.0	10.0	7.0	20.0	20.0
Minimum Split (s)	36.2	36.2	11.0	38.4	38.4
Total Split (s)	40.0	40.0	13.0	90.0	77.0
Total Split (%)	30.8%	30.8%	10.0%	69.2%	59.2%
Yellow Time (s)	3.3	3.3	3.0	4.2	4.2
All-Red Time (s)	2.9	2.9	1.0	2.2	2.2
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	5.2	5.2	3.0	5.4	5.4
Lead/Lag			Lead		Lag
Lead-Lag Optimize?			Yes		Yes
Recall Mode	None	None	None	C-Max	C-Max
Act Effct Green (s)	13.1	13.1	111.9	110.6	101.8
Actuated g/C Ratio	0.10	0.10	0.86	0.85	0.78
v/c Ratio	0.46	0.14	0.12	0.47	0.34
Control Delay	63.2	19.0	1.2	1.5	3.0
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	63.2	19.0	1.2	1.5	3.0
LOS	E	B	A	A	A
Approach Delay	52.1			1.5	3.0
Approach LOS	D			A	A

Intersection Summary

Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 103 (79%), Referenced to phase 2:NBT and 6:SBT, Start of Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.47
 Intersection Signal Delay: 4.3
 Intersection Capacity Utilization 52.5%
 Analysis Period (min) 15
 Intersection LOS: A
 ICU Level of Service A

Splits and Phases: 5: Regional Rd 25 & Etheridge Ave



Queues
5: Regional Rd 25 & Etheridge Ave

Existing PM
07-17-2023



Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Group Flow (vph)	81	27	65	1376	898
v/c Ratio	0.46	0.14	0.12	0.47	0.34
Control Delay	63.2	19.0	1.2	1.5	3.0
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	63.2	19.0	1.2	1.5	3.0
Queue Length 50th (m)	21.1	0.0	0.6	10.5	47.2
Queue Length 95th (m)	37.1	9.3	m1.7	18.7	7.1
Internal Link Dist (m)	53.9			292.1	696.9
Turn Bay Length (m)	40.0		70.0		
Base Capacity (vph)	468	452	571	2953	2672
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	0.17	0.06	0.11	0.47	0.34

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
5: Regional Rd 25 & Etheridge Ave

Existing PM
07-17-2023



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	75	25	60	1280	720	115
Future Volume (vph)	75	25	60	1280	720	115
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.2	5.2	3.0	5.4	5.4	
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	
Frt	1.00	0.85	1.00	1.00	0.98	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1752	1615	1805	3471	3408	
Flt Permitted	0.95	1.00	0.29	1.00	1.00	
Satd. Flow (perm)	1752	1615	551	3471	3408	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	81	27	65	1376	774	124
RTOR Reduction (vph)	0	25	0	0	5	0
Lane Group Flow (vph)	81	2	65	1376	893	0
Heavy Vehicles (%)	3%	0%	0%	4%	4%	2%
Turn Type	Prot	Perm	pm+pt	NA	NA	
Protected Phases	4		5	2	6	
Permitted Phases		4	2			
Actuated Green, G (s)	10.1	10.1	107.3	107.3	97.7	
Effective Green, g (s)	11.1	11.1	108.3	108.3	98.7	
Actuated g/C Ratio	0.09	0.09	0.83	0.83	0.76	
Clearance Time (s)	6.2	6.2	4.0	6.4	6.4	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	149	137	522	2891	2587	
v/s Ratio Prot	c0.05		0.01	c0.40	0.26	
v/s Ratio Perm		0.00	0.10			
v/c Ratio	0.54	0.02	0.12	0.48	0.35	
Uniform Delay, d1	57.0	54.5	2.2	3.0	5.1	
Progression Factor	1.00	1.00	0.42	0.31	0.48	
Incremental Delay, d2	4.0	0.0	0.1	0.4	0.4	
Delay (s)	61.0	54.5	1.0	1.4	2.8	
Level of Service	E	D	A	A	A	
Approach Delay (s)	59.4			1.4	2.8	
Approach LOS	E			A	A	

Intersection Summary

HCM 2000 Control Delay	4.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	13.6
Intersection Capacity Utilization	52.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Timings
7: Regional Rd 25 & Britannia Rd

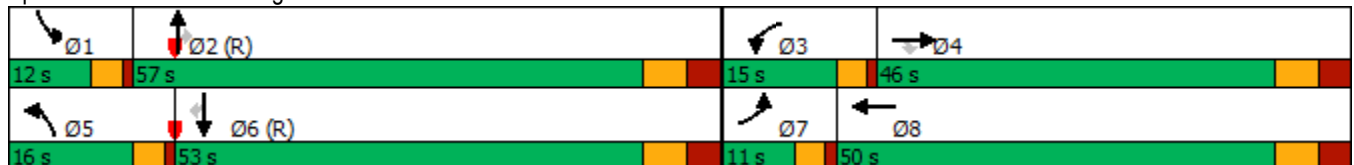
Existing PM
07-17-2023

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations												
Traffic Volume (vph)	30	250	35	210	395	210	1060	315	95	610	40	
Future Volume (vph)	30	250	35	210	395	210	1060	315	95	610	40	
Turn Type	Prot	NA	Perm	Prot	NA	Prot	NA	Perm	Prot	NA	Perm	
Protected Phases	7	4		3	8	5	2		1	6		
Permitted Phases			4					2			6	
Detector Phase	7	4	4	3	8	5	2	2	1	6	6	
Switch Phase												
Minimum Initial (s)	7.0	10.0	10.0	7.0	10.0	7.0	20.0	20.0	7.0	20.0	20.0	
Minimum Split (s)	11.0	45.5	45.5	11.0	45.5	11.0	49.7	49.7	11.0	49.7	49.7	
Total Split (s)	11.0	46.0	46.0	15.0	50.0	16.0	57.0	57.0	12.0	53.0	53.0	
Total Split (%)	8.5%	35.4%	35.4%	11.5%	38.5%	12.3%	43.8%	43.8%	9.2%	40.8%	40.8%	
Yellow Time (s)	3.0	4.2	4.2	3.0	4.2	3.0	4.2	4.2	3.0	4.2	4.2	
All-Red Time (s)	1.0	3.3	3.3	1.0	3.3	1.0	3.5	3.5	1.0	3.5	3.5	
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	
Total Lost Time (s)	3.0	6.5	6.5	3.0	6.5	3.0	6.7	6.7	3.0	6.7	6.7	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Recall Mode	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max	
Act Effct Green (s)	8.0	23.3	23.3	11.8	31.6	14.7	65.4	65.4	10.3	60.9	60.9	
Actuated g/C Ratio	0.06	0.18	0.18	0.09	0.24	0.11	0.50	0.50	0.08	0.47	0.47	
v/c Ratio	0.16	0.42	0.10	0.73	0.77	0.58	0.65	0.36	0.38	0.41	0.05	
Control Delay	59.9	47.8	0.5	71.8	44.0	60.3	28.2	4.8	74.7	18.9	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	
Total Delay	59.9	47.8	0.5	71.8	44.0	60.3	28.2	4.8	74.7	18.9	0.1	
LOS	E	D	A	E	D	E	C	A	E	B	A	
Approach Delay		43.7			50.8		27.8			25.0		
Approach LOS		D			D		C			C		

Intersection Summary

Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 104 (80%), Referenced to phase 2:NBT and 6:SBT, Start of Green
 Natural Cycle: 120
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.77
 Intersection Signal Delay: 34.3
 Intersection LOS: C
 Intersection Capacity Utilization 77.6%
 ICU Level of Service D
 Analysis Period (min) 15

Splits and Phases: 7: Regional Rd 25 & Britannia Rd



Queues
7: Regional Rd 25 & Britannia Rd

Existing PM
07-17-2023


































Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	33	272	38	228	701	228	1152	342	103	663	43
v/c Ratio	0.16	0.42	0.10	0.73	0.77	0.58	0.65	0.36	0.38	0.41	0.05
Control Delay	59.9	47.8	0.5	71.8	44.0	60.3	28.2	4.8	74.7	18.9	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
Total Delay	59.9	47.8	0.5	71.8	44.0	60.3	28.2	4.8	74.7	18.9	0.1
Queue Length 50th (m)	4.4	33.4	0.0	31.3	79.4	30.5	124.6	4.2	15.2	35.0	0.0
Queue Length 95th (m)	10.2	44.1	0.0	#47.5	95.6	43.0	173.1	25.3	25.7	54.7	0.0
Internal Link Dist (m)		377.9			362.1		165.3			292.1	
Turn Bay Length (m)	60.0			120.0		90.0		90.0	90.0		90.0
Base Capacity (vph)	203	1096	565	316	1204	406	1762	951	279	1627	812
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	0.16	0.25	0.07	0.72	0.58	0.56	0.65	0.36	0.37	0.41	0.05

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
7: Regional Rd 25 & Britannia Rd

Existing PM
07-17-2023

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 	 		 	 		 	 		 	 	
Traffic Volume (vph)	30	250	35	210	395	250	210	1060	315	95	610	40
Future Volume (vph)	30	250	35	210	395	250	210	1060	315	95	610	40
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.5	6.5	3.0	6.5		3.0	6.7	6.7	3.0	6.7	6.7
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95		0.97	0.95	1.00	0.97	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.94		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3303	3610	1615	3433	3366		3502	3505	1583	3467	3471	1615
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3303	3610	1615	3433	3366		3502	3505	1583	3467	3471	1615
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	33	272	38	228	429	272	228	1152	342	103	663	43
RTOR Reduction (vph)	0	0	31	0	89	0	0	0	159	0	0	23
Lane Group Flow (vph)	33	272	7	228	612	0	228	1152	183	103	663	20
Heavy Vehicles (%)	6%	0%	0%	2%	1%	1%	0%	3%	2%	1%	4%	0%
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4						2			6
Actuated Green, G (s)	4.2	24.0	24.0	10.8	30.6		13.7	62.7	62.7	9.3	58.3	58.3
Effective Green, g (s)	5.2	25.0	25.0	11.8	31.6		14.7	63.7	63.7	10.3	59.3	59.3
Actuated g/C Ratio	0.04	0.19	0.19	0.09	0.24		0.11	0.49	0.49	0.08	0.46	0.46
Clearance Time (s)	4.0	7.5	7.5	4.0	7.5		4.0	7.7	7.7	4.0	7.7	7.7
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
Lane Grp Cap (vph)	132	694	310	311	818		395	1717	775	274	1583	736
v/s Ratio Prot	0.01	0.08		c0.07	c0.18		c0.07	c0.33		0.03	0.19	
v/s Ratio Perm			0.00						0.12			0.01
v/c Ratio	0.25	0.39	0.02	0.73	0.75		0.58	0.67	0.24	0.38	0.42	0.03
Uniform Delay, d1	60.5	45.9	42.6	57.6	45.5		54.7	25.2	19.1	56.8	23.8	19.5
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.26	0.73	1.00
Incremental Delay, d2	1.0	0.4	0.0	8.6	3.8		2.0	2.1	0.7	0.8	0.8	0.1
Delay (s)	61.5	46.2	42.6	66.2	49.3		56.7	27.3	19.8	72.2	18.1	19.5
Level of Service	E	D	D	E	D		E	C	B	E	B	B
Approach Delay (s)		47.3			53.5			29.7			25.0	
Approach LOS		D			D			C			C	
Intersection Summary												
HCM 2000 Control Delay			36.1			HCM 2000 Level of Service			D			
HCM 2000 Volume to Capacity ratio			0.71									
Actuated Cycle Length (s)			130.0			Sum of lost time (s)		19.2				
Intersection Capacity Utilization			77.6%			ICU Level of Service			D			
Analysis Period (min)			15									
c Critical Lane Group												

Timings
10: Britannia Rd & Farmstead Dr

Existing PM
07-17-2023

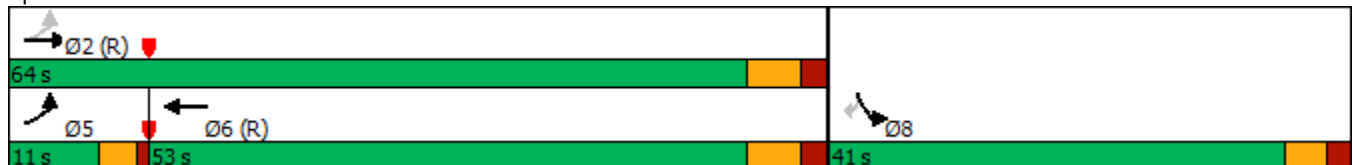


Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Configurations	↘	↑↑↑	↑↑↑	↘	↗
Traffic Volume (vph)	15	260	565	55	15
Future Volume (vph)	15	260	565	55	15
Turn Type	pm+pt	NA	NA	Prot	Perm
Protected Phases	5	2	6	8	
Permitted Phases	2				8
Detector Phase	5	2	6	8	8
Switch Phase					
Minimum Initial (s)	7.0	20.0	20.0	10.0	10.0
Minimum Split (s)	11.0	29.4	29.4	15.3	15.3
Total Split (s)	11.0	64.0	53.0	41.0	41.0
Total Split (%)	10.5%	61.0%	50.5%	39.0%	39.0%
Yellow Time (s)	3.0	4.2	4.2	3.3	3.3
All-Red Time (s)	1.0	2.2	2.2	2.0	2.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	3.0	5.4	5.4	4.3	4.3
Lead/Lag	Lead		Lag		
Lead-Lag Optimize?	Yes		Yes		
Recall Mode	None	C-Max	C-Max	None	None
Act Effct Green (s)	89.2	87.9	83.5	11.6	11.6
Actuated g/C Ratio	0.85	0.84	0.80	0.11	0.11
v/c Ratio	0.02	0.06	0.17	0.31	0.08
Control Delay	1.9	2.1	3.8	47.4	19.2
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	1.9	2.1	3.8	47.4	19.2
LOS	A	A	A	D	B
Approach Delay		2.1	3.8	41.4	
Approach LOS		A	A	D	

Intersection Summary

Cycle Length: 105
 Actuated Cycle Length: 105
 Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.31
 Intersection Signal Delay: 6.0
 Intersection LOS: A
 Intersection Capacity Utilization 33.1%
 ICU Level of Service A
 Analysis Period (min) 15

Splits and Phases: 10: Britannia Rd & Farmstead Dr



Queues
10: Britannia Rd & Farmstead Dr

Existing PM
07-17-2023



Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	16	280	694	59	16
v/c Ratio	0.02	0.06	0.17	0.31	0.08
Control Delay	1.9	2.1	3.8	47.4	19.2
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	1.9	2.1	3.8	47.4	19.2
Queue Length 50th (m)	0.5	3.5	9.1	12.0	0.0
Queue Length 95th (m)	1.7	6.0	22.4	24.5	6.6
Internal Link Dist (m)		101.0	377.9	199.3	
Turn Bay Length (m)	20.0				
Base Capacity (vph)	671	4341	4016	606	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	0.02	0.06	0.17	0.10	0.03
Intersection Summary					

HCM Signalized Intersection Capacity Analysis
10: Britannia Rd & Farmstead Dr

Existing PM
07-17-2023



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↖	↑↑↑	↑↑↑		↘	↘
Traffic Volume (vph)	15	260	565	80	55	15
Future Volume (vph)	15	260	565	80	55	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	5.4	5.4		4.3	4.3
Lane Util. Factor	1.00	0.91	0.91		1.00	1.00
Frt	1.00	1.00	0.98		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1805	5187	5046		1736	1615
Flt Permitted	0.36	1.00	1.00		0.95	1.00
Satd. Flow (perm)	689	5187	5046		1736	1615
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	16	280	608	86	59	16
RTOR Reduction (vph)	0	0	8	0	0	15
Lane Group Flow (vph)	16	280	686	0	59	1
Heavy Vehicles (%)	0%	0%	1%	0%	4%	0%
Turn Type	pm+pt	NA	NA		Prot	Perm
Protected Phases	5	2	6		8	
Permitted Phases	2					8
Actuated Green, G (s)	84.7	84.7	77.9		8.6	8.6
Effective Green, g (s)	85.7	85.7	78.9		9.6	9.6
Actuated g/C Ratio	0.82	0.82	0.75		0.09	0.09
Clearance Time (s)	4.0	6.4	6.4		5.3	5.3
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	602	4233	3791		158	147
v/s Ratio Prot	0.00	c0.05	c0.14		c0.03	
v/s Ratio Perm	0.02					0.00
v/c Ratio	0.03	0.07	0.18		0.37	0.01
Uniform Delay, d1	1.8	1.9	3.8		44.9	43.4
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.0	0.0	0.1		1.5	0.0
Delay (s)	1.9	1.9	3.9		46.4	43.4
Level of Service	A	A	A		D	D
Approach Delay (s)		1.9	3.9		45.7	
Approach LOS		A	A		D	

Intersection Summary

HCM 2000 Control Delay	6.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.20		
Actuated Cycle Length (s)	105.0	Sum of lost time (s)	12.7
Intersection Capacity Utilization	33.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Timings
1: Regional Rd 25 & Louis St Laurent Ave

2029 Future Background AM
07-17-2023

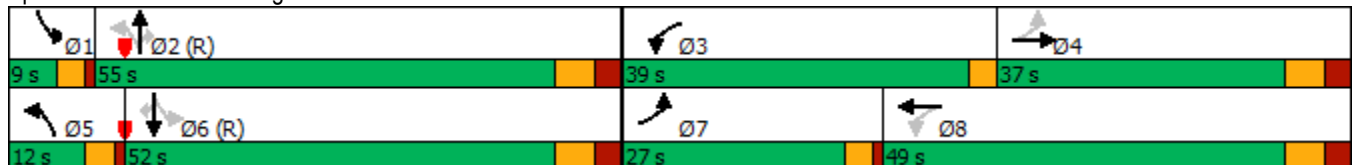


Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↕	↖	↕	↖	↕	↗	↖	↕	↗
Traffic Volume (vph)	270	535	475	560	105	830	300	65	775	95
Future Volume (vph)	270	535	475	560	105	830	300	65	775	95
Turn Type	pm+pt	NA	pm+pt	NA	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4	3	8	5	2		1	6	
Permitted Phases	4		8		2		2	6		6
Detector Phase	7	4	3	8	5	2	2	1	6	6
Switch Phase										
Minimum Initial (s)	5.0	10.0	10.0	10.0	5.0	20.0	20.0	5.0	20.0	20.0
Minimum Split (s)	9.0	30.0	14.0	30.0	9.0	32.2	32.2	9.0	32.2	32.2
Total Split (s)	27.0	37.0	39.0	49.0	12.0	55.0	55.0	9.0	52.0	52.0
Total Split (%)	19.3%	26.4%	27.9%	35.0%	8.6%	39.3%	39.3%	6.4%	37.1%	37.1%
Yellow Time (s)	3.0	4.0	3.0	4.0	3.0	4.2	4.2	3.0	4.2	4.2
All-Red Time (s)	1.0	3.0	0.0	3.0	1.0	3.0	3.0	1.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	3.0	6.0	2.0	6.0	3.0	6.2	6.2	3.0	6.2	6.2
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Act Effct Green (s)	52.9	31.1	71.6	45.7	63.4	52.7	52.7	57.9	48.2	48.2
Actuated g/C Ratio	0.38	0.22	0.51	0.33	0.45	0.38	0.38	0.41	0.34	0.34
v/c Ratio	0.66	0.92	0.92	0.58	0.43	0.65	0.40	0.30	0.67	0.15
Control Delay	30.0	68.9	61.7	40.8	29.0	40.2	8.7	26.7	43.2	3.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	30.0	68.9	61.7	40.8	29.0	40.2	8.7	26.7	43.2	3.6
LOS	C	E	E	D	C	D	A	C	D	A
Approach Delay		58.3		49.6		31.6			38.0	
Approach LOS		E		D		C			D	

Intersection Summary

Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.92
 Intersection Signal Delay: 43.9
 Intersection LOS: D
 Intersection Capacity Utilization 91.1%
 ICU Level of Service F
 Analysis Period (min) 15

Splits and Phases: 1: Regional Rd 25 & Louis St Laurent Ave



Queues
1: Regional Rd 25 & Louis St Laurent Ave

2029 Future Background AM
07-17-2023



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	270	720	475	655	105	830	300	65	775	95
v/c Ratio	0.66	0.92	0.92	0.58	0.43	0.65	0.40	0.30	0.67	0.15
Control Delay	30.0	68.9	61.7	40.8	29.0	40.2	8.7	26.7	43.2	3.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	30.0	68.9	61.7	40.8	29.0	40.2	8.7	26.7	43.2	3.6
Queue Length 50th (m)	43.2	105.0	112.7	79.1	18.2	109.7	10.4	11.0	103.7	0.0
Queue Length 95th (m)	62.6	#142.8	#172.4	105.6	30.9	134.3	34.5	20.8	127.7	8.3
Internal Link Dist (m)		126.1		117.1		481.0			113.5	
Turn Bay Length (m)	90.0		35.0		65.0		65.0	80.0		90.0
Base Capacity (vph)	475	790	547	1133	245	1271	744	219	1161	621
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	0.57	0.91	0.87	0.58	0.43	0.65	0.40	0.30	0.67	0.15

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
1: Regional Rd 25 & Louis St Laurent Ave

2029 Future Background AM
07-17-2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	270	535	185	475	560	95	105	830	300	65	775	95
Future Volume (vph)	270	535	185	475	560	95	105	830	300	65	775	95
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0		2.0	6.0		3.0	6.2	6.2	3.0	6.2	6.2
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00
Frbp, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.96		1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		1.00	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1767	3411		1863	3427		1703	3374	1568	1719	3374	1583
Flt Permitted	0.38	1.00		0.12	1.00		0.19	1.00	1.00	0.21	1.00	1.00
Satd. Flow (perm)	711	3411		225	3427		345	3374	1568	380	3374	1583
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	270	535	185	475	560	95	105	830	300	65	775	95
RTOR Reduction (vph)	0	24	0	0	9	0	0	0	155	0	0	62
Lane Group Flow (vph)	270	696	0	475	646	0	105	830	145	65	775	33
Confl. Peds. (#/hr)	5					5						
Heavy Vehicles (%)	2%	2%	1%	2%	2%	7%	6%	7%	3%	5%	7%	2%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	47.9	30.1		66.6	44.8		58.9	50.9	50.9	51.5	47.2	47.2
Effective Green, g (s)	49.9	31.1		67.6	45.8		60.2	51.9	51.9	53.5	48.2	48.2
Actuated g/C Ratio	0.36	0.22		0.48	0.33		0.43	0.37	0.37	0.38	0.34	0.34
Clearance Time (s)	4.0	7.0		3.0	7.0		4.0	7.2	7.2	4.0	7.2	7.2
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	395	757		512	1121		235	1250	581	195	1161	545
v/s Ratio Prot	0.09	c0.20		c0.23	0.19		c0.03	c0.25		0.01	0.23	
v/s Ratio Perm	0.15			0.22			0.16		0.09	0.11		0.02
v/c Ratio	0.68	0.92		0.93	0.58		0.45	0.66	0.25	0.33	0.67	0.06
Uniform Delay, d1	34.2	53.2		41.0	39.0		26.6	36.8	30.5	29.1	39.1	30.7
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	4.8	16.1		23.0	0.7		1.4	2.8	1.0	1.0	3.1	0.2
Delay (s)	39.1	69.3		64.1	39.8		28.0	39.6	31.6	30.1	42.1	30.9
Level of Service	D	E		E	D		C	D	C	C	D	C
Approach Delay (s)		61.0			50.0			36.6			40.2	
Approach LOS		E			D			D			D	
Intersection Summary												
HCM 2000 Control Delay			46.6			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)			18.2			
Intersection Capacity Utilization			91.1%			ICU Level of Service			F			
Analysis Period (min)			15									

c Critical Lane Group

Timings
2: Regional Rd 25 & Whitlock Ave

2029 Future Background AM
07-17-2023

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	145	50	50	35	95	45	1020	10	50	1585	100
Future Volume (vph)	145	50	50	35	95	45	1020	10	50	1585	100
Turn Type	Perm	NA	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases		4		8		5	2		1	6	
Permitted Phases	4		8		8	2		2	6		6
Detector Phase	4	4	8	8	8	5	2	2	1	6	6
Switch Phase											
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	7.0	20.0	20.0	7.0	20.0	20.0
Minimum Split (s)	37.5	37.5	37.5	37.5	37.5	11.0	35.5	35.5	11.0	35.5	35.5
Total Split (s)	38.0	38.0	38.0	38.0	38.0	11.0	81.0	81.0	11.0	81.0	81.0
Total Split (%)	29.2%	29.2%	29.2%	29.2%	29.2%	8.5%	62.3%	62.3%	8.5%	62.3%	62.3%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.0	4.2	4.2	3.0	4.2	4.2
All-Red Time (s)	3.2	3.2	3.2	3.2	3.2	1.0	2.3	2.3	1.0	2.3	2.3
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5	3.0	5.5	5.5	3.0	5.5	5.5
Lead/Lag						Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?						Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Act Effct Green (s)	20.4	20.4	20.4	20.4	20.4	98.7	89.7	89.7	98.7	89.7	89.7
Actuated g/C Ratio	0.16	0.16	0.16	0.16	0.16	0.76	0.69	0.69	0.76	0.69	0.69
v/c Ratio	0.69	0.49	0.33	0.13	0.31	0.19	0.43	0.01	0.12	0.67	0.09
Control Delay	68.1	30.2	52.5	45.3	10.9	5.3	8.5	0.2	4.9	15.0	4.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	68.1	30.2	52.5	45.3	10.9	5.3	8.5	0.2	4.9	15.0	4.1
LOS	E	C	D	D	B	A	A	A	A	B	A
Approach Delay		49.2		29.2			8.3			14.1	
Approach LOS		D		C			A			B	

Intersection Summary

Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 64 (49%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 95
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.69
 Intersection Signal Delay: 16.1
 Intersection Capacity Utilization 77.3%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service D

Splits and Phases: 2: Regional Rd 25 & Whitlock Ave



Queues
2: Regional Rd 25 & Whitlock Ave

2029 Future Background AM
07-17-2023


























Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	145	145	50	35	95	45	1020	10	50	1585	100
v/c Ratio	0.69	0.49	0.33	0.13	0.31	0.19	0.43	0.01	0.12	0.67	0.09
Control Delay	68.1	30.2	52.5	45.3	10.9	5.3	8.5	0.2	4.9	15.0	4.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	68.1	30.2	52.5	45.3	10.9	5.3	8.5	0.2	4.9	15.0	4.1
Queue Length 50th (m)	37.5	18.2	12.1	8.2	0.0	0.8	105.3	0.0	2.6	125.2	3.1
Queue Length 95th (m)	57.3	37.4	23.8	17.1	14.7	3.7	144.1	m0.1	7.2	183.7	11.2
Internal Link Dist (m)		62.9		68.1			696.9			481.0	
Turn Bay Length (m)	35.0		65.0		65.0	100.0		25.0	100.0		25.0
Base Capacity (vph)	333	431	241	439	435	233	2349	910	434	2371	1060
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	0.44	0.34	0.21	0.08	0.22	0.19	0.43	0.01	0.12	0.67	0.09

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
2: Regional Rd 25 & Whitlock Ave

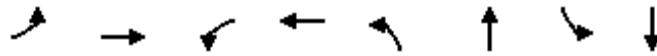
2029 Future Background AM
07-17-2023

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	145	50	95	50	35	95	45	1020	10	50	1585	100
Future Volume (vph)	145	50	95	50	35	95	45	1020	10	50	1585	100
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5		5.5	5.5	5.5	3.0	5.5	5.5	3.0	5.5	5.5
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frbp, ped/bikes	1.00	0.99		1.00	1.00	0.98	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	0.99	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.90		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)	1725	1516		1727	1759	1455	1671	3406	1292	1805	3438	1509
Flt Permitted	0.73	1.00		0.53	1.00	1.00	0.11	1.00	1.00	0.24	1.00	1.00
Satd. Flow (perm)	1333	1516		965	1759	1455	185	3406	1292	462	3438	1509
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	145	50	95	50	35	95	45	1020	10	50	1585	100
RTOR Reduction (vph)	0	59	0	0	0	80	0	0	3	0	0	20
Lane Group Flow (vph)	145	86	0	50	35	15	45	1020	7	50	1585	80
Confl. Peds. (#/hr)	5		5	5		5						
Heavy Vehicles (%)	4%	32%	1%	4%	8%	9%	8%	6%	25%	0%	5%	7%
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8	2		2	6		6
Actuated Green, G (s)	19.4	19.4		19.4	19.4	19.4	93.6	87.9	87.9	93.6	87.9	87.9
Effective Green, g (s)	20.4	20.4		20.4	20.4	20.4	95.6	88.9	88.9	95.6	88.9	88.9
Actuated g/C Ratio	0.16	0.16		0.16	0.16	0.16	0.74	0.68	0.68	0.74	0.68	0.68
Clearance Time (s)	6.5	6.5		6.5	6.5	6.5	4.0	6.5	6.5	4.0	6.5	6.5
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
Lane Grp Cap (vph)	209	237		151	276	228	212	2329	883	408	2351	1031
v/s Ratio Prot		0.06			0.02		c0.01	0.30		0.01	c0.46	
v/s Ratio Perm	c0.11			0.05		0.01	0.14		0.01	0.08		0.05
v/c Ratio	0.69	0.36		0.33	0.13	0.07	0.21	0.44	0.01	0.12	0.67	0.08
Uniform Delay, d1	51.8	49.0		48.7	47.1	46.7	8.8	9.3	6.5	5.3	12.1	6.9
Progression Factor	1.00	1.00		1.00	1.00	1.00	0.80	0.77	1.00	1.00	1.00	1.00
Incremental Delay, d2	9.6	0.9		1.3	0.2	0.1	0.5	0.6	0.0	0.1	1.6	0.1
Delay (s)	61.4	49.9		50.0	47.3	46.8	7.5	7.7	6.5	5.4	13.6	7.0
Level of Service	E	D		D	D	D	A	A	A	A	B	A
Approach Delay (s)		55.7			47.8			7.7			13.0	
Approach LOS		E			D			A			B	
Intersection Summary												
HCM 2000 Control Delay			17.0				HCM 2000 Level of Service				B	
HCM 2000 Volume to Capacity ratio			0.65									
Actuated Cycle Length (s)			130.0				Sum of lost time (s)				14.0	
Intersection Capacity Utilization			77.3%				ICU Level of Service				D	
Analysis Period (min)			15									

c Critical Lane Group

Timings
5: Regional Rd 25 & Etheridge Ave/Collector Road

2029 Future Background AM
07-17-2023

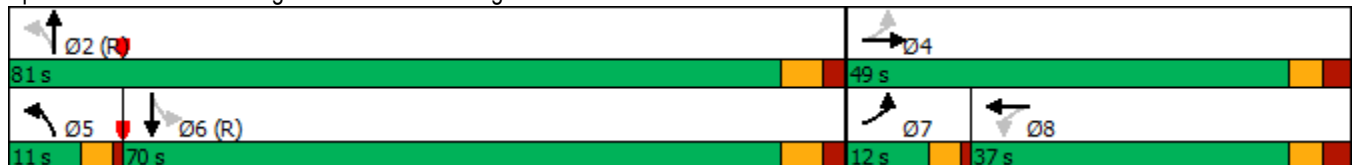


Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↖	↗	↖	↗	↖	↕	↖	↕
Traffic Volume (vph)	100	0	65	0	30	920	30	1645
Future Volume (vph)	100	0	65	0	30	920	30	1645
Turn Type	pm+pt	NA	Perm	NA	pm+pt	NA	Perm	NA
Protected Phases	7	4		8	5	2		6
Permitted Phases	4		8		2		6	
Detector Phase	7	4	8	8	5	2	6	6
Switch Phase								
Minimum Initial (s)	7.0	10.0	10.0	10.0	7.0	20.0	20.0	20.0
Minimum Split (s)	11.0	36.2	36.2	36.2	11.0	38.4	38.4	38.4
Total Split (s)	12.0	49.0	37.0	37.0	11.0	81.0	70.0	70.0
Total Split (%)	9.2%	37.7%	28.5%	28.5%	8.5%	62.3%	53.8%	53.8%
Yellow Time (s)	3.0	3.3	3.3	3.3	3.0	4.2	4.2	4.2
All-Red Time (s)	1.0	2.9	2.9	2.9	1.0	2.2	2.2	2.2
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	3.0	5.2	5.2	5.2	3.0	5.4	5.4	5.4
Lead/Lag	Lead		Lag	Lag	Lead		Lag	Lag
Lead-Lag Optimize?	Yes		Yes	Yes	Yes		Yes	Yes
Recall Mode	None	None	None	None	None	C-Max	C-Max	C-Max
Act Effct Green (s)	25.2	23.0	13.4	13.4	98.8	96.4	89.8	89.8
Actuated g/C Ratio	0.19	0.18	0.10	0.10	0.76	0.74	0.69	0.69
v/c Ratio	0.38	0.17	0.47	0.16	0.14	0.37	0.08	0.72
Control Delay	47.2	1.0	65.3	1.1	5.0	2.1	3.3	9.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	47.2	1.0	65.3	1.1	5.0	2.1	3.3	9.0
LOS	D	A	E	A	A	A	A	A
Approach Delay		29.0		35.9		2.2		8.9
Approach LOS		C		D		A		A

Intersection Summary

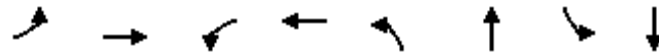
Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 120
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.72
 Intersection Signal Delay: 8.9
 Intersection LOS: A
 Intersection Capacity Utilization 68.3%
 ICU Level of Service C
 Analysis Period (min) 15

Splits and Phases: 5: Regional Rd 25 & Etheridge Ave/Collector Road



Queues
5: Regional Rd 25 & Etheridge Ave/Collector Road

2029 Future Background AM
07-17-2023



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	100	65	65	55	30	940	30	1700
v/c Ratio	0.38	0.17	0.47	0.16	0.14	0.37	0.08	0.72
Control Delay	47.2	1.0	65.3	1.1	5.0	2.1	3.3	9.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	47.2	1.0	65.3	1.1	5.0	2.1	3.3	9.0
Queue Length 50th (m)	22.9	0.0	16.9	0.0	0.3	8.2	0.8	180.5
Queue Length 95th (m)	37.9	0.6	31.7	0.0	m1.0	13.9	m1.0	176.3
Internal Link Dist (m)		53.9		63.1		292.1		696.9
Turn Bay Length (m)	40.0		40.0		70.0		70.0	
Base Capacity (vph)	262	623	332	536	208	2522	399	2363
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	0.38	0.10	0.20	0.10	0.14	0.37	0.08	0.72

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
5: Regional Rd 25 & Etheridge Ave/Collector Road

2029 Future Background AM
07-17-2023



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	100	0	65	65	0	55	30	920	20	30	1645	55
Future Volume (vph)	100	0	65	65	0	55	30	920	20	30	1645	55
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	5.2		5.2	5.2		3.0	5.4		5.4	5.4	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.85		1.00	0.85		1.00	1.00		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1787	1615		1805	1615		1752	3399		1805	3420	
Flt Permitted	0.57	1.00		0.71	1.00		0.08	1.00		0.30	1.00	
Satd. Flow (perm)	1074	1615		1358	1615		145	3399		578	3420	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	100	0	65	65	0	55	30	920	20	30	1645	55
RTOR Reduction (vph)	0	53	0	0	50	0	0	1	0	0	1	0
Lane Group Flow (vph)	100	12	0	65	5	0	30	939	0	30	1699	0
Heavy Vehicles (%)	1%	0%	0%	0%	0%	0%	3%	6%	0%	0%	5%	6%
Turn Type	pm+pt	NA		Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases	7	4			8		5	2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	23.2	23.2		10.4	10.4		94.2	94.2		86.0	86.0	
Effective Green, g (s)	24.2	24.2		11.4	11.4		95.2	95.2		87.0	87.0	
Actuated g/C Ratio	0.19	0.19		0.09	0.09		0.73	0.73		0.67	0.67	
Clearance Time (s)	4.0	6.2		6.2	6.2		4.0	6.4		6.4	6.4	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	253	300		119	141		170	2489		386	2288	
v/s Ratio Prot	c0.03	0.01			0.00		0.01	c0.28			c0.50	
v/s Ratio Perm	0.04			c0.05			0.12			0.05		
v/c Ratio	0.40	0.04		0.55	0.03		0.18	0.38		0.08	0.74	
Uniform Delay, d1	45.6	43.4		56.8	54.3		11.7	6.4		7.5	14.1	
Progression Factor	1.00	1.00		1.00	1.00		0.75	0.26		0.31	0.50	
Incremental Delay, d2	1.0	0.1		5.0	0.1		0.4	0.4		0.3	1.7	
Delay (s)	46.7	43.4		61.9	54.4		9.2	2.0		2.6	8.8	
Level of Service	D	D		E	D		A	A		A	A	
Approach Delay (s)		45.4			58.4			2.3			8.7	
Approach LOS		D			E			A			A	

Intersection Summary

HCM 2000 Control Delay	10.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	16.6
Intersection Capacity Utilization	68.3%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings
7: Regional Rd 25 & Britannia Rd

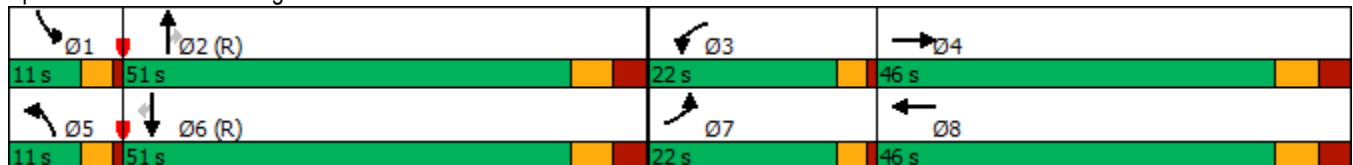


Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖↗	↕↔	↖↗	↕↔	↖↗	↕↔	↖	↖↗	↕↔	↖
Traffic Volume (vph)	60	390	410	325	50	800	210	280	1480	15
Future Volume (vph)	60	390	410	325	50	800	210	280	1480	15
Turn Type	Prot	NA	Prot	NA	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4	3	8	5	2		1	6	
Permitted Phases							2			6
Detector Phase	7	4	3	8	5	2	2	1	6	6
Switch Phase										
Minimum Initial (s)	7.0	10.0	7.0	10.0	7.0	20.0	20.0	7.0	20.0	20.0
Minimum Split (s)	11.0	45.5	11.0	45.5	11.0	49.7	49.7	11.0	49.7	49.7
Total Split (s)	22.0	46.0	22.0	46.0	11.0	51.0	51.0	11.0	51.0	51.0
Total Split (%)	16.9%	35.4%	16.9%	35.4%	8.5%	39.2%	39.2%	8.5%	39.2%	39.2%
Yellow Time (s)	3.0	4.2	3.0	4.2	3.0	4.2	4.2	3.0	4.2	4.2
All-Red Time (s)	1.0	3.3	1.0	3.3	1.0	3.5	3.5	1.0	3.5	3.5
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	3.0	6.5	3.0	6.5	3.0	6.7	6.7	3.0	6.7	6.7
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Act Effct Green (s)	9.0	23.8	18.6	35.5	8.7	47.3	47.3	21.1	61.9	61.9
Actuated g/C Ratio	0.07	0.18	0.14	0.27	0.07	0.36	0.36	0.16	0.48	0.48
v/c Ratio	0.26	0.76	0.83	0.35	0.22	0.64	0.30	0.49	0.90	0.02
Control Delay	59.9	46.5	65.8	30.5	59.6	37.5	5.0	51.0	48.4	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	59.9	46.5	65.8	30.5	59.6	37.5	5.0	51.0	48.4	0.1
LOS	E	D	E	C	E	D	A	D	D	A
Approach Delay		47.6		47.6		32.1			48.4	
Approach LOS		D		D		C			D	

Intersection Summary

Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 104 (80%), Referenced to phase 2:NBT and 6:SBT, Start of Green
 Natural Cycle: 140
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.90
 Intersection Signal Delay: 44.2
 Intersection LOS: D
 Intersection Capacity Utilization 89.7%
 ICU Level of Service E
 Analysis Period (min) 15

Splits and Phases: 7: Regional Rd 25 & Britannia Rd



Queues
7: Regional Rd 25 & Britannia Rd

2029 Future Background AM
07-17-2023



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	60	660	410	435	50	800	210	280	1480	15
v/c Ratio	0.26	0.76	0.83	0.35	0.22	0.64	0.30	0.49	0.90	0.02
Control Delay	59.9	46.5	65.8	30.5	59.6	37.5	5.0	51.0	48.4	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	59.9	46.5	65.8	30.5	59.6	37.5	5.0	51.0	48.4	0.1
Queue Length 50th (m)	8.0	58.7	55.9	34.3	6.7	92.4	0.0	40.6	176.3	0.0
Queue Length 95th (m)	15.3	71.6	#80.0	47.0	13.4	120.7	17.3	56.9	#275.4	m0.0
Internal Link Dist (m)		377.9		182.4		165.3			292.1	
Turn Bay Length (m)	60.0		120.0		90.0		90.0	90.0		90.0
Base Capacity (vph)	482	1371	503	1359	225	1251	699	567	1637	660
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	0.12	0.48	0.82	0.32	0.22	0.64	0.30	0.49	0.90	0.02

Intersection Summary

































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
7: Regional Rd 25 & Britannia Rd

2029 Future Background AM
07-17-2023

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	 	  		 	  		 	 		 	 		
Traffic Volume (vph)	60	390	270	410	325	110	50	800	210	280	1480	15	
Future Volume (vph)	60	390	270	410	325	110	50	800	210	280	1480	15	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	3.0	6.5		3.0	6.5		3.0	6.7	6.7	3.0	6.7	6.7	
Lane Util. Factor	0.97	*0.80		0.97	*0.80		0.97	0.95	1.00	0.97	0.95	1.00	
Frt	1.00	0.94		1.00	0.96		1.00	1.00	0.85	1.00	1.00	0.85	
Flt Protected	0.95	1.00		1.00	1.00		0.95	1.00	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	3303	4238		3445	4333		3367	3438	1553	3502	3438	1272	
Flt Permitted	0.95	1.00		1.00	1.00		0.95	1.00	1.00	0.95	1.00	1.00	
Satd. Flow (perm)	3303	4238		3445	4333		3367	3438	1553	3502	3438	1272	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Adj. Flow (vph)	60	390	270	410	325	110	50	800	210	280	1480	15	
RTOR Reduction (vph)	0	97	0	0	45	0	0	0	135	0	0	8	
Lane Group Flow (vph)	60	563	0	410	390	0	50	800	75	280	1480	7	
Heavy Vehicles (%)	6%	1%	1%	7%	1%	2%	4%	5%	4%	0%	5%	27%	
Turn Type	Prot	NA		Prot	NA		Prot	NA	Perm	Prot	NA	Perm	
Protected Phases	7	4		3	8		5	2		1	6		
Permitted Phases									2			6	
Actuated Green, G (s)	6.6	23.5		17.6	34.5		6.3	45.6	45.6	20.1	59.4	59.4	
Effective Green, g (s)	7.6	24.5		18.6	35.5		7.3	46.6	46.6	21.1	60.4	60.4	
Actuated g/C Ratio	0.06	0.19		0.14	0.27		0.06	0.36	0.36	0.16	0.46	0.46	
Clearance Time (s)	4.0	7.5		4.0	7.5		4.0	7.7	7.7	4.0	7.7	7.7	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	193	798		492	1183		189	1232	556	568	1597	590	
v/s Ratio Prot	0.02	c0.13		c0.12	0.09		0.01	0.23		c0.08	c0.43		
v/s Ratio Perm									0.05			0.01	
v/c Ratio	0.31	0.71		0.83	0.33		0.26	0.65	0.14	0.49	0.93	0.01	
Uniform Delay, d1	58.7	49.4		54.2	37.7		58.8	34.9	28.1	49.6	32.7	18.7	
Progression Factor	1.00	1.00		0.93	0.92		1.00	1.00	1.00	0.96	1.30	1.00	
Incremental Delay, d2	0.9	2.9		11.4	0.2		0.8	2.7	0.5	0.5	8.3	0.0	
Delay (s)	59.6	52.2		61.9	34.8		59.5	37.5	28.6	48.2	50.9	18.8	
Level of Service	E	D		E	C		E	D	C	D	D	B	
Approach Delay (s)		52.8			47.9			36.8			50.2		
Approach LOS		D			D			D			D		
Intersection Summary													
HCM 2000 Control Delay			47.0									HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio			0.84										
Actuated Cycle Length (s)			130.0									Sum of lost time (s)	19.2
Intersection Capacity Utilization			89.7%									ICU Level of Service	E
Analysis Period (min)			15										
c Critical Lane Group													

Timings
10: Britannia Rd & Farmstead Dr



Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Configurations	↘	↑↑↑	↑↑↑	↘	↗
Traffic Volume (vph)	20	630	365	90	20
Future Volume (vph)	20	630	365	90	20
Turn Type	pm+pt	NA	NA	Prot	Perm
Protected Phases	5	2	6	8	
Permitted Phases	2				8
Detector Phase	5	2	6	8	8
Switch Phase					
Minimum Initial (s)	7.0	20.0	20.0	10.0	10.0
Minimum Split (s)	11.0	29.4	29.4	15.3	15.3
Total Split (s)	11.0	64.0	53.0	41.0	41.0
Total Split (%)	10.5%	61.0%	50.5%	39.0%	39.0%
Yellow Time (s)	3.0	4.2	4.2	3.3	3.3
All-Red Time (s)	1.0	2.2	2.2	2.0	2.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	3.0	5.4	5.4	4.3	4.3
Lead/Lag	Lead		Lag		
Lead-Lag Optimize?	Yes		Yes		
Recall Mode	None	C-Max	C-Max	None	None
Act Effct Green (s)	88.0	86.7	82.3	12.8	12.8
Actuated g/C Ratio	0.84	0.83	0.78	0.12	0.12
v/c Ratio	0.03	0.17	0.12	0.43	0.10
Control Delay	2.4	2.7	4.3	49.0	17.3
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	2.4	2.7	4.3	49.0	17.3
LOS	A	A	A	D	B
Approach Delay		2.7	4.3	43.2	
Approach LOS		A	A	D	

Intersection Summary
 Cycle Length: 105
 Actuated Cycle Length: 105
 Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.43
 Intersection Signal Delay: 7.2
 Intersection LOS: A
 Intersection Capacity Utilization 33.1%
 ICU Level of Service A
 Analysis Period (min) 15

Splits and Phases: 10: Britannia Rd & Farmstead Dr



Queues
10: Britannia Rd & Farmstead Dr



Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	20	630	390	90	20
v/c Ratio	0.03	0.17	0.12	0.43	0.10
Control Delay	2.4	2.7	4.3	49.0	17.3
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	2.4	2.7	4.3	49.0	17.3
Queue Length 50th (m)	0.6	10.5	6.0	18.4	0.0
Queue Length 95th (m)	2.3	17.7	16.7	33.1	7.0
Internal Link Dist (m)		101.0	377.9	199.3	
Turn Bay Length (m)	20.0				
Base Capacity (vph)	747	3653	3292	595	550
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	0.17	0.12	0.15	0.04

Intersection Summary

HCM Signalized Intersection Capacity Analysis
10: Britannia Rd & Farmstead Dr

2029 Future Background AM
07-17-2023



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↶	↑↑↑	↑↑↑		↶	↷
Traffic Volume (vph)	20	630	365	25	90	20
Future Volume (vph)	20	630	365	25	90	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	5.4	5.4		4.3	4.3
Lane Util. Factor	1.00	*0.80	*0.80		1.00	1.00
Frt	1.00	1.00	0.99		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1656	4427	4202		1703	1538
Flt Permitted	0.47	1.00	1.00		0.95	1.00
Satd. Flow (perm)	815	4427	4202		1703	1538
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	20	630	365	25	90	20
RTOR Reduction (vph)	0	0	3	0	0	18
Lane Group Flow (vph)	20	630	387	0	90	2
Heavy Vehicles (%)	9%	3%	8%	0%	6%	5%
Turn Type	pm+pt	NA	NA		Prot	Perm
Protected Phases	5	2	6		8	
Permitted Phases	2					8
Actuated Green, G (s)	83.5	83.5	76.7		9.8	9.8
Effective Green, g (s)	84.5	84.5	77.7		10.8	10.8
Actuated g/C Ratio	0.80	0.80	0.74		0.10	0.10
Clearance Time (s)	4.0	6.4	6.4		5.3	5.3
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	686	3562	3109		175	158
v/s Ratio Prot	0.00	c0.14	0.09		c0.05	
v/s Ratio Perm	0.02					0.00
v/c Ratio	0.03	0.18	0.12		0.51	0.01
Uniform Delay, d1	2.1	2.3	3.9		44.6	42.3
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.0	0.1	0.1		2.5	0.0
Delay (s)	2.1	2.4	4.0		47.2	42.3
Level of Service	A	A	A		D	D
Approach Delay (s)		2.4	4.0		46.3	
Approach LOS		A	A		D	

Intersection Summary

HCM 2000 Control Delay	7.2	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.22		
Actuated Cycle Length (s)	105.0	Sum of lost time (s)	12.7
Intersection Capacity Utilization	33.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Timings
11: Britannia Rd & Rose Way



Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Configurations	↖	↑↑↑	↑↑↑↔	↖	↗
Traffic Volume (vph)	25	855	770	55	75
Future Volume (vph)	25	855	770	55	75
Turn Type	pm+pt	NA	NA	Prot	Perm
Protected Phases	5	2	6	4	
Permitted Phases	2				4
Detector Phase	5	2	6	4	4
Switch Phase					
Minimum Initial (s)	7.0	20.0	20.0	10.0	10.0
Minimum Split (s)	11.0	29.0	29.0	43.0	43.0
Total Split (s)	15.0	80.0	65.0	50.0	50.0
Total Split (%)	11.5%	61.5%	50.0%	38.5%	38.5%
Yellow Time (s)	3.0	4.0	4.0	3.0	3.0
All-Red Time (s)	1.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	3.0	6.0	6.0	5.0	5.0
Lead/Lag	Lead		Lag		
Lead-Lag Optimize?	Yes		Yes		
Recall Mode	None	C-Max	C-Max	None	None
Act Effct Green (s)	110.2	107.2	100.6	11.8	11.8
Actuated g/C Ratio	0.85	0.82	0.77	0.09	0.09
v/c Ratio	0.05	0.23	0.22	0.34	0.35
Control Delay	4.8	7.3	4.6	61.1	16.3
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	4.8	7.3	4.6	61.1	16.3
LOS	A	A	A	E	B
Approach Delay		7.2	4.6	35.2	
Approach LOS		A	A	D	

Intersection Summary

Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
 Natural Cycle: 85
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.35
 Intersection Signal Delay: 8.1
 Intersection Capacity Utilization 38.3%
 Analysis Period (min) 15

Intersection LOS: A
 ICU Level of Service A

Splits and Phases: 11: Britannia Rd & Rose Way



Queues
11: Britannia Rd & Rose Way



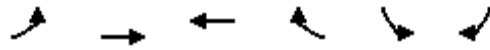
Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	25	855	780	55	75
v/c Ratio	0.05	0.23	0.22	0.34	0.35
Control Delay	4.8	7.3	4.6	61.1	16.3
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	4.8	7.3	4.6	61.1	16.3
Queue Length 50th (m)	2.3	43.9	23.5	14.3	0.0
Queue Length 95th (m)	m5.0	51.6	32.0	27.8	15.3
Internal Link Dist (m)		182.4	155.7	76.0	
Turn Bay Length (m)	50.0			50.0	
Base Capacity (vph)	593	3761	3523	624	608
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	0.23	0.22	0.09	0.12

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
 11: Britannia Rd & Rose Way

2029 Future Background AM
 07-17-2023



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↵	↑↑↑	↑↑↑		↵	↵
Traffic Volume (vph)	25	855	770	10	55	75
Future Volume (vph)	25	855	770	10	55	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0	6.0		5.0	5.0
Lane Util. Factor	1.00	*0.80	*0.80		1.00	1.00
Frt	1.00	1.00	1.00		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1805	4560	4551		1805	1615
Flt Permitted	0.30	1.00	1.00		0.95	1.00
Satd. Flow (perm)	564	4560	4551		1805	1615
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	25	855	770	10	55	75
RTOR Reduction (vph)	0	0	0	0	0	68
Lane Group Flow (vph)	25	855	780	0	55	7
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Turn Type	pm+pt	NA	NA		Prot	Perm
Protected Phases	5	2	6		4	
Permitted Phases	2					4
Actuated Green, G (s)	106.2	106.2	98.0		10.8	10.8
Effective Green, g (s)	107.2	107.2	99.0		11.8	11.8
Actuated g/C Ratio	0.82	0.82	0.76		0.09	0.09
Clearance Time (s)	4.0	7.0	7.0		6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	514	3760	3465		163	146
v/s Ratio Prot	0.00	c0.19	0.17		c0.03	
v/s Ratio Perm	0.04					0.00
v/c Ratio	0.05	0.23	0.22		0.34	0.05
Uniform Delay, d1	2.1	2.5	4.5		55.4	54.0
Progression Factor	2.78	2.85	1.00		1.00	1.00
Incremental Delay, d2	0.0	0.1	0.2		1.2	0.1
Delay (s)	5.8	7.2	4.6		56.7	54.1
Level of Service	A	A	A		E	D
Approach Delay (s)		7.1	4.6		55.2	
Approach LOS		A	A		E	

Intersection Summary				
HCM 2000 Control Delay		9.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio		0.24		
Actuated Cycle Length (s)		130.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization		38.3%	ICU Level of Service	A
Analysis Period (min)		15		
c Critical Lane Group				

Timings
1: Regional Rd 25 & Louis St Laurent Ave

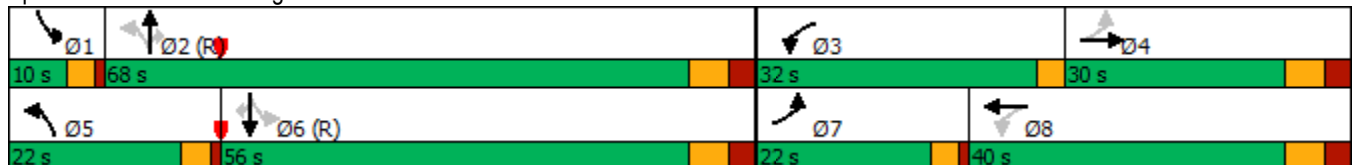
2029 Future Background PM
07-17-2023

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	205	375	325	545	205	860	420	95	805	195
Future Volume (vph)	205	375	325	545	205	860	420	95	805	195
Turn Type	pm+pt	NA	pm+pt	NA	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4	3	8	5	2		1	6	
Permitted Phases	4		8		2		2	6		6
Detector Phase	7	4	3	8	5	2	2	1	6	6
Switch Phase										
Minimum Initial (s)	5.0	10.0	10.0	10.0	5.0	20.0	20.0	5.0	20.0	20.0
Minimum Split (s)	9.0	30.0	14.0	30.0	9.0	32.2	32.2	9.0	32.2	32.2
Total Split (s)	22.0	30.0	32.0	40.0	22.0	68.0	68.0	10.0	56.0	56.0
Total Split (%)	15.7%	21.4%	22.9%	28.6%	15.7%	48.6%	48.6%	7.1%	40.0%	40.0%
Yellow Time (s)	3.0	4.0	3.0	4.0	3.0	4.2	4.2	3.0	4.2	4.2
All-Red Time (s)	1.0	3.0	0.0	3.0	1.0	3.0	3.0	1.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	3.0	6.0	2.0	6.0	3.0	6.2	6.2	3.0	6.2	6.2
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Act Effct Green (s)	43.8	23.9	54.1	30.2	80.8	66.7	66.7	71.5	60.3	60.3
Actuated g/C Ratio	0.31	0.17	0.39	0.22	0.58	0.48	0.48	0.51	0.43	0.43
v/c Ratio	0.70	0.81	0.80	0.79	0.53	0.53	0.44	0.29	0.54	0.25
Control Delay	44.7	63.7	47.9	59.1	20.4	28.1	4.8	17.5	32.9	4.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	44.7	63.7	47.9	59.1	20.4	28.1	4.8	17.5	32.9	4.7
LOS	D	E	D	E	C	C	A	B	C	A
Approach Delay		58.1		55.2		20.4			26.5	
Approach LOS		E		E		C			C	

Intersection Summary

Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.81
 Intersection Signal Delay: 36.0
 Intersection LOS: D
 Intersection Capacity Utilization 83.4%
 ICU Level of Service E
 Analysis Period (min) 15

Splits and Phases: 1: Regional Rd 25 & Louis St Laurent Ave



Queues
1: Regional Rd 25 & Louis St Laurent Ave

2029 Future Background PM
07-17-2023



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	205	490	325	610	205	860	420	95	805	195
v/c Ratio	0.70	0.81	0.80	0.79	0.53	0.53	0.44	0.29	0.54	0.25
Control Delay	44.7	63.7	47.9	59.1	20.4	28.1	4.8	17.5	32.9	4.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	44.7	63.7	47.9	59.1	20.4	28.1	4.8	17.5	32.9	4.7
Queue Length 50th (m)	41.0	68.7	68.5	87.7	28.0	94.7	5.0	12.1	91.8	0.0
Queue Length 95th (m)	60.2	90.8	96.4	106.9	45.8	118.6	26.9	22.7	126.6	16.8
Internal Link Dist (m)		126.1		117.1		481.0			113.5	
Turn Bay Length (m)	90.0		35.0		65.0		65.0	80.0		90.0
Base Capacity (vph)	318	634	469	865	433	1623	950	330	1495	792
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	0.64	0.77	0.69	0.71	0.47	0.53	0.44	0.29	0.54	0.25

Intersection Summary

HCM Signalized Intersection Capacity Analysis
1: Regional Rd 25 & Louis St Laurent Ave

2029 Future Background PM
07-17-2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	205	375	115	325	545	65	205	860	420	95	805	195
Future Volume (vph)	205	375	115	325	545	65	205	860	420	95	805	195
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0		2.0	6.0		3.0	6.2	6.2	3.0	6.2	6.2
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00
Frbp, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	0.98	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	0.96		1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		1.00	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1769	3439		1899	3537		1787	3406	1567	1804	3471	1582
Flt Permitted	0.22	1.00		0.19	1.00		0.23	1.00	1.00	0.26	1.00	1.00
Satd. Flow (perm)	405	3439		364	3537		433	3406	1567	501	3471	1582
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	205	375	115	325	545	65	205	860	420	95	805	195
RTOR Reduction (vph)	0	21	0	0	7	0	0	0	204	0	0	111
Lane Group Flow (vph)	205	469	0	325	603	0	205	860	216	95	805	84
Confl. Peds. (#/hr)	5		5	5		5	5		5	5		5
Heavy Vehicles (%)	2%	1%	0%	0%	0%	2%	1%	6%	1%	0%	4%	0%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	38.8	22.9		49.1	29.2		76.7	65.7	65.7	66.3	59.3	59.3
Effective Green, g (s)	40.8	23.9		50.1	30.2		77.7	66.7	66.7	68.3	60.3	60.3
Actuated g/C Ratio	0.29	0.17		0.36	0.22		0.56	0.48	0.48	0.49	0.43	0.43
Clearance Time (s)	4.0	7.0		3.0	7.0		4.0	7.2	7.2	4.0	7.2	7.2
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	282	587		395	762		379	1622	746	318	1495	681
v/s Ratio Prot	0.09	0.14		c0.14	c0.17		c0.06	0.25		0.02	0.23	
v/s Ratio Perm	0.12			0.15			c0.24		0.14	0.13		0.05
v/c Ratio	0.73	0.80		0.82	0.79		0.54	0.53	0.29	0.30	0.54	0.12
Uniform Delay, d1	40.4	55.7		36.2	51.9		18.0	25.7	22.3	20.0	29.5	24.0
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	9.0	7.5		13.0	5.6		1.6	1.2	1.0	0.5	1.4	0.4
Delay (s)	49.4	63.3		49.1	57.5		19.6	26.9	23.2	20.5	30.9	24.3
Level of Service	D	E		D	E		B	C	C	C	C	C
Approach Delay (s)		59.2			54.6			24.9			28.9	
Approach LOS		E			D			C			C	
Intersection Summary												
HCM 2000 Control Delay			38.2				HCM 2000 Level of Service			D		
HCM 2000 Volume to Capacity ratio			0.67									
Actuated Cycle Length (s)			140.0				Sum of lost time (s)			18.2		
Intersection Capacity Utilization			83.4%				ICU Level of Service			E		
Analysis Period (min)			15									

c Critical Lane Group

Queues
2: Regional Rd 25 & Whitlock Ave

2029 Future Background PM
07-17-2023



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	105	80	25	40	75	90	1485	40	60	990	135
v/c Ratio	0.60	0.32	0.15	0.17	0.29	0.20	0.60	0.03	0.21	0.41	0.12
Control Delay	67.4	31.8	50.2	50.0	13.0	1.6	7.1	1.3	4.8	9.4	3.9
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	67.4	31.8	50.2	50.0	13.0	1.6	7.1	1.3	4.8	9.4	3.9
Queue Length 50th (m)	27.2	10.6	6.1	9.8	0.0	1.4	50.7	0.4	2.6	52.7	4.8
Queue Length 95th (m)	45.1	25.0	14.4	20.3	14.0	m3.4	110.6	m1.7	6.9	80.2	13.8
Internal Link Dist (m)		62.9		68.1			696.9			481.0	
Turn Bay Length (m)	35.0		65.0		65.0	100.0		25.0	100.0		25.0
Base Capacity (vph)	341	452	333	475	441	459	2473	1143	291	2386	1152
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	0.31	0.18	0.08	0.08	0.17	0.20	0.60	0.03	0.21	0.41	0.12

