



BA Group

12563 & 12599 HIGHWAY 50 PROPOSED MIXED-USE DEVELOPMENT URBAN TRANSPORTATION CONSIDERATIONS

Town of Caledon, Region of Peel

Prepared For: 12599 Hwy 50 Ltd.

March 2021

**TOWN OF CALEDON
PLANNING
RECEIVED**

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1.0 INTRODUCTION

BA Group has been retained by 12599 Hwy 50 Ltd. to provide transportation consulting services related to a proposed mixed-use development on a site municipally known as 12563 and 12599 Highway 50, in the Town of Caledon in the Region of Peel. The site is located on the east side of Highway 50, north of Industrial Road. It is bounded by Highway 50 to the west, a commercial development to the north and commercial uses to the south and east. The site location is illustrated in **Figure 1**.

This Transportation Considerations Report has been prepared as part of the **Official Plan and Zoning By-law Amendment (ZBA) application** and subsequent **Site Plan Application** being submitted to the Region of Peel and the Town of Caledon.

1.1 EXISTING SITE CONTEXT

The site is currently designated as Bolton Highway Commercial (CHB) in the Town of Bolton Zoning By-law. Examples of some of the land uses permitted within CHB are business office, industrial use, motor vehicle gas bar and repair facility, commercial parking lot, accessory retail store and warehouse. Residential, convenience store and retail uses are not permitted within the CHB designation.

The site includes the properties at 12563 and 12599 Highway 50 which are described as follows:

12563 Highway 50

This property is occupied by a variety of motor vehicle maintenance, repair and storage facilities. The property includes 5 private driveways; 2 with full access at Highway 50 and 3 with full access on Industrial Road. All of the existing buildings and land uses on the property will be eliminated as part of the development of the site.

12599 Highway 50

This property is currently occupied by a small commercial plaza (Northpoint Plaza) that includes restaurants and a variety of commercial spaces. The property includes a private driveway with full access at Highway 50. It is proposed that the commercial plaza remain until the property is required for the construction of Building 5.







1.2 DEVELOPMENT CONCEPT PLAN

The development concept plan includes the eventual demolition of all existing buildings at 12563 and 12599 Highway 50 and the construction of 5 mixed-use buildings with a total of 2,229 residential units and 3,179 m² of retail. The development statistics for the concept plan are summarized in **Table 1**.

A key element of the development concept plan is the creation of a driveway through the middle of the site that connects to a new full access at Highway 50 and a new full access at Industrial Road. Since all of the existing access points to the properties will be closed, the consolidation of these driveways, particularly along Highway 50, will increase the level of safety for all road users.

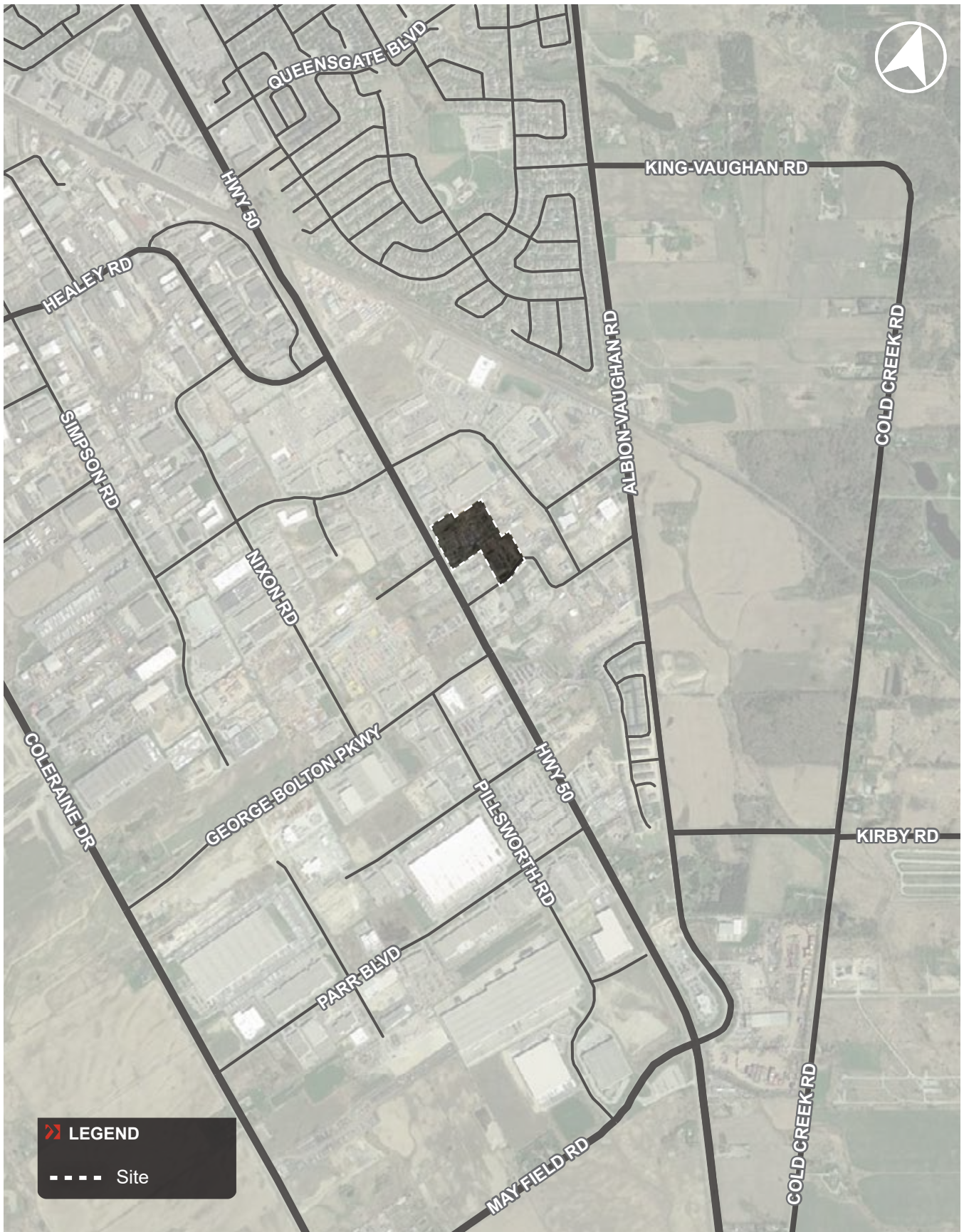
The site concept plan is illustrated in **Figure 2**. Reduced scale architectural ground floor and parking-level plans are provided in **Appendix A**.

TABLE 1 DEVELOPMENT CONCEPT PLAN

Use		Proposed Statistics	
	Residential Units	Building 1	519 units
		Building 2	428 units
		Building 3	413 units
		Building 4	611 units
		Building 5	258 units
		Total	2,229 units
	Retail	Building 1	1,144 m ²
		Building 2	748 m ²
		Building 3	507 m ²
		Building 4	--
		Building 5	780 m ²
		Total	3,179 m²
	Vehicle Parking Spaces	2552 spaces total <ul style="list-style-type: none"> • 97 spaces at-grade • 2,455 spaces in a 3-level below-grade parking facility 	
	Bicycle Parking Spaces	916 spaces total <ul style="list-style-type: none"> • 52 visitor spaces at-grade • 864 stacked resident spaces below-grade on P1 	
	Loading Facilities	<ul style="list-style-type: none"> • 2 loading spaces at each building (1 for residential and 1 for retail). 	
	Site Access	<ul style="list-style-type: none"> • Access to site driveway at Highway 50 (full unsignalized access with a separate left-turn lane). • Access at Industrial Road (full unsignalized access with a shared through/right lane). 	

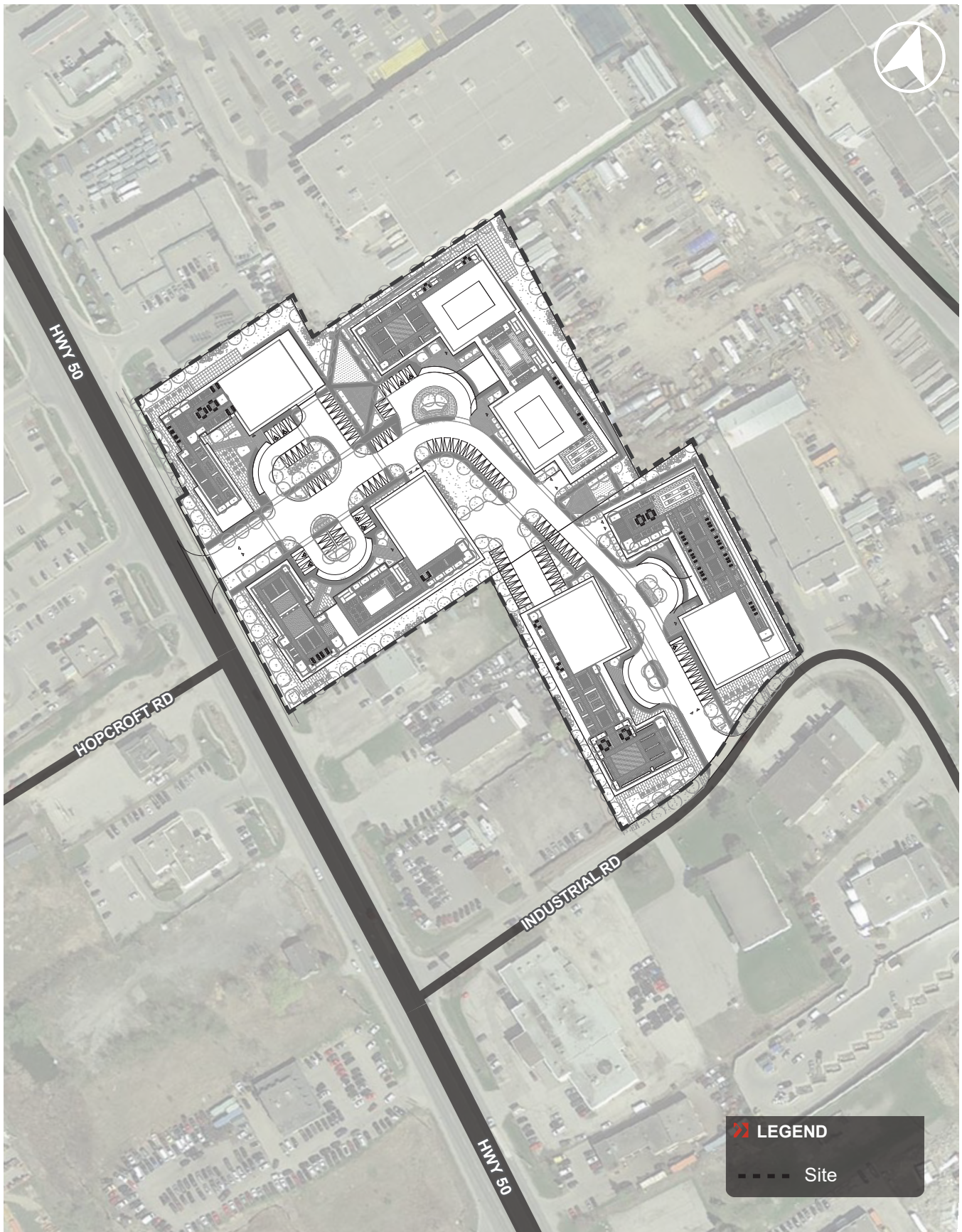
Notes:

1. Site statistics based on site plans prepared by SRN Architects dated February 26, 2021.



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FIGURE 1 SITE LOCATION



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FIGURE 2 SITE CONCEPT PLAN

1.3 STUDY SCOPE

The study scope is summarized below and the detailed Terms of Reference for the study is provided in **Appendix B**.

Development Concept Plan

- A summary of the proposed development concept plan.
- An overview of the site and the area-wide transportation system that provides for automobiles but encourages 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 Context

- A description of the existing transportation context with consideration for the area road network, transit system and active transportation facilities.
- A description of future transportation changes and/or improvements to the area context such as planned road upgrades, transit and active transportation improvements.

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 parking supply.
- A review of the adequacy of the loading space provisions.
- A review of the bicycle parking supply.
- 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.

Traffic Operations Review

- An assessment of the existing traffic patterns and traffic volumes in the study area during the key weekday morning and afternoon peak hours.
- A comprehensive review of traffic-related changes that may occur in the area with consideration for corridor growth and construction of other area development projects.
- 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.

Site Access Review

- A review of access options at the intersection of the proposed site access with Highway 50 and the proposed access at Industrial Road.
- Confirmation of the proposed traffic control and lane configuration at the site access points.
- Evaluation of the sight distance at the proposed access points.

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

2.0 TRANSPORTATION CONTEXT

2.1 AREA ROAD NETWORK

2.1.1 Existing Road Network

The existing road network of arterial roads, collector roads and local roads considered in the study area are described below and illustrated in **Figure 3**. The existing lane configuration and traffic control are shown in **Figure 5**.

Highway 50 is a north-south Region of Peel arterial road that extends from Highway 407 in the south to Highway 89 in the north and is designated as an Industrial Connector in Peel Region's 2013 Road Characterization Study. In the vicinity of the site, Highway 50 has an urban 4-lane cross section with a centre left-turning lane and a posted speed limit of 60 km/h.

George Bolton Parkway is an east-west Town of Caledon collector road that intersects Highway 50 at a signalized t-intersection and extends westerly to Coleraine Drive. This road currently has a 2-lane urban cross section and a de facto speed limit of 50 km/h.

Industrial Road is an east-west Town of Caledon local road with a two-lane rural cross section (one lane per direction) and a de facto speed limit of 50 km/h. Industrial Road connects Highway 50 and Albion Vaughan Road and is controlled by a stop sign at each end.

McEwan Drive is a northeast-southwest Town of Caledon local road that operates with a two-lane mostly urban cross section (one lane per direction) and a de facto speed limit of 50 km/h. McEwan Drive intersects Highway 50 with a 4-legged signalized intersection and connects easterly to Commercial Road and westerly to Simpson Road.

Albion Vaughan Road is a north/south Town of Caledon local road in the study area that is located along the boundary of the Town of Caledon and the City of Vaughan and extends northerly from Mayfield Road/Highway 50 to King Street East/King Road. This road currently has a 2-lane rural cross-section and a de facto speed limit of 50 km/h.

Commercial Road is an east/west local Town of Caledon road that extends easterly from McEwan Drive and connects to Albion Vaughan Road as well as to Industrial Road. This road currently has a 2-lane cross section and a posted speed limit of 50 km/h.

Hopcroft Road is a dead-end unpaved local Town of Caledon Road that provides access to 3 single-family homes. As the traffic volumes on this road are extremely low, Hopcroft Road was not included as part of the analysis. Since the road is 35 metres from the proposed site access on Highway 50, it was confirmed by the Town that there are no upgrades planned for Hopcroft Road at this time.

Kirby Road is a City of Vaughan minor arterial roadway that extends easterly from the boundary with the Town of Caledon at Albion Vaughan Road to Huntington Road in the City of Vaughan. This road has a 2-lane rural cross-section and a de facto speed limit of 80 km/h.

2.1.2 Future Road Network

The future road network of roads considered in the study area is described below and illustrated in **Figure 4**. The future lane configuration and traffic control are shown in **Figure 6**.

George Bolton Parkway

In 2018, the Town of Caledon completed a Municipal Class Environmental Assessment (EA) for the extension of the George Bolton Parkway from Highway 50 to Albion Vaughan Road with stop control intersections at Industrial Road and Commercial Road. The preferred plan includes one lane in each direction and a centre left-turn lane. As outlined in the 2017 Town of Caledon Transportation Master Plan and confirmed by Town staff, there are plans to begin this work by 2023.

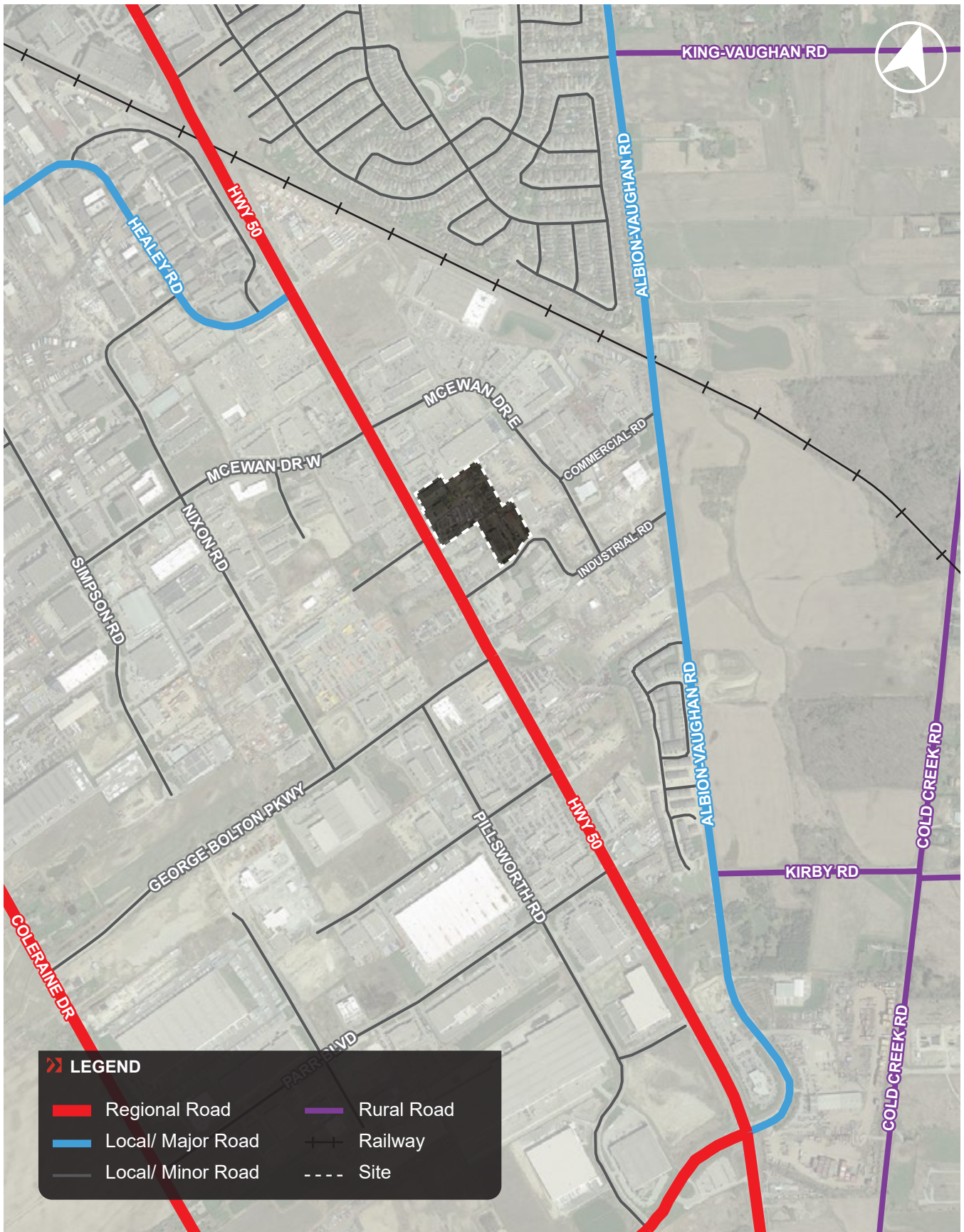
Albion Vaughan Road

As identified in the Town of Caledon 2017 Transportation Master Plan and the 2019 Development Charges Background Study, Albion Vaughan Road (Mayfield Road to King Street), is listed as a long-term transportation network improvement to be upgraded from 2 to 4 lanes by 2031.

GTA West

The Ontario Ministry of Transportation (MTO) is currently undertaking the GTA West Transportation Corridor Route Planning and Environmental Assessment Study with a recommendation for a new multimodal transportation corridor that extends from Highway 400 in the east to the Highway 401/407 ETR interchange area in the west. This work will identify the route, determine interchange locations and complete the preliminary design for this new transportation corridor.

The confirmed preferred alignment indicates that the new route will pass through the Bolton area, just south of the existing intersection of Mayfield Road/Highway 50 at Albion Vaughan Road. Since the timelines and budget for this proposed new transportation corridor have not been confirmed, this future road was not included in the analysis for this study.



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FIGURE 3 EXISTING AREA ROAD NETWORK



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FIGURE 4 FUTURE CHANGES TO AREA ROAD NETWORK

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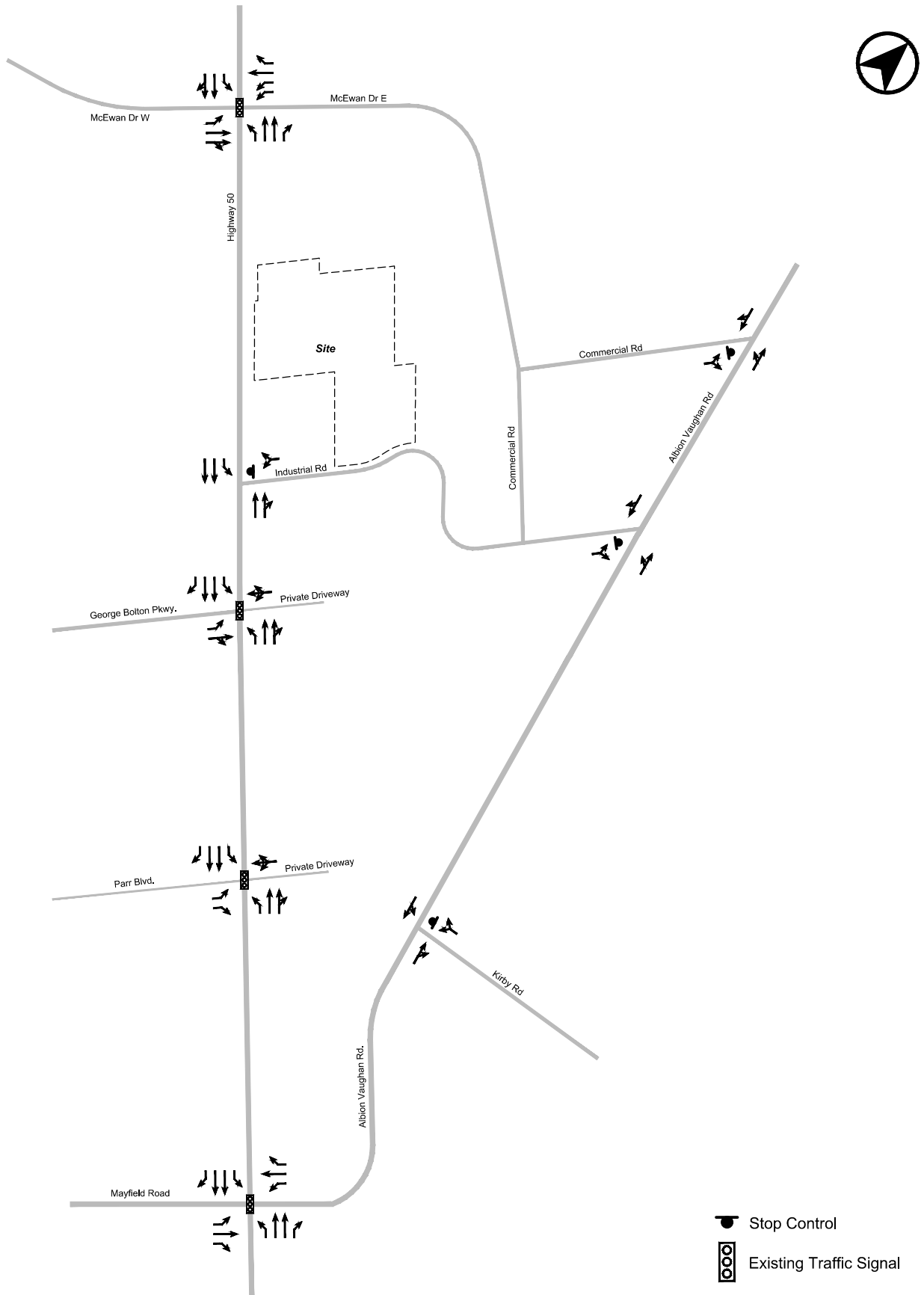