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
2: Regional Rd 25 & Whitlock Ave

2029 Future Background PM
07-17-2023



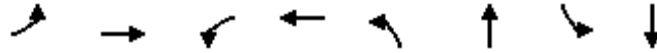
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	105	40	40	25	40	75	90	1485	40	60	990	135
Future Volume (vph)	105	40	40	25	40	75	90	1485	40	60	990	135
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5		5.5	5.5	5.5	3.0	5.5	5.5	3.0	5.5	5.5
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frbp, ped/bikes	1.00	0.99		1.00	1.00	0.98	1.00	1.00	0.97	1.00	1.00	1.00
Flpb, ped/bikes	0.99	1.00		0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.93		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)	1776	1699		1795	1900	1539	1787	3438	1565	1769	3406	1615
Flt Permitted	0.73	1.00		0.70	1.00	1.00	0.25	1.00	1.00	0.13	1.00	1.00
Satd. Flow (perm)	1367	1699		1332	1900	1539	474	3438	1565	251	3406	1615
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	105	40	40	25	40	75	90	1485	40	60	990	135
RTOR Reduction (vph)	0	32	0	0	0	65	0	0	11	0	0	21
Lane Group Flow (vph)	105	48	0	25	40	10	90	1485	29	60	990	114
Confl. Peds. (#/hr)	5		5	5		5			5	5		
Heavy Vehicles (%)	1%	5%	0%	0%	0%	3%	1%	5%	0%	2%	6%	0%
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8	2		2	6		6
Actuated Green, G (s)	15.6	15.6		15.6	15.6	15.6	99.1	91.7	91.7	95.7	90.0	90.0
Effective Green, g (s)	16.6	16.6		16.6	16.6	16.6	101.1	92.7	92.7	97.7	91.0	91.0
Actuated g/C Ratio	0.13	0.13		0.13	0.13	0.13	0.78	0.71	0.71	0.75	0.70	0.70
Clearance Time (s)	6.5	6.5		6.5	6.5	6.5	4.0	6.5	6.5	4.0	6.5	6.5
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
Lane Grp Cap (vph)	174	216		170	242	196	453	2451	1115	266	2384	1130
v/s Ratio Prot		0.03			0.02		c0.01	c0.43		c0.01	0.29	
v/s Ratio Perm	c0.08			0.02		0.01	0.14		0.02	0.16		0.07
v/c Ratio	0.60	0.22		0.15	0.17	0.05	0.20	0.61	0.03	0.23	0.42	0.10
Uniform Delay, d1	53.6	50.9		50.4	50.5	49.8	4.1	9.4	5.5	6.3	8.2	6.3
Progression Factor	1.00	1.00		1.00	1.00	1.00	0.28	0.60	1.54	1.00	1.00	1.00
Incremental Delay, d2	5.8	0.5		0.4	0.3	0.1	0.2	0.9	0.0	0.4	0.5	0.2
Delay (s)	59.4	51.4		50.8	50.9	49.9	1.3	6.6	8.4	6.7	8.8	6.5
Level of Service	E	D		D	D	D	A	A	A	A	A	A
Approach Delay (s)		55.9			50.3			6.3			8.4	
Approach LOS		E			D			A			A	

Intersection Summary

HCM 2000 Control Delay	12.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	74.2%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Timings
5: Regional Rd 25 & Etheridge Ave/Collector Road

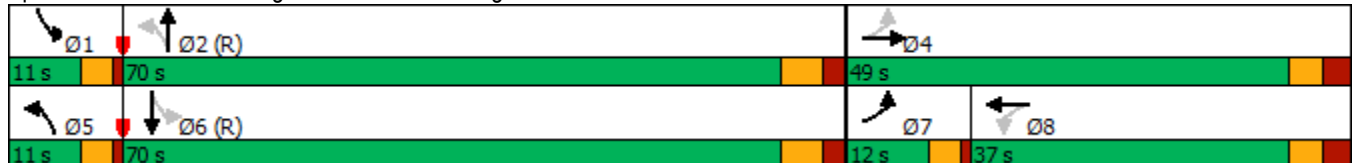


Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↶	↷	↶	↷	↶	↷	↶	↷
Traffic Volume (vph)	75	0	40	0	60	1500	55	885
Future Volume (vph)	75	0	40	0	60	1500	55	885
Turn Type	pm+pt	NA	Perm	NA	pm+pt	NA	pm+pt	NA
Protected Phases	7	4		8	5	2	1	6
Permitted Phases	4		8		2		6	
Detector Phase	7	4	8	8	5	2	1	6
Switch Phase								
Minimum Initial (s)	7.0	10.0	10.0	10.0	7.0	20.0	7.0	20.0
Minimum Split (s)	11.0	36.2	36.2	36.2	11.0	38.4	11.0	38.4
Total Split (s)	12.0	49.0	37.0	37.0	11.0	70.0	11.0	70.0
Total Split (%)	9.2%	37.7%	28.5%	28.5%	8.5%	53.8%	8.5%	53.8%
Yellow Time (s)	3.0	3.3	3.3	3.3	3.0	4.2	3.0	4.2
All-Red Time (s)	1.0	2.9	2.9	2.9	1.0	2.2	1.0	2.2
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	3.0	5.2	5.2	5.2	3.0	5.4	3.0	5.4
Lead/Lag	Lead		Lag	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	C-Max	None	C-Max
Act Effct Green (s)	22.5	21.3	11.7	11.7	101.2	93.3	101.5	93.5
Actuated g/C Ratio	0.17	0.16	0.09	0.09	0.78	0.72	0.78	0.72
v/c Ratio	0.33	0.06	0.31	0.13	0.13	0.63	0.21	0.41
Control Delay	48.2	0.2	62.0	0.8	2.7	6.7	5.2	4.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	48.2	0.2	62.0	0.8	2.7	6.7	5.2	4.4
LOS	D	A	E	A	A	A	A	A
Approach Delay		36.2		31.4		6.6		4.5
Approach LOS		D		C		A		A

Intersection Summary

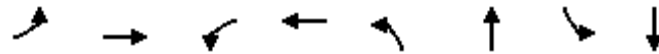
Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 103 (79%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 110
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.63
 Intersection Signal Delay: 7.5
 Intersection Capacity Utilization 69.5%
 Analysis Period (min) 15
 Intersection LOS: A
 ICU Level of Service C

Splits and Phases: 5: Regional Rd 25 & Etheridge Ave/Collector Road



Queues
5: Regional Rd 25 & Etheridge Ave/Collector Road

2029 Future Background PM
07-17-2023



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	75	25	40	40	60	1565	55	1000
v/c Ratio	0.33	0.06	0.31	0.13	0.13	0.63	0.21	0.41
Control Delay	48.2	0.2	62.0	0.8	2.7	6.7	5.2	4.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	48.2	0.2	62.0	0.8	2.7	6.7	5.2	4.4
Queue Length 50th (m)	17.2	0.0	10.3	0.0	1.5	53.9	0.8	68.4
Queue Length 95th (m)	31.1	0.0	22.4	0.0	m3.4	74.4	4.5	8.6
Internal Link Dist (m)		53.9		63.5		292.1		696.9
Turn Bay Length (m)	40.0		40.0		70.0		70.0	
Base Capacity (vph)	229	677	344	535	454	2482	265	2462
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	0.33	0.04	0.12	0.07	0.13	0.63	0.21	0.41

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
5: Regional Rd 25 & Etheridge Ave/Collector Road

2029 Future Background PM
07-17-2023



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	75	0	25	40	0	40	60	1500	65	55	885	115
Future Volume (vph)	75	0	25	40	0	40	60	1500	65	55	885	115
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	5.2		5.2	5.2		3.0	5.4		3.0	5.4	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.85		1.00	0.85		1.00	0.99		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1752	1615		1805	1615		1805	3455		1805	3419	
Flt Permitted	0.56	1.00		0.74	1.00		0.25	1.00		0.11	1.00	
Satd. Flow (perm)	1030	1615		1408	1615		477	3455		208	3419	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	75	0	25	40	0	40	60	1500	65	55	885	115
RTOR Reduction (vph)	0	21	0	0	37	0	0	2	0	0	5	0
Lane Group Flow (vph)	75	4	0	40	3	0	60	1563	0	55	995	0
Heavy Vehicles (%)	3%	0%	0%	0%	0%	0%	0%	4%	0%	0%	4%	2%
Turn Type	pm+pt	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	19.1	19.1		8.7	8.7		94.1	88.4		94.5	88.6	
Effective Green, g (s)	20.1	20.1		9.7	9.7		96.1	89.4		96.5	89.6	
Actuated g/C Ratio	0.15	0.15		0.07	0.07		0.74	0.69		0.74	0.69	
Clearance Time (s)	4.0	6.2		6.2	6.2		4.0	6.4		4.0	6.4	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	200	249		105	120		421	2375		239	2356	
v/s Ratio Prot	c0.02	0.00			0.00		0.01	c0.45		c0.01	0.29	
v/s Ratio Perm	c0.04			0.03			0.10			0.16		
v/c Ratio	0.38	0.02		0.38	0.02		0.14	0.66		0.23	0.42	
Uniform Delay, d1	48.6	46.6		57.3	55.8		5.1	11.6		8.4	8.9	
Progression Factor	1.00	1.00		1.00	1.00		0.54	0.44		0.83	0.41	
Incremental Delay, d2	1.2	0.0		2.3	0.1		0.1	1.1		0.5	0.5	
Delay (s)	49.8	46.6		59.6	55.8		2.9	6.2		7.5	4.1	
Level of Service	D	D		E	E		A	A		A	A	
Approach Delay (s)		49.0			57.7			6.1			4.3	
Approach LOS		D			E			A			A	

Intersection Summary

HCM 2000 Control Delay	8.4	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	16.6
Intersection Capacity Utilization	69.5%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings
7: Regional Rd 25 & Britannia Rd

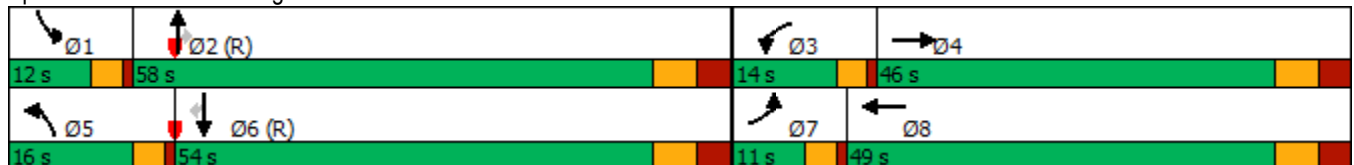


Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖↗	↕↔	↖↗	↕↔	↖↗	↕↔	↗	↖↗	↕↔	↗
Traffic Volume (vph)	40	305	285	470	235	1290	445	120	780	50
Future Volume (vph)	40	305	285	470	235	1290	445	120	780	50
Turn Type	Prot	NA	Prot	NA	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4	3	8	5	2		1	6	
Permitted Phases							2			6
Detector Phase	7	4	3	8	5	2	2	1	6	6
Switch Phase										
Minimum Initial (s)	7.0	10.0	7.0	10.0	7.0	20.0	20.0	7.0	20.0	20.0
Minimum Split (s)	11.0	45.5	11.0	45.5	11.0	49.7	49.7	11.0	49.7	49.7
Total Split (s)	11.0	46.0	14.0	49.0	16.0	58.0	58.0	12.0	54.0	54.0
Total Split (%)	8.5%	35.4%	10.8%	37.7%	12.3%	44.6%	44.6%	9.2%	41.5%	41.5%
Yellow Time (s)	3.0	4.2	3.0	4.2	3.0	4.2	4.2	3.0	4.2	4.2
All-Red Time (s)	1.0	3.3	1.0	3.3	1.0	3.5	3.5	1.0	3.5	3.5
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	3.0	6.5	3.0	6.5	3.0	6.7	6.7	3.0	6.7	6.7
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Act Effct Green (s)	8.0	23.3	11.0	28.5	14.9	65.7	65.7	10.8	61.6	61.6
Actuated g/C Ratio	0.06	0.18	0.08	0.22	0.11	0.51	0.51	0.08	0.47	0.47
v/c Ratio	0.20	0.42	0.93	0.74	0.58	0.73	0.45	0.42	0.47	0.06
Control Delay	60.5	45.8	113.4	38.9	60.3	29.8	6.1	72.1	17.3	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	60.5	45.8	113.4	38.9	60.3	29.8	6.1	72.1	17.3	0.1
LOS	E	D	F	D	E	C	A	E	B	A
Approach Delay		47.3		59.1		28.1			23.3	
Approach LOS		D		E		C			C	

Intersection Summary

Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 104 (80%), Referenced to phase 2:NBT and 6:SBT, Start of Green
 Natural Cycle: 120
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.93
 Intersection Signal Delay: 36.2
 Intersection LOS: D
 Intersection Capacity Utilization 80.7%
 ICU Level of Service D
 Analysis Period (min) 15

Splits and Phases: 7: Regional Rd 25 & Britannia Rd



Queues
7: Regional Rd 25 & Britannia Rd

2029 Future Background PM
07-17-2023



































Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	40	345	285	765	235	1290	445	120	780	50
v/c Ratio	0.20	0.42	0.93	0.74	0.58	0.73	0.45	0.42	0.47	0.06
Control Delay	60.5	45.8	113.4	38.9	60.3	29.8	6.1	72.1	17.3	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	60.5	45.8	113.4	38.9	60.3	29.8	6.1	72.1	17.3	0.1
Queue Length 50th (m)	5.3	32.8	42.4	43.1	31.4	141.8	10.8	17.0	38.9	0.0
Queue Length 95th (m)	11.7	42.0	#70.1	46.5	44.1	196.6	39.5	28.0	45.9	0.0
Internal Link Dist (m)		377.9		190.1		165.3			292.1	
Turn Bay Length (m)	60.0		120.0		90.0		90.0	90.0		90.0
Base Capacity (vph)	203	1372	305	1477	412	1771	981	293	1643	820
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	0.20	0.25	0.93	0.52	0.57	0.73	0.45	0.41	0.47	0.06

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
7: Regional Rd 25 & Britannia Rd

2029 Future Background PM
07-17-2023

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 	  		 	  		 	 		 	 	
Traffic Volume (vph)	40	305	40	285	470	295	235	1290	445	120	780	50
Future Volume (vph)	40	305	40	285	470	295	235	1290	445	120	780	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.5		3.0	6.5		3.0	6.7	6.7	3.0	6.7	6.7
Lane Util. Factor	0.97	*0.80		0.97	*0.80		0.97	0.95	1.00	0.97	0.95	1.00
Frt	1.00	0.98		1.00	0.94		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		1.00	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3303	4481		3614	4254		3502	3505	1583	3467	3471	1615
Flt Permitted	0.95	1.00		1.00	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3303	4481		3614	4254		3502	3505	1583	3467	3471	1615
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	40	305	40	285	470	295	235	1290	445	120	780	50
RTOR Reduction (vph)	0	12	0	0	101	0	0	0	184	0	0	27
Lane Group Flow (vph)	40	333	0	285	664	0	235	1290	261	120	780	23
Heavy Vehicles (%)	6%	0%	0%	2%	1%	1%	0%	3%	2%	1%	4%	0%
Turn Type	Prot	NA		Prot	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases									2			6
Actuated Green, G (s)	5.6	23.1		10.0	27.5		13.9	63.9	63.9	9.8	59.8	59.8
Effective Green, g (s)	6.6	24.1		11.0	28.5		14.9	64.9	64.9	10.8	60.8	60.8
Actuated g/C Ratio	0.05	0.19		0.08	0.22		0.11	0.50	0.50	0.08	0.47	0.47
Clearance Time (s)	4.0	7.5		4.0	7.5		4.0	7.7	7.7	4.0	7.7	7.7
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	167	830		305	932		401	1749	790	288	1623	755
v/s Ratio Prot	0.01	0.07		c0.08	c0.16		c0.07	c0.37		0.03	0.22	
v/s Ratio Perm									0.16			0.01
v/c Ratio	0.24	0.40		0.93	0.71		0.59	0.74	0.33	0.42	0.48	0.03
Uniform Delay, d1	59.3	46.6		59.1	47.0		54.6	25.8	19.5	56.6	23.8	18.7
Progression Factor	1.00	1.00		1.33	0.88		1.00	1.00	1.00	1.21	0.65	1.00
Incremental Delay, d2	0.7	0.3		33.9	2.5		2.2	2.8	1.1	0.9	1.0	0.1
Delay (s)	60.0	46.9		112.6	44.0		56.8	28.6	20.6	69.3	16.5	18.8
Level of Service	E	D		F	D		E	C	C	E	B	B
Approach Delay (s)		48.3			62.6			30.2			23.3	
Approach LOS		D			E			C			C	
Intersection Summary												
HCM 2000 Control Delay			38.1									D
HCM 2000 Volume to Capacity ratio			0.76									
Actuated Cycle Length (s)			130.0								19.2	
Intersection Capacity Utilization			80.7%									D
ICU Level of Service												
Analysis Period (min)			15									
c Critical Lane Group												

Timings
10: Britannia Rd & Farmstead Dr

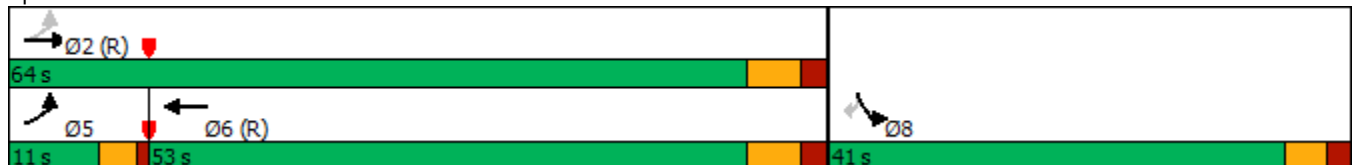


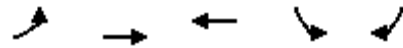
Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Configurations	↖	↑↑↑	↑↑↑	↖	↗
Traffic Volume (vph)	15	330	675	55	15
Future Volume (vph)	15	330	675	55	15
Turn Type	pm+pt	NA	NA	Prot	Perm
Protected Phases	5	2	6	8	
Permitted Phases	2				8
Detector Phase	5	2	6	8	8
Switch Phase					
Minimum Initial (s)	7.0	20.0	20.0	10.0	10.0
Minimum Split (s)	11.0	29.4	29.4	15.3	15.3
Total Split (s)	11.0	64.0	53.0	41.0	41.0
Total Split (%)	10.5%	61.0%	50.5%	39.0%	39.0%
Yellow Time (s)	3.0	4.2	4.2	3.3	3.3
All-Red Time (s)	1.0	2.2	2.2	2.0	2.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	3.0	5.4	5.4	4.3	4.3
Lead/Lag	Lead		Lag		
Lead-Lag Optimize?	Yes		Yes		
Recall Mode	None	C-Max	C-Max	None	None
Act Effct Green (s)	89.3	88.0	83.6	11.4	11.4
Actuated g/C Ratio	0.85	0.84	0.80	0.11	0.11
v/c Ratio	0.03	0.09	0.21	0.29	0.08
Control Delay	1.9	2.1	4.0	47.2	19.9
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	1.9	2.1	4.0	47.2	19.9
LOS	A	A	A	D	B
Approach Delay		2.1	4.0	41.4	
Approach LOS		A	A	D	

Intersection Summary

Cycle Length: 105
 Actuated Cycle Length: 105
 Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.29
 Intersection Signal Delay: 5.7
 Intersection LOS: A
 Intersection Capacity Utilization 33.1%
 ICU Level of Service A
 Analysis Period (min) 15

Splits and Phases: 10: Britannia Rd & Farmstead Dr





Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	15	330	755	55	15
v/c Ratio	0.03	0.09	0.21	0.29	0.08
Control Delay	1.9	2.1	4.0	47.2	19.9
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	1.9	2.1	4.0	47.2	19.9
Queue Length 50th (m)	0.4	4.8	12.0	11.1	0.0
Queue Length 95th (m)	1.6	7.8	28.9	23.1	6.3
Internal Link Dist (m)		101.0	377.9	199.3	
Turn Bay Length (m)	20.0				
Base Capacity (vph)	587	3822	3545	606	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	0.03	0.09	0.21	0.09	0.03
Intersection Summary					

HCM Signalized Intersection Capacity Analysis
 10: Britannia Rd & Farmstead Dr

2029 Future Background PM
 07-17-2023



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↰	↑↑↑	↑↑↑		↰	↰
Traffic Volume (vph)	15	330	675	80	55	15
Future Volume (vph)	15	330	675	80	55	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	5.4	5.4		4.3	4.3
Lane Util. Factor	1.00	*0.80	*0.80		1.00	1.00
Frt	1.00	1.00	0.98		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1805	4560	4448		1736	1615
Flt Permitted	0.31	1.00	1.00		0.95	1.00
Satd. Flow (perm)	581	4560	4448		1736	1615
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	15	330	675	80	55	15
RTOR Reduction (vph)	0	0	5	0	0	14
Lane Group Flow (vph)	15	330	750	0	55	1
Heavy Vehicles (%)	0%	0%	1%	0%	4%	0%
Turn Type	pm+pt	NA	NA		Prot	Perm
Protected Phases	5	2	6		8	
Permitted Phases	2					8
Actuated Green, G (s)	84.9	84.9	78.1		8.4	8.4
Effective Green, g (s)	85.9	85.9	79.1		9.4	9.4
Actuated g/C Ratio	0.82	0.82	0.75		0.09	0.09
Clearance Time (s)	4.0	6.4	6.4		5.3	5.3
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	519	3730	3350		155	144
v/s Ratio Prot	0.00	c0.07	c0.17		c0.03	
v/s Ratio Perm	0.02					0.00
v/c Ratio	0.03	0.09	0.22		0.35	0.01
Uniform Delay, d1	1.8	1.9	3.8		44.9	43.6
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.0	0.0	0.2		1.4	0.0
Delay (s)	1.8	1.9	4.0		46.3	43.6
Level of Service	A	A	A		D	D
Approach Delay (s)		1.9	4.0		45.8	
Approach LOS		A	A		D	

Intersection Summary			
HCM 2000 Control Delay	5.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.23		
Actuated Cycle Length (s)	105.0	Sum of lost time (s)	12.7
Intersection Capacity Utilization	33.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Timings
11: Britannia Rd & Rose Way



Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Configurations	↖	↑↑↑	↑↑↑	↖	↗
Traffic Volume (vph)	80	790	1000	30	50
Future Volume (vph)	80	790	1000	30	50
Turn Type	pm+pt	NA	NA	Prot	Perm
Protected Phases	5	2	6	4	
Permitted Phases	2				4
Detector Phase	5	2	6	4	4
Switch Phase					
Minimum Initial (s)	7.0	20.0	20.0	10.0	10.0
Minimum Split (s)	11.0	29.0	29.0	43.0	43.0
Total Split (s)	15.0	80.0	65.0	50.0	50.0
Total Split (%)	11.5%	61.5%	50.0%	38.5%	38.5%
Yellow Time (s)	3.0	4.0	4.0	3.0	3.0
All-Red Time (s)	1.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	3.0	6.0	6.0	5.0	5.0
Lead/Lag	Lead		Lag		
Lead-Lag Optimize?	Yes		Yes		
Recall Mode	None	C-Max	C-Max	None	None
Act Effct Green (s)	114.2	112.4	103.5	11.0	11.0
Actuated g/C Ratio	0.88	0.86	0.80	0.08	0.08
v/c Ratio	0.19	0.20	0.29	0.20	0.27
Control Delay	1.9	1.2	4.9	58.7	18.8
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	1.9	1.2	4.9	58.7	18.8
LOS	A	A	A	E	B
Approach Delay		1.3	4.9	33.8	
Approach LOS		A	A	C	

Intersection Summary

Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 65 (50%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
 Natural Cycle: 85
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.29
 Intersection Signal Delay: 4.5
 Intersection Capacity Utilization 47.3%
 Analysis Period (min) 15

Intersection LOS: A
 ICU Level of Service A

Splits and Phases: 11: Britannia Rd & Rose Way



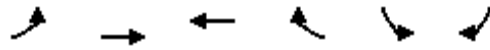
Queues
11: Britannia Rd & Rose Way



Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	80	790	1060	30	50
v/c Ratio	0.19	0.20	0.29	0.20	0.27
Control Delay	1.9	1.2	4.9	58.7	18.8
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	1.9	1.2	4.9	58.7	18.8
Queue Length 50th (m)	1.3	6.8	34.3	7.7	0.0
Queue Length 95th (m)	2.5	11.4	41.2	18.0	13.0
Internal Link Dist (m)		190.1	148.0	92.6	
Turn Bay Length (m)	50.0			50.0	
Base Capacity (vph)	475	3941	3604	624	591
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	0.17	0.20	0.29	0.05	0.08
Intersection Summary					

HCM Signalized Intersection Capacity Analysis
 11: Britannia Rd & Rose Way

2029 Future Background PM
 07-17-2023



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↖	↑↑↑	↑↑↑		↘	↘
Traffic Volume (vph)	80	790	1000	60	30	50
Future Volume (vph)	80	790	1000	60	30	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0	6.0		5.0	5.0
Lane Util. Factor	1.00	*0.80	*0.80		1.00	1.00
Frt	1.00	1.00	0.99		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1805	4560	4521		1805	1615
Flt Permitted	0.21	1.00	1.00		0.95	1.00
Satd. Flow (perm)	393	4560	4521		1805	1615
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	80	790	1000	60	30	50
RTOR Reduction (vph)	0	0	2	0	0	47
Lane Group Flow (vph)	80	790	1058	0	30	3
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Turn Type	pm+pt	NA	NA		Prot	Perm
Protected Phases	5	2	6		4	
Permitted Phases	2					4
Actuated Green, G (s)	109.0	109.0	99.4		8.0	8.0
Effective Green, g (s)	110.0	110.0	100.4		9.0	9.0
Actuated g/C Ratio	0.85	0.85	0.77		0.07	0.07
Clearance Time (s)	4.0	7.0	7.0		6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	404	3858	3491		124	111
v/s Ratio Prot	0.01	c0.17	c0.23		c0.02	
v/s Ratio Perm	0.16					0.00
v/c Ratio	0.20	0.20	0.30		0.24	0.03
Uniform Delay, d1	1.8	1.9	4.4		57.3	56.4
Progression Factor	0.74	0.56	1.00		1.00	1.00
Incremental Delay, d2	0.2	0.1	0.2		1.0	0.1
Delay (s)	1.6	1.2	4.6		58.3	56.5
Level of Service	A	A	A		E	E
Approach Delay (s)		1.2	4.6		57.2	
Approach LOS		A	A		E	

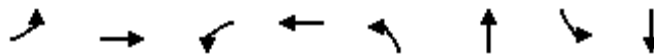
Intersection Summary

HCM 2000 Control Delay	5.2	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.29		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	47.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Timings
1: Regional Rd 25 & Louis St Laurent Ave

2032 Future Background AM
07-17-2023

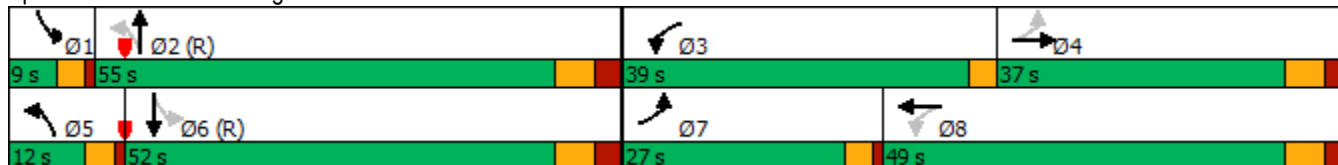


Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↖	↕	↖	↕	↖	↕	↖	↕
Traffic Volume (vph)	270	535	485	560	105	910	65	905
Future Volume (vph)	270	535	485	560	105	910	65	905
Turn Type	pm+pt	NA	pm+pt	NA	pm+pt	NA	pm+pt	NA
Protected Phases	7	4	3	8	5	2	1	6
Permitted Phases	4		8		2		6	
Detector Phase	7	4	3	8	5	2	1	6
Switch Phase								
Minimum Initial (s)	5.0	10.0	10.0	10.0	5.0	20.0	5.0	20.0
Minimum Split (s)	9.0	30.0	14.0	30.0	9.0	32.2	9.0	32.2
Total Split (s)	27.0	37.0	39.0	49.0	12.0	55.0	9.0	52.0
Total Split (%)	19.3%	26.4%	27.9%	35.0%	8.6%	39.3%	6.4%	37.1%
Yellow Time (s)	3.0	4.0	3.0	4.0	3.0	4.2	3.0	4.2
All-Red Time (s)	1.0	3.0	0.0	3.0	1.0	3.0	1.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	3.0	6.0	2.0	6.0	3.0	6.2	3.0	6.2
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	C-Max	None	C-Max
Act Effct Green (s)	53.1	31.2	72.3	46.4	62.7	52.3	57.1	47.7
Actuated g/C Ratio	0.38	0.22	0.52	0.33	0.45	0.37	0.41	0.34
v/c Ratio	0.66	0.93	0.93	0.58	0.56	0.78	0.50	0.70
Control Delay	29.9	70.4	63.7	40.5	35.3	41.7	36.6	43.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.9	70.4	63.7	40.5	35.3	41.7	36.6	43.1
LOS	C	E	E	D	D	D	D	D
Approach Delay		59.4		50.4		41.2		42.7
Approach LOS		E		D		D		D

Intersection Summary

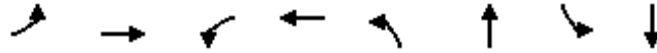
Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.93
 Intersection Signal Delay: 47.9
 Intersection LOS: D
 Intersection Capacity Utilization 93.1%
 ICU Level of Service F
 Analysis Period (min) 15

Splits and Phases: 1: Regional Rd 25 & Louis St Laurent Ave



Queues
1: Regional Rd 25 & Louis St Laurent Ave

2032 Future Background AM
07-17-2023

























Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	273	732	490	662	106	1227	66	1010
v/c Ratio	0.66	0.93	0.93	0.58	0.56	0.78	0.50	0.70
Control Delay	29.9	70.4	63.7	40.5	35.3	41.7	36.6	43.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.9	70.4	63.7	40.5	35.3	41.7	36.6	43.1
Queue Length 50th (m)	43.8	106.9	118.4	80.3	18.3	130.4	11.2	107.2
Queue Length 95th (m)	63.4	#146.2	#183.0	107.0	31.2	153.5	21.1	127.5
Internal Link Dist (m)		126.1		117.1		481.0		113.5
Turn Bay Length (m)	90.0		35.0		65.0		80.0	
Base Capacity (vph)	478	789	548	1145	191	1582	132	1444
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	0.57	0.93	0.89	0.58	0.55	0.78	0.50	0.70

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
1: Regional Rd 25 & Louis St Laurent Ave

2032 Future Background AM
07-17-2023

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	270	535	190	485	560	95	105	910	305	65	905	95
Future Volume (vph)	270	535	190	485	560	95	105	910	305	65	905	95
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0		2.0	6.0		3.0	6.2		3.0	6.2	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	*0.80		1.00	*0.80	
Frbp, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.96		1.00	0.98		1.00	0.96		1.00	0.99	
Flt Protected	0.95	1.00		1.00	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1767	3409		1863	3427		1703	4140		1719	4220	
Flt Permitted	0.39	1.00		0.12	1.00		0.12	1.00		0.09	1.00	
Satd. Flow (perm)	717	3409		224	3427		213	4140		155	4220	
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	273	540	192	490	566	96	106	919	308	66	914	96
RTOR Reduction (vph)	0	26	0	0	9	0	0	38	0	0	7	0
Lane Group Flow (vph)	273	706	0	490	653	0	106	1189	0	66	1003	0
Confl. Peds. (#/hr)	5					5						
Heavy Vehicles (%)	2%	2%	1%	2%	2%	7%	6%	7%	3%	5%	7%	2%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	48.1	30.2		67.4	45.5		58.2	50.4		50.6	46.6	
Effective Green, g (s)	50.1	31.2		68.4	46.5		59.4	51.4		52.6	47.6	
Actuated g/C Ratio	0.36	0.22		0.49	0.33		0.42	0.37		0.38	0.34	
Clearance Time (s)	4.0	7.0		3.0	7.0		4.0	7.2		4.0	7.2	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	398	759		521	1138		184	1519		114	1434	
v/s Ratio Prot	0.09	c0.21		c0.24	0.19		c0.04	c0.29		0.02	0.24	
v/s Ratio Perm	0.15			0.22			0.21			0.20		
v/c Ratio	0.69	0.93		0.94	0.57		0.58	0.78		0.58	0.70	
Uniform Delay, d1	34.1	53.3		41.3	38.6		27.7	39.3		31.2	40.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	4.9	17.9		25.4	0.7		4.3	4.1		7.0	2.9	
Delay (s)	39.0	71.3		66.6	39.3		32.0	43.4		38.2	42.9	
Level of Service	D	E		E	D		C	D		D	D	
Approach Delay (s)		62.5			50.9			42.5			42.6	
Approach LOS		E			D			D			D	
Intersection Summary												
HCM 2000 Control Delay			49.1				HCM 2000 Level of Service				D	
HCM 2000 Volume to Capacity ratio			0.87									
Actuated Cycle Length (s)			140.0				Sum of lost time (s)			18.2		
Intersection Capacity Utilization			93.1%				ICU Level of Service			F		
Analysis Period (min)			15									
c Critical Lane Group												

Timings
2: Regional Rd 25 & Whitlock Ave



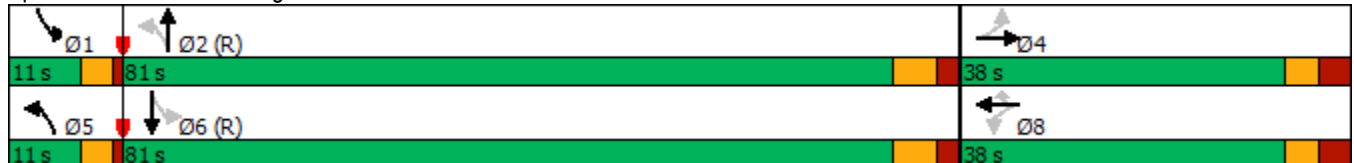
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	145	50	50	35	95	45	1105	50	1730
Future Volume (vph)	145	50	50	35	95	45	1105	50	1730
Turn Type	Perm	NA	Perm	NA	Perm	pm+pt	NA	pm+pt	NA
Protected Phases		4		8		5	2	1	6
Permitted Phases	4		8		8	2		6	
Detector Phase	4	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	20.0	7.0	20.0
Minimum Split (s)	37.5	37.5	37.5	37.5	37.5	11.0	35.5	11.0	35.5
Total Split (s)	38.0	38.0	38.0	38.0	38.0	11.0	81.0	11.0	81.0
Total Split (%)	29.2%	29.2%	29.2%	29.2%	29.2%	8.5%	62.3%	8.5%	62.3%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.0	4.2	3.0	4.2
All-Red Time (s)	3.2	3.2	3.2	3.2	3.2	1.0	2.3	1.0	2.3
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5	3.0	5.5	3.0	5.5
Lead/Lag						Lead	Lag	Lead	Lag
Lead-Lag Optimize?						Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	None	C-Max
Act Effct Green (s)	21.7	21.7	21.7	21.7	21.7	97.5	88.3	97.3	88.2
Actuated g/C Ratio	0.17	0.17	0.17	0.17	0.17	0.75	0.68	0.75	0.68
v/c Ratio	0.71	0.50	0.35	0.13	0.31	0.30	0.42	0.17	0.68
Control Delay	67.9	31.2	52.1	44.2	10.2	22.8	8.1	5.8	15.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	67.9	31.2	52.1	44.2	10.2	22.8	8.1	5.8	15.6
LOS	E	C	D	D	B	C	A	A	B
Approach Delay		49.6		28.4			8.7		15.3
Approach LOS		D		C			A		B

Intersection Summary

Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 64 (49%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 95
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.71
 Intersection Signal Delay: 16.6
 Intersection Capacity Utilization 75.1%
 Analysis Period (min) 15

Intersection LOS: B
 ICU Level of Service D

Splits and Phases: 2: Regional Rd 25 & Whitlock Ave



Queues
2: Regional Rd 25 & Whitlock Ave

2032 Future Background AM
07-17-2023



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	158	157	54	38	103	49	1212	54	1989
v/c Ratio	0.71	0.50	0.35	0.13	0.31	0.30	0.42	0.17	0.68
Control Delay	67.9	31.2	52.1	44.2	10.2	22.8	8.1	5.8	15.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	67.9	31.2	52.1	44.2	10.2	22.8	8.1	5.8	15.6
Queue Length 50th (m)	40.7	21.0	13.0	8.8	0.0	2.9	58.8	3.0	128.7
Queue Length 95th (m)	61.3	40.9	25.1	18.0	15.2	8.8	131.7	8.1	184.2
Internal Link Dist (m)		62.9		68.1			696.9		481.0
Turn Bay Length (m)	35.0		65.0		65.0	100.0		100.0	
Base Capacity (vph)	332	431	232	439	441	162	2915	323	2924
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	0.48	0.36	0.23	0.09	0.23	0.30	0.42	0.17	0.68
Intersection Summary									

HCM Signalized Intersection Capacity Analysis
2: Regional Rd 25 & Whitlock Ave

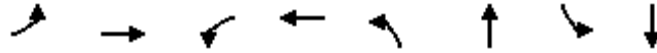
2032 Future Background AM
07-17-2023



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗	↗	↖	↑↑↑		↖	↑↑↑	
Traffic Volume (vph)	145	50	95	50	35	95	45	1105	10	50	1730	100
Future Volume (vph)	145	50	95	50	35	95	45	1105	10	50	1730	100
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5		5.5	5.5	5.5	3.0	5.5		3.0	5.5	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	*0.80		1.00	*0.80	
Frbp, ped/bikes	1.00	0.99		1.00	1.00	0.98	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	0.99	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.90		1.00	1.00	0.85	1.00	1.00		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1725	1516		1727	1759	1455	1671	4289		1805	4303	
Flt Permitted	0.73	1.00		0.51	1.00	1.00	0.05	1.00		0.16	1.00	
Satd. Flow (perm)	1330	1516		928	1759	1455	81	4289		306	4303	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	158	54	103	54	38	103	49	1201	11	54	1880	109
RTOR Reduction (vph)	0	58	0	0	0	86	0	0	0	0	3	0
Lane Group Flow (vph)	158	99	0	54	38	17	49	1212	0	54	1986	0
Confl. Peds. (#/hr)	5		5	5		5						
Heavy Vehicles (%)	4%	32%	1%	4%	8%	9%	8%	6%	25%	0%	5%	7%
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	20.7	20.7		20.7	20.7	20.7	92.4	86.5		92.2	86.4	
Effective Green, g (s)	21.7	21.7		21.7	21.7	21.7	94.4	87.5		94.2	87.4	
Actuated g/C Ratio	0.17	0.17		0.17	0.17	0.17	0.73	0.67		0.72	0.67	
Clearance Time (s)	6.5	6.5		6.5	6.5	6.5	4.0	6.5		4.0	6.5	
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)	222	253		154	293	242	143	2886		300	2892	
v/s Ratio Prot		0.07			0.02		c0.02	0.28		0.01	c0.46	
v/s Ratio Perm	c0.12			0.06		0.01	0.23			0.12		
v/c Ratio	0.71	0.39		0.35	0.13	0.07	0.34	0.42		0.18	0.69	
Uniform Delay, d1	51.2	48.3		47.9	46.1	45.7	11.1	9.7		5.6	13.0	
Progression Factor	1.00	1.00		1.00	1.00	1.00	2.09	0.73		1.00	1.00	
Incremental Delay, d2	10.3	1.0		1.4	0.2	0.1	1.4	0.4		0.3	1.4	
Delay (s)	61.5	49.3		49.3	46.3	45.8	24.5	7.5		5.9	14.3	
Level of Service	E	D		D	D	D	C	A		A	B	
Approach Delay (s)		55.4			46.9			8.1			14.1	
Approach LOS		E			D			A			B	
Intersection Summary												
HCM 2000 Control Delay			17.2									B
HCM 2000 Volume to Capacity ratio			0.67									
Actuated Cycle Length (s)			130.0								14.0	
Intersection Capacity Utilization			75.1%									D
Analysis Period (min)			15									

c Critical Lane Group

Timings
5: Regional Rd 25 & Etheridge Ave/Collector Road

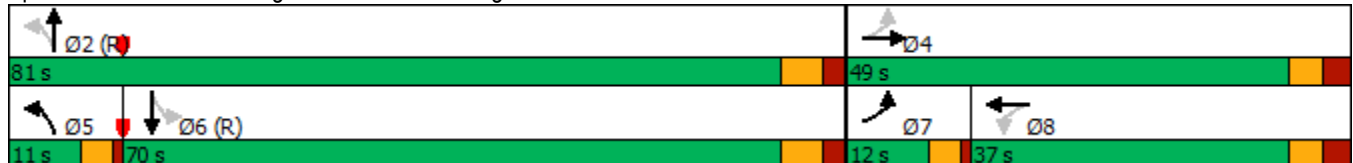


Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↖	↗	↖	↗	↖	↑↑↑	↖	↑↑↑
Traffic Volume (vph)	100	0	65	0	30	1005	30	1790
Future Volume (vph)	100	0	65	0	30	1005	30	1790
Turn Type	pm+pt	NA	Perm	NA	pm+pt	NA	Perm	NA
Protected Phases	7	4		8	5	2		6
Permitted Phases	4		8		2		6	
Detector Phase	7	4	8	8	5	2	6	6
Switch Phase								
Minimum Initial (s)	7.0	10.0	10.0	10.0	7.0	20.0	20.0	20.0
Minimum Split (s)	11.0	36.2	36.2	36.2	11.0	38.4	38.4	38.4
Total Split (s)	12.0	49.0	37.0	37.0	11.0	81.0	70.0	70.0
Total Split (%)	9.2%	37.7%	28.5%	28.5%	8.5%	62.3%	53.8%	53.8%
Yellow Time (s)	3.0	3.3	3.3	3.3	3.0	4.2	4.2	4.2
All-Red Time (s)	1.0	2.9	2.9	2.9	1.0	2.2	2.2	2.2
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	3.0	5.2	5.2	5.2	3.0	5.4	5.4	5.4
Lead/Lag	Lead		Lag	Lag	Lead		Lag	Lag
Lead-Lag Optimize?	Yes		Yes	Yes	Yes		Yes	Yes
Recall Mode	None	None	None	None	None	C-Max	C-Max	C-Max
Act Effct Green (s)	25.4	23.2	13.6	13.6	98.6	96.2	89.6	89.6
Actuated g/C Ratio	0.20	0.18	0.10	0.10	0.76	0.74	0.69	0.69
v/c Ratio	0.40	0.18	0.48	0.19	0.19	0.34	0.11	0.65
Control Delay	47.4	2.3	65.5	1.4	17.4	2.2	3.4	5.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	47.4	2.3	65.5	1.4	17.4	2.2	3.4	5.7
LOS	D	A	E	A	B	A	A	A
Approach Delay		29.7		36.0		2.7		5.7
Approach LOS		C		D		A		A

Intersection Summary

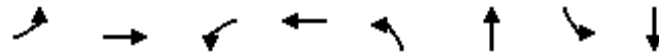
Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 110
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.65
 Intersection Signal Delay: 7.1
 Intersection Capacity Utilization 56.8%
 Analysis Period (min) 15
 Intersection LOS: A
 ICU Level of Service B

Splits and Phases: 5: Regional Rd 25 & Etheridge Ave/Collector Road



Queues
5: Regional Rd 25 & Etheridge Ave/Collector Road

2032 Future Background AM
07-17-2023



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	105	68	68	58	32	1079	32	1942
v/c Ratio	0.40	0.18	0.48	0.19	0.19	0.34	0.11	0.65
Control Delay	47.4	2.3	65.5	1.4	17.4	2.2	3.4	5.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	47.4	2.3	65.5	1.4	17.4	2.2	3.4	5.7
Queue Length 50th (m)	24.0	0.0	17.7	0.0	0.5	9.5	0.7	150.9
Queue Length 95th (m)	39.5	2.5	32.4	0.0	m3.0	14.5	m1.0	24.3
Internal Link Dist (m)		53.9		63.1		292.1		696.9
Turn Bay Length (m)	40.0		40.0		70.0		70.0	
Base Capacity (vph)	264	619	331	509	169	3177	282	2980
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	0.40	0.11	0.21	0.11	0.19	0.34	0.11	0.65

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
5: Regional Rd 25 & Etheridge Ave/Collector Road

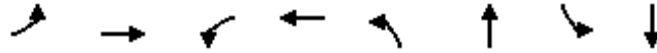
2032 Future Background AM
07-17-2023



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↑↑↑		↖	↑↑↑	
Traffic Volume (vph)	100	0	65	65	0	55	30	1005	20	30	1790	55
Future Volume (vph)	100	0	65	65	0	55	30	1005	20	30	1790	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	5.2		5.2	5.2		3.0	5.4		5.4	5.4	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	*0.80		1.00	*0.80	
Frt	1.00	0.85		1.00	0.85		1.00	1.00		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1787	1615		1805	1615		1752	4294		1805	4322	
Flt Permitted	0.57	1.00		0.71	1.00		0.05	1.00		0.22	1.00	
Satd. Flow (perm)	1075	1615		1354	1615		88	4294		411	4322	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	105	0	68	68	0	58	32	1058	21	32	1884	58
RTOR Reduction (vph)	0	55	0	0	53	0	0	1	0	0	1	0
Lane Group Flow (vph)	105	13	0	68	5	0	32	1078	0	32	1941	0
Heavy Vehicles (%)	1%	0%	0%	0%	0%	0%	3%	6%	0%	0%	5%	6%
Turn Type	pm+pt	NA		Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases	7	4			8		5	2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	23.4	23.4		10.6	10.6		94.0	94.0		85.8	85.8	
Effective Green, g (s)	24.4	24.4		11.6	11.6		95.0	95.0		86.8	86.8	
Actuated g/C Ratio	0.19	0.19		0.09	0.09		0.73	0.73		0.67	0.67	
Clearance Time (s)	4.0	6.2		6.2	6.2		4.0	6.4		6.4	6.4	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	255	303		120	144		130	3137		274	2885	
v/s Ratio Prot	c0.03	0.01			0.00		0.01	c0.25			c0.45	
v/s Ratio Perm	0.05			c0.05			0.17			0.08		
v/c Ratio	0.41	0.04		0.57	0.04		0.25	0.34		0.12	0.67	
Uniform Delay, d1	45.6	43.2		56.8	54.1		10.2	6.3		7.8	13.0	
Progression Factor	1.00	1.00		1.00	1.00		3.04	0.31		0.27	0.36	
Incremental Delay, d2	1.1	0.1		6.0	0.1		0.8	0.2		0.7	1.0	
Delay (s)	46.7	43.3		62.8	54.2		31.8	2.2		2.7	5.7	
Level of Service	D	D		E	D		C	A		A	A	
Approach Delay (s)		45.4			58.8			3.0			5.6	
Approach LOS		D			E			A			A	

Intersection Summary		
HCM 2000 Control Delay	8.8	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	0.63	A
Actuated Cycle Length (s)	130.0	Sum of lost time (s)
Intersection Capacity Utilization	56.8%	16.6
Analysis Period (min)	15	ICU Level of Service
		B
c Critical Lane Group		

Timings
7: Regional Rd 25 & Britannia Rd

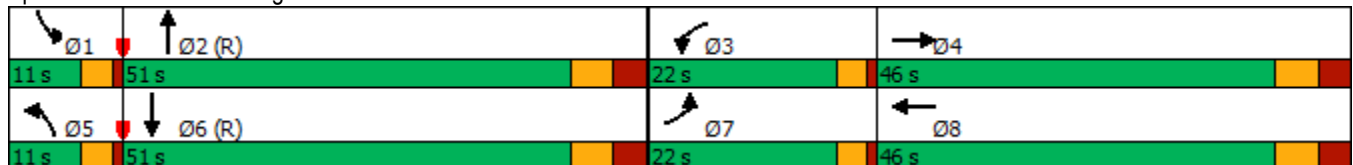


Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↖↗	↕↔	↖↗	↕↔	↖↗	↕↔	↖↗	↕↔
Traffic Volume (vph)	60	415	430	345	50	880	285	1620
Future Volume (vph)	60	415	430	345	50	880	285	1620
Turn Type	Prot	NA	Prot	NA	Prot	NA	Prot	NA
Protected Phases	7	4	3	8	5	2	1	6
Permitted Phases								
Detector Phase	7	4	3	8	5	2	1	6
Switch Phase								
Minimum Initial (s)	7.0	10.0	7.0	10.0	7.0	20.0	7.0	20.0
Minimum Split (s)	11.0	45.5	11.0	45.5	11.0	49.7	11.0	49.7
Total Split (s)	22.0	46.0	22.0	46.0	11.0	51.0	11.0	51.0
Total Split (%)	16.9%	35.4%	16.9%	35.4%	8.5%	39.2%	8.5%	39.2%
Yellow Time (s)	3.0	4.2	3.0	4.2	3.0	4.2	3.0	4.2
All-Red Time (s)	1.0	3.3	1.0	3.3	1.0	3.5	1.0	3.5
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	3.0	6.5	3.0	6.5	3.0	6.7	3.0	6.7
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	C-Max	None	C-Max
Act Effct Green (s)	9.0	25.5	18.8	37.4	8.7	45.3	21.2	60.0
Actuated g/C Ratio	0.07	0.20	0.14	0.29	0.07	0.35	0.16	0.46
v/c Ratio	0.27	0.76	0.87	0.36	0.23	0.74	0.50	0.83
Control Delay	60.0	46.4	69.1	30.2	59.6	39.6	54.6	45.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	60.0	46.4	69.1	30.2	59.6	39.6	54.6	45.6
LOS	E	D	E	C	E	D	D	D
Approach Delay		47.5		49.0		40.5		46.9
Approach LOS		D		D		D		D

Intersection Summary

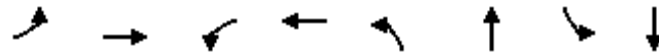
Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 104 (80%), Referenced to phase 2:NBT and 6:SBT, Start of Green
 Natural Cycle: 130
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.87
 Intersection Signal Delay: 45.8
 Intersection LOS: D
 Intersection Capacity Utilization 81.8%
 ICU Level of Service D
 Analysis Period (min) 15

Splits and Phases: 7: Regional Rd 25 & Britannia Rd



Queues
7: Regional Rd 25 & Britannia Rd

2032 Future Background AM
07-17-2023



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	61	707	434	464	51	1106	288	1651
v/c Ratio	0.27	0.76	0.87	0.36	0.23	0.74	0.50	0.83
Control Delay	60.0	46.4	69.1	30.2	59.6	39.6	54.6	45.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	60.0	46.4	69.1	30.2	59.6	39.6	54.6	45.6
Queue Length 50th (m)	8.1	63.4	59.8	36.6	6.8	105.2	42.6	151.7
Queue Length 95th (m)	15.6	76.7	#87.4	50.4	13.7	127.6	58.2	#221.1
Internal Link Dist (m)		377.9		182.4		165.3		292.1
Turn Bay Length (m)	60.0		120.0		90.0		90.0	
Base Capacity (vph)	482	1370	503	1364	226	1496	571	1998
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	0.52	0.86	0.34	0.23	0.74	0.50	0.83

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
7: Regional Rd 25 & Britannia Rd

2032 Future Background AM
07-17-2023



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	60	415	285	430	345	115	50	880	215	285	1620	15
Future Volume (vph)	60	415	285	430	345	115	50	880	215	285	1620	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.5		3.0	6.5		3.0	6.7		3.0	6.7	
Lane Util. Factor	0.97	*0.80		0.97	*0.80		0.97	*0.80		0.97	*0.80	
Frt	1.00	0.94		1.00	0.96		1.00	0.97		1.00	1.00	
Flt Protected	0.95	1.00		1.00	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	3303	4239		3445	4335		3367	4223		3502	4329	
Flt Permitted	0.95	1.00		1.00	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	3303	4239		3445	4335		3367	4223		3502	4329	
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	61	419	288	434	348	116	51	889	217	288	1636	15
RTOR Reduction (vph)	0	94	0	0	43	0	0	24	0	0	1	0
Lane Group Flow (vph)	61	613	0	434	421	0	51	1082	0	288	1650	0
Heavy Vehicles (%)	6%	1%	1%	7%	1%	2%	4%	5%	4%	0%	5%	27%
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	6.6	25.2		17.8	36.4		6.3	43.6		20.2	57.5	
Effective Green, g (s)	7.6	26.2		18.8	37.4		7.3	44.6		21.2	58.5	
Actuated g/C Ratio	0.06	0.20		0.14	0.29		0.06	0.34		0.16	0.45	
Clearance Time (s)	4.0	7.5		4.0	7.5		4.0	7.7		4.0	7.7	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	193	854		498	1247		189	1448		571	1948	
v/s Ratio Prot	0.02	c0.14		c0.13	0.10		0.02	0.26		c0.08	c0.38	
v/s Ratio Perm												
v/c Ratio	0.32	0.72		0.87	0.34		0.27	0.75		0.50	0.85	
Uniform Delay, d1	58.7	48.4		54.4	36.5		58.8	37.7		49.6	31.8	
Progression Factor	1.00	1.00		0.93	0.92		1.00	1.00		1.02	1.33	
Incremental Delay, d2	0.9	2.9		15.1	0.2		0.8	3.6		0.6	3.8	
Delay (s)	59.7	51.3		65.6	33.9		59.6	41.3		51.2	46.1	
Level of Service	E	D		E	C		E	D		D	D	
Approach Delay (s)		52.0			49.2			42.1			46.9	
Approach LOS		D			D			D			D	
Intersection Summary												
HCM 2000 Control Delay			47.0			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.80									
Actuated Cycle Length (s)			130.0			Sum of lost time (s)				19.2		
Intersection Capacity Utilization			81.8%			ICU Level of Service				D		
Analysis Period (min)			15									
c Critical Lane Group												

Timings
10: Britannia Rd & Farmstead Dr

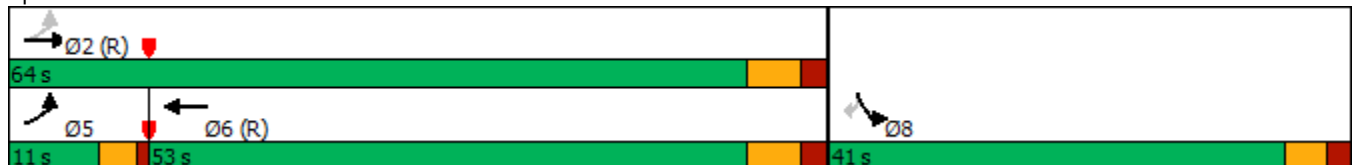


Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Configurations	↖	↑↑↑	↑↑↑↔	↖	↗
Traffic Volume (vph)	20	670	385	90	20
Future Volume (vph)	20	670	385	90	20
Turn Type	pm+pt	NA	NA	Prot	Perm
Protected Phases	5	2	6	8	
Permitted Phases	2				8
Detector Phase	5	2	6	8	8
Switch Phase					
Minimum Initial (s)	7.0	20.0	20.0	10.0	10.0
Minimum Split (s)	11.0	29.4	29.4	15.3	15.3
Total Split (s)	11.0	64.0	53.0	41.0	41.0
Total Split (%)	10.5%	61.0%	50.5%	39.0%	39.0%
Yellow Time (s)	3.0	4.2	4.2	3.3	3.3
All-Red Time (s)	1.0	2.2	2.2	2.0	2.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	3.0	5.4	5.4	4.3	4.3
Lead/Lag	Lead		Lag		
Lead-Lag Optimize?	Yes		Yes		
Recall Mode	None	C-Max	C-Max	None	None
Act Effct Green (s)	87.8	86.5	82.1	12.9	12.9
Actuated g/C Ratio	0.84	0.82	0.78	0.12	0.12
v/c Ratio	0.03	0.19	0.13	0.44	0.10
Control Delay	2.5	2.8	4.4	49.0	16.6
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	2.5	2.8	4.4	49.0	16.6
LOS	A	A	A	D	B
Approach Delay		2.8	4.4	43.1	
Approach LOS		A	A	D	

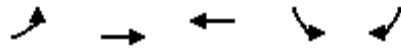
Intersection Summary

Cycle Length: 105
 Actuated Cycle Length: 105
 Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.44
 Intersection Signal Delay: 7.1
 Intersection LOS: A
 Intersection Capacity Utilization 33.1%
 ICU Level of Service A
 Analysis Period (min) 15

Splits and Phases: 10: Britannia Rd & Farmstead Dr



Queues
10: Britannia Rd & Farmstead Dr



Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	21	691	423	93	21
v/c Ratio	0.03	0.19	0.13	0.44	0.10
Control Delay	2.5	2.8	4.4	49.0	16.6
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	2.5	2.8	4.4	49.0	16.6
Queue Length 50th (m)	0.6	12.0	6.7	19.0	0.0
Queue Length 95th (m)	2.4	19.7	18.2	33.9	7.2
Internal Link Dist (m)		101.0	377.9	199.3	
Turn Bay Length (m)	20.0				
Base Capacity (vph)	722	3647	3288	595	551
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	0.19	0.13	0.16	0.04
Intersection Summary					

HCM Signalized Intersection Capacity Analysis
 10: Britannia Rd & Farmstead Dr

2032 Future Background AM
 07-17-2023



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↶	↑↑↑	↑↑↑		↶	↷
Traffic Volume (vph)	20	670	385	25	90	20
Future Volume (vph)	20	670	385	25	90	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	5.4	5.4		4.3	4.3
Lane Util. Factor	1.00	*0.80	*0.80		1.00	1.00
Frt	1.00	1.00	0.99		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1656	4427	4202		1703	1538
Flt Permitted	0.45	1.00	1.00		0.95	1.00
Satd. Flow (perm)	785	4427	4202		1703	1538
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	21	691	397	26	93	21
RTOR Reduction (vph)	0	0	3	0	0	19
Lane Group Flow (vph)	21	691	420	0	93	2
Heavy Vehicles (%)	9%	3%	8%	0%	6%	5%
Turn Type	pm+pt	NA	NA		Prot	Perm
Protected Phases	5	2	6		8	
Permitted Phases	2					8
Actuated Green, G (s)	83.4	83.4	76.6		9.9	9.9
Effective Green, g (s)	84.4	84.4	77.6		10.9	10.9
Actuated g/C Ratio	0.80	0.80	0.74		0.10	0.10
Clearance Time (s)	4.0	6.4	6.4		5.3	5.3
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	662	3558	3105		176	159
v/s Ratio Prot	0.00	c0.16	0.10		c0.05	
v/s Ratio Perm	0.02					0.00
v/c Ratio	0.03	0.19	0.14		0.53	0.01
Uniform Delay, d1	2.1	2.4	4.0		44.6	42.2
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.0	0.1	0.1		2.8	0.0
Delay (s)	2.1	2.5	4.1		47.5	42.3
Level of Service	A	A	A		D	D
Approach Delay (s)		2.5	4.1		46.5	
Approach LOS		A	A		D	

Intersection Summary

HCM 2000 Control Delay	7.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.24		
Actuated Cycle Length (s)	105.0	Sum of lost time (s)	12.7
Intersection Capacity Utilization	33.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Timings
11: Britannia Rd & Rose Way

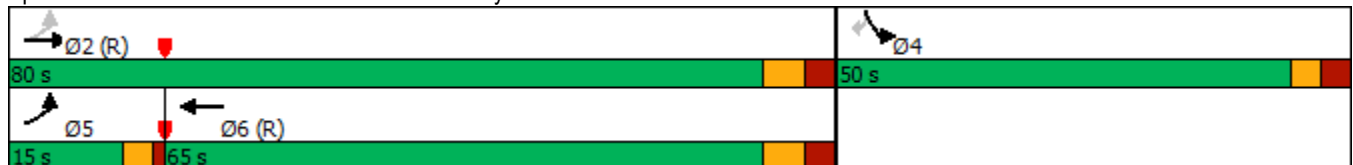


Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Configurations	↖	↑↑↑	↑↑↑↔	↖	↗
Traffic Volume (vph)	25	890	815	55	75
Future Volume (vph)	25	890	815	55	75
Turn Type	pm+pt	NA	NA	Prot	Perm
Protected Phases	5	2	6	4	
Permitted Phases	2				4
Detector Phase	5	2	6	4	4
Switch Phase					
Minimum Initial (s)	7.0	20.0	20.0	10.0	10.0
Minimum Split (s)	11.0	29.0	29.0	43.0	43.0
Total Split (s)	15.0	80.0	65.0	50.0	50.0
Total Split (%)	11.5%	61.5%	50.0%	38.5%	38.5%
Yellow Time (s)	3.0	4.0	4.0	3.0	3.0
All-Red Time (s)	1.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	3.0	6.0	6.0	5.0	5.0
Lead/Lag	Lead		Lag		
Lead-Lag Optimize?	Yes		Yes		
Recall Mode	None	C-Max	C-Max	None	None
Act Effct Green (s)	110.1	107.1	100.5	11.9	11.9
Actuated g/C Ratio	0.85	0.82	0.77	0.09	0.09
v/c Ratio	0.05	0.26	0.26	0.36	0.37
Control Delay	4.3	6.3	4.9	61.5	15.9
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	4.3	6.3	4.9	61.5	15.9
LOS	A	A	A	E	B
Approach Delay		6.3	4.9	35.2	
Approach LOS		A	A	D	

Intersection Summary

Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
 Natural Cycle: 85
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.37
 Intersection Signal Delay: 7.7
 Intersection LOS: A
 Intersection Capacity Utilization 38.3%
 ICU Level of Service A
 Analysis Period (min) 15

Splits and Phases: 11: Britannia Rd & Rose Way



Queues
11: Britannia Rd & Rose Way



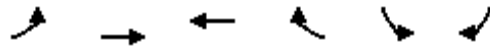
Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	27	967	897	60	82
v/c Ratio	0.05	0.26	0.26	0.36	0.37
Control Delay	4.3	6.3	4.9	61.5	15.9
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	4.3	6.3	4.9	61.5	15.9
Queue Length 50th (m)	2.1	43.5	27.8	15.6	0.0
Queue Length 95th (m)	m4.2	52.4	38.0	29.6	15.7
Internal Link Dist (m)		182.4	155.7	76.0	
Turn Bay Length (m)	50.0			50.0	
Base Capacity (vph)	531	3755	3517	624	612
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.05	0.26	0.26	0.10	0.13

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
 11: Britannia Rd & Rose Way

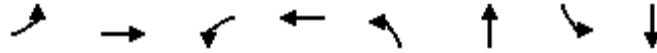
2032 Future Background AM
 07-17-2023



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↰	↑↑↑	↑↑↑		↰	↰
Traffic Volume (vph)	25	890	815	10	55	75
Future Volume (vph)	25	890	815	10	55	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0	6.0		5.0	5.0
Lane Util. Factor	1.00	*0.80	*0.80		1.00	1.00
Frt	1.00	1.00	1.00		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1805	4560	4552		1805	1615
Flt Permitted	0.26	1.00	1.00		0.95	1.00
Satd. Flow (perm)	485	4560	4552		1805	1615
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	27	967	886	11	60	82
RTOR Reduction (vph)	0	0	0	0	0	74
Lane Group Flow (vph)	27	967	897	0	60	8
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Turn Type	pm+pt	NA	NA		Prot	Perm
Protected Phases	5	2	6		4	
Permitted Phases	2					4
Actuated Green, G (s)	106.1	106.1	97.9		10.9	10.9
Effective Green, g (s)	107.1	107.1	98.9		11.9	11.9
Actuated g/C Ratio	0.82	0.82	0.76		0.09	0.09
Clearance Time (s)	4.0	7.0	7.0		6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	452	3756	3463		165	147
v/s Ratio Prot	0.00	c0.21	0.20		c0.03	
v/s Ratio Perm	0.05					0.00
v/c Ratio	0.06	0.26	0.26		0.36	0.05
Uniform Delay, d1	2.2	2.6	4.6		55.5	53.9
Progression Factor	2.38	2.34	1.00		1.00	1.00
Incremental Delay, d2	0.0	0.1	0.2		1.4	0.1
Delay (s)	5.2	6.1	4.8		56.9	54.0
Level of Service	A	A	A		E	D
Approach Delay (s)		6.1	4.8		55.2	
Approach LOS		A	A		E	

Intersection Summary			
HCM 2000 Control Delay	9.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.27		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	38.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Timings
1: Regional Rd 25 & Louis St Laurent Ave

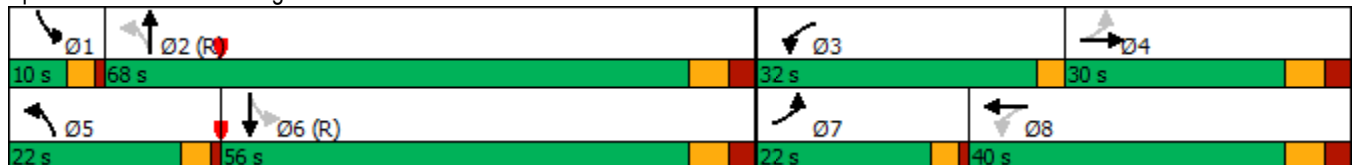


Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↙	↕	↙	↕	↙	↕	↙	↕
Traffic Volume (vph)	205	375	330	545	210	980	95	875
Future Volume (vph)	205	375	330	545	210	980	95	875
Turn Type	pm+pt	NA	pm+pt	NA	pm+pt	NA	pm+pt	NA
Protected Phases	7	4	3	8	5	2	1	6
Permitted Phases	4		8		2		6	
Detector Phase	7	4	3	8	5	2	1	6
Switch Phase								
Minimum Initial (s)	5.0	10.0	10.0	10.0	5.0	20.0	5.0	20.0
Minimum Split (s)	9.0	30.0	14.0	30.0	9.0	32.2	9.0	32.2
Total Split (s)	22.0	30.0	32.0	40.0	22.0	68.0	10.0	56.0
Total Split (%)	15.7%	21.4%	22.9%	28.6%	15.7%	48.6%	7.1%	40.0%
Yellow Time (s)	3.0	4.0	3.0	4.0	3.0	4.2	3.0	4.2
All-Red Time (s)	1.0	3.0	0.0	3.0	1.0	3.0	1.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	3.0	6.0	2.0	6.0	3.0	6.2	3.0	6.2
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	C-Max	None	C-Max
Act Effct Green (s)	43.7	23.9	54.3	30.4	80.6	66.5	70.8	59.5
Actuated g/C Ratio	0.31	0.17	0.39	0.22	0.58	0.48	0.51	0.42
v/c Ratio	0.70	0.81	0.81	0.79	0.67	0.70	0.53	0.58
Control Delay	44.4	63.9	48.4	58.7	28.4	29.7	29.9	32.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	44.4	63.9	48.4	58.7	28.4	29.7	29.9	32.9
LOS	D	E	D	E	C	C	C	C
Approach Delay		58.1		55.1		29.5		32.7
Approach LOS		E		E		C		C

Intersection Summary

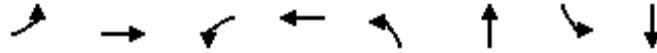
Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.81
 Intersection Signal Delay: 40.3
 Intersection LOS: D
 Intersection Capacity Utilization 84.0%
 ICU Level of Service E
 Analysis Period (min) 15

Splits and Phases: 1: Regional Rd 25 & Louis St Laurent Ave



Queues
1: Regional Rd 25 & Louis St Laurent Ave

2032 Future Background PM
07-17-2023






























Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	205	490	330	610	210	1410	95	1070
v/c Ratio	0.70	0.81	0.81	0.79	0.67	0.70	0.53	0.58
Control Delay	44.4	63.9	48.4	58.7	28.4	29.7	29.9	32.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	44.4	63.9	48.4	58.7	28.4	29.7	29.9	32.9
Queue Length 50th (m)	40.9	68.7	69.7	87.4	28.9	129.2	12.2	97.0
Queue Length 95th (m)	59.7	90.8	98.6	106.9	52.9	154.1	#28.3	127.7
Internal Link Dist (m)		126.1		117.1		481.0		113.5
Turn Bay Length (m)	90.0		35.0		65.0		80.0	
Base Capacity (vph)	319	633	470	865	356	2019	179	1838
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	0.64	0.77	0.70	0.71	0.59	0.70	0.53	0.58

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
1: Regional Rd 25 & Louis St Laurent Ave

2032 Future Background PM
07-17-2023

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		 			 			  			  		
Traffic Volume (vph)	205	375	115	330	545	65	210	980	430	95	875	195	
Future Volume (vph)	205	375	115	330	545	65	210	980	430	95	875	195	
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	3.0	6.0		2.0	6.0		3.0	6.2		3.0	6.2		
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	*0.80		1.00	*0.80		
Frbp, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	1.00		
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00		
Frt	1.00	0.96		1.00	0.98		1.00	0.95		1.00	0.97		
Flt Protected	0.95	1.00		1.00	1.00		0.95	1.00		0.95	1.00		
Satd. Flow (prot)	1769	3439		1899	3537		1787	4139		1805	4279		
Flt Permitted	0.22	1.00		0.19	1.00		0.14	1.00		0.09	1.00		
Satd. Flow (perm)	413	3439		364	3537		258	4139		172	4279		
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Adj. Flow (vph)	205	375	115	330	545	65	210	980	430	95	875	195	
RTOR Reduction (vph)	0	21	0	0	7	0	0	53	0	0	18	0	
Lane Group Flow (vph)	205	469	0	330	603	0	210	1357	0	95	1052	0	
Confl. Peds. (#/hr)	5		5	5		5	5		5	5		5	
Heavy Vehicles (%)	2%	1%	0%	0%	0%	2%	1%	6%	1%	0%	4%	0%	
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA		
Protected Phases	7	4		3	8		5	2		1	6		
Permitted Phases	4			8			2			6			
Actuated Green, G (s)	38.8	22.9		49.3	29.4		76.5	65.5		65.5	58.5		
Effective Green, g (s)	40.8	23.9		50.3	30.4		77.5	66.5		67.5	59.5		
Actuated g/C Ratio	0.29	0.17		0.36	0.22		0.55	0.48		0.48	0.42		
Clearance Time (s)	4.0	7.0		3.0	7.0		4.0	7.2		4.0	7.2		
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0		
Lane Grp Cap (vph)	284	587		398	768		306	1966		176	1818		
v/s Ratio Prot	0.09	0.14		c0.14	c0.17		c0.07	c0.33		0.03	0.25		
v/s Ratio Perm	0.12			0.15			0.31			0.23			
v/c Ratio	0.72	0.80		0.83	0.79		0.69	0.69		0.54	0.58		
Uniform Delay, d1	40.4	55.7		36.1	51.7		19.8	28.7		22.6	30.7		
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00		
Incremental Delay, d2	8.7	7.5		13.3	5.3		6.3	2.0		3.2	1.4		
Delay (s)	49.1	63.3		49.4	57.0		26.0	30.7		25.7	32.0		
Level of Service	D	E		D	E		C	C		C	C		
Approach Delay (s)		59.1			54.4			30.1			31.5		
Approach LOS		E			D			C			C		
Intersection Summary													
HCM 2000 Control Delay			40.2				HCM 2000 Level of Service			D			
HCM 2000 Volume to Capacity ratio			0.77										
Actuated Cycle Length (s)			140.0			Sum of lost time (s)			18.2				
Intersection Capacity Utilization			84.0%			ICU Level of Service			E				
Analysis Period (min)			15										

c Critical Lane Group

Timings
2: Regional Rd 25 & Whitlock Ave



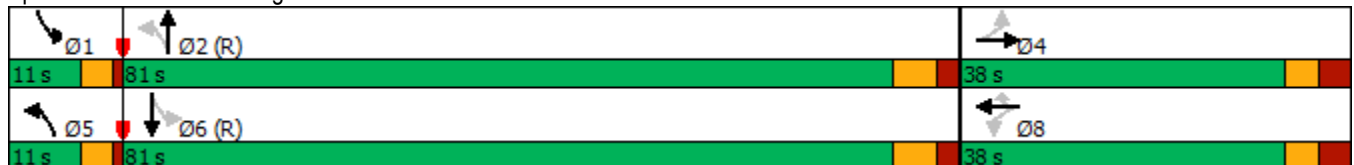
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	105	40	25	40	75	90	1620	60	1065
Future Volume (vph)	105	40	25	40	75	90	1620	60	1065
Turn Type	Perm	NA	Perm	NA	Perm	pm+pt	NA	pm+pt	NA
Protected Phases		4		8		5	2	1	6
Permitted Phases	4		8		8	2		6	
Detector Phase	4	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	20.0	7.0	20.0
Minimum Split (s)	37.5	37.5	37.5	37.5	37.5	11.0	35.5	11.0	35.5
Total Split (s)	38.0	38.0	38.0	38.0	38.0	11.0	81.0	11.0	81.0
Total Split (%)	29.2%	29.2%	29.2%	29.2%	29.2%	8.5%	62.3%	8.5%	62.3%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.0	4.2	3.0	4.2
All-Red Time (s)	3.2	3.2	3.2	3.2	3.2	1.0	2.3	1.0	2.3
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5	3.0	5.5	3.0	5.5
Lead/Lag						Lead	Lag	Lead	Lag
Lead-Lag Optimize?						Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	None	C-Max
Act Effct Green (s)	16.6	16.6	16.6	16.6	16.6	102.7	93.4	101.8	91.1
Actuated g/C Ratio	0.13	0.13	0.13	0.13	0.13	0.79	0.72	0.78	0.70
v/c Ratio	0.60	0.32	0.15	0.17	0.29	0.27	0.53	0.26	0.40
Control Delay	67.4	31.8	50.2	50.0	13.0	2.7	5.6	6.0	8.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	67.4	31.8	50.2	50.0	13.0	2.7	5.6	6.0	8.8
LOS	E	C	D	D	B	A	A	A	A
Approach Delay		52.0		30.2			5.4		8.7
Approach LOS		D		C			A		A

Intersection Summary

Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 40 (31%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 85
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.60
 Intersection Signal Delay: 10.3
 Intersection Capacity Utilization 65.3%
 Analysis Period (min) 15

Intersection LOS: B
 ICU Level of Service C

Splits and Phases: 2: Regional Rd 25 & Whitlock Ave



Queues
2: Regional Rd 25 & Whitlock Ave

2032 Future Background PM
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Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	105	80	25	40	75	90	1660	60	1200
v/c Ratio	0.60	0.32	0.15	0.17	0.29	0.27	0.53	0.26	0.40
Control Delay	67.4	31.8	50.2	50.0	13.0	2.7	5.6	6.0	8.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	67.4	31.8	50.2	50.0	13.0	2.7	5.6	6.0	8.8
Queue Length 50th (m)	27.2	10.6	6.1	9.8	0.0	1.6	46.0	2.6	48.8
Queue Length 95th (m)	45.1	25.0	14.4	20.3	14.0	4.5	63.6	6.9	72.0
Internal Link Dist (m)		62.9		68.1			696.9		481.0
Turn Bay Length (m)	35.0		65.0		65.0	100.0		100.0	
Base Capacity (vph)	341	452	333	475	441	339	3111	229	2989
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	0.31	0.18	0.08	0.08	0.17	0.27	0.53	0.26	0.40
Intersection Summary									

HCM Signalized Intersection Capacity Analysis
2: Regional Rd 25 & Whitlock Ave

2032 Future Background PM
07-17-2023



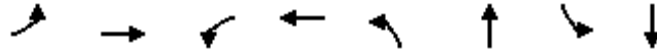
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗	↗	↖	↑↑↑		↖	↑↑↑	
Traffic Volume (vph)	105	40	40	25	40	75	90	1620	40	60	1065	135
Future Volume (vph)	105	40	40	25	40	75	90	1620	40	60	1065	135
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5		5.5	5.5	5.5	3.0	5.5		3.0	5.5	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	*0.80		1.00	*0.80	
Frbp, ped/bikes	1.00	0.99		1.00	1.00	0.98	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	0.99	1.00		0.99	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.93		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)	1776	1699		1795	1900	1539	1787	4329		1770	4256	
Flt Permitted	0.73	1.00		0.70	1.00	1.00	0.16	1.00		0.09	1.00	
Satd. Flow (perm)	1367	1699		1332	1900	1539	310	4329		164	4256	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	105	40	40	25	40	75	90	1620	40	60	1065	135
RTOR Reduction (vph)	0	32	0	0	0	65	0	1	0	0	7	0
Lane Group Flow (vph)	105	48	0	25	40	10	90	1659	0	60	1193	0
Confl. Peds. (#/hr)	5		5	5		5			5	5		
Heavy Vehicles (%)	1%	5%	0%	0%	0%	3%	1%	5%	0%	2%	6%	0%
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	15.6	15.6		15.6	15.6	15.6	99.0	91.6		95.8	90.0	
Effective Green, g (s)	16.6	16.6		16.6	16.6	16.6	101.0	92.6		97.8	91.0	
Actuated g/C Ratio	0.13	0.13		0.13	0.13	0.13	0.78	0.71		0.75	0.70	
Clearance Time (s)	6.5	6.5		6.5	6.5	6.5	4.0	6.5		4.0	6.5	
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)	174	216		170	242	196	336	3083		207	2979	
v/s Ratio Prot		0.03			0.02		c0.02	c0.38		c0.02	0.28	
v/s Ratio Perm	c0.08			0.02		0.01	0.19			0.20		
v/c Ratio	0.60	0.22		0.15	0.17	0.05	0.27	0.54		0.29	0.40	
Uniform Delay, d1	53.6	50.9		50.4	50.5	49.8	4.0	8.7		5.6	8.1	
Progression Factor	1.00	1.00		1.00	1.00	1.00	0.33	0.53		1.00	1.00	
Incremental Delay, d2	5.8	0.5		0.4	0.3	0.1	0.4	0.6		0.8	0.4	
Delay (s)	59.4	51.4		50.8	50.9	49.9	1.7	5.2		6.4	8.5	
Level of Service	E	D		D	D	D	A	A		A	A	
Approach Delay (s)		55.9			50.3			5.0			8.4	
Approach LOS		E			D			A			A	

Intersection Summary

HCM 2000 Control Delay	11.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	65.3%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Timings
5: Regional Rd 25 & Etheridge Ave/Collector Road



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↶	↷	↶	↷	↶	↑↑↑	↶	↑↑↑
Traffic Volume (vph)	75	0	40	0	60	1635	55	960
Future Volume (vph)	75	0	40	0	60	1635	55	960
Turn Type	pm+pt	NA	Perm	NA	pm+pt	NA	pm+pt	NA
Protected Phases	7	4		8	5	2	1	6
Permitted Phases	4		8		2		6	
Detector Phase	7	4	8	8	5	2	1	6
Switch Phase								
Minimum Initial (s)	7.0	10.0	10.0	10.0	7.0	20.0	7.0	20.0
Minimum Split (s)	11.0	36.2	36.2	36.2	11.0	38.4	11.0	38.4
Total Split (s)	12.0	49.0	37.0	37.0	11.0	70.0	11.0	70.0
Total Split (%)	9.2%	37.7%	28.5%	28.5%	8.5%	53.8%	8.5%	53.8%
Yellow Time (s)	3.0	3.3	3.3	3.3	3.0	4.2	3.0	4.2
All-Red Time (s)	1.0	2.9	2.9	2.9	1.0	2.2	1.0	2.2
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	3.0	5.2	5.2	5.2	3.0	5.4	3.0	5.4
Lead/Lag	Lead		Lag	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	C-Max	None	C-Max
Act Effct Green (s)	22.5	21.3	11.7	11.7	101.2	93.3	101.5	93.5
Actuated g/C Ratio	0.17	0.16	0.09	0.09	0.78	0.72	0.78	0.72
v/c Ratio	0.33	0.06	0.31	0.13	0.16	0.54	0.25	0.35
Control Delay	48.2	0.3	62.0	0.8	3.0	6.4	10.9	3.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	48.2	0.3	62.0	0.8	3.0	6.4	10.9	3.7
LOS	D	A	E	A	A	A	B	A
Approach Delay		36.2		31.4		6.3		4.0
Approach LOS		D		C		A		A

Intersection Summary

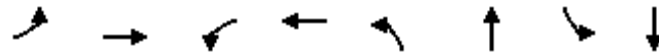
Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 103 (79%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 100
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.54
 Intersection Signal Delay: 7.1
 Intersection Capacity Utilization 61.9%
 Analysis Period (min) 15
 Intersection LOS: A
 ICU Level of Service B

Splits and Phases: 5: Regional Rd 25 & Etheridge Ave/Collector Road



Queues
5: Regional Rd 25 & Etheridge Ave/Collector Road

2032 Future Background PM
07-17-2023



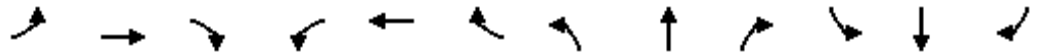
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	75	25	40	40	60	1700	55	1075
v/c Ratio	0.33	0.06	0.31	0.13	0.16	0.54	0.25	0.35
Control Delay	48.2	0.3	62.0	0.8	3.0	6.4	10.9	3.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	48.2	0.3	62.0	0.8	3.0	6.4	10.9	3.7
Queue Length 50th (m)	17.2	0.0	10.3	0.0	1.5	46.4	1.5	47.2
Queue Length 95th (m)	31.1	0.0	22.4	0.0	m3.0	64.7	7.1	7.5
Internal Link Dist (m)		53.9		63.5		292.1		696.9
Turn Bay Length (m)	40.0		40.0		70.0		70.0	
Base Capacity (vph)	229	665	344	531	382	3134	221	3113
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	0.33	0.04	0.12	0.08	0.16	0.54	0.25	0.35

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
5: Regional Rd 25 & Etheridge Ave/Collector Road

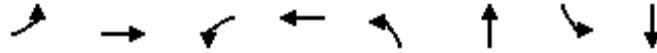
2032 Future Background PM
07-17-2023



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↑↑↑		↖	↑↑↑	
Traffic Volume (vph)	75	0	25	40	0	40	60	1635	65	55	960	115
Future Volume (vph)	75	0	25	40	0	40	60	1635	65	55	960	115
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	5.2		5.2	5.2		3.0	5.4		3.0	5.4	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	*0.80		1.00	*0.80	
Frt	1.00	0.85		1.00	0.85		1.00	0.99		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1752	1615		1805	1615		1805	4366		1805	4323	
Flt Permitted	0.56	1.00		0.74	1.00		0.20	1.00		0.08	1.00	
Satd. Flow (perm)	1030	1615		1408	1615		377	4366		148	4323	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	75	0	25	40	0	40	60	1635	65	55	960	115
RTOR Reduction (vph)	0	21	0	0	37	0	0	2	0	0	6	0
Lane Group Flow (vph)	75	4	0	40	3	0	60	1698	0	55	1069	0
Heavy Vehicles (%)	3%	0%	0%	0%	0%	0%	0%	4%	0%	0%	4%	2%
Turn Type	pm+pt	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	19.1	19.1		8.7	8.7		94.1	88.4		94.5	88.6	
Effective Green, g (s)	20.1	20.1		9.7	9.7		96.1	89.4		96.5	89.6	
Actuated g/C Ratio	0.15	0.15		0.07	0.07		0.74	0.69		0.74	0.69	
Clearance Time (s)	4.0	6.2		6.2	6.2		4.0	6.4		4.0	6.4	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	200	249		105	120		352	3002		197	2979	
v/s Ratio Prot	c0.02	0.00			0.00		0.01	c0.39		c0.01	0.25	
v/s Ratio Perm	c0.04			0.03			0.12			0.19		
v/c Ratio	0.38	0.02		0.38	0.02		0.17	0.57		0.28	0.36	
Uniform Delay, d1	48.6	46.6		57.3	55.8		4.8	10.4		6.9	8.3	
Progression Factor	1.00	1.00		1.00	1.00		0.59	0.52		1.96	0.37	
Incremental Delay, d2	1.2	0.0		2.3	0.1		0.1	0.5		0.7	0.3	
Delay (s)	49.8	46.6		59.6	55.8		3.0	5.9		14.2	3.4	
Level of Service	D	D		E	E		A	A		B	A	
Approach Delay (s)		49.0			57.7			5.8			3.9	
Approach LOS		D			E			A			A	

Intersection Summary		
HCM 2000 Control Delay	7.9	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	0.53	A
Actuated Cycle Length (s)	130.0	Sum of lost time (s)
Intersection Capacity Utilization	61.9%	16.6
Analysis Period (min)	15	ICU Level of Service
c Critical Lane Group		B

Timings
7: Regional Rd 25 & Britannia Rd

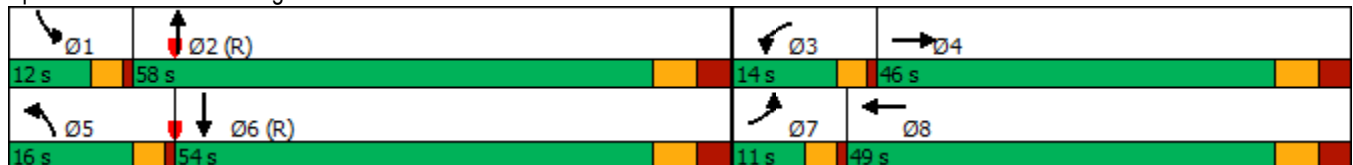


Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↖↖	↕↕↗	↖↖	↕↕↗	↖↖	↕↕↗	↖↖	↕↕↗
Traffic Volume (vph)	40	320	300	500	240	1410	120	855
Future Volume (vph)	40	320	300	500	240	1410	120	855
Turn Type	Prot	NA	Prot	NA	Prot	NA	Prot	NA
Protected Phases	7	4	3	8	5	2	1	6
Permitted Phases								
Detector Phase	7	4	3	8	5	2	1	6
Switch Phase								
Minimum Initial (s)	7.0	10.0	7.0	10.0	7.0	20.0	7.0	20.0
Minimum Split (s)	11.0	45.5	11.0	45.5	11.0	49.7	11.0	49.7
Total Split (s)	11.0	46.0	14.0	49.0	16.0	58.0	12.0	54.0
Total Split (%)	8.5%	35.4%	10.8%	37.7%	12.3%	44.6%	9.2%	41.5%
Yellow Time (s)	3.0	4.2	3.0	4.2	3.0	4.2	3.0	4.2
All-Red Time (s)	1.0	3.3	1.0	3.3	1.0	3.5	1.0	3.5
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	3.0	6.5	3.0	6.5	3.0	6.7	3.0	6.7
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	C-Max	None	C-Max
Act Effct Green (s)	8.0	24.5	11.0	29.7	15.1	64.5	10.8	60.2
Actuated g/C Ratio	0.06	0.19	0.08	0.23	0.12	0.50	0.08	0.46
v/c Ratio	0.20	0.42	0.98	0.76	0.59	0.86	0.42	0.45
Control Delay	60.5	45.0	123.2	39.0	60.3	34.4	74.1	17.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	60.5	45.0	123.2	39.0	60.3	34.4	74.1	17.4
LOS	E	D	F	D	E	C	E	B
Approach Delay		46.6		61.8		37.3		24.1
Approach LOS		D		E		D		C

Intersection Summary

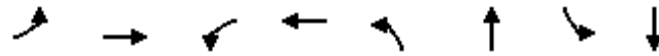
Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 104 (80%), Referenced to phase 2:NBT and 6:SBT, Start of Green
 Natural Cycle: 130
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.98
 Intersection Signal Delay: 41.0
 Intersection LOS: D
 Intersection Capacity Utilization 83.2%
 ICU Level of Service E
 Analysis Period (min) 15

Splits and Phases: 7: Regional Rd 25 & Britannia Rd



Queues
7: Regional Rd 25 & Britannia Rd

2032 Future Background PM
07-17-2023



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	40	360	300	810	240	1860	120	905
v/c Ratio	0.20	0.42	0.98	0.76	0.59	0.86	0.42	0.45
Control Delay	60.5	45.0	123.2	39.0	60.3	34.4	74.1	17.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	60.5	45.0	123.2	39.0	60.3	34.4	74.1	17.4
Queue Length 50th (m)	5.3	34.1	44.6	45.5	32.1	178.4	17.1	35.1
Queue Length 95th (m)	11.7	43.2	#74.9	48.5	44.8	#254.5	28.5	40.8
Internal Link Dist (m)		377.9		190.1		165.3		292.1
Turn Bay Length (m)	60.0		120.0		90.0		90.0	
Base Capacity (vph)	203	1371	305	1478	416	2153	293	2020
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.20	0.26	0.98	0.55	0.58	0.86	0.41	0.45

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
7: Regional Rd 25 & Britannia Rd

2032 Future Background PM
07-17-2023



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	↔↔	↕↕↔		↔↔	↕↕↔		↔↔	↕↕↔		↔↔	↕↕↔		
Traffic Volume (vph)	40	320	40	300	500	310	240	1410	450	120	855	50	
Future Volume (vph)	40	320	40	300	500	310	240	1410	450	120	855	50	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	3.0	6.5		3.0	6.5		3.0	6.7		3.0	6.7		
Lane Util. Factor	0.97	*0.80		0.97	*0.80		0.97	*0.80		0.97	*0.80		
Frt	1.00	0.98		1.00	0.94		1.00	0.96		1.00	0.99		
Flt Protected	0.95	1.00		1.00	1.00		0.95	1.00		0.95	1.00		
Satd. Flow (prot)	3303	4484		3614	4256		3502	4277		3467	4358		
Flt Permitted	0.95	1.00		1.00	1.00		0.95	1.00		0.95	1.00		
Satd. Flow (perm)	3303	4484		3614	4256		3502	4277		3467	4358		
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Adj. Flow (vph)	40	320	40	300	500	310	240	1410	450	120	855	50	
RTOR Reduction (vph)	0	11	0	0	99	0	0	32	0	0	4	0	
Lane Group Flow (vph)	40	349	0	300	711	0	240	1828	0	120	901	0	
Heavy Vehicles (%)	6%	0%	0%	2%	1%	1%	0%	3%	2%	1%	4%	0%	
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA		
Protected Phases	7	4		3	8		5	2		1	6		
Permitted Phases													
Actuated Green, G (s)	5.6	24.3		10.0	28.7		14.1	62.7		9.8	58.4		
Effective Green, g (s)	6.6	25.3		11.0	29.7		15.1	63.7		10.8	59.4		
Actuated g/C Ratio	0.05	0.19		0.08	0.23		0.12	0.49		0.08	0.46		
Clearance Time (s)	4.0	7.5		4.0	7.5		4.0	7.7		4.0	7.7		
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0		
Lane Grp Cap (vph)	167	872		305	972		406	2095		288	1991		
v/s Ratio Prot	0.01	0.08		c0.08	c0.17		c0.07	c0.43		0.03	0.21		
v/s Ratio Perm													
v/c Ratio	0.24	0.40		0.98	0.73		0.59	0.87		0.42	0.45		
Uniform Delay, d1	59.3	45.7		59.4	46.5		54.5	29.5		56.6	24.2		
Progression Factor	1.00	1.00		1.33	0.88		1.00	1.00		1.24	0.67		
Incremental Delay, d2	0.7	0.3		45.9	2.8		2.3	5.4		0.9	0.7		
Delay (s)	60.0	46.0		124.8	43.7		56.8	34.9		71.3	16.8		
Level of Service	E	D		F	D		E	C		E	B		
Approach Delay (s)		47.4			65.6			37.4			23.2		
Approach LOS		D			E			D			C		
Intersection Summary													
HCM 2000 Control Delay			41.9									HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio			0.85										
Actuated Cycle Length (s)			130.0									Sum of lost time (s)	19.2
Intersection Capacity Utilization			83.2%									ICU Level of Service	E
Analysis Period (min)			15										
c Critical Lane Group													

Timings
10: Britannia Rd & Farmstead Dr

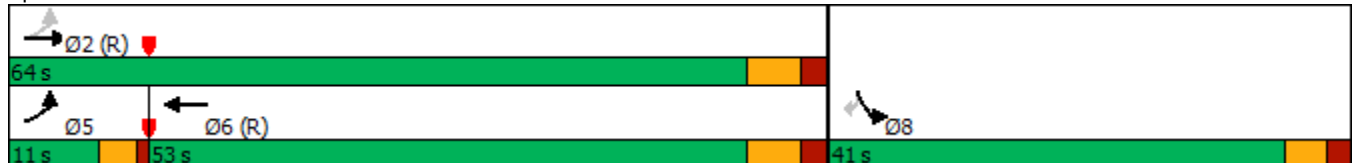


Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Configurations	↖	↑↑↑	↑↑↑↔	↖	↗
Traffic Volume (vph)	15	345	710	55	15
Future Volume (vph)	15	345	710	55	15
Turn Type	pm+pt	NA	NA	Prot	Perm
Protected Phases	5	2	6	8	
Permitted Phases	2				8
Detector Phase	5	2	6	8	8
Switch Phase					
Minimum Initial (s)	7.0	20.0	20.0	10.0	10.0
Minimum Split (s)	11.0	29.4	29.4	15.3	15.3
Total Split (s)	11.0	64.0	53.0	41.0	41.0
Total Split (%)	10.5%	61.0%	50.5%	39.0%	39.0%
Yellow Time (s)	3.0	4.2	4.2	3.3	3.3
All-Red Time (s)	1.0	2.2	2.2	2.0	2.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	3.0	5.4	5.4	4.3	4.3
Lead/Lag	Lead		Lag		
Lead-Lag Optimize?	Yes		Yes		
Recall Mode	None	C-Max	C-Max	None	None
Act Effct Green (s)	89.3	88.0	83.6	11.4	11.4
Actuated g/C Ratio	0.85	0.84	0.80	0.11	0.11
v/c Ratio	0.03	0.09	0.22	0.29	0.08
Control Delay	1.9	2.1	4.1	47.2	19.9
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	1.9	2.1	4.1	47.2	19.9
LOS	A	A	A	D	B
Approach Delay		2.1	4.1	41.4	
Approach LOS		A	A	D	

Intersection Summary

Cycle Length: 105
 Actuated Cycle Length: 105
 Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.29
 Intersection Signal Delay: 5.6
 Intersection LOS: A
 Intersection Capacity Utilization 33.1%
 ICU Level of Service A
 Analysis Period (min) 15

Splits and Phases: 10: Britannia Rd & Farmstead Dr



Queues
10: Britannia Rd & Farmstead Dr



Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	15	345	790	55	15
v/c Ratio	0.03	0.09	0.22	0.29	0.08
Control Delay	1.9	2.1	4.1	47.2	19.9
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	1.9	2.1	4.1	47.2	19.9
Queue Length 50th (m)	0.4	5.0	12.7	11.1	0.0
Queue Length 95th (m)	1.6	8.2	30.5	23.1	6.3
Internal Link Dist (m)		101.0	377.9	199.3	
Turn Bay Length (m)	20.0				
Base Capacity (vph)	567	3822	3549	606	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	0.03	0.09	0.22	0.09	0.03
Intersection Summary					

HCM Signalized Intersection Capacity Analysis
 10: Britannia Rd & Farmstead Dr

2032 Future Background PM
 07-17-2023



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↵	↑↑↑	↑↑↑		↵	↵
Traffic Volume (vph)	15	345	710	80	55	15
Future Volume (vph)	15	345	710	80	55	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	5.4	5.4		4.3	4.3
Lane Util. Factor	1.00	*0.80	*0.80		1.00	1.00
Frt	1.00	1.00	0.98		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1805	4560	4451		1736	1615
Flt Permitted	0.29	1.00	1.00		0.95	1.00
Satd. Flow (perm)	555	4560	4451		1736	1615
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	15	345	710	80	55	15
RTOR Reduction (vph)	0	0	5	0	0	14
Lane Group Flow (vph)	15	345	785	0	55	1
Heavy Vehicles (%)	0%	0%	1%	0%	4%	0%
Turn Type	pm+pt	NA	NA		Prot	Perm
Protected Phases	5	2	6		8	
Permitted Phases	2					8
Actuated Green, G (s)	84.9	84.9	78.1		8.4	8.4
Effective Green, g (s)	85.9	85.9	79.1		9.4	9.4
Actuated g/C Ratio	0.82	0.82	0.75		0.09	0.09
Clearance Time (s)	4.0	6.4	6.4		5.3	5.3
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	499	3730	3353		155	144
v/s Ratio Prot	0.00	c0.08	c0.18		c0.03	
v/s Ratio Perm	0.02					0.00
v/c Ratio	0.03	0.09	0.23		0.35	0.01
Uniform Delay, d1	1.8	1.9	3.9		44.9	43.6
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.0	0.0	0.2		1.4	0.0
Delay (s)	1.8	1.9	4.0		46.3	43.6
Level of Service	A	A	A		D	D
Approach Delay (s)		1.9	4.0		45.8	
Approach LOS		A	A		D	

Intersection Summary			
HCM 2000 Control Delay	5.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.24		
Actuated Cycle Length (s)	105.0	Sum of lost time (s)	12.7
Intersection Capacity Utilization	33.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Timings
11: Britannia Rd & Rose Way



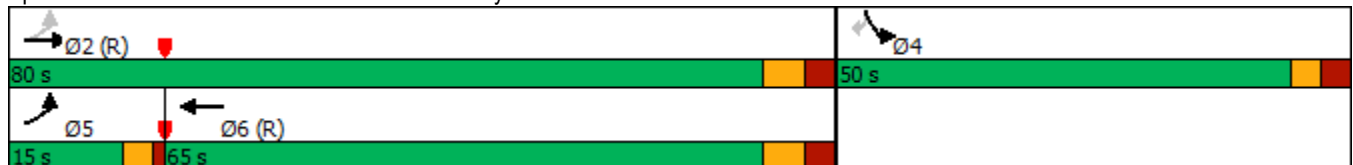
Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Configurations	↖	↑↑↑	↑↑↑	↖	↗
Traffic Volume (vph)	80	810	1060	30	50
Future Volume (vph)	80	810	1060	30	50
Turn Type	pm+pt	NA	NA	Prot	Perm
Protected Phases	5	2	6	4	
Permitted Phases	2				4
Detector Phase	5	2	6	4	4
Switch Phase					
Minimum Initial (s)	7.0	20.0	20.0	10.0	10.0
Minimum Split (s)	11.0	29.0	29.0	43.0	43.0
Total Split (s)	15.0	80.0	65.0	50.0	50.0
Total Split (%)	11.5%	61.5%	50.0%	38.5%	38.5%
Yellow Time (s)	3.0	4.0	4.0	3.0	3.0
All-Red Time (s)	1.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	3.0	6.0	6.0	5.0	5.0
Lead/Lag	Lead		Lag		
Lead-Lag Optimize?	Yes		Yes		
Recall Mode	None	C-Max	C-Max	None	None
Act Effct Green (s)	114.2	112.4	103.5	11.0	11.0
Actuated g/C Ratio	0.88	0.86	0.80	0.08	0.08
v/c Ratio	0.20	0.21	0.31	0.20	0.27
Control Delay	2.8	2.5	5.0	58.7	18.8
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	2.8	2.5	5.0	58.7	18.8
LOS	A	A	A	E	B
Approach Delay		2.5	5.0	33.8	
Approach LOS		A	A	C	

Intersection Summary

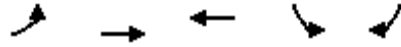
Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 65 (50%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
 Natural Cycle: 85
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.31
 Intersection Signal Delay: 5.0
 Intersection Capacity Utilization 48.5%
 Analysis Period (min) 15

Intersection LOS: A
 ICU Level of Service A

Splits and Phases: 11: Britannia Rd & Rose Way



Queues
11: Britannia Rd & Rose Way



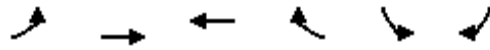
Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	80	810	1120	30	50
v/c Ratio	0.20	0.21	0.31	0.20	0.27
Control Delay	2.8	2.5	5.0	58.7	18.8
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	2.8	2.5	5.0	58.7	18.8
Queue Length 50th (m)	2.9	17.8	36.9	7.7	0.0
Queue Length 95th (m)	m4.5	m22.8	44.3	18.0	13.0
Internal Link Dist (m)		190.1	148.0	92.6	
Turn Bay Length (m)	50.0			50.0	
Base Capacity (vph)	452	3941	3604	624	591
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	0.18	0.21	0.31	0.05	0.08

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
 11: Britannia Rd & Rose Way

2032 Future Background PM
 07-17-2023

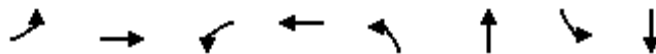


Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↖	↑↑↑	↑↑↑		↘	↘
Traffic Volume (vph)	80	810	1060	60	30	50
Future Volume (vph)	80	810	1060	60	30	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0	6.0		5.0	5.0
Lane Util. Factor	1.00	*0.80	*0.80		1.00	1.00
Frt	1.00	1.00	0.99		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1805	4560	4523		1805	1615
Flt Permitted	0.19	1.00	1.00		0.95	1.00
Satd. Flow (perm)	363	4560	4523		1805	1615
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	80	810	1060	60	30	50
RTOR Reduction (vph)	0	0	2	0	0	47
Lane Group Flow (vph)	80	810	1118	0	30	3
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Turn Type	pm+pt	NA	NA		Prot	Perm
Protected Phases	5	2	6		4	
Permitted Phases	2					4
Actuated Green, G (s)	109.0	109.0	99.4		8.0	8.0
Effective Green, g (s)	110.0	110.0	100.4		9.0	9.0
Actuated g/C Ratio	0.85	0.85	0.77		0.07	0.07
Clearance Time (s)	4.0	7.0	7.0		6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	380	3858	3493		124	111
v/s Ratio Prot	0.01	c0.18	c0.25		c0.02	
v/s Ratio Perm	0.17					0.00
v/c Ratio	0.21	0.21	0.32		0.24	0.03
Uniform Delay, d1	1.9	1.9	4.5		57.3	56.4
Progression Factor	1.36	1.22	1.00		1.00	1.00
Incremental Delay, d2	0.2	0.1	0.2		1.0	0.1
Delay (s)	2.8	2.4	4.7		58.3	56.5
Level of Service	A	A	A		E	E
Approach Delay (s)		2.4	4.7		57.2	
Approach LOS		A	A		E	

Intersection Summary			
HCM 2000 Control Delay	5.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.31		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	48.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Timings
1: Regional Rd 25 & Louis St Laurent Ave

2037 Future Background AM
07-17-2023

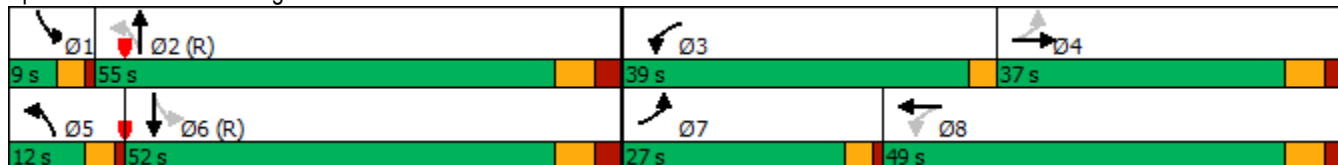


Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↙	↕↗	↙	↕↗	↙	↕↗↕	↙	↕↗↕
Traffic Volume (vph)	270	535	485	560	105	1100	65	1215
Future Volume (vph)	270	535	485	560	105	1100	65	1215
Turn Type	pm+pt	NA	pm+pt	NA	pm+pt	NA	pm+pt	NA
Protected Phases	7	4	3	8	5	2	1	6
Permitted Phases	4		8		2		6	
Detector Phase	7	4	3	8	5	2	1	6
Switch Phase								
Minimum Initial (s)	5.0	10.0	10.0	10.0	5.0	20.0	5.0	20.0
Minimum Split (s)	9.0	30.0	14.0	30.0	9.0	32.2	9.0	32.2
Total Split (s)	27.0	37.0	39.0	49.0	12.0	55.0	9.0	52.0
Total Split (%)	19.3%	26.4%	27.9%	35.0%	8.6%	39.3%	6.4%	37.1%
Yellow Time (s)	3.0	4.0	3.0	4.0	3.0	4.2	3.0	4.2
All-Red Time (s)	1.0	3.0	0.0	3.0	1.0	3.0	1.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	3.0	6.0	2.0	6.0	3.0	6.2	3.0	6.2
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	C-Max	None	C-Max
Act Effct Green (s)	52.9	31.2	72.1	46.3	62.9	52.5	57.3	47.8
Actuated g/C Ratio	0.38	0.22	0.52	0.33	0.45	0.38	0.41	0.34
v/c Ratio	0.65	0.92	0.93	0.57	0.65	0.89	0.50	0.90
Control Delay	29.6	69.1	63.1	40.4	44.1	48.5	36.3	53.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.6	69.1	63.1	40.4	44.1	48.5	36.3	53.7
LOS	C	E	E	D	D	D	D	D
Approach Delay		58.4		50.1		48.2		52.9
Approach LOS		E		D		D		D

Intersection Summary

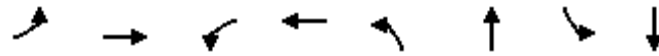
Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 100
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.93
 Intersection Signal Delay: 51.9
 Intersection LOS: D
 Intersection Capacity Utilization 96.8%
 ICU Level of Service F
 Analysis Period (min) 15

Splits and Phases: 1: Regional Rd 25 & Louis St Laurent Ave



Queues
1: Regional Rd 25 & Louis St Laurent Ave

2037 Future Background AM
07-17-2023





























Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	270	725	485	655	105	1405	65	1310
v/c Ratio	0.65	0.92	0.93	0.57	0.65	0.89	0.50	0.90
Control Delay	29.6	69.1	63.1	40.4	44.1	48.5	36.3	53.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.6	69.1	63.1	40.4	44.1	48.5	36.3	53.7
Queue Length 50th (m)	43.2	105.5	116.5	79.1	18.2	162.0	11.0	154.0
Queue Length 95th (m)	62.6	#144.0	#179.3	105.6	#38.0	#200.1	20.8	#190.1
Internal Link Dist (m)		126.1		117.1		481.0		113.5
Turn Bay Length (m)	90.0		35.0		65.0		80.0	
Base Capacity (vph)	479	792	548	1142	164	1584	131	1450
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	0.56	0.92	0.89	0.57	0.64	0.89	0.50	0.90

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
1: Regional Rd 25 & Louis St Laurent Ave

2037 Future Background AM
07-17-2023

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 			  			  	
Traffic Volume (vph)	270	535	190	485	560	95	105	1100	305	65	1215	95
Future Volume (vph)	270	535	190	485	560	95	105	1100	305	65	1215	95
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0		2.0	6.0		3.0	6.2		3.0	6.2	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	*0.80		1.00	*0.80	
Frbp, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.96		1.00	0.98		1.00	0.97		1.00	0.99	
Flt Protected	0.95	1.00		1.00	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1767	3409		1863	3427		1703	4157		1719	4230	
Flt Permitted	0.39	1.00		0.12	1.00		0.08	1.00		0.08	1.00	
Satd. Flow (perm)	723	3409		224	3427		141	4157		151	4230	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	270	535	190	485	560	95	105	1100	305	65	1215	95
RTOR Reduction (vph)	0	26	0	0	9	0	0	27	0	0	5	0
Lane Group Flow (vph)	270	699	0	485	646	0	105	1378	0	65	1305	0
Confl. Peds. (#/hr)	5					5						
Heavy Vehicles (%)	2%	2%	1%	2%	2%	7%	6%	7%	3%	5%	7%	2%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	48.0	30.2		67.1	45.3		58.6	50.7		50.8	46.8	
Effective Green, g (s)	50.0	31.2		68.1	46.3		59.7	51.7		52.8	47.8	
Actuated g/C Ratio	0.36	0.22		0.49	0.33		0.43	0.37		0.38	0.34	
Clearance Time (s)	4.0	7.0		3.0	7.0		4.0	7.2		4.0	7.2	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	398	759		517	1133		159	1535		112	1444	
v/s Ratio Prot	0.09	c0.21		c0.23	0.19		c0.04	c0.33		0.02	0.31	
v/s Ratio Perm	0.15			0.22			0.24			0.20		
v/c Ratio	0.68	0.92		0.94	0.57		0.66	0.90		0.58	0.90	
Uniform Delay, d1	34.2	53.2		41.2	38.6		30.7	41.7		32.6	43.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	4.6	16.5		24.8	0.7		9.8	8.7		7.4	9.6	
Delay (s)	38.7	69.7		66.0	39.3		40.5	50.3		40.0	53.5	
Level of Service	D	E		E	D		D	D		D	D	
Approach Delay (s)		61.3			50.7			49.6			52.8	
Approach LOS		E			D			D			D	
Intersection Summary												
HCM 2000 Control Delay			53.1			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.92									
Actuated Cycle Length (s)			140.0			Sum of lost time (s)			18.2			
Intersection Capacity Utilization			96.8%			ICU Level of Service				F		
Analysis Period (min)			15									

c Critical Lane Group

Timings
2: Regional Rd 25 & Whitlock Ave

2037 Future Background AM
07-17-2023



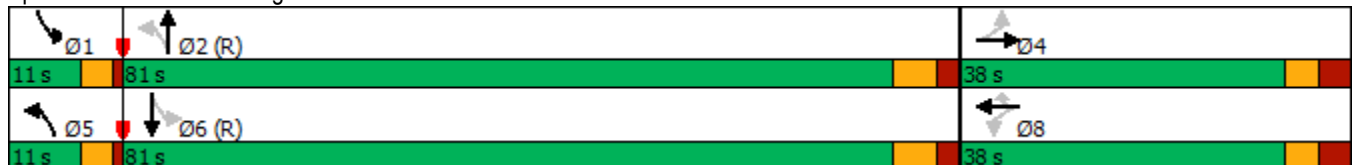
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations	↖	↗	↖	↗	↗	↖	↑↑↑	↖	↑↑↑
Traffic Volume (vph)	145	50	50	35	95	45	1295	50	2040
Future Volume (vph)	145	50	50	35	95	45	1295	50	2040
Turn Type	Perm	NA	Perm	NA	Perm	pm+pt	NA	pm+pt	NA
Protected Phases		4		8		5	2	1	6
Permitted Phases	4		8		8	2		6	
Detector Phase	4	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	20.0	7.0	20.0
Minimum Split (s)	37.5	37.5	37.5	37.5	37.5	11.0	35.5	11.0	35.5
Total Split (s)	38.0	38.0	38.0	38.0	38.0	11.0	81.0	11.0	81.0
Total Split (%)	29.2%	29.2%	29.2%	29.2%	29.2%	8.5%	62.3%	8.5%	62.3%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.0	4.2	3.0	4.2
All-Red Time (s)	3.2	3.2	3.2	3.2	3.2	1.0	2.3	1.0	2.3
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5	3.0	5.5	3.0	5.5
Lead/Lag						Lead	Lag	Lead	Lag
Lead-Lag Optimize?						Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	None	C-Max
Act Effct Green (s)	20.4	20.4	20.4	20.4	20.4	98.7	89.7	98.7	89.6
Actuated g/C Ratio	0.16	0.16	0.16	0.16	0.16	0.76	0.69	0.76	0.69
v/c Ratio	0.69	0.49	0.33	0.13	0.31	0.28	0.44	0.17	0.72
Control Delay	68.1	30.2	52.5	45.3	10.9	25.0	6.2	5.5	15.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	68.1	30.2	52.5	45.3	10.9	25.0	6.2	5.5	15.8
LOS	E	C	D	D	B	C	A	A	B
Approach Delay		49.2		29.2			6.8		15.6
Approach LOS		D		C			A		B

Intersection Summary

Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 64 (49%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 105
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.72
 Intersection Signal Delay: 15.7
 Intersection Capacity Utilization 75.2%
 Analysis Period (min) 15

Intersection LOS: B
 ICU Level of Service D

Splits and Phases: 2: Regional Rd 25 & Whitlock Ave



Queues
2: Regional Rd 25 & Whitlock Ave

2037 Future Background AM
07-17-2023



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	145	145	50	35	95	45	1305	50	2140
v/c Ratio	0.69	0.49	0.33	0.13	0.31	0.28	0.44	0.17	0.72
Control Delay	68.1	30.2	52.5	45.3	10.9	25.0	6.2	5.5	15.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	68.1	30.2	52.5	45.3	10.9	25.0	6.2	5.5	15.8
Queue Length 50th (m)	37.5	18.2	12.1	8.2	0.0	3.0	18.2	2.6	142.8
Queue Length 95th (m)	57.3	37.4	23.8	17.1	14.7	9.6	139.6	7.2	201.8
Internal Link Dist (m)		62.9		68.1			696.9		481.0
Turn Bay Length (m)	35.0		65.0		65.0	100.0		100.0	
Base Capacity (vph)	333	431	241	439	435	159	2960	300	2973
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	0.44	0.34	0.21	0.08	0.22	0.28	0.44	0.17	0.72

Intersection Summary

HCM Signalized Intersection Capacity Analysis
2: Regional Rd 25 & Whitlock Ave

2037 Future Background AM
07-17-2023



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗	↗	↖	↑↑↑		↖	↑↑↑	
Traffic Volume (vph)	145	50	95	50	35	95	45	1295	10	50	2040	100
Future Volume (vph)	145	50	95	50	35	95	45	1295	10	50	2040	100
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5		5.5	5.5	5.5	3.0	5.5		3.0	5.5	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	*0.80		1.00	*0.80	
Frbp, ped/bikes	1.00	0.99		1.00	1.00	0.98	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	0.99	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.90		1.00	1.00	0.85	1.00	1.00		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1725	1516		1727	1759	1455	1671	4291		1805	4309	
Flt Permitted	0.73	1.00		0.53	1.00	1.00	0.04	1.00		0.14	1.00	
Satd. Flow (perm)	1333	1516		965	1759	1455	79	4291		270	4309	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	145	50	95	50	35	95	45	1295	10	50	2040	100
RTOR Reduction (vph)	0	59	0	0	0	80	0	0	0	0	3	0
Lane Group Flow (vph)	145	86	0	50	35	15	45	1305	0	50	2137	0
Confl. Peds. (#/hr)	5		5	5		5						
Heavy Vehicles (%)	4%	32%	1%	4%	8%	9%	8%	6%	25%	0%	5%	7%
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	19.4	19.4		19.4	19.4	19.4	93.6	87.9		93.6	87.9	
Effective Green, g (s)	20.4	20.4		20.4	20.4	20.4	95.6	88.9		95.6	88.9	
Actuated g/C Ratio	0.16	0.16		0.16	0.16	0.16	0.74	0.68		0.74	0.68	
Clearance Time (s)	6.5	6.5		6.5	6.5	6.5	4.0	6.5		4.0	6.5	
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)	209	237		151	276	228	140	2934		277	2946	
v/s Ratio Prot		0.06			0.02		c0.02	0.30		0.01	c0.50	
v/s Ratio Perm	c0.11			0.05		0.01	0.22			0.12		
v/c Ratio	0.69	0.36		0.33	0.13	0.07	0.32	0.44		0.18	0.73	
Uniform Delay, d1	51.8	49.0		48.7	47.1	46.7	11.8	9.3		5.4	12.9	
Progression Factor	1.00	1.00		1.00	1.00	1.00	2.63	0.56		1.00	1.00	
Incremental Delay, d2	9.6	0.9		1.3	0.2	0.1	1.3	0.5		0.3	1.6	
Delay (s)	61.4	49.9		50.0	47.3	46.8	32.3	5.7		5.7	14.5	
Level of Service	E	D		D	D	D	C	A		A	B	
Approach Delay (s)		55.7			47.8			6.6			14.3	
Approach LOS		E			D			A			B	

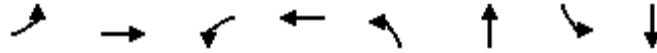
Intersection Summary

HCM 2000 Control Delay	16.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	75.2%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Timings
5: Regional Rd 25 & Etheridge Ave/Collector Road

2037 Future Background AM
07-17-2023

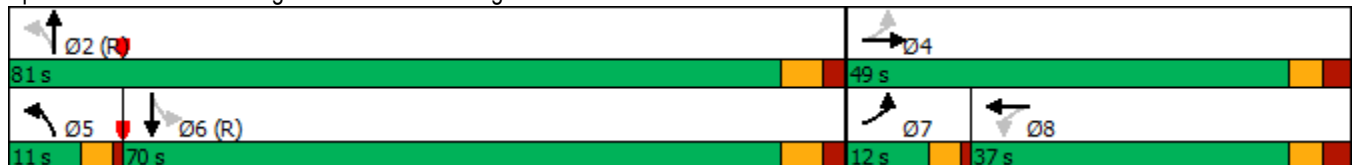


Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↖	↗	↖	↗	↖	↑↑↑	↖	↑↑↑
Traffic Volume (vph)	100	0	65	0	30	1195	30	2100
Future Volume (vph)	100	0	65	0	30	1195	30	2100
Turn Type	pm+pt	NA	Perm	NA	pm+pt	NA	Perm	NA
Protected Phases	7	4		8	5	2		6
Permitted Phases	4		8		2		6	
Detector Phase	7	4	8	8	5	2	6	6
Switch Phase								
Minimum Initial (s)	7.0	10.0	10.0	10.0	7.0	20.0	20.0	20.0
Minimum Split (s)	11.0	36.2	36.2	36.2	11.0	38.4	38.4	38.4
Total Split (s)	12.0	49.0	37.0	37.0	11.0	81.0	70.0	70.0
Total Split (%)	9.2%	37.7%	28.5%	28.5%	8.5%	62.3%	53.8%	53.8%
Yellow Time (s)	3.0	3.3	3.3	3.3	3.0	4.2	4.2	4.2
All-Red Time (s)	1.0	2.9	2.9	2.9	1.0	2.2	2.2	2.2
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	3.0	5.2	5.2	5.2	3.0	5.4	5.4	5.4
Lead/Lag	Lead		Lag	Lag	Lead		Lag	Lag
Lead-Lag Optimize?	Yes		Yes	Yes	Yes		Yes	Yes
Recall Mode	None	None	None	None	None	C-Max	C-Max	C-Max
Act Effct Green (s)	25.2	23.0	13.4	13.4	98.8	96.4	89.8	89.8
Actuated g/C Ratio	0.19	0.18	0.10	0.10	0.76	0.74	0.69	0.69
v/c Ratio	0.38	0.17	0.47	0.20	0.18	0.38	0.12	0.72
Control Delay	47.2	2.0	65.3	1.6	18.4	2.0	3.3	6.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	47.2	2.0	65.3	1.6	18.4	2.0	3.3	6.9
LOS	D	A	E	A	B	A	A	A
Approach Delay		29.4		36.1		2.4		6.8
Approach LOS		C		D		A		A

Intersection Summary

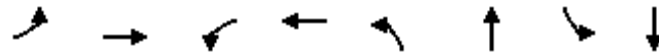
Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 120
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.72
 Intersection Signal Delay: 7.3
 Intersection LOS: A
 Intersection Capacity Utilization 62.8%
 ICU Level of Service B
 Analysis Period (min) 15

Splits and Phases: 5: Regional Rd 25 & Etheridge Ave/Collector Road



Queues
5: Regional Rd 25 & Etheridge Ave/Collector Road

2037 Future Background AM
07-17-2023



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	100	65	65	55	30	1215	30	2155
v/c Ratio	0.38	0.17	0.47	0.20	0.18	0.38	0.12	0.72
Control Delay	47.2	2.0	65.3	1.6	18.4	2.0	3.3	6.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	47.2	2.0	65.3	1.6	18.4	2.0	3.3	6.9
Queue Length 50th (m)	22.9	0.0	16.9	0.0	0.4	9.5	0.7	179.8
Queue Length 95th (m)	37.9	2.3	31.7	0.0	m1.5	13.7	m0.8	67.5
Internal Link Dist (m)		53.9		63.1		292.1		696.9
Turn Bay Length (m)	40.0		40.0		70.0		70.0	
Base Capacity (vph)	262	617	332	491	164	3187	241	2988
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	0.38	0.11	0.20	0.11	0.18	0.38	0.12	0.72

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
5: Regional Rd 25 & Etheridge Ave/Collector Road

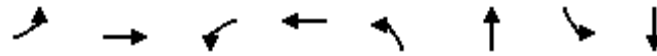
2037 Future Background AM
07-17-2023



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↑↑↑		↖	↑↑↑	
Traffic Volume (vph)	100	0	65	65	0	55	30	1195	20	30	2100	55
Future Volume (vph)	100	0	65	65	0	55	30	1195	20	30	2100	55
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	5.2		5.2	5.2		3.0	5.4		5.4	5.4	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	*0.80		1.00	*0.80	
Frt	1.00	0.85		1.00	0.85		1.00	1.00		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1787	1615		1805	1615		1752	4295		1805	4325	
Flt Permitted	0.57	1.00		0.71	1.00		0.04	1.00		0.18	1.00	
Satd. Flow (perm)	1074	1615		1358	1615		82	4295		349	4325	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	100	0	65	65	0	55	30	1195	20	30	2100	55
RTOR Reduction (vph)	0	53	0	0	50	0	0	1	0	0	1	0
Lane Group Flow (vph)	100	12	0	65	5	0	30	1214	0	30	2154	0
Heavy Vehicles (%)	1%	0%	0%	0%	0%	0%	3%	6%	0%	0%	5%	6%
Turn Type	pm+pt	NA		Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases	7	4			8		5	2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	23.2	23.2		10.4	10.4		94.2	94.2		86.0	86.0	
Effective Green, g (s)	24.2	24.2		11.4	11.4		95.2	95.2		87.0	87.0	
Actuated g/C Ratio	0.19	0.19		0.09	0.09		0.73	0.73		0.67	0.67	
Clearance Time (s)	4.0	6.2		6.2	6.2		4.0	6.4		6.4	6.4	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	253	300		119	141		126	3145		233	2894	
v/s Ratio Prot	c0.03	0.01			0.00		0.01	c0.28			c0.50	
v/s Ratio Perm	0.04			c0.05			0.16			0.09		
v/c Ratio	0.40	0.04		0.55	0.03		0.24	0.39		0.13	0.74	
Uniform Delay, d1	45.6	43.4		56.8	54.3		12.6	6.5		7.8	14.2	
Progression Factor	1.00	1.00		1.00	1.00		3.38	0.26		0.24	0.39	
Incremental Delay, d2	1.0	0.1		5.0	0.1		0.6	0.2		0.8	1.3	
Delay (s)	46.7	43.4		61.9	54.4		43.3	1.9		2.7	6.8	
Level of Service	D	D		E	D		D	A		A	A	
Approach Delay (s)		45.4			58.4			2.9			6.8	
Approach LOS		D			E			A			A	

Intersection Summary		
HCM 2000 Control Delay	8.9	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	0.68	A
Actuated Cycle Length (s)	130.0	Sum of lost time (s)
Intersection Capacity Utilization	62.8%	16.6
Analysis Period (min)	15	ICU Level of Service
c Critical Lane Group		B

Timings
7: Regional Rd 25 & Britannia Rd



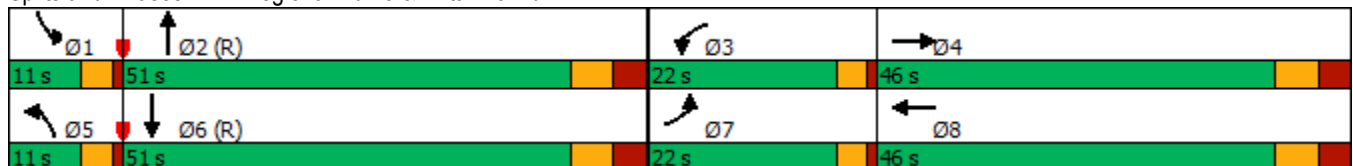
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↖↗	↕↔	↖↗	↕↔	↖↗	↕↔	↖↗	↕↔
Traffic Volume (vph)	65	455	465	380	50	1055	285	1930
Future Volume (vph)	65	455	465	380	50	1055	285	1930
Turn Type	Prot	NA	Prot	NA	Prot	NA	Prot	NA
Protected Phases	7	4	3	8	5	2	1	6
Permitted Phases								
Detector Phase	7	4	3	8	5	2	1	6
Switch Phase								
Minimum Initial (s)	7.0	10.0	7.0	10.0	7.0	20.0	7.0	20.0
Minimum Split (s)	11.0	45.5	11.0	45.5	11.0	49.7	11.0	49.7
Total Split (s)	22.0	46.0	22.0	46.0	11.0	51.0	11.0	51.0
Total Split (%)	16.9%	35.4%	16.9%	35.4%	8.5%	39.2%	8.5%	39.2%
Yellow Time (s)	3.0	4.2	3.0	4.2	3.0	4.2	3.0	4.2
All-Red Time (s)	1.0	3.3	1.0	3.3	1.0	3.5	1.0	3.5
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	3.0	6.5	3.0	6.5	3.0	6.7	3.0	6.7
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	C-Max	None	C-Max
Act Effct Green (s)	9.2	27.8	19.0	39.8	8.7	44.3	19.7	57.5
Actuated g/C Ratio	0.07	0.21	0.15	0.31	0.07	0.34	0.15	0.44
v/c Ratio	0.28	0.87dr	0.92	0.37	0.22	0.87	0.54	1.02
Control Delay	60.0	45.9	76.0	30.3	59.6	46.6	55.5	65.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	60.0	45.9	76.0	30.3	59.6	46.6	55.5	65.6
LOS	E	D	E	C	E	D	E	E
Approach Delay		47.0		52.2		47.1		64.3
Approach LOS		D		D		D		E

Intersection Summary

Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 104 (80%), Referenced to phase 2:NBT and 6:SBT, Start of Green
 Natural Cycle: 150
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.02
 Intersection Signal Delay: 55.2
 Intersection LOS: E
 Intersection Capacity Utilization 90.2%
 ICU Level of Service E
 Analysis Period (min) 15

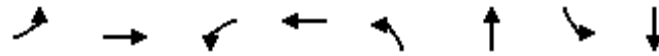
dr Defacto Right Lane. Recode with 1 though lane as a right lane.