FIGURE 5 EXISTING LANE CONFIGURATION AND TRAFFIC CONTROL

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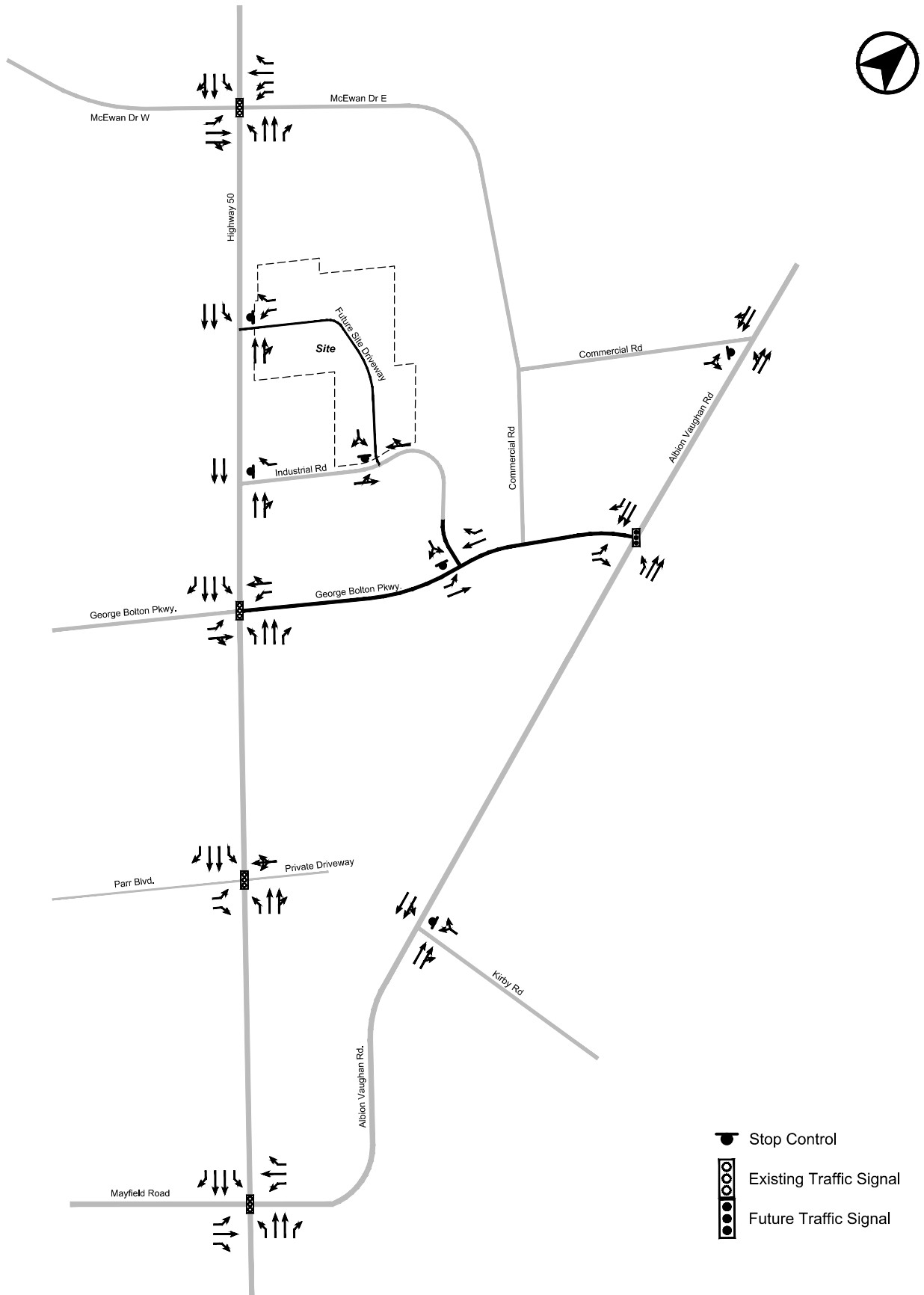


FIGURE 6 FUTURE LANE CONFIGURATION AND TRAFFIC CONTROL

2.2 AREA TRANSIT NETWORK

2.2.1 Existing Transit Network

The Town of Caledon does not currently operate a local public transit system. Inter-regional transit is provided by GO Transit with the operation of 1 bus route in Caledon. It should be noted that GO Transit is only operating 1 route in the study area due to COVID conditions. Once typical travel patterns return, it is possible that additional GO Transit routes will once again be available in the Bolton area.

There is a carpool lot located on the southwest corner of the Mayfield Road and Highway 50 intersection approximately 2 km from the site (25 minute walk). The carpool lot provides free 24/7 parking for drivers, a passenger pick-up/drop-off area and bike racks. The lot is serviced by the Bolton GO Transit bus route, which provides service to and from the Malton GO Station, with connections to Union Station, Brampton's ZUM network and York Region Transit.

The existing transit service in the area is described in detail in **Table 2**. Although the table makes note of two Brampton bus routes, as the nearest stops for these routes are 6 and 10 km away from the site and best suited to multi-modal travel, they have not been included in the figure as they are well outside the study area.

There are no future improvements confirmed for the transit network in the vicinity of the site at this time. Once typical travel patterns return post-COVID, it is possible that the frequency of GO Bus 38 will increase and additional routes to service the area will be implemented.

An overview the existing area transit network is illustrated in **Figure 7**.

TABLE 2 EXISTING AREA TRANSIT NETWORK

Route	Peak Period Headways	Closest Stop Location	Description
GO Bus Routes (Inter-regional transit)			
Route 38 Bolton /Malton (peak service only)	2 buses 55 minutes apart during morning service. 2 buses 120 minutes apart during evening service.	Southbound East side of Highway 50 at McEwan Drive East (~300m North of the site) Northbound West side of Highway 50 at McEwan Drive West (290m North of the site)	The 38 GO bus route provides weekday service along Highway 50 from Queen Street N. at Columbia Way to Mississauga (Malton) with GO train connections at Malton to Union Station and beyond. This route takes approximately 40 minutes to travel from the site to the end of the line at the Malton Go station.
Brampton Transit Routes			
Route 31 McVean Road	65 minutes	Southbound East side of The Gore Road south of Mayfield Road (~6 km south-west of site) Northbound West side of The Gore Road south of Mayfield Road (~6km south-west of site)	Route 31 of the Brampton Transit network runs in a general north-south direction from northern Brampton to Highway 107. From this line riders can transfer to numerous routes in the Brampton transit network, including the 501 Züm rapid transit line which connects to the TTC. As this bus stop is 6 km away from the site, it is best suited to a multi-modal approach to transit travel.
Route 30 Airport Road	10 minutes during peak periods 20 minutes during off-peak	Southbound South side of Mayfield Road at Airport road (~10km south-west of site) Northbound East side of Airport Road at Mayfield Road (~ 10km south-west of site)	Route 30 of the Brampton Transit network runs in a general north-south direction from northern Brampton to the Shops at Westwood Square. From this line riders can transfer to numerous routes in the Brampton transit network including the 511 and 501 Züm rapid transit lines which connect to the TTC. As this bus stop is 10 km away from the site, it is best suited to a multi-modal approach to transit travel.

The existing area transit network is illustrated in **Figure 7**.

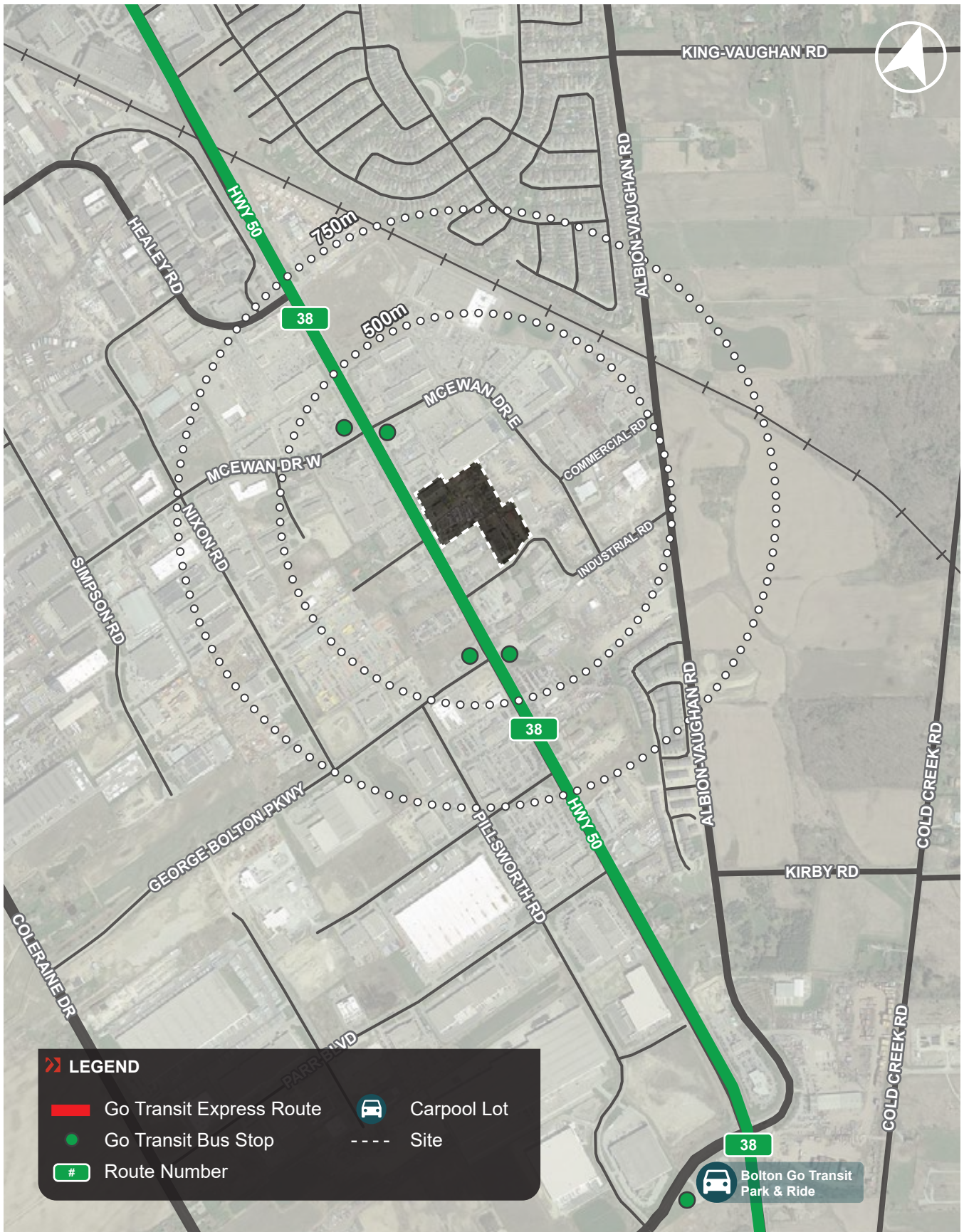


FIGURE 7 EXISTING AREA TRANSIT NETWORK

2.3 AREA CYCLING NETWORK

2.3.1 Existing Cycling Network

The existing cycling infrastructure in the area of the site is relatively limited at this time. On-street cycling lanes exist on McEwan Drive West between Simpson Road and just east of Loring Drive and on George Bolton Parkway between Highway 50 and Coleraine Drive. These cycling lanes are not connected to other cycling infrastructure within the Town.

The existing area cycling facilities are displayed in **Figure 8**.

2.3.2 Future Cycling Network

On February 22nd, 2018, Peel Regional Council approved the Sustainable Transportation Strategy (STS) and its accompanying five-year Active Transportation and Transportation Demand Management implementation plans (ATIP and TDMIP, respectively). The STS is the result of extensive consultation efforts, involving the public, local municipalities and other stakeholders from across the Region. Although these short-term plans did not include cycling infrastructure upgrades in the vicinity of the site, a review of long-term plans identified that a cycle track is track proposed for Highway 50 from Mayfield Road to just north of the CN rail line (2023 – 2031).

As noted, the Town of Caledon has plans to extend the George Bolton Parkway from Highway 50 to Albion Vaughan Road in 2023. The plan includes a 3.0 m wide in-boulevard multi-use pathway on both sides of the road that will provide new facilities for pedestrians and cyclists.

Future changes to the area cycling facilities are displayed in **Figure 9**.

2.4 AREA PEDESTRIAN CONTEXT

2.4.1 Existing Pedestrian Network

In the vicinity of the site, a continuous sidewalk exists on the east side of Highway 50 across the frontage of 12599 Highway 50 and extends northbound to McEwan Drive and as far north as Healy Road. Directly in front of 12563 Highway 50, a narrow asphalt walkway exists and continues southerly to the George Bolton Parkway.

On the west side of Highway 50, a continuous sidewalk is available between Healey Road southerly to Hopcroft Road. There are sidewalk segments between Hopcroft Road to just south of Parr Boulevard.

The existing area pedestrian facilities are displayed in **Figure 8**.

2.4.2 Future Pedestrian Network

The proposed site includes sidewalks along both sides of the site driveway that connect to the east side of Highway 50 and the north side of Industrial Road.

As noted, the Town of Caledon has plans to extend the George Bolton Parkway from Highway 50 to Albion Vaughan Road in 2023. The plan includes a 3.0 m wide in-boulevard multi-use pathway on both sides of the road that will provide new facilities for pedestrians and cyclists.

Future changes to the pedestrian facilities are displayed in **Figure 9**.

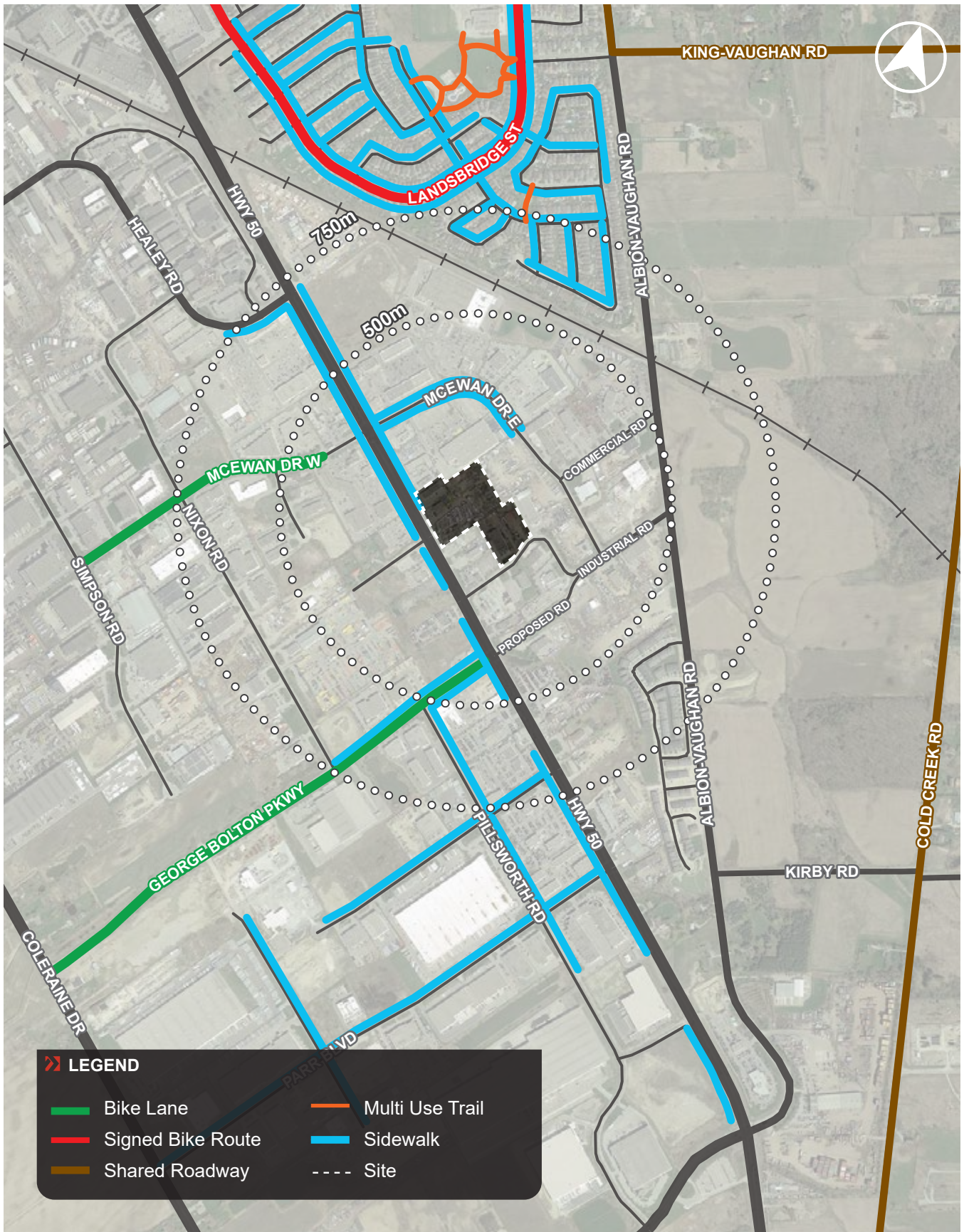


FIGURE 8 EXISTING AREA CYCLING AND PEDESTRIAN NETWORK



FIGURE 9 FUTURE CHANGES TO AREA CYCLING AND PEDESTRIAN NETWORK

3.0 VEHICLE PARKING CONSIDERATIONS

3.1 TOWN OF CALEDON ZONING BY-LAW

The site is subject to the Town of Caledon Zoning By-law for parking considerations. Application of this By-law is summarized for each building in **Table 3** and results in a minimum parking requirement for the site of 4,065 parking spaces, including 3,345 resident spaces, 559 visitor spaces and 161 retail spaces. The effective resident parking supply ratio (resident + visitor) is 1.75 spaces per unit.

TABLE 3 TOWN OF CALEDON ZONING BY-LAW - MINIMUM PARKING REQUIREMENTS (BY BUILDING)

	Land Use	Units or Gross Floor Area (GFA)	Zoning By-law Parking Rate	Parking Requirement (spaces)
Building 1	Resident	519	1.5 spaces/unit	779
	Visitor		0.25 spaces/unit	130
	Sub-Total		1.75 spaces/unit	909
	Retail	1144	1 space/20 m ²	58
	Sub-Total			967
Building 2	Resident	428	1.5 spaces/unit	642
	Visitor		0.25 spaces/unit	107
	Sub-Total		1.75 spaces/unit	749
	Retail	748	1 space/20 m ²	38
	Sub-Total			787
Building 3	Resident	413	1.5 spaces/unit	620
	Visitor		0.25 spaces/unit	104
	Sub-Total		1.75 spaces/unit	724
	Retail	507	1 space/20 m ²	26
	Sub-Total			750
Building 4	Resident	611	1.5 spaces/unit	917
	Visitor		0.25 spaces/unit	153
	Sub-Total		1.75 spaces/unit	1070
	Retail	0	1 space/20 m ²	0
	Sub-Total			1070
Building 5	Resident	258	1.5 spaces/unit	387
	Visitor		0.25 spaces/unit	65
	Sub-Total		1.75 spaces/unit	452
	Retail	780	1 space/20 m ²	39
	Sub-Total			491
TOTAL SITE	Resident	2229	1.5 spaces/unit	3345
	Visitor		0.25 spaces/unit	559
	Sub-Total		1.75 spaces/unit	3904
	Retail	3179	1 space/20 m ²	161
	TOTAL			4065

Notes:

1. Site statistics based on site plans prepared by SRN Architects dated February 26, 2021.
2. As per Section 5.2.4, where the minimum number of parking, loading or delivery spaces is calculated on the basis of a rate or ratio, the required number of parking, loading or delivery spaces shall be rounded to the next higher whole number.
3. Net floor Area (NFA) assumed to equal Gross Floor Area (GFA) for the purposes of these calculations

3.2 PARKING DEMAND STUDIES

To determine the appropriate resident and visitor parking rates for the site, Zoning By-law parking requirements and parking demand studies at apartments in the City of Barrie were reviewed as a comparison.

Parking demand studies previously completed at three apartment buildings in the City of Barrie were reviewed, since data for similar developments were not available for the Town of Caledon. Although the City of Barrie (population 150,000) has more than twice the population of the Town of Caledon (population less than 70,000), they are deemed to be comparable municipalities for parking consideration due to similar travel patterns and similar Zoning By-law requirements for residential parking.

3.2.1 Town of Caledon vs. City of Barrie Travel Patterns

To confirm that travel patterns are similar between the Town of Caledon and the City of Barrie, data from the Transportation Tomorrow Survey (TTS) was analyzed for each municipality. The City of Barrie data considered apartment dwellings while the Town of Caledon considered all residential types since the sample size was too small to consider only apartments. As shown in **Table 4**, the travel mode share is very similar between the municipalities for peak periods of the day with differences in auto mode share that range from only 2 to 3%.

TABLE 4 TRAVEL MODE SHARES – CALEDON VS. BARRIE

Peak Period / Peak Direction						
Travel Mode	Morning Out			Afternoon In		
	Barrie	Bolton	Difference	Barrie	Bolton	Difference
Auto	83%	81%	-2%	86%	84%	-2%
Non-Auto	17%	19%	2%	14%	16%	2%
Peak Period / Non-Peak Direction						
Travel Mode	Morning Out			Afternoon In		
	Barrie	Bolton	Difference	Barrie	Bolton	Difference
Auto	94%	97%	3%	92%	95%	3%
Non-Auto	6%	3%	-3%	8%	5%	-3%

3.2.2 Town of Caledon vs. City of Barrie Zoning By-law Parking Requirements

Both the Town of Caledon Zoning By-law and the City of Barrie Zoning By-law 2009-141, require a minimum of 1.5 parking spaces per residential unit. The Town of Caledon By-law however requires an additional 0.25 spaces per unit for visitors while the City of Barrie's Zoning By-law does not include a requirement for visitor parking. Since this provision does not differentiate between resident and visitor parking and because the City of Barrie does not have a specific Zoning By-law for visitor parking, it can be assumed that the ratio of 1.5

parking spaces per residential unit includes both resident and visitor parking. This is lower than the Town of Caledon Zoning By-law requirement of 1.75 spaces per unit for residents plus visitors.

3.2.3 Resident Parking Rate

The current development concept plans illustrate a total of 1,895 resident parking spaces for 2,229 residential units. The effective resident parking supply ratio is 0.85 spaces per unit.

To determine appropriate resident parking supply, parking demand surveys were previously completed by BA Group at three apartment buildings in the City of Barrie. The peak resident parking demand observed at the three proxy sites ranged from 0.74 to 0.81 spaces per unit. These rates are significantly lower than both the City of Barrie Zoning By-law 2009-141 requirement of 1.5 spaces per unit and the Town of Caledon Zoning By-law requirement of 1.5 spaces per unit.

TABLE 5 RESIDENT PARKING DEMANDS (CITY OF BARRIE)

Address	Number of Units	Survey Date	Time of Day	Peak Parking Demand (spaces)	Resident Parking Ratio (spaces/unit)
37 Johnson Street	188 ¹	Wednesday June 10, 2015	3:00 am	139	0.74
		Thursday June 18, 2015		134	0.71
		Saturday July 11, 2015	3:00 pm – 11:00 pm	115	0.61
7 & 15 Vancouver Street	67	Tuesday June 2, 2015	3:00 am	53	0.79
		Wednesday June 10, 2015		49	0.73
		Thursday June 18, 2015		47	0.70
		Saturday July 11, 2015	3:00 pm – 11:00 pm	51	0.76
262 Rose Street	84	Tuesday June 2, 2015	3:00 am	59 ²	0.70
		Wednesday June 10, 2015		55 ²	0.65
		Thursday June 18, 2015		68 ²	0.81
		Saturday July 11, 2015	3:00 pm – 11:00 pm	64 ²	0.76

Notes:

1. Number of units at the time of the study.
2. Parking demands observed at 262 Rose Street include both resident and visitor parking areas. Visitor demands at 3:00 am were unusually high and assumed to include some resident demand.

3.2.3.1 City of Barrie Site-Specific Zoning By-law 2018-031

As per the City of Barrie's By-law 2018-031, this Site-Specific Zoning By-law amendment designates a property on Grove Street West for apartment dwellings. This By-law includes the requirement for 1.0 parking space per residential unit which is much lower than the 1.5 spaces per unit required by the City of Barrie Zoning By-law 2009-141. Since this provision does not differentiate between resident and visitor parking and

because the City of Barrie does not have a specific Zoning By-law for visitor parking, it may be assumed that the ratio of 1.0 parking spaces per residential unit includes both resident and visitor parking.

3.2.4 Resident Visitor Parking Rate

The current development concept plan illustrates a total of 446 visitor parking spaces for 2,229 residential units. The effective visitor parking supply ratio is 0.20 spaces per unit.

3.2.4.1 Zoning By-law Comparison

A review of the Zoning By-law visitor parking requirements for apartments in municipalities in proximity to, or similar to the Town of Caledon, has been completed and is summarized in **Table 6**. The review confirms that visitor parking requirements for comparable municipalities range from 0.20 to 0.25 spaces per unit. The City of Brampton, adjacent to the Town of Caledon, has a visitor parking requirement of 0.20 spaces per unit. This is slightly lower than the Town of Caledon’s visitor parking requirement of 0.25 spaces per unit.

TABLE 6 ZONING BY-LAW VISITOR PARKING REQUIREMENTS

City / Town	Zoning By-law	Type of Use	Visitor Parking Requirement (spaces/unit)
City of Barrie	--	Apartment Dwelling	Resident 1.5 – no visitor rate
Town of Caledon	--	Apartment Dwelling	0.25
Brampton	270-2004	Rental Apartment	0.20
Ajax	95-2003	Apartment Dwelling	0.25
Markham	28-97	Apartment Dwelling	0.25
Richmond Hill	313-96	Multiple or Apartment Dwelling	0.25
Whitchurch-Stouffville	2010-001	Apartment Dwelling	0.25
Collingwood	2010-040	Dwelling, Apartment	0.25

3.2.4.2 Proxy Site Comparison

To determine appropriate visitor parking supply, BA Group previously conducted a residential visitor parking survey at three apartment buildings in the City of Barrie on Saturday July 11, 2015 between 3:00 pm and 11:00 pm (times when visitor parking demands are typically highest).

As shown in **Table 7**, the peak visitor parking demand observed at the three proxy sites ranged from 0.03 to 0.05 spaces per unit. These rates are significantly lower than the Town of Caledon Zoning By-law requirement of 0.25 spaces per unit as well as the Zoning By-law visitor parking requirements set out in other municipalities (0.20 to 0.25 spaces per unit).

TABLE 7 PROXY VISITOR PARKING DEMANDS (CITY OF BARRIE)

Address	Number of Units	Survey Day	Time of Day	Peak Parking Demand (spaces)	Visitor Parking Ratio (spaces/unit)
37 Johnson Street	188	Saturday July 11, 2015	3:00 pm – 11:00 pm	9	0.05
7 & 15 Vancouver Street	67	Saturday July 11, 2015	3:00 pm – 11:00 pm	3	0.03
262 Rose Street	84	Saturday July 11, 2015	3:00 pm – 11:00 pm	3	0.04

3.3 PROPOSED PARKING SUPPLY

The minimum proposed parking supply for the site is summarized in **Table 8** and is based on a ratio of 0.85 spaces per unit for resident parking, 0.20 spaces per unit for residential visitor parking and 1 space per 20 m² for retail parking. The current architectural plans for the site illustrate a total of **2,552** parking spaces which is an additional 52 spaces beyond what is required with the proposed parking rates outlined in **Table 8**.

As per By-law 2015-058, the minimum number of designated accessible parking spaces at each building equals 11 spaces plus 1% which results in a total requirement of **36** accessible spaces on the site, based on the requirement of a total of 2,500 parking spaces for the site.

In accordance with the By-law, where an even number of accessible parking spaces are required, an equal number of Type A and B accessible parking spaces shall be provided. Where an odd number of accessible parking spaces are required, an equal number of Type A and B accessible parking spaces shall be provided but the last accessible parking space may be Type B. The architectural drawings for the site include 18 Type A and 18 Type B accessible spaces. The designated accessible parking spaces will be located in proximity to the primary entrances to the buildings and have direct access to the entrances by a minimum 1.5 metres wide unobstructed access route.

TABLE 8 MINIMUM PROPOSED PARKING SUPPLY

	Land Use	Units or Gross Floor Area (GFA)	Proposed Parking Rate	Parking Requirement (spaces)	
Building 1	Resident	519	0.85 spaces/unit	441	
	Visitor		0.20 spaces/unit	104	
	Sub-Total			1.05 spaces/unit	545
	Retail	1144	1 space/20 m ²	57	
	Sub-Total				602
Building 2	Resident	428	0.85 spaces/unit	364	
	Visitor		0.20 spaces/unit	86	
	Sub-Total			1.05 spaces/unit	450
	Retail	748	1 space/20 m ²	37	
	Sub-Total				487
Building 3	Resident	413	0.85 spaces/unit	351	
	Visitor		0.20 spaces/unit	83	
	Sub-Total			1.05 spaces/unit	434
	Retail	507	1 space/20 m ²	25	
	Sub-Total				459
Building 4	Resident	611	0.85 spaces/unit	519	
	Visitor		0.20 spaces/unit	122	
	Sub-Total			1.05 spaces/unit	641
	Retail	0	1 space/20 m ²	--	
	Sub-Total				641
Building 5	Resident	258	0.85 spaces/unit	219	
	Visitor		0.20 spaces/unit	52	
	Sub-Total			1.05 spaces/unit	271
	Retail	780	1 space/20 m ²	39	
	Sub-Total				310
SITE	Resident	2229	0.85 spaces/unit	1,895	
	Visitor		0.20 spaces/unit	446	
	Sub-Total			1.05 spaces/unit	2,341
	Retail	3179	1 space/20 m ²	159	
	TOTAL				2,500

Notes:

1. Site statistics based on site plans prepared by SRN Architects dated February 26, 2021.
2. As per Section 5.2.4, where the minimum number of parking, loading or delivery spaces is calculated on the basis of a rate or ratio, the required number of parking, loading or delivery spaces shall be rounded to the next higher whole number. Rounding has been applied to the total site not per building.
3. Net floor Area (NFA) assumed to equal Gross Floor Area (GFA) for the purposes of these calculations.

As shown in the architectural drawings, the parking supply will be located at-grade and in a below-grade facility with 3 levels as summarized in **Table 9**. As a total of 605 non-residential parking spaces are required (446 resident visitors + 159 retail spaces), 97 of these spaces will be provided at-grade and a minimum of 508 spaces will be provided on P1.

TABLE 9 LOCATION OF PARKING SUPPLY

	Number of Spaces	Number of Spaces	Accessible Type A (number of Spaces ¹)	Accessible Type B (number of Spaces ¹)	Total Number of Spaces
At-Grade		97	5	4	97
Below-Grade					
Level P1	994	--	13	14	994
Level P2	1,015	--	--	--	1,015
Level P3	446	--	--	--	446
Total	2,455	97	18	18	2,552

Notes:

1. Accessible spaces are included within total number of parking spaces required.
2. Site statistics based on site plans prepared by SRN Architects dated February 26, 2021.

The proposed parking supply will meet the practical requirements of the site.

4.0 BICYCLE PARKING CONSIDERATIONS

4.1 PROPOSED BICYCLE PARKING SUPPLY

Although the Town of Caledon Zoning By-law does not include a requirement for bicycle parking, in order to encourage sustainable transportation, bicycle parking on the site is being proposed.

The current architectural drawings provide a total of 916 parking spaces for bicycles, including 52 spaces at-grade for visitors and 864 stacked spaces for residents below-grade on P1. The location of the bicycle parking areas is illustrated in the architectural drawings for the site included in **Appendix A**.

5.0 LOADING CONSIDERATIONS

The loading requirements for the site have been considered based on land use and municipal requirements. As the proposed development would be serviced by the Region of Peel for residential garbage collection, the requirements of the Region's Waste Collection Design Standards have been applied for the residential components of the site. As per the Town of Caledon Zoning By-law, the retail components of the site would require a private waste collection service.

The proposed loading spaces at each building will meet the practical requirements of the site and are described in detail below. Vehicle manoeuvring drawings for the site are attached in **Appendix C**.

Residential Waste Collection

In accordance with the Region's Waste Collection Design Standards, the residential waste collection loading space (1 per building) will be a minimum of at 6.0 m wide and 15.0 m long with a 7.5 m height clearance.

It is proposed that the loading space designated for residential waste collection be shared with residential deliveries.

Retail Waste Collection

In accordance with the Town of Caledon Zoning By-law, waste collection for the retail components of the site must be serviced by a private contractor. The size of the loading space is dependent on the retail use. The retail uses for the site are unknown at this time hence the size of the loading spaces will range from 9.0 to 14.0 m in length with a width of 3.5 metres and will meet the minimum requirements of the Town of Caledon Zoning By-law.

One retail waste collection loading space per building will be provided. It is proposed that the loading space designated for private waste collection be shared with retail deliveries.

The proposed supply of loading spaces will meet the practical requirements of the site.

6.0 TRANSPORTATION DEMAND MANAGEMENT FRAMEWORK

6.1 TDM OBJECTIVES

The Transportation Demand Management (TDM) framework strives to reduce automobile use through an on-going strategy by supporting and promoting the use of non-auto transportation modes.

The key objective of the TDM framework 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 following sections summarize the TDM strategies which will be refined at the Site Plan Application (SPA) stage of the project.

6.2 TDM STRATEGIES

The existing site context provides for public transit service as well as pedestrian and cycling facilities. Potential TDM strategies have been developed to further support the use of non-auto modes of travel. Potential TDM measures for the site are summarized in **Table 10**.

6.3 TDM IMPLEMENTATION

The physical infrastructure components or 'hard' TDM measures outlined in this plan (i.e. pedestrian connections and 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. After construction, a qualified engineer or planner will confirm the incorporation of these design elements within the development.

The 'soft' measures of the TDM plan (i.e. travel mode choice information packages) will be implemented by the developer.

TABLE 10 TRANSPORTATION DEMAND MANAGEMENT STRATEGIES

Measure	Description	Cost Estimate	Implementation Strategy
Hard Measures			
Pedestrian Connections	Provide sidewalks along both sides of the site driveway that connect to the proposed sidewalk on the east side of Highway 50.	Integrated into overall development cost.	Construct as part of development.
Bicycle Parking	Provide 52 bicycle parking spaces at-grade for visitors and 864 stacked bicycle parking spaces for residents in a below-grade parking facility on P1.	Integrated into overall development cost.	Construct as part of development.
Car Share	Provide up to 10 car share spaces on-site.	To be determined if/when car share services are available in Bolton.	To be confirmed at a later phase of the development.
Soft 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 will be distributed at the sales centre.
Presto Cards	Provide Presto cards to new residents.	To be determined.	Presto cards will be distributed at the sales centre.

7.0 TRAFFIC VOLUME FORECASTING

7.1 EXISTING TRAFFIC VOLUMES

As a result of the current COVID pandemic, existing traffic volumes on the public road network do not reflect typical travel patterns. As a result, traffic data collected in November of 2020 was compared and balanced with traffic data from 2018 and 2019 to represent non-COVID conditions as best as possible.

Baseline existing turning movement volumes were established for intersections within the study area road network based on the most recently available traffic count data not impacted by COVID conditions and collected by Spectrum Traffic Inc. on behalf of BA Group. Based on discussions with Region of Peel staff and as summarized in the terms of reference letter¹, a 1.5% annual growth rate for years between 2016 and 2021 were applied to the traffic count information to present a more conservative “existing traffic volume” baseline for the current year of 2021.

The most recent traffic count information is summarized in **Table 11**. Detailed traffic count data is attached in **Appendix D**.

TABLE 11 EXISTING TRAFFIC COUNT INFORMATION

Intersection	Date of Count	Source
Highway 50 / McEwan Drive East & West	Wednesday, November 25, 2020	Spectrum Traffic Inc. 7:00 a.m. to 9:00 a.m. 4:00 p.m. to 6:00 p.m.
Albion Vaughan Road / Commercial Road		
Albion Vaughan Road / Industrial Road		
Albion Vaughan Road / Kirby Road		
Highway 50 / Albion Vaughan Road / Mayfield Road	Tuesday, October 8, 2019	
Highway 50 / Parr Boulevard	Wednesday, October 2, 2019	
Highway 50 / Industrial Road	Wednesday, May 8, 2019	
Highway 50 / George Bolton Parkway	Tuesday, March 20, 2018	

Existing turning movement volumes were rounded to the nearest 5 vehicles and reviewed to ensure a general consistency in the traffic volumes on links between intersections. Where necessary, minor volume adjustments were made to *conservatively* balance through traffic volumes between intersections to ensure consistency in the corridor.

Existing traffic volumes for the weekday morning and afternoon peak hours adopted for the analysis are illustrated in **Figure 10**.

¹ As requested by the Region of Peel, a terms of reference was prepared and submitted by BA Group in a letter dated December 2020 and titled “Traffic Impact Study Terms of Reference – 12563 & 12599 Highway 50, Bolton, Proposed Multi-Use Development”.

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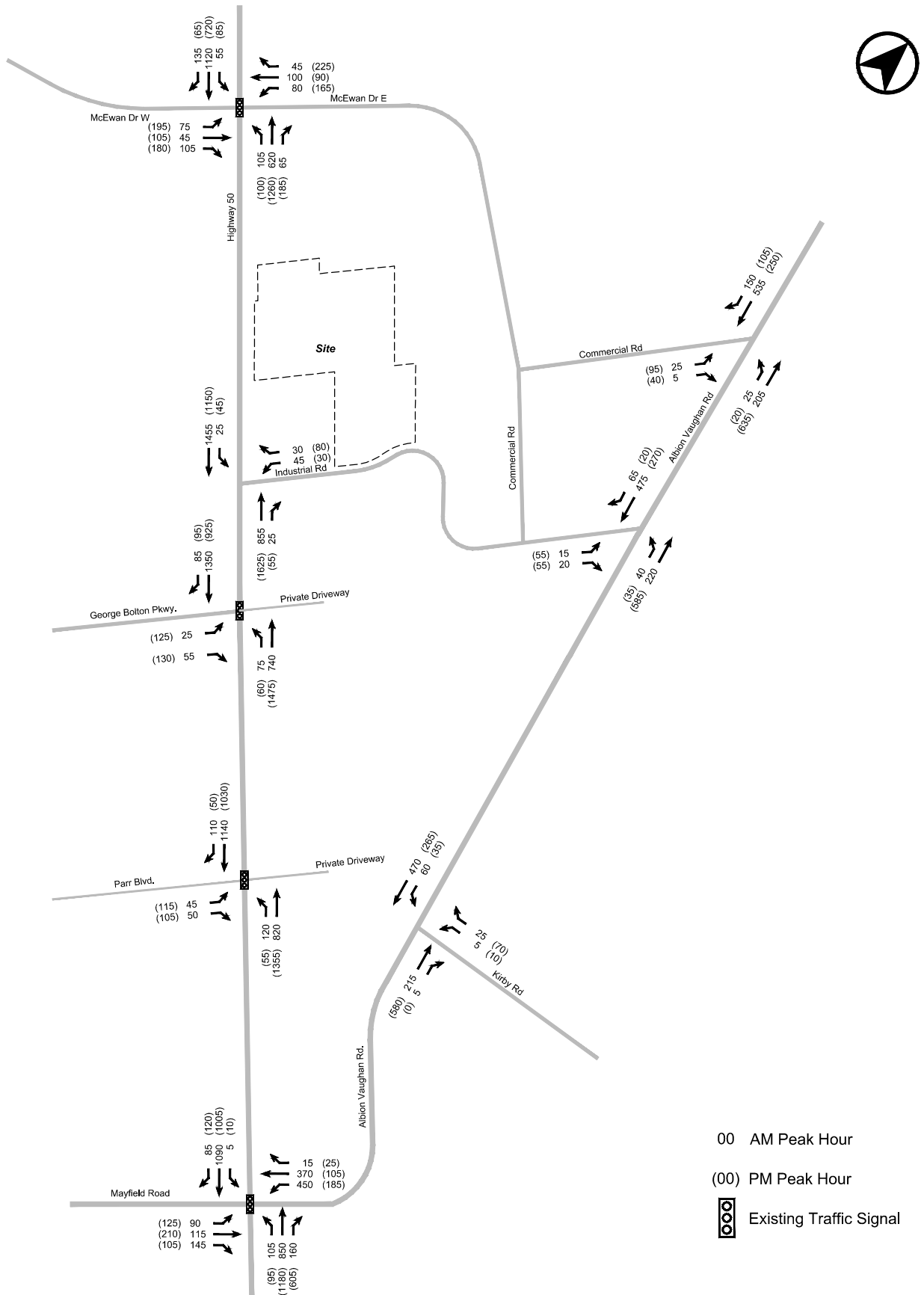


FIGURE 10 EXISTING TRAFFIC VOLUMES

7.2 FUTURE BACKGROUND TRAFFIC VOLUMES

Future background traffic volumes in the 2036 and 2041 horizon years represent the summation of the existing traffic volumes plus traffic redistribution resulting from the George Bolton Parkway extension and general corridor growth allowances in the 2036 and 2041 horizon years plus background development traffic allowances. The future background traffic volumes for the 2031 and 2041 horizon years are shown in **Figure 15** and **Figure 16**, respectively.

7.2.1 George Bolton Parkway Extension Traffic Redistribution

As part of the George Bolton Parkway EA discussed in **Section 2.1.2**, a traffic analysis was conducted to project the traffic redistribution related to the extension and to provide a preliminary analysis on the study area intersections. The study forecasts both heavy vehicle and light vehicle redistributions as a result of the George Bolton Parkway extension. More detail related to the redistribution is attached in **Appendix E** while the total traffic volume redistribution is illustrated in **Figure 11**.

7.2.2 General Corridor Growth

In order to conservatively capture development progress outside of the site vicinity and study area for both horizon years of 2036 (site build-out) and 2041 (five-years beyond build-out), the following growth rates were applied during both weekday morning and afternoon peak hours based on discussions with Region of Peel staff:

- 2021 to 2031: 1.0% annual growth rate
- 2031 to 2041: 0.5% annual growth rate

General corridor growth allowances for both the 2036 and 2041 horizon years are illustrated on the study area road network in **Figure 12** and **Figure 13**, respectively.

7.2.3 Background Development Traffic

Allowances were made under future traffic conditions to account for new traffic generated by other development proposals in proximity to the proposed site that are either under construction, approved, being reviewed or for which an application is expected to be submitted to the Town of Caledon in the near future. Traffic volume allowances related to the list of background developments are included in the study.

As summarized in **Table 12**, a total of 3 background developments were considered and include the following:

- 8 gas station positions
- 279 m² retail GFA
- 909 m² office GFA
- 928 m² medical office GFA; and
- 3,247 m² industrial GFA

TABLE 12 BACKGROUND DEVELOPMENTS

Development	Description	Report Source	Trip Assignment Source
12544 Highway 50 (SP-15-067C)	8 gas station positions 279 m ² retail GFA 461 m ² office GFA	LMM Engineering	TIS Report Excerpt
12700 Highway 50 (SP-16-072C)	448 m ² office GFA 928 m ² medical office GFA	Trans-Plan Consulting	
7 Loring Drive (SP-19-014C)	3,247 m ² industrial GFA	LEA Consulting	
Total	<ul style="list-style-type: none"> • 8 gas station positions • 279 m² retail GFA • 909 m² office GFA • 928 m² medical office GFA • 3,247 m² industrial GFA 		

The background development traffic is illustrated in **Figure 14**. These allowances were carried forward to both the 2036 and 2041 horizon years.

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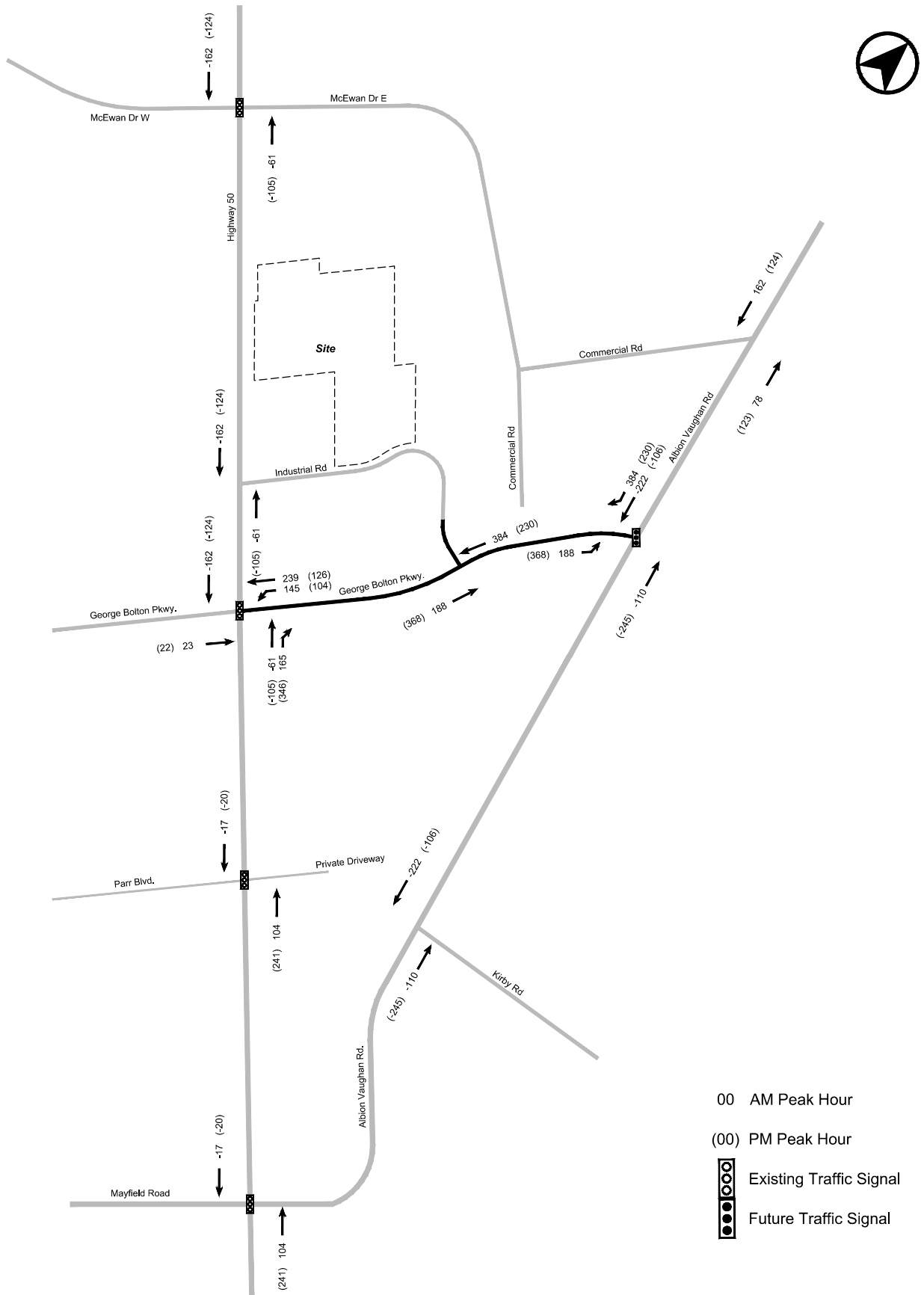


FIGURE 11 GEORGE BOLTON PARKWAY EXTENSION TRAFFIC REDISTRIBUTION

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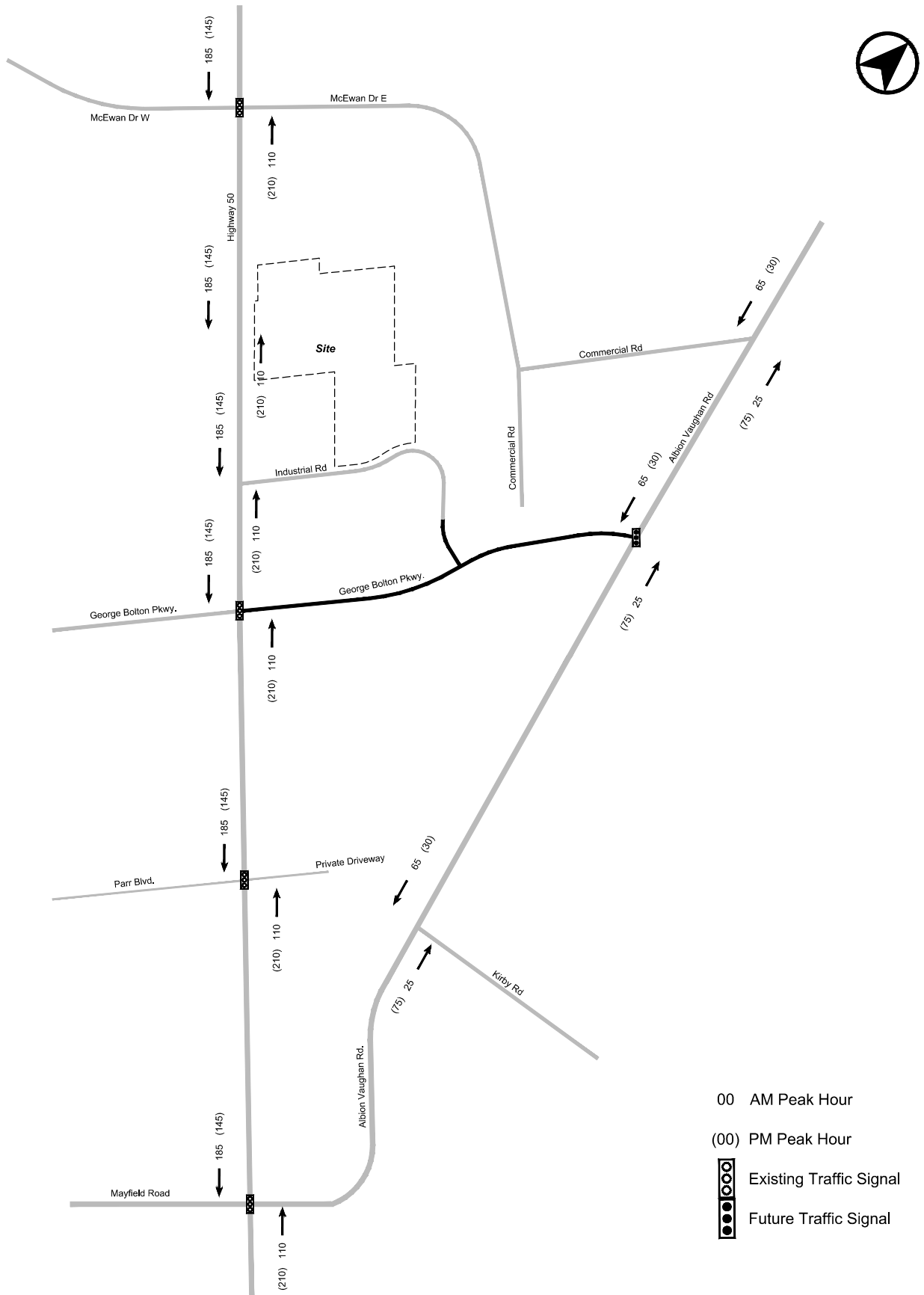