Splits and Phases: 7: Regional Rd 25 & Britannia Rd



Queues
7: Regional Rd 25 & Britannia Rd

2037 Future Background AM
07-17-2023



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	65	770	465	505	50	1270	285	1945
v/c Ratio	0.28	0.87dr	0.92	0.37	0.22	0.87	0.54	1.02
Control Delay	60.0	45.9	76.0	30.3	59.6	46.6	55.5	65.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	60.0	45.9	76.0	30.3	59.6	46.6	55.5	65.6
Queue Length 50th (m)	8.7	70.3	64.6	41.1	6.7	130.5	42.3	~231.8
Queue Length 95th (m)	16.3	83.0	#97.4	54.8	13.4	154.0	#62.4	#300.9
Internal Link Dist (m)		377.9		182.4		165.3		292.1
Turn Bay Length (m)	60.0		120.0		90.0		90.0	
Base Capacity (vph)	482	1368	503	1400	225	1465	529	1916
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	0.56	0.92	0.36	0.22	0.87	0.54	1.02

Intersection Summary

~ 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.

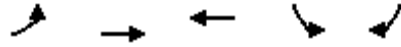
dr Defacto Right Lane. Recode with 1 though lane as a right lane.

HCM Signalized Intersection Capacity Analysis
7: Regional Rd 25 & Britannia Rd

2037 Future Background AM
07-17-2023

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 	  		 	  		 	  		 	  	
Traffic Volume (vph)	65	455	315	465	380	125	50	1055	215	285	1930	15
Future Volume (vph)	65	455	315	465	380	125	50	1055	215	285	1930	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.5		3.0	6.5		3.0	6.7		3.0	6.7	
Lane Util. Factor	0.97	*0.80		0.97	*0.80		0.97	*0.80		0.97	*0.80	
Frt	1.00	0.94		1.00	0.96		1.00	0.97		1.00	1.00	
Flt Protected	0.95	1.00		1.00	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	3303	4238		3445	4337		3367	4239		3502	4331	
Flt Permitted	0.95	1.00		1.00	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	3303	4238		3445	4337		3367	4239		3502	4331	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	65	455	315	465	380	125	50	1055	215	285	1930	15
RTOR Reduction (vph)	0	90	0	0	40	0	0	19	0	0	1	0
Lane Group Flow (vph)	65	680	0	465	465	0	50	1251	0	285	1944	0
Heavy Vehicles (%)	6%	1%	1%	7%	1%	2%	4%	5%	4%	0%	5%	27%
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	6.8	27.6		18.0	38.8		6.3	42.5		18.7	54.9	
Effective Green, g (s)	7.8	28.6		19.0	39.8		7.3	43.5		19.7	55.9	
Actuated g/C Ratio	0.06	0.22		0.15	0.31		0.06	0.33		0.15	0.43	
Clearance Time (s)	4.0	7.5		4.0	7.5		4.0	7.7		4.0	7.7	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	198	932		503	1327		189	1418		530	1862	
v/s Ratio Prot	0.02	c0.16		c0.13	0.11		0.01	0.30		c0.08	c0.45	
v/s Ratio Perm												
v/c Ratio	0.33	0.87dr		0.92	0.35		0.26	0.88		0.54	1.04	
Uniform Delay, d1	58.6	47.1		54.8	35.1		58.8	40.8		50.9	37.0	
Progression Factor	1.00	1.00		0.93	0.95		1.00	1.00		1.01	1.26	
Incremental Delay, d2	1.0	2.9		22.5	0.2		0.8	8.2		0.8	30.6	
Delay (s)	59.6	50.0		73.4	33.5		59.5	49.0		52.0	77.2	
Level of Service	E	D		E	C		E	D		D	E	
Approach Delay (s)		50.7			52.6			49.4			74.0	
Approach LOS		D			D			D			E	
Intersection Summary												
HCM 2000 Control Delay			60.4				HCM 2000 Level of Service				E	
HCM 2000 Volume to Capacity ratio			0.91									
Actuated Cycle Length (s)			130.0				Sum of lost time (s)			19.2		
Intersection Capacity Utilization			90.2%				ICU Level of Service			E		
Analysis Period (min)			15									
dr Defacto Right Lane. Recode with 1 though lane as a right lane.												
c Critical Lane Group												

Timings
10: Britannia Rd & Farmstead Dr

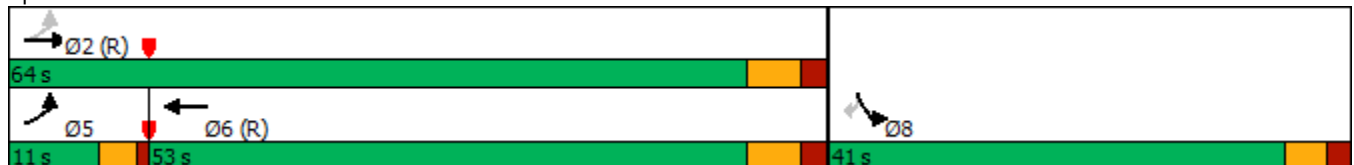


Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Configurations	↖	↑↑↑	↑↑↑	↖	↗
Traffic Volume (vph)	20	745	420	90	20
Future Volume (vph)	20	745	420	90	20
Turn Type	pm+pt	NA	NA	Prot	Perm
Protected Phases	5	2	6	8	
Permitted Phases	2				8
Detector Phase	5	2	6	8	8
Switch Phase					
Minimum Initial (s)	7.0	20.0	20.0	10.0	10.0
Minimum Split (s)	11.0	29.4	29.4	15.3	15.3
Total Split (s)	11.0	64.0	53.0	41.0	41.0
Total Split (%)	10.5%	61.0%	50.5%	39.0%	39.0%
Yellow Time (s)	3.0	4.2	4.2	3.3	3.3
All-Red Time (s)	1.0	2.2	2.2	2.0	2.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	3.0	5.4	5.4	4.3	4.3
Lead/Lag	Lead		Lag		
Lead-Lag Optimize?	Yes		Yes		
Recall Mode	None	C-Max	C-Max	None	None
Act Effct Green (s)	88.0	86.7	82.3	12.8	12.8
Actuated g/C Ratio	0.84	0.83	0.78	0.12	0.12
v/c Ratio	0.03	0.20	0.13	0.43	0.10
Control Delay	2.4	2.8	4.4	49.0	17.3
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	2.4	2.8	4.4	49.0	17.3
LOS	A	A	A	D	B
Approach Delay		2.8	4.4	43.2	
Approach LOS		A	A	D	

Intersection Summary

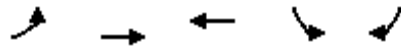
Cycle Length: 105
 Actuated Cycle Length: 105
 Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.43
 Intersection Signal Delay: 6.7
 Intersection LOS: A
 Intersection Capacity Utilization 33.1%
 ICU Level of Service A
 Analysis Period (min) 15

Splits and Phases: 10: Britannia Rd & Farmstead Dr



Queues
10: Britannia Rd & Farmstead Dr

2037 Future Background AM
07-17-2023



Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	20	745	445	90	20
v/c Ratio	0.03	0.20	0.13	0.43	0.10
Control Delay	2.4	2.8	4.4	49.0	17.3
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	2.4	2.8	4.4	49.0	17.3
Queue Length 50th (m)	0.6	12.9	7.0	18.4	0.0
Queue Length 95th (m)	2.3	21.1	19.0	33.1	7.0
Internal Link Dist (m)		101.0	377.9	199.3	
Turn Bay Length (m)	20.0				
Base Capacity (vph)	708	3653	3297	595	550
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	0.20	0.13	0.15	0.04
Intersection Summary					

HCM Signalized Intersection Capacity Analysis
 10: Britannia Rd & Farmstead Dr

2037 Future Background AM
 07-17-2023



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↵	↑↑↑	↑↑↑		↵	↵
Traffic Volume (vph)	20	745	420	25	90	20
Future Volume (vph)	20	745	420	25	90	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	5.4	5.4		4.3	4.3
Lane Util. Factor	1.00	*0.80	*0.80		1.00	1.00
Frt	1.00	1.00	0.99		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1656	4427	4204		1703	1538
Flt Permitted	0.44	1.00	1.00		0.95	1.00
Satd. Flow (perm)	765	4427	4204		1703	1538
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	20	745	420	25	90	20
RTOR Reduction (vph)	0	0	3	0	0	18
Lane Group Flow (vph)	20	745	442	0	90	2
Heavy Vehicles (%)	9%	3%	8%	0%	6%	5%
Turn Type	pm+pt	NA	NA		Prot	Perm
Protected Phases	5	2	6		8	
Permitted Phases	2					8
Actuated Green, G (s)	83.5	83.5	76.7		9.8	9.8
Effective Green, g (s)	84.5	84.5	77.7		10.8	10.8
Actuated g/C Ratio	0.80	0.80	0.74		0.10	0.10
Clearance Time (s)	4.0	6.4	6.4		5.3	5.3
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	647	3562	3110		175	158
v/s Ratio Prot	0.00	c0.17	0.11		c0.05	
v/s Ratio Perm	0.02					0.00
v/c Ratio	0.03	0.21	0.14		0.51	0.01
Uniform Delay, d1	2.1	2.4	4.0		44.6	42.3
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.0	0.1	0.1		2.5	0.0
Delay (s)	2.1	2.5	4.1		47.2	42.3
Level of Service	A	A	A		D	D
Approach Delay (s)		2.5	4.1		46.3	
Approach LOS		A	A		D	

Intersection Summary

HCM 2000 Control Delay	6.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.25		
Actuated Cycle Length (s)	105.0	Sum of lost time (s)	12.7
Intersection Capacity Utilization	33.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Timings
11: Britannia Rd & Rose Way

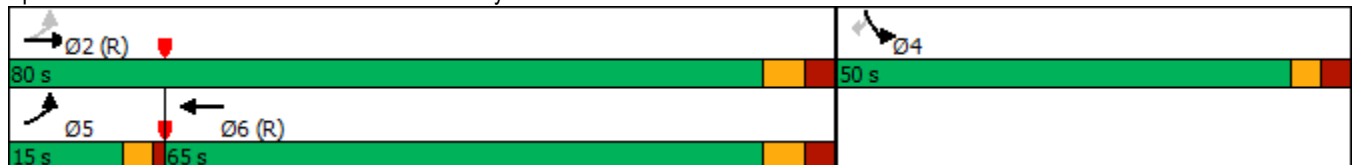


Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Configurations	↖	↑↑↑	↑↑↑	↖	↗
Traffic Volume (vph)	25	930	895	55	75
Future Volume (vph)	25	930	895	55	75
Turn Type	pm+pt	NA	NA	Prot	Perm
Protected Phases	5	2	6	4	
Permitted Phases	2				4
Detector Phase	5	2	6	4	4
Switch Phase					
Minimum Initial (s)	7.0	20.0	20.0	10.0	10.0
Minimum Split (s)	11.0	29.0	29.0	43.0	43.0
Total Split (s)	15.0	80.0	65.0	50.0	50.0
Total Split (%)	11.5%	61.5%	50.0%	38.5%	38.5%
Yellow Time (s)	3.0	4.0	4.0	3.0	3.0
All-Red Time (s)	1.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	3.0	6.0	6.0	5.0	5.0
Lead/Lag	Lead		Lag		
Lead-Lag Optimize?	Yes		Yes		
Recall Mode	None	C-Max	C-Max	None	None
Act Effct Green (s)	110.2	107.2	100.6	11.8	11.8
Actuated g/C Ratio	0.85	0.82	0.77	0.09	0.09
v/c Ratio	0.05	0.25	0.26	0.34	0.35
Control Delay	4.2	6.4	4.8	61.1	16.3
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	4.2	6.4	4.8	61.1	16.3
LOS	A	A	A	E	B
Approach Delay		6.3	4.8	35.2	
Approach LOS		A	A	D	

Intersection Summary

Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
 Natural Cycle: 85
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.35
 Intersection Signal Delay: 7.5
 Intersection LOS: A
 Intersection Capacity Utilization 38.3%
 ICU Level of Service A
 Analysis Period (min) 15

Splits and Phases: 11: Britannia Rd & Rose Way



Queues
11: Britannia Rd & Rose Way



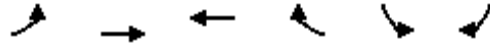
Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	25	930	905	55	75
v/c Ratio	0.05	0.25	0.26	0.34	0.35
Control Delay	4.2	6.4	4.8	61.1	16.3
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	4.2	6.4	4.8	61.1	16.3
Queue Length 50th (m)	2.0	45.7	28.1	14.3	0.0
Queue Length 95th (m)	m3.3	m53.8	37.7	27.8	15.3
Internal Link Dist (m)		182.4	155.7	76.0	
Turn Bay Length (m)	50.0			50.0	
Base Capacity (vph)	528	3761	3523	624	608
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.05	0.25	0.26	0.09	0.12

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
 11: Britannia Rd & Rose Way

2037 Future Background AM
 07-17-2023



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↵	↑↑↑	↑↑↑		↵	↵
Traffic Volume (vph)	25	930	895	10	55	75
Future Volume (vph)	25	930	895	10	55	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0	6.0		5.0	5.0
Lane Util. Factor	1.00	*0.80	*0.80		1.00	1.00
Frt	1.00	1.00	1.00		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1805	4560	4552		1805	1615
Flt Permitted	0.25	1.00	1.00		0.95	1.00
Satd. Flow (perm)	480	4560	4552		1805	1615
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	25	930	895	10	55	75
RTOR Reduction (vph)	0	0	0	0	0	68
Lane Group Flow (vph)	25	930	905	0	55	7
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Turn Type	pm+pt	NA	NA		Prot	Perm
Protected Phases	5	2	6		4	
Permitted Phases	2					4
Actuated Green, G (s)	106.2	106.2	98.0		10.8	10.8
Effective Green, g (s)	107.2	107.2	99.0		11.8	11.8
Actuated g/C Ratio	0.82	0.82	0.76		0.09	0.09
Clearance Time (s)	4.0	7.0	7.0		6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	448	3760	3466		163	146
v/s Ratio Prot	0.00	c0.20	c0.20		c0.03	
v/s Ratio Perm	0.04					0.00
v/c Ratio	0.06	0.25	0.26		0.34	0.05
Uniform Delay, d1	2.1	2.5	4.6		55.4	54.0
Progression Factor	2.43	2.44	1.00		1.00	1.00
Incremental Delay, d2	0.0	0.1	0.2		1.2	0.1
Delay (s)	5.2	6.3	4.8		56.7	54.1
Level of Service	A	A	A		E	D
Approach Delay (s)		6.2	4.8		55.2	
Approach LOS		A	A		E	

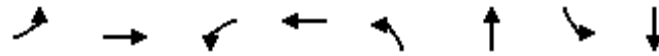
Intersection Summary

HCM 2000 Control Delay	8.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.27		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	38.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Timings
1: Regional Rd 25 & Louis St Laurent Ave

2037 Future Background PM
07-17-2023

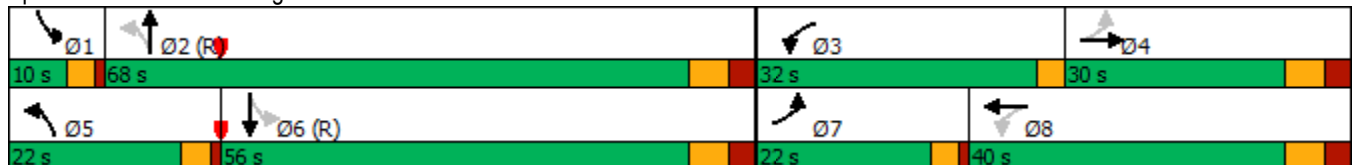


Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↖	↕	↖	↕	↖	↕	↖	↕
Traffic Volume (vph)	205	375	330	545	210	1285	95	1040
Future Volume (vph)	205	375	330	545	210	1285	95	1040
Turn Type	pm+pt	NA	pm+pt	NA	pm+pt	NA	pm+pt	NA
Protected Phases	7	4	3	8	5	2	1	6
Permitted Phases	4		8		2		6	
Detector Phase	7	4	3	8	5	2	1	6
Switch Phase								
Minimum Initial (s)	5.0	10.0	10.0	10.0	5.0	20.0	5.0	20.0
Minimum Split (s)	9.0	30.0	14.0	30.0	9.0	32.2	9.0	32.2
Total Split (s)	22.0	30.0	32.0	40.0	22.0	68.0	10.0	56.0
Total Split (%)	15.7%	21.4%	22.9%	28.6%	15.7%	48.6%	7.1%	40.0%
Yellow Time (s)	3.0	4.0	3.0	4.0	3.0	4.2	3.0	4.2
All-Red Time (s)	1.0	3.0	0.0	3.0	1.0	3.0	1.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	3.0	6.0	2.0	6.0	3.0	6.2	3.0	6.2
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	C-Max	None	C-Max
Act Effct Green (s)	43.7	23.9	54.3	30.4	80.6	66.4	70.0	58.7
Actuated g/C Ratio	0.31	0.17	0.39	0.22	0.58	0.47	0.50	0.42
v/c Ratio	0.70	0.81	0.81	0.79	0.74	0.85	0.59	0.68
Control Delay	44.4	63.9	48.4	58.7	40.9	37.0	39.4	36.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	44.4	63.9	48.4	58.7	40.9	37.0	39.4	36.4
LOS	D	E	D	E	D	D	D	D
Approach Delay		58.1		55.1		37.4		36.6
Approach LOS		E		E		D		D

Intersection Summary

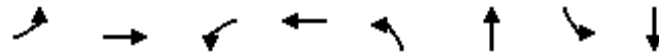
Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.85
 Intersection Signal Delay: 43.5
 Intersection LOS: D
 Intersection Capacity Utilization 89.9%
 ICU Level of Service E
 Analysis Period (min) 15

Splits and Phases: 1: Regional Rd 25 & Louis St Laurent Ave



Queues
1: Regional Rd 25 & Louis St Laurent Ave

2037 Future Background PM
07-17-2023



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	205	490	330	610	210	1715	95	1235
v/c Ratio	0.70	0.81	0.81	0.79	0.74	0.85	0.59	0.68
Control Delay	44.4	63.9	48.4	58.7	40.9	37.0	39.4	36.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	44.4	63.9	48.4	58.7	40.9	37.0	39.4	36.4
Queue Length 50th (m)	40.9	68.7	69.7	87.4	34.0	182.7	12.2	122.9
Queue Length 95th (m)	59.7	90.8	98.6	106.9	65.0	214.5	#38.5	154.7
Internal Link Dist (m)		126.1		117.1		481.0		113.5
Turn Bay Length (m)	90.0		35.0		65.0		80.0	
Base Capacity (vph)	319	633	470	865	320	2013	161	1813
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	0.64	0.77	0.70	0.71	0.66	0.85	0.59	0.68

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
1: Regional Rd 25 & Louis St Laurent Ave

2037 Future Background PM
07-17-2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	205	375	115	330	545	65	210	1285	430	95	1040	195
Future Volume (vph)	205	375	115	330	545	65	210	1285	430	95	1040	195
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0		2.0	6.0		3.0	6.2		3.0	6.2	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	*0.80		1.00	*0.80	
Frbp, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.96		1.00	0.98		1.00	0.96		1.00	0.98	
Flt Protected	0.95	1.00		1.00	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1769	3439		1899	3537		1787	4168		1805	4293	
Flt Permitted	0.22	1.00		0.19	1.00		0.09	1.00		0.07	1.00	
Satd. Flow (perm)	413	3439		364	3537		176	4168		130	4293	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	205	375	115	330	545	65	210	1285	430	95	1040	195
RTOR Reduction (vph)	0	21	0	0	7	0	0	36	0	0	14	0
Lane Group Flow (vph)	205	469	0	330	603	0	210	1679	0	95	1221	0
Confl. Peds. (#/hr)	5		5	5		5	5		5	5		5
Heavy Vehicles (%)	2%	1%	0%	0%	0%	2%	1%	6%	1%	0%	4%	0%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	38.8	22.9		49.3	29.4		76.5	65.4		64.7	57.6	
Effective Green, g (s)	40.8	23.9		50.3	30.4		77.5	66.4		66.7	58.6	
Actuated g/C Ratio	0.29	0.17		0.36	0.22		0.55	0.47		0.48	0.42	
Clearance Time (s)	4.0	7.0		3.0	7.0		4.0	7.2		4.0	7.2	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	284	587		398	768		280	1976		158	1796	
v/s Ratio Prot	0.09	0.14		c0.14	c0.17		c0.09	c0.40		0.03	0.28	
v/s Ratio Perm	0.12			0.15			0.33			0.25		
v/c Ratio	0.72	0.80		0.83	0.79		0.75	0.85		0.60	0.68	
Uniform Delay, d1	40.4	55.7		36.1	51.7		28.4	32.4		26.3	33.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	8.7	7.5		13.3	5.3		10.7	4.8		6.3	2.1	
Delay (s)	49.1	63.3		49.4	57.0		39.2	37.2		32.6	35.2	
Level of Service	D	E		D	E		D	D		C	D	
Approach Delay (s)		59.1			54.4			37.4			35.0	
Approach LOS		E			D			D			C	
Intersection Summary												
HCM 2000 Control Delay			43.1				HCM 2000 Level of Service				D	
HCM 2000 Volume to Capacity ratio			0.86									
Actuated Cycle Length (s)			140.0				Sum of lost time (s)				18.2	
Intersection Capacity Utilization			89.9%				ICU Level of Service				E	
Analysis Period (min)			15									

c Critical Lane Group

Queues
2: Regional Rd 25 & Whitlock Ave

2037 Future Background PM
07-17-2023



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	105	80	25	40	75	90	1965	60	1365
v/c Ratio	0.60	0.32	0.15	0.17	0.29	0.31	0.63	0.32	0.46
Control Delay	67.4	31.8	50.2	50.0	13.0	3.7	7.4	10.3	9.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	67.4	31.8	50.2	50.0	13.0	3.7	7.4	10.3	9.5
Queue Length 50th (m)	27.2	10.6	6.1	9.8	0.0	1.4	62.4	2.6	58.9
Queue Length 95th (m)	45.1	25.0	14.4	20.3	14.0	m3.4	182.1	10.1	86.2
Internal Link Dist (m)		62.9		68.1			696.9		481.0
Turn Bay Length (m)	35.0		65.0		65.0	100.0		100.0	
Base Capacity (vph)	341	452	333	475	441	292	3106	187	2991
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	0.31	0.18	0.08	0.08	0.17	0.31	0.63	0.32	0.46

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
2: Regional Rd 25 & Whitlock Ave

2037 Future Background PM
07-17-2023



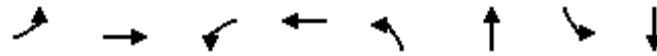
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	105	40	40	25	40	75	90	1925	40	60	1230	135
Future Volume (vph)	105	40	40	25	40	75	90	1925	40	60	1230	135
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5		5.5	5.5	5.5	3.0	5.5		3.0	5.5	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	*0.80		1.00	*0.80	
Frbp, ped/bikes	1.00	0.99		1.00	1.00	0.98	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	0.99	1.00		0.99	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.93		1.00	1.00	0.85	1.00	1.00		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1776	1699		1795	1900	1539	1787	4331		1770	4262	
Flt Permitted	0.73	1.00		0.70	1.00	1.00	0.13	1.00		0.05	1.00	
Satd. Flow (perm)	1367	1699		1332	1900	1539	245	4331		100	4262	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	105	40	40	25	40	75	90	1925	40	60	1230	135
RTOR Reduction (vph)	0	32	0	0	0	65	0	1	0	0	6	0
Lane Group Flow (vph)	105	48	0	25	40	10	90	1964	0	60	1359	0
Confl. Peds. (#/hr)	5		5	5		5			5	5		
Heavy Vehicles (%)	1%	5%	0%	0%	0%	3%	1%	5%	0%	2%	6%	0%
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	15.6	15.6		15.6	15.6	15.6	98.8	91.4		96.0	90.0	
Effective Green, g (s)	16.6	16.6		16.6	16.6	16.6	100.8	92.4		98.0	91.0	
Actuated g/C Ratio	0.13	0.13		0.13	0.13	0.13	0.78	0.71		0.75	0.70	
Clearance Time (s)	6.5	6.5		6.5	6.5	6.5	4.0	6.5		4.0	6.5	
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)	174	216		170	242	196	289	3078		165	2983	
v/s Ratio Prot		0.03			0.02		c0.02	c0.45		c0.02	0.32	
v/s Ratio Perm	c0.08			0.02		0.01	0.22			0.25		
v/c Ratio	0.60	0.22		0.15	0.17	0.05	0.31	0.64		0.36	0.46	
Uniform Delay, d1	53.6	50.9		50.4	50.5	49.8	4.5	10.0		8.2	8.6	
Progression Factor	1.00	1.00		1.00	1.00	1.00	0.50	0.61		1.00	1.00	
Incremental Delay, d2	5.8	0.5		0.4	0.3	0.1	0.5	0.8		1.4	0.5	
Delay (s)	59.4	51.4		50.8	50.9	49.9	2.8	6.8		9.6	9.1	
Level of Service	E	D		D	D	D	A	A		A	A	
Approach Delay (s)		55.9			50.3			6.7			9.1	
Approach LOS		E			D			A			A	

Intersection Summary

HCM 2000 Control Delay	11.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	71.2%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Timings
5: Regional Rd 25 & Etheridge Ave/Collector Road

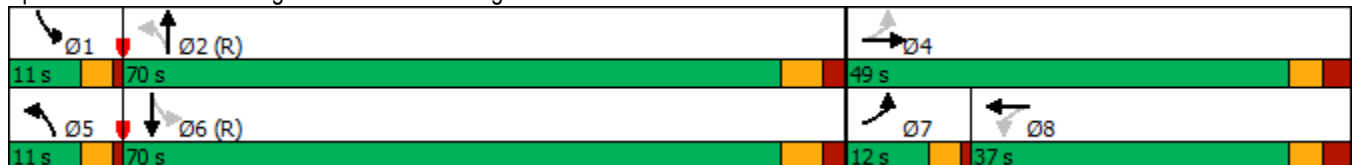


Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↶	↷	↶	↷	↶	↑↑↑	↶	↑↑↑
Traffic Volume (vph)	75	0	40	0	60	1940	55	1125
Future Volume (vph)	75	0	40	0	60	1940	55	1125
Turn Type	pm+pt	NA	Perm	NA	pm+pt	NA	pm+pt	NA
Protected Phases	7	4		8	5	2	1	6
Permitted Phases	4		8		2		6	
Detector Phase	7	4	8	8	5	2	1	6
Switch Phase								
Minimum Initial (s)	7.0	10.0	10.0	10.0	7.0	20.0	7.0	20.0
Minimum Split (s)	11.0	36.2	36.2	36.2	11.0	38.4	11.0	38.4
Total Split (s)	12.0	49.0	37.0	37.0	11.0	70.0	11.0	70.0
Total Split (%)	9.2%	37.7%	28.5%	28.5%	8.5%	53.8%	8.5%	53.8%
Yellow Time (s)	3.0	3.3	3.3	3.3	3.0	4.2	3.0	4.2
All-Red Time (s)	1.0	2.9	2.9	2.9	1.0	2.2	1.0	2.2
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	3.0	5.2	5.2	5.2	3.0	5.4	3.0	5.4
Lead/Lag	Lead		Lag	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	C-Max	None	C-Max
Act Effct Green (s)	22.5	21.3	11.7	11.7	101.2	93.3	101.5	93.5
Actuated g/C Ratio	0.17	0.16	0.09	0.09	0.78	0.72	0.78	0.72
v/c Ratio	0.33	0.06	0.31	0.13	0.18	0.64	0.31	0.40
Control Delay	48.2	0.3	62.0	0.9	3.1	8.0	29.9	3.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	48.2	0.3	62.0	0.9	3.1	8.0	29.9	3.6
LOS	D	A	E	A	A	A	C	A
Approach Delay		36.2		31.4		7.9		4.7
Approach LOS		D		C		A		A

Intersection Summary

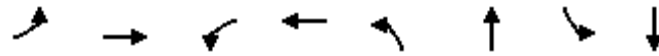
Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 103 (79%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 110
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.64
 Intersection Signal Delay: 8.1
 Intersection Capacity Utilization 67.8%
 Analysis Period (min) 15
 Intersection LOS: A
 ICU Level of Service C

Splits and Phases: 5: Regional Rd 25 & Etheridge Ave/Collector Road



Queues
5: Regional Rd 25 & Etheridge Ave/Collector Road

2037 Future Background PM
07-17-2023



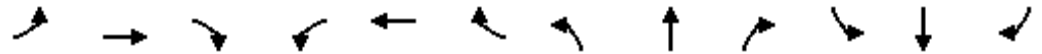
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	75	25	40	40	60	2005	55	1240
v/c Ratio	0.33	0.06	0.31	0.13	0.18	0.64	0.31	0.40
Control Delay	48.2	0.3	62.0	0.9	3.1	8.0	29.9	3.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	48.2	0.3	62.0	0.9	3.1	8.0	29.9	3.6
Queue Length 50th (m)	17.2	0.0	10.3	0.0	1.8	63.5	2.1	53.7
Queue Length 95th (m)	31.1	0.0	22.4	0.0	m2.4	m67.9	14.5	7.5
Internal Link Dist (m)		53.9		63.5		292.1		696.9
Turn Bay Length (m)	40.0		40.0		70.0		70.0	
Base Capacity (vph)	229	646	344	527	326	3136	177	3118
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	0.33	0.04	0.12	0.08	0.18	0.64	0.31	0.40

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
5: Regional Rd 25 & Etheridge Ave/Collector Road

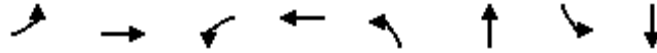
2037 Future Background PM
07-17-2023



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	75	0	25	40	0	40	60	1940	65	55	1125	115
Future Volume (vph)	75	0	25	40	0	40	60	1940	65	55	1125	115
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	5.2		5.2	5.2		3.0	5.4		3.0	5.4	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	*0.80		1.00	*0.80	
Frt	1.00	0.85		1.00	0.85		1.00	1.00		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1752	1615		1805	1615		1805	4369		1805	4331	
Flt Permitted	0.56	1.00		0.74	1.00		0.16	1.00		0.05	1.00	
Satd. Flow (perm)	1030	1615		1408	1615		298	4369		88	4331	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	75	0	25	40	0	40	60	1940	65	55	1125	115
RTOR Reduction (vph)	0	21	0	0	37	0	0	2	0	0	5	0
Lane Group Flow (vph)	75	4	0	40	3	0	60	2003	0	55	1235	0
Heavy Vehicles (%)	3%	0%	0%	0%	0%	0%	0%	4%	0%	0%	4%	2%
Turn Type	pm+pt	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	19.1	19.1		8.7	8.7		94.1	88.4		94.5	88.6	
Effective Green, g (s)	20.1	20.1		9.7	9.7		96.1	89.4		96.5	89.6	
Actuated g/C Ratio	0.15	0.15		0.07	0.07		0.74	0.69		0.74	0.69	
Clearance Time (s)	4.0	6.2		6.2	6.2		4.0	6.4		4.0	6.4	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	200	249		105	120		297	3004		156	2985	
v/s Ratio Prot	c0.02	0.00			0.00		0.01	c0.46		c0.02	0.29	
v/s Ratio Perm	c0.04			0.03			0.14			0.24		
v/c Ratio	0.38	0.02		0.38	0.02		0.20	0.67		0.35	0.41	
Uniform Delay, d1	48.6	46.6		57.3	55.8		5.1	11.7		10.4	8.8	
Progression Factor	1.00	1.00		1.00	1.00		0.63	0.59		3.07	0.34	
Incremental Delay, d2	1.2	0.0		2.3	0.1		0.1	0.4		1.3	0.4	
Delay (s)	49.8	46.6		59.6	55.8		3.3	7.3		33.0	3.4	
Level of Service	D	D		E	E		A	A		C	A	
Approach Delay (s)		49.0			57.7			7.2			4.6	
Approach LOS		D			E			A			A	

Intersection Summary		
HCM 2000 Control Delay	8.6	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	0.61	A
Actuated Cycle Length (s)	130.0	Sum of lost time (s)
Intersection Capacity Utilization	67.8%	16.6
Analysis Period (min)	15	ICU Level of Service
c Critical Lane Group		C

Timings
7: Regional Rd 25 & Britannia Rd

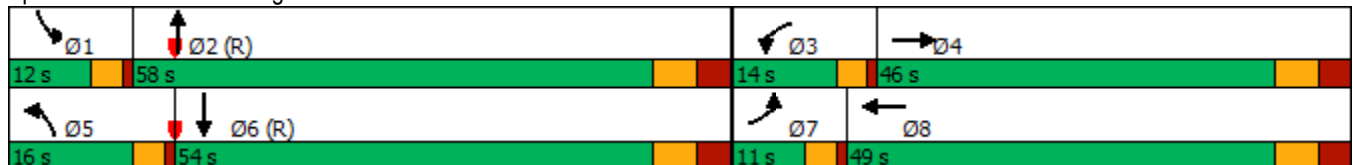


Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↖↗	↕↔	↖↗	↕↔	↖↗	↕↔	↖↗	↕↔
Traffic Volume (vph)	45	350	325	550	240	1680	120	1020
Future Volume (vph)	45	350	325	550	240	1680	120	1020
Turn Type	Prot	NA	Prot	NA	Prot	NA	Prot	NA
Protected Phases	7	4	3	8	5	2	1	6
Permitted Phases								
Detector Phase	7	4	3	8	5	2	1	6
Switch Phase								
Minimum Initial (s)	7.0	10.0	7.0	10.0	7.0	20.0	7.0	20.0
Minimum Split (s)	11.0	45.5	11.0	45.5	11.0	49.7	11.0	49.7
Total Split (s)	11.0	46.0	14.0	49.0	16.0	58.0	12.0	54.0
Total Split (%)	8.5%	35.4%	10.8%	37.7%	12.3%	44.6%	9.2%	41.5%
Yellow Time (s)	3.0	4.2	3.0	4.2	3.0	4.2	3.0	4.2
All-Red Time (s)	1.0	3.3	1.0	3.3	1.0	3.5	1.0	3.5
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	3.0	6.5	3.0	6.5	3.0	6.7	3.0	6.7
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	C-Max	None	C-Max
Act Effct Green (s)	8.0	26.9	11.0	32.1	14.8	62.2	10.8	58.1
Actuated g/C Ratio	0.06	0.21	0.08	0.25	0.11	0.48	0.08	0.45
v/c Ratio	0.22	0.42	1.07	0.78	0.60	1.03	0.42	0.55
Control Delay	60.9	43.3	139.9	38.8	61.1	60.0	76.3	19.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	60.9	43.3	139.9	38.8	61.1	60.0	76.3	19.5
LOS	E	D	F	D	E	E	E	B
Approach Delay		45.1		65.9		60.1		25.2
Approach LOS		D		E		E		C

Intersection Summary

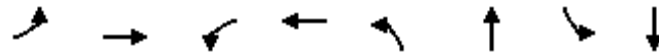
Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 104 (80%), Referenced to phase 2:NBT and 6:SBT, Start of Green
 Natural Cycle: 150
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.07
 Intersection Signal Delay: 52.2
 Intersection LOS: D
 Intersection Capacity Utilization 90.1%
 ICU Level of Service E
 Analysis Period (min) 15

Splits and Phases: 7: Regional Rd 25 & Britannia Rd



Queues
7: Regional Rd 25 & Britannia Rd

2037 Future Background PM
07-17-2023



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	45	395	325	890	240	2130	120	1070
v/c Ratio	0.22	0.42	1.07	0.78	0.60	1.03	0.42	0.55
Control Delay	60.9	43.3	139.9	38.8	61.1	60.0	76.3	19.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	60.9	43.3	139.9	38.8	61.1	60.0	76.3	19.5
Queue Length 50th (m)	6.0	36.8	~51.0	49.2	32.1	~257.6	17.3	41.2
Queue Length 95th (m)	12.7	45.8	#83.4	52.0	45.5	#329.0	28.7	61.0
Internal Link Dist (m)		377.9		190.1		165.3		292.1
Turn Bay Length (m)	60.0		120.0		90.0		90.0	
Base Capacity (vph)	203	1372	305	1477	408	2077	292	1953
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	0.29	1.07	0.60	0.59	1.03	0.41	0.55

Intersection Summary

~ 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
7: Regional Rd 25 & Britannia Rd

2037 Future Background PM
07-17-2023



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔	↕↕↔		↔↔	↕↕↔		↔↔	↕↕↔		↔↔	↕↕↔	
Traffic Volume (vph)	45	350	45	325	550	340	240	1680	450	120	1020	50
Future Volume (vph)	45	350	45	325	550	340	240	1680	450	120	1020	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.5		3.0	6.5		3.0	6.7		3.0	6.7	
Lane Util. Factor	0.97	*0.80		0.97	*0.80		0.97	*0.80		0.97	*0.80	
Frt	1.00	0.98		1.00	0.94		1.00	0.97		1.00	0.99	
Flt Protected	0.95	1.00		1.00	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	3303	4482		3614	4256		3502	4296		3467	4362	
Flt Permitted	0.95	1.00		1.00	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	3303	4482		3614	4256		3502	4296		3467	4362	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	45	350	45	325	550	340	240	1680	450	120	1020	50
RTOR Reduction (vph)	0	12	0	0	96	0	0	25	0	0	3	0
Lane Group Flow (vph)	45	383	0	325	794	0	240	2105	0	120	1067	0
Heavy Vehicles (%)	6%	0%	0%	2%	1%	1%	0%	3%	2%	1%	4%	0%
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	5.6	26.7		10.0	31.1		13.8	60.3		9.8	56.3	
Effective Green, g (s)	6.6	27.7		11.0	32.1		14.8	61.3		10.8	57.3	
Actuated g/C Ratio	0.05	0.21		0.08	0.25		0.11	0.47		0.08	0.44	
Clearance Time (s)	4.0	7.5		4.0	7.5		4.0	7.7		4.0	7.7	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	167	955		305	1050		398	2025		288	1922	
v/s Ratio Prot	0.01	0.09		c0.09	c0.19		c0.07	c0.49		0.03	0.24	
v/s Ratio Perm												
v/c Ratio	0.27	0.40		1.07	0.76		0.60	1.04		0.42	0.56	
Uniform Delay, d1	59.4	44.0		59.5	45.3		54.8	34.4		56.6	26.9	
Progression Factor	1.00	1.00		1.32	0.88		1.00	1.00		1.28	0.66	
Incremental Delay, d2	0.9	0.3		68.9	3.0		2.6	31.2		0.9	1.1	
Delay (s)	60.3	44.3		147.7	42.8		57.4	65.5		73.5	18.8	
Level of Service	E	D		F	D		E	E		E	B	
Approach Delay (s)		45.9			70.9			64.7			24.3	
Approach LOS		D			E			E			C	

Intersection Summary

HCM 2000 Control Delay	55.3	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	19.2
Intersection Capacity Utilization	90.1%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Timings
10: Britannia Rd & Farmstead Dr

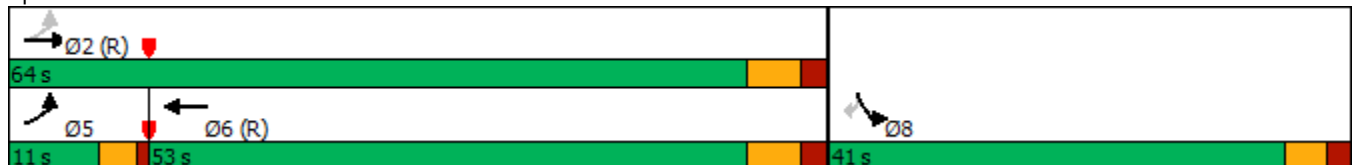


Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Configurations	↖	↑↑↑	↑↑↑	↖	↗
Traffic Volume (vph)	15	385	760	55	15
Future Volume (vph)	15	385	760	55	15
Turn Type	pm+pt	NA	NA	Prot	Perm
Protected Phases	5	2	6	8	
Permitted Phases	2				8
Detector Phase	5	2	6	8	8
Switch Phase					
Minimum Initial (s)	7.0	20.0	20.0	10.0	10.0
Minimum Split (s)	11.0	29.4	29.4	15.3	15.3
Total Split (s)	11.0	64.0	53.0	41.0	41.0
Total Split (%)	10.5%	61.0%	50.5%	39.0%	39.0%
Yellow Time (s)	3.0	4.2	4.2	3.3	3.3
All-Red Time (s)	1.0	2.2	2.2	2.0	2.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	3.0	5.4	5.4	4.3	4.3
Lead/Lag	Lead		Lag		
Lead-Lag Optimize?	Yes		Yes		
Recall Mode	None	C-Max	C-Max	None	None
Act Effct Green (s)	89.3	88.0	83.6	11.4	11.4
Actuated g/C Ratio	0.85	0.84	0.80	0.11	0.11
v/c Ratio	0.03	0.10	0.24	0.29	0.08
Control Delay	1.9	2.2	4.1	47.2	19.9
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	1.9	2.2	4.1	47.2	19.9
LOS	A	A	A	D	B
Approach Delay		2.2	4.1	41.4	
Approach LOS		A	A	D	

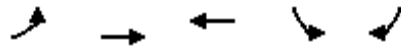
Intersection Summary

Cycle Length: 105
 Actuated Cycle Length: 105
 Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.29
 Intersection Signal Delay: 5.5
 Intersection LOS: A
 Intersection Capacity Utilization 33.1%
 ICU Level of Service A
 Analysis Period (min) 15

Splits and Phases: 10: Britannia Rd & Farmstead Dr



Queues
10: Britannia Rd & Farmstead Dr



Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	15	385	840	55	15
v/c Ratio	0.03	0.10	0.24	0.29	0.08
Control Delay	1.9	2.2	4.1	47.2	19.9
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	1.9	2.2	4.1	47.2	19.9
Queue Length 50th (m)	0.4	5.7	13.7	11.1	0.0
Queue Length 95th (m)	1.6	9.0	32.7	23.1	6.3
Internal Link Dist (m)		101.0	377.9	199.3	
Turn Bay Length (m)	20.0				
Base Capacity (vph)	541	3822	3552	606	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	0.03	0.10	0.24	0.09	0.03
Intersection Summary					

HCM Signalized Intersection Capacity Analysis
 10: Britannia Rd & Farmstead Dr

2037 Future Background PM
 07-17-2023



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↵	↑↑↑	↑↑↑		↵	↵
Traffic Volume (vph)	15	385	760	80	55	15
Future Volume (vph)	15	385	760	80	55	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	5.4	5.4		4.3	4.3
Lane Util. Factor	1.00	*0.80	*0.80		1.00	1.00
Frt	1.00	1.00	0.99		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1805	4560	4455		1736	1615
Flt Permitted	0.27	1.00	1.00		0.95	1.00
Satd. Flow (perm)	520	4560	4455		1736	1615
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	15	385	760	80	55	15
RTOR Reduction (vph)	0	0	5	0	0	14
Lane Group Flow (vph)	15	385	835	0	55	1
Heavy Vehicles (%)	0%	0%	1%	0%	4%	0%
Turn Type	pm+pt	NA	NA		Prot	Perm
Protected Phases	5	2	6		8	
Permitted Phases	2					8
Actuated Green, G (s)	84.9	84.9	78.1		8.4	8.4
Effective Green, g (s)	85.9	85.9	79.1		9.4	9.4
Actuated g/C Ratio	0.82	0.82	0.75		0.09	0.09
Clearance Time (s)	4.0	6.4	6.4		5.3	5.3
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	471	3730	3356		155	144
v/s Ratio Prot	0.00	c0.08	c0.19		c0.03	
v/s Ratio Perm	0.02					0.00
v/c Ratio	0.03	0.10	0.25		0.35	0.01
Uniform Delay, d1	1.8	1.9	3.9		44.9	43.6
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.0	0.1	0.2		1.4	0.0
Delay (s)	1.9	2.0	4.1		46.3	43.6
Level of Service	A	A	A		D	D
Approach Delay (s)		1.9	4.1		45.8	
Approach LOS		A	A		D	

Intersection Summary

HCM 2000 Control Delay	5.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.25		
Actuated Cycle Length (s)	105.0	Sum of lost time (s)	12.7
Intersection Capacity Utilization	33.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Timings
11: Britannia Rd & Rose Way



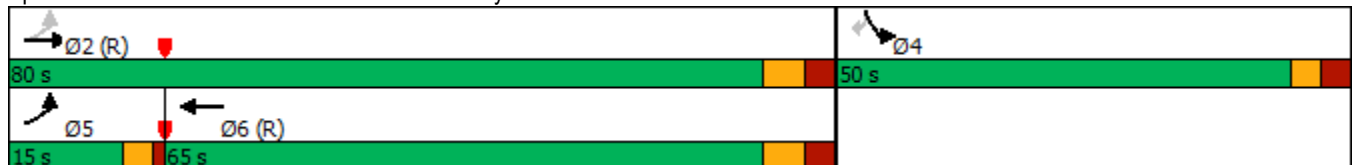
Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Configurations	↖	↑↑↑	↑↑↑↔	↖	↗
Traffic Volume (vph)	80	840	1165	30	50
Future Volume (vph)	80	840	1165	30	50
Turn Type	pm+pt	NA	NA	Prot	Perm
Protected Phases	5	2	6	4	
Permitted Phases	2				4
Detector Phase	5	2	6	4	4
Switch Phase					
Minimum Initial (s)	7.0	20.0	20.0	10.0	10.0
Minimum Split (s)	11.0	29.0	29.0	43.0	43.0
Total Split (s)	15.0	80.0	65.0	50.0	50.0
Total Split (%)	11.5%	61.5%	50.0%	38.5%	38.5%
Yellow Time (s)	3.0	4.0	4.0	3.0	3.0
All-Red Time (s)	1.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	3.0	6.0	6.0	5.0	5.0
Lead/Lag	Lead		Lag		
Lead-Lag Optimize?	Yes		Yes		
Recall Mode	None	C-Max	C-Max	None	None
Act Effct Green (s)	114.2	112.4	103.5	11.0	11.0
Actuated g/C Ratio	0.88	0.86	0.80	0.08	0.08
v/c Ratio	0.22	0.21	0.34	0.20	0.27
Control Delay	3.1	2.4	5.2	58.7	18.8
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	3.1	2.4	5.2	58.7	18.8
LOS	A	A	A	E	B
Approach Delay		2.5	5.2	33.8	
Approach LOS		A	A	C	

Intersection Summary

Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 65 (50%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
 Natural Cycle: 85
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.34
 Intersection Signal Delay: 5.1
 Intersection Capacity Utilization 50.5%
 Analysis Period (min) 15

Intersection LOS: A
 ICU Level of Service A

Splits and Phases: 11: Britannia Rd & Rose Way



Queues
11: Britannia Rd & Rose Way



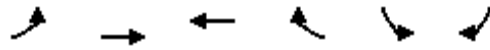
Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	80	840	1225	30	50
v/c Ratio	0.22	0.21	0.34	0.20	0.27
Control Delay	3.1	2.4	5.2	58.7	18.8
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	3.1	2.4	5.2	58.7	18.8
Queue Length 50th (m)	2.6	16.2	41.7	7.7	0.0
Queue Length 95th (m)	m4.3	m22.0	49.6	18.0	13.0
Internal Link Dist (m)		190.1	148.0	92.6	
Turn Bay Length (m)	50.0			50.0	
Base Capacity (vph)	414	3941	3607	624	591
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	0.19	0.21	0.34	0.05	0.08

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
 11: Britannia Rd & Rose Way

2037 Future Background PM
 07-17-2023



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↰	↑↑↑	↑↑↑		↰	↰
Traffic Volume (vph)	80	840	1165	60	30	50
Future Volume (vph)	80	840	1165	60	30	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0	6.0		5.0	5.0
Lane Util. Factor	1.00	*0.80	*0.80		1.00	1.00
Frt	1.00	1.00	0.99		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1805	4560	4526		1805	1615
Flt Permitted	0.17	1.00	1.00		0.95	1.00
Satd. Flow (perm)	316	4560	4526		1805	1615
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	80	840	1165	60	30	50
RTOR Reduction (vph)	0	0	2	0	0	47
Lane Group Flow (vph)	80	840	1223	0	30	3
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Turn Type	pm+pt	NA	NA		Prot	Perm
Protected Phases	5	2	6		4	
Permitted Phases	2					4
Actuated Green, G (s)	109.0	109.0	99.4		8.0	8.0
Effective Green, g (s)	110.0	110.0	100.4		9.0	9.0
Actuated g/C Ratio	0.85	0.85	0.77		0.07	0.07
Clearance Time (s)	4.0	7.0	7.0		6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	342	3858	3495		124	111
v/s Ratio Prot	c0.01	0.18	c0.27		c0.02	
v/s Ratio Perm	0.19					0.00
v/c Ratio	0.23	0.22	0.35		0.24	0.03
Uniform Delay, d1	2.0	1.9	4.6		57.3	56.4
Progression Factor	1.50	1.17	1.00		1.00	1.00
Incremental Delay, d2	0.3	0.1	0.3		1.0	0.1
Delay (s)	3.3	2.3	4.9		58.3	56.5
Level of Service	A	A	A		E	E
Approach Delay (s)		2.4	4.9		57.2	
Approach LOS		A	A		E	

Intersection Summary

HCM 2000 Control Delay	5.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.34		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	50.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Timings
1: Regional Rd 25 & Louis St Laurent Ave

2028 Future Total AM (South Parcel)
07-17-2023

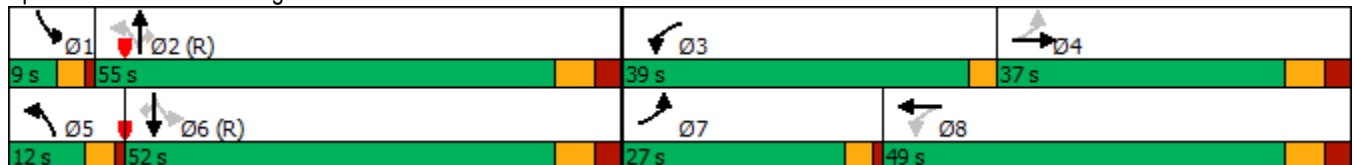


Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↘	↗	↘	↗	↘	↗	↗	↘	↗	↗
Traffic Volume (vph)	270	535	485	560	115	875	330	65	790	95
Future Volume (vph)	270	535	485	560	115	875	330	65	790	95
Turn Type	pm+pt	NA	pm+pt	NA	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4	3	8	5	2		1	6	
Permitted Phases	4		8		2		2	6		6
Detector Phase	7	4	3	8	5	2	2	1	6	6
Switch Phase										
Minimum Initial (s)	5.0	10.0	10.0	10.0	5.0	20.0	20.0	5.0	20.0	20.0
Minimum Split (s)	9.0	30.0	14.0	30.0	9.0	32.2	32.2	9.0	32.2	32.2
Total Split (s)	27.0	37.0	39.0	49.0	12.0	55.0	55.0	9.0	52.0	52.0
Total Split (%)	19.3%	26.4%	27.9%	35.0%	8.6%	39.3%	39.3%	6.4%	37.1%	37.1%
Yellow Time (s)	3.0	4.0	3.0	4.0	3.0	4.2	4.2	3.0	4.2	4.2
All-Red Time (s)	1.0	3.0	0.0	3.0	1.0	3.0	3.0	1.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	3.0	6.0	2.0	6.0	3.0	6.2	6.2	3.0	6.2	6.2
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Act Effct Green (s)	52.9	31.2	72.1	46.3	62.9	52.5	52.5	57.3	47.8	47.8
Actuated g/C Ratio	0.38	0.22	0.52	0.33	0.45	0.38	0.38	0.41	0.34	0.34
v/c Ratio	0.65	0.92	0.93	0.57	0.49	0.69	0.44	0.33	0.69	0.15
Control Delay	29.6	69.1	63.1	40.4	31.0	41.5	10.1	27.7	43.9	3.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.6	69.1	63.1	40.4	31.0	41.5	10.1	27.7	43.9	3.6
LOS	C	E	E	D	C	D	B	C	D	A
Approach Delay		58.4		50.1		32.8			38.8	
Approach LOS		E		D		C			D	

Intersection Summary

Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.93
 Intersection Signal Delay: 44.3
 Intersection LOS: D
 Intersection Capacity Utilization 92.9%
 ICU Level of Service F
 Analysis Period (min) 15

Splits and Phases: 1: Regional Rd 25 & Louis St Laurent Ave



Queues

1: Regional Rd 25 & Louis St Laurent Ave



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	270	725	485	655	115	875	330	65	790	95
v/c Ratio	0.65	0.92	0.93	0.57	0.49	0.69	0.44	0.33	0.69	0.15
Control Delay	29.6	69.1	63.1	40.4	31.0	41.5	10.1	27.7	43.9	3.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.6	69.1	63.1	40.4	31.0	41.5	10.1	27.7	43.9	3.6
Queue Length 50th (m)	43.2	105.5	116.5	79.1	20.0	117.7	14.3	11.0	106.4	0.0
Queue Length 95th (m)	62.6	#144.0	#179.3	105.6	33.5	143.6	41.3	20.8	130.8	8.3
Internal Link Dist (m)		126.1		117.1		481.0			113.5	
Turn Bay Length (m)	90.0		35.0		65.0		65.0	80.0		90.0
Base Capacity (vph)	479	792	548	1142	236	1265	748	199	1152	617
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	0.56	0.92	0.89	0.57	0.49	0.69	0.44	0.33	0.69	0.15

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
 1: Regional Rd 25 & Louis St Laurent Ave