FIGURE 12 CORRIDOR GROWTH (2036 HORIZON)

Date Plotted: March 3, 2021 Filename: P:\8076\01\Graphics\CAD\Fig13-00-Corr2041.dwg

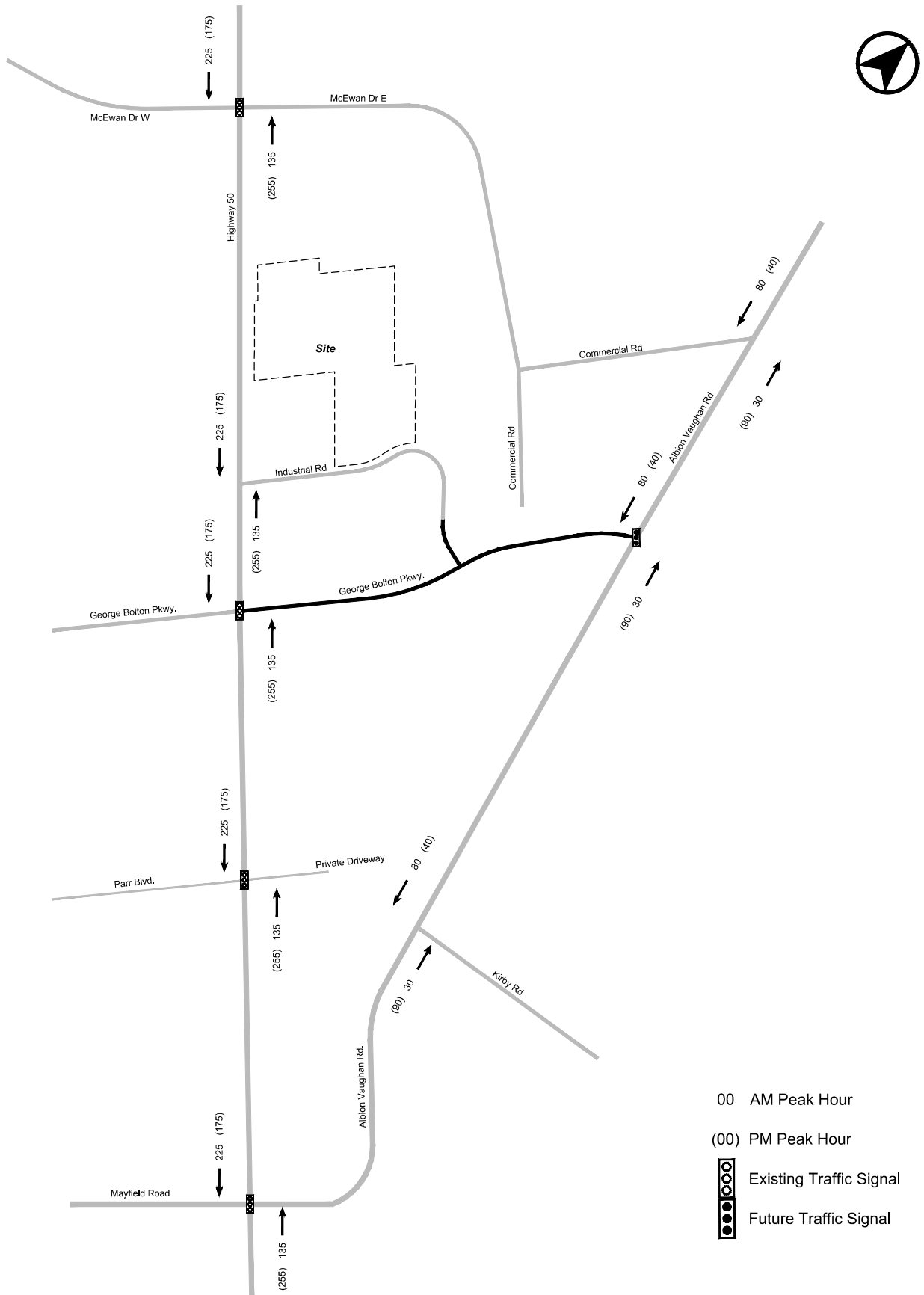


FIGURE 13 CORRIDOR GROWTH (2041 HORIZON)

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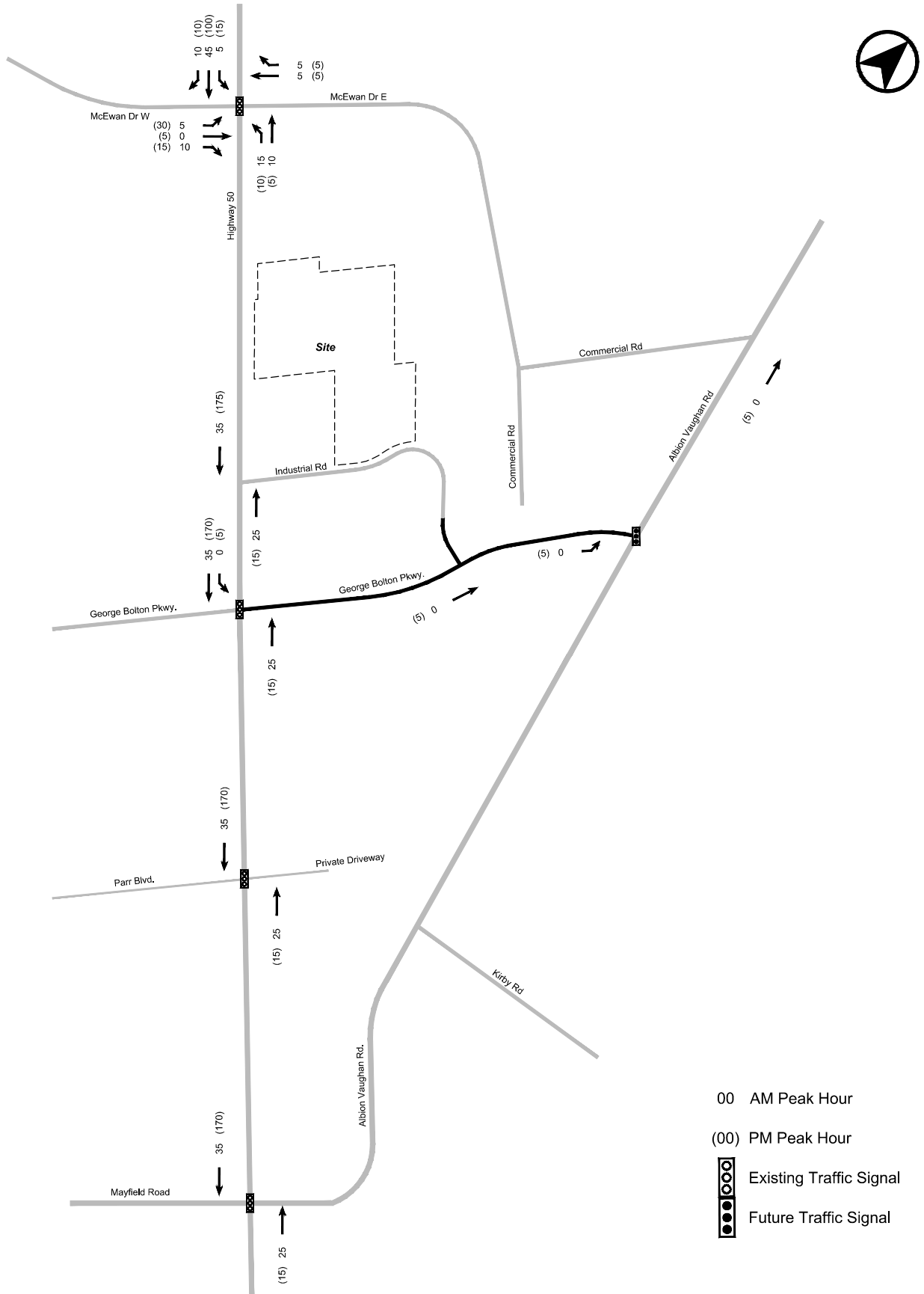


FIGURE 14 BACKGROUND DEVELOPMENT TRAFFIC VOLUMES



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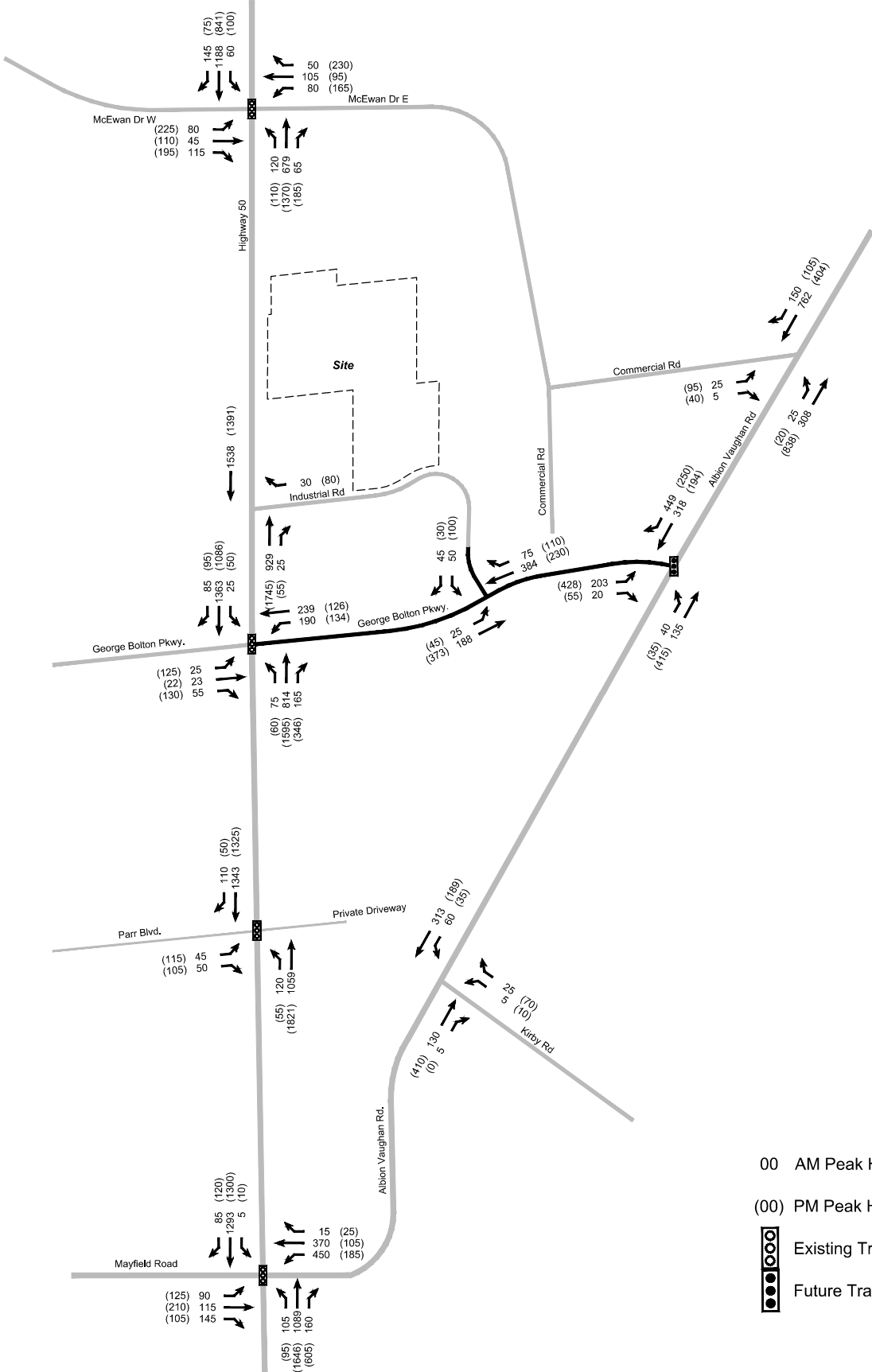


FIGURE 15 2036 FUTURE BACKGROUND TRAFFIC VOLUMES

Date Plotted: March 3, 2021 Filename: P:\8076\01\Graphics\CAD\Fig16-00-2041FB.dwg

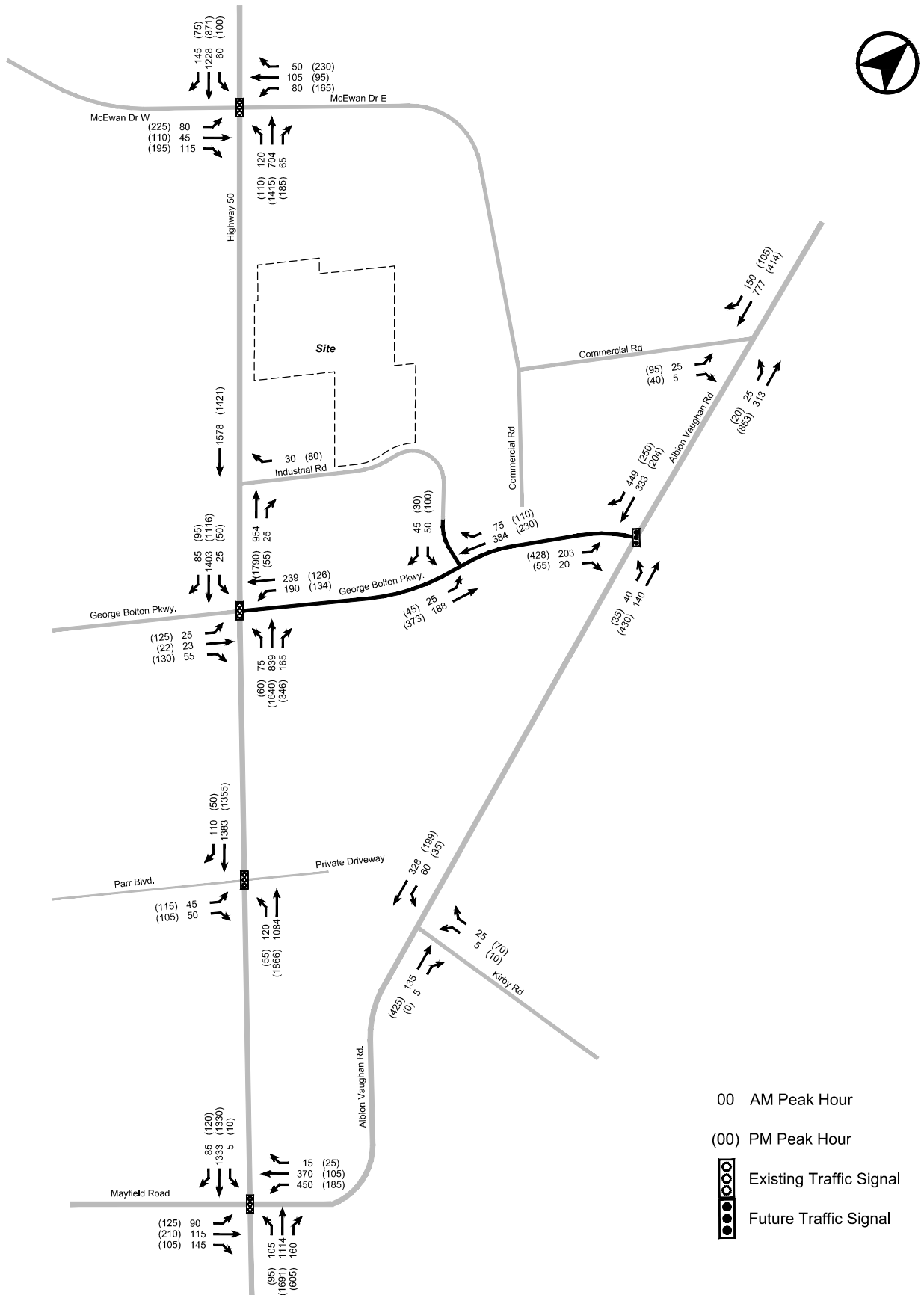


FIGURE 16 2041 FUTURE BACKGROUND TRAFFIC VOLUMES

7.3 SITE TRAFFIC VOLUMES

7.3.1 Residential Site Traffic Volumes

Trip Generation

The residential trip generation potential of the proposed site is based upon trip behaviour observed within the ITE Trip Generation Manual (10th Edition), Land Use Code (LUC) 222 (High-Rise Multi-family Housing). The trip rates and resultant trips are summarized in **Table 13**.

The site anticipates in the order of 645 and 760 two-way residential vehicle trips during the weekday morning and afternoon peak hours, respectively.

TABLE 13 RESIDENTIAL TRIP GENERATION

	AM Peak Hour			PM Peak Hour		
	In	Out	2-Way	In	Out	2-Way
Directional Distribution	24%	76%	100%	61%	39%	100%
Residential Trip Rate	0.07	0.22	0.29	0.21	0.13	0.34
Residential Site Trips	155	490	645	470	290	760

Notes:

1. Site trips are rounded to the nearest 5.

Trip Distribution

The new residential site trips in the weekday morning and afternoon peak hours are assigned to the study area road network based on the observed travel pattern of home-based trips within the site area as provided by the 2016 Transportation Tomorrow Survey (TTS). TTS queries are provided in **Appendix F**.

The residential site traffic distribution is summarized in **Table 14**. The residential site traffic volumes on the area road network are illustrated in **Figure 17**.

TABLE 14 RESIDENTIAL SITE TRAFFIC DISTRIBUTION

To / From Site	Corridor	Inbound	Outbound
North	Highway 50	15%	15%
	Albion Vaughan Road	15%	15%
South	Highway 50	50%	50%
West	McEwan Drive West	5%	5%
	Mayfield Road	15%	15%
Total		100%	100%

Notes:

- 2006 TTS zones considered include 3190 and 3192.
- Inbound and outbound distributions are based on collected data from the weekday afternoon and morning peak hours, respectively.

7.3.2 Retail Site Traffic Volumes

Trip Generation

The trip generation potential of the commercial site uses were estimated based on the ITE Trip Generation Manual (10th Edition), LUC 820 (Shopping Center). The trip rates and resultant trips are summarized in **Table 15**.

The site anticipates in the order of 30 and 135 two-way commercial vehicle trips during the weekday morning and afternoon peak hours, respectively.

TABLE 15 RETAIL TRIP GENERATION, LUC 820 (SHOPPING CENTER)

	AM Peak Hour			PM Peak Hour		
	In	Out	2-Way	In	Out	2-Way
Directional Distribution	62%	38%	100%	48%	52%	100%
Retail Trip Rate	0.58	0.36	0.94	1.83	1.98	3.81
Retail Site Trips	20	10	30	65	70	135
<i>Passby Retail Site Trips¹</i>	<i>10</i>	<i>10</i>	<i>20</i>	<i>35</i>	<i>35</i>	<i>70</i>
<i>Primary Retail Site Trips</i>	<i>10</i>	<i>0</i>	<i>10</i>	<i>30</i>	<i>35</i>	<i>65</i>

Notes:

- Passby percentage is obtained from passby data found in the ITE Trip Generation Handbook, 3rd Edition (September 2017), and calculated as 52% based on the commercial GFA proposed as part of this site.
- Site trips are rounded to the nearest 5.

Trip Distribution

The retail site trips were distributed onto the area road network based upon existing travel patterns observed at the study area intersections.

7.3.3 Total Site Traffic Volumes

The site anticipates in the order of 675 and 895 two-way vehicle trips during the weekday morning and afternoon peak hours, respectively. The total site traffic volumes are summarized in **Table 16**.

TABLE 16 TOTAL TRIP GENERATION

	AM Peak Hour			PM Peak Hour		
	In	Out	2-Way	In	Out	2-Way
Residential Trip Generation	155	490	645	470	290	760
Retail Trip Generation	20	10	30	65	70	135
Total Trip Generation	175	500	675	535	360	895

Notes:

1. Site trips are rounded to the nearest 5.

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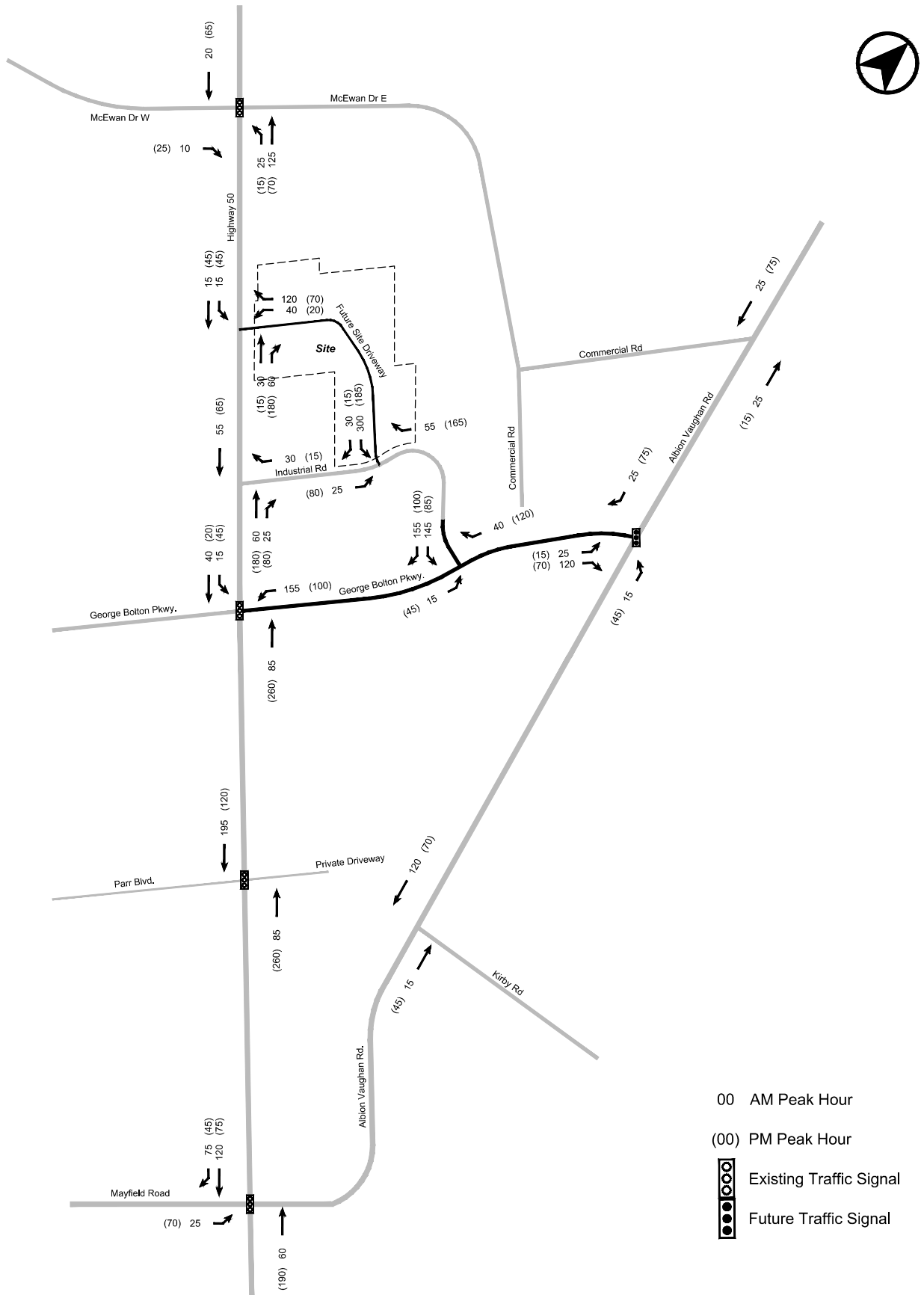


FIGURE 17 RESIDENTIAL SITE TRAFFIC VOLUMES

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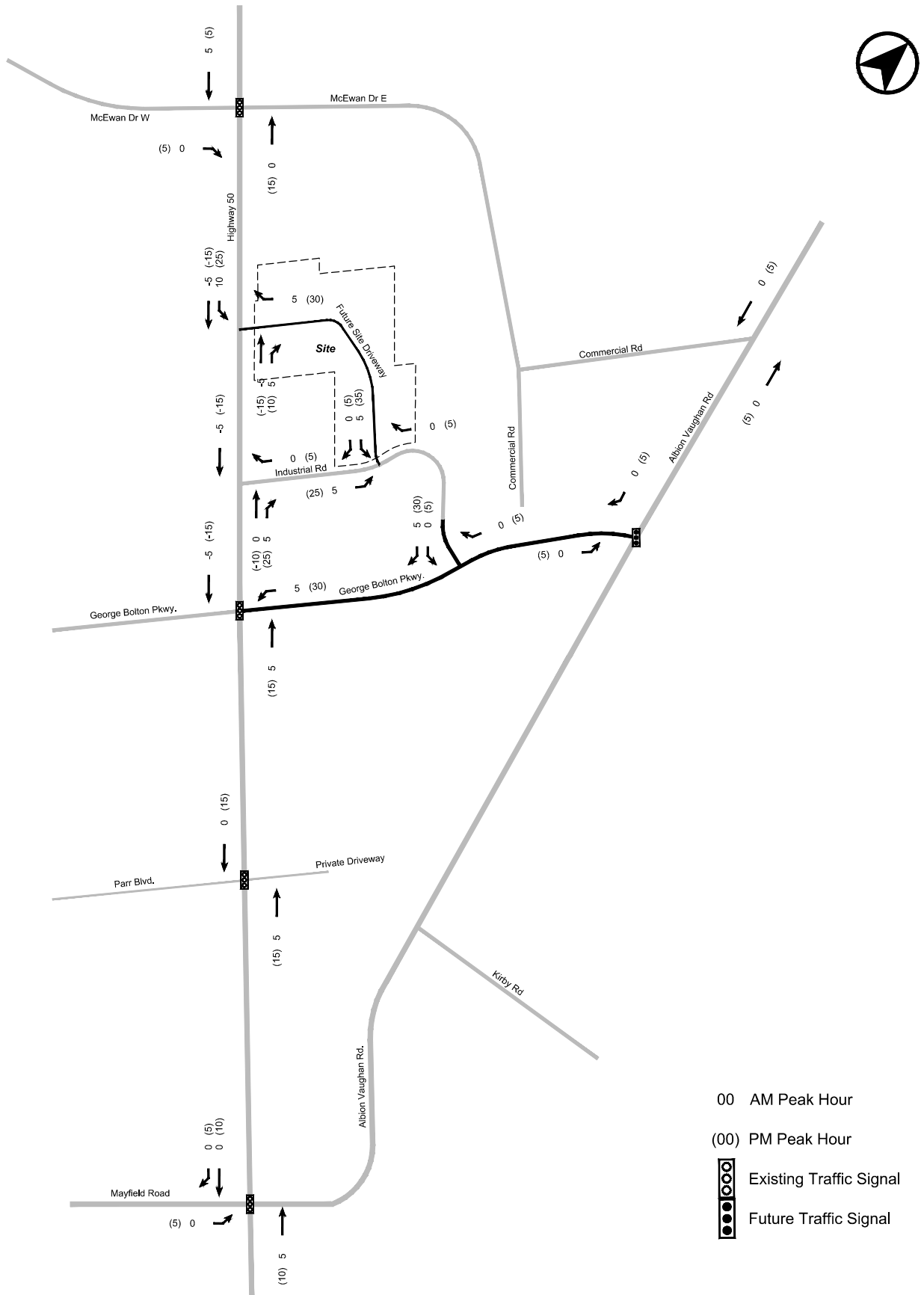


FIGURE 18 RETAIL SITE TRAFFIC VOLUMES

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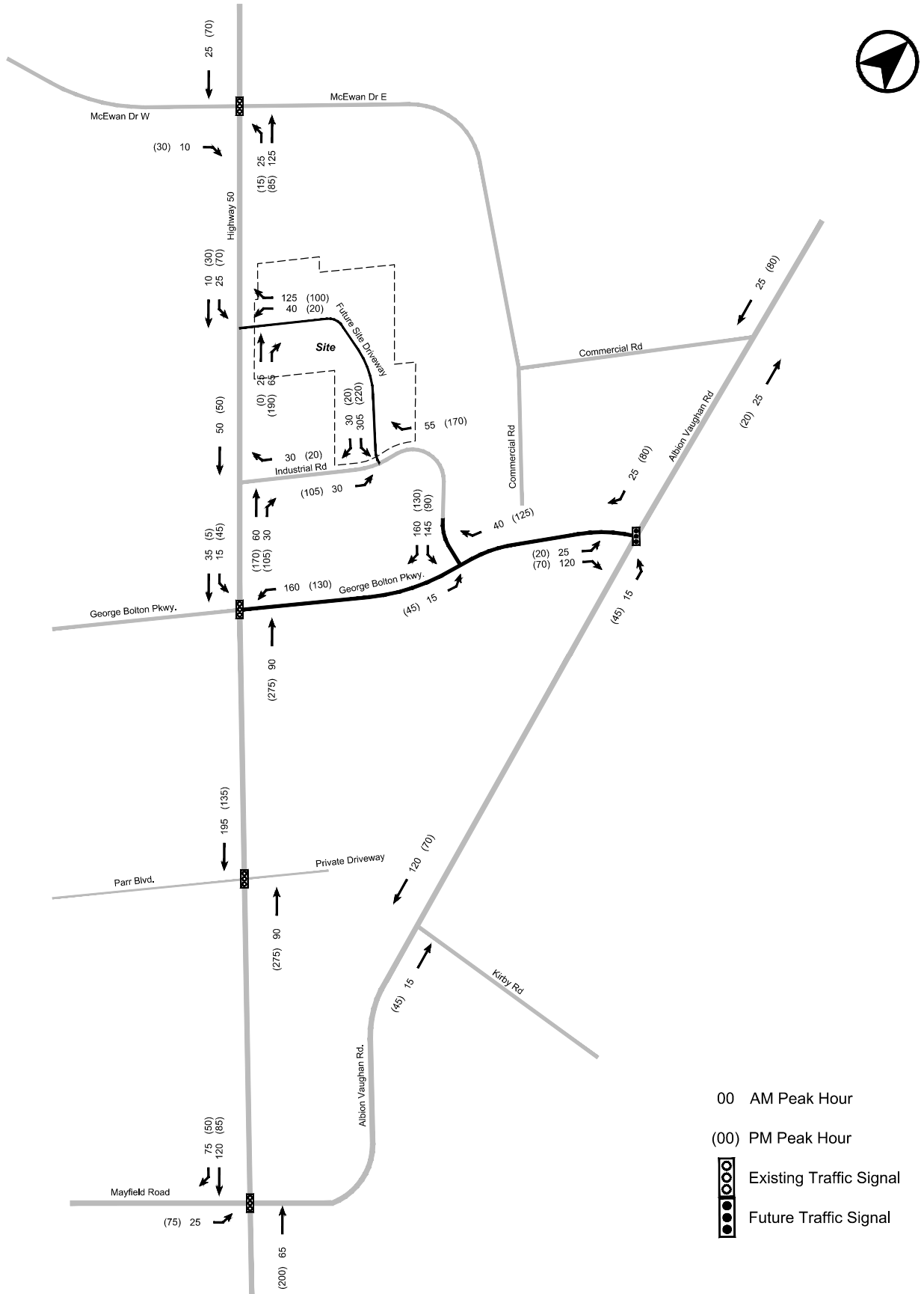


FIGURE 19 TOTAL SITE TRAFFIC VOLUMES

7.4 FUTURE TOTAL TRAFFIC VOLUMES

Future total traffic volumes in the 2036 and 2041 horizon years reflect the sum of future background traffic volumes in the respective horizons with total site traffic volumes and are summarized in **Figure 20** and **Figure 21**, respectively.

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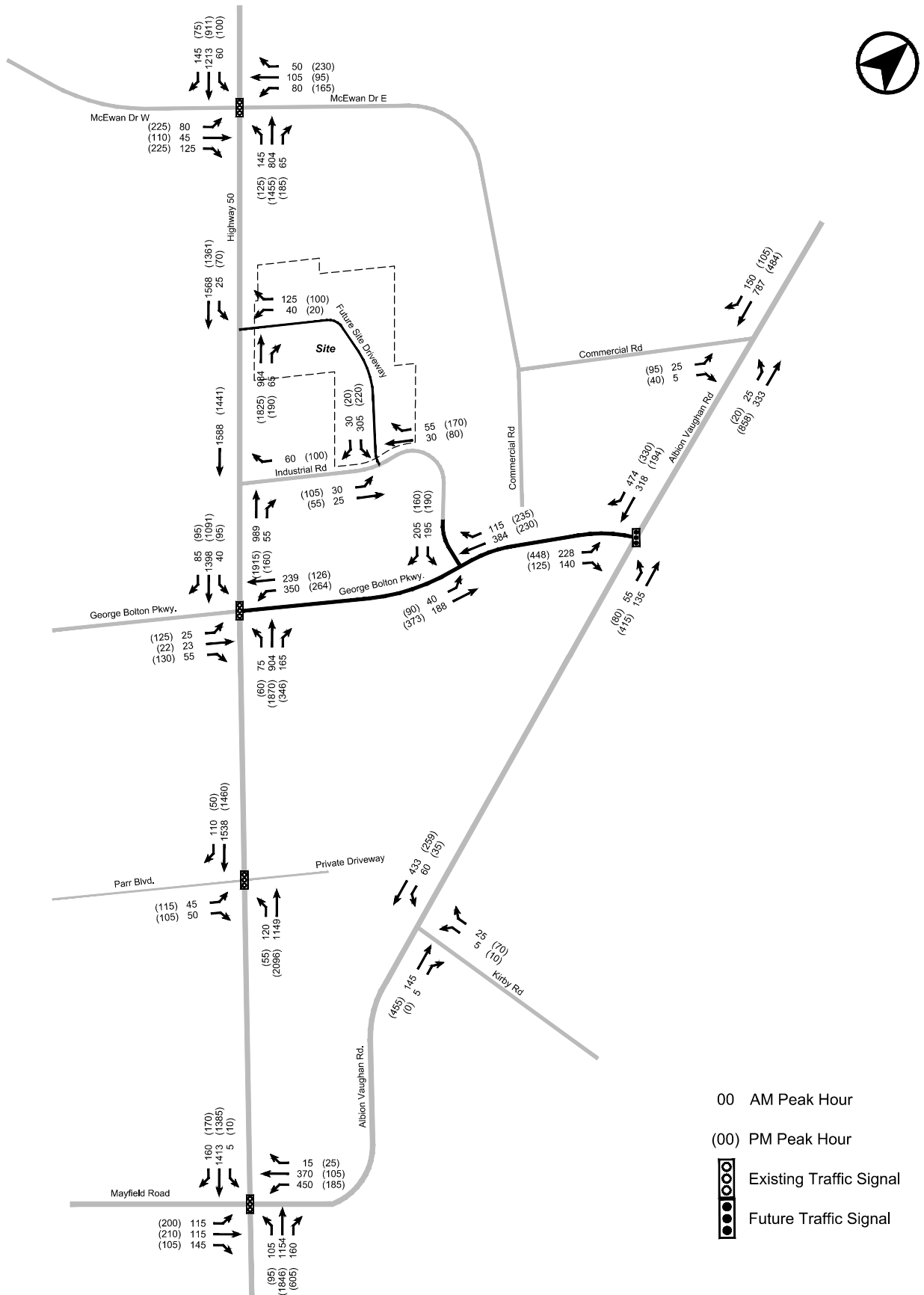


FIGURE 20 2036 FUTURE TOTAL TRAFFIC VOLUMES

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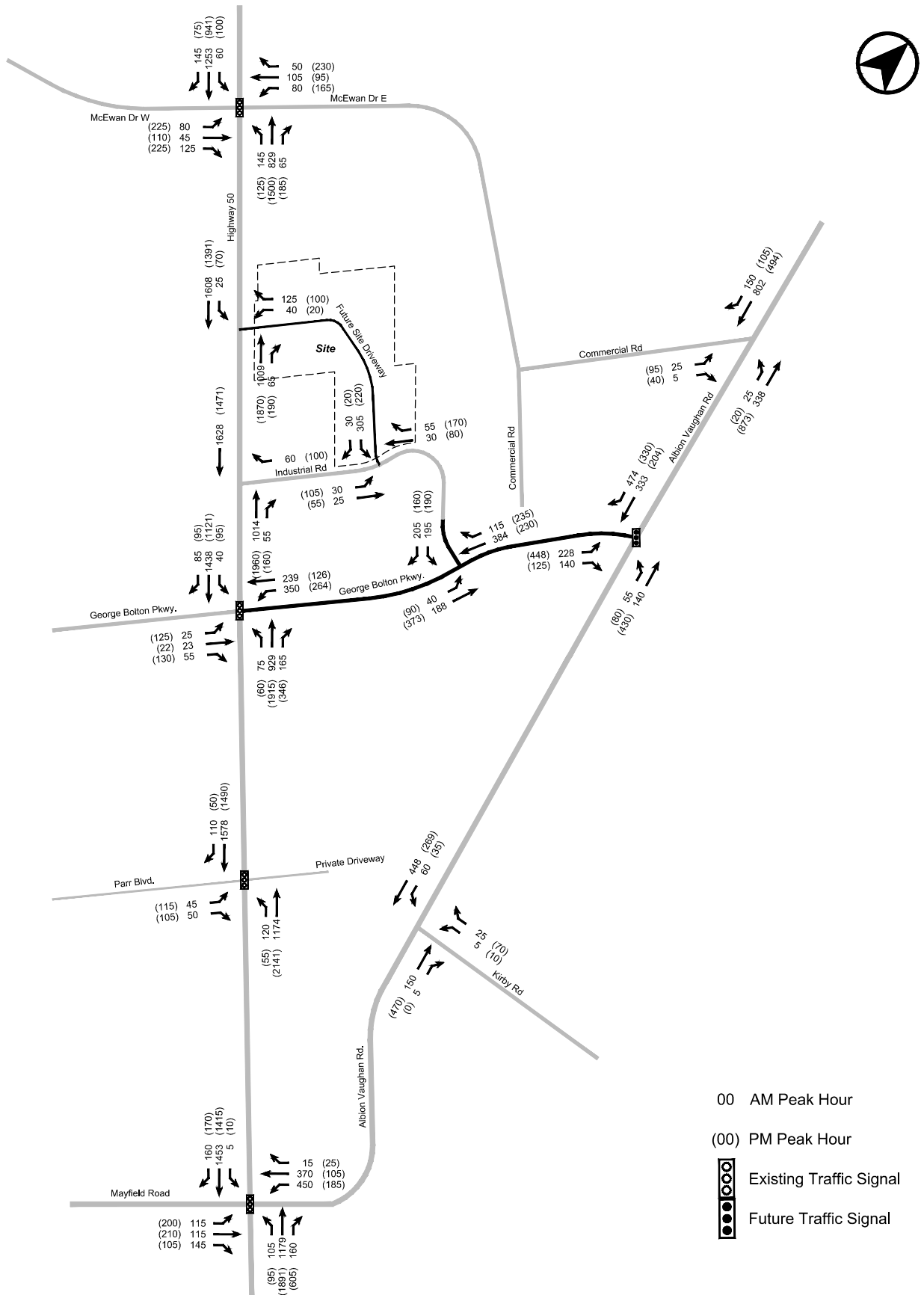


FIGURE 21 2041 FUTURE TOTAL TRAFFIC VOLUMES

8.0 TRAFFIC OPERATIONS ANALYSIS

8.1 TRAFFIC OPERATIONS SCENARIOS

A traffic operations analysis was completed for the following scenarios:

- Existing traffic conditions;
- Future background traffic conditions (2036 horizon year);
- Future total traffic conditions (2036 horizon year);
- Future background traffic conditions (2041 horizon year); and
- Future total traffic conditions (2041 horizon year).

8.2 ANALYSIS METHODOLOGY

The intersection capacity analysis was completed using Synchro Version 11 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 the 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 reflect average (control) delays in the range of 35 to 80 seconds².

For unsignalized intersections, level of service (LOS) characterizes operational conditions for key movements in terms of delay within the traffic stream³. LOS A represents a good level of service with short delays. Based on the Region of Peel's Synchro Guidelines, LOS E represents "an unacceptable LOS"; this implies 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.

² HCM Level of Service criteria for signalized intersections:

- LOS A: Control Delay $\leq 10s$
- LOS B: $10s < \text{Control Delay} \leq 20s$
- LOS C: $20s < \text{Control Delay} \leq 35s$
- LOS D: $35s < \text{Control Delay} \leq 55s$
- LOS E: $55s < \text{Control Delay} \leq 80s$
- LOS F: Control Delay $> 80s$

³ HCM Level of Service criteria for unsignalized intersections:

- LOS A: Control Delay $\leq 10s$
- LOS B: $10s < \text{Control Delay} \leq 15s$
- LOS C: $15s < \text{Control Delay} \leq 25s$
- LOS D: $25s < \text{Control Delay} \leq 35s$
- LOS E: $35s < \text{Control Delay} \leq 50s$
- LOS F: Control Delay $> 50s$

8.3 INPUT AND CALIBRATION PARAMETERS

Key parameters adopted in the analysis include:

Lane Configurations

Under existing conditions analysis scenarios, the existing lane configurations of the area road network were assumed. Under future conditions analysis scenarios, the George Bolton Parkway Extension and the widening of Albion Vaughan Road from 2 to 4 lanes were incorporated into the traffic model, as previously discussed in **Section 2.1.2. Appendix G** illustrates the preferred road design of the George Bolton Parkway Extension.

Based on the Region of Peel's "*Regional Guidelines for Using Synchro, Version 7.73 Rev 8*" dated December 2010 (herein referred to as the "Region of Peel's Synchro Guidelines"), lane widths of 3.7 and 3.5 metres have been adopted for through and auxiliary turn lanes, respectively.

Traffic Signal Timings

Traffic signal timings have been obtained from the Region of Peel and are provided in **Appendix H**. The existing traffic signal timings have been adopted for existing conditions analysis.

Under future background and future total conditions, traffic signal timings may have been optimized 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.

Peak Hour Factors (PHF)

The Region of Peel's Synchro Guidelines state that the peak hour factor should be 1.00 for all movements on all approaches. This is applied to all intersections in all scenarios.

Lane Utilization Factor (LUF)

A lane utilization factor (LUF) of less than 1.00 reflects the inefficient use of lanes, where vehicles may favour one lane over another for a variety of reasons such as avoiding transit traffic and turning vehicles or positioning for an upcoming manoeuvre. For the southbound movements at the Highway 50 / Albion Vaughan Road / Mayfield Road intersection, significant left and right-turn storage lanes are provided in the southbound direction at the intersection, which removes turning vehicles from the through travel lanes well in advance of the intersection. Consequently, as the intersection approaches capacity, it can be reasonably expected that the through volumes will evenly distribute across the two through lanes. An LUF of 1.00 (rather than a default of 0.95) has therefore been applied for the southbound through movements under future traffic conditions.

Pedestrian and Bicycle Volumes

Pedestrian and bicycle volumes are based on those observed at the study area intersections under existing conditions.

Heavy Vehicle Percentages

Heavy vehicle percentages were derived from existing turning movement counts. Where the intersection is not existing, such as at the site accesses, the Synchro default of 2% is assumed for all movements.

Synchro Defaults

Synchro defaults have been adopted for all other parameters.

8.4 STUDY AREA INTERSECTION OPERATIONS

The following sections discuss the operations of the study area intersections. Synchro reports are provided in **Appendix I**. All signalized intersections in the study area are expected to operate under capacity under future total conditions with the consideration of the George Bolton Parkway Extension and related road improvements. No mitigation measures or improvements are recommended with the exception of traffic signal timing optimization at Highway 50 / George Bolton Parkway (due to the future extension) and the Highway 50 / Albion Vaughan Road / Mayfield Road intersection. All movements at unsignalized intersections in the study area, including the site access points, are expected to operate acceptably at LOS D or better. No mitigation measures or improvements are recommended.

8.4.1 Signalized Intersections

8.4.1.1 Highway 50 / McEwan Drive

At Highway 50 / McEwan Drive, the intersection currently operates under traffic signal control with cycle lengths of 120 and 140 seconds during the weekday morning and afternoon peak hours, respectively. The existing cycle length and timing splits were maintained in all analysis scenarios. Analysis results are summarized in **Table 17**.

Under existing conditions, the intersection operates under capacity during the weekday morning and afternoon peak hours with overall v/c ratios of 0.58 and 0.60, respectively.

Under all future conditions, the intersection continues to operate under capacity with overall v/c ratios of 0.66 and 0.72 or better during the weekday morning and afternoon peak hours, respectively.

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

TABLE 17 HIGHWAY 50 / MCEWAN DRIVE CAPACITY ANALYSIS RESULTS

Key Movements	Existing		2036 Horizon Year				2041 Horizon Year			
			Future Background		Future Total		Future Background		Future Total	
	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS
EBL	0.32 (0.58)	D (D)	0.37 (0.65)	D (D)	0.38 (0.68)	D (D)	0.38 (0.67)	D (D)	0.41 (0.69)	D (E)
EBTR	0.20 (0.36)	D (E)	0.22 (0.36)	D (E)	0.22 (0.41)	D (E)	0.22 (0.37)	D (E)	0.23 (0.42)	D (E)
WBL	0.41 (0.56)	E (E)	0.41 (0.57)	E (E)	0.41 (0.57)	E (E)	0.41 (0.57)	E (E)	0.41 (0.57)	E (E)
WBT	0.43 (0.56)	D (E)	0.45 (0.54)	D (E)	0.44 (0.54)	D (E)	0.44 (0.54)	D (E)	0.44 (0.52)	D (E)
WBR	0.03 (0.28)	D (E)	0.03 (0.39)	D (E)	0.03 (0.39)	D (E)	0.03 (0.39)	D (E)	0.03 (0.37)	D (E)
NBL	0.42 (0.27)	B (B)	0.51 (0.35)	C (B)	0.60 (0.42)	B (B)	0.53 (0.36)	C (B)	0.61 (0.43)	B (B)
NBT	0.30 (0.60)	B (B)	0.32 (0.68)	B (C)	0.38 (0.71)	B (C)	0.34 (0.70)	B (C)	0.39 (0.73)	B (C)
NBR	0.04 (0.14)	A (B)	0.04 (0.15)	A (B)	0.04 (0.15)	A (B)	0.04 (0.15)	A (B)	0.04 (0.15)	A (B)
SBL	0.11 (0.31)	A (B)	0.13 (0.40)	A (B)	0.15 (0.43)	A (B)	0.13 (0.42)	A (B)	0.15 (0.45)	A (B)
SBTR	0.63 (0.38)	B (B)	0.67 (0.46)	B (B)	0.70 (0.48)	C (B)	0.69 (0.47)	B (B)	0.71 (0.50)	C (B)
Overall	0.58 (0.60)	C (C)	0.62 (0.68)	C (C)	0.65 (0.70)	C (C)	0.64 (0.69)	C (C)	0.66 (0.72)	C (C)

Notes:

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

8.4.1.2 Highway 50 / George Bolton Parkway

The Highway 50 / George Bolton Parkway intersection currently operates under traffic signal control with cycle lengths of 120 seconds during both the weekday morning and afternoon peak hours, respectively. Analysis results are summarized in **Table 18**.

Under existing conditions, the intersection operates under capacity during the weekday morning and afternoon peak hours with overall v/c ratios of 0.48 and 0.59, respectively.