2028 Future Total AM (South Parcel)
 07-17-2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	270	535	190	485	560	95	115	875	330	65	790	95
Future Volume (vph)	270	535	190	485	560	95	115	875	330	65	790	95
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0		2.0	6.0		3.0	6.2	6.2	3.0	6.2	6.2
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00
Frbp, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.96		1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		1.00	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1767	3409		1863	3427		1703	3374	1568	1719	3374	1583
Flt Permitted	0.39	1.00		0.12	1.00		0.18	1.00	1.00	0.19	1.00	1.00
Satd. Flow (perm)	723	3409		224	3427		327	3374	1568	338	3374	1583
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	270	535	190	485	560	95	115	875	330	65	790	95
RTOR Reduction (vph)	0	26	0	0	9	0	0	0	163	0	0	63
Lane Group Flow (vph)	270	699	0	485	646	0	115	875	167	65	790	32
Confl. Peds. (#/hr)	5					5						
Heavy Vehicles (%)	2%	2%	1%	2%	2%	7%	6%	7%	3%	5%	7%	2%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	48.0	30.2		67.1	45.3		58.6	50.7	50.7	50.8	46.8	46.8
Effective Green, g (s)	50.0	31.2		68.1	46.3		59.7	51.7	51.7	52.8	47.8	47.8
Actuated g/C Ratio	0.36	0.22		0.49	0.33		0.43	0.37	0.37	0.38	0.34	0.34
Clearance Time (s)	4.0	7.0		3.0	7.0		4.0	7.2	7.2	4.0	7.2	7.2
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	398	759		517	1133		226	1245	579	176	1151	540
v/s Ratio Prot	0.09	c0.21		c0.23	0.19		c0.03	c0.26		0.01	0.23	
v/s Ratio Perm	0.15			0.22			0.18		0.11	0.13		0.02
v/c Ratio	0.68	0.92		0.94	0.57		0.51	0.70	0.29	0.37	0.69	0.06
Uniform Delay, d1	34.2	53.2		41.2	38.6		27.3	37.6	31.2	29.9	39.7	31.0
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	4.6	16.5		24.8	0.7		1.8	3.3	1.3	1.3	3.3	0.2
Delay (s)	38.7	69.7		66.0	39.3		29.1	40.9	32.4	31.2	43.0	31.2
Level of Service	D	E		E	D		C	D	C	C	D	C
Approach Delay (s)		61.3			50.7			37.8			41.0	
Approach LOS		E			D			D			D	
Intersection Summary												
HCM 2000 Control Delay			47.1									D
HCM 2000 Volume to Capacity ratio			0.83									
Actuated Cycle Length (s)			140.0								18.2	
Intersection Capacity Utilization			92.9%									F
ICU Level of Service												
Analysis Period (min)			15									

c Critical Lane Group

Timings
2: Regional Rd 25 & Whitlock Ave

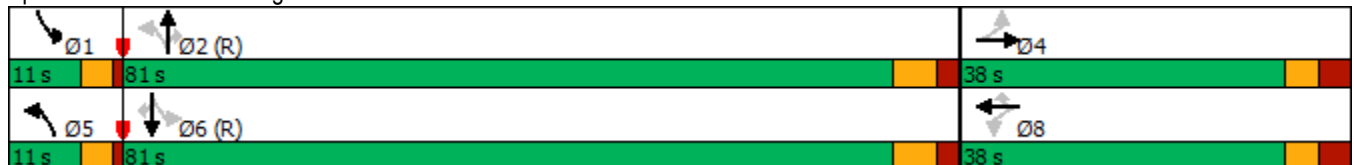
2028 Future Total AM (South Parcel)
07-17-2023

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	145	50	50	35	95	45	1105	10	50	1615	100
Future Volume (vph)	145	50	50	35	95	45	1105	10	50	1615	100
Turn Type	Perm	NA	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases		4		8		5	2		1	6	
Permitted Phases	4		8		8	2		2	6		6
Detector Phase	4	4	8	8	8	5	2	2	1	6	6
Switch Phase											
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	7.0	20.0	20.0	7.0	20.0	20.0
Minimum Split (s)	37.5	37.5	37.5	37.5	37.5	11.0	35.5	35.5	11.0	35.5	35.5
Total Split (s)	38.0	38.0	38.0	38.0	38.0	11.0	81.0	81.0	11.0	81.0	81.0
Total Split (%)	29.2%	29.2%	29.2%	29.2%	29.2%	8.5%	62.3%	62.3%	8.5%	62.3%	62.3%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.0	4.2	4.2	3.0	4.2	4.2
All-Red Time (s)	3.2	3.2	3.2	3.2	3.2	1.0	2.3	2.3	1.0	2.3	2.3
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5	3.0	5.5	5.5	3.0	5.5	5.5
Lead/Lag						Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?						Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Act Effct Green (s)	20.4	20.4	20.4	20.4	20.4	98.7	89.7	89.7	98.7	89.7	89.7
Actuated g/C Ratio	0.16	0.16	0.16	0.16	0.16	0.76	0.69	0.69	0.76	0.69	0.69
v/c Ratio	0.69	0.49	0.33	0.13	0.31	0.20	0.47	0.01	0.13	0.68	0.09
Control Delay	68.1	30.2	52.5	45.3	10.9	5.3	8.2	0.1	5.0	15.3	4.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	68.1	30.2	52.5	45.3	10.9	5.3	8.2	0.1	5.0	15.3	4.1
LOS	E	C	D	D	B	A	A	A	A	B	A
Approach Delay		49.2		29.2			8.1			14.4	
Approach LOS		D		C			A			B	

Intersection Summary

Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 64 (49%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 95
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.69
 Intersection Signal Delay: 16.0
 Intersection LOS: B
 Intersection Capacity Utilization 78.2%
 ICU Level of Service D
 Analysis Period (min) 15

Splits and Phases: 2: Regional Rd 25 & Whitlock Ave



Queues
2: Regional Rd 25 & Whitlock Ave

2028 Future Total AM (South Parcel)
07-17-2023



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	145	145	50	35	95	45	1105	10	50	1615	100
v/c Ratio	0.69	0.49	0.33	0.13	0.31	0.20	0.47	0.01	0.13	0.68	0.09
Control Delay	68.1	30.2	52.5	45.3	10.9	5.3	8.2	0.1	5.0	15.3	4.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	68.1	30.2	52.5	45.3	10.9	5.3	8.2	0.1	5.0	15.3	4.1
Queue Length 50th (m)	37.5	18.2	12.1	8.2	0.0	0.9	77.6	0.0	2.6	129.8	3.1
Queue Length 95th (m)	57.3	37.4	23.8	17.1	14.7	m3.1	153.0	m0.0	7.2	190.2	11.2
Internal Link Dist (m)		62.9		68.1			696.9			481.0	
Turn Bay Length (m)	35.0		65.0		65.0	100.0		25.0	100.0		25.0
Base Capacity (vph)	333	431	241	439	435	226	2349	910	399	2371	1060
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	0.44	0.34	0.21	0.08	0.22	0.20	0.47	0.01	0.13	0.68	0.09
























Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
2: Regional Rd 25 & Whitlock Ave

2028 Future Total AM (South Parcel)

07-17-2023

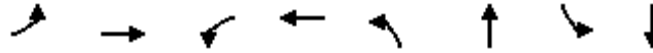
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	145	50	95	50	35	95	45	1105	10	50	1615	100
Future Volume (vph)	145	50	95	50	35	95	45	1105	10	50	1615	100
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5		5.5	5.5	5.5	3.0	5.5	5.5	3.0	5.5	5.5
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frbp, ped/bikes	1.00	0.99		1.00	1.00	0.98	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	0.99	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.90		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)	1725	1516		1727	1759	1455	1671	3406	1292	1805	3438	1509
Flt Permitted	0.73	1.00		0.53	1.00	1.00	0.10	1.00	1.00	0.22	1.00	1.00
Satd. Flow (perm)	1333	1516		965	1759	1455	176	3406	1292	413	3438	1509
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	145	50	95	50	35	95	45	1105	10	50	1615	100
RTOR Reduction (vph)	0	59	0	0	0	80	0	0	3	0	0	20
Lane Group Flow (vph)	145	86	0	50	35	15	45	1105	7	50	1615	80
Confl. Peds. (#/hr)	5		5	5		5						
Heavy Vehicles (%)	4%	32%	1%	4%	8%	9%	8%	6%	25%	0%	5%	7%
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases		4			8		5	2		1		6
Permitted Phases	4			8		8	2		2	6		6
Actuated Green, G (s)	19.4	19.4		19.4	19.4	19.4	93.6	87.9	87.9	93.6	87.9	87.9
Effective Green, g (s)	20.4	20.4		20.4	20.4	20.4	95.6	88.9	88.9	95.6	88.9	88.9
Actuated g/C Ratio	0.16	0.16		0.16	0.16	0.16	0.74	0.68	0.68	0.74	0.68	0.68
Clearance Time (s)	6.5	6.5		6.5	6.5	6.5	4.0	6.5	6.5	4.0	6.5	6.5
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
Lane Grp Cap (vph)	209	237		151	276	228	206	2329	883	375	2351	1031
v/s Ratio Prot		0.06			0.02		c0.01	0.32		0.01	c0.47	
v/s Ratio Perm	c0.11			0.05		0.01	0.15		0.01	0.09		0.05
v/c Ratio	0.69	0.36		0.33	0.13	0.07	0.22	0.47	0.01	0.13	0.69	0.08
Uniform Delay, d1	51.8	49.0		48.7	47.1	46.7	9.2	9.6	6.5	5.5	12.3	6.9
Progression Factor	1.00	1.00		1.00	1.00	1.00	0.79	0.72	1.00	1.00	1.00	1.00
Incremental Delay, d2	9.6	0.9		1.3	0.2	0.1	0.5	0.6	0.0	0.2	1.7	0.1
Delay (s)	61.4	49.9		50.0	47.3	46.8	7.8	7.5	6.5	5.7	13.9	7.0
Level of Service	E	D		D	D	D	A	A	A	A	B	A
Approach Delay (s)		55.7			47.8			7.5			13.3	
Approach LOS		E			D			A			B	
Intersection Summary												
HCM 2000 Control Delay			16.8				HCM 2000 Level of Service				B	
HCM 2000 Volume to Capacity ratio			0.66									
Actuated Cycle Length (s)			130.0				Sum of lost time (s)				14.0	
Intersection Capacity Utilization			78.2%				ICU Level of Service				D	
Analysis Period (min)			15									

c Critical Lane Group

Timings
5: Regional Rd 25 & Etheridge Ave/Collector Road

2028 Future Total AM (South Parcel)

07-17-2023



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↖	↗	↖	↗	↖	↕	↖	↕
Traffic Volume (vph)	185	0	65	0	60	920	30	1660
Future Volume (vph)	185	0	65	0	60	920	30	1660
Turn Type	pm+pt	NA	Perm	NA	pm+pt	NA	Perm	NA
Protected Phases	7	4		8	5	2		6
Permitted Phases	4		8		2		6	
Detector Phase	7	4	8	8	5	2	6	6
Switch Phase								
Minimum Initial (s)	7.0	10.0	10.0	10.0	7.0	20.0	20.0	20.0
Minimum Split (s)	11.0	36.2	36.2	36.2	11.0	38.4	38.4	38.4
Total Split (s)	12.0	49.0	37.0	37.0	11.0	81.0	70.0	70.0
Total Split (%)	9.2%	37.7%	28.5%	28.5%	8.5%	62.3%	53.8%	53.8%
Yellow Time (s)	3.0	3.3	3.3	3.3	3.0	4.2	4.2	4.2
All-Red Time (s)	1.0	2.9	2.9	2.9	1.0	2.2	2.2	2.2
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	3.0	5.2	5.2	5.2	3.0	5.4	5.4	5.4
Lead/Lag	Lead		Lag	Lag	Lead		Lag	Lag
Lead-Lag Optimize?	Yes		Yes	Yes	Yes		Yes	Yes
Recall Mode	None	None	None	None	None	C-Max	C-Max	C-Max
Act Effct Green (s)	25.4	23.2	13.6	13.6	98.6	96.2	87.1	87.1
Actuated g/C Ratio	0.20	0.18	0.10	0.10	0.76	0.74	0.67	0.67
v/c Ratio	0.70	0.27	0.48	0.18	0.30	0.37	0.08	0.76
Control Delay	60.9	7.2	65.9	1.2	24.0	2.2	3.5	11.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	60.9	7.2	65.9	1.2	24.0	2.2	3.5	11.2
LOS	E	A	E	A	C	A	A	B
Approach Delay		41.5		36.3		3.6		11.1
Approach LOS		D		D		A		B

Intersection Summary

Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 120
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.76
 Intersection Signal Delay: 12.4
 Intersection LOS: B
 Intersection Capacity Utilization 75.6%
 ICU Level of Service D
 Analysis Period (min) 15

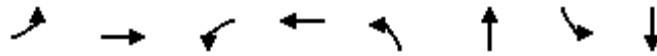
Splits and Phases: 5: Regional Rd 25 & Etheridge Ave/Collector Road



Queues
5: Regional Rd 25 & Etheridge Ave/Collector Road

2028 Future Total AM (South Parcel)

07-17-2023



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	185	105	65	55	60	940	30	1730
v/c Ratio	0.70	0.27	0.48	0.18	0.30	0.37	0.08	0.76
Control Delay	60.9	7.2	65.9	1.2	24.0	2.2	3.5	11.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	60.9	7.2	65.9	1.2	24.0	2.2	3.5	11.2
Queue Length 50th (m)	44.5	0.0	16.9	0.0	3.8	9.0	0.8	187.3
Queue Length 95th (m)	65.7	12.3	31.7	0.0	m9.2	15.2	m1.0	250.5
Internal Link Dist (m)		53.9		63.1		108.9		696.9
Turn Bay Length (m)	40.0		40.0		70.0		70.0	
Base Capacity (vph)	264	622	320	518	199	2517	387	2291
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	0.70	0.17	0.20	0.11	0.30	0.37	0.08	0.76

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
5: Regional Rd 25 & Etheridge Ave/Collector Road

2028 Future Total AM (South Parcel)
07-17-2023



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↕		↖	↗	
Traffic Volume (vph)	185	0	105	65	0	55	60	920	20	30	1660	70
Future Volume (vph)	185	0	105	65	0	55	60	920	20	30	1660	70
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	5.2		5.2	5.2		3.0	5.4		5.4	5.4	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.85		1.00	0.85		1.00	1.00		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1787	1615		1805	1615		1752	3399		1805	3416	
Flt Permitted	0.57	1.00		0.69	1.00		0.07	1.00		0.30	1.00	
Satd. Flow (perm)	1078	1615		1309	1615		128	3399		578	3416	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	185	0	105	65	0	55	60	920	20	30	1660	70
RTOR Reduction (vph)	0	85	0	0	50	0	0	1	0	0	2	0
Lane Group Flow (vph)	185	20	0	65	5	0	60	939	0	30	1728	0
Heavy Vehicles (%)	1%	0%	0%	0%	0%	0%	3%	6%	0%	0%	5%	6%
Turn Type	pm+pt	NA		Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases	7	4			8		5	2				6
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	23.4	23.4		10.6	10.6		94.0	94.0		84.1	84.1	
Effective Green, g (s)	24.4	24.4		11.6	11.6		95.0	95.0		85.1	85.1	
Actuated g/C Ratio	0.19	0.19		0.09	0.09		0.73	0.73		0.65	0.65	
Clearance Time (s)	4.0	6.2		6.2	6.2		4.0	6.4		6.4	6.4	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	255	303		116	144		179	2483		378	2236	
v/s Ratio Prot	c0.05	0.01			0.00		0.02	c0.28			c0.51	
v/s Ratio Perm	c0.08			0.05			0.23			0.05		
v/c Ratio	0.73	0.07		0.56	0.03		0.34	0.38		0.08	0.77	
Uniform Delay, d1	48.5	43.4		56.8	54.1		14.4	6.5		8.2	15.7	
Progression Factor	1.00	1.00		1.00	1.00		4.19	0.28		0.31	0.56	
Incremental Delay, d2	9.8	0.1		6.1	0.1		0.9	0.3		0.3	2.0	
Delay (s)	58.3	43.5		62.8	54.2		61.4	2.2		2.8	10.8	
Level of Service	E	D		E	D		E	A		A	B	
Approach Delay (s)		53.0			58.9			5.7			10.7	
Approach LOS		D			E			A			B	

Intersection Summary

HCM 2000 Control Delay	14.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	16.6
Intersection Capacity Utilization	75.6%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
6: Regional Rd 25 & Site Dwy (South)

2028 Future Total AM (South Parcel)
07-17-2023



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗		↕	↕	↘
Traffic Volume (veh/h)	0	45	0	1000	1815	15
Future Volume (Veh/h)	0	45	0	1000	1815	15
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	45	0	1000	1815	15
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)				183	133	
pX, platoon unblocked	0.73	0.63	0.63			
vC, conflicting volume	2322	915	1830			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	828	0	1147			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	93	100			
cM capacity (veh/h)	230	689	389			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	45	500	500	1210	620	
Volume Left	0	0	0	0	0	
Volume Right	45	0	0	0	15	
cSH	689	1700	1700	1700	1700	
Volume to Capacity	0.07	0.29	0.29	0.71	0.36	
Queue Length 95th (m)	1.7	0.0	0.0	0.0	0.0	
Control Delay (s)	10.6	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	0.2					
Intersection Capacity Utilization	60.6%			ICU Level of Service	B	
Analysis Period (min)	15					

Timings
7: Regional Rd 25 & Britannia Rd

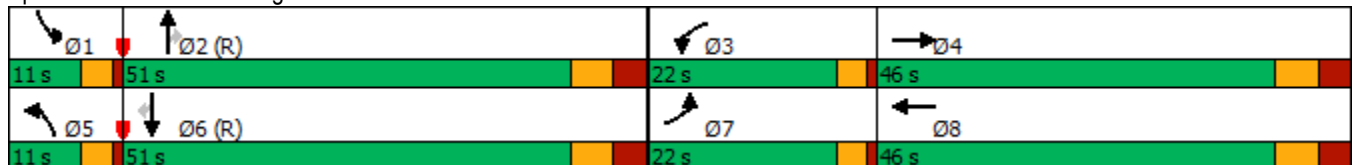
2028 Future Total AM (South Parcel)
07-17-2023

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	60	390	410	325	50	815	210	325	1515	20
Future Volume (vph)	60	390	410	325	50	815	210	325	1515	20
Turn Type	Prot	NA	Prot	NA	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4	3	8	5	2		1	6	
Permitted Phases							2			6
Detector Phase	7	4	3	8	5	2	2	1	6	6
Switch Phase										
Minimum Initial (s)	7.0	10.0	7.0	10.0	7.0	20.0	20.0	7.0	20.0	20.0
Minimum Split (s)	11.0	45.5	11.0	45.5	11.0	49.7	49.7	11.0	49.7	49.7
Total Split (s)	22.0	46.0	22.0	46.0	11.0	51.0	51.0	11.0	51.0	51.0
Total Split (%)	16.9%	35.4%	16.9%	35.4%	8.5%	39.2%	39.2%	8.5%	39.2%	39.2%
Yellow Time (s)	3.0	4.2	3.0	4.2	3.0	4.2	4.2	3.0	4.2	4.2
All-Red Time (s)	1.0	3.3	1.0	3.3	1.0	3.5	3.5	1.0	3.5	3.5
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	3.0	6.5	3.0	6.5	3.0	6.7	6.7	3.0	6.7	6.7
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Act Effct Green (s)	9.0	23.8	18.6	35.5	8.7	44.7	44.7	23.8	61.9	61.9
Actuated g/C Ratio	0.07	0.18	0.14	0.27	0.07	0.34	0.34	0.18	0.48	0.48
v/c Ratio	0.26	0.76	0.83	0.36	0.22	0.69	0.31	0.51	0.93	0.03
Control Delay	59.9	46.5	65.8	29.5	59.6	40.4	5.2	49.5	52.3	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	59.9	46.5	65.8	29.5	59.6	40.4	5.2	49.5	52.3	0.1
LOS	E	D	E	C	E	D	A	D	D	A
Approach Delay		47.6		46.8		34.4			51.3	
Approach LOS		D		D		C			D	

Intersection Summary

Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 104 (80%), Referenced to phase 2:NBT and 6:SBT, Start of Green
 Natural Cycle: 150
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.93
 Intersection Signal Delay: 45.8
 Intersection LOS: D
 Intersection Capacity Utilization 90.7%
 ICU Level of Service E
 Analysis Period (min) 15

Splits and Phases: 7: Regional Rd 25 & Britannia Rd



Queues
7: Regional Rd 25 & Britannia Rd

2028 Future Total AM (South Parcel)
07-17-2023



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	60	660	410	450	50	815	210	325	1515	20
v/c Ratio	0.26	0.76	0.83	0.36	0.22	0.69	0.31	0.51	0.93	0.03
Control Delay	59.9	46.5	65.8	29.5	59.6	40.4	5.2	49.5	52.3	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	59.9	46.5	65.8	29.5	59.6	40.4	5.2	49.5	52.3	0.1
Queue Length 50th (m)	8.0	58.7	56.0	34.4	6.7	98.2	0.0	47.4	182.7	0.0
Queue Length 95th (m)	15.3	71.6	#79.8	47.4	13.4	123.5	17.3	m62.7	#285.8	m0.0
Internal Link Dist (m)		377.9		182.4		165.3			159.1	
Turn Bay Length (m)	60.0		120.0		90.0		90.0	90.0		90.0
Base Capacity (vph)	482	1371	503	1363	225	1181	671	640	1637	660
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	0.12	0.48	0.82	0.33	0.22	0.69	0.31	0.51	0.93	0.03

Intersection Summary

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

2028 Future Total AM (South Parcel)

7: Regional Rd 25 & Britannia Rd

07-17-2023



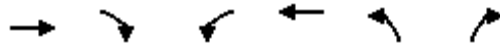
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔	↕↕↔		↔↔	↕↕↔		↔↔	↕↕	↔	↔↔	↕↕	↔
Traffic Volume (vph)	60	390	270	410	325	125	50	815	210	325	1515	20
Future Volume (vph)	60	390	270	410	325	125	50	815	210	325	1515	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.5		3.0	6.5		3.0	6.7	6.7	3.0	6.7	6.7
Lane Util. Factor	0.97	*0.80		0.97	*0.80		0.97	0.95	1.00	0.97	0.95	1.00
Frt	1.00	0.94		1.00	0.96		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		1.00	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3303	4238		3445	4315		3367	3438	1553	3502	3438	1272
Flt Permitted	0.95	1.00		1.00	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3303	4238		3445	4315		3367	3438	1553	3502	3438	1272
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	60	390	270	410	325	125	50	815	210	325	1515	20
RTOR Reduction (vph)	0	97	0	0	55	0	0	0	139	0	0	11
Lane Group Flow (vph)	60	563	0	410	395	0	50	815	71	325	1515	9
Heavy Vehicles (%)	6%	1%	1%	7%	1%	2%	4%	5%	4%	0%	5%	27%
Turn Type	Prot	NA		Prot	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases									2			6
Actuated Green, G (s)	6.6	23.5		17.6	34.5		6.3	42.9	42.9	22.8	59.4	59.4
Effective Green, g (s)	7.6	24.5		18.6	35.5		7.3	43.9	43.9	23.8	60.4	60.4
Actuated g/C Ratio	0.06	0.19		0.14	0.27		0.06	0.34	0.34	0.18	0.46	0.46
Clearance Time (s)	4.0	7.5		4.0	7.5		4.0	7.7	7.7	4.0	7.7	7.7
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	193	798		492	1178		189	1160	524	641	1597	590
v/s Ratio Prot	0.02	c0.13		c0.12	0.09		0.01	0.24		c0.09	c0.44	
v/s Ratio Perm									0.05			0.01
v/c Ratio	0.31	0.71		0.83	0.34		0.26	0.70	0.14	0.51	0.95	0.02
Uniform Delay, d1	58.7	49.4		54.2	37.8		58.8	37.4	29.9	47.8	33.3	18.8
Progression Factor	1.00	1.00		0.93	0.91		1.00	1.00	1.00	0.96	1.38	1.00
Incremental Delay, d2	0.9	2.9		11.4	0.2		0.8	3.6	0.5	0.5	10.3	0.0
Delay (s)	59.6	52.2		61.9	34.7		59.5	41.0	30.4	46.3	56.2	18.8
Level of Service	E	D		E	C		E	D	C	D	E	B
Approach Delay (s)		52.8			47.7			39.8			54.1	
Approach LOS		D			D			D			D	

Intersection Summary

HCM 2000 Control Delay	49.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	19.2
Intersection Capacity Utilization	90.7%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
 8: Site Dwy (South) & Etheridge Ave

2028 Future Total AM (South Parcel)
 07-17-2023



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔			↔	↔	
Traffic Volume (veh/h)	165	5	45	85	15	125
Future Volume (Veh/h)	165	5	45	85	15	125
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	165	5	45	85	15	125
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh						
Upstream signal (m)	78					
pX, platoon unblocked						
vC, conflicting volume			170			168
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			170			168
tC, single (s)			4.1			6.2
tC, 2 stage (s)						
tF (s)			2.2			3.3
p0 queue free %			97			86
cM capacity (veh/h)			1420			882
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	170	130	140			
Volume Left	0	45	15			
Volume Right	5	0	125			
cSH	1700	1420	847			
Volume to Capacity	0.10	0.03	0.17			
Queue Length 95th (m)	0.0	0.8	4.7			
Control Delay (s)	0.0	2.8	10.1			
Lane LOS			A			B
Approach Delay (s)	0.0	2.8	10.1			
Approach LOS			B			
Intersection Summary						
Average Delay			4.0			
Intersection Capacity Utilization			34.5%	ICU Level of Service	A	
Analysis Period (min)			15			

Timings
10: Britannia Rd & Farmstead Dr

2028 Future Total AM (South Parcel)
07-17-2023

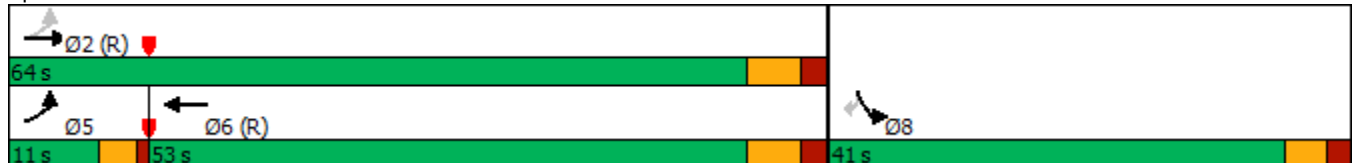


Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Configurations	↘	↑↑↑	↑↑↑	↘	↗
Traffic Volume (vph)	20	630	370	90	25
Future Volume (vph)	20	630	370	90	25
Turn Type	pm+pt	NA	NA	Prot	Perm
Protected Phases	5	2	6	8	
Permitted Phases	2				8
Detector Phase	5	2	6	8	8
Switch Phase					
Minimum Initial (s)	7.0	20.0	20.0	10.0	10.0
Minimum Split (s)	11.0	29.4	29.4	15.3	15.3
Total Split (s)	11.0	64.0	53.0	41.0	41.0
Total Split (%)	10.5%	61.0%	50.5%	39.0%	39.0%
Yellow Time (s)	3.0	4.2	4.2	3.3	3.3
All-Red Time (s)	1.0	2.2	2.2	2.0	2.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	3.0	5.4	5.4	4.3	4.3
Lead/Lag	Lead		Lag		
Lead-Lag Optimize?	Yes		Yes		
Recall Mode	None	C-Max	C-Max	None	None
Act Effct Green (s)	88.0	86.7	82.3	12.8	12.8
Actuated g/C Ratio	0.84	0.83	0.78	0.12	0.12
v/c Ratio	0.03	0.17	0.12	0.43	0.12
Control Delay	2.4	2.7	4.3	49.0	16.1
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	2.4	2.7	4.3	49.0	16.1
LOS	A	A	A	D	B
Approach Delay		2.7	4.3	41.9	
Approach LOS		A	A	D	

Intersection Summary

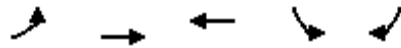
Cycle Length: 105
 Actuated Cycle Length: 105
 Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.43
 Intersection Signal Delay: 7.2
 Intersection LOS: A
 Intersection Capacity Utilization 33.1%
 ICU Level of Service A
 Analysis Period (min) 15

Splits and Phases: 10: Britannia Rd & Farmstead Dr



Queues
10: Britannia Rd & Farmstead Dr

2028 Future Total AM (South Parcel)
07-17-2023



Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	20	630	395	90	25
v/c Ratio	0.03	0.17	0.12	0.43	0.12
Control Delay	2.4	2.7	4.3	49.0	16.1
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	2.4	2.7	4.3	49.0	16.1
Queue Length 50th (m)	0.6	10.5	6.1	18.4	0.0
Queue Length 95th (m)	2.3	17.7	16.9	33.1	7.7
Internal Link Dist (m)		101.0	377.9	199.3	
Turn Bay Length (m)	20.0				
Base Capacity (vph)	744	3653	3296	595	553
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	0.17	0.12	0.15	0.05
Intersection Summary					

HCM Signalized Intersection Capacity Analysis
 10: Britannia Rd & Farmstead Dr

2028 Future Total AM (South Parcel)
 07-17-2023



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↶	↑↑↑	↑↑↑		↶	↷
Traffic Volume (vph)	20	630	370	25	90	25
Future Volume (vph)	20	630	370	25	90	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	5.4	5.4		4.3	4.3
Lane Util. Factor	1.00	*0.80	*0.80		1.00	1.00
Frt	1.00	1.00	0.99		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1656	4427	4202		1703	1538
Flt Permitted	0.46	1.00	1.00		0.95	1.00
Satd. Flow (perm)	811	4427	4202		1703	1538
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	20	630	370	25	90	25
RTOR Reduction (vph)	0	0	3	0	0	22
Lane Group Flow (vph)	20	630	392	0	90	3
Heavy Vehicles (%)	9%	3%	8%	0%	6%	5%
Turn Type	pm+pt	NA	NA		Prot	Perm
Protected Phases	5	2	6		8	
Permitted Phases	2					8
Actuated Green, G (s)	83.5	83.5	76.7		9.8	9.8
Effective Green, g (s)	84.5	84.5	77.7		10.8	10.8
Actuated g/C Ratio	0.80	0.80	0.74		0.10	0.10
Clearance Time (s)	4.0	6.4	6.4		5.3	5.3
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	683	3562	3109		175	158
v/s Ratio Prot	0.00	c0.14	0.09		c0.05	
v/s Ratio Perm	0.02					0.00
v/c Ratio	0.03	0.18	0.13		0.51	0.02
Uniform Delay, d1	2.1	2.3	3.9		44.6	42.3
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.0	0.1	0.1		2.5	0.0
Delay (s)	2.1	2.4	4.0		47.2	42.4
Level of Service	A	A	A		D	D
Approach Delay (s)		2.4	4.0		46.1	
Approach LOS		A	A		D	

Intersection Summary

HCM 2000 Control Delay	7.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.22		
Actuated Cycle Length (s)	105.0	Sum of lost time (s)	12.7
Intersection Capacity Utilization	33.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Timings
11: Britannia Rd & Rose Way



Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Configurations	↖	↑↑↑	↑↑↑↔	↖	↗
Traffic Volume (vph)	25	900	785	55	75
Future Volume (vph)	25	900	785	55	75
Turn Type	pm+pt	NA	NA	Prot	Perm
Protected Phases	5	2	6	4	
Permitted Phases	2				4
Detector Phase	5	2	6	4	4
Switch Phase					
Minimum Initial (s)	7.0	20.0	20.0	10.0	10.0
Minimum Split (s)	11.0	29.0	29.0	43.0	43.0
Total Split (s)	15.0	80.0	65.0	50.0	50.0
Total Split (%)	11.5%	61.5%	50.0%	38.5%	38.5%
Yellow Time (s)	3.0	4.0	4.0	3.0	3.0
All-Red Time (s)	1.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	3.0	6.0	6.0	5.0	5.0
Lead/Lag	Lead		Lag		
Lead-Lag Optimize?	Yes		Yes		
Recall Mode	None	C-Max	C-Max	None	None
Act Effct Green (s)	110.2	107.2	100.6	11.8	11.8
Actuated g/C Ratio	0.85	0.82	0.77	0.09	0.09
v/c Ratio	0.05	0.24	0.23	0.34	0.35
Control Delay	4.5	7.0	4.6	61.1	16.3
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	4.5	7.0	4.6	61.1	16.3
LOS	A	A	A	E	B
Approach Delay		6.9	4.6	35.2	
Approach LOS		A	A	D	

Intersection Summary

Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
 Natural Cycle: 85
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.35
 Intersection Signal Delay: 7.9
 Intersection LOS: A
 Intersection Capacity Utilization 38.3%
 ICU Level of Service A
 Analysis Period (min) 15

Splits and Phases: 11: Britannia Rd & Rose Way



11: Britannia Rd & Rose Way



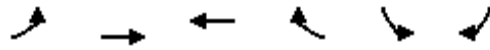
Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	25	900	795	55	75
v/c Ratio	0.05	0.24	0.23	0.34	0.35
Control Delay	4.5	7.0	4.6	61.1	16.3
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	4.5	7.0	4.6	61.1	16.3
Queue Length 50th (m)	2.2	44.0	24.0	14.3	0.0
Queue Length 95th (m)	m4.7	51.4	32.6	27.8	15.3
Internal Link Dist (m)		182.4	155.7	76.0	
Turn Bay Length (m)	50.0			50.0	
Base Capacity (vph)	584	3761	3523	624	608
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	0.24	0.23	0.09	0.12

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
 11: Britannia Rd & Rose Way

2028 Future Total AM (South Parcel)
 07-17-2023



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↵	↑↑↑	↑↑↑		↵	↵
Traffic Volume (vph)	25	900	785	10	55	75
Future Volume (vph)	25	900	785	10	55	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0	6.0		5.0	5.0
Lane Util. Factor	1.00	*0.80	*0.80		1.00	1.00
Frt	1.00	1.00	1.00		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1805	4560	4551		1805	1615
Flt Permitted	0.29	1.00	1.00		0.95	1.00
Satd. Flow (perm)	553	4560	4551		1805	1615
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	25	900	785	10	55	75
RTOR Reduction (vph)	0	0	0	0	0	68
Lane Group Flow (vph)	25	900	795	0	55	7
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Turn Type	pm+pt	NA	NA		Prot	Perm
Protected Phases	5	2	6		4	
Permitted Phases	2					4
Actuated Green, G (s)	106.2	106.2	98.0		10.8	10.8
Effective Green, g (s)	107.2	107.2	99.0		11.8	11.8
Actuated g/C Ratio	0.82	0.82	0.76		0.09	0.09
Clearance Time (s)	4.0	7.0	7.0		6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	506	3760	3465		163	146
v/s Ratio Prot	0.00	c0.20	0.17		c0.03	
v/s Ratio Perm	0.04					0.00
v/c Ratio	0.05	0.24	0.23		0.34	0.05
Uniform Delay, d1	2.1	2.5	4.5		55.4	54.0
Progression Factor	2.64	2.69	1.00		1.00	1.00
Incremental Delay, d2	0.0	0.1	0.2		1.2	0.1
Delay (s)	5.6	6.8	4.6		56.7	54.1
Level of Service	A	A	A		E	D
Approach Delay (s)		6.8	4.6		55.2	
Approach LOS		A	A		E	

Intersection Summary				
HCM 2000 Control Delay		9.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio		0.26		
Actuated Cycle Length (s)		130.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization		38.3%	ICU Level of Service	A
Analysis Period (min)		15		
c Critical Lane Group				

Timings
1: Regional Rd 25 & Louis St Laurent Ave

2028 Future Total PM (South Parcel)

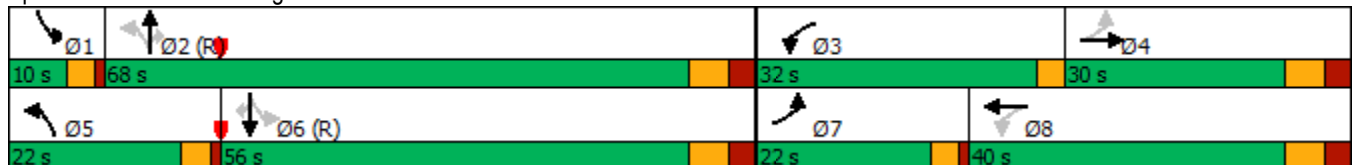
07-17-2023

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	205	375	355	545	210	890	435	95	845	195
Future Volume (vph)	205	375	355	545	210	890	435	95	845	195
Turn Type	pm+pt	NA	pm+pt	NA	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4	3	8	5	2		1	6	
Permitted Phases	4		8		2		2	6		6
Detector Phase	7	4	3	8	5	2	2	1	6	6
Switch Phase										
Minimum Initial (s)	5.0	10.0	10.0	10.0	5.0	20.0	20.0	5.0	20.0	20.0
Minimum Split (s)	9.0	30.0	14.0	30.0	9.0	32.2	32.2	9.0	32.2	32.2
Total Split (s)	22.0	30.0	32.0	40.0	22.0	68.0	68.0	10.0	56.0	56.0
Total Split (%)	15.7%	21.4%	22.9%	28.6%	15.7%	48.6%	48.6%	7.1%	40.0%	40.0%
Yellow Time (s)	3.0	4.0	3.0	4.0	3.0	4.2	4.2	3.0	4.2	4.2
All-Red Time (s)	1.0	3.0	0.0	3.0	1.0	3.0	3.0	1.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	3.0	6.0	2.0	6.0	3.0	6.2	6.2	3.0	6.2	6.2
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Act Effct Green (s)	43.4	23.6	55.6	31.8	79.4	65.4	65.4	69.5	58.5	58.5
Actuated g/C Ratio	0.31	0.17	0.40	0.23	0.57	0.47	0.47	0.50	0.42	0.42
v/c Ratio	0.69	0.84	0.85	0.76	0.58	0.57	0.47	0.32	0.59	0.25
Control Delay	42.4	66.5	54.0	56.4	22.7	29.5	5.5	18.5	35.1	4.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	42.4	66.5	54.0	56.4	22.7	29.5	5.5	18.5	35.1	4.7
LOS	D	E	D	E	C	C	A	B	D	A
Approach Delay		59.5		55.5		21.8			28.5	
Approach LOS		E		E		C			C	

Intersection Summary

Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.85
 Intersection Signal Delay: 37.2
 Intersection LOS: D
 Intersection Capacity Utilization 86.7%
 ICU Level of Service E
 Analysis Period (min) 15

Splits and Phases: 1: Regional Rd 25 & Louis St Laurent Ave



Queues

2028 Future Total PM (South Parcel)

1: Regional Rd 25 & Louis St Laurent Ave

07-17-2023



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	207	505	359	617	212	899	439	96	854	197
v/c Ratio	0.69	0.84	0.85	0.76	0.58	0.57	0.47	0.32	0.59	0.25
Control Delay	42.4	66.5	54.0	56.4	22.7	29.5	5.5	18.5	35.1	4.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	42.4	66.5	54.0	56.4	22.7	29.5	5.5	18.5	35.1	4.7
Queue Length 50th (m)	40.1	70.4	77.6	86.3	30.5	103.2	8.1	12.9	103.6	0.0
Queue Length 95th (m)	58.8	#97.2	113.6	108.3	47.3	125.3	32.5	23.0	135.9	17.0
Internal Link Dist (m)		126.1		117.1		481.0			113.5	
Turn Bay Length (m)	90.0		35.0		65.0		65.0	80.0		90.0
Base Capacity (vph)	327	621	466	865	406	1591	939	304	1449	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	0.63	0.81	0.77	0.71	0.52	0.57	0.47	0.32	0.59	0.25

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
 1: Regional Rd 25 & Louis St Laurent Ave

2028 Future Total PM (South Parcel)
 07-17-2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	205	375	125	355	545	65	210	890	435	95	845	195
Future Volume (vph)	205	375	125	355	545	65	210	890	435	95	845	195
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0		2.0	6.0		3.0	6.2	6.2	3.0	6.2	6.2
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00
Frbp, ped/bikes	1.00	0.99		1.00	1.00		1.00	1.00	0.98	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	0.96		1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		1.00	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1768	3431		1899	3537		1787	3406	1567	1804	3471	1582
Flt Permitted	0.25	1.00		0.17	1.00		0.20	1.00	1.00	0.24	1.00	1.00
Satd. Flow (perm)	461	3431		326	3537		380	3406	1567	464	3471	1582
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	207	379	126	359	551	66	212	899	439	96	854	197
RTOR Reduction (vph)	0	23	0	0	7	0	0	0	208	0	0	115
Lane Group Flow (vph)	207	482	0	359	610	0	212	899	231	96	854	82
Confl. Peds. (#/hr)	5		5	5		5	5		5	5		5
Heavy Vehicles (%)	2%	1%	0%	0%	0%	2%	1%	6%	1%	0%	4%	0%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	38.4	22.6		50.6	30.8		75.2	64.4	64.4	64.2	57.4	57.4
Effective Green, g (s)	40.4	23.6		51.6	31.8		76.2	65.4	65.4	66.2	58.4	58.4
Actuated g/C Ratio	0.29	0.17		0.37	0.23		0.54	0.47	0.47	0.47	0.42	0.42
Clearance Time (s)	4.0	7.0		3.0	7.0		4.0	7.2	7.2	4.0	7.2	7.2
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	289	578		412	803		355	1591	732	294	1447	659
v/s Ratio Prot	0.09	0.14		c0.16	c0.17		c0.06	0.26		0.02	0.25	
v/s Ratio Perm	0.12			0.16			c0.26		0.15	0.14		0.05
v/c Ratio	0.72	0.83		0.87	0.76		0.60	0.57	0.32	0.33	0.59	0.12
Uniform Delay, d1	40.6	56.3		37.8	50.5		19.6	27.0	23.3	21.3	31.5	25.1
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	8.2	10.0		17.9	4.2		2.7	1.5	1.1	0.7	1.8	0.4
Delay (s)	48.8	66.3		55.7	54.7		22.3	28.5	24.4	22.0	33.3	25.5
Level of Service	D	E		E	D		C	C	C	C	C	C
Approach Delay (s)		61.2			55.1			26.5			31.0	
Approach LOS		E			E			C			C	
Intersection Summary												
HCM 2000 Control Delay			39.7	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)				18.2				
Intersection Capacity Utilization			86.7%	ICU Level of Service				E				
Analysis Period (min)			15									

c Critical Lane Group

Timings
2: Regional Rd 25 & Whitlock Ave

2028 Future Total PM (South Parcel)
07-17-2023

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	105	40	25	40	75	90	1535	40	60	1070	135
Future Volume (vph)	105	40	25	40	75	90	1535	40	60	1070	135
Turn Type	Perm	NA	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases		4		8		5	2		1	6	
Permitted Phases	4		8		8	2		2	6		6
Detector Phase	4	4	8	8	8	5	2	2	1	6	6
Switch Phase											
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	7.0	20.0	20.0	7.0	20.0	20.0
Minimum Split (s)	37.5	37.5	37.5	37.5	37.5	11.0	35.5	35.5	11.0	35.5	35.5
Total Split (s)	38.0	38.0	38.0	38.0	38.0	11.0	81.0	81.0	11.0	81.0	81.0
Total Split (%)	29.2%	29.2%	29.2%	29.2%	29.2%	8.5%	62.3%	62.3%	8.5%	62.3%	62.3%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.0	4.2	4.2	3.0	4.2	4.2
All-Red Time (s)	3.2	3.2	3.2	3.2	3.2	1.0	2.3	2.3	1.0	2.3	2.3
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5	3.0	5.5	5.5	3.0	5.5	5.5
Lead/Lag							Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Act Effct Green (s)	16.8	16.8	16.8	16.8	16.8	102.5	93.2	93.2	101.4	90.8	90.8
Actuated g/C Ratio	0.13	0.13	0.13	0.13	0.13	0.79	0.72	0.72	0.78	0.70	0.70
v/c Ratio	0.61	0.33	0.15	0.17	0.29	0.23	0.64	0.04	0.23	0.46	0.12
Control Delay	67.6	32.0	49.9	49.8	12.7	1.8	8.2	1.1	5.3	10.1	4.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	67.6	32.0	49.9	49.8	12.7	1.8	8.2	1.1	5.3	10.1	4.3
LOS	E	C	D	D	B	A	A	A	A	B	A
Approach Delay		52.2		30.0			7.7			9.3	
Approach LOS		D		C			A			A	

Intersection Summary

Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 40 (31%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 95
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.64
 Intersection Signal Delay: 11.8
 Intersection LOS: B
 Intersection Capacity Utilization 75.5%
 ICU Level of Service D
 Analysis Period (min) 15

Splits and Phases: 2: Regional Rd 25 & Whitlock Ave



Queues
2: Regional Rd 25 & Whitlock Ave

2028 Future Total PM (South Parcel)
07-17-2023


























Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	108	82	26	41	77	93	1582	41	62	1103	139
v/c Ratio	0.61	0.33	0.15	0.17	0.29	0.23	0.64	0.04	0.23	0.46	0.12
Control Delay	67.6	32.0	49.9	49.8	12.7	1.8	8.2	1.1	5.3	10.1	4.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	67.6	32.0	49.9	49.8	12.7	1.8	8.2	1.1	5.3	10.1	4.3
Queue Length 50th (m)	28.0	11.0	6.3	10.0	0.0	1.4	61.2	0.3	2.7	62.2	5.6
Queue Length 95th (m)	45.9	25.7	14.8	20.2	14.2	m2.5	185.1	m1.2	7.2	94.1	15.2
Internal Link Dist (m)		62.9		68.1			696.9			481.0	
Turn Bay Length (m)	35.0		65.0		65.0	100.0		25.0	100.0		25.0
Base Capacity (vph)	341	452	332	475	442	410	2465	1140	264	2378	1147
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	0.32	0.18	0.08	0.09	0.17	0.23	0.64	0.04	0.23	0.46	0.12

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
2: Regional Rd 25 & Whitlock Ave

2028 Future Total PM (South Parcel)
07-17-2023

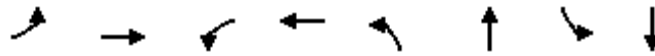
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	105	40	40	25	40	75	90	1535	40	60	1070	135
Future Volume (vph)	105	40	40	25	40	75	90	1535	40	60	1070	135
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5		5.5	5.5	5.5	3.0	5.5	5.5	3.0	5.5	5.5
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frbp, ped/bikes	1.00	0.99		1.00	1.00	0.98	1.00	1.00	0.97	1.00	1.00	1.00
Flpb, ped/bikes	0.99	1.00		0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.93		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)	1777	1699		1795	1900	1539	1787	3438	1565	1770	3406	1615
Flt Permitted	0.73	1.00		0.70	1.00	1.00	0.22	1.00	1.00	0.12	1.00	1.00
Satd. Flow (perm)	1366	1699		1330	1900	1539	409	3438	1565	214	3406	1615
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	108	41	41	26	41	77	93	1582	41	62	1103	139
RTOR Reduction (vph)	0	32	0	0	0	67	0	0	12	0	0	20
Lane Group Flow (vph)	108	50	0	26	41	10	93	1582	29	62	1103	119
Confl. Peds. (#/hr)	5		5	5		5			5	5		
Heavy Vehicles (%)	1%	5%	0%	0%	0%	3%	1%	5%	0%	2%	6%	0%
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8	2		2	6		6
Actuated Green, G (s)	15.8	15.8		15.8	15.8	15.8	98.8	91.4	91.4	95.6	89.8	89.8
Effective Green, g (s)	16.8	16.8		16.8	16.8	16.8	100.8	92.4	92.4	97.6	90.8	90.8
Actuated g/C Ratio	0.13	0.13		0.13	0.13	0.13	0.78	0.71	0.71	0.75	0.70	0.70
Clearance Time (s)	6.5	6.5		6.5	6.5	6.5	4.0	6.5	6.5	4.0	6.5	6.5
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
Lane Grp Cap (vph)	176	219		171	245	198	406	2443	1112	242	2378	1128
v/s Ratio Prot		0.03			0.02		c0.01	c0.46		c0.01	0.32	
v/s Ratio Perm	c0.08			0.02		0.01	0.16		0.02	0.18		0.07
v/c Ratio	0.61	0.23		0.15	0.17	0.05	0.23	0.65	0.03	0.26	0.46	0.11
Uniform Delay, d1	53.5	50.8		50.3	50.4	49.6	4.5	10.1	5.5	7.3	8.7	6.4
Progression Factor	1.00	1.00		1.00	1.00	1.00	0.28	0.65	1.31	1.00	1.00	1.00
Incremental Delay, d2	6.2	0.5		0.4	0.3	0.1	0.2	1.0	0.0	0.6	0.7	0.2
Delay (s)	59.7	51.3		50.7	50.7	49.7	1.5	7.5	7.3	7.8	9.4	6.6
Level of Service	E	D		D	D	D	A	A	A	A	A	A
Approach Delay (s)		56.1			50.2			7.2			9.0	
Approach LOS		E			D			A			A	
Intersection Summary												
HCM 2000 Control Delay			12.5	HCM 2000 Level of Service				B				
HCM 2000 Volume to Capacity ratio			0.62									
Actuated Cycle Length (s)			130.0	Sum of lost time (s)				14.0				
Intersection Capacity Utilization			75.5%	ICU Level of Service				D				
Analysis Period (min)			15									

c Critical Lane Group

Timings
5: Regional Rd 25 & Etheridge Ave/Collector Road

2028 Future Total PM (South Parcel)

07-17-2023

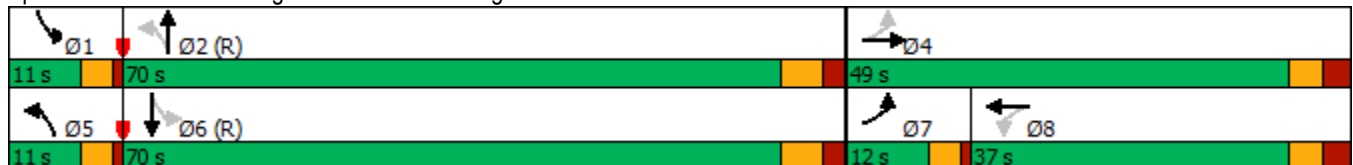


Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↖	↗	↖	↗	↖	↕	↖	↕
Traffic Volume (vph)	125	0	40	0	150	1500	55	925
Future Volume (vph)	125	0	40	0	150	1500	55	925
Turn Type	pm+pt	NA	Perm	NA	pm+pt	NA	pm+pt	NA
Protected Phases	7	4		8	5	2	1	6
Permitted Phases	4		8		2		6	
Detector Phase	7	4	8	8	5	2	1	6
Switch Phase								
Minimum Initial (s)	7.0	10.0	10.0	10.0	7.0	20.0	7.0	20.0
Minimum Split (s)	11.0	36.2	36.2	36.2	11.0	38.4	11.0	38.4
Total Split (s)	12.0	49.0	37.0	37.0	11.0	70.0	11.0	70.0
Total Split (%)	9.2%	37.7%	28.5%	28.5%	8.5%	53.8%	8.5%	53.8%
Yellow Time (s)	3.0	3.3	3.3	3.3	3.0	4.2	3.0	4.2
All-Red Time (s)	1.0	2.9	2.9	2.9	1.0	2.2	1.0	2.2
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	3.0	5.2	5.2	5.2	3.0	5.4	3.0	5.4
Lead/Lag	Lead		Lag	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	C-Max	None	C-Max
Act Effct Green (s)	23.8	21.6	12.0	12.0	99.2	88.7	95.9	85.1
Actuated g/C Ratio	0.18	0.17	0.09	0.09	0.76	0.68	0.74	0.65
v/c Ratio	0.55	0.14	0.34	0.15	0.43	0.71	0.26	0.52
Control Delay	54.9	0.7	62.8	1.1	8.6	9.3	10.9	6.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	54.9	0.7	62.8	1.1	8.6	9.3	10.9	6.5
LOS	D	A	E	A	A	A	B	A
Approach Delay		38.4		31.9		9.2		6.7
Approach LOS		D		C		A		A

Intersection Summary

Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 103 (79%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 120
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.71
 Intersection Signal Delay: 10.6
 Intersection LOS: B
 Intersection Capacity Utilization 75.1%
 ICU Level of Service D
 Analysis Period (min) 15

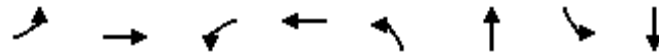
Splits and Phases: 5: Regional Rd 25 & Etheridge Ave/Collector Road



Queues
5: Regional Rd 25 & Etheridge Ave/Collector Road

2028 Future Total PM (South Parcel)

07-17-2023



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	134	59	43	43	161	1683	59	1162
v/c Ratio	0.55	0.14	0.34	0.15	0.43	0.71	0.26	0.52
Control Delay	54.9	0.7	62.8	1.1	8.6	9.3	10.9	6.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	54.9	0.7	62.8	1.1	8.6	9.3	10.9	6.5
Queue Length 50th (m)	31.9	0.0	11.2	0.0	4.6	65.1	1.8	87.0
Queue Length 95th (m)	50.8	0.0	23.4	0.0	m16.2	88.7	7.7	119.6
Internal Link Dist (m)		53.9		63.5		106.2		696.9
Turn Bay Length (m)	40.0		40.0		70.0		70.0	
Base Capacity (vph)	243	660	334	516	377	2358	226	2235
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.55	0.09	0.13	0.08	0.43	0.71	0.26	0.52

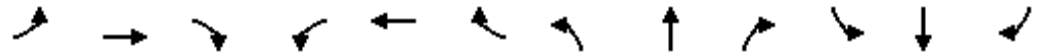
Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
5: Regional Rd 25 & Etheridge Ave/Collector Road

2028 Future Total PM (South Parcel)

07-17-2023



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	125	0	55	40	0	40	150	1500	65	55	925	155
Future Volume (vph)	125	0	55	40	0	40	150	1500	65	55	925	155
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	5.2		5.2	5.2		3.0	5.4		3.0	5.4	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.85		1.00	0.85		1.00	0.99		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1752	1615		1805	1615		1805	3455		1805	3406	
Flt Permitted	0.56	1.00		0.72	1.00		0.18	1.00		0.09	1.00	
Satd. Flow (perm)	1034	1615		1365	1615		351	3455		163	3406	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	134	0	59	43	0	43	161	1613	70	59	995	167
RTOR Reduction (vph)	0	49	0	0	40	0	0	2	0	0	7	0
Lane Group Flow (vph)	134	10	0	43	3	0	161	1681	0	59	1155	0
Heavy Vehicles (%)	3%	0%	0%	0%	0%	0%	0%	4%	0%	0%	4%	2%
Turn Type	pm+pt	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	21.8	21.8		9.0	9.0		94.3	85.6		88.9	82.9	
Effective Green, g (s)	22.8	22.8		10.0	10.0		96.3	86.6		90.9	83.9	
Actuated g/C Ratio	0.18	0.18		0.08	0.08		0.74	0.67		0.70	0.65	
Clearance Time (s)	4.0	6.2		6.2	6.2		4.0	6.4		4.0	6.4	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	235	283		105	124		368	2301		202	2198	
v/s Ratio Prot	c0.04	0.01			0.00		c0.03	c0.49		0.02	0.34	
v/s Ratio Perm	c0.06			0.03			0.29			0.19		
v/c Ratio	0.57	0.04		0.41	0.03		0.44	0.73		0.29	0.53	
Uniform Delay, d1	47.9	44.5		57.2	55.5		7.4	14.1		11.7	12.4	
Progression Factor	1.00	1.00		1.00	1.00		1.37	0.53		1.83	0.45	
Incremental Delay, d2	3.3	0.1		2.6	0.1		0.6	1.5		0.7	0.8	
Delay (s)	51.2	44.5		59.8	55.6		10.8	9.1		22.2	6.5	
Level of Service	D	D		E	E		B	A		C	A	
Approach Delay (s)		49.2			57.7			9.2			7.2	
Approach LOS		D			E			A			A	

Intersection Summary			
HCM 2000 Control Delay	12.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	16.6
Intersection Capacity Utilization	75.1%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
6: Regional Rd 25 & Site Dwy (South)

2028 Future Total PM (South Parcel)
07-17-2023



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗		↕	↕↗↘	
Traffic Volume (veh/h)	0	25	0	1715	980	40
Future Volume (Veh/h)	0	25	0	1715	980	40
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	27	0	1864	1065	43
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)				186	130	
pX, platoon unblocked	0.67					
vC, conflicting volume	2018	376	1108			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1532	376	1108			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	96	100			
cM capacity (veh/h)	73	627	638			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	27	932	932	426	426	256
Volume Left	0	0	0	0	0	0
Volume Right	27	0	0	0	0	43
cSH	627	1700	1700	1700	1700	1700
Volume to Capacity	0.04	0.55	0.55	0.25	0.25	0.15
Queue Length 95th (m)	1.1	0.0	0.0	0.0	0.0	0.0
Control Delay (s)	11.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	B					
Approach Delay (s)	11.0	0.0		0.0		
Approach LOS	B					
Intersection Summary						
Average Delay	0.1					
Intersection Capacity Utilization	50.7%			ICU Level of Service	A	
Analysis Period (min)	15					

Timings
7: Regional Rd 25 & Britannia Rd

2028 Future Total PM (South Parcel)
07-17-2023

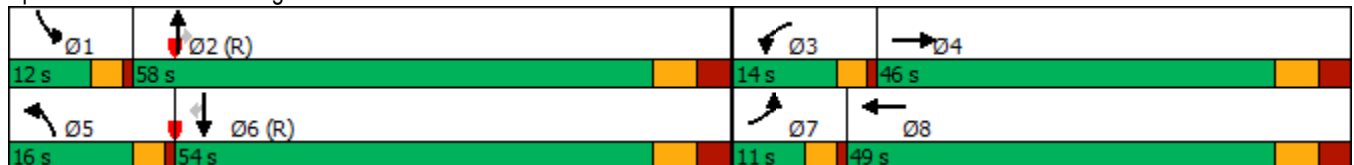


Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖↗	↕↔	↖↗	↕↔	↖↗	↕↔	↖	↖↗	↕↔	↖
Traffic Volume (vph)	45	305	285	470	235	1330	445	145	805	55
Future Volume (vph)	45	305	285	470	235	1330	445	145	805	55
Turn Type	Prot	NA	Prot	NA	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4	3	8	5	2		1	6	
Permitted Phases							2			6
Detector Phase	7	4	3	8	5	2	2	1	6	6
Switch Phase										
Minimum Initial (s)	7.0	10.0	7.0	10.0	7.0	20.0	20.0	7.0	20.0	20.0
Minimum Split (s)	11.0	45.5	11.0	45.5	11.0	49.7	49.7	11.0	49.7	49.7
Total Split (s)	11.0	46.0	14.0	49.0	16.0	58.0	58.0	12.0	54.0	54.0
Total Split (%)	8.5%	35.4%	10.8%	37.7%	12.3%	44.6%	44.6%	9.2%	41.5%	41.5%
Yellow Time (s)	3.0	4.2	3.0	4.2	3.0	4.2	4.2	3.0	4.2	4.2
All-Red Time (s)	1.0	3.3	1.0	3.3	1.0	3.5	3.5	1.0	3.5	3.5
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	3.0	6.5	3.0	6.5	3.0	6.7	6.7	3.0	6.7	6.7
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Act Effct Green (s)	8.0	24.4	11.0	29.6	15.0	63.6	63.6	11.8	60.4	60.4
Actuated g/C Ratio	0.06	0.19	0.08	0.23	0.12	0.49	0.49	0.09	0.46	0.46
v/c Ratio	0.22	0.41	0.94	0.76	0.59	0.78	0.47	0.46	0.50	0.07
Control Delay	60.9	44.7	114.5	37.7	60.2	33.1	7.2	70.6	18.3	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	60.9	44.7	114.5	37.7	60.2	33.1	7.2	70.6	18.3	0.1
LOS	E	D	F	D	E	C	A	E	B	A
Approach Delay		46.6		57.7		30.6			24.8	
Approach LOS		D		E		C			C	

Intersection Summary

Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 104 (80%), Referenced to phase 2:NBT and 6:SBT, Start of Green
 Natural Cycle: 120
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.94
 Intersection Signal Delay: 37.3
 Intersection LOS: D
 Intersection Capacity Utilization 82.8%
 ICU Level of Service E
 Analysis Period (min) 15

Splits and Phases: 7: Regional Rd 25 & Britannia Rd



Queues
7: Regional Rd 25 & Britannia Rd

2028 Future Total PM (South Parcel)
07-17-2023



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	45	348	288	818	237	1343	449	146	813	56
v/c Ratio	0.22	0.41	0.94	0.76	0.59	0.78	0.47	0.46	0.50	0.07
Control Delay	60.9	44.7	114.5	37.7	60.2	33.1	7.2	70.6	18.3	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	60.9	44.7	114.5	37.7	60.2	33.1	7.2	70.6	18.3	0.1
Queue Length 50th (m)	6.0	32.7	42.7	44.7	31.7	157.1	13.6	20.7	42.6	0.0
Queue Length 95th (m)	12.7	41.7	#71.1	47.9	44.3	#231.4	45.4	33.0	51.1	m0.0
Internal Link Dist (m)		377.9		190.1		165.3			161.9	
Turn Bay Length (m)	60.0		120.0		90.0		90.0	90.0		90.0
Base Capacity (vph)	203	1372	305	1483	414	1715	956	315	1612	806
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	0.22	0.25	0.94	0.55	0.57	0.78	0.47	0.46	0.50	0.07

Intersection Summary

































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.