As previously discussed in **Section 2.1.2**, the George Bolton Parkway extension from Highway 50 to Albion Vaughan Road was incorporated into the analysis for future scenarios.

In order to accommodate the traffic volumes following the construction of the extension, the traffic signal timings were optimized (with the cycle length maintained) in the weekday afternoon peak hour. The recommended traffic signal timing plans are attached in **Appendix I** with the Synchro worksheets.

Under all future conditions with the George Bolton Parkway extension, the intersection continues to operate under capacity with overall v/c ratios of 0.81 and 0.92 or better during the weekday morning and afternoon peak hours, respectively.

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

TABLE 18 HIGHWAY 50 / GEORGE BOLTON PARKWAY CAPACITY ANALYSIS RESULTS

Key Movements	Existing		2036 Horizon Year				2041 Horizon Year			
			Future Background		Future Total		Future Background		Future Total	
	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS
EBL	0.31 (0.67)	E (E)	0.19 (0.67)	D (E)	0.08 (0.42)	C (D)	0.19 (0.67)	D (E)	0.09 (0.42)	C (D)
EBTR	0.05 (0.08)	D (D)	0.13 (0.17)	D (D)	0.10 (0.14)	C (D)	0.13 (0.17)	D (D)	0.10 (0.14)	C (D)
WBL ²	Lane does not currently exist.		0.77 (0.80)	E (E)	0.83 (0.94)	D (F)	0.77 (0.80)	E (E)	0.86 (0.94)	E (F)
WBTR	0.00 (0.00)	D (A)	0.67 (0.41)	D (D)	0.39 (0.27)	C (D)	0.67 (0.41)	D (D)	0.40 (0.27)	D (D)
NBL	0.25 (0.17)	A (A)	0.32 (0.21)	B (A)	0.52 (0.26)	D (B)	0.34 (0.22)	B (A)	0.53 (0.27)	D (B)
NBT	0.26 (0.55)	A (A)	0.34 (0.68)	A (A)	0.46 (0.92)	B (C)	0.35 (0.70)	A (B)	0.47 (0.94)	B (C)
NBR ²	Lane does not currently exist.		0.10 (0.22)	A (A)	0.10 (0.22)	A (B)	0.10 (0.22)	A (A)	0.10 (0.23)	A (B)
SBL	0.00 (0.00)	A (A)	0.06 (0.25)	A (B)	0.14 (0.67)	A (D)	0.06 (0.26)	A (B)	0.14 (0.67)	A (D)
SBT	0.51 (0.39)	A (A)	0.62 (0.47)	A (B)	0.80 (0.54)	C (B)	0.64 (0.49)	A (B)	0.81 (0.55)	C (B)
SBR	0.06 (0.06)	A (A)	0.06 (0.07)	A (A)	0.07 (0.07)	A (B)	0.06 (0.07)	A (A)	0.07 (0.07)	A (B)
Overall	0.48 (0.59)	A (B)	0.64 (0.68)	B (B)	0.80 (0.91)	C (C)	0.65 (0.70)	B (B)	0.81 (0.92)	C (C)

Notes:

1. XX (XX) – Weekday Morning Peak Hour (Weekday Afternoon Peak Hour).
2. These lanes have been incorporated into the Synchro model based on the preferred design of the Highway 50 / George Bolton Parkway intersection illustrated in Appendix P of the EA.

8.4.1.3 Highway 50 / Parr Boulevard

The Highway 50 / Parr Boulevard intersection currently operates under traffic signal control with cycle lengths of 120 seconds during both the weekday morning and afternoon peak hours, respectively. The existing cycle length and timing splits were maintained in all analysis scenarios. Analysis results are summarized in **Table 19**.

Under existing conditions, the intersection operates under capacity during the weekday morning and afternoon peak hours with overall v/c ratios of 0.45 and 0.54, respectively.

Under all future conditions, the intersection continues to operate under capacity with overall v/c ratios of 0.62 and 0.80 or better during the weekday morning and afternoon peak hours, respectively.

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

TABLE 19 HIGHWAY 50 / PARR BOULEVARD CAPACITY ANALYSIS RESULTS

Key Movements	Existing		2036 Horizon Year				2041 Horizon Year			
			Future Background		Future Total		Future Background		Future Total	
	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS
EBL	0.48 (0.65)	E (E)	0.48 (0.65)	E (E)	0.48 (0.65)	E (E)	0.48 (0.65)	E (E)	0.48 (0.65)	E (E)
EBTR	0.04 (0.07)	D (D)	0.04 (0.07)	D (D)	0.04 (0.07)	D (D)	0.04 (0.07)	D (D)	0.04 (0.07)	D (D)
NBL	0.31 (0.17)	A (A)	0.37 (0.23)	A (A)	0.41 (0.26)	A (A)	0.36 (0.23)	A (A)	0.43 (0.27)	A (A)
NBTR	0.30 (0.51)	A (A)	0.38 (0.68)	A (A)	0.41 (0.79)	A (B)	0.39 (0.70)	A (A)	0.42 (0.80)	A (B)
SBT	0.46 (0.43)	A (A)	0.55 (0.55)	A (A)	0.64 (0.60)	B (A)	0.57 (0.56)	A (A)	0.66 (0.62)	B (A)
SBR	0.08 (0.03)	A (A)	0.08 (0.03)	A (A)	0.08 (0.03)	A (A)	0.08 (0.03)	A (A)	0.08 (0.03)	A (A)
Overall	0.45 (0.54)	A (B)	0.53 (0.70)	A (B)	0.61 (0.79)	A (B)	0.55 (0.71)	A (B)	0.62 (0.80)	A (B)

Notes:

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

8.4.1.4 Highway 50 / Albion Vaughan Road / Mayfield Road

The Highway 50 / Albion Vaughan Road / Mayfield Road intersection currently operates under traffic signal control with cycle lengths of 160 seconds during both the weekday morning and afternoon peak hours, respectively. Analysis results are summarized in **Table 20**.

Under existing conditions, the intersection operates under capacity during the weekday morning and afternoon peak hours with overall v/c ratios of 0.86 and 0.67, respectively.

Traffic signal timings were optimized in the weekday morning peak hour (cycle lengths maintained). The recommended traffic signal timing plans are attached in **Appendix I** with the Synchro worksheets.

Under all future conditions, the intersection continues to operate under capacity with overall v/c ratios of 0.96 and 0.90 or better during the weekday morning and afternoon peak hours, respectively.

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

TABLE 20 HIGHWAY 50 / ALBION VAUGHAN ROAD / MAYFIELD ROAD CAPACITY ANALYSIS RESULTS

Key Movements	Existing		2036 Horizon Year				2041 Horizon Year			
			Future Background		Future Total		Future Background		Future Total	
	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS
EBL	0.43 (0.37)	D (D)	0.43 (0.37)	E (D)	0.52 (0.56)	D (D)	0.43 (0.37)	E (D)	0.52 (0.56)	D (D)
EBT	0.51 (0.78)	E (E)	0.56 (0.78)	E (E)	0.53 (0.78)	E (E)	0.56 (0.78)	E (E)	0.53 (0.78)	E (E)
EBR	0.16 (0.10)	E (E)	0.16 (0.10)	E (E)	0.16 (0.10)	E (E)	0.16 (0.10)	E (E)	0.16 (0.10)	E (E)
WBL	0.96 (0.70)	E (D)	0.96 (0.73)	F (E)	0.94 (0.73)	E (E)	0.96 (0.73)	F (E)	0.94 (0.73)	E (E)
WBT	0.80 (0.37)	E (E)	0.83 (0.39)	E (E)	0.84 (0.48)	E (E)	0.83 (0.39)	E (E)	0.84 (0.48)	E (E)
WBR	0.01 (0.02)	D (D)	0.01 (0.02)	D (E)	0.01 (0.02)	D (E)	0.01 (0.02)	D (E)	0.01 (0.02)	D (E)
NBL	0.75 (0.71)	F (F)	0.72 (0.71)	F (F)	0.73 (0.71)	F (F)	0.72 (0.71)	F (F)	0.73 (0.71)	F (F)
NBT	0.47 (0.59)	C (C)	0.60 (0.81)	C (C)	0.65 (0.91)	C (D)	0.61 (0.84)	C (C)	0.66 (0.94)	C (D)
NBR	0.11 (0.41)	B (B)	0.11 (0.47)	B (C)	0.11 (0.49)	B (C)	0.11 (0.47)	B (C)	0.11 (0.50)	B (C)
SBL	0.26 (0.23)	F (E)	0.26 (0.23)	F (E)	0.26 (0.23)	F (E)	0.26 (0.23)	F (E)	0.26 (0.23)	F (E)
SBT	0.78 (0.59)	D (C)	0.86 (0.75)	D (D)	0.95 (0.80)	E (D)	0.88 (0.77)	D (D)	0.98 (0.82)	E (D)
SBR	0.06 (0.08)	C (C)	0.06 (0.08)	C (C)	0.15 (0.14)	C (C)	0.06 (0.08)	C (C)	0.15 (0.14)	C (C)
Overall	0.86 (0.67)	D (C)	0.91 (0.81)	D (D)	0.95 (0.88)	D (D)	0.92 (0.82)	D (D)	0.96 (0.90)	D (D)

Notes:

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

8.4.1.5 Future Albion Vaughan Road / George Bolton Parkway

The Albion Vaughan Road / Industrial Road intersection currently operates under “STOP” control. Existing conditions analysis results are summarized in **Section 8.4.2** in **Table 22**.

As previously discussed in **Section 2.1.2**, the Albion Vaughan Road corridor is scheduled to be widened from 2 to 4 lanes from Mayfield Road to King Street. This upgrade been incorporated into the analysis for future

scenarios. Furthermore, it is recommended that a traffic signal be considered at this intersection once the George Bolton Parkway extension is complete. The extension is expected to draw significant local and non-local traffic volumes, as discussed in detail in Appendix D of the George Bolton Parkway EA. The recommended traffic signal timing plans are attached in **Appendix I** with the Synchro worksheets.

Under all future conditions, the intersection continues to operate under capacity with overall v/c ratios of 0.41 and 0.41 or better during the weekday morning and afternoon peak hours, respectively.

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

TABLE 21 FUTURE ALBION VAUGHAN ROAD / GEORGE BOLTON CAPACITY ANALYSIS RESULTS

Key Movements	Existing		2036 Horizon Year				2041 Horizon Year			
			Future Background		Future Total		Future Background		Future Total	
	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS
EBL	Intersection is currently under "STOP" control.		0.75 (0.78)	E (D)	0.77 (0.79)	E (D)	0.75 (0.78)	E (D)	0.77 (0.79)	E (D)
EBR			0.01 (0.03)	D (D)	0.10 (0.08)	D (D)	0.01 (0.03)	D (D)	0.10 (0.08)	E (D)
NBL			0.06 (0.06)	A (B)	0.09 (0.15)	A (B)	0.06 (0.06)	A (B)	0.09 (0.15)	A (B)
NBT			0.06 (0.20)	A (B)	0.06 (0.20)	A (B)	0.06 (0.20)	A (B)	0.06 (0.21)	A (B)
SBT			0.12 (0.10)	A (B)	0.13 (0.10)	A (B)	0.13 (0.10)	A (B)	0.13 (0.11)	A (B)
SBR			0.29 (0.16)	A (B)	0.31 (0.21)	A (B)	0.29 (0.16)	A (B)	0.31 (0.21)	A (B)
Overall				0.38 (0.40)	B (C)	0.41 (0.41)	C (C)	0.38 (0.40)	B (C)	0.41 (0.41)

Notes:

1. XX (XX) – Weekday Morning Peak Hour (Weekday Afternoon Peak Hour).
2. The lane configuration of the Future Albion Vaughan Road / Industrial Road (George Bolton Parkway Extension) intersection adopted in the Synchro model is based on the preferred design illustrated in Appendix P of the EA.

8.4.2 Unsignalized Intersections

Table 22 summarizes the capacity analysis results for unsignalized intersections in the study area.

All movements operate acceptably at LOS D or better. No mitigation measures or improvements are recommended for any unsignalized intersection in the study area.

TABLE 22 UNSIGNALIZED INTERSECTION CAPACITY ANALYSIS RESULTS

Key Movements	Existing		2036 Horizon Year				2041 Horizon Year			
			Future Background		Future Total		Future Background		Future Total	
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Highway 50 / Industrial Road³										
WBLR / WBR	18.2 (23.8)	C (C)	10.8 (10.4)	B (B)	10.0 (13.6)	B (B)	10.8 (10.4)	B (B)	10.1 (14.4)	B (B)
SBL	9.6 (15.8)	A (C)	Intersection to become RIRO.							
Albion Vaughan Road / Commercial Road⁴										
EBLR	18.3 (22.9)	C (C)	26.2 (21.6)	D (C)	27.8 (25.4)	D (D)	26.9 (22.1)	D (C)	28.5 (26.0)	D (D)
NBLT	1.3 (0.5)	A (A)	2.3 (0.8)	A (A)	2.2 (0.8)	A (A)	2.3 (0.8)	A (A)	2.2 (0.8)	A (A)
Albion Vaughan Road / Industrial Road⁴ (Future George Bolton Parkway)										
EBLR	14.6 (16.7)	B (C)	Intersection recommended to be signalized with extension of George Bolton Parkway							
NBLT	1.7 (0.8)	A (A)								
Albion Vaughan Road / Kirby Road⁴										
WBLR	11.2 (14.4)	B (B)	9.7 (10.7)	A (B)	9.9 (11.0)	A (B)	9.7 (10.8)	A (B)	9.9 (11.1)	A (B)
SBLT	1.3 (1.4)	A (A)	3.0 (3.1)	A (A)	2.5 (2.6)	A (A)	2.9 (3.1)	A (A)	2.4 (2.6)	A (A)
George Bolton Parkway Extension / Industrial Road										
EBLT	Intersection does not exist.		1.2 (1.2)	A (A)	1.8 (2.4)	A (A)	1.2 (1.2)	A (A)	1.8 (2.4)	A (A)
SBLR			11.9 (12.8)	B (B)	22.3 (21.5)	C (C)	11.9 (12.8)	B (B)	22.3 (21.5)	C (C)
Highway 50 / Site Access										
WBL	Intersection does not exist.				15.6 (26.8)	C (D)	Intersection does not exist.		15.9 (27.5)	C (D)
WBR					10.4 (13.3)	B (B)			10.5 (13.9)	B (B)
SBL					9.9 (17.9)	A (C)			10.0 (18.7)	B (C)
Industrial Road / Site Access										
EBLT	Intersection does not exist.				4.1 (5.4)	A (A)	Intersection does not exist.		4.1 (5.4)	A (A)
SBLR					11.9 (16.2)	B (C)			11.9 (16.2)	B (C)

Notes:

1. XX (XX) – Weekday Morning Peak Hour (Weekday Afternoon Peak Hour).
2. All delay values are in seconds (s).
3. As illustrated in the preferred design of the George Bolton Parkway extension in Appendix P of the EA, the Highway 50 / Industrial Road intersection is to become a right-in right-out (RIRO) configuration with the extension.
4. These intersections assume the widening of Albion Vaughan Road from 2 to 4 lanes from Mayfield Road to King Street as discussed in **Section 2.1.2**.

9.0 PROPOSED SITE ACCESS

A key element of the development concept plan is the creation of a driveway through the middle of the site that connects to Highway 50 in the west and at Industrial Road in the southeast. The only two points of access proposed for the site are at each end of the driveway at Highway 50 and at Industrial Road. Since all of the existing access points to the properties will be closed, the consolidation of the existing driveways, particularly along Highway 50, will increase the level of safety for all road users.

The proposed points of access at the site driveway are described in more detail as follows:

9.1 HIGHWAY 50 & SITE DRIVEWAY

As discussed with the Region of Peel, this study considered the following 4 different access scenarios for the proposed intersection at Highway 50 with the main site driveway.

- Scenario 1: Full access (signalized)
- Scenario 2: Full access (unsignalized)
- Scenario 3: Left-in/right-in/right-out (unsignalized)
- Scenario 4: Right-in/right-out (unsignalized)

Although a full access with a traffic signal at Highway 50 is desirable from a development perspective, as shown in **Table 23**, the traffic signal warrant analysis based on the Ontario Traffic Manual (OTM) Book 12 methodology (Justification 7) showed that the intersection only meets **33% of the 150%** requirement, hence a traffic signal is not warranted.

In addition, an existing full access on the west side of Highway 50 (Tim Horton's driveway) is less than 30 m from the proposed site driveway. Without access modifications at the "Tim Horton's" driveway, a traffic signal in proximity could create safety concerns. As it is not practical at this stage to shift the location of the site driveway to align with the "Tim Horton's" driveway, a new traffic signal at the site driveway is not being proposed at this time.

Furthermore, as discussed in **Section 8.4.2**, the delays with respect to drivers entering and exiting the Highway 50 site driveway are projected to be acceptable and in the order of 27 seconds or better in all future scenarios (i.e. LOS D or better).

TABLE 23 TRAFFIC SIGNAL WARRANTS – HIGHWAY 50 & SITE DRIVEWAY

Justification	Description	Minimum Requirement (2 or more lanes) [Restricted Flow]		Compliance		
		Base	“T”	Sectional		Entire % (Warranted ≥150%)
				Actual Traffic Volumes	% of Required	
1. Minimum Vehicular Volume	A. Vehicle volume, all approaches (average hour)	900	900	1628	181%	28%
	B ⁽¹⁾ . Vehicle volume, along minor streets (average hour)	170	255	71	28%	
2. Delay to Cross Traffic	A. Vehicle volume, major street (average hour)	900	900	1557	173%	33%
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)	75 ⁵	75	25	33%	

Notes:

- For “T” intersections, the base required values should be increased by 50% for case 1B.
- For future intersections, the warrant should be met with 150% (as opposed to 100% for an existing intersection with an 8-hour count estimate).
- Average hourly volumes were derived based on the formula presented in the OTM Book 12.
AHV = (weekday morning peak hour volumes + weekday afternoon peak hour volumes) ÷ 4
- Relevant OTM excerpts are provided in **Appendix J**.
- There are errors within the OTM excerpts (confirmed in discussions with MTO staff): (1) the 50% increase due to “T” intersections only applies to Justification 1B, and (2) Justification 2B has a requirement value of 75, not 170, under restricted flow in 2 or more lanes

As a result of the detailed traffic analysis that confirmed traffic volumes, delays and queuing at Highway 50 and the site access, a full unsignalized access (t-intersection) is being proposed at Highway 50 and the site driveway. The conceptual design of the proposed access is illustrated in **Figure 22**. The proposed lane configuration includes a dedicated left-turn lane and a right-turn lane.

As shown in **Table 24**, the Region of Peel Road Characterization Study was reviewed to confirm the desired minimum spacing between the site driveway and the nearby driveways and intersections on the east side of Highway 50.

With the elimination of all other driveways along the site frontage, on the north side of the proposed site driveway, the nearest access is an existing right-in/right-out commercial driveway at a distance of approximately 105 m. This meets the minimum requirement of 100 m established in the Region of Peel Road Characterization Study (full access to right-in/right out).

On the south side of the proposed site driveway, the nearest access is an existing driveway for a small commercial business at a distance of approximately 90 m. Although this spacing does not meet the minimum requirement established in the Region of Peel Road Characterization Study, it is not expected to create operational or safety concerns due to the low traffic volumes generated at the commercial driveway.

On the south side of the proposed site driveway, the distance to Industrial Road is 200 m. Since Industrial Road is planned to become a right-in/right-out when the George Bolton Parkway is extended, this spacing meets the minimum requirement of 100 m established in the Region of Peel Road Characterization Study (full access to right-in/right out).

As the George Bolton Parkway is 370 m away from the proposed site driveway, the distance is slightly less than the 450 m required in the Region of Peel Road Characterization Study. As the analysis completed for this study demonstrated that there are no queuing concerns between these two intersections, even with the future extension of the George Bolton Parkway, it is not expected that this spacing would pose operational or safety concerns.

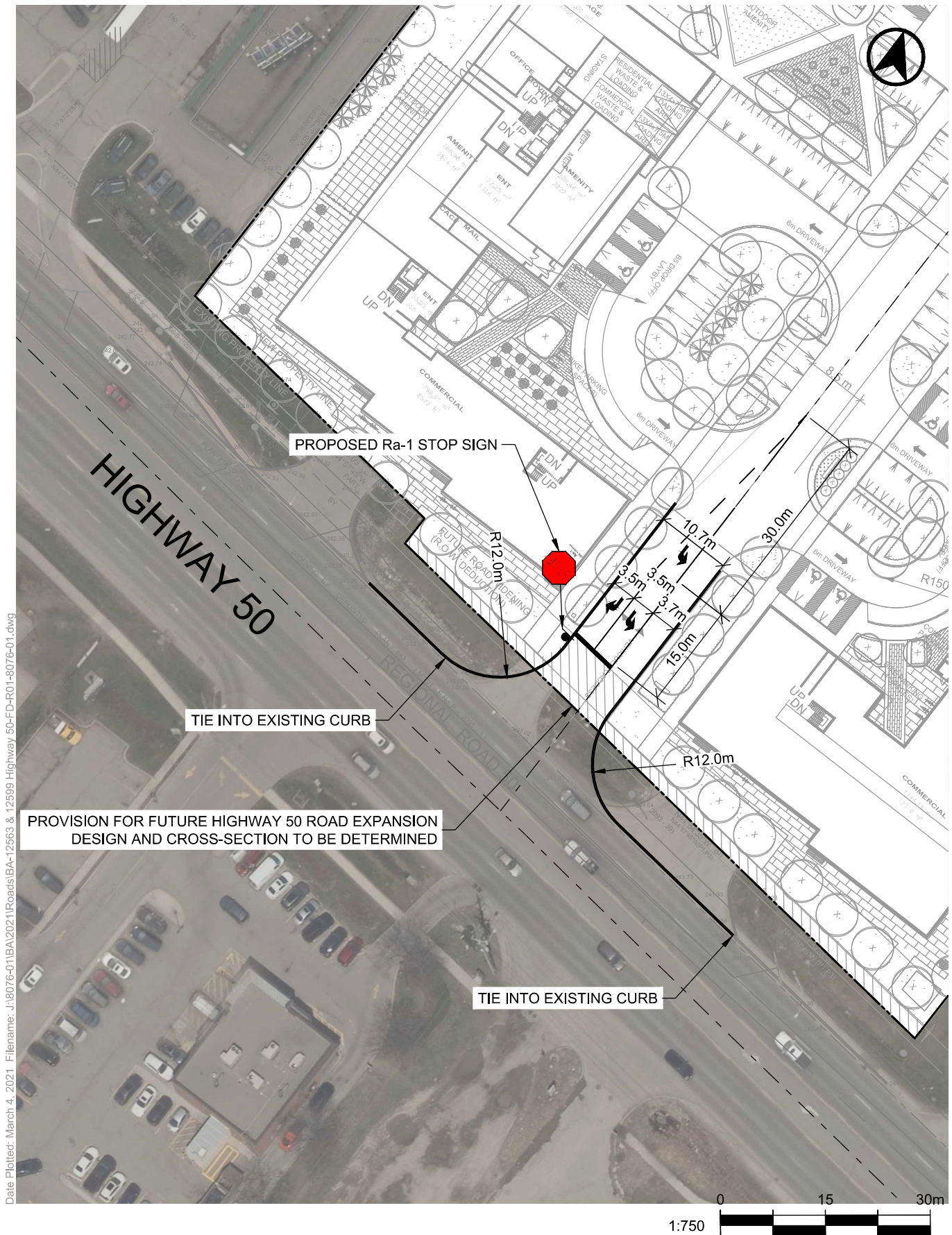
TABLE 24 PROPOSED INTERSECTION SPACING

Distance from Full Access at Site Driveway to:	Peel Road Characterization Study Minimum Spacing (m)	Proposed Spacing (m)
Nearest commercial driveway north of site driveway (Right-in/right-out)	100	105
Nearest commercial driveway south of site driveway ¹ (Full access)	450	90 ¹
Industrial Road (future right in/right-out with George Bolton Parkway Extension)	100	200
George Bolton Parkway (Future access)	450	370

Notes:

1. This driveway services a small commercial business that generates low volumes of traffic.

Due to COVID, staff were unable to undertake field studies at this time to confirm the sight distance at this proposed access. However, based on a review of the aerial photos for the area, sight distance at the proposed access is deemed to be more than adequate since Highway 50 in the area has limited to no horizontal or vertical curvature.



Date Plotted: March 4, 2021 Filename: J:\8076-01\BA\2021\Roads\BA-12563 & 12599 Highway 50-FD-R01-8076-01.dwg

FIGURE 22 PROPOSED ACCESS CONFIGURATION AT HIGHWAY 50 & SITE DRIVEWAY

9.2 INDUSTRIAL ROAD & SITE DRIVEWAY

As a result of the detailed traffic analysis that confirmed the traffic volumes, delays and queuing at Industrial Road and the site access, a full unsignalized access (t-intersection) is being proposed at Industrial Road and the site driveway. The conceptual design of the proposed access is illustrated in **Figure 23**. The proposed lane configuration includes a shared left/right lane.

Due to COVID, staff were unable to undertake field studies at this time to confirm the sight distance at this proposed access. A comprehensive sight distance review was however completed utilizing aerial photos. Sight distances were evaluated in accordance with Transportation Association of Canada (TAC) guidelines for both stopping sight distance and turning sight distance, using a conservative design speed of 60 km/h (10 km/h over the posted speed limit).

As shown in **Table 25**, the minimum stopping sight distance for vehicles turning left into the site driveway from Industrial Road, exceeds the minimum requirement. Due to the presence of a sharp curve, the turning sight distance requirements are however not met for vehicles turning left or right from the site driveway to Industrial Road.

A further review of the context of Industrial Road supports consideration for a design speed of 30 km/h in the vicinity of the curve for the following reasons:

- There are plans for the full access at Industrial Road and Highway 50 to be changed to a right-in/right-out only when the George Bolton Parkway is extended. This ensures that traffic volumes in the future will remain low on Industrial Road.
- Industrial Road currently consists of a rural cross-section with gravel shoulders and an approximate asphalt width of 7 m.
- The 2041 traffic analysis confirmed there will be approximately only 85 and 250 vehicles in the morning and afternoon peak hours respectively, travelling westbound from the curve on Industrial Road towards the site driveway. The majority of these westbound vehicles on Industrial Road will be turning right into the site driveway, so will most likely be travelling at a reduced speed.
- The presence of a sharp curve typically results in significantly reduced vehicle operating speeds.

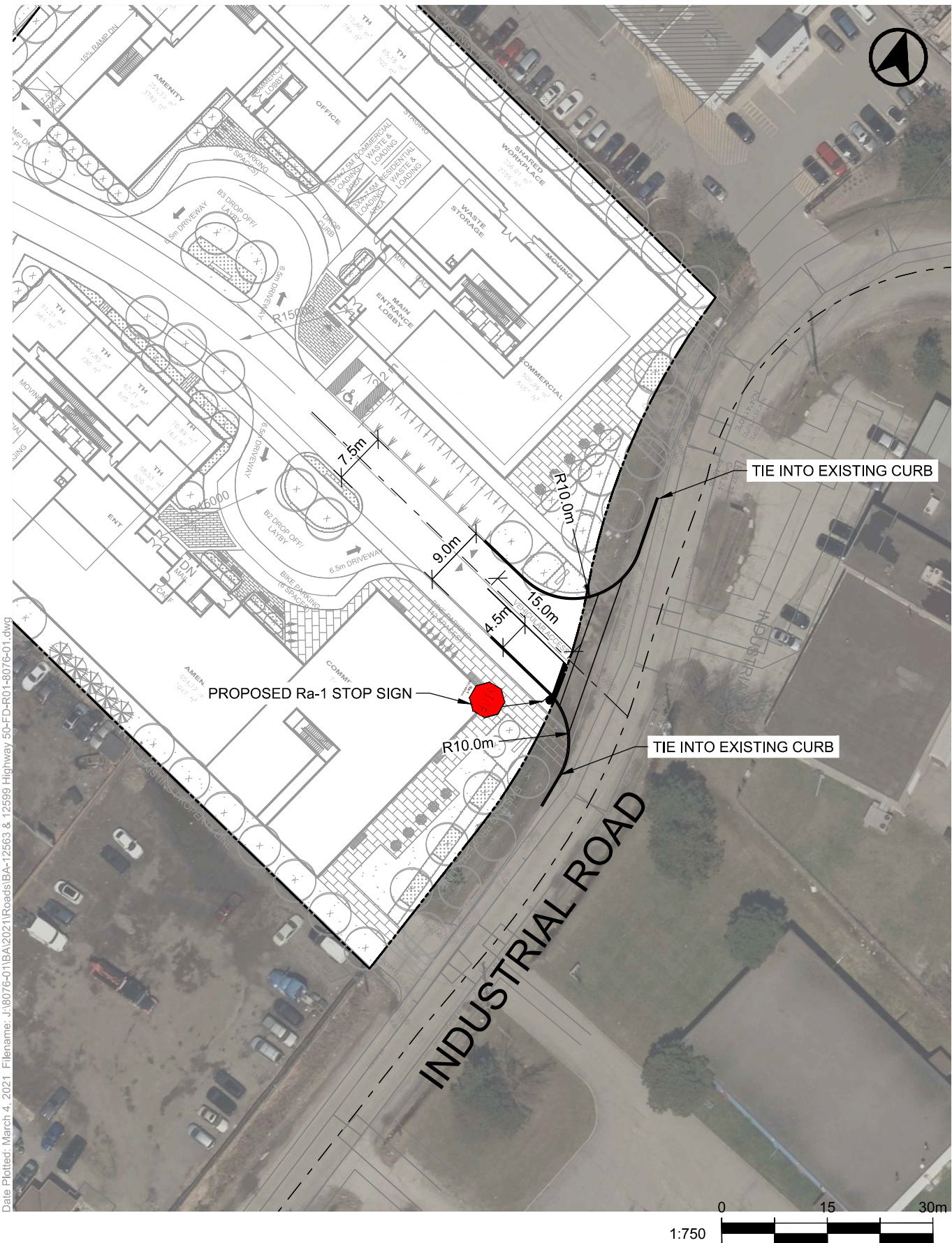
To increase the level of safety in the vicinity of the site driveway, it is proposed that the existing curve ahead warning sign on Industrial Road be replaced with an oversized curve ahead sign that includes an advisory speed tab of 30 km/h (as per *Ontario Traffic Manual Book 6 – Warning Signs*), in addition to an amber flashing beacon.

TABLE 25 SIGHT DISTANCE (INDUSTRIAL ROAD AT SITE DRIVEWAY)

Movement	TAC Minimum Requirement (metres)	Available Sight Distance (metres)
Stopping Sight Distance (Design Speed of 60 km/h)		
Left turn from Industrial Road to Site Driveway ¹	85	>85
Turning Sight Distance (Design Speed of 60 km/h at Curve)		
Left-turn from Site Driveway to Industrial Road (stop condition) ²	130	78
Right-turn from Site Driveway to Industrial Road (stop condition) ³	110	78
Turning Sight Distance (Design Speed of 30 km/h at Curve)		
Left-turn from Site Driveway to Industrial Road (stop condition) ²	65	78
Right-turn from Site Driveway to Industrial Road (stop condition) ³	55	78

Notes:

1. Transportation Association of Canada (TAC) Manual, Table 2.5.2.
2. Transportation Association of Canada (TAC) Manual, Case B1; Table 9.9.4
3. Transportation Association of Canada (TAC) Manual, Case B2; Table 9.9.6



Date Plotted: March 4, 2021. Filename: J:\8076-01\BA\2021\Roads\BA-12563 & 12599 Highway 50-FD-R01-8076-01.dwg

FIGURE 23 PROPOSED ACCESS CONFIGURATION AT INDUSTRIAL ROAD & SITE DRIVEWAY

10.0 SUMMARY AND CONCLUSIONS

BA Group was retained by 12599 Hwy 50 Ltd. to provide transportation consulting services related to a proposed mixed-use development on a site municipally known as 12563 and 12599 Highway 50 in the Town of Caledon in the Region of Peel. The site is located on the east side of Highway 50, north of Industrial Road. It is bounded by Highway 50 to the west, a commercial development to the north and commercial uses to the south and east.

The site is currently designated as Bolton Highway Commercial (CHB) in the Town of Bolton Zoning By-law and is currently occupied by a small commercial plaza (Northpoint Plaza) that includes restaurants and a variety of commercial spaces, in addition to a variety of motor vehicle maintenance, repair and storage facilities.

The development concept plan includes the eventual demolition of all existing buildings at 12563 and 12599 Highway 50 and the construction of 5 mixed-use buildings with a total of 2,229 residential units and 3,179 m² of retail. A key element of the development concept plan is the creation of a private driveway across the site that connects to a new unsignalized full access at Highway 50 and a new unsignalized full access at Industrial Road. Since all of the existing access points to the properties will be closed, the consolidation of these driveways, particularly along Highway 50, will increase the level of safety for all road users.

Key findings of the Transportation Considerations Report are summarized as follows:

Transportation Context

- The Town of Caledon has plans to begin work to extend the George Bolton Parkway from Highway 50 to Albion Vaughan Road in 2023. A planned new stop-controlled intersection at Industrial Road and the George Bolton Parkway will provide a key roadway connection for the site.
- There is a carpool lot located on the southwest corner of the Mayfield Road and Highway 50 intersection approximately 2 km from the site (25 minute walk). The carpool lot provides free 24/7 parking for drivers, a passenger pick-up/drop-off area and bike racks. The lot is serviced by the Bolton GO Transit bus route, which provides service to and from the Malton GO Station, with connections to Union Station, Brampton's ZUM network and York Region Transit.
- The proposed site includes sidewalks along both sides of the site driveway that connect to the east side of Highway 50 and the north side of Industrial Road. These sidewalks will improve permeability for pedestrians in the area.
- The plan to extend the George Bolton Parkway includes a 3.0 m wide in-boulevard multi-use pathway on both sides of the road that will provide new facilities in the area for pedestrians and cyclists. In addition, a review of long-term plans in the Peel Region Sustainable Transportation Strategy identified that a cycle track is track proposed for Highway 50 from Mayfield Road to just north of the CN rail line (2023 – 2031).

Vehicle Parking Considerations

- The site is subject to the Town of Caledon Zoning By-law for parking considerations. Application of this By-law summarized for each of the 5 buildings, results in a minimum parking requirement for the total site of 4,011 parking spaces, including 3,345 resident spaces, 559 visitor spaces and 107 retail spaces. This requirement results in an effective resident parking supply ratio (resident + visitor) of 1.75 spaces per unit.
- The minimum proposed parking supply for the site is based on a ratio of 0.85 spaces per unit for resident parking, 0.20 spaces per unit for residential visitor parking and 1 space per 20 m² for retail parking. The current architectural plans for the site illustrate a total of 2,552 parking spaces which is an additional 52 spaces beyond what is required with the proposed parking rates. The parking supply includes 99 at-grade spaces and 2,453 spaces located in a 3-level below-grade parking facility.

Bicycle Parking Considerations

- Although the Town of Caledon Zoning By-law does not include a requirement for bicycle parking, in order to encourage sustainable transportation, bicycle parking on the site is being proposed. The current architectural drawings allow for the provision of 916 bicycle parking spaces, including 52 spaces at-grade for visitors and 864 stacked spaces for residents, located in a below-grade parking facility on P1.

Loading Considerations

- As the proposed development would be serviced by the Region of Peel for residential garbage collection, the requirements of the Region's Waste Collection Design Standards have been applied for the residential components of the site. As per the Town of Caledon Zoning By-law, the retail components of the site would require a private waste collection service.
- In accordance with the Region's Waste Collection Design Standards, the residential waste collection loading space (1 per building) will be a minimum of at 6.0 m wide and 15.0 m long with a 7.5 m height clearance. It is proposed that the loading space designated for residential waste collection be shared with residential deliveries.
- In accordance with the Town of Caledon Zoning By-law, waste collection for the retail components of the site must be serviced by a private contractor. The size of the loading space is dependent on the retail use. The retail uses for the site are unknown at this time hence the size of the loading spaces will range from 9.0 to 14.0 m in length with a width of 3.5 metres and will meet the minimum requirements of the Town of Caledon Zoning By-law. One retail waste collection loading space per building will be provided. It is proposed that the loading space designated for private waste collection be shared with retail deliveries.

Transportation Demand Management Framework

- The Transportation Demand Management (TDM) framework strives to reduce automobile use as a part of the design and construction of the development, as well as after construction as an on-going strategy by supporting and promoting the use of non-auto transportation modes. Proposed TDM strategies include a reduced vehicle parking supply, visitor and resident bicycle parking, sidewalks along the site driveway, consideration for up to 10 car-share spaces, provision of Presto cards to new residents and programs to inform residents of available travel options.

Traffic Operations Analysis

- The proposed development is forecast to generate 675 and 895 two-way vehicle trips in the weekday morning and afternoon peak hours, respectively.
- All signalized intersections in the study area are expected to operate under capacity under future total conditions with the consideration of the George Bolton Parkway Extension and related road improvements. No mitigation measures or improvements are recommended, with the exception of traffic signal timing optimization at Highway 50 / George Bolton Parkway (due to the future extension) and the Highway 50 / Albion Vaughan Road / Mayfield Road intersection.
- All movements at unsignalized intersections in the study area, including the site access points, are expected to operate acceptably at LOS D or better. No mitigation measures or improvements are recommended.

Proposed Site Access

- As a result of the detailed traffic analysis that confirmed traffic volumes, delays and queuing at Highway 50 and the site access, a full unsignalized access is being proposed at Highway 50 and the site driveway. The proposed lane configuration at the site driveway includes a dedicated left-turn lane and a right-turn lane.
- Although a full access with a traffic signal at Highway 50 is desirable from a development perspective, the traffic signal warrant analysis based on the Ontario Traffic Manual (OTM) Book 12 methodology (Justification 7) showed that the intersection only meets 33% of the 150% requirement, hence a traffic signal is not warranted.
- As a result of the detailed traffic analysis that confirmed the traffic volumes, delays and queuing at Industrial Road and the site access, a full unsignalized access is being proposed at Industrial Drive at the site driveway. The proposed lane configuration at the site driveway includes a shared left/right lane.
- At the Industrial Road intersection with the site driveway, with a 60 km/h design speed (10 km/h over posted), the minimum TAC requirements for turning sight distance are not met due to a horizontal

curve on Industrial Road. A further review of the context of Industrial Road supports consideration for a design speed of 30 km/h in the vicinity of the curve.

- To increase the level of safety in the vicinity of the site driveway, it is proposed that the existing curve ahead warning sign on Industrial Road be replaced with an oversized curve ahead sign that includes an advisory speed tab of 30 km/h, in addition to an amber flashing beacon.

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

Appendix A

Reduced Scale Architectural Drawings



MIXED-USE DEVELOPMENT - 12563&12599 HWY 50
Bolton, Ontario
Project Statistics
February 26, 2021

1.0	Site Area
	Survey Site Area 3.61 8.92 36,091.00 388,480
	Potential Hwy 50 Road Widening 0.09 0.22 904.00 9,731
	Total Site Area 3.52 8.89 35,177.00 378,211

2.0	GFA
	Total GFA 3,179,000 34,218

2.1	Commercial GFA
	Total Commercial GFA 51,908 564

2.2	Building 1 Residential GFA
	Total GFA 32,584.87 438,584

2.3	Building 2 Residential GFA
	Total GFA 32,594.59 356,844

2.4	Building 3 Residential GFA
	Total GFA 32,187.33 345,901

2.5	Building 4 Residential GFA
	Total GFA 48,296.87 519,883

2.6	Building 5 Residential GFA
	Total GFA 19,736.55 212,378

4.0	Units Count
	Proposed Units 4,900

4.1	Building 1 Units
	Total Units 39

4.2	Building 2 Units
	Total Units 46

4.3	Building 3 Units
	Total Units 38

4.4	Building 4 Units
	Total Units 75

4.5	Building 5 Units
	Total Units 31

Total Units Provided for B1, B2, B3, B4 & B5	
	229 817 890 152 116 25 2,229

5.0	Amenity Area
	Total Units 2,229 4,458 47,986

5.1	Proposed Indoor Amenity
	Total Units 2,229 4,458 47,986

5.2	Proposed Outdoor Amenity
	Total Units 4 8 80,336

6.0	Vehicle Parking
	Total Proposed Amenity 12,533 134,899

6.1A	B1 Proposed Parking Demand
	Total Proposed Demand for B1 67

6.1B	B1 Proposed Parking Supply
	Total Proposed Supply for B1 778

6.2A	B2 Proposed Parking Demand
	Total Proposed Demand for B2 487

6.2B	B2 Proposed Parking Supply
	Total Proposed Supply for B2 345

6.3A	B3 Proposed Parking Demand
	Total Proposed Demand for B3 459

6.3B	B3 Proposed Parking Supply
	Total Proposed Supply for B3 476

6.4A	B4 Proposed Parking Demand
	Total Proposed Demand for B4 643

6.4B	B4 Proposed Parking Supply
	Total Proposed Supply for B4 683

6.5A	B5 Proposed Parking Demand
	Total Proposed Demand for B5 310

6.5B	B5 Proposed Parking Supply
	Total Proposed Supply for B5 359

6.6	Total Proposed Parking Supply for the Development
	Total Development Required Supply 2,560

6.7	Net Parking Spaces Provided
	Total Net Parking Spaces 2,455 97 19 18 2,552

6.8	Parking Supply - Proposed Demand
	Total 52

7.0	Bicycle Parking
	Total Proposed Bicycle Parking 916

7.0	Lot Coverage
	Proposed Building Coverage 15,040.00 162,320 42%
	Proposed Inner Roads 7,480.00 80,514 21%
	Landscape Coverage 13,531.00 145,646 37%
	Site Area 36,091.00 388,480 100%

2	PROJECT STATISTICS
	100%

OBC Matrix 2 - Site Plan Approval	
OBC Reference	
Containing the Building Code Act and O. Reg 332/12 in effect Jan 1, 2014	
Data Matrix Part 3	
High Rise Residential Buildings	
Location: 12563 & 12599 HWY 50, BOLTON - ONTARIO	
Name of Project: MIXED USE DEVELOPMENT	
Seal must be signed to be valid	
Item	1
Item	2
Item	3
Item	4
Item	5
Item	6
Item	7
Item	8
Item	9
Item	10
Item	11

12	Water Service/Supply is Adequate	Yes	3.2.5.7
13	High Building	Yes	3.2.6.
14	Construction Restrictions	Non-combustible required	3.2.2.10 - 83.
15	Barrier Free Design	Yes	3.8
16	Required Fire Resistance Rating (FRR)	Refer to A8 Schedule	3.2.2.10 - 83. 3.2.1.4.
17	Interior Fire Separation Requirements	Fire-Resistance Rating	3.3.
18	Spatial Separation	Refer to elevation drawings for spatial separation requirements	3.2.3.
19	Barrier-free Design	Refer to A8 Schedule	3.8.

THESE DRAWINGS ARE NOT TO BE SCALED: ALL DIMENSIONS MUST BE VERIFIED BY CONTRACTOR PRIOR TO COMMENCEMENT OF ANY WORK. ANY DISCREPANCIES MUST BE REPORTED DIRECTLY TO SRN ARCHITECTS INC.

ADDITIONAL NOTES:
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CONDITIONS FOR ELECTRONIC INFORMATION TRANSFER:
ELECTRONIC INFORMATION IS SUPPLIED TO THE OTHER ASSOCIATED FIRMS TO ASSIST THEM IN THE EXECUTION OF THEIR WORK. REVIEW. THE RECIPIENT FIRMS MUST DETERMINE THE COMPLETENESS/APPROPRIATENESS/RELEVANCE OF THE INFORMATION IN RESPECT TO THEIR PARTICULAR RESPONSIBILITY.

NO.	DATE	REVISION	COMMENT

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2. TRANSMISSIONS OF ANY VIRUS OR DAMAGE TO RECEIVING ELECTRONIC SYSTEM WHEN INFORMATION IS TRANSFERRED

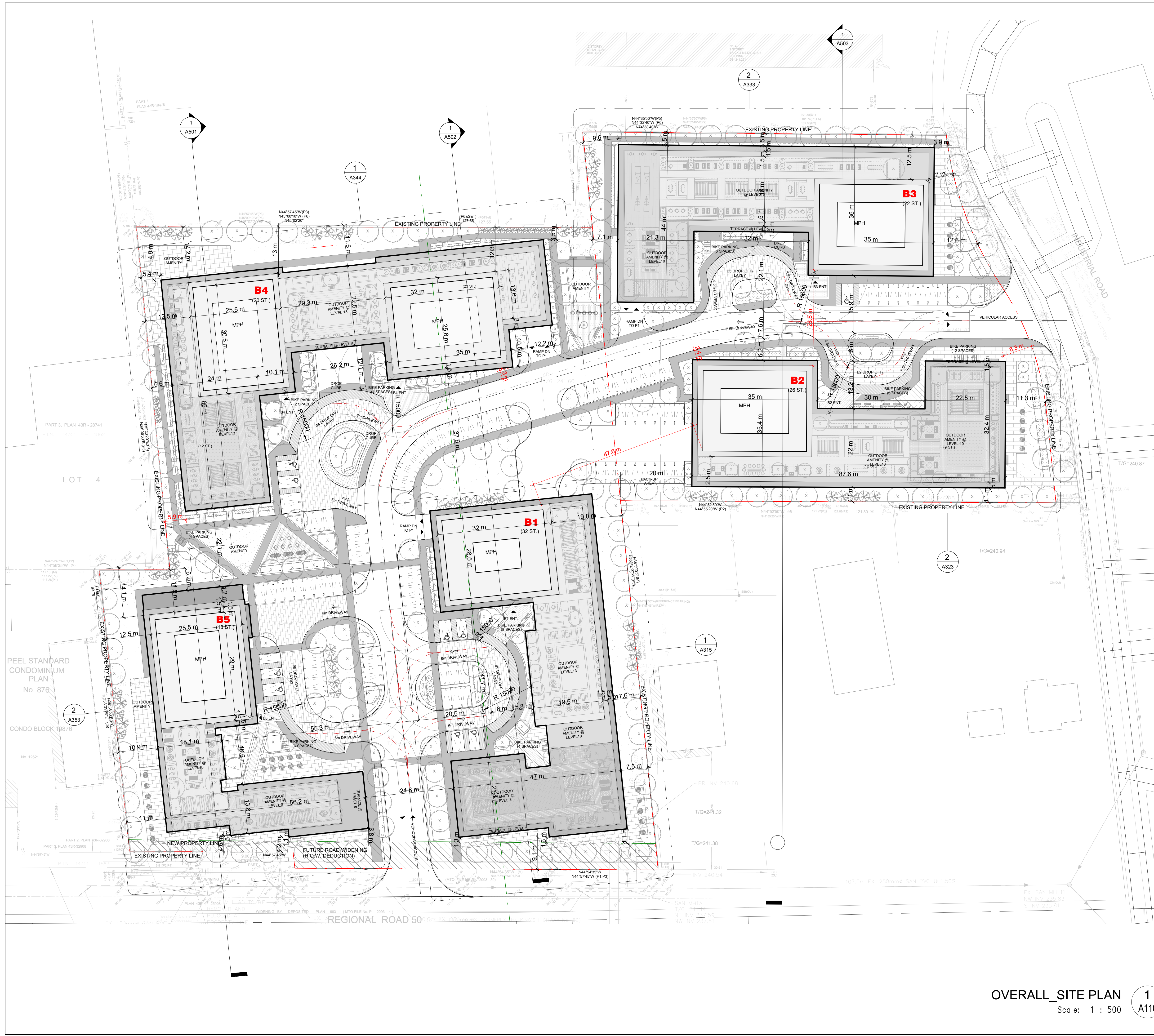
PROJECT:	MIXED USE DEVELOPMENT
12563 & 12599 HWY 50 BOLTON - ONTARIO	
DRAWING TITLE:	PROJECT STATISTICS - OBC MATRIX & ZONING MATRIX
DATE:	Feb. 26, 2021
SCALE:	
DRAWN BY:	EM/FK
CHECKED BY:	EM/GR
PROJECT NUMBER:	
DRAWING NUMBER:	