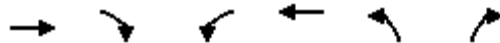
HCM Signalized Intersection Capacity Analysis
7: Regional Rd 25 & Britannia Rd

2028 Future Total PM (South Parcel)
07-17-2023

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 	  		 	  		 	 		 	 	
Traffic Volume (vph)	45	305	40	285	470	340	235	1330	445	145	805	55
Future Volume (vph)	45	305	40	285	470	340	235	1330	445	145	805	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.5		3.0	6.5		3.0	6.7	6.7	3.0	6.7	6.7
Lane Util. Factor	0.97	*0.80		0.97	*0.80		0.97	0.95	1.00	0.97	0.95	1.00
Frt	1.00	0.98		1.00	0.94		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		1.00	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3303	4481		3614	4231		3502	3505	1583	3467	3471	1615
Flt Permitted	0.95	1.00		1.00	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3303	4481		3614	4231		3502	3505	1583	3467	3471	1615
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	45	308	40	288	475	343	237	1343	449	146	813	56
RTOR Reduction (vph)	0	12	0	0	115	0	0	0	184	0	0	30
Lane Group Flow (vph)	45	336	0	288	703	0	237	1343	265	146	813	26
Heavy Vehicles (%)	6%	0%	0%	2%	1%	1%	0%	3%	2%	1%	4%	0%
Turn Type	Prot	NA		Prot	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases									2			6
Actuated Green, G (s)	5.6	24.2		10.0	28.6		14.0	61.8	61.8	10.8	58.6	58.6
Effective Green, g (s)	6.6	25.2		11.0	29.6		15.0	62.8	62.8	11.8	59.6	59.6
Actuated g/C Ratio	0.05	0.19		0.08	0.23		0.12	0.48	0.48	0.09	0.46	0.46
Clearance Time (s)	4.0	7.5		4.0	7.5		4.0	7.7	7.7	4.0	7.7	7.7
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	167	868		305	963		404	1693	764	314	1591	740
v/s Ratio Prot	0.01	0.07		c0.08	c0.17		c0.07	c0.38		0.04	0.23	
v/s Ratio Perm									0.17			0.02
v/c Ratio	0.27	0.39		0.94	0.73		0.59	0.79	0.35	0.46	0.51	0.03
Uniform Delay, d1	59.4	45.7		59.2	46.5		54.6	28.2	20.9	56.1	24.9	19.4
Progression Factor	1.00	1.00		1.32	0.87		1.00	1.00	1.00	1.19	0.66	0.00
Incremental Delay, d2	0.9	0.3		35.7	2.7		2.2	3.9	1.2	1.0	1.1	0.1
Delay (s)	60.3	46.0		114.1	43.1		56.7	32.1	22.1	67.7	17.4	0.1
Level of Service	E	D		F	D		E	C	C	E	B	A
Approach Delay (s)		47.6			61.6			32.7			23.7	
Approach LOS		D			E			C			C	
Intersection Summary												
HCM 2000 Control Delay			39.0	HCM 2000 Level of Service				D				
HCM 2000 Volume to Capacity ratio			0.80									
Actuated Cycle Length (s)			130.0	Sum of lost time (s)				19.2				
Intersection Capacity Utilization			82.8%	ICU Level of Service				E				
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis
 8: Site Dwy (South) & Etheridge Ave

2028 Future Total PM (South Parcel)
 07-17-2023



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	→			←	←	←
Traffic Volume (veh/h)	100	15	130	175	10	80
Future Volume (Veh/h)	100	15	130	175	10	80
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	109	16	141	190	11	87
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh						
Upstream signal (m)	78					
pX, platoon unblocked					0.97	
vC, conflicting volume			125	589		117
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			125	563		117
tC, single (s)			4.1	6.4		6.2
tC, 2 stage (s)						
tF (s)			2.2	3.5		3.3
p0 queue free %			90	97		91
cM capacity (veh/h)			1474	432		941
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	125	331	98			
Volume Left	0	141	11			
Volume Right	16	0	87			
cSH	1700	1474	831			
Volume to Capacity	0.07	0.10	0.12			
Queue Length 95th (m)	0.0	2.5	3.2			
Control Delay (s)	0.0	3.8	9.9			
Lane LOS			A			
Approach Delay (s)	0.0	3.8	9.9			
Approach LOS			A			
Intersection Summary						
Average Delay			4.0			
Intersection Capacity Utilization			35.2%	ICU Level of Service	A	
Analysis Period (min)			15			

Timings
10: Britannia Rd & Farmstead Dr

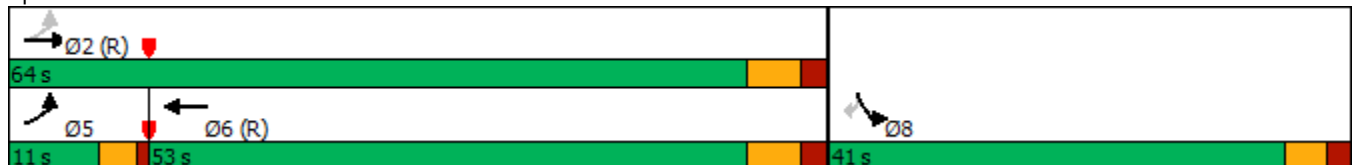


Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Configurations	↘	↑↑↑	↑↑↑	↘	↗
Traffic Volume (vph)	20	335	680	55	20
Future Volume (vph)	20	335	680	55	20
Turn Type	pm+pt	NA	NA	Prot	Perm
Protected Phases	5	2	6	8	
Permitted Phases	2				8
Detector Phase	5	2	6	8	8
Switch Phase					
Minimum Initial (s)	7.0	20.0	20.0	10.0	10.0
Minimum Split (s)	11.0	29.4	29.4	15.3	15.3
Total Split (s)	11.0	64.0	53.0	41.0	41.0
Total Split (%)	10.5%	61.0%	50.5%	39.0%	39.0%
Yellow Time (s)	3.0	4.2	4.2	3.3	3.3
All-Red Time (s)	1.0	2.2	2.2	2.0	2.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	3.0	5.4	5.4	4.3	4.3
Lead/Lag	Lead		Lag		
Lead-Lag Optimize?	Yes		Yes		
Recall Mode	None	C-Max	C-Max	None	None
Act Effct Green (s)	89.2	87.9	83.5	11.6	11.6
Actuated g/C Ratio	0.85	0.84	0.80	0.11	0.11
v/c Ratio	0.04	0.09	0.23	0.31	0.11
Control Delay	2.0	2.2	4.2	47.4	17.6
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	2.0	2.2	4.2	47.4	17.6
LOS	A	A	A	D	B
Approach Delay		2.2	4.2	39.3	
Approach LOS		A	A	D	

Intersection Summary

Cycle Length: 105
 Actuated Cycle Length: 105
 Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.31
 Intersection Signal Delay: 5.8
 Intersection LOS: A
 Intersection Capacity Utilization 33.1%
 ICU Level of Service A
 Analysis Period (min) 15

Splits and Phases: 10: Britannia Rd & Farmstead Dr



Queues
10: Britannia Rd & Farmstead Dr

2028 Future Total PM (South Parcel)
07-17-2023



Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	22	360	817	59	22
v/c Ratio	0.04	0.09	0.23	0.31	0.11
Control Delay	2.0	2.2	4.2	47.4	17.6
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	2.0	2.2	4.2	47.4	17.6
Queue Length 50th (m)	0.6	5.3	13.2	12.0	0.0
Queue Length 95th (m)	2.1	8.7	32.0	24.5	7.4
Internal Link Dist (m)		101.0	377.9	199.3	
Turn Bay Length (m)	20.0				
Base Capacity (vph)	552	3816	3540	606	578
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	0.09	0.23	0.10	0.04
Intersection Summary					

HCM Signalized Intersection Capacity Analysis
 10: Britannia Rd & Farmstead Dr

2028 Future Total PM (South Parcel)
 07-17-2023



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↖	↑↑↑	↑↑↑		↘	↘
Traffic Volume (vph)	20	335	680	80	55	20
Future Volume (vph)	20	335	680	80	55	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	5.4	5.4		4.3	4.3
Lane Util. Factor	1.00	*0.80	*0.80		1.00	1.00
Frt	1.00	1.00	0.98		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1805	4560	4448		1736	1615
Flt Permitted	0.28	1.00	1.00		0.95	1.00
Satd. Flow (perm)	536	4560	4448		1736	1615
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	22	360	731	86	59	22
RTOR Reduction (vph)	0	0	5	0	0	20
Lane Group Flow (vph)	22	360	812	0	59	2
Heavy Vehicles (%)	0%	0%	1%	0%	4%	0%
Turn Type	pm+pt	NA	NA		Prot	Perm
Protected Phases	5	2	6		8	
Permitted Phases	2					8
Actuated Green, G (s)	84.7	84.7	77.9		8.6	8.6
Effective Green, g (s)	85.7	85.7	78.9		9.6	9.6
Actuated g/C Ratio	0.82	0.82	0.75		0.09	0.09
Clearance Time (s)	4.0	6.4	6.4		5.3	5.3
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	483	3721	3342		158	147
v/s Ratio Prot	0.00	c0.08	c0.18		c0.03	
v/s Ratio Perm	0.04					0.00
v/c Ratio	0.05	0.10	0.24		0.37	0.01
Uniform Delay, d1	1.9	1.9	4.0		44.9	43.4
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.0	0.1	0.2		1.5	0.0
Delay (s)	1.9	2.0	4.1		46.4	43.4
Level of Service	A	A	A		D	D
Approach Delay (s)		2.0	4.1		45.6	
Approach LOS		A	A		D	

Intersection Summary			
HCM 2000 Control Delay	6.1	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.25		
Actuated Cycle Length (s)	105.0	Sum of lost time (s)	12.7
Intersection Capacity Utilization	33.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Timings
11: Britannia Rd & Rose Way



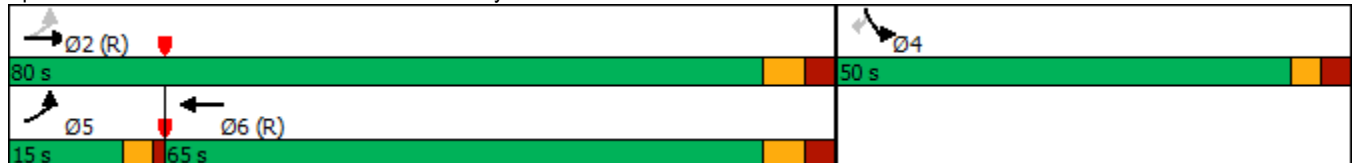
Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Configurations	↖	↑↑↑	↑↑↑	↖	↗
Traffic Volume (vph)	80	815	1045	30	50
Future Volume (vph)	80	815	1045	30	50
Turn Type	pm+pt	NA	NA	Prot	Perm
Protected Phases	5	2	6	4	
Permitted Phases	2				4
Detector Phase	5	2	6	4	4
Switch Phase					
Minimum Initial (s)	7.0	20.0	20.0	10.0	10.0
Minimum Split (s)	11.0	29.0	29.0	43.0	43.0
Total Split (s)	15.0	80.0	65.0	50.0	50.0
Total Split (%)	11.5%	61.5%	50.0%	38.5%	38.5%
Yellow Time (s)	3.0	4.0	4.0	3.0	3.0
All-Red Time (s)	1.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	3.0	6.0	6.0	5.0	5.0
Lead/Lag	Lead		Lag		
Lead-Lag Optimize?	Yes		Yes		
Recall Mode	None	C-Max	C-Max	None	None
Act Effct Green (s)	114.1	112.3	100.1	11.1	11.1
Actuated g/C Ratio	0.88	0.86	0.77	0.09	0.09
v/c Ratio	0.23	0.22	0.34	0.22	0.29
Control Delay	3.0	1.4	5.4	59.1	18.3
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	3.0	1.4	5.4	59.1	18.3
LOS	A	A	A	E	B
Approach Delay		1.5	5.4	33.7	
Approach LOS		A	A	C	

Intersection Summary

Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 65 (50%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
 Natural Cycle: 85
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.34
 Intersection Signal Delay: 4.8
 Intersection Capacity Utilization 48.2%
 Analysis Period (min) 15

Intersection LOS: A
 ICU Level of Service A

Splits and Phases: 11: Britannia Rd & Rose Way



Queues

2028 Future Total PM (South Parcel)

11: Britannia Rd & Rose Way

07-17-2023

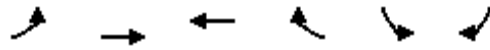


Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	87	886	1201	33	54
v/c Ratio	0.23	0.22	0.34	0.22	0.29
Control Delay	3.0	1.4	5.4	59.1	18.3
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	3.0	1.4	5.4	59.1	18.3
Queue Length 50th (m)	1.4	8.0	40.6	8.5	0.0
Queue Length 95th (m)	4.1	16.9	49.1	19.6	13.4
Internal Link Dist (m)		190.1	148.0	92.6	
Turn Bay Length (m)	50.0			50.0	
Base Capacity (vph)	420	3939	3483	624	594
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	0.21	0.22	0.34	0.05	0.09

Intersection Summary

HCM Signalized Intersection Capacity Analysis
 11: Britannia Rd & Rose Way

2028 Future Total PM (South Parcel)
 07-17-2023

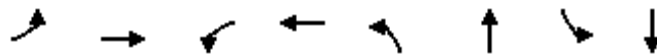


Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↵	↑↑↑	↑↑↑		↵	↵
Traffic Volume (vph)	80	815	1045	60	30	50
Future Volume (vph)	80	815	1045	60	30	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0	6.0		5.0	5.0
Lane Util. Factor	1.00	*0.80	*0.80		1.00	1.00
Frt	1.00	1.00	0.99		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1805	4560	4523		1805	1615
Flt Permitted	0.17	1.00	1.00		0.95	1.00
Satd. Flow (perm)	324	4560	4523		1805	1615
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	87	886	1136	65	33	54
RTOR Reduction (vph)	0	0	2	0	0	50
Lane Group Flow (vph)	87	886	1199	0	33	4
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Turn Type	pm+pt	NA	NA		Prot	Perm
Protected Phases	5	2	6		4	
Permitted Phases	2					4
Actuated Green, G (s)	108.9	108.9	97.9		8.1	8.1
Effective Green, g (s)	109.9	109.9	98.9		9.1	9.1
Actuated g/C Ratio	0.85	0.85	0.76		0.07	0.07
Clearance Time (s)	4.0	7.0	7.0		6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	365	3854	3440		126	113
v/s Ratio Prot	0.01	c0.19	c0.27		c0.02	
v/s Ratio Perm	0.19					0.00
v/c Ratio	0.24	0.23	0.35		0.26	0.03
Uniform Delay, d1	2.0	1.9	5.1		57.3	56.4
Progression Factor	1.14	0.63	1.00		1.00	1.00
Incremental Delay, d2	0.3	0.1	0.3		1.1	0.1
Delay (s)	2.7	1.4	5.3		58.4	56.5
Level of Service	A	A	A		E	E
Approach Delay (s)		1.5	5.3		57.2	
Approach LOS		A	A		E	

Intersection Summary				
HCM 2000 Control Delay		5.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio		0.33		
Actuated Cycle Length (s)		130.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization		48.2%	ICU Level of Service	A
Analysis Period (min)		15		
c Critical Lane Group				

Timings
1: Regional Rd 25 & Louis St Laurent Ave

2032 Future Total AM
07-17-2023

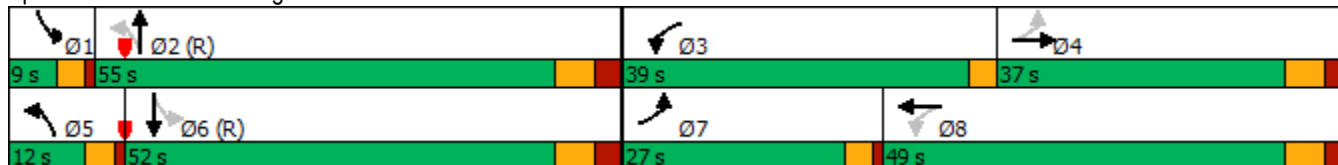


Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↖	↕	↖	↕	↖	↕	↖	↕
Traffic Volume (vph)	270	535	500	560	120	990	65	930
Future Volume (vph)	270	535	500	560	120	990	65	930
Turn Type	pm+pt	NA	pm+pt	NA	pm+pt	NA	pm+pt	NA
Protected Phases	7	4	3	8	5	2	1	6
Permitted Phases	4		8		2		6	
Detector Phase	7	4	3	8	5	2	1	6
Switch Phase								
Minimum Initial (s)	5.0	10.0	10.0	10.0	5.0	20.0	5.0	20.0
Minimum Split (s)	9.0	30.0	14.0	30.0	9.0	32.2	9.0	32.2
Total Split (s)	27.0	37.0	39.0	49.0	12.0	55.0	9.0	52.0
Total Split (%)	19.3%	26.4%	27.9%	35.0%	8.6%	39.3%	6.4%	37.1%
Yellow Time (s)	3.0	4.0	3.0	4.0	3.0	4.2	3.0	4.2
All-Red Time (s)	1.0	3.0	0.0	3.0	1.0	3.0	1.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	3.0	6.0	2.0	6.0	3.0	6.2	3.0	6.2
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	C-Max	None	C-Max
Act Effct Green (s)	52.7	30.9	72.6	46.8	62.4	52.0	56.7	47.3
Actuated g/C Ratio	0.38	0.22	0.52	0.33	0.45	0.37	0.40	0.34
v/c Ratio	0.65	0.94	0.94	0.57	0.65	0.85	0.50	0.72
Control Delay	29.2	72.1	64.6	40.0	40.6	45.4	36.4	43.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.2	72.1	64.6	40.0	40.6	45.4	36.4	43.8
LOS	C	E	E	D	D	D	D	D
Approach Delay		60.6		50.6		45.0		43.4
Approach LOS		E		D		D		D

Intersection Summary

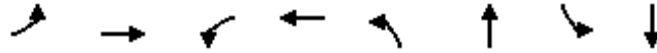
Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 100
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.94
 Intersection Signal Delay: 49.3
 Intersection LOS: D
 Intersection Capacity Utilization 96.9%
 ICU Level of Service F
 Analysis Period (min) 15

Splits and Phases: 1: Regional Rd 25 & Louis St Laurent Ave



Queues
1: Regional Rd 25 & Louis St Laurent Ave

2032 Future Total AM
07-17-2023



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	270	735	500	655	120	1345	65	1025
v/c Ratio	0.65	0.94	0.94	0.57	0.65	0.85	0.50	0.72
Control Delay	29.2	72.1	64.6	40.0	40.6	45.4	36.4	43.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.2	72.1	64.6	40.0	40.6	45.4	36.4	43.8
Queue Length 50th (m)	43.2	107.2	121.8	79.1	21.0	148.7	11.0	109.2
Queue Length 95th (m)	62.6	#147.0	#188.6	105.6	#35.6	#174.5	20.8	129.8
Internal Link Dist (m)		126.1		117.1		481.0		113.5
Turn Bay Length (m)	90.0		35.0		65.0		80.0	
Base Capacity (vph)	484	783	550	1155	186	1577	131	1431
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	0.56	0.94	0.91	0.57	0.65	0.85	0.50	0.72

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
1: Regional Rd 25 & Louis St Laurent Ave

2032 Future Total AM
07-17-2023



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↗		↖	↗	
Traffic Volume (vph)	270	535	200	500	560	95	120	990	355	65	930	95
Future Volume (vph)	270	535	200	500	560	95	120	990	355	65	930	95
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0		2.0	6.0		3.0	6.2		3.0	6.2	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	*0.80		1.00	*0.80	
Frbp, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.96		1.00	0.98		1.00	0.96		1.00	0.99	
Flt Protected	0.95	1.00		1.00	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1767	3404		1863	3427		1703	4134		1719	4221	
Flt Permitted	0.40	1.00		0.12	1.00		0.11	1.00		0.08	1.00	
Satd. Flow (perm)	745	3404		226	3427		203	4134		153	4221	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	270	535	200	500	560	95	120	990	355	65	930	95
RTOR Reduction (vph)	0	27	0	0	9	0	0	43	0	0	7	0
Lane Group Flow (vph)	270	708	0	500	646	0	120	1302	0	65	1018	0
Confl. Peds. (#/hr)	5					5						
Heavy Vehicles (%)	2%	2%	1%	2%	2%	7%	6%	7%	3%	5%	7%	2%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	47.6	29.9		67.5	45.8		58.3	50.3		50.3	46.3	
Effective Green, g (s)	49.6	30.9		68.5	46.8		59.3	51.3		52.3	47.3	
Actuated g/C Ratio	0.35	0.22		0.49	0.33		0.42	0.37		0.37	0.34	
Clearance Time (s)	4.0	7.0		3.0	7.0		4.0	7.2		4.0	7.2	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	400	751		526	1145		182	1514		113	1426	
v/s Ratio Prot	0.09	c0.21		c0.24	0.19		c0.04	c0.31		0.02	0.24	
v/s Ratio Perm	0.15			0.22			0.24			0.19		
v/c Ratio	0.68	0.94		0.95	0.56		0.66	0.86		0.58	0.71	
Uniform Delay, d1	34.4	53.7		41.4	38.2		28.3	41.0		32.3	40.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	4.5	20.0		27.2	0.6		8.4	6.6		6.9	3.1	
Delay (s)	38.9	73.7		68.7	38.9		36.7	47.6		39.2	43.5	
Level of Service	D	E		E	D		D	D		D	D	
Approach Delay (s)		64.3			51.8			46.7			43.3	
Approach LOS		E			D			D			D	

Intersection Summary

HCM 2000 Control Delay	50.9	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)	18.2
Intersection Capacity Utilization	96.9%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Timings
2: Regional Rd 25 & Whitlock Ave

2032 Future Total AM
07-17-2023

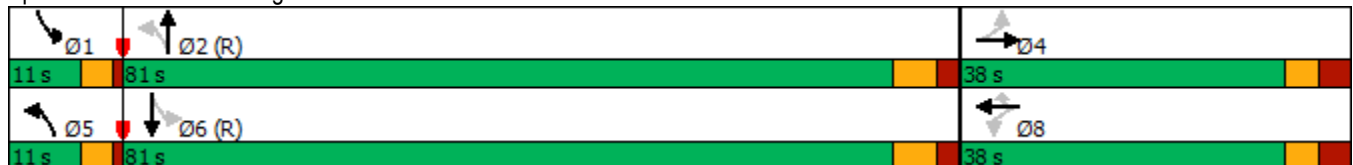


Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations	↖	↗	↖	↗	↗	↖	↑↑↑	↖	↑↑↑
Traffic Volume (vph)	145	50	50	35	95	45	1250	50	1780
Future Volume (vph)	145	50	50	35	95	45	1250	50	1780
Turn Type	Perm	NA	Perm	NA	Perm	pm+pt	NA	pm+pt	NA
Protected Phases		4		8		5	2	1	6
Permitted Phases	4		8		8	2		6	
Detector Phase	4	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	20.0	7.0	20.0
Minimum Split (s)	37.5	37.5	37.5	37.5	37.5	11.0	35.5	11.0	35.5
Total Split (s)	38.0	38.0	38.0	38.0	38.0	11.0	81.0	11.0	81.0
Total Split (%)	29.2%	29.2%	29.2%	29.2%	29.2%	8.5%	62.3%	8.5%	62.3%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.0	4.2	3.0	4.2
All-Red Time (s)	3.2	3.2	3.2	3.2	3.2	1.0	2.3	1.0	2.3
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5	3.0	5.5	3.0	5.5
Lead/Lag						Lead	Lag	Lead	Lag
Lead-Lag Optimize?						Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	None	C-Max
Act Effct Green (s)	20.4	20.4	20.4	20.4	20.4	98.7	89.7	98.7	89.6
Actuated g/C Ratio	0.16	0.16	0.16	0.16	0.16	0.76	0.69	0.76	0.69
v/c Ratio	0.69	0.49	0.33	0.13	0.31	0.26	0.43	0.16	0.63
Control Delay	68.1	30.2	52.5	45.3	10.9	12.5	7.8	5.4	13.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	68.1	30.2	52.5	45.3	10.9	12.5	7.8	5.4	13.7
LOS	E	C	D	D	B	B	A	A	B
Approach Delay		49.2		29.2			8.0		13.5
Approach LOS		D		C			A		B

Intersection Summary

Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 64 (49%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 95
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.69
 Intersection Signal Delay: 15.1
 Intersection Capacity Utilization 75.1%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service D

Splits and Phases: 2: Regional Rd 25 & Whitlock Ave



Queues
2: Regional Rd 25 & Whitlock Ave

2032 Future Total AM
07-17-2023



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	145	145	50	35	95	45	1260	50	1880
v/c Ratio	0.69	0.49	0.33	0.13	0.31	0.26	0.43	0.16	0.63
Control Delay	68.1	30.2	52.5	45.3	10.9	12.5	7.8	5.4	13.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	68.1	30.2	52.5	45.3	10.9	12.5	7.8	5.4	13.7
Queue Length 50th (m)	37.5	18.2	12.1	8.2	0.0	1.2	34.9	2.6	111.9
Queue Length 95th (m)	57.3	37.4	23.8	17.1	14.7	m4.8	m130.7	7.2	159.0
Internal Link Dist (m)		62.9		68.1			497.5		481.0
Turn Bay Length (m)	35.0		65.0		65.0	100.0		100.0	
Base Capacity (vph)	333	431	241	439	435	174	2959	314	2970
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	0.44	0.34	0.21	0.08	0.22	0.26	0.43	0.16	0.63

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
2: Regional Rd 25 & Whitlock Ave

2032 Future Total AM
07-17-2023



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	145	50	95	50	35	95	45	1250	10	50	1780	100
Future Volume (vph)	145	50	95	50	35	95	45	1250	10	50	1780	100
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5		5.5	5.5	5.5	3.0	5.5		3.0	5.5	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	*0.80		1.00	*0.80	
Frbp, ped/bikes	1.00	0.99		1.00	1.00	0.98	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	0.99	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.90		1.00	1.00	0.85	1.00	1.00		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1725	1516		1727	1759	1455	1671	4291		1805	4304	
Flt Permitted	0.73	1.00		0.53	1.00	1.00	0.06	1.00		0.15	1.00	
Satd. Flow (perm)	1333	1516		965	1759	1455	101	4291		288	4304	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	145	50	95	50	35	95	45	1250	10	50	1780	100
RTOR Reduction (vph)	0	59	0	0	0	80	0	0	0	0	3	0
Lane Group Flow (vph)	145	86	0	50	35	15	45	1260	0	50	1877	0
Confl. Peds. (#/hr)	5		5	5		5						
Heavy Vehicles (%)	4%	32%	1%	4%	8%	9%	8%	6%	25%	0%	5%	7%
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	19.4	19.4		19.4	19.4	19.4	93.6	87.9		93.6	87.9	
Effective Green, g (s)	20.4	20.4		20.4	20.4	20.4	95.6	88.9		95.6	88.9	
Actuated g/C Ratio	0.16	0.16		0.16	0.16	0.16	0.74	0.68		0.74	0.68	
Clearance Time (s)	6.5	6.5		6.5	6.5	6.5	4.0	6.5		4.0	6.5	
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)	209	237		151	276	228	155	2934		289	2943	
v/s Ratio Prot		0.06			0.02		c0.01	0.29		0.01	c0.44	
v/s Ratio Perm	c0.11			0.05		0.01	0.20			0.12		
v/c Ratio	0.69	0.36		0.33	0.13	0.07	0.29	0.43		0.17	0.64	
Uniform Delay, d1	51.8	49.0		48.7	47.1	46.7	8.5	9.2		5.3	11.5	
Progression Factor	1.00	1.00		1.00	1.00	1.00	2.04	0.74		1.00	1.00	
Incremental Delay, d2	9.6	0.9		1.3	0.2	0.1	1.0	0.4		0.3	1.1	
Delay (s)	61.4	49.9		50.0	47.3	46.8	18.3	7.2		5.6	12.6	
Level of Service	E	D		D	D	D	B	A		A	B	
Approach Delay (s)		55.7			47.8			7.6			12.4	
Approach LOS		E			D			A			B	
Intersection Summary												
HCM 2000 Control Delay			15.8			HCM 2000 Level of Service				B		
HCM 2000 Volume to Capacity ratio			0.63									
Actuated Cycle Length (s)			130.0	Sum of lost time (s)				14.0				
Intersection Capacity Utilization			75.1%	ICU Level of Service				D				
Analysis Period (min)			15									

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
 3: Regional Rd 25 & Site Dwy (North)

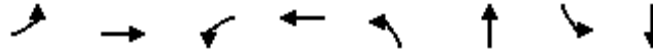
2032 Future Total AM
 07-17-2023



Movement	EBL	EBR	NBL	NBT	SBT	SBR	
Lane Configurations		↗		↑↑↑	↑↑↑↗		
Traffic Volume (veh/h)	0	30	0	1305	1915	10	
Future Volume (Veh/h)	0	30	0	1305	1915	10	
Sign Control	Stop			Free	Free		
Grade	0%			0%	0%		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Hourly flow rate (vph)	0	30	0	1305	1915	10	
Pedestrians							
Lane Width (m)							
Walking Speed (m/s)							
Percent Blockage							
Right turn flare (veh)							
Median type				None	None		
Median storage veh							
Upstream signal (m)	199						
pX, platoon unblocked	0.94						
vC, conflicting volume	2355	643	1925				
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol	2226	643	1925				
tC, single (s)	6.8	6.9	4.1				
tC, 2 stage (s)							
tF (s)	3.5	3.3	2.2				
p0 queue free %	100	93	100				
cM capacity (veh/h)	35	421	311				
Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	30	435	435	435	766	766	393
Volume Left	0	0	0	0	0	0	0
Volume Right	30	0	0	0	0	0	10
cSH	421	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.07	0.26	0.26	0.26	0.45	0.45	0.23
Queue Length 95th (m)	1.8	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (s)	14.2	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	B						
Approach Delay (s)	14.2	0.0					0.0
Approach LOS	B						
Intersection Summary							
Average Delay	0.1						
Intersection Capacity Utilization	47.2%			ICU Level of Service	A		
Analysis Period (min)	15						

Timings
5: Regional Rd 25 & Etheridge Ave/Collector Road

2032 Future Total AM
07-17-2023

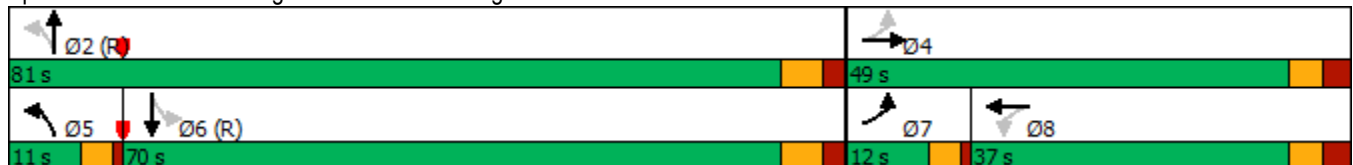


Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↖	↗	↖	↗	↖	↑↑↑	↖	↑↑↑
Traffic Volume (vph)	245	0	65	0	85	1005	30	1835
Future Volume (vph)	245	0	65	0	85	1005	30	1835
Turn Type	pm+pt	NA	Perm	NA	pm+pt	NA	Perm	NA
Protected Phases	7	4		8	5	2		6
Permitted Phases	4		8		2		6	
Detector Phase	7	4	8	8	5	2	6	6
Switch Phase								
Minimum Initial (s)	7.0	10.0	10.0	10.0	7.0	20.0	20.0	20.0
Minimum Split (s)	11.0	36.2	36.2	36.2	11.0	38.4	38.4	38.4
Total Split (s)	12.0	49.0	37.0	37.0	11.0	81.0	70.0	70.0
Total Split (%)	9.2%	37.7%	28.5%	28.5%	8.5%	62.3%	53.8%	53.8%
Yellow Time (s)	3.0	3.3	3.3	3.3	3.0	4.2	4.2	4.2
All-Red Time (s)	1.0	2.9	2.9	2.9	1.0	2.2	2.2	2.2
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	3.0	5.2	5.2	5.2	3.0	5.4	5.4	5.4
Lead/Lag	Lead		Lag	Lag	Lead		Lag	Lag
Lead-Lag Optimize?	Yes		Yes	Yes	Yes		Yes	Yes
Recall Mode	None	None	None	None	None	C-Max	C-Max	C-Max
Act Effct Green (s)	25.6	23.4	13.8	13.8	98.4	96.0	84.1	84.1
Actuated g/C Ratio	0.20	0.18	0.11	0.11	0.76	0.74	0.65	0.65
v/c Ratio	0.92	0.37	0.49	0.19	0.47	0.32	0.11	0.69
Control Delay	87.5	14.0	66.3	1.5	50.1	2.4	4.2	10.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	87.5	14.0	66.3	1.5	50.1	2.4	4.2	10.3
LOS	F	B	E	A	D	A	A	B
Approach Delay		60.8		36.6		6.1		10.3
Approach LOS		E		D		A		B

Intersection Summary

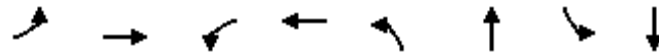
Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 110
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.92
 Intersection Signal Delay: 15.3
 Intersection LOS: B
 Intersection Capacity Utilization 80.5%
 ICU Level of Service D
 Analysis Period (min) 15

Splits and Phases: 5: Regional Rd 25 & Etheridge Ave/Collector Road



Queues
5: Regional Rd 25 & Etheridge Ave/Collector Road

2032 Future Total AM
07-17-2023



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	245	140	65	55	85	1025	30	1915
v/c Ratio	0.92	0.37	0.49	0.19	0.47	0.32	0.11	0.69
Control Delay	87.5	14.0	66.3	1.5	50.1	2.4	4.2	10.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	87.5	14.0	66.3	1.5	50.1	2.4	4.2	10.3
Queue Length 50th (m)	61.1	5.8	16.9	0.0	10.8	9.6	0.9	147.3
Queue Length 95th (m)	#92.9	23.3	31.7	0.0	m20.4	14.7	m1.9	200.6
Internal Link Dist (m)		53.9		63.1		108.9		175.3
Turn Bay Length (m)	40.0		40.0		70.0		70.0	
Base Capacity (vph)	266	619	310	492	180	3173	283	2792
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	0.92	0.23	0.21	0.11	0.47	0.32	0.11	0.69

Intersection Summary

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
5: Regional Rd 25 & Etheridge Ave/Collector Road

2032 Future Total AM
07-17-2023



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↑↑↑		↖	↑↑↑	
Traffic Volume (vph)	245	0	140	65	0	55	85	1005	20	30	1835	80
Future Volume (vph)	245	0	140	65	0	55	85	1005	20	30	1835	80
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	5.2		5.2	5.2		3.0	5.4		5.4	5.4	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	*0.80		1.00	*0.80	
Frt	1.00	0.85		1.00	0.85		1.00	1.00		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1787	1615		1805	1615		1752	4294		1805	4314	
Flt Permitted	0.57	1.00		0.67	1.00		0.05	1.00		0.23	1.00	
Satd. Flow (perm)	1082	1615		1269	1615		86	4294		438	4314	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	245	0	140	65	0	55	85	1005	20	30	1835	80
RTOR Reduction (vph)	0	92	0	0	50	0	0	1	0	0	2	0
Lane Group Flow (vph)	245	48	0	65	5	0	85	1024	0	30	1913	0
Heavy Vehicles (%)	1%	0%	0%	0%	0%	0%	3%	6%	0%	0%	5%	6%
Turn Type	pm+pt	NA		Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases	7	4			8		5	2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	23.6	23.6		10.8	10.8		93.8	93.8		81.8	81.8	
Effective Green, g (s)	24.6	24.6		11.8	11.8		94.8	94.8		82.8	82.8	
Actuated g/C Ratio	0.19	0.19		0.09	0.09		0.73	0.73		0.64	0.64	
Clearance Time (s)	4.0	6.2		6.2	6.2		4.0	6.4		6.4	6.4	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	257	305		115	146		178	3131		278	2747	
v/s Ratio Prot	c0.07	0.03			0.00		c0.03	0.24			c0.44	
v/s Ratio Perm	c0.11			0.05			0.32			0.07		
v/c Ratio	0.95	0.16		0.57	0.03		0.48	0.33		0.11	0.70	
Uniform Delay, d1	51.2	44.0		56.6	53.9		16.4	6.3		9.2	15.4	
Progression Factor	1.00	1.00		1.00	1.00		2.90	0.34		0.31	0.57	
Incremental Delay, d2	43.1	0.2		6.2	0.1		1.5	0.2		0.6	1.2	
Delay (s)	94.4	44.3		62.9	54.0		49.1	2.3		3.5	10.0	
Level of Service	F	D		E	D		D	A		A	B	
Approach Delay (s)		76.1			58.8			5.9			9.9	
Approach LOS		E			E			A			A	

Intersection Summary

HCM 2000 Control Delay	17.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	16.6
Intersection Capacity Utilization	80.5%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
6: Regional Rd 25 & Site Dwy (South)

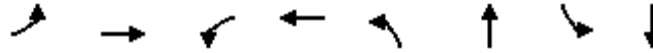
2032 Future Total AM
07-17-2023



Movement	EBL	EBR	NBL	NBT	SBT	SBR	
Lane Configurations		↗		↑↑↑	↑↑↑↗		
Traffic Volume (veh/h)	0	45	0	1110	2025	15	
Future Volume (Veh/h)	0	45	0	1110	2025	15	
Sign Control	Stop			Free	Free		
Grade	0%			0%	0%		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Hourly flow rate (vph)	0	45	0	1110	2025	15	
Pedestrians							
Lane Width (m)							
Walking Speed (m/s)							
Percent Blockage							
Right turn flare (veh)							
Median type				None	None		
Median storage veh							
Upstream signal (m)				183	133		
pX, platoon unblocked	0.82	0.72	0.72				
vC, conflicting volume	2402	682	2040				
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol	420	0	1103				
tC, single (s)	6.8	6.9	4.1				
tC, 2 stage (s)							
tF (s)	3.5	3.3	2.2				
p0 queue free %	100	94	100				
cM capacity (veh/h)	462	790	464				
Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	45	370	370	370	810	810	420
Volume Left	0	0	0	0	0	0	0
Volume Right	45	0	0	0	0	0	15
cSH	790	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.06	0.22	0.22	0.22	0.48	0.48	0.25
Queue Length 95th (m)	1.4	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	49.5%			ICU Level of Service	A		
Analysis Period (min)	15						

Timings
7: Regional Rd 25 & Britannia Rd

2032 Future Total AM
07-17-2023

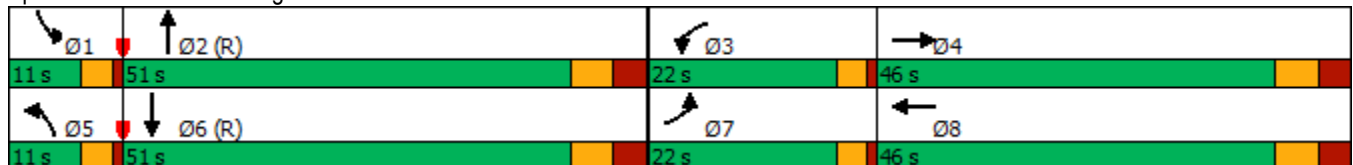


Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↖↗	↕↗	↖↗	↕↗	↖↗	↕↗	↖↗	↕↗
Traffic Volume (vph)	60	415	430	345	50	905	365	1680
Future Volume (vph)	60	415	430	345	50	905	365	1680
Turn Type	Prot	NA	Prot	NA	Prot	NA	Prot	NA
Protected Phases	7	4	3	8	5	2	1	6
Permitted Phases								
Detector Phase	7	4	3	8	5	2	1	6
Switch Phase								
Minimum Initial (s)	7.0	10.0	7.0	10.0	7.0	20.0	7.0	20.0
Minimum Split (s)	11.0	45.5	11.0	45.5	11.0	49.7	11.0	49.7
Total Split (s)	22.0	46.0	22.0	46.0	11.0	51.0	11.0	51.0
Total Split (%)	16.9%	35.4%	16.9%	35.4%	8.5%	39.2%	8.5%	39.2%
Yellow Time (s)	3.0	4.2	3.0	4.2	3.0	4.2	3.0	4.2
All-Red Time (s)	1.0	3.3	1.0	3.3	1.0	3.5	1.0	3.5
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	3.0	6.5	3.0	6.5	3.0	6.7	3.0	6.7
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	C-Max	None	C-Max
Act Effct Green (s)	9.0	25.2	18.8	37.2	8.7	44.3	22.5	60.3
Actuated g/C Ratio	0.07	0.19	0.14	0.29	0.07	0.34	0.17	0.46
v/c Ratio	0.26	0.76	0.87	0.38	0.22	0.77	0.60	0.85
Control Delay	59.9	46.4	68.6	29.3	59.6	41.1	53.7	48.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	59.9	46.4	68.6	29.3	59.6	41.1	53.7	48.6
LOS	E	D	E	C	E	D	D	D
Approach Delay		47.5		47.7		41.9		49.5
Approach LOS		D		D		D		D

Intersection Summary

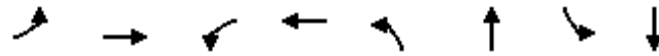
Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 104 (80%), Referenced to phase 2:NBT and 6:SBT, Start of Green
 Natural Cycle: 130
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.87
 Intersection Signal Delay: 47.0
 Intersection LOS: D
 Intersection Capacity Utilization 83.2%
 ICU Level of Service E
 Analysis Period (min) 15

Splits and Phases: 7: Regional Rd 25 & Britannia Rd



Queues
7: Regional Rd 25 & Britannia Rd

2032 Future Total AM
07-17-2023



































Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	60	700	430	490	50	1120	365	1705
v/c Ratio	0.26	0.76	0.87	0.38	0.22	0.77	0.60	0.85
Control Delay	59.9	46.4	68.6	29.3	59.6	41.1	53.7	48.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	59.9	46.4	68.6	29.3	59.6	41.1	53.7	48.6
Queue Length 50th (m)	8.0	62.7	59.0	37.8	6.7	108.6	53.2	157.8
Queue Length 95th (m)	15.3	76.0	#86.1	51.4	13.4	129.7	#75.3	#232.1
Internal Link Dist (m)		377.9		182.4		165.3		159.1
Turn Bay Length (m)	60.0		120.0		90.0		90.0	
Base Capacity (vph)	482	1370	503	1369	225	1463	605	2005
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	0.51	0.85	0.36	0.22	0.77	0.60	0.85

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
7: Regional Rd 25 & Britannia Rd

2032 Future Total AM
07-17-2023

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	 	  		 	  		 	  		 	  		
Traffic Volume (vph)	60	415	285	430	345	145	50	905	215	365	1680	25	
Future Volume (vph)	60	415	285	430	345	145	50	905	215	365	1680	25	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	3.0	6.5		3.0	6.5		3.0	6.7		3.0	6.7		
Lane Util. Factor	0.97	*0.80		0.97	*0.80		0.97	*0.80		0.97	*0.80		
Frt	1.00	0.94		1.00	0.96		1.00	0.97		1.00	1.00		
Flt Protected	0.95	1.00		1.00	1.00		0.95	1.00		0.95	1.00		
Satd. Flow (prot)	3303	4239		3445	4302		3367	4226		3502	4320		
Flt Permitted	0.95	1.00		1.00	1.00		0.95	1.00		0.95	1.00		
Satd. Flow (perm)	3303	4239		3445	4302		3367	4226		3502	4320		
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Adj. Flow (vph)	60	415	285	430	345	145	50	905	215	365	1680	25	
RTOR Reduction (vph)	0	94	0	0	60	0	0	24	0	0	1	0	
Lane Group Flow (vph)	60	606	0	430	430	0	50	1096	0	365	1704	0	
Heavy Vehicles (%)	6%	1%	1%	7%	1%	2%	4%	5%	4%	0%	5%	27%	
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA		
Protected Phases	7	4		3	8		5	2		1	6		
Permitted Phases													
Actuated Green, G (s)	6.6	25.0		17.8	36.2		6.3	42.5		21.5	57.7		
Effective Green, g (s)	7.6	26.0		18.8	37.2		7.3	43.5		22.5	58.7		
Actuated g/C Ratio	0.06	0.20		0.14	0.29		0.06	0.33		0.17	0.45		
Clearance Time (s)	4.0	7.5		4.0	7.5		4.0	7.7		4.0	7.7		
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0		
Lane Grp Cap (vph)	193	847		498	1231		189	1414		606	1950		
v/s Ratio Prot	0.02	c0.14		c0.12	0.10		0.01	0.26		c0.10	c0.39		
v/s Ratio Perm													
v/c Ratio	0.31	0.71		0.86	0.35		0.26	0.78		0.60	0.87		
Uniform Delay, d1	58.7	48.5		54.3	36.8		58.8	38.9		49.6	32.3		
Progression Factor	1.00	1.00		0.93	0.93		1.00	1.00		0.98	1.40		
Incremental Delay, d2	0.9	2.9		14.2	0.2		0.8	4.2		1.3	4.6		
Delay (s)	59.6	51.4		64.7	34.4		59.5	43.1		50.1	49.9		
Level of Service	E	D		E	C		E	D		D	D		
Approach Delay (s)		52.1			48.6			43.8			49.9		
Approach LOS		D			D			D			D		
Intersection Summary													
HCM 2000 Control Delay			48.5									HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio			0.82										
Actuated Cycle Length (s)			130.0									Sum of lost time (s)	19.2
Intersection Capacity Utilization			83.2%									ICU Level of Service	E
Analysis Period (min)			15										
c Critical Lane Group													

HCM Unsignalized Intersection Capacity Analysis
 8: Site Dwy (South)/Site Dwy (North) & Etheridge Ave

2032 Future Total AM
 07-17-2023



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (veh/h)	5	165	5	45	85	35	15	0	125	95	0	10
Future Volume (Veh/h)	5	165	5	45	85	35	15	0	125	95	0	10
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	5	165	5	45	85	35	15	0	125	95	0	10
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None				None							
Median storage (veh)												
Upstream signal (m)	78											
pX, platoon unblocked	1.00						1.00	1.00		1.00	1.00	1.00
vC, conflicting volume	120			170			380	388	168	495	372	102
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	119			170			379	387	168	494	372	101
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			97			97	100	86	77	100	99
cM capacity (veh/h)	1480			1420			560	531	882	408	542	959
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	175	165	140	105								
Volume Left	5	45	15	95								
Volume Right	5	35	125	10								
cSH	1480	1420	831	432								
Volume to Capacity	0.00	0.03	0.17	0.24								
Queue Length 95th (m)	0.1	0.8	4.8	7.5								
Control Delay (s)	0.2	2.3	10.2	16.0								
Lane LOS	A	A	B	C								
Approach Delay (s)	0.2	2.3	10.2	16.0								
Approach LOS			B	C								
Intersection Summary												
Average Delay			6.0									
Intersection Capacity Utilization			46.1%	ICU Level of Service	A							
Analysis Period (min)			15									

Timings
10: Britannia Rd & Farmstead Dr

2032 Future Total AM
07-17-2023

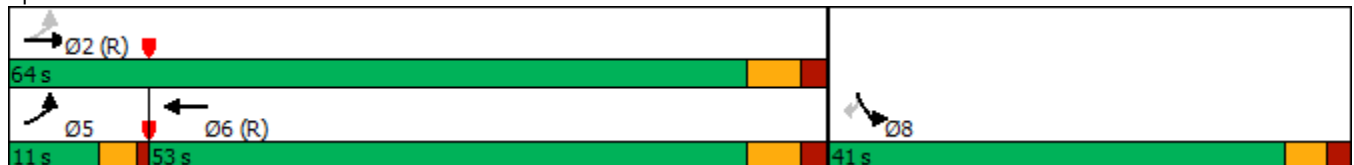


Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Configurations	↘	↑↑↑	↑↑↑	↘	↗
Traffic Volume (vph)	20	670	395	90	30
Future Volume (vph)	20	670	395	90	30
Turn Type	pm+pt	NA	NA	Prot	Perm
Protected Phases	5	2	6	8	
Permitted Phases	2				8
Detector Phase	5	2	6	8	8
Switch Phase					
Minimum Initial (s)	7.0	20.0	20.0	10.0	10.0
Minimum Split (s)	11.0	29.4	29.4	15.3	15.3
Total Split (s)	11.0	64.0	53.0	41.0	41.0
Total Split (%)	10.5%	61.0%	50.5%	39.0%	39.0%
Yellow Time (s)	3.0	4.2	4.2	3.3	3.3
All-Red Time (s)	1.0	2.2	2.2	2.0	2.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	3.0	5.4	5.4	4.3	4.3
Lead/Lag	Lead		Lag		
Lead-Lag Optimize?	Yes		Yes		
Recall Mode	None	C-Max	C-Max	None	None
Act Effct Green (s)	88.0	86.7	82.3	12.8	12.8
Actuated g/C Ratio	0.84	0.83	0.78	0.12	0.12
v/c Ratio	0.03	0.18	0.13	0.43	0.14
Control Delay	2.4	2.8	4.4	49.0	15.4
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	2.4	2.8	4.4	49.0	15.4
LOS	A	A	A	D	B
Approach Delay		2.8	4.4	40.6	
Approach LOS		A	A	D	

Intersection Summary

Cycle Length: 105
 Actuated Cycle Length: 105
 Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.43
 Intersection Signal Delay: 7.0
 Intersection LOS: A
 Intersection Capacity Utilization 33.1%
 ICU Level of Service A
 Analysis Period (min) 15

Splits and Phases: 10: Britannia Rd & Farmstead Dr



Queues
10: Britannia Rd & Farmstead Dr

2032 Future Total AM
07-17-2023



Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	20	670	420	90	30
v/c Ratio	0.03	0.18	0.13	0.43	0.14
Control Delay	2.4	2.8	4.4	49.0	15.4
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	2.4	2.8	4.4	49.0	15.4
Queue Length 50th (m)	0.6	11.4	6.5	18.4	0.0
Queue Length 95th (m)	2.3	18.8	18.0	33.1	8.5
Internal Link Dist (m)		101.0	377.9	199.3	
Turn Bay Length (m)	20.0				
Base Capacity (vph)	726	3653	3295	595	557
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	0.18	0.13	0.15	0.05
Intersection Summary					

HCM Signalized Intersection Capacity Analysis
 10: Britannia Rd & Farmstead Dr

2032 Future Total AM
 07-17-2023



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↵	↑↑↑	↑↑↑		↵	↵
Traffic Volume (vph)	20	670	395	25	90	30
Future Volume (vph)	20	670	395	25	90	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	5.4	5.4		4.3	4.3
Lane Util. Factor	1.00	*0.80	*0.80		1.00	1.00
Frt	1.00	1.00	0.99		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1656	4427	4203		1703	1538
Flt Permitted	0.45	1.00	1.00		0.95	1.00
Satd. Flow (perm)	787	4427	4203		1703	1538
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	20	670	395	25	90	30
RTOR Reduction (vph)	0	0	3	0	0	27
Lane Group Flow (vph)	20	670	417	0	90	3
Heavy Vehicles (%)	9%	3%	8%	0%	6%	5%
Turn Type	pm+pt	NA	NA		Prot	Perm
Protected Phases	5	2	6		8	
Permitted Phases	2					8
Actuated Green, G (s)	83.5	83.5	76.7		9.8	9.8
Effective Green, g (s)	84.5	84.5	77.7		10.8	10.8
Actuated g/C Ratio	0.80	0.80	0.74		0.10	0.10
Clearance Time (s)	4.0	6.4	6.4		5.3	5.3
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	664	3562	3110		175	158
v/s Ratio Prot	0.00	c0.15	0.10		c0.05	
v/s Ratio Perm	0.02					0.00
v/c Ratio	0.03	0.19	0.13		0.51	0.02
Uniform Delay, d1	2.1	2.4	3.9		44.6	42.3
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.0	0.1	0.1		2.5	0.0
Delay (s)	2.1	2.5	4.0		47.2	42.4
Level of Service	A	A	A		D	D
Approach Delay (s)		2.5	4.0		46.0	
Approach LOS		A	A		D	

Intersection Summary

HCM 2000 Control Delay	7.2	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.23		
Actuated Cycle Length (s)	105.0	Sum of lost time (s)	12.7
Intersection Capacity Utilization	33.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Timings
11: Britannia Rd & Rose Way

2032 Future Total AM
07-17-2023

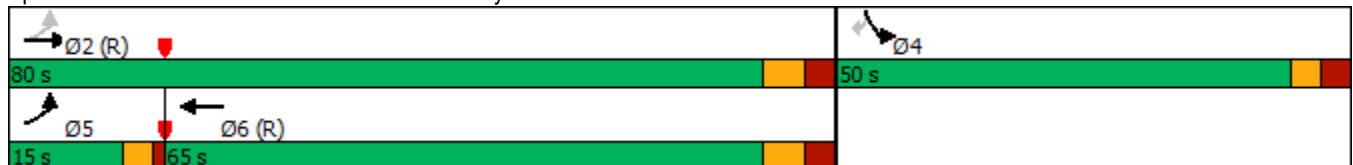


Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Configurations	↖	↑↑↑	↑↑↑	↖	↗
Traffic Volume (vph)	25	970	845	55	75
Future Volume (vph)	25	970	845	55	75
Turn Type	pm+pt	NA	NA	Prot	Perm
Protected Phases	5	2	6	4	
Permitted Phases	2				4
Detector Phase	5	2	6	4	4
Switch Phase					
Minimum Initial (s)	7.0	20.0	20.0	10.0	10.0
Minimum Split (s)	11.0	29.0	29.0	43.0	43.0
Total Split (s)	15.0	80.0	65.0	50.0	50.0
Total Split (%)	11.5%	61.5%	50.0%	38.5%	38.5%
Yellow Time (s)	3.0	4.0	4.0	3.0	3.0
All-Red Time (s)	1.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	3.0	6.0	6.0	5.0	5.0
Lead/Lag	Lead		Lag		
Lead-Lag Optimize?	Yes		Yes		
Recall Mode	None	C-Max	C-Max	None	None
Act Effct Green (s)	110.2	107.2	100.6	11.8	11.8
Actuated g/C Ratio	0.85	0.82	0.77	0.09	0.09
v/c Ratio	0.05	0.26	0.24	0.34	0.35
Control Delay	4.0	5.9	4.7	61.1	16.3
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	4.0	5.9	4.7	61.1	16.3
LOS	A	A	A	E	B
Approach Delay		5.9	4.7	35.2	
Approach LOS		A	A	D	

Intersection Summary

Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
 Natural Cycle: 85
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.35
 Intersection Signal Delay: 7.3
 Intersection LOS: A
 Intersection Capacity Utilization 38.3%
 ICU Level of Service A
 Analysis Period (min) 15

Splits and Phases: 11: Britannia Rd & Rose Way



Queues
11: Britannia Rd & Rose Way

2032 Future Total AM
07-17-2023



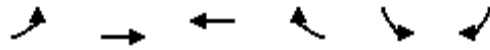
Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	25	970	855	55	75
v/c Ratio	0.05	0.26	0.24	0.34	0.35
Control Delay	4.0	5.9	4.7	61.1	16.3
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	4.0	5.9	4.7	61.1	16.3
Queue Length 50th (m)	1.9	41.4	26.2	14.3	0.0
Queue Length 95th (m)	m3.2	49.1	35.3	27.8	15.3
Internal Link Dist (m)		182.4	155.7	76.0	
Turn Bay Length (m)	50.0			50.0	
Base Capacity (vph)	552	3761	3523	624	608
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.05	0.26	0.24	0.09	0.12

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
 11: Britannia Rd & Rose Way

2032 Future Total AM
 07-17-2023



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↵	↑↑↑	↑↑↑		↵	↵
Traffic Volume (vph)	25	970	845	10	55	75
Future Volume (vph)	25	970	845	10	55	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0	6.0		5.0	5.0
Lane Util. Factor	1.00	*0.80	*0.80		1.00	1.00
Frt	1.00	1.00	1.00		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1805	4560	4552		1805	1615
Flt Permitted	0.27	1.00	1.00		0.95	1.00
Satd. Flow (perm)	512	4560	4552		1805	1615
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	25	970	845	10	55	75
RTOR Reduction (vph)	0	0	0	0	0	68
Lane Group Flow (vph)	25	970	855	0	55	7
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Turn Type	pm+pt	NA	NA		Prot	Perm
Protected Phases	5	2	6		4	
Permitted Phases	2					4
Actuated Green, G (s)	106.2	106.2	98.0		10.8	10.8
Effective Green, g (s)	107.2	107.2	99.0		11.8	11.8
Actuated g/C Ratio	0.82	0.82	0.76		0.09	0.09
Clearance Time (s)	4.0	7.0	7.0		6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	473	3760	3466		163	146
v/s Ratio Prot	0.00	c0.21	0.19		c0.03	
v/s Ratio Perm	0.04					0.00
v/c Ratio	0.05	0.26	0.25		0.34	0.05
Uniform Delay, d1	2.1	2.5	4.6		55.4	54.0
Progression Factor	2.33	2.22	1.00		1.00	1.00
Incremental Delay, d2	0.0	0.1	0.2		1.2	0.1
Delay (s)	5.0	5.8	4.7		56.7	54.1
Level of Service	A	A	A		E	D
Approach Delay (s)		5.8	4.7		55.2	
Approach LOS		A	A		E	

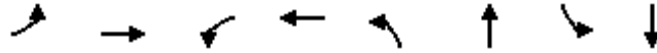
Intersection Summary

HCM 2000 Control Delay	8.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.27		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	38.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Timings
1: Regional Rd 25 & Louis St Laurent Ave

2032 Future Total PM
07-17-2023

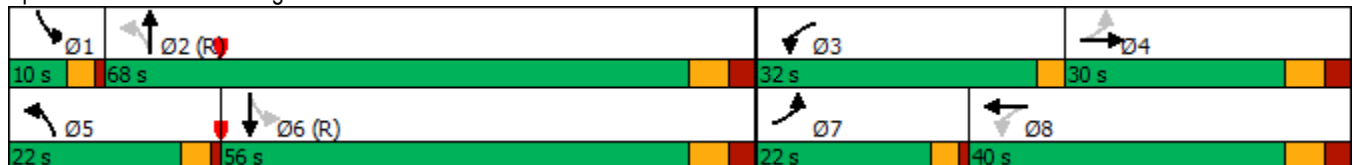


Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↖	↕	↖	↕	↖	↕	↖	↕
Traffic Volume (vph)	205	375	380	545	220	1030	95	950
Future Volume (vph)	205	375	380	545	220	1030	95	950
Turn Type	pm+pt	NA	pm+pt	NA	pm+pt	NA	pm+pt	NA
Protected Phases	7	4	3	8	5	2	1	6
Permitted Phases	4		8		2		6	
Detector Phase	7	4	3	8	5	2	1	6
Switch Phase								
Minimum Initial (s)	5.0	10.0	10.0	10.0	5.0	20.0	5.0	20.0
Minimum Split (s)	9.0	30.0	14.0	30.0	9.0	32.2	9.0	32.2
Total Split (s)	22.0	30.0	32.0	40.0	22.0	68.0	10.0	56.0
Total Split (%)	15.7%	21.4%	22.9%	28.6%	15.7%	48.6%	7.1%	40.0%
Yellow Time (s)	3.0	4.0	3.0	4.0	3.0	4.2	3.0	4.2
All-Red Time (s)	1.0	3.0	0.0	3.0	1.0	3.0	1.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	3.0	6.0	2.0	6.0	3.0	6.2	3.0	6.2
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	C-Max	None	C-Max
Act Effct Green (s)	43.2	23.5	56.5	32.9	78.5	64.8	66.9	56.2
Actuated g/C Ratio	0.31	0.17	0.40	0.24	0.56	0.46	0.48	0.40
v/c Ratio	0.67	0.84	0.88	0.73	0.74	0.75	0.61	0.66
Control Delay	40.2	66.3	56.9	54.2	38.9	32.3	39.6	36.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	40.2	66.3	56.9	54.2	38.9	32.3	39.6	36.7
LOS	D	E	E	D	D	C	D	D
Approach Delay		58.8		55.2		33.2		37.0
Approach LOS		E		E		C		D

Intersection Summary

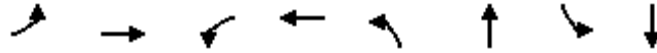
Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.88
 Intersection Signal Delay: 42.8
 Intersection LOS: D
 Intersection Capacity Utilization 88.7%
 ICU Level of Service E
 Analysis Period (min) 15

Splits and Phases: 1: Regional Rd 25 & Louis St Laurent Ave



Queues
1: Regional Rd 25 & Louis St Laurent Ave

2032 Future Total PM
07-17-2023



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	205	505	380	610	220	1485	95	1145
v/c Ratio	0.67	0.84	0.88	0.73	0.74	0.75	0.61	0.66
Control Delay	40.2	66.3	56.9	54.2	38.9	32.3	39.6	36.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	40.2	66.3	56.9	54.2	38.9	32.3	39.6	36.7
Queue Length 50th (m)	38.7	70.2	83.3	83.2	35.1	143.3	13.2	116.9
Queue Length 95th (m)	58.3	#96.8	#130.4	106.9	65.1	166.6	#35.4	139.6
Internal Link Dist (m)		126.1		117.1		481.0		113.5
Turn Bay Length (m)	90.0		35.0		65.0		80.0	
Base Capacity (vph)	338	621	468	875	329	1968	157	1736
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	0.61	0.81	0.81	0.70	0.67	0.75	0.61	0.66

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
 1: Regional Rd 25 & Louis St Laurent Ave

2032 Future Total PM
 07-17-2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	205	375	130	380	545	65	220	1030	455	95	950	195
Future Volume (vph)	205	375	130	380	545	65	220	1030	455	95	950	195
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0		2.0	6.0		3.0	6.2		3.0	6.2	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	*0.80		1.00	*0.80	
Frbp, ped/bikes	1.00	0.99		1.00	1.00		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.96		1.00	0.98		1.00	0.95		1.00	0.97	
Flt Protected	0.95	1.00		1.00	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1768	3426		1899	3537		1787	4139		1805	4286	
Flt Permitted	0.28	1.00		0.17	1.00		0.11	1.00		0.07	1.00	
Satd. Flow (perm)	522	3426		324	3537		204	4139		142	4286	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	205	375	130	380	545	65	220	1030	455	95	950	195
RTOR Reduction (vph)	0	25	0	0	7	0	0	55	0	0	17	0
Lane Group Flow (vph)	205	480	0	380	603	0	220	1430	0	95	1128	0
Confl. Peds. (#/hr)	5		5	5		5	5		5	5		5
Heavy Vehicles (%)	2%	1%	0%	0%	0%	2%	1%	6%	1%	0%	4%	0%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	38.1	22.5		51.5	31.9		74.3	63.8		61.7	55.2	
Effective Green, g (s)	40.1	23.5		52.5	32.9		75.3	64.8		63.7	56.2	
Actuated g/C Ratio	0.29	0.17		0.38	0.23		0.54	0.46		0.46	0.40	
Clearance Time (s)	4.0	7.0		3.0	7.0		4.0	7.2		4.0	7.2	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	297	575		425	831		291	1915		153	1720	
v/s Ratio Prot	0.08	c0.14		c0.17	0.17		c0.09	0.35		0.03	0.26	
v/s Ratio Perm	0.12			0.16			c0.32			0.25		
v/c Ratio	0.69	0.83		0.89	0.73		0.76	0.75		0.62	0.66	
Uniform Delay, d1	40.6	56.4		38.7	49.4		25.5	30.9		25.4	34.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	6.7	10.1		20.6	3.2		10.7	2.7		7.6	2.0	
Delay (s)	47.4	66.5		59.3	52.6		36.1	33.6		33.0	36.0	
Level of Service	D	E		E	D		D	C		C	D	
Approach Delay (s)		61.0			55.2			33.9			35.8	
Approach LOS		E			E			C			D	
Intersection Summary												
HCM 2000 Control Delay			43.1				HCM 2000 Level of Service				D	
HCM 2000 Volume to Capacity ratio			0.82									
Actuated Cycle Length (s)			140.0				Sum of lost time (s)			18.2		
Intersection Capacity Utilization			88.7%				ICU Level of Service			E		
Analysis Period (min)			15									

c Critical Lane Group

Timings
2: Regional Rd 25 & Whitlock Ave

2032 Future Total PM
07-17-2023



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations	↖	↗	↖	↗	↗	↖	↑↑↑	↖	↑↑↑
Traffic Volume (vph)	105	40	25	40	75	90	1705	60	1205
Future Volume (vph)	105	40	25	40	75	90	1705	60	1205
Turn Type	Perm	NA	Perm	NA	Perm	pm+pt	NA	pm+pt	NA
Protected Phases		4		8		5	2	1	6
Permitted Phases	4		8		8	2		6	
Detector Phase	4	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	20.0	7.0	20.0
Minimum Split (s)	37.5	37.5	37.5	37.5	37.5	11.0	35.5	11.0	35.5
Total Split (s)	38.0	38.0	38.0	38.0	38.0	11.0	81.0	11.0	81.0
Total Split (%)	29.2%	29.2%	29.2%	29.2%	29.2%	8.5%	62.3%	8.5%	62.3%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.0	4.2	3.0	4.2
All-Red Time (s)	3.2	3.2	3.2	3.2	3.2	1.0	2.3	1.0	2.3
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5	3.0	5.5	3.0	5.5
Lead/Lag						Lead	Lag	Lead	Lag
Lead-Lag Optimize?						Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	None	C-Max
Act Effct Green (s)	16.6	16.6	16.6	16.6	16.6	102.5	93.3	102.0	91.1
Actuated g/C Ratio	0.13	0.13	0.13	0.13	0.13	0.79	0.72	0.78	0.70
v/c Ratio	0.60	0.32	0.15	0.17	0.29	0.30	0.56	0.28	0.45
Control Delay	67.4	31.8	50.2	50.0	13.0	3.4	6.3	6.3	9.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	67.4	31.8	50.2	50.0	13.0	3.4	6.3	6.3	9.4
LOS	E	C	D	D	B	A	A	A	A
Approach Delay		52.0		30.2			6.2		9.3
Approach LOS		D		C			A		A

Intersection Summary

Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 40 (31%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 85
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.60
 Intersection Signal Delay: 10.7
 Intersection LOS: B
 Intersection Capacity Utilization 66.9%
 ICU Level of Service C
 Analysis Period (min) 15

Splits and Phases: 2: Regional Rd 25 & Whitlock Ave



Queues
2: Regional Rd 25 & Whitlock Ave

2032 Future Total PM
07-17-2023



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	105	80	25	40	75	90	1745	60	1340
v/c Ratio	0.60	0.32	0.15	0.17	0.29	0.30	0.56	0.28	0.45
Control Delay	67.4	31.8	50.2	50.0	13.0	3.4	6.3	6.3	9.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	67.4	31.8	50.2	50.0	13.0	3.4	6.3	6.3	9.4
Queue Length 50th (m)	27.2	10.6	6.1	9.8	0.0	1.6	55.1	2.6	57.3
Queue Length 95th (m)	45.1	25.0	14.4	20.3	14.0	m3.9	71.6	6.9	84.0
Internal Link Dist (m)		62.9		68.1			503.8		481.0
Turn Bay Length (m)	35.0		65.0		65.0	100.0		100.0	
Base Capacity (vph)	341	452	333	475	441	299	3108	217	2992
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	0.31	0.18	0.08	0.08	0.17	0.30	0.56	0.28	0.45

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
2: Regional Rd 25 & Whitlock Ave

2032 Future Total PM
07-17-2023



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	105	40	40	25	40	75	90	1705	40	60	1205	135
Future Volume (vph)	105	40	40	25	40	75	90	1705	40	60	1205	135
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5		5.5	5.5	5.5	3.0	5.5		3.0	5.5	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	*0.80		1.00	*0.80	
Frbp, ped/bikes	1.00	0.99		1.00	1.00	0.98	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	0.99	1.00		0.99	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.93		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)	1776	1699		1795	1900	1539	1787	4330		1770	4261	
Flt Permitted	0.73	1.00		0.70	1.00	1.00	0.14	1.00		0.08	1.00	
Satd. Flow (perm)	1367	1699		1332	1900	1539	254	4330		143	4261	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	105	40	40	25	40	75	90	1705	40	60	1205	135
RTOR Reduction (vph)	0	32	0	0	0	65	0	1	0	0	6	0
Lane Group Flow (vph)	105	48	0	25	40	10	90	1744	0	60	1334	0
Confl. Peds. (#/hr)	5		5	5		5			5	5		
Heavy Vehicles (%)	1%	5%	0%	0%	0%	3%	1%	5%	0%	2%	6%	0%
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	15.6	15.6		15.6	15.6	15.6	98.8	91.4		96.0	90.0	
Effective Green, g (s)	16.6	16.6		16.6	16.6	16.6	100.8	92.4		98.0	91.0	
Actuated g/C Ratio	0.13	0.13		0.13	0.13	0.13	0.78	0.71		0.75	0.70	
Clearance Time (s)	6.5	6.5		6.5	6.5	6.5	4.0	6.5		4.0	6.5	
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)	174	216		170	242	196	296	3077		195	2982	
v/s Ratio Prot		0.03			0.02		c0.02	c0.40		0.02	0.31	
v/s Ratio Perm	c0.08			0.02		0.01	0.22			0.22		
v/c Ratio	0.60	0.22		0.15	0.17	0.05	0.30	0.57		0.31	0.45	
Uniform Delay, d1	53.6	50.9		50.4	50.5	49.8	4.4	9.1		6.1	8.5	
Progression Factor	1.00	1.00		1.00	1.00	1.00	0.41	0.58		1.00	1.00	
Incremental Delay, d2	5.8	0.5		0.4	0.3	0.1	0.5	0.6		0.9	0.5	
Delay (s)	59.4	51.4		50.8	50.9	49.9	2.3	5.9		7.0	9.0	
Level of Service	E	D		D	D	D	A	A		A	A	
Approach Delay (s)		55.9			50.3			5.7			8.9	
Approach LOS		E			D			A			A	

Intersection Summary		
HCM 2000 Control Delay	11.3	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	0.56	B
Actuated Cycle Length (s)	130.0	Sum of lost time (s)
Intersection Capacity Utilization	66.9%	14.0
Analysis Period (min)	15	ICU Level of Service
		C

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
3: Regional Rd 25 & Site Dwy (North)

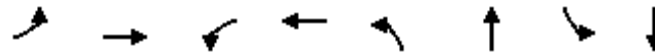
2032 Future Total PM
07-17-2023



Movement	EBL	EBR	NBL	NBT	SBT	SBR	
Lane Configurations		↗		↑↑↑	↑↑↑↗		
Traffic Volume (veh/h)	0	20	0	1835	1240	30	
Future Volume (Veh/h)	0	20	0	1835	1240	30	
Sign Control	Stop			Free	Free		
Grade	0%			0%	0%		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Hourly flow rate (vph)	0	20	0	1835	1240	30	
Pedestrians							
Lane Width (m)							
Walking Speed (m/s)							
Percent Blockage							
Right turn flare (veh)							
Median type				None	None		
Median storage veh							
Upstream signal (m)	193						
pX, platoon unblocked	0.81						
vC, conflicting volume	1867	428	1270				
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol	1240	428	1270				
tC, single (s)	6.8	6.9	4.1				
tC, 2 stage (s)							
tF (s)	3.5	3.3	2.2				
p0 queue free %	100	97	100				
cM capacity (veh/h)	137	580	554				
Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	20	612	612	612	496	496	278
Volume Left	0	0	0	0	0	0	0
Volume Right	20	0	0	0	0	0	30
cSH	580	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.03	0.36	0.36	0.36	0.29	0.29	0.16
Queue Length 95th (m)	0.9	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (s)	11.4	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	B						
Approach Delay (s)	11.4	0.0	0.0				
Approach LOS	B						
Intersection Summary							
Average Delay	0.1						
Intersection Capacity Utilization	38.8%			ICU Level of Service	A		
Analysis Period (min)	15						

Timings
5: Regional Rd 25 & Etheridge Ave/Collector Road

2032 Future Total PM
07-17-2023

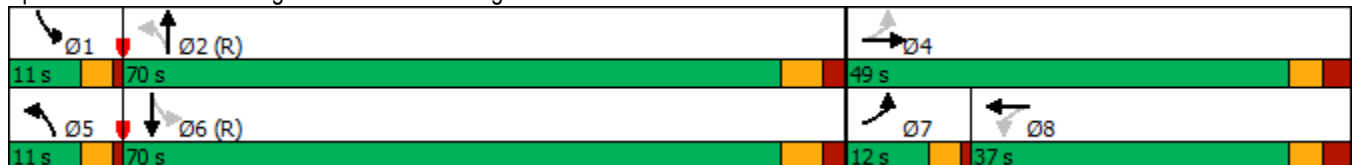


Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↖	↗	↖	↗	↖	↑↑↑	↖	↑↑↑
Traffic Volume (vph)	160	0	40	0	215	1635	55	1020
Future Volume (vph)	160	0	40	0	215	1635	55	1020
Turn Type	pm+pt	NA	Perm	NA	pm+pt	NA	pm+pt	NA
Protected Phases	7	4		8	5	2	1	6
Permitted Phases	4		8		2		6	
Detector Phase	7	4	8	8	5	2	1	6
Switch Phase								
Minimum Initial (s)	7.0	10.0	10.0	10.0	7.0	20.0	7.0	20.0
Minimum Split (s)	11.0	36.2	36.2	36.2	11.0	38.4	11.0	38.4
Total Split (s)	12.0	49.0	37.0	37.0	11.0	70.0	11.0	70.0
Total Split (%)	9.2%	37.7%	28.5%	28.5%	8.5%	53.8%	8.5%	53.8%
Yellow Time (s)	3.0	3.3	3.3	3.3	3.0	4.2	3.0	4.2
All-Red Time (s)	1.0	2.9	2.9	2.9	1.0	2.2	1.0	2.2
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	3.0	5.2	5.2	5.2	3.0	5.4	3.0	5.4
Lead/Lag	Lead		Lag	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	C-Max	None	C-Max
Act Effct Green (s)	23.7	21.5	11.9	11.9	100.3	88.8	92.1	81.4
Actuated g/C Ratio	0.18	0.17	0.09	0.09	0.77	0.68	0.71	0.63
v/c Ratio	0.66	0.18	0.33	0.14	0.57	0.57	0.26	0.45
Control Delay	60.8	1.0	62.5	1.0	20.6	7.5	14.6	6.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	60.8	1.0	62.5	1.0	20.6	7.5	14.6	6.9
LOS	E	A	E	A	C	A	B	A
Approach Delay		41.7		31.8		9.0		7.2
Approach LOS		D		C		A		A

Intersection Summary

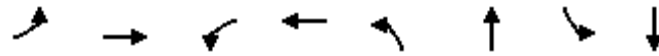
Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 103 (79%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 100
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.66
 Intersection Signal Delay: 11.1
 Intersection LOS: B
 Intersection Capacity Utilization 66.6%
 ICU Level of Service C
 Analysis Period (min) 15

Splits and Phases: 5: Regional Rd 25 & Etheridge Ave/Collector Road



Queues
5: Regional Rd 25 & Etheridge Ave/Collector Road

2032 Future Total PM
07-17-2023



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	160	75	40	40	215	1700	55	1205
v/c Ratio	0.66	0.18	0.33	0.14	0.57	0.57	0.26	0.45
Control Delay	60.8	1.0	62.5	1.0	20.6	7.5	14.6	6.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	60.8	1.0	62.5	1.0	20.6	7.5	14.6	6.9
Queue Length 50th (m)	38.7	0.0	10.4	0.0	19.6	55.3	3.1	70.0
Queue Length 95th (m)	59.6	0.0	22.4	0.0	m34.5	m69.6	9.6	96.0
Internal Link Dist (m)		53.9		63.5		106.2		169.0
Turn Bay Length (m)	40.0		40.0		70.0		70.0	
Base Capacity (vph)	242	658	329	510	376	2984	215	2700
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	0.66	0.11	0.12	0.08	0.57	0.57	0.26	0.45

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
 5: Regional Rd 25 & Etheridge Ave/Collector Road

2032 Future Total PM
 07-17-2023



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↑↑↑		↖	↑↑↑	
Traffic Volume (vph)	160	0	75	40	0	40	215	1635	65	55	1020	185
Future Volume (vph)	160	0	75	40	0	40	215	1635	65	55	1020	185
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	5.2		5.2	5.2		3.0	5.4		3.0	5.4	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	*0.80		1.00	*0.80	
Frt	1.00	0.85		1.00	0.85		1.00	0.99		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1752	1615		1805	1615		1805	4366		1805	4296	
Flt Permitted	0.56	1.00		0.71	1.00		0.15	1.00		0.08	1.00	
Satd. Flow (perm)	1035	1615		1346	1615		281	4366		155	4296	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	160	0	75	40	0	40	215	1635	65	55	1020	185
RTOR Reduction (vph)	0	62	0	0	37	0	0	2	0	0	12	0
Lane Group Flow (vph)	160	13	0	40	3	0	215	1698	0	55	1193	0
Heavy Vehicles (%)	3%	0%	0%	0%	0%	0%	0%	4%	0%	0%	4%	2%
Turn Type	pm+pt	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	21.7	21.7		8.9	8.9		95.7	85.8		85.0	79.1	
Effective Green, g (s)	22.7	22.7		9.9	9.9		96.7	86.8		87.0	80.1	
Actuated g/C Ratio	0.17	0.17		0.08	0.08		0.74	0.67		0.67	0.62	
Clearance Time (s)	4.0	6.2		6.2	6.2		4.0	6.4		4.0	6.4	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	234	282		102	122		368	2915		191	2646	
v/s Ratio Prot	c0.05	0.01			0.00		c0.06	0.39		0.02	0.28	
v/s Ratio Perm	c0.07			0.03			c0.37			0.18		
v/c Ratio	0.68	0.05		0.39	0.02		0.58	0.58		0.29	0.45	
Uniform Delay, d1	49.0	44.6		57.2	55.6		7.6	11.7		8.7	13.3	
Progression Factor	1.00	1.00		1.00	1.00		2.95	0.59		2.36	0.48	
Incremental Delay, d2	8.0	0.1		2.5	0.1		1.2	0.4		0.8	0.5	
Delay (s)	57.0	44.7		59.7	55.7		23.7	7.4		21.3	6.9	
Level of Service	E	D		E	E		C	A		C	A	
Approach Delay (s)		53.1			57.7			9.2			7.6	
Approach LOS		D			E			A			A	

Intersection Summary		
HCM 2000 Control Delay	12.7	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	0.63	B
Actuated Cycle Length (s)	130.0	Sum of lost time (s)
Intersection Capacity Utilization	66.6%	16.6
Analysis Period (min)	15	ICU Level of Service
c Critical Lane Group		C

HCM Unsignalized Intersection Capacity Analysis
6: Regional Rd 25 & Site Dwy (South)

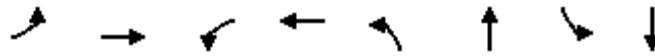
2032 Future Total PM
07-17-2023



Movement	EBL	EBR	NBL	NBT	SBT	SBR	
Lane Configurations		↗		↑↑↑	↑↑↑↗		
Traffic Volume (veh/h)	0	25	0	1915	1095	40	
Future Volume (Veh/h)	0	25	0	1915	1095	40	
Sign Control	Stop			Free	Free		
Grade	0%			0%	0%		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Hourly flow rate (vph)	0	25	0	1915	1095	40	
Pedestrians							
Lane Width (m)							
Walking Speed (m/s)							
Percent Blockage							
Right turn flare (veh)							
Median type				None	None		
Median storage veh							
Upstream signal (m)				186	130		
pX, platoon unblocked	0.69	0.88	0.88				
vC, conflicting volume	1753	385	1135				
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol	0	0	690				
tC, single (s)	6.8	6.9	4.1				
tC, 2 stage (s)							
tF (s)	3.5	3.3	2.2				
p0 queue free %	100	97	100				
cM capacity (veh/h)	712	963	807				
Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	25	638	638	638	438	438	259
Volume Left	0	0	0	0	0	0	0
Volume Right	25	0	0	0	0	0	40
cSH	963	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.03	0.38	0.38	0.38	0.26	0.26	0.15
Queue Length 95th (m)	0.6	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (s)	8.8	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	A						
Approach Delay (s)	8.8	0.0	0.0				
Approach LOS	A						
Intersection Summary							
Average Delay	0.1						
Intersection Capacity Utilization	40.3%			ICU Level of Service	A		
Analysis Period (min)	15						

Timings
7: Regional Rd 25 & Britannia Rd

2032 Future Total PM
07-17-2023

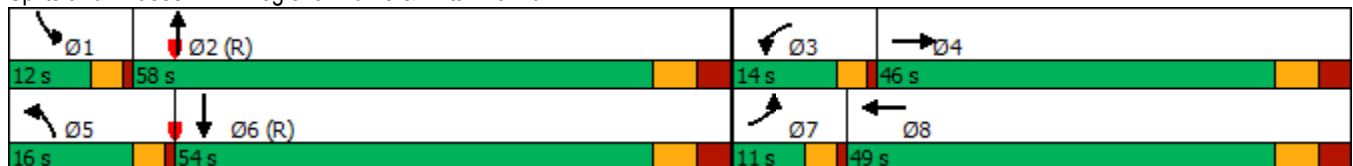


Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↖↖	↑↑↘	↖↖	↑↑↘	↖↖	↑↑↘	↖↖	↑↑↘
Traffic Volume (vph)	50	320	300	500	240	1475	165	895
Future Volume (vph)	50	320	300	500	240	1475	165	895
Turn Type	Prot	NA	Prot	NA	Prot	NA	Prot	NA
Protected Phases	7	4	3	8	5	2	1	6
Permitted Phases								
Detector Phase	7	4	3	8	5	2	1	6
Switch Phase								
Minimum Initial (s)	7.0	10.0	7.0	10.0	7.0	20.0	7.0	20.0
Minimum Split (s)	11.0	45.5	11.0	45.5	11.0	49.7	11.0	49.7
Total Split (s)	11.0	46.0	14.0	49.0	16.0	58.0	12.0	54.0
Total Split (%)	8.5%	35.4%	10.8%	37.7%	12.3%	44.6%	9.2%	41.5%
Yellow Time (s)	3.0	4.2	3.0	4.2	3.0	4.2	3.0	4.2
All-Red Time (s)	1.0	3.3	1.0	3.3	1.0	3.5	1.0	3.5
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	3.0	6.5	3.0	6.5	3.0	6.7	3.0	6.7
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	C-Max	None	C-Max
Act Effct Green (s)	8.0	26.2	11.0	31.4	14.9	61.4	12.2	58.7
Actuated g/C Ratio	0.06	0.20	0.08	0.24	0.11	0.47	0.09	0.45
v/c Ratio	0.25	0.39	0.98	0.91dr	0.60	0.94	0.51	0.48
Control Delay	61.4	43.2	123.0	37.5	60.8	42.6	72.9	18.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	61.4	43.2	123.0	37.5	60.8	42.6	72.9	18.4
LOS	E	D	F	D	E	D	E	B
Approach Delay		45.4		59.1		44.7		26.4
Approach LOS		D		E		D		C

Intersection Summary

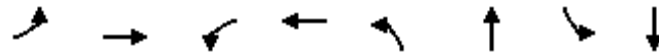
Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 104 (80%), Referenced to phase 2:NBT and 6:SBT, Start of Green
 Natural Cycle: 140
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.98
 Intersection Signal Delay: 44.0
 Intersection LOS: D
 Intersection Capacity Utilization 86.3%
 ICU Level of Service E
 Analysis Period (min) 15
 dr Defacto Right Lane. Recode with 1 though lane as a right lane.

Splits and Phases: 7: Regional Rd 25 & Britannia Rd



Queues
7: Regional Rd 25 & Britannia Rd

2032 Future Total PM
07-17-2023



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	50	360	300	890	240	1925	165	955
v/c Ratio	0.25	0.39	0.98	0.91dr	0.60	0.94	0.51	0.48
Control Delay	61.4	43.2	123.0	37.5	60.8	42.6	72.9	18.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	61.4	43.2	123.0	37.5	60.8	42.6	72.9	18.4
Queue Length 50th (m)	6.7	33.4	44.6	47.4	32.1	202.0	23.5	39.3
Queue Length 95th (m)	13.7	42.2	#75.2	50.4	45.3	#280.1	36.8	46.2
Internal Link Dist (m)		377.9		190.1		165.3		161.9
Turn Bay Length (m)	60.0		120.0		90.0		90.0	
Base Capacity (vph)	203	1371	305	1486	411	2051	325	1970
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.25	0.26	0.98	0.60	0.58	0.94	0.51	0.48

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

dr Defacto Right Lane. Recode with 1 though lane as a right lane.

HCM Signalized Intersection Capacity Analysis

2032 Future Total PM

7: Regional Rd 25 & Britannia Rd

07-17-2023



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔	↕↕↔		↔↔	↕↕↔		↔↔	↕↕↔		↔↔	↕↕↔	
Traffic Volume (vph)	50	320	40	300	500	390	240	1475	450	165	895	60
Future Volume (vph)	50	320	40	300	500	390	240	1475	450	165	895	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.5		3.0	6.5		3.0	6.7		3.0	6.7	
Lane Util. Factor	0.97	*0.80		0.97	*0.80		0.97	*0.80		0.97	*0.80	
Frt	1.00	0.98		1.00	0.93		1.00	0.96		1.00	0.99	
Flt Protected	0.95	1.00		1.00	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	3303	4484		3614	4218		3502	4282		3467	4354	
Flt Permitted	0.95	1.00		1.00	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	3303	4484		3614	4218		3502	4282		3467	4354	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	50	320	40	300	500	390	240	1475	450	165	895	60
RTOR Reduction (vph)	0	11	0	0	121	0	0	31	0	0	4	0
Lane Group Flow (vph)	50	349	0	300	769	0	240	1894	0	165	951	0
Heavy Vehicles (%)	6%	0%	0%	2%	1%	1%	0%	3%	2%	1%	4%	0%
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	5.6	26.0		10.0	30.4		13.9	59.6		11.2	56.9	
Effective Green, g (s)	6.6	27.0		11.0	31.4		14.9	60.6		12.2	57.9	
Actuated g/C Ratio	0.05	0.21		0.08	0.24		0.11	0.47		0.09	0.45	
Clearance Time (s)	4.0	7.5		4.0	7.5		4.0	7.7		4.0	7.7	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	167	931		305	1018		401	1996		325	1939	
v/s Ratio Prot	0.02	0.08		c0.08	c0.18		c0.07	c0.44		0.05	0.22	
v/s Ratio Perm												
v/c Ratio	0.30	0.37		0.98	0.91dr		0.60	0.95		0.51	0.49	
Uniform Delay, d1	59.5	44.2		59.4	45.7		54.7	33.2		56.0	25.6	
Progression Factor	1.00	1.00		1.33	0.87		1.00	1.00		1.21	0.66	
Incremental Delay, d2	1.0	0.3		45.8	3.1		2.4	11.2		1.2	0.8	
Delay (s)	60.5	44.5		124.6	43.1		57.1	44.5		69.1	17.7	
Level of Service	E	D		F	D		E	D		E	B	
Approach Delay (s)		46.5			63.6			45.9			25.2	
Approach LOS		D			E			D			C	

Intersection Summary

HCM 2000 Control Delay	45.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	19.2
Intersection Capacity Utilization	86.3%	ICU Level of Service	E
Analysis Period (min)	15		

dr Defacto Right Lane. Recode with 1 though lane as a right lane.

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
 8: Site Dwy (South)/Site Dwy (North) & Etheridge Ave

2032 Future Total PM
 07-17-2023



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (veh/h)	10	100	15	130	175	95	10	0	80	55	0	5
Future Volume (Veh/h)	10	100	15	130	175	95	10	0	80	55	0	5
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	10	100	15	130	175	95	10	0	80	55	0	5
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)					78							
pX, platoon unblocked	0.96						0.96	0.96		0.96	0.96	0.96
vC, conflicting volume	270			115			615	658	108	690	618	222
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	216			115			576	620	108	654	579	166
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			91			97	100	92	82	100	99
cM capacity (veh/h)	1308			1487			381	352	952	311	372	846
Direction, Lane #												
	EB 1	WB 1	NB 1	SB 1								
Volume Total	125	400	90	60								
Volume Left	10	130	10	55								
Volume Right	15	95	80	5								
cSH	1308	1487	816	329								
Volume to Capacity	0.01	0.09	0.11	0.18								
Queue Length 95th (m)	0.2	2.3	3.0	5.3								
Control Delay (s)	0.7	3.0	10.0	18.4								
Lane LOS	A	A	A	C								
Approach Delay (s)	0.7	3.0	10.0	18.4								
Approach LOS			A	C								
Intersection Summary												
Average Delay			4.9									
Intersection Capacity Utilization			45.5%		ICU Level of Service				A			
Analysis Period (min)			15									

Timings
10: Britannia Rd & Farmstead Dr

2032 Future Total PM
07-17-2023

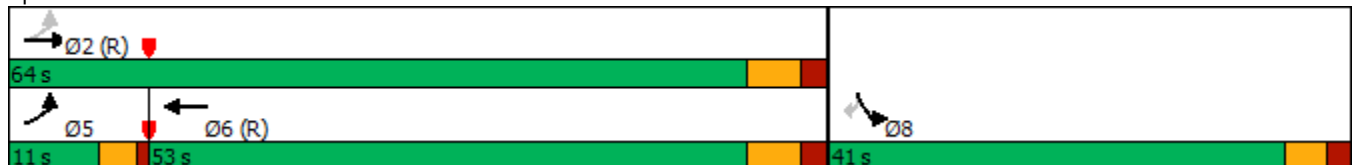


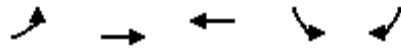
Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Configurations	↖	↑↑↑	↑↑↑	↖	↗
Traffic Volume (vph)	20	355	720	55	20
Future Volume (vph)	20	355	720	55	20
Turn Type	pm+pt	NA	NA	Prot	Perm
Protected Phases	5	2	6	8	
Permitted Phases	2				8
Detector Phase	5	2	6	8	8
Switch Phase					
Minimum Initial (s)	7.0	20.0	20.0	10.0	10.0
Minimum Split (s)	11.0	29.4	29.4	15.3	15.3
Total Split (s)	11.0	64.0	53.0	41.0	41.0
Total Split (%)	10.5%	61.0%	50.5%	39.0%	39.0%
Yellow Time (s)	3.0	4.2	4.2	3.3	3.3
All-Red Time (s)	1.0	2.2	2.2	2.0	2.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	3.0	5.4	5.4	4.3	4.3
Lead/Lag	Lead		Lag		
Lead-Lag Optimize?	Yes		Yes		
Recall Mode	None	C-Max	C-Max	None	None
Act Effct Green (s)	89.3	88.0	83.6	11.4	11.4
Actuated g/C Ratio	0.85	0.84	0.80	0.11	0.11
v/c Ratio	0.04	0.09	0.23	0.29	0.10
Control Delay	1.9	2.1	4.1	47.2	18.6
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	1.9	2.1	4.1	47.2	18.6
LOS	A	A	A	D	B
Approach Delay		2.1	4.1	39.6	
Approach LOS		A	A	D	

Intersection Summary

Cycle Length: 105
 Actuated Cycle Length: 105
 Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.29
 Intersection Signal Delay: 5.6
 Intersection LOS: A
 Intersection Capacity Utilization 33.1%
 ICU Level of Service A
 Analysis Period (min) 15

Splits and Phases: 10: Britannia Rd & Farmstead Dr





Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	20	355	800	55	20
v/c Ratio	0.04	0.09	0.23	0.29	0.10
Control Delay	1.9	2.1	4.1	47.2	18.6
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	1.9	2.1	4.1	47.2	18.6
Queue Length 50th (m)	0.6	5.2	12.8	11.1	0.0
Queue Length 95th (m)	1.9	8.3	30.9	23.1	7.2
Internal Link Dist (m)		101.0	377.9	199.3	
Turn Bay Length (m)	20.0				
Base Capacity (vph)	561	3822	3549	606	577
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	0.09	0.23	0.09	0.03
Intersection Summary					

HCM Signalized Intersection Capacity Analysis
 10: Britannia Rd & Farmstead Dr

2032 Future Total PM
 07-17-2023



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↰	↑↑↑	↑↑↑		↰	↰
Traffic Volume (vph)	20	355	720	80	55	20
Future Volume (vph)	20	355	720	80	55	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	5.4	5.4		4.3	4.3
Lane Util. Factor	1.00	*0.80	*0.80		1.00	1.00
Frt	1.00	1.00	0.98		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1805	4560	4452		1736	1615
Flt Permitted	0.29	1.00	1.00		0.95	1.00
Satd. Flow (perm)	548	4560	4452		1736	1615
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	20	355	720	80	55	20
RTOR Reduction (vph)	0	0	5	0	0	18
Lane Group Flow (vph)	20	355	795	0	55	2
Heavy Vehicles (%)	0%	0%	1%	0%	4%	0%
Turn Type	pm+pt	NA	NA		Prot	Perm
Protected Phases	5	2	6		8	
Permitted Phases	2					8
Actuated Green, G (s)	84.9	84.9	78.1		8.4	8.4
Effective Green, g (s)	85.9	85.9	79.1		9.4	9.4
Actuated g/C Ratio	0.82	0.82	0.75		0.09	0.09
Clearance Time (s)	4.0	6.4	6.4		5.3	5.3
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	493	3730	3353		155	144
v/s Ratio Prot	0.00	c0.08	c0.18		c0.03	
v/s Ratio Perm	0.03					0.00
v/c Ratio	0.04	0.10	0.24		0.35	0.01
Uniform Delay, d1	1.8	1.9	3.9		44.9	43.6
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.0	0.1	0.2		1.4	0.0
Delay (s)	1.9	1.9	4.1		46.3	43.6
Level of Service	A	A	A		D	D
Approach Delay (s)		1.9	4.1		45.6	
Approach LOS		A	A		D	

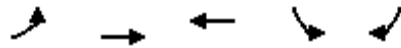
Intersection Summary

HCM 2000 Control Delay	5.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.24		
Actuated Cycle Length (s)	105.0	Sum of lost time (s)	12.7
Intersection Capacity Utilization	33.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Timings
11: Britannia Rd & Rose Way

2032 Future Total PM
07-17-2023



Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Configurations	↖	↑↑↑	↑↑↑	↖	↗
Traffic Volume (vph)	80	855	1140	30	50
Future Volume (vph)	80	855	1140	30	50
Turn Type	pm+pt	NA	NA	Prot	Perm
Protected Phases	5	2	6	4	
Permitted Phases	2				4
Detector Phase	5	2	6	4	4
Switch Phase					
Minimum Initial (s)	7.0	20.0	20.0	10.0	10.0
Minimum Split (s)	11.0	29.0	29.0	43.0	43.0
Total Split (s)	15.0	80.0	65.0	50.0	50.0
Total Split (%)	11.5%	61.5%	50.0%	38.5%	38.5%
Yellow Time (s)	3.0	4.0	4.0	3.0	3.0
All-Red Time (s)	1.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	3.0	6.0	6.0	5.0	5.0
Lead/Lag	Lead		Lag		
Lead-Lag Optimize?	Yes		Yes		
Recall Mode	None	C-Max	C-Max	None	None
Act Effct Green (s)	114.2	112.4	103.5	11.0	11.0
Actuated g/C Ratio	0.88	0.86	0.80	0.08	0.08
v/c Ratio	0.21	0.22	0.33	0.20	0.27
Control Delay	3.0	2.5	5.1	58.7	18.8
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	3.0	2.5	5.1	58.7	18.8
LOS	A	A	A	E	B
Approach Delay		2.5	5.1	33.8	
Approach LOS		A	A	C	

Intersection Summary

Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 65 (50%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
 Natural Cycle: 85
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.33
 Intersection Signal Delay: 5.1
 Intersection Capacity Utilization 50.0%
 Analysis Period (min) 15

Intersection LOS: A
 ICU Level of Service A

Splits and Phases: 11: Britannia Rd & Rose Way



Queues
11: Britannia Rd & Rose Way

2032 Future Total PM
07-17-2023



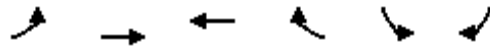
Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	80	855	1200	30	50
v/c Ratio	0.21	0.22	0.33	0.20	0.27
Control Delay	3.0	2.5	5.1	58.7	18.8
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	3.0	2.5	5.1	58.7	18.8
Queue Length 50th (m)	2.6	17.2	40.6	7.7	0.0
Queue Length 95th (m)	m4.3	m23.2	48.3	18.0	13.0
Internal Link Dist (m)		190.1	148.0	92.6	
Turn Bay Length (m)	50.0			50.0	
Base Capacity (vph)	423	3941	3604	624	591
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	0.19	0.22	0.33	0.05	0.08

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
 11: Britannia Rd & Rose Way

2032 Future Total PM
 07-17-2023

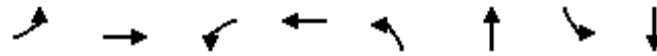


Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↵	↑↑↑	↑↑↑		↵	↵
Traffic Volume (vph)	80	855	1140	60	30	50
Future Volume (vph)	80	855	1140	60	30	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0	6.0		5.0	5.0
Lane Util. Factor	1.00	*0.80	*0.80		1.00	1.00
Frt	1.00	1.00	0.99		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1805	4560	4526		1805	1615
Flt Permitted	0.17	1.00	1.00		0.95	1.00
Satd. Flow (perm)	327	4560	4526		1805	1615
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	80	855	1140	60	30	50
RTOR Reduction (vph)	0	0	2	0	0	47
Lane Group Flow (vph)	80	855	1198	0	30	3
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Turn Type	pm+pt	NA	NA		Prot	Perm
Protected Phases	5	2	6		4	
Permitted Phases	2					4
Actuated Green, G (s)	109.0	109.0	99.4		8.0	8.0
Effective Green, g (s)	110.0	110.0	100.4		9.0	9.0
Actuated g/C Ratio	0.85	0.85	0.77		0.07	0.07
Clearance Time (s)	4.0	7.0	7.0		6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	351	3858	3495		124	111
v/s Ratio Prot	0.01	c0.19	c0.26		c0.02	
v/s Ratio Perm	0.18					0.00
v/c Ratio	0.23	0.22	0.34		0.24	0.03
Uniform Delay, d1	2.0	1.9	4.6		57.3	56.4
Progression Factor	1.39	1.20	1.00		1.00	1.00
Incremental Delay, d2	0.3	0.1	0.3		1.0	0.1
Delay (s)	3.0	2.4	4.9		58.3	56.5
Level of Service	A	A	A		E	E
Approach Delay (s)		2.4	4.9		57.2	
Approach LOS		A	A		E	

Intersection Summary				
HCM 2000 Control Delay		5.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio		0.33		
Actuated Cycle Length (s)		130.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization		50.0%	ICU Level of Service	A
Analysis Period (min)		15		
c Critical Lane Group				

Timings
1: Regional Rd 25 & Louis St Laurent Ave

2037 Future Total AM
07-17-2023

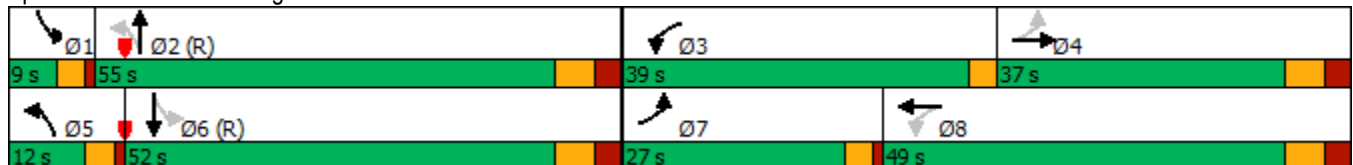


Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↖	↕	↖	↕	↖	↕	↖	↕
Traffic Volume (vph)	270	535	500	560	120	1180	65	1240
Future Volume (vph)	270	535	500	560	120	1180	65	1240
Turn Type	pm+pt	NA	pm+pt	NA	pm+pt	NA	pm+pt	NA
Protected Phases	7	4	3	8	5	2	1	6
Permitted Phases	4		8		2		6	
Detector Phase	7	4	3	8	5	2	1	6
Switch Phase								
Minimum Initial (s)	5.0	10.0	10.0	10.0	5.0	20.0	5.0	20.0
Minimum Split (s)	9.0	30.0	14.0	30.0	9.0	32.2	9.0	32.2
Total Split (s)	27.0	37.0	39.0	49.0	12.0	55.0	9.0	52.0
Total Split (%)	19.3%	26.4%	27.9%	35.0%	8.6%	39.3%	6.4%	37.1%
Yellow Time (s)	3.0	4.0	3.0	4.0	3.0	4.2	3.0	4.2
All-Red Time (s)	1.0	3.0	0.0	3.0	1.0	3.0	1.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	3.0	6.0	2.0	6.0	3.0	6.2	3.0	6.2
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	C-Max	None	C-Max
Act Effct Green (s)	52.7	30.9	72.6	46.8	62.4	52.0	56.6	47.2
Actuated g/C Ratio	0.38	0.22	0.52	0.33	0.45	0.37	0.40	0.34
v/c Ratio	0.65	0.94	0.94	0.57	0.73	0.98	0.50	0.93
Control Delay	29.2	72.1	64.6	40.0	52.1	60.1	36.4	57.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.2	72.1	64.6	40.0	52.1	60.1	36.4	57.4
LOS	C	E	E	D	D	E	D	E
Approach Delay		60.6		50.6		59.5		56.5
Approach LOS		E		D		E		E

Intersection Summary

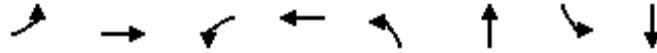
Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 110
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.98
 Intersection Signal Delay: 56.9
 Intersection LOS: E
 Intersection Capacity Utilization 100.6%
 ICU Level of Service G
 Analysis Period (min) 15

Splits and Phases: 1: Regional Rd 25 & Louis St Laurent Ave



Queues
1: Regional Rd 25 & Louis St Laurent Ave

2037 Future Total AM
07-17-2023



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	270	735	500	655	120	1535	65	1335
v/c Ratio	0.65	0.94	0.94	0.57	0.73	0.98	0.50	0.93
Control Delay	29.2	72.1	64.6	40.0	52.1	60.1	36.4	57.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.2	72.1	64.6	40.0	52.1	60.1	36.4	57.4
Queue Length 50th (m)	43.2	107.2	121.8	79.1	21.0	~196.6	11.0	158.3
Queue Length 95th (m)	62.6	#147.0	#188.6	105.6	#49.4	#232.6	20.8	#196.5
Internal Link Dist (m)		126.1		117.1		481.0		113.5
Turn Bay Length (m)	90.0		35.0		65.0		80.0	
Base Capacity (vph)	484	783	550	1155	164	1571	131	1430
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	0.56	0.94	0.91	0.57	0.73	0.98	0.50	0.93



























Intersection Summary

~ 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: Regional Rd 25 & Louis St Laurent Ave

2037 Future Total AM
 07-17-2023

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 			  			 	
Traffic Volume (vph)	270	535	200	500	560	95	120	1180	355	65	1240	95
Future Volume (vph)	270	535	200	500	560	95	120	1180	355	65	1240	95
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0		2.0	6.0		3.0	6.2		3.0	6.2	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	*0.80		1.00	*0.80	
Frbp, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.96		1.00	0.98		1.00	0.97		1.00	0.99	
Flt Protected	0.95	1.00		1.00	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1767	3404		1863	3427		1703	4150		1719	4230	
Flt Permitted	0.40	1.00		0.12	1.00		0.08	1.00		0.08	1.00	
Satd. Flow (perm)	745	3404		226	3427		143	4150		153	4230	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	270	535	200	500	560	95	120	1180	355	65	1240	95
RTOR Reduction (vph)	0	27	0	0	9	0	0	31	0	0	5	0
Lane Group Flow (vph)	270	708	0	500	646	0	120	1504	0	65	1330	0
Confl. Peds. (#/hr)	5					5						
Heavy Vehicles (%)	2%	2%	1%	2%	2%	7%	6%	7%	3%	5%	7%	2%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	47.6	29.9		67.5	45.8		58.3	50.3		50.3	46.3	
Effective Green, g (s)	49.6	30.9		68.5	46.8		59.3	51.3		52.3	47.3	
Actuated g/C Ratio	0.35	0.22		0.49	0.33		0.42	0.37		0.37	0.34	
Clearance Time (s)	4.0	7.0		3.0	7.0		4.0	7.2		4.0	7.2	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	400	751		526	1145		160	1520		113	1429	
v/s Ratio Prot	0.09	c0.21		c0.24	0.19		c0.05	c0.36		0.02	0.31	
v/s Ratio Perm	0.15			0.22			0.27			0.19		
v/c Ratio	0.68	0.94		0.95	0.56		0.75	0.99		0.58	0.93	
Uniform Delay, d1	34.4	53.7		41.4	38.2		31.6	44.1		34.3	44.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	4.5	20.0		27.2	0.6		17.8	20.7		6.9	12.1	
Delay (s)	38.9	73.7		68.7	38.9		49.3	64.8		41.3	56.9	
Level of Service	D	E		E	D		D	E		D	E	
Approach Delay (s)		64.3			51.8			63.7			56.2	
Approach LOS		E			D			E			E	
Intersection Summary												
HCM 2000 Control Delay			59.2			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)		18.2				
Intersection Capacity Utilization			100.6%			ICU Level of Service		G				
Analysis Period (min)			15									

c Critical Lane Group

Timings
2: Regional Rd 25 & Whitlock Ave

2037 Future Total AM
07-17-2023



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations	↖	↗	↖	↗	↗	↖	↑↑↑	↖	↑↑↑
Traffic Volume (vph)	145	50	50	35	95	45	1440	50	2090
Future Volume (vph)	145	50	50	35	95	45	1440	50	2090
Turn Type	Perm	NA	Perm	NA	Perm	pm+pt	NA	pm+pt	NA
Protected Phases		4		8		5	2	1	6
Permitted Phases	4		8		8	2		6	
Detector Phase	4	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	20.0	7.0	20.0
Minimum Split (s)	37.5	37.5	37.5	37.5	37.5	11.0	35.5	11.0	35.5
Total Split (s)	38.0	38.0	38.0	38.0	38.0	11.0	81.0	11.0	81.0
Total Split (%)	29.2%	29.2%	29.2%	29.2%	29.2%	8.5%	62.3%	8.5%	62.3%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.0	4.2	3.0	4.2
All-Red Time (s)	3.2	3.2	3.2	3.2	3.2	1.0	2.3	1.0	2.3
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5	3.0	5.5	3.0	5.5
Lead/Lag						Lead	Lag	Lead	Lag
Lead-Lag Optimize?						Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	None	C-Max
Act Effct Green (s)	20.4	20.4	20.4	20.4	20.4	98.7	89.7	98.7	89.6
Actuated g/C Ratio	0.16	0.16	0.16	0.16	0.16	0.76	0.69	0.76	0.69
v/c Ratio	0.69	0.49	0.33	0.13	0.31	0.28	0.49	0.19	0.74
Control Delay	68.1	30.2	52.5	45.3	10.9	20.5	8.2	5.9	16.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	68.1	30.2	52.5	45.3	10.9	20.5	8.2	5.9	16.3
LOS	E	C	D	D	B	C	A	A	B
Approach Delay		49.2		29.2			8.6		16.1
Approach LOS		D		C			A		B

Intersection Summary

Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 64 (49%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 105
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.74
 Intersection Signal Delay: 16.3
 Intersection LOS: B
 Intersection Capacity Utilization 76.1%
 ICU Level of Service D
 Analysis Period (min) 15

Splits and Phases: 2: Regional Rd 25 & Whitlock Ave



Queues
2: Regional Rd 25 & Whitlock Ave

2037 Future Total AM
07-17-2023



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	145	145	50	35	95	45	1450	50	2190
v/c Ratio	0.69	0.49	0.33	0.13	0.31	0.28	0.49	0.19	0.74
Control Delay	68.1	30.2	52.5	45.3	10.9	20.5	8.2	5.9	16.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	68.1	30.2	52.5	45.3	10.9	20.5	8.2	5.9	16.3
Queue Length 50th (m)	37.5	18.2	12.1	8.2	0.0	2.1	44.9	2.6	149.6
Queue Length 95th (m)	57.3	37.4	23.8	17.1	14.7	m6.9	m159.2	7.2	211.2
Internal Link Dist (m)		62.9		68.1			497.5		481.0
Turn Bay Length (m)	35.0		65.0		65.0	100.0		100.0	
Base Capacity (vph)	333	431	241	439	435	159	2960	264	2973
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	0.44	0.34	0.21	0.08	0.22	0.28	0.49	0.19	0.74

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
2: Regional Rd 25 & Whitlock Ave

2037 Future Total AM
07-17-2023



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗	↗	↖	↑↑↑		↖	↑↑↑	
Traffic Volume (vph)	145	50	95	50	35	95	45	1440	10	50	2090	100
Future Volume (vph)	145	50	95	50	35	95	45	1440	10	50	2090	100
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5		5.5	5.5	5.5	3.0	5.5		3.0	5.5	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	*0.80		1.00	*0.80	
Frbp, ped/bikes	1.00	0.99		1.00	1.00	0.98	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	0.99	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.90		1.00	1.00	0.85	1.00	1.00		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1725	1516		1727	1759	1455	1671	4292		1805	4309	
Flt Permitted	0.73	1.00		0.53	1.00	1.00	0.04	1.00		0.11	1.00	
Satd. Flow (perm)	1333	1516		965	1759	1455	79	4292		218	4309	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	145	50	95	50	35	95	45	1440	10	50	2090	100
RTOR Reduction (vph)	0	59	0	0	0	80	0	0	0	0	3	0
Lane Group Flow (vph)	145	86	0	50	35	15	45	1450	0	50	2187	0
Confl. Peds. (#/hr)	5		5	5		5						
Heavy Vehicles (%)	4%	32%	1%	4%	8%	9%	8%	6%	25%	0%	5%	7%
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	19.4	19.4		19.4	19.4	19.4	93.6	87.9		93.6	87.9	
Effective Green, g (s)	20.4	20.4		20.4	20.4	20.4	95.6	88.9		95.6	88.9	
Actuated g/C Ratio	0.16	0.16		0.16	0.16	0.16	0.74	0.68		0.74	0.68	
Clearance Time (s)	6.5	6.5		6.5	6.5	6.5	4.0	6.5		4.0	6.5	
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)	209	237		151	276	228	140	2935		242	2946	
v/s Ratio Prot		0.06			0.02		c0.02	0.34		0.01	c0.51	
v/s Ratio Perm	c0.11			0.05		0.01	0.22			0.14		
v/c Ratio	0.69	0.36		0.33	0.13	0.07	0.32	0.49		0.21	0.74	
Uniform Delay, d1	51.8	49.0		48.7	47.1	46.7	12.5	9.8		5.8	13.2	
Progression Factor	1.00	1.00		1.00	1.00	1.00	2.08	0.72		1.00	1.00	
Incremental Delay, d2	9.6	0.9		1.3	0.2	0.1	1.2	0.5		0.4	1.7	
Delay (s)	61.4	49.9		50.0	47.3	46.8	27.2	7.6		6.2	14.9	
Level of Service	E	D		D	D	D	C	A		A	B	
Approach Delay (s)		55.7			47.8			8.2			14.7	
Approach LOS		E			D			A			B	

Intersection Summary

HCM 2000 Control Delay	16.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	76.1%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
 3: Regional Rd 25 & Site Dwy (North)

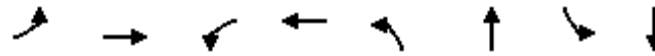
2037 Future Total AM
 07-17-2023



Movement	EBL	EBR	NBL	NBT	SBT	SBR	
Lane Configurations		↗		↑↑↑	↑↑↑↗		
Traffic Volume (veh/h)	0	30	0	1495	2225	10	
Future Volume (Veh/h)	0	30	0	1495	2225	10	
Sign Control	Stop			Free	Free		
Grade	0%			0%	0%		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Hourly flow rate (vph)	0	30	0	1495	2225	10	
Pedestrians							
Lane Width (m)							
Walking Speed (m/s)							
Percent Blockage							
Right turn flare (veh)							
Median type				None	None		
Median storage veh							
Upstream signal (m)	199						
pX, platoon unblocked	0.92						
vC, conflicting volume	2728	747	2235				
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol	2570	747	2235				
tC, single (s)	6.8	6.9	4.1				
tC, 2 stage (s)							
tF (s)	3.5	3.3	2.2				
p0 queue free %	100	92	100				
cM capacity (veh/h)	20	360	235				
Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	30	498	498	498	890	890	455
Volume Left	0	0	0	0	0	0	0
Volume Right	30	0	0	0	0	0	10
cSH	360	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.08	0.29	0.29	0.29	0.52	0.52	0.27
Queue Length 95th (m)	2.2	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (s)	15.9	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	C						
Approach Delay (s)	15.9	0.0	0.0				
Approach LOS	C						
Intersection Summary							
Average Delay	0.1						
Intersection Capacity Utilization	53.2%			ICU Level of Service	A		
Analysis Period (min)	15						

Timings
5: Regional Rd 25 & Etheridge Ave/Collector Road

2037 Future Total AM
07-17-2023

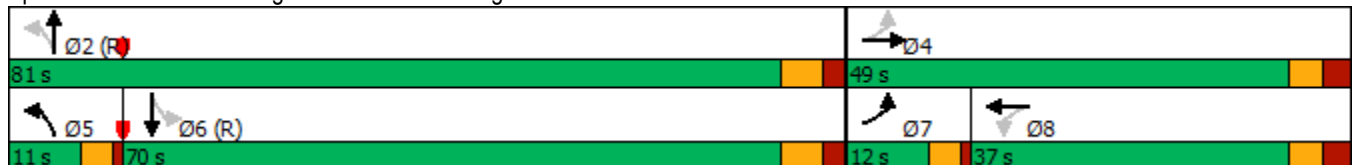


Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↖	↗	↖	↗	↖	↑↑↑	↖	↑↑↑
Traffic Volume (vph)	245	0	65	0	85	1195	30	2145
Future Volume (vph)	245	0	65	0	85	1195	30	2145
Turn Type	pm+pt	NA	Perm	NA	pm+pt	NA	Perm	NA
Protected Phases	7	4		8	5	2		6
Permitted Phases	4		8		2		6	
Detector Phase	7	4	8	8	5	2	6	6
Switch Phase								
Minimum Initial (s)	7.0	10.0	10.0	10.0	7.0	20.0	20.0	20.0
Minimum Split (s)	11.0	36.2	36.2	36.2	11.0	38.4	38.4	38.4
Total Split (s)	12.0	49.0	37.0	37.0	11.0	81.0	70.0	70.0
Total Split (%)	9.2%	37.7%	28.5%	28.5%	8.5%	62.3%	53.8%	53.8%
Yellow Time (s)	3.0	3.3	3.3	3.3	3.0	4.2	4.2	4.2
All-Red Time (s)	1.0	2.9	2.9	2.9	1.0	2.2	2.2	2.2
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	3.0	5.2	5.2	5.2	3.0	5.4	5.4	5.4
Lead/Lag	Lead		Lag	Lag	Lead		Lag	Lag
Lead-Lag Optimize?	Yes		Yes	Yes	Yes		Yes	Yes
Recall Mode	None	None	None	None	None	C-Max	C-Max	C-Max
Act Effct Green (s)	25.6	23.4	13.8	13.8	98.4	96.0	84.1	84.1
Actuated g/C Ratio	0.20	0.18	0.11	0.11	0.76	0.74	0.65	0.65
v/c Ratio	0.92	0.37	0.49	0.21	0.47	0.38	0.13	0.80
Control Delay	87.5	14.7	66.3	3.5	48.3	2.3	4.0	11.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	87.5	14.7	66.3	3.5	48.3	2.3	4.0	11.6
LOS	F	B	E	A	D	A	A	B
Approach Delay		61.0		37.5		5.3		11.5
Approach LOS		E		D		A		B

Intersection Summary

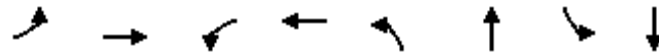
Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 130
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.92
 Intersection Signal Delay: 15.0
 Intersection LOS: B
 Intersection Capacity Utilization 86.5%
 ICU Level of Service E
 Analysis Period (min) 15

Splits and Phases: 5: Regional Rd 25 & Etheridge Ave/Collector Road



Queues
5: Regional Rd 25 & Etheridge Ave/Collector Road

2037 Future Total AM
07-17-2023



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	245	140	65	55	85	1215	30	2225
v/c Ratio	0.92	0.37	0.49	0.21	0.47	0.38	0.13	0.80
Control Delay	87.5	14.7	66.3	3.5	48.3	2.3	4.0	11.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	87.5	14.7	66.3	3.5	48.3	2.3	4.0	11.6
Queue Length 50th (m)	61.1	6.5	16.9	0.0	11.0	11.2	0.8	193.3
Queue Length 95th (m)	#92.9	24.0	31.7	2.6	m16.6	16.0	m1.6	226.6
Internal Link Dist (m)		53.9		63.1		108.9		175.3
Turn Bay Length (m)	40.0		40.0		70.0		70.0	
Base Capacity (vph)	266	617	310	467	180	3175	226	2795
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	0.92	0.23	0.21	0.12	0.47	0.38	0.13	0.80

Intersection Summary

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
5: Regional Rd 25 & Etheridge Ave/Collector Road

2037 Future Total AM
07-17-2023



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↑↑↑		↖	↑↑↑	
Traffic Volume (vph)	245	0	140	65	0	55	85	1195	20	30	2145	80
Future Volume (vph)	245	0	140	65	0	55	85	1195	20	30	2145	80
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	5.2		5.2	5.2		3.0	5.4		5.4	5.4	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	*0.80		1.00	*0.80	
Frt	1.00	0.85		1.00	0.85		1.00	1.00		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1787	1615		1805	1615		1752	4295		1805	4318	
Flt Permitted	0.57	1.00		0.67	1.00		0.05	1.00		0.18	1.00	
Satd. Flow (perm)	1082	1615		1269	1615		86	4295		349	4318	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	245	0	140	65	0	55	85	1195	20	30	2145	80
RTOR Reduction (vph)	0	90	0	0	50	0	0	1	0	0	2	0
Lane Group Flow (vph)	245	50	0	65	5	0	85	1214	0	30	2223	0
Heavy Vehicles (%)	1%	0%	0%	0%	0%	0%	3%	6%	0%	0%	5%	6%
Turn Type	pm+pt	NA		Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases	7	4			8		5	2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	23.6	23.6		10.8	10.8		93.8	93.8		81.8	81.8	
Effective Green, g (s)	24.6	24.6		11.8	11.8		94.8	94.8		82.8	82.8	
Actuated g/C Ratio	0.19	0.19		0.09	0.09		0.73	0.73		0.64	0.64	
Clearance Time (s)	4.0	6.2		6.2	6.2		4.0	6.4		6.4	6.4	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	257	305		115	146		178	3132		222	2750	
v/s Ratio Prot	c0.07	0.03			0.00		c0.03	0.28			c0.51	
v/s Ratio Perm	c0.11			0.05			0.32			0.09		
v/c Ratio	0.95	0.16		0.57	0.03		0.48	0.39		0.14	0.81	
Uniform Delay, d1	51.2	44.1		56.6	53.9		20.6	6.6		9.4	17.7	
Progression Factor	1.00	1.00		1.00	1.00		2.86	0.31		0.27	0.52	
Incremental Delay, d2	43.1	0.3		6.2	0.1		1.2	0.2		0.9	1.9	
Delay (s)	94.4	44.4		62.9	54.0		60.1	2.3		3.4	11.1	
Level of Service	F	D		E	D		E	A		A	B	
Approach Delay (s)		76.2			58.8			6.0			11.0	
Approach LOS		E			E			A			B	

Intersection Summary

HCM 2000 Control Delay	17.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	16.6
Intersection Capacity Utilization	86.5%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
6: Regional Rd 25 & Site Dwy (South)

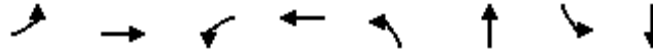
2037 Future Total AM
07-17-2023



Movement	EBL	EBR	NBL	NBT	SBT	SBR	
Lane Configurations		↗		↑↑↑	↑↑↑↗		
Traffic Volume (veh/h)	0	45	0	1300	2335	15	
Future Volume (Veh/h)	0	45	0	1300	2335	15	
Sign Control	Stop			Free	Free		
Grade	0%			0%	0%		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Hourly flow rate (vph)	0	45	0	1300	2335	15	
Pedestrians							
Lane Width (m)							
Walking Speed (m/s)							
Percent Blockage							
Right turn flare (veh)							
Median type				None	None		
Median storage veh							
Upstream signal (m)				183	133		
pX, platoon unblocked	0.75	0.62	0.62				
vC, conflicting volume	2776	786	2350				
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol	0	0	1054				
tC, single (s)	6.8	6.9	4.1				
tC, 2 stage (s)							
tF (s)	3.5	3.3	2.2				
p0 queue free %	100	93	100				
cM capacity (veh/h)	767	681	417				
Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	45	433	433	433	934	934	482
Volume Left	0	0	0	0	0	0	0
Volume Right	45	0	0	0	0	0	15
cSH	681	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.07	0.25	0.25	0.25	0.55	0.55	0.28
Queue Length 95th (m)	1.7	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (s)	10.7	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	B						
Approach Delay (s)	10.7	0.0					0.0
Approach LOS	B						
Intersection Summary							
Average Delay	0.1						
Intersection Capacity Utilization	55.4%			ICU Level of Service	B		
Analysis Period (min)	15						

Timings
7: Regional Rd 25 & Britannia Rd

2037 Future Total AM
07-17-2023



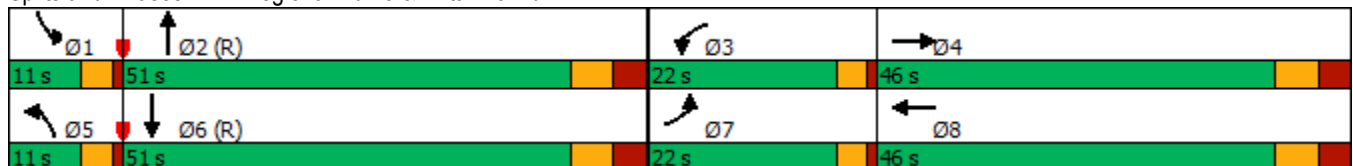
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↖↗	↕↔	↖↗	↕↔	↖↗	↕↔	↖↗	↕↔
Traffic Volume (vph)	65	455	465	380	50	1080	365	1990
Future Volume (vph)	65	455	465	380	50	1080	365	1990
Turn Type	Prot	NA	Prot	NA	Prot	NA	Prot	NA
Protected Phases	7	4	3	8	5	2	1	6
Permitted Phases								
Detector Phase	7	4	3	8	5	2	1	6
Switch Phase								
Minimum Initial (s)	7.0	10.0	7.0	10.0	7.0	20.0	7.0	20.0
Minimum Split (s)	11.0	45.5	11.0	45.5	11.0	49.7	11.0	49.7
Total Split (s)	22.0	46.0	22.0	46.0	11.0	51.0	11.0	51.0
Total Split (%)	16.9%	35.4%	16.9%	35.4%	8.5%	39.2%	8.5%	39.2%
Yellow Time (s)	3.0	4.2	3.0	4.2	3.0	4.2	3.0	4.2
All-Red Time (s)	1.0	3.3	1.0	3.3	1.0	3.5	1.0	3.5
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	3.0	6.5	3.0	6.5	3.0	6.7	3.0	6.7
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	C-Max	None	C-Max
Act Effct Green (s)	9.2	27.8	19.0	39.8	8.7	44.3	19.7	57.5
Actuated g/C Ratio	0.07	0.21	0.15	0.31	0.07	0.34	0.15	0.44
v/c Ratio	0.28	0.87dr	0.92	0.39	0.22	0.89	0.69	1.05
Control Delay	60.0	45.9	75.9	29.5	59.6	48.0	55.4	79.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	60.0	45.9	75.9	29.5	59.6	48.0	55.4	79.2
LOS	E	D	E	C	E	D	E	E
Approach Delay		47.0		51.0		48.5		75.6
Approach LOS		D		D		D		E

Intersection Summary

Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 104 (80%), Referenced to phase 2:NBT and 6:SBT, Start of Green
 Natural Cycle: 150
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.05
 Intersection Signal Delay: 60.3
 Intersection LOS: E
 Intersection Capacity Utilization 91.6%
 ICU Level of Service F
 Analysis Period (min) 15

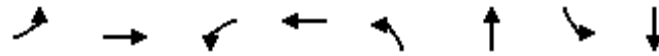
dr Defacto Right Lane. Recode with 1 though lane as a right lane.

Splits and Phases: 7: Regional Rd 25 & Britannia Rd



Queues
7: Regional Rd 25 & Britannia Rd

2037 Future Total AM
07-17-2023



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	65	770	465	535	50	1295	365	2015
v/c Ratio	0.28	0.87dr	0.92	0.39	0.22	0.89	0.69	1.05
Control Delay	60.0	45.9	75.9	29.5	59.6	48.0	55.4	79.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	60.0	45.9	75.9	29.5	59.6	48.0	55.4	79.2
Queue Length 50th (m)	8.7	70.3	64.7	42.7	6.7	134.4	53.4	~249.3
Queue Length 95th (m)	16.3	83.0	#97.2	56.3	13.4	158.5	m#83.7	#318.4
Internal Link Dist (m)		377.9		182.4		165.3		159.1
Turn Bay Length (m)	60.0		120.0		90.0		90.0	
Base Capacity (vph)	482	1368	503	1407	225	1463	530	1912
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	0.56	0.92	0.38	0.22	0.89	0.69	1.05

Intersection Summary

- ~ 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.
- dr Defacto Right Lane. Recode with 1 though lane as a right lane.

HCM Signalized Intersection Capacity Analysis

2037 Future Total AM

7: Regional Rd 25 & Britannia Rd

07-17-2023



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔	↑↑↔		↔↔	↑↑↔		↔↔	↑↑↔		↔↔	↑↑↔	
Traffic Volume (vph)	65	455	315	465	380	155	50	1080	215	365	1990	25
Future Volume (vph)	65	455	315	465	380	155	50	1080	215	365	1990	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.5		3.0	6.5		3.0	6.7		3.0	6.7	
Lane Util. Factor	0.97	*0.80		0.97	*0.80		0.97	*0.80		0.97	*0.80	
Frt	1.00	0.94		1.00	0.96		1.00	0.98		1.00	1.00	
Flt Protected	0.95	1.00		1.00	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	3303	4238		3445	4306		3367	4241		3502	4324	
Flt Permitted	0.95	1.00		1.00	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	3303	4238		3445	4306		3367	4241		3502	4324	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	65	455	315	465	380	155	50	1080	215	365	1990	25
RTOR Reduction (vph)	0	90	0	0	56	0	0	19	0	0	1	0
Lane Group Flow (vph)	65	680	0	465	479	0	50	1276	0	365	2014	0
Heavy Vehicles (%)	6%	1%	1%	7%	1%	2%	4%	5%	4%	0%	5%	27%
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	6.8	27.6		18.0	38.8		6.3	42.5		18.7	54.9	
Effective Green, g (s)	7.8	28.6		19.0	39.8		7.3	43.5		19.7	55.9	
Actuated g/C Ratio	0.06	0.22		0.15	0.31		0.06	0.33		0.15	0.43	
Clearance Time (s)	4.0	7.5		4.0	7.5		4.0	7.7		4.0	7.7	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	198	932		503	1318		189	1419		530	1859	
v/s Ratio Prot	0.02	c0.16		c0.13	0.11		0.01	0.30		c0.10	c0.47	
v/s Ratio Perm												
v/c Ratio	0.33	0.87dr		0.92	0.36		0.26	0.90		0.69	1.08	
Uniform Delay, d1	58.6	47.1		54.8	35.2		58.8	41.2		52.2	37.0	
Progression Factor	1.00	1.00		0.93	0.96		1.00	1.00		0.94	1.36	
Incremental Delay, d2	1.0	2.9		22.5	0.2		0.8	9.4		2.5	44.6	
Delay (s)	59.6	50.0		73.3	33.9		59.5	50.6		51.8	94.9	
Level of Service	E	D		E	C		E	D		D	F	
Approach Delay (s)		50.7			52.2			50.9			88.3	
Approach LOS		D			D			D			F	

Intersection Summary

HCM 2000 Control Delay	67.1	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	19.2
Intersection Capacity Utilization	91.6%	ICU Level of Service	F
Analysis Period (min)	15		

dr Defacto Right Lane. Recode with 1 though lane as a right lane.

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
 8: Site Dwy (South)/Site Dwy (North) & Etheridge Ave

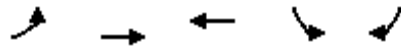
2037 Future Total AM
 07-17-2023



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (veh/h)	5	165	5	45	85	35	15	0	125	95	0	10
Future Volume (Veh/h)	5	165	5	45	85	35	15	0	125	95	0	10
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	5	165	5	45	85	35	15	0	125	95	0	10
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)					78							
pX, platoon unblocked	1.00						1.00	1.00		1.00	1.00	1.00
vC, conflicting volume	120			170			380	388	168	495	372	102
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	119			170			379	387	168	494	372	101
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			97			97	100	86	77	100	99
cM capacity (veh/h)	1480			1420			560	531	882	408	542	959
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	175	165	140	105								
Volume Left	5	45	15	95								
Volume Right	5	35	125	10								
cSH	1480	1420	831	432								
Volume to Capacity	0.00	0.03	0.17	0.24								
Queue Length 95th (m)	0.1	0.8	4.8	7.5								
Control Delay (s)	0.2	2.3	10.2	16.0								
Lane LOS	A	A	B	C								
Approach Delay (s)	0.2	2.3	10.2	16.0								
Approach LOS			B	C								
Intersection Summary												
Average Delay			6.0									
Intersection Capacity Utilization			46.1%		ICU Level of Service				A			
Analysis Period (min)			15									

Timings
10: Britannia Rd & Farmstead Dr

2037 Future Total AM
07-17-2023

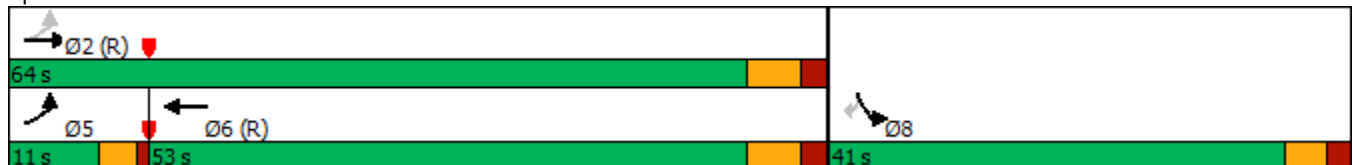


Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Configurations	↖	↑↑↑	↑↑↑↔	↖	↗
Traffic Volume (vph)	20	745	430	90	30
Future Volume (vph)	20	745	430	90	30
Turn Type	pm+pt	NA	NA	Prot	Perm
Protected Phases	5	2	6	8	
Permitted Phases	2				8
Detector Phase	5	2	6	8	8
Switch Phase					
Minimum Initial (s)	7.0	20.0	20.0	10.0	10.0
Minimum Split (s)	11.0	29.4	29.4	15.3	15.3
Total Split (s)	11.0	64.0	53.0	41.0	41.0
Total Split (%)	10.5%	61.0%	50.5%	39.0%	39.0%
Yellow Time (s)	3.0	4.2	4.2	3.3	3.3
All-Red Time (s)	1.0	2.2	2.2	2.0	2.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	3.0	5.4	5.4	4.3	4.3
Lead/Lag	Lead		Lag		
Lead-Lag Optimize?	Yes		Yes		
Recall Mode	None	C-Max	C-Max	None	None
Act Effct Green (s)	88.0	86.7	82.3	12.8	12.8
Actuated g/C Ratio	0.84	0.83	0.78	0.12	0.12
v/c Ratio	0.03	0.20	0.14	0.43	0.14
Control Delay	2.4	2.8	4.4	49.0	15.4
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	2.4	2.8	4.4	49.0	15.4
LOS	A	A	A	D	B
Approach Delay		2.8	4.4	40.6	
Approach LOS		A	A	D	

Intersection Summary

Cycle Length: 105
 Actuated Cycle Length: 105
 Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.43
 Intersection Signal Delay: 6.7
 Intersection LOS: A
 Intersection Capacity Utilization 33.1%
 ICU Level of Service A
 Analysis Period (min) 15

Splits and Phases: 10: Britannia Rd & Farmstead Dr



Queues
10: Britannia Rd & Farmstead Dr

2037 Future Total AM
07-17-2023



Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	20	745	455	90	30
v/c Ratio	0.03	0.20	0.14	0.43	0.14
Control Delay	2.4	2.8	4.4	49.0	15.4
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	2.4	2.8	4.4	49.0	15.4
Queue Length 50th (m)	0.6	12.9	7.2	18.4	0.0
Queue Length 95th (m)	2.3	21.1	19.4	33.1	8.5
Internal Link Dist (m)		101.0	377.9	199.3	
Turn Bay Length (m)	20.0				
Base Capacity (vph)	702	3653	3297	595	557
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	0.20	0.14	0.15	0.05
Intersection Summary					

HCM Signalized Intersection Capacity Analysis
 10: Britannia Rd & Farmstead Dr

2037 Future Total AM
 07-17-2023



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↙	↑↑↑	↑↑↑		↙	↗
Traffic Volume (vph)	20	745	430	25	90	30
Future Volume (vph)	20	745	430	25	90	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	5.4	5.4		4.3	4.3
Lane Util. Factor	1.00	*0.80	*0.80		1.00	1.00
Frt	1.00	1.00	0.99		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1656	4427	4205		1703	1538
Flt Permitted	0.43	1.00	1.00		0.95	1.00
Satd. Flow (perm)	756	4427	4205		1703	1538
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	20	745	430	25	90	30
RTOR Reduction (vph)	0	0	3	0	0	27
Lane Group Flow (vph)	20	745	452	0	90	3
Heavy Vehicles (%)	9%	3%	8%	0%	6%	5%
Turn Type	pm+pt	NA	NA		Prot	Perm
Protected Phases	5	2	6		8	
Permitted Phases	2					8
Actuated Green, G (s)	83.5	83.5	76.7		9.8	9.8
Effective Green, g (s)	84.5	84.5	77.7		10.8	10.8
Actuated g/C Ratio	0.80	0.80	0.74		0.10	0.10
Clearance Time (s)	4.0	6.4	6.4		5.3	5.3
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	640	3562	3111		175	158
v/s Ratio Prot	0.00	c0.17	0.11		c0.05	
v/s Ratio Perm	0.02					0.00
v/c Ratio	0.03	0.21	0.15		0.51	0.02
Uniform Delay, d1	2.1	2.4	4.0		44.6	42.3
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.0	0.1	0.1		2.5	0.0
Delay (s)	2.1	2.5	4.1		47.2	42.4
Level of Service	A	A	A		D	D
Approach Delay (s)		2.5	4.1		46.0	
Approach LOS		A	A		D	

Intersection Summary

HCM 2000 Control Delay	6.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.25		
Actuated Cycle Length (s)	105.0	Sum of lost time (s)	12.7
Intersection Capacity Utilization	33.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Timings
11: Britannia Rd & Rose Way

2037 Future Total AM
07-17-2023



Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Configurations	↘	↑↑↑	↑↑↑	↘	↗
Traffic Volume (vph)	25	1010	925	55	75
Future Volume (vph)	25	1010	925	55	75
Turn Type	pm+pt	NA	NA	Prot	Perm
Protected Phases	5	2	6	4	
Permitted Phases	2				4
Detector Phase	5	2	6	4	4
Switch Phase					
Minimum Initial (s)	7.0	20.0	20.0	10.0	10.0
Minimum Split (s)	11.0	29.0	29.0	43.0	43.0
Total Split (s)	15.0	80.0	65.0	50.0	50.0
Total Split (%)	11.5%	61.5%	50.0%	38.5%	38.5%
Yellow Time (s)	3.0	4.0	4.0	3.0	3.0
All-Red Time (s)	1.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	3.0	6.0	6.0	5.0	5.0
Lead/Lag	Lead		Lag		
Lead-Lag Optimize?	Yes		Yes		
Recall Mode	None	C-Max	C-Max	None	None
Act Effct Green (s)	110.2	107.2	100.6	11.8	11.8
Actuated g/C Ratio	0.85	0.82	0.77	0.09	0.09
v/c Ratio	0.05	0.27	0.27	0.34	0.35
Control Delay	3.9	5.9	4.8	61.1	16.3
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	3.9	5.9	4.8	61.1	16.3
LOS	A	A	A	E	B
Approach Delay		5.9	4.8	35.2	
Approach LOS		A	A	D	

Intersection Summary

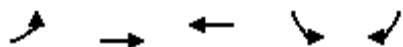
Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
 Natural Cycle: 85
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.35
 Intersection Signal Delay: 7.2
 Intersection LOS: A
 Intersection Capacity Utilization 38.3%
 ICU Level of Service A
 Analysis Period (min) 15

Splits and Phases: 11: Britannia Rd & Rose Way



Queues
11: Britannia Rd & Rose Way

2037 Future Total AM
07-17-2023



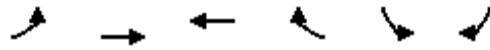
Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	25	1010	935	55	75
v/c Ratio	0.05	0.27	0.27	0.34	0.35
Control Delay	3.9	5.9	4.8	61.1	16.3
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	3.9	5.9	4.8	61.1	16.3
Queue Length 50th (m)	1.8	45.8	29.4	14.3	0.0
Queue Length 95th (m)	m2.8	m53.3	39.3	27.8	15.3
Internal Link Dist (m)		182.4	155.7	76.0	
Turn Bay Length (m)	50.0			50.0	
Base Capacity (vph)	515	3761	3523	624	608
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.05	0.27	0.27	0.09	0.12

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
 11: Britannia Rd & Rose Way

2037 Future Total AM
 07-17-2023

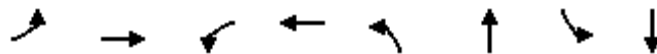


Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↵	↑↑↑	↑↑↑		↵	↵
Traffic Volume (vph)	25	1010	925	10	55	75
Future Volume (vph)	25	1010	925	10	55	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0	6.0		5.0	5.0
Lane Util. Factor	1.00	*0.80	*0.80		1.00	1.00
Frt	1.00	1.00	1.00		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1805	4560	4553		1805	1615
Flt Permitted	0.24	1.00	1.00		0.95	1.00
Satd. Flow (perm)	461	4560	4553		1805	1615
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	25	1010	925	10	55	75
RTOR Reduction (vph)	0	0	0	0	0	68
Lane Group Flow (vph)	25	1010	935	0	55	7
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Turn Type	pm+pt	NA	NA		Prot	Perm
Protected Phases	5	2	6		4	
Permitted Phases	2					4
Actuated Green, G (s)	106.2	106.2	98.0		10.8	10.8
Effective Green, g (s)	107.2	107.2	99.0		11.8	11.8
Actuated g/C Ratio	0.82	0.82	0.76		0.09	0.09
Clearance Time (s)	4.0	7.0	7.0		6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	433	3760	3467		163	146
v/s Ratio Prot	0.00	c0.22	0.21		c0.03	
v/s Ratio Perm	0.05					0.00
v/c Ratio	0.06	0.27	0.27		0.34	0.05
Uniform Delay, d1	2.2	2.6	4.7		55.4	54.0
Progression Factor	2.24	2.20	1.00		1.00	1.00
Incremental Delay, d2	0.0	0.1	0.2		1.2	0.1
Delay (s)	4.9	5.8	4.8		56.7	54.1
Level of Service	A	A	A		E	D
Approach Delay (s)		5.8	4.8		55.2	
Approach LOS		A	A		E	

Intersection Summary			
HCM 2000 Control Delay	8.4	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.28		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	38.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Timings
1: Regional Rd 25 & Louis St Laurent Ave

2037 Future Total PM
07-17-2023

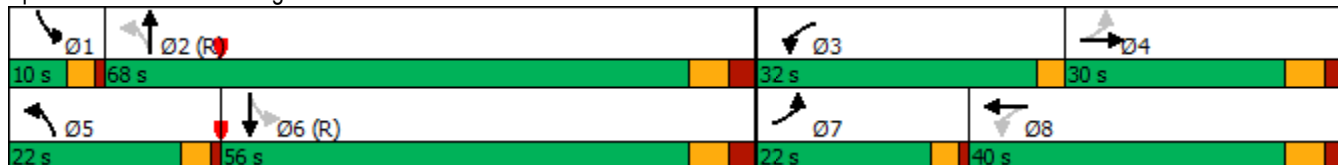


Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↖	↕	↖	↕	↖	↕	↖	↕
Traffic Volume (vph)	205	375	380	545	220	1335	95	1115
Future Volume (vph)	205	375	380	545	220	1335	95	1115
Turn Type	pm+pt	NA	pm+pt	NA	pm+pt	NA	pm+pt	NA
Protected Phases	7	4	3	8	5	2	1	6
Permitted Phases	4		8		2		6	
Detector Phase	7	4	3	8	5	2	1	6
Switch Phase								
Minimum Initial (s)	5.0	10.0	10.0	10.0	5.0	20.0	5.0	20.0
Minimum Split (s)	9.0	30.0	14.0	30.0	9.0	32.2	9.0	32.2
Total Split (s)	22.0	30.0	32.0	40.0	22.0	68.0	10.0	56.0
Total Split (%)	15.7%	21.4%	22.9%	28.6%	15.7%	48.6%	7.1%	40.0%
Yellow Time (s)	3.0	4.0	3.0	4.0	3.0	4.2	3.0	4.2
All-Red Time (s)	1.0	3.0	0.0	3.0	1.0	3.0	1.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	3.0	6.0	2.0	6.0	3.0	6.2	3.0	6.2
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	C-Max	None	C-Max
Act Effct Green (s)	43.2	23.5	56.5	32.9	78.5	64.8	66.4	55.7
Actuated g/C Ratio	0.31	0.17	0.40	0.24	0.56	0.46	0.47	0.40
v/c Ratio	0.67	0.84	0.88	0.73	0.82	0.91	0.62	0.76
Control Delay	40.2	66.3	56.9	54.2	57.1	42.1	41.4	40.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	40.2	66.3	56.9	54.2	57.1	42.1	41.4	40.6
LOS	D	E	E	D	E	D	D	D
Approach Delay		58.8		55.2		43.7		40.6
Approach LOS		E		E		D		D

Intersection Summary

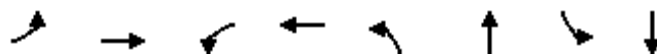
Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 100
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.91
 Intersection Signal Delay: 47.2
 Intersection LOS: D
 Intersection Capacity Utilization 94.6%
 ICU Level of Service F
 Analysis Period (min) 15

Splits and Phases: 1: Regional Rd 25 & Louis St Laurent Ave



Queues
1: Regional Rd 25 & Louis St Laurent Ave

2037 Future Total PM
07-17-2023





























Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	205	505	380	610	220	1790	95	1310
v/c Ratio	0.67	0.84	0.88	0.73	0.82	0.91	0.62	0.76
Control Delay	40.2	66.3	56.9	54.2	57.1	42.1	41.4	40.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	40.2	66.3	56.9	54.2	57.1	42.1	41.4	40.6
Queue Length 50th (m)	38.7	70.2	83.3	83.2	45.4	200.7	13.2	144.1
Queue Length 95th (m)	58.3	#96.8	#130.4	106.9	#81.9	#244.2	#36.6	168.0
Internal Link Dist (m)		126.1		117.1		481.0		113.5
Turn Bay Length (m)	90.0		35.0		65.0		80.0	
Base Capacity (vph)	338	621	468	875	298	1966	154	1724
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	0.61	0.81	0.81	0.70	0.74	0.91	0.62	0.76

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
1: Regional Rd 25 & Louis St Laurent Ave

2037 Future Total PM
07-17-2023

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 			  			  	
Traffic Volume (vph)	205	375	130	380	545	65	220	1335	455	95	1115	195
Future Volume (vph)	205	375	130	380	545	65	220	1335	455	95	1115	195
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0		2.0	6.0		3.0	6.2		3.0	6.2	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	*0.80		1.00	*0.80	
Frbp, ped/bikes	1.00	0.99		1.00	1.00		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.96		1.00	0.98		1.00	0.96		1.00	0.98	
Flt Protected	0.95	1.00		1.00	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1768	3426		1899	3537		1787	4167		1805	4298	
Flt Permitted	0.28	1.00		0.17	1.00		0.07	1.00		0.07	1.00	
Satd. Flow (perm)	522	3426		324	3537		132	4167		136	4298	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	205	375	130	380	545	65	220	1335	455	95	1115	195
RTOR Reduction (vph)	0	25	0	0	7	0	0	39	0	0	13	0
Lane Group Flow (vph)	205	480	0	380	603	0	220	1751	0	95	1297	0
Confl. Peds. (#/hr)	5		5	5		5	5		5	5		5
Heavy Vehicles (%)	2%	1%	0%	0%	0%	2%	1%	6%	1%	0%	4%	0%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	38.1	22.5		51.5	31.9		74.3	63.8		61.2	54.7	
Effective Green, g (s)	40.1	23.5		52.5	32.9		75.3	64.8		63.2	55.7	
Actuated g/C Ratio	0.29	0.17		0.38	0.23		0.54	0.46		0.45	0.40	
Clearance Time (s)	4.0	7.0		3.0	7.0		4.0	7.2		4.0	7.2	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	297	575		425	831		267	1928		150	1709	
v/s Ratio Prot	0.08	c0.14		c0.17	0.17		c0.10	c0.42		0.03	0.30	
v/s Ratio Perm	0.12			0.16			0.34			0.25		
v/c Ratio	0.69	0.83		0.89	0.73		0.82	0.91		0.63	0.76	
Uniform Delay, d1	40.6	56.4		38.7	49.4		38.8	34.8		28.8	36.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	6.7	10.1		20.6	3.2		18.3	7.8		8.4	3.2	
Delay (s)	47.4	66.5		59.3	52.6		57.0	42.6		37.3	39.6	
Level of Service	D	E		E	D		E	D		D	D	
Approach Delay (s)		61.0			55.2			44.2			39.4	
Approach LOS		E			E			D			D	
Intersection Summary												
HCM 2000 Control Delay			47.3				HCM 2000 Level of Service			D		
HCM 2000 Volume to Capacity ratio			0.90									
Actuated Cycle Length (s)			140.0				Sum of lost time (s)		18.2			
Intersection Capacity Utilization			94.6%				ICU Level of Service		F			
Analysis Period (min)			15									

c Critical Lane Group

Timings
2: Regional Rd 25 & Whitlock Ave

2037 Future Total PM
07-17-2023

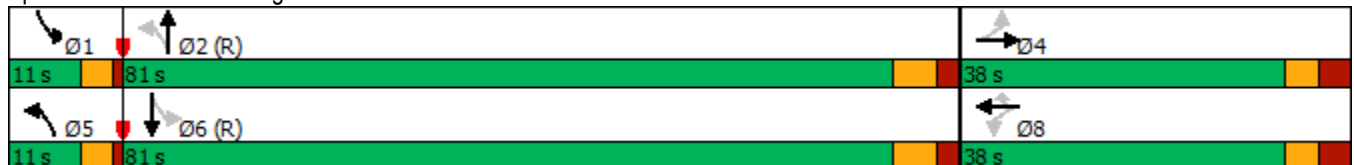


Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	105	40	25	40	75	90	2010	60	1370
Future Volume (vph)	105	40	25	40	75	90	2010	60	1370
Turn Type	Perm	NA	Perm	NA	Perm	pm+pt	NA	pm+pt	NA
Protected Phases		4		8		5	2	1	6
Permitted Phases	4		8		8	2		6	
Detector Phase	4	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	20.0	7.0	20.0
Minimum Split (s)	37.5	37.5	37.5	37.5	37.5	11.0	35.5	11.0	35.5
Total Split (s)	38.0	38.0	38.0	38.0	38.0	11.0	81.0	11.0	81.0
Total Split (%)	29.2%	29.2%	29.2%	29.2%	29.2%	8.5%	62.3%	8.5%	62.3%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.0	4.2	3.0	4.2
All-Red Time (s)	3.2	3.2	3.2	3.2	3.2	1.0	2.3	1.0	2.3
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5	3.0	5.5	3.0	5.5
Lead/Lag						Lead	Lag	Lead	Lag
Lead-Lag Optimize?						Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	None	C-Max
Act Effct Green (s)	16.6	16.6	16.6	16.6	16.6	102.5	93.2	102.0	91.1
Actuated g/C Ratio	0.13	0.13	0.13	0.13	0.13	0.79	0.72	0.78	0.70
v/c Ratio	0.60	0.32	0.15	0.17	0.29	0.35	0.66	0.34	0.50
Control Delay	67.4	31.8	50.2	50.0	13.0	5.6	8.0	13.8	10.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	67.4	31.8	50.2	50.0	13.0	5.6	8.0	13.8	10.1
LOS	E	C	D	D	B	A	A	B	B
Approach Delay		52.0		30.2			7.9		10.2
Approach LOS		D		C			A		B

Intersection Summary

Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 40 (31%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 95
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.66
 Intersection Signal Delay: 11.6
 Intersection LOS: B
 Intersection Capacity Utilization 72.8%
 ICU Level of Service C
 Analysis Period (min) 15

Splits and Phases: 2: Regional Rd 25 & Whitlock Ave



Queues
2: Regional Rd 25 & Whitlock Ave

2037 Future Total PM
07-17-2023



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	105	80	25	40	75	90	2050	60	1505
v/c Ratio	0.60	0.32	0.15	0.17	0.29	0.35	0.66	0.34	0.50
Control Delay	67.4	31.8	50.2	50.0	13.0	5.6	8.0	13.8	10.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	67.4	31.8	50.2	50.0	13.0	5.6	8.0	13.8	10.1
Queue Length 50th (m)	27.2	10.6	6.1	9.8	0.0	1.3	69.2	2.6	68.7
Queue Length 95th (m)	45.1	25.0	14.4	20.3	14.0	m3.2	193.5	13.2	99.7
Internal Link Dist (m)		62.9		68.1			503.8		481.0
Turn Bay Length (m)	35.0		65.0		65.0	100.0		100.0	
Base Capacity (vph)	341	452	333	475	441	259	3106	176	2995
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	0.31	0.18	0.08	0.08	0.17	0.35	0.66	0.34	0.50

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
2: Regional Rd 25 & Whitlock Ave

2037 Future Total PM
07-17-2023



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗	↗	↖	↑↑↑		↖	↑↑↑	
Traffic Volume (vph)	105	40	40	25	40	75	90	2010	40	60	1370	135
Future Volume (vph)	105	40	40	25	40	75	90	2010	40	60	1370	135
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5		5.5	5.5	5.5	3.0	5.5		3.0	5.5	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	*0.80		1.00	*0.80	
Frbp, ped/bikes	1.00	0.99		1.00	1.00	0.98	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	0.99	1.00		0.99	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.93		1.00	1.00	0.85	1.00	1.00		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1776	1699		1795	1900	1539	1787	4332		1770	4266	
Flt Permitted	0.73	1.00		0.70	1.00	1.00	0.11	1.00		0.05	1.00	
Satd. Flow (perm)	1367	1699		1332	1900	1539	199	4332		86	4266	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	105	40	40	25	40	75	90	2010	40	60	1370	135
RTOR Reduction (vph)	0	32	0	0	0	65	0	1	0	0	5	0
Lane Group Flow (vph)	105	48	0	25	40	10	90	2049	0	60	1500	0
Confl. Peds. (#/hr)	5		5	5		5			5	5		
Heavy Vehicles (%)	1%	5%	0%	0%	0%	3%	1%	5%	0%	2%	6%	0%
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	15.6	15.6		15.6	15.6	15.6	98.8	91.4		96.0	90.0	
Effective Green, g (s)	16.6	16.6		16.6	16.6	16.6	100.8	92.4		98.0	91.0	
Actuated g/C Ratio	0.13	0.13		0.13	0.13	0.13	0.78	0.71		0.75	0.70	
Clearance Time (s)	6.5	6.5		6.5	6.5	6.5	4.0	6.5		4.0	6.5	
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)	174	216		170	242	196	256	3079		155	2986	
v/s Ratio Prot		0.03			0.02		c0.02	c0.47		c0.02	0.35	
v/s Ratio Perm	c0.08			0.02		0.01	0.25			0.27		
v/c Ratio	0.60	0.22		0.15	0.17	0.05	0.35	0.67		0.39	0.50	
Uniform Delay, d1	53.6	50.9		50.4	50.5	49.8	5.2	10.3		9.6	9.0	
Progression Factor	1.00	1.00		1.00	1.00	1.00	0.90	0.63		1.00	1.00	
Incremental Delay, d2	5.8	0.5		0.4	0.3	0.1	0.6	0.9		1.6	0.6	
Delay (s)	59.4	51.4		50.8	50.9	49.9	5.3	7.4		11.2	9.6	
Level of Service	E	D		D	D	D	A	A		B	A	
Approach Delay (s)		55.9			50.3			7.3			9.7	
Approach LOS		E			D			A			A	

Intersection Summary		
HCM 2000 Control Delay	11.9	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	0.64	B
Actuated Cycle Length (s)	130.0	Sum of lost time (s)
Intersection Capacity Utilization	72.8%	14.0
Analysis Period (min)	15	ICU Level of Service
		C

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
 3: Regional Rd 25 & Site Dwy (North)

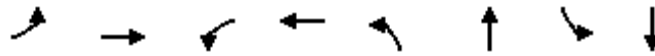
2037 Future Total PM
 07-17-2023



Movement	EBL	EBR	NBL	NBT	SBT	SBR	
Lane Configurations		↗		↑↑↑	↑↑↑↗		
Traffic Volume (veh/h)	0	20	0	2140	1405	30	
Future Volume (Veh/h)	0	20	0	2140	1405	30	
Sign Control	Stop			Free	Free		
Grade	0%			0%	0%		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Hourly flow rate (vph)	0	20	0	2140	1405	30	
Pedestrians							
Lane Width (m)							
Walking Speed (m/s)							
Percent Blockage							
Right turn flare (veh)							
Median type				None	None		
Median storage veh							
Upstream signal (m)	193						
pX, platoon unblocked	0.73						
vC, conflicting volume	2133	483	1435				
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol	1270	483	1435				
tC, single (s)	6.8	6.9	4.1				
tC, 2 stage (s)							
tF (s)	3.5	3.3	2.2				
p0 queue free %	100	96	100				
cM capacity (veh/h)	119	535	479				
Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	20	713	713	713	562	562	311
Volume Left	0	0	0	0	0	0	0
Volume Right	20	0	0	0	0	0	30
cSH	535	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.04	0.42	0.42	0.42	0.33	0.33	0.18
Queue Length 95th (m)	0.9	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (s)	12.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	B						
Approach Delay (s)	12.0	0.0					0.0
Approach LOS	B						
Intersection Summary							
Average Delay	0.1						
Intersection Capacity Utilization	44.7%			ICU Level of Service	A		
Analysis Period (min)	15						

Timings
5: Regional Rd 25 & Etheridge Ave/Collector Road

2037 Future Total PM
07-17-2023

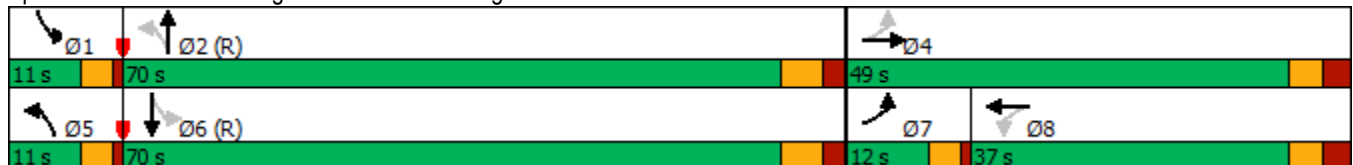


Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↖	↗	↖	↗	↖	↑↑↑	↖	↑↑↑
Traffic Volume (vph)	160	0	40	0	215	1940	55	1185
Future Volume (vph)	160	0	40	0	215	1940	55	1185
Turn Type	pm+pt	NA	Perm	NA	pm+pt	NA	pm+pt	NA
Protected Phases	7	4		8	5	2	1	6
Permitted Phases	4		8		2		6	
Detector Phase	7	4	8	8	5	2	1	6
Switch Phase								
Minimum Initial (s)	7.0	10.0	10.0	10.0	7.0	20.0	7.0	20.0
Minimum Split (s)	11.0	36.2	36.2	36.2	11.0	38.4	11.0	38.4
Total Split (s)	12.0	49.0	37.0	37.0	11.0	70.0	11.0	70.0
Total Split (%)	9.2%	37.7%	28.5%	28.5%	8.5%	53.8%	8.5%	53.8%
Yellow Time (s)	3.0	3.3	3.3	3.3	3.0	4.2	3.0	4.2
All-Red Time (s)	1.0	2.9	2.9	2.9	1.0	2.2	1.0	2.2
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	3.0	5.2	5.2	5.2	3.0	5.4	3.0	5.4
Lead/Lag	Lead		Lag	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	C-Max	None	C-Max
Act Effct Green (s)	23.7	21.5	11.9	11.9	100.3	88.8	87.2	76.5
Actuated g/C Ratio	0.18	0.17	0.09	0.09	0.77	0.68	0.67	0.59
v/c Ratio	0.66	0.19	0.33	0.14	0.56	0.67	0.31	0.54
Control Delay	60.8	1.1	62.5	1.1	27.2	8.9	32.5	9.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	60.8	1.1	62.5	1.1	27.2	8.9	32.5	9.9
LOS	E	A	E	A	C	A	C	A
Approach Delay		41.7		31.8		10.6		10.7
Approach LOS		D		C		B		B

Intersection Summary

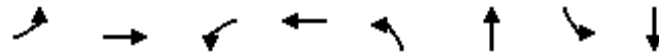
Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 103 (79%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 110
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.67
 Intersection Signal Delay: 12.9
 Intersection LOS: B
 Intersection Capacity Utilization 72.5%
 ICU Level of Service C
 Analysis Period (min) 15

Splits and Phases: 5: Regional Rd 25 & Etheridge Ave/Collector Road



Queues
5: Regional Rd 25 & Etheridge Ave/Collector Road

2037 Future Total PM
07-17-2023



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	160	75	40	40	215	2005	55	1370
v/c Ratio	0.66	0.19	0.33	0.14	0.56	0.67	0.31	0.54
Control Delay	60.8	1.1	62.5	1.1	27.2	8.9	32.5	9.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	60.8	1.1	62.5	1.1	27.2	8.9	32.5	9.9
Queue Length 50th (m)	38.7	0.0	10.4	0.0	31.9	69.7	4.0	90.9
Queue Length 95th (m)	59.6	0.0	22.4	0.0	m35.5	m68.4	14.4	120.5
Internal Link Dist (m)		53.9		63.5		106.2		169.0
Turn Bay Length (m)	40.0		40.0		70.0		70.0	
Base Capacity (vph)	242	642	329	506	384	2986	176	2546
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	0.66	0.12	0.12	0.08	0.56	0.67	0.31	0.54

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
5: Regional Rd 25 & Etheridge Ave/Collector Road

2037 Future Total PM
07-17-2023



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↑↑↑		↖	↑↑↑	
Traffic Volume (vph)	160	0	75	40	0	40	215	1940	65	55	1185	185
Future Volume (vph)	160	0	75	40	0	40	215	1940	65	55	1185	185
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	5.2		5.2	5.2		3.0	5.4		3.0	5.4	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	*0.80		1.00	*0.80	
Frt	1.00	0.85		1.00	0.85		1.00	1.00		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1752	1615		1805	1615		1805	4369		1805	4307	
Flt Permitted	0.56	1.00		0.71	1.00		0.11	1.00		0.05	1.00	
Satd. Flow (perm)	1035	1615		1346	1615		204	4369		101	4307	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	160	0	75	40	0	40	215	1940	65	55	1185	185
RTOR Reduction (vph)	0	62	0	0	37	0	0	2	0	0	11	0
Lane Group Flow (vph)	160	13	0	40	3	0	215	2003	0	55	1359	0
Heavy Vehicles (%)	3%	0%	0%	0%	0%	0%	0%	4%	0%	0%	4%	2%
Turn Type	pm+pt	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	21.7	21.7		8.9	8.9		95.7	85.8		80.2	74.3	
Effective Green, g (s)	22.7	22.7		9.9	9.9		96.7	86.8		82.2	75.3	
Actuated g/C Ratio	0.17	0.17		0.08	0.08		0.74	0.67		0.63	0.58	
Clearance Time (s)	4.0	6.2		6.2	6.2		4.0	6.4		4.0	6.4	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	234	282		102	122		378	2917		154	2494	
v/s Ratio Prot	c0.05	0.01			0.00		c0.08	c0.46		0.02	0.32	
v/s Ratio Perm	c0.07			0.03			0.34			0.21		
v/c Ratio	0.68	0.05		0.39	0.02		0.57	0.69		0.36	0.54	
Uniform Delay, d1	49.0	44.6		57.2	55.6		13.7	13.3		11.7	16.8	
Progression Factor	1.00	1.00		1.00	1.00		2.16	0.63		2.65	0.55	
Incremental Delay, d2	8.0	0.1		2.5	0.1		0.5	0.3		1.3	0.8	
Delay (s)	57.0	44.7		59.7	55.7		30.1	8.6		32.4	10.0	
Level of Service	E	D		E	E		C	A		C	B	
Approach Delay (s)		53.1			57.7			10.7			10.9	
Approach LOS		D			E			B			B	

Intersection Summary

HCM 2000 Control Delay	14.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	16.6
Intersection Capacity Utilization	72.5%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
6: Regional Rd 25 & Site Dwy (South)

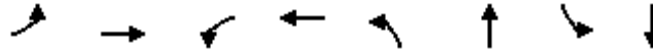
2037 Future Total PM
07-17-2023



Movement	EBL	EBR	NBL	NBT	SBT	SBR	
Lane Configurations		↗		↑↑↑	↑↑↑↗		
Traffic Volume (veh/h)	0	25	0	2220	1260	40	
Future Volume (Veh/h)	0	25	0	2220	1260	40	
Sign Control	Stop			Free	Free		
Grade	0%			0%	0%		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Hourly flow rate (vph)	0	25	0	2220	1260	40	
Pedestrians							
Lane Width (m)							
Walking Speed (m/s)							
Percent Blockage							
Right turn flare (veh)							
Median type				None	None		
Median storage veh							
Upstream signal (m)				186	130		
pX, platoon unblocked	0.67	0.83	0.83				
vC, conflicting volume	2020	440	1300				
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol	0	0	658				
tC, single (s)	6.8	6.9	4.1				
tC, 2 stage (s)							
tF (s)	3.5	3.3	2.2				
p0 queue free %	100	97	100				
cM capacity (veh/h)	689	909	782				
Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	25	740	740	740	504	504	292
Volume Left	0	0	0	0	0	0	0
Volume Right	25	0	0	0	0	0	40
cSH	909	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.03	0.44	0.44	0.44	0.30	0.30	0.17
Queue Length 95th (m)	0.7	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (s)	9.1	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	A						
Approach Delay (s)	9.1	0.0					0.0
Approach LOS	A						
Intersection Summary							
Average Delay	0.1						
Intersection Capacity Utilization	46.2%			ICU Level of Service	A		
Analysis Period (min)	15						

Timings
7: Regional Rd 25 & Britannia Rd

2037 Future Total PM
07-17-2023

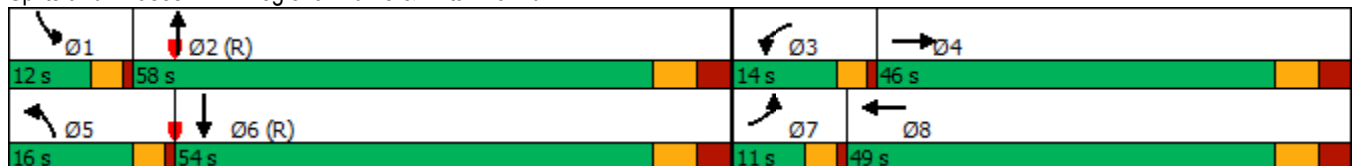


Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↖↖	↑↑↘	↖↖	↑↑↘	↖↖	↑↑↘	↖↖	↑↑↘
Traffic Volume (vph)	55	350	325	550	240	1745	165	1060
Future Volume (vph)	55	350	325	550	240	1745	165	1060
Turn Type	Prot	NA	Prot	NA	Prot	NA	Prot	NA
Protected Phases	7	4	3	8	5	2	1	6
Permitted Phases								
Detector Phase	7	4	3	8	5	2	1	6
Switch Phase								
Minimum Initial (s)	7.0	10.0	7.0	10.0	7.0	20.0	7.0	20.0
Minimum Split (s)	11.0	45.5	11.0	45.5	11.0	49.7	11.0	49.7
Total Split (s)	11.0	46.0	14.0	49.0	16.0	58.0	12.0	54.0
Total Split (%)	8.5%	35.4%	10.8%	37.7%	12.3%	44.6%	9.2%	41.5%
Yellow Time (s)	3.0	4.2	3.0	4.2	3.0	4.2	3.0	4.2
All-Red Time (s)	1.0	3.3	1.0	3.3	1.0	3.5	1.0	3.5
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	3.0	6.5	3.0	6.5	3.0	6.7	3.0	6.7
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	C-Max	None	C-Max
Act Effct Green (s)	8.0	28.7	11.0	33.9	14.3	59.5	11.6	56.8
Actuated g/C Ratio	0.06	0.22	0.08	0.26	0.11	0.46	0.09	0.44
v/c Ratio	0.27	0.39	1.07	0.94dr	0.62	1.10	0.54	0.59
Control Delay	61.9	41.4	139.7	37.2	62.8	87.9	73.5	21.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	61.9	41.4	139.7	37.2	62.8	87.9	73.5	21.2
LOS	E	D	F	D	E	F	E	C
Approach Delay		43.9		62.9		85.4		28.0
Approach LOS		D		E		F		C

Intersection Summary

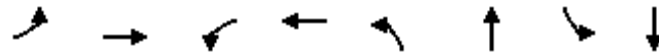
Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 104 (80%), Referenced to phase 2:NBT and 6:SBT, Start of Green
 Natural Cycle: 150
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.10
 Intersection Signal Delay: 63.2
 Intersection LOS: E
 Intersection Capacity Utilization 93.1%
 ICU Level of Service F
 Analysis Period (min) 15
 dr Defacto Right Lane. Recode with 1 though lane as a right lane.

Splits and Phases: 7: Regional Rd 25 & Britannia Rd



Queues
7: Regional Rd 25 & Britannia Rd

2037 Future Total PM
07-17-2023



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	55	395	325	970	240	2195	165	1120
v/c Ratio	0.27	0.39	1.07	0.94dr	0.62	1.10	0.54	0.59
Control Delay	61.9	41.4	139.7	37.2	62.8	87.9	73.5	21.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	61.9	41.4	139.7	37.2	62.8	87.9	73.5	21.2
Queue Length 50th (m)	7.4	35.7	~51.4	50.2	32.1	~290.7	23.9	45.8
Queue Length 95th (m)	14.6	44.4	#83.6	52.9	46.7	#344.4	36.8	64.0
Internal Link Dist (m)		377.9		190.1		165.3		161.9
Turn Bay Length (m)	60.0		120.0		90.0		90.0	
Base Capacity (vph)	203	1372	305	1485	393	1991	308	1908
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.27	0.29	1.07	0.65	0.61	1.10	0.54	0.59

Intersection Summary

~ 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.

dr Defacto Right Lane. Recode with 1 though lane as a right lane.

















HCM Signalized Intersection Capacity Analysis
7: Regional Rd 25 & Britannia Rd

2037 Future Total PM
07-17-2023

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	 	  		 	  		 	  		 	  		
Traffic Volume (vph)	55	350	45	325	550	420	240	1745	450	165	1060	60	
Future Volume (vph)	55	350	45	325	550	420	240	1745	450	165	1060	60	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	3.0	6.5		3.0	6.5		3.0	6.7		3.0	6.7		
Lane Util. Factor	0.97	*0.80		0.97	*0.80		0.97	*0.80		0.97	*0.80		
Frt	1.00	0.98		1.00	0.94		1.00	0.97		1.00	0.99		
Flt Protected	0.95	1.00		1.00	1.00		0.95	1.00		0.95	1.00		
Satd. Flow (prot)	3303	4482		3614	4222		3502	4300		3467	4358		
Flt Permitted	0.95	1.00		1.00	1.00		0.95	1.00		0.95	1.00		
Satd. Flow (perm)	3303	4482		3614	4222		3502	4300		3467	4358		
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Adj. Flow (vph)	55	350	45	325	550	420	240	1745	450	165	1060	60	
RTOR Reduction (vph)	0	12	0	0	116	0	0	24	0	0	3	0	
Lane Group Flow (vph)	55	383	0	325	854	0	240	2171	0	165	1117	0	
Heavy Vehicles (%)	6%	0%	0%	2%	1%	1%	0%	3%	2%	1%	4%	0%	
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA		
Protected Phases	7	4		3	8		5	2		1	6		
Permitted Phases													
Actuated Green, G (s)	5.6	28.5		10.0	32.9		13.3	57.7		10.6	55.0		
Effective Green, g (s)	6.6	29.5		11.0	33.9		14.3	58.7		11.6	56.0		
Actuated g/C Ratio	0.05	0.23		0.08	0.26		0.11	0.45		0.09	0.43		
Clearance Time (s)	4.0	7.5		4.0	7.5		4.0	7.7		4.0	7.7		
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0		
Lane Grp Cap (vph)	167	1017		305	1100		385	1941		309	1877		
v/s Ratio Prot	0.02	0.09		c0.09	c0.20		c0.07	c0.50		0.05	0.26		
v/s Ratio Perm													
v/c Ratio	0.33	0.38		1.07	0.94dr		0.62	1.12		0.53	0.59		
Uniform Delay, d1	59.6	42.5		59.5	44.5		55.3	35.6		56.6	28.3		
Progression Factor	1.00	1.00		1.32	0.87		1.00	1.00		1.19	0.68		
Incremental Delay, d2	1.2	0.2		68.7	3.3		3.1	60.9		1.6	1.2		
Delay (s)	60.7	42.7		147.5	42.0		58.4	96.6		69.1	20.5		
Level of Service	E	D		F	D		E	F		E	C		
Approach Delay (s)		44.9			68.5			92.8			26.7		
Approach LOS		D			E			F			C		
Intersection Summary													
HCM 2000 Control Delay			67.6									HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio			0.99										
Actuated Cycle Length (s)			130.0									Sum of lost time (s)	19.2
Intersection Capacity Utilization			93.1%									ICU Level of Service	F
Analysis Period (min)			15										
dr Defacto Right Lane. Recode with 1 though lane as a right lane.													
c Critical Lane Group													

HCM Unsignalized Intersection Capacity Analysis
 8: Site Dwy (South)/Site Dwy (North) & Etheridge Ave

2037 Future Total PM
 07-17-2023

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	100	15	130	175	95	10	0	80	55	0	5
Future Volume (Veh/h)	10	100	15	130	175	95	10	0	80	55	0	5
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	10	100	15	130	175	95	10	0	80	55	0	5
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)					78							
pX, platoon unblocked	0.96						0.96	0.96		0.96	0.96	0.96
vC, conflicting volume	270			115			615	658	108	690	618	222
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	216			115			576	620	108	654	579	166
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			91			97	100	92	82	100	99
cM capacity (veh/h)	1308			1487			381	352	952	311	372	846
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	125	400	90	60								
Volume Left	10	130	10	55								
Volume Right	15	95	80	5								
cSH	1308	1487	816	329								
Volume to Capacity	0.01	0.09	0.11	0.18								
Queue Length 95th (m)	0.2	2.3	3.0	5.3								
Control Delay (s)	0.7	3.0	10.0	18.4								
Lane LOS	A	A	A	C								
Approach Delay (s)	0.7	3.0	10.0	18.4								
Approach LOS			A	C								
Intersection Summary												
Average Delay			4.9									
Intersection Capacity Utilization			45.5%		ICU Level of Service				A			
Analysis Period (min)			15									

Timings
10: Britannia Rd & Farmstead Dr

2037 Future Total PM
07-17-2023

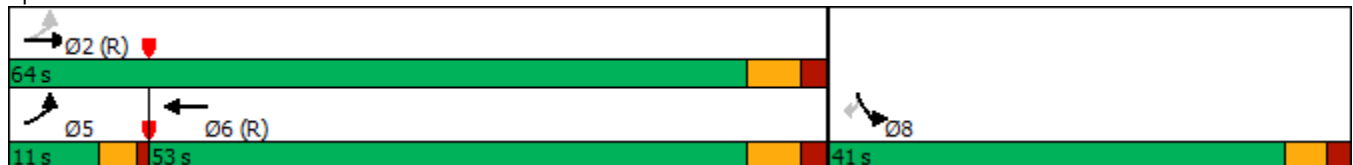


Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Configurations	↖	↑↑↑	↑↑↑	↖	↗
Traffic Volume (vph)	20	395	770	55	20
Future Volume (vph)	20	395	770	55	20
Turn Type	pm+pt	NA	NA	Prot	Perm
Protected Phases	5	2	6	8	
Permitted Phases	2				8
Detector Phase	5	2	6	8	8
Switch Phase					
Minimum Initial (s)	7.0	20.0	20.0	10.0	10.0
Minimum Split (s)	11.0	29.4	29.4	15.3	15.3
Total Split (s)	11.0	64.0	53.0	41.0	41.0
Total Split (%)	10.5%	61.0%	50.5%	39.0%	39.0%
Yellow Time (s)	3.0	4.2	4.2	3.3	3.3
All-Red Time (s)	1.0	2.2	2.2	2.0	2.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	3.0	5.4	5.4	4.3	4.3
Lead/Lag	Lead		Lag		
Lead-Lag Optimize?	Yes		Yes		
Recall Mode	None	C-Max	C-Max	None	None
Act Effct Green (s)	89.3	88.0	83.6	11.4	11.4
Actuated g/C Ratio	0.85	0.84	0.80	0.11	0.11
v/c Ratio	0.04	0.10	0.24	0.29	0.10
Control Delay	1.9	2.2	4.1	47.2	18.6
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	1.9	2.2	4.1	47.2	18.6
LOS	A	A	A	D	B
Approach Delay		2.2	4.1	39.6	
Approach LOS		A	A	D	

Intersection Summary

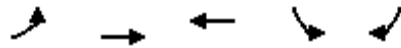
Cycle Length: 105
 Actuated Cycle Length: 105
 Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.29
 Intersection Signal Delay: 5.5
 Intersection LOS: A
 Intersection Capacity Utilization 33.1%
 ICU Level of Service A
 Analysis Period (min) 15

Splits and Phases: 10: Britannia Rd & Farmstead Dr



Queues
10: Britannia Rd & Farmstead Dr

2037 Future Total PM
07-17-2023



Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	20	395	850	55	20
v/c Ratio	0.04	0.10	0.24	0.29	0.10
Control Delay	1.9	2.2	4.1	47.2	18.6
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	1.9	2.2	4.1	47.2	18.6
Queue Length 50th (m)	0.6	5.9	13.9	11.1	0.0
Queue Length 95th (m)	1.9	9.2	33.3	23.1	7.2
Internal Link Dist (m)		101.0	377.9	199.3	
Turn Bay Length (m)	20.0				
Base Capacity (vph)	535	3822	3552	606	577
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	0.10	0.24	0.09	0.03
Intersection Summary					

HCM Signalized Intersection Capacity Analysis
10: Britannia Rd & Farmstead Dr

2037 Future Total PM
07-17-2023



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	20	395	770	80	55	20
Future Volume (vph)	20	395	770	80	55	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	5.4	5.4		4.3	4.3
Lane Util. Factor	1.00	*0.80	*0.80		1.00	1.00
Frt	1.00	1.00	0.99		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1805	4560	4455		1736	1615
Flt Permitted	0.27	1.00	1.00		0.95	1.00
Satd. Flow (perm)	514	4560	4455		1736	1615
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	20	395	770	80	55	20
RTOR Reduction (vph)	0	0	4	0	0	18
Lane Group Flow (vph)	20	395	846	0	55	2
Heavy Vehicles (%)	0%	0%	1%	0%	4%	0%
Turn Type	pm+pt	NA	NA		Prot	Perm
Protected Phases	5	2	6		8	
Permitted Phases	2					8
Actuated Green, G (s)	84.9	84.9	78.1		8.4	8.4
Effective Green, g (s)	85.9	85.9	79.1		9.4	9.4
Actuated g/C Ratio	0.82	0.82	0.75		0.09	0.09
Clearance Time (s)	4.0	6.4	6.4		5.3	5.3
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	467	3730	3356		155	144
v/s Ratio Prot	0.00	c0.09	c0.19		c0.03	
v/s Ratio Perm	0.03					0.00
v/c Ratio	0.04	0.11	0.25		0.35	0.01
Uniform Delay, d1	1.8	1.9	3.9		44.9	43.6
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.0	0.1	0.2		1.4	0.0
Delay (s)	1.9	2.0	4.1		46.3	43.6
Level of Service	A	A	A		D	D
Approach Delay (s)		2.0	4.1		45.6	
Approach LOS		A	A		D	

Intersection Summary

HCM 2000 Control Delay	5.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.26		
Actuated Cycle Length (s)	105.0	Sum of lost time (s)	12.7
Intersection Capacity Utilization	33.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Timings
11: Britannia Rd & Rose Way

2037 Future Total PM
07-17-2023



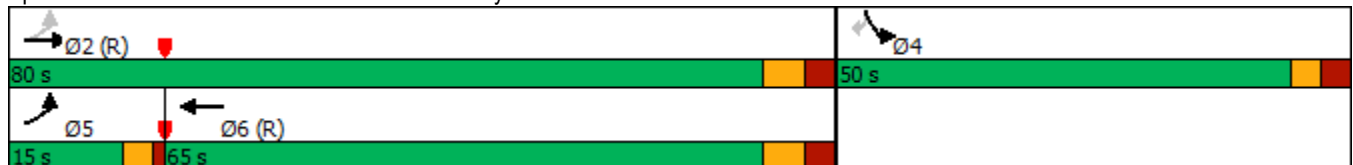
Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Configurations	↖	↑↑↑	↑↑↑	↖	↗
Traffic Volume (vph)	80	885	1245	30	50
Future Volume (vph)	80	885	1245	30	50
Turn Type	pm+pt	NA	NA	Prot	Perm
Protected Phases	5	2	6	4	
Permitted Phases	2				4
Detector Phase	5	2	6	4	4
Switch Phase					
Minimum Initial (s)	7.0	20.0	20.0	10.0	10.0
Minimum Split (s)	11.0	29.0	29.0	43.0	43.0
Total Split (s)	15.0	80.0	65.0	50.0	50.0
Total Split (%)	11.5%	61.5%	50.0%	38.5%	38.5%
Yellow Time (s)	3.0	4.0	4.0	3.0	3.0
All-Red Time (s)	1.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	3.0	6.0	6.0	5.0	5.0
Lead/Lag	Lead		Lag		
Lead-Lag Optimize?	Yes		Yes		
Recall Mode	None	C-Max	C-Max	None	None
Act Effct Green (s)	114.2	112.4	103.5	11.0	11.0
Actuated g/C Ratio	0.88	0.86	0.80	0.08	0.08
v/c Ratio	0.23	0.22	0.36	0.20	0.27
Control Delay	3.3	2.4	5.3	58.7	18.8
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	3.3	2.4	5.3	58.7	18.8
LOS	A	A	A	E	B
Approach Delay		2.5	5.3	33.8	
Approach LOS		A	A	C	

Intersection Summary

Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 65 (50%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
 Natural Cycle: 85
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.36
 Intersection Signal Delay: 5.1
 Intersection Capacity Utilization 52.1%
 Analysis Period (min) 15

Intersection LOS: A
 ICU Level of Service A

Splits and Phases: 11: Britannia Rd & Rose Way



Queues
11: Britannia Rd & Rose Way

2037 Future Total PM
07-17-2023



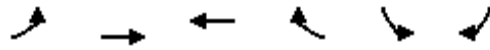
Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	80	885	1305	30	50
v/c Ratio	0.23	0.22	0.36	0.20	0.27
Control Delay	3.3	2.4	5.3	58.7	18.8
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	3.3	2.4	5.3	58.7	18.8
Queue Length 50th (m)	2.6	17.9	45.6	7.7	0.0
Queue Length 95th (m)	m4.1	m21.4	54.0	18.0	13.0
Internal Link Dist (m)		190.1	148.0	92.6	
Turn Bay Length (m)	50.0			50.0	
Base Capacity (vph)	389	3941	3607	624	591
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	0.21	0.22	0.36	0.05	0.08

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
 11: Britannia Rd & Rose Way

2037 Future Total PM
 07-17-2023



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↵	↑↑↑	↑↑↑		↵	↵
Traffic Volume (vph)	80	885	1245	60	30	50
Future Volume (vph)	80	885	1245	60	30	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0	6.0		5.0	5.0
Lane Util. Factor	1.00	*0.80	*0.80		1.00	1.00
Frt	1.00	1.00	0.99		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1805	4560	4529		1805	1615
Flt Permitted	0.15	1.00	1.00		0.95	1.00
Satd. Flow (perm)	283	4560	4529		1805	1615
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	80	885	1245	60	30	50
RTOR Reduction (vph)	0	0	1	0	0	47
Lane Group Flow (vph)	80	885	1304	0	30	3
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Turn Type	pm+pt	NA	NA		Prot	Perm
Protected Phases	5	2	6		4	
Permitted Phases	2					4
Actuated Green, G (s)	109.0	109.0	99.4		8.0	8.0
Effective Green, g (s)	110.0	110.0	100.4		9.0	9.0
Actuated g/C Ratio	0.85	0.85	0.77		0.07	0.07
Clearance Time (s)	4.0	7.0	7.0		6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	316	3858	3497		124	111
v/s Ratio Prot	c0.01	0.19	c0.29		c0.02	
v/s Ratio Perm	0.20					0.00
v/c Ratio	0.25	0.23	0.37		0.24	0.03
Uniform Delay, d1	2.1	1.9	4.7		57.3	56.4
Progression Factor	1.58	1.15	1.00		1.00	1.00
Incremental Delay, d2	0.3	0.1	0.3		1.0	0.1
Delay (s)	3.6	2.3	5.0		58.3	56.5
Level of Service	A	A	A		E	E
Approach Delay (s)		2.4	5.0		57.2	
Approach LOS		A	A		E	

Intersection Summary

HCM 2000 Control Delay	5.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.36		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	52.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			