S20023 A102

OBC MATRIX 3

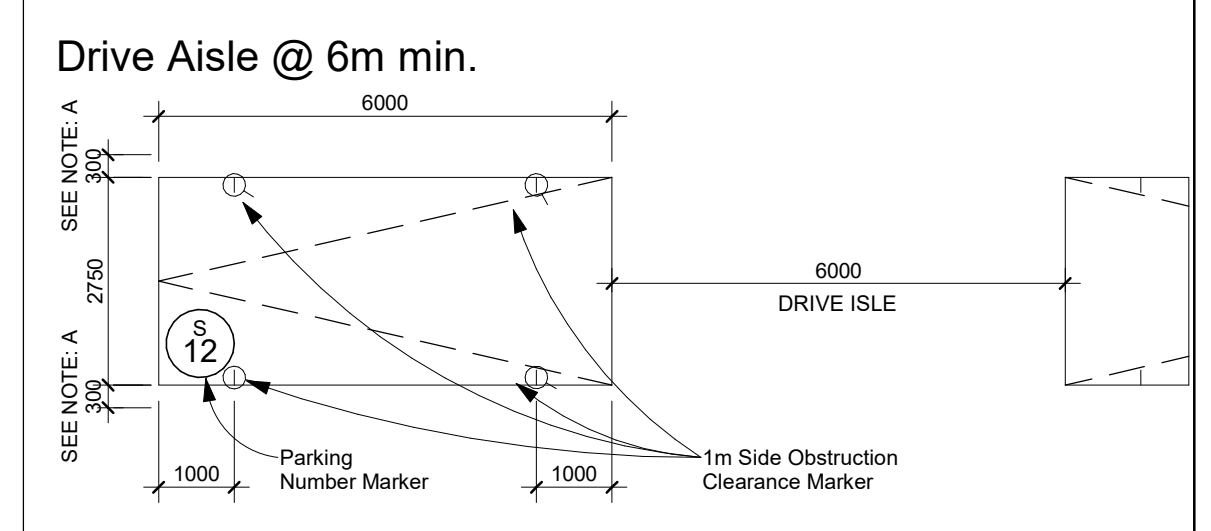
Zone Standard	Requirements RM (Proposed Zone)	Proposed RM-XX Zone
Lot Area (min)	925 sq.m	35,200 sq.m
Lot Frontage (min)	30m	108m (Hwy 50)
Building Area (max)	20%	42%
Front Yards (min)	8m	1.1m from Highway 50
Exterior Side Yards (min)	9m	7.0m from Industrial Road
Rear Yards (min)	7.5m	3.4m
Interior Side Yards (min)		
Main building on driveway side	7.5m	4.1m
Main building on other side		
Building Heights (max)	12.2m	100.40m (excluding mechanical penthouse)
Landscape Area (min)	45%	37%
Privacy Yard	1/habitable room 5m depth	n/a
Play Facility	1/lot	n/a
Driveway Setbacks (min)	0.5m	2.3m
Parking Space Setback (min)	6m	12.6m above grade 1m for underground parking garage
Parking and Loading		
Building, Apartment	1.5 spaces per dwelling unit + 0.25 parking spaces per unit for visitor parking	0.85 spaces per dwelling unit + 0.20 parking spaces per unit for visitor parking
Commercial Uses	1 space per 20 square metres of net floor area	1 space per 20 square metres of net floor area
Barrier Free Parking (Traffic By-law 2015-058)	11 accessible spaces plus 1% of total number of spaces	36 spaces (included within total number of parking spaces required)
Parking Space Size (min)	2.75m x 6m above grade 2.6m x 5.8m in parking garage	2.75m x 6m
Loading Space	n/a	Residential: 1 per building Commercial: 1 per building

ZONING MATRIX 1



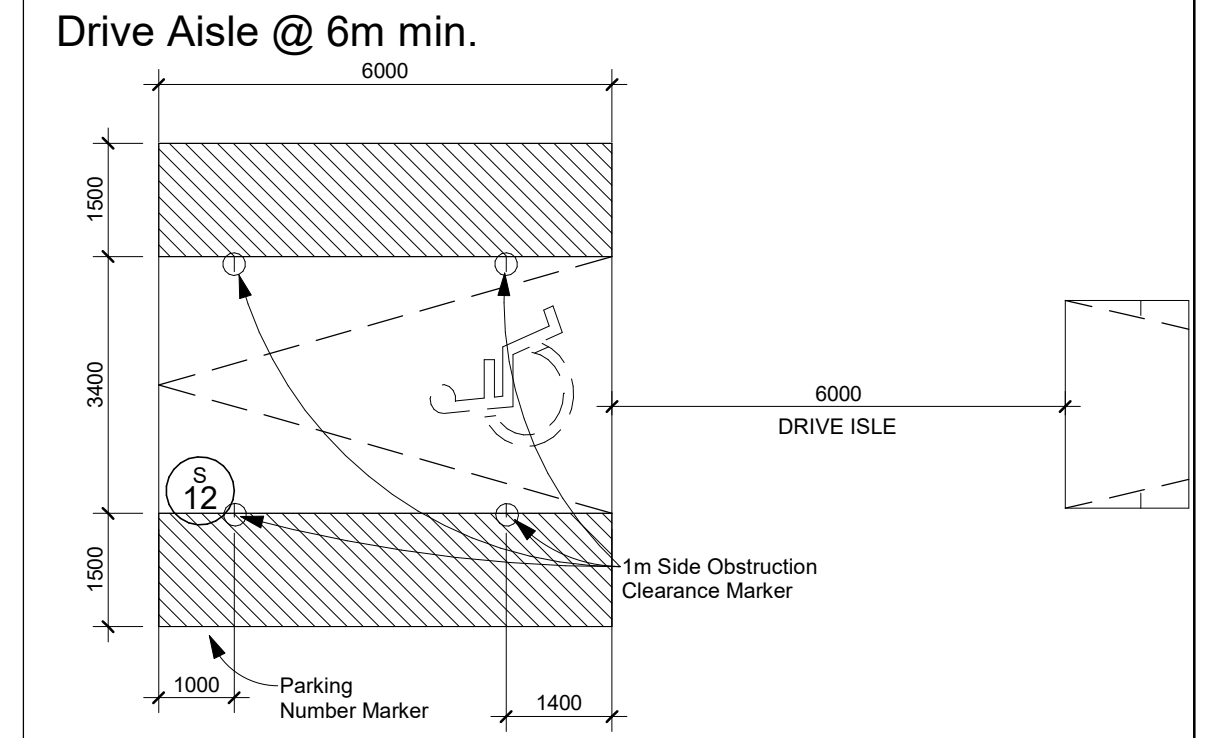
OVERALL SITE PLAN 1
Scale: 1 : 500 A110

TYPICAL PARKING SPACE:



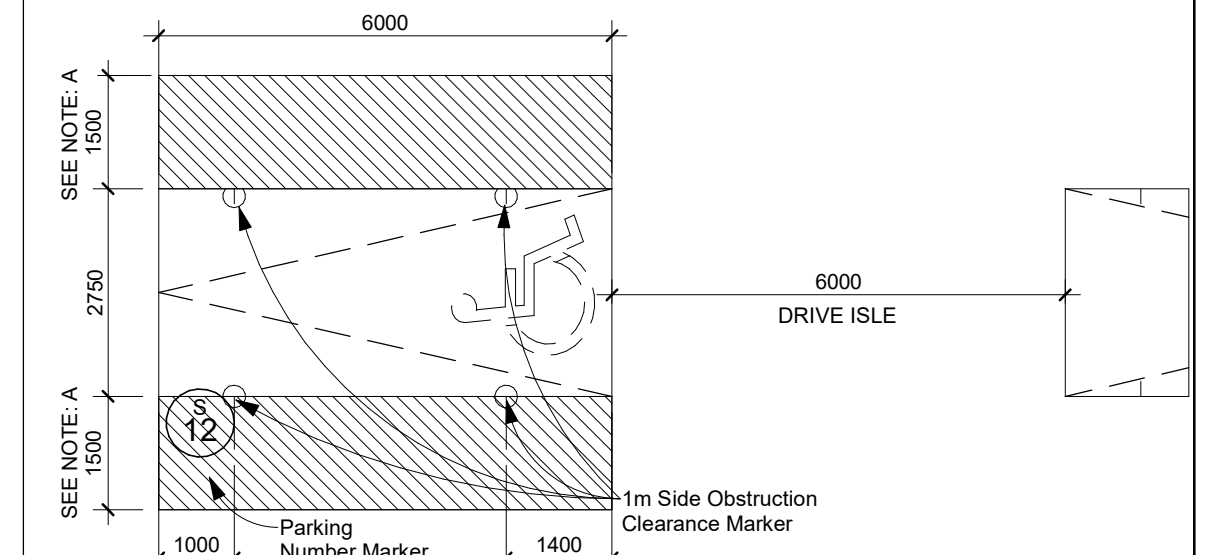
NOTE: A- PROVIDE AN ADDITIONAL 300mm FOR PARKING SPACE WIDTH WHEN OBSTRUCTIONS OCCUR BETWEEN THE FRONT AND REAR 1000mm

BARRIER-FREE PARKING SPACE TYPE A:



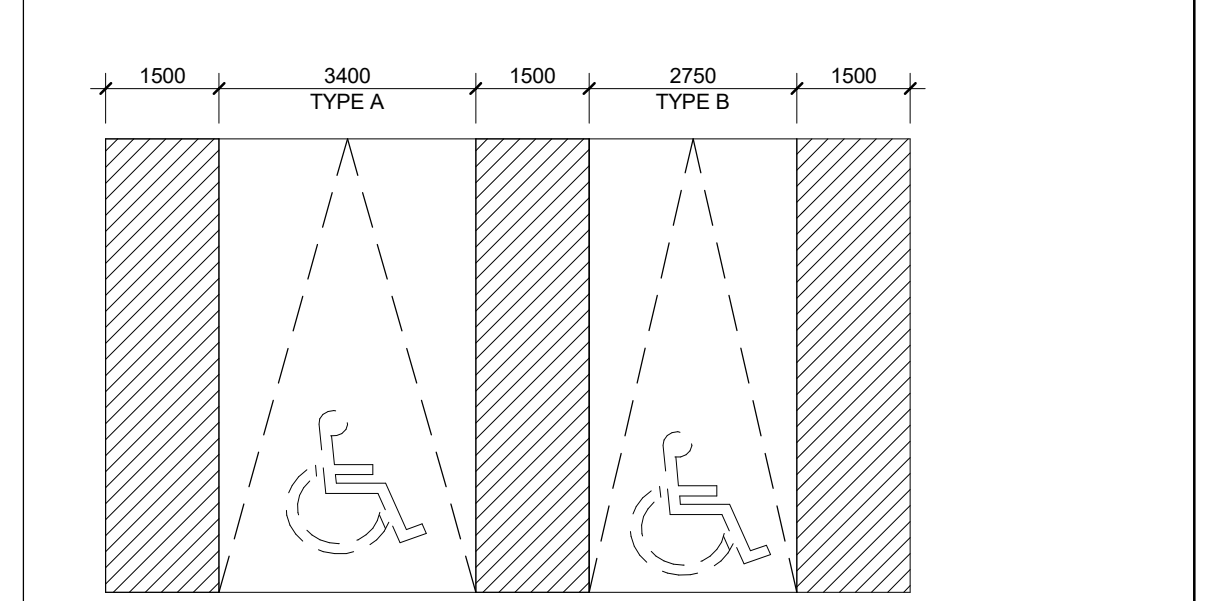
NOTE: A- PROVIDE AN ADDITIONAL 1500mm FOR PARKING SPACE WIDTH WHEN OBSTRUCTIONS OCCUR BETWEEN THE FRONT AND REAR 1000mm

BARRIER-FREE PARKING SPACE TYPE B:



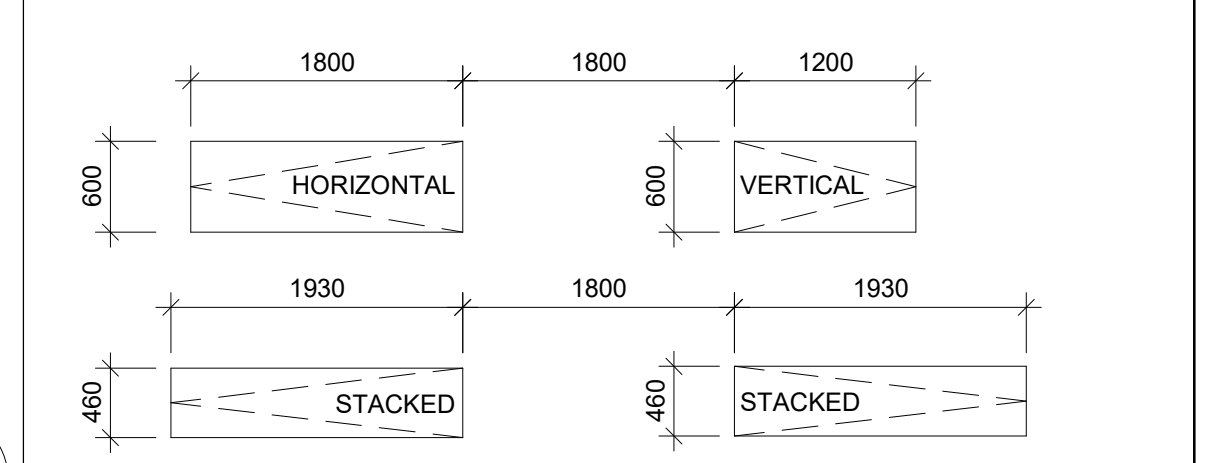
NOTE: A- PROVIDE AN ADDITIONAL 1500mm FOR PARKING SPACE WIDTH WHEN OBSTRUCTIONS OCCUR BETWEEN THE FRONT AND REAR 1000mm

BARRIER-FREE PARKING SPACE TYPE A & B:



TYPICAL BICYCLE PARKING SPACE:

WALKWAY: MINIMUM 1800mm
 VERTICAL PARKING SPACE: 1200mm (L) x 600mm (W)
 HORIZONTAL PARKING SPACE: 1800mm (L) x 600mm (W)
 STACKED PARKING SPACE: 1930mm (L) x 460mm (W)



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 CONDITIONS FOR ELECTRONIC INFORMATION TRANSFER: ELECTRONIC INFORMATION IS SUPPLIED TO THE OTHER ASSOCIATED FIRMS TO ASSIST THEM IN THE EXECUTION OF THEIR WORK. THE RECIPIENT FIRMS MUST DETERMINE THE COMPLETENESS/APPROPRIATENESS/RELEVANCE OF THE INFORMATION IN RESPECT TO THEIR PARTICULAR RESPONSIBILITY.

NO.	DATE	REVISION COMMENT

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SRN ARCHITECTS
 8395 JANE ST, SUITE 202
 VAUGHAN, ONTARIO, L4K 5Y2
 PHONE: 905.417.5515 FAX: 905.417.5517

STAMP:

CLIENT: 12599 Hwy 50 Ltd.

PROJECT: MIXED USE DEVELOPMENT
 12563 & 12599 HWY 50
 BOLTON - ONTARIO

DRAWING TITLE: SITE PLAN

DATE: Feb. 26, 2021	SCALE: As indicated
DRAWN BY: EM/EH	CHECKED BY: EM/GR
PROJECT NUMBER: S20023	DRAWING NUMBER: A110

Appendix B

Submitted Terms of Reference



Memorandum

TO:

Rosalie Shan
Technical Analyst
Traffic Development and Permits
Region of Peel
10 Peel Centre Drive Suite B, 4th Floor
Brampton, ON L6T 4B9
905 791-7800 Ext. 7999
e-mail: Rosalie.shan@peelregion.ca

FROM:
Deanna Green, P.Eng.

PROJECT:
8076-01
Proposed Multi-Use
Redevelopment

DATE:
December 18, 2020

**SUBJECT: Traffic Impact Study Terms of Reference - 12563 & 12599 Highway 50, Bolton,
Proposed Multi-Use Development**

1.0 INTRODUCTION

BA Group has been retained by SRN Architects Incorporated to provide transportation consulting services related to the proposed development of a site municipally known as 12563 & 12599 Highway 50 in the community of Bolton within the Town of Caledon, in the Region of Peel (herein referred to as “the site”).

As requested by the Region of Peel, this letter outlines the proposed Terms of Reference for the Traffic Impact Study (TIS) that is being prepared as part of the **Official Plan and Zoning By-law Amendment (ZBA) application** and subsequent **Site Plan Application** being submitted to the Region of Peel and the Town of Caledon.

2.0 PROPOSED DEVELOPMENT

The draft development concept plan includes 5 mixed-use buildings with an approximate total of 2200 residential units and 3200 m² Gross Floor Area (GFA) of retail. Although the phasing is still being confirmed, the site will most likely be developed in phases over a 15-year period with proposed build-out by 2035.

The primary points of access to the site are proposed to be provided via a driveway that connects to Highway 50 in the west and Industrial Road in the southeast.

The TIS will include consideration for the Region of Peel's Road Characterization Study (2013) as well as the planned extension of the George Bolton Parkway and will evaluate the following 4 scenarios for the proposed site driveway at Highway 50:

1. Full access (signalized)
2. Full access (unsignalized)
3. Left-in/right-in/right-out (unsignalized)
4. Right-in/right-out (unsignalized)

The traffic impact study will be completed in accordance with the Region of Peel's *Traffic Impact Study Guidelines* (from Region of Peel website) as outlined in the following sections.

2.1.1 Full Description

The study will provide a full description of the proposed development and will include the following:

- Municipal address;
- Existing land uses that are permitted and use provisions in an Official Plan Amendment, Zoning By-law, etc.;
- Proposed land uses;
- Floor space, including a summary of each type of use and number of residential units;
- Anticipated date of occupancy;
- Approximate hour of operation (retail uses);
- Planned phasing of the development;
- Nearby Regional of Peel, Town of Caledon and City of Vaughan intersections and access to adjacent developments, including type of control (signalized or unsignalized);
- Number of lanes, width and configuration:
- The requirements for auxiliary turn lanes will be reviewed;
- Adequate spacing will be considered between access points in accordance with the Region of Peel's current Controlled Access By-law, as amended and the Region of Peel's Road Characterization Study (2013). All design standards will be in accordance with those outlined in the Transportation Association of Canada (TAC) Geometric Design Guide for Canadian Roads and the Ministry of Transportation, Ontario (MTO) Geometric Design Standards for Ontario Highways;
- When determining the location of accesses, consideration will be provided in relation to how the accesses will affect the surrounding road network, area residents and area businesses. All proposed site access points on Region of Peel and Town of Caledon roads (no proposed accesses on City of Vaughan roads) will be evaluated for capacity, safety and adequacy of queue storage capacity;



- Nearby transit facilities/stops;
- Bike paths;
- A combination of maps and other documentation, which will identify all relevant information.

2.1.2 Traffic Volume Analysis

Based on direction from staff at the Region of Peel, Town of Caledon and City of Vaughan, the traffic analysis will include the following intersections:

- Highway 50 & Industrial Road (Region of Peel)
- Highway 50 & McEwan Drive (Region of Peel)
- Highway 50 & site driveway (Region of Peel)
- Industrial Road & site driveway (Town of Caledon)
- Albion Vaughan Road & Industrial Road (Town of Caledon)
- Albion Vaughan Road & Commercial Road (Town of Caledon)
- Albion Vaughan Road & Kirby Road (City of Vaughan)

As a result of the planned extension to the George Bolton Parkway, the analysis will also consider the following future intersections:

- George Bolton Parkway & Highway 50
- George Bolton Parkway & Industrial Road
- George Bolton Parkway & Albion Vaughan Road

The Region of Peel, Town of Caledon and City of Vaughan were contacted regarding current traffic counts for intersections in the study area. All three municipalities confirmed that in-house traffic counts were not available. The TIS will be therefore utilize the traffic counts summarized in **Table 1** for the analysis. All traffic data collection undertaken includes pedestrians, cyclists, buses and cars on a typical weekday during typical morning and afternoon peak periods.



TABLE 1 SUMMARY OF TRAFFIC COUNTS

Intersection	Date of Count	Source
Highway 50 & Industrial Road	May 8, 2019 November 25, 2020	Spectrum
Highway 50 & McEwan Drive	June 22, 2017 November 25, 2020	Spectrum
Albion Vaughan Road & Industrial Road	November 25, 2020	Spectrum
Albion Vaughan Road & Commercial Road	November 25, 2020	Spectrum
Albion Vaughan Road & Kirby Road	November 25, 2020	Spectrum
Highway 50 & George Bolton Parkway	March 20, 2018	Spectrum
Highway 50 & Mayfield Road	October 8, 2019	Spectrum
Highway 50 & Parr Boulevard	October 2, 2019	Spectrum

Given the current COVID-19 conditions, it is recognized that the November 2020 traffic counts may not be representative. For this reason, the November 2020 traffic counts will be calibrated and balanced utilizing traffic counts from pre-COVID conditions. It is important to note that traffic counts can be updated in the future, once stable transportation conditions return. In the meantime, the analysis will utilize conservative allowances for pre-COVID existing conditions.

Although the phasing is still being confirmed, the site will most likely be developed in phases over a 15-year period with proposed build-out by 2035. As the retail component of the development only has a Gross Floor Area (GFA) of 3200 m², it is proposed that the analysis consider only the weekday morning and afternoon peak periods.

It is proposed that the traffic analysis includes the following scenarios:

- Existing conditions (2020);
- Future background conditions (2035) – 15-years for build-out with corridor growth and area background development traffic;
- Future total conditions (2035) – 15-years for build-out with site generated traffic;
- Future total conditions (2040) – 5-years beyond build-out with site generated traffic.

Additional scenarios may be evaluated when the phasing of the site has been confirmed.

As confirmed by Region of Peel staff, the TIS will utilize a 1.5% growth rate for 2016 to 2021 and a 1.0% growth rate for 2021 to 2031. As the horizon for the development extends beyond 2031, a 0.5% growth rate will be applied from 2031 to 2035. It is understood that the growth rates received from the Region have been estimated based on multiple sources, including the Peel Travel Demand forecasting model, ATR and land use/forecast data but as requested, professional judgment will be used when considering these growth rates.

Traffic signal timing parameters have been obtained from the Region of Peel for the intersection of Highway 50 & McEwan Drive and will be utilized in the analysis. The analysis will also ensure that appropriate traffic

signal timings for the analysis of future traffic signals, such as at Highway 50 & George Bolton Parkway and at the site driveway & Highway 50 (if determined that the proposed location is feasible), are included in the analysis.

Development Services Planning staff from the Town of Caledon have provided details on surrounding developments in the area that may affect traffic capacity in the planning horizon years. The following developments will be considered in the TIS:

Approved Site Plans:

- SP-17-023C – To construct a single storey daycare service 353m² of Institutional development. (No TIS)
- SP-16-072C - To construct 3-storey medical building 2,206m² if Institutional development. (TIS available)
- SP-15-040C, SP-16-066C, SP-19-052C – To construct commercial 5 buildings in 4 phases outlined by older site plan SP-14-045C. A total of 4,621m² of industrial and commercial development. (No TIS)

Ongoing Site Plans:

- SP-18-005C – To construct existing parking area for car dealership. (TIS available)
- SP-19-014C – To construct an industrial building 2,995m² of industrial development. (TIS available)
- SP-15-067C – To demolish existing building and rezone to permit commercial and office use proposed 1,130m² of commercial development (TIS available).
- SP-14-069C – to construct 3 commercial buildings 2,657m² of commercial development. (No TIS)

2.1.3 Trip Generation and Distribution

The trip distribution and trip generation analysis will include the following:

- Trip generation surveys from similar developments in the Region, which have similar operating characteristics as the proposed development, will be considered;
- The latest edition of the Institute of Transportation Engineers (ITE) trip generation rates will be utilized as a reference with the use of the greater of the average rate method or the fitted line equation;
- A table summarizing the trip generation findings; and
- Trip distribution assumptions will be supported by one or more of the following:
 - Transportation Tomorrow Survey
 - Origin-destination surveys
 - Comprehensive travel surveys
 - Existing/anticipated travel patterns
 - Output from the Region of Peel Travel Demand Forecasting Model
 - Market studies.

2.1.4 Capacity Analysis

Intersection capacity analysis will be completed using Synchro Version 9.0 and a combination of Highway Capacity Manual (HCM) 2000 and HCM 6 methodologies.

The following parameters will be applied to the analysis:

- Saturation flow rate of 1,900 vehicles per hour;
- 7 metre lane width on Regional roads; and
- 5 metre lane width on the intersecting street(s) and/or access(es)

The Synchro analysis will adhere to Peel Region's Guidelines for Using Synchro for other individual parameters.

The analysis will also include the identification of signalized intersections, unsignalized intersections and unsignalized accesses where:

- Volume/capacity (v/c) ratios for overall intersection operations, through movements or shared through/turning movements increased to 0.90 or above;
- V/C ratios for exclusive movements that will exceed 1.00; and
- 95th percentile queue lengths for individual movements with confirmation of any queues that exceed available lane storage.

All intersections that are modelled as signalized intersections (other than existing signalized intersections) will be supported by an Ontario Traffic Manual (OTM) Book 12 traffic control signals warrant and each one will be included in the appendix of the TIS.

The horizon year in which a particular intersection is warranted for traffic control signals will be documented in the text of the TIS.

In the Synchro unsignalized intersection analysis, if an unacceptable LOS ("E" or higher) and v/c ratio results on the minor approach in existing conditions analysis, a gap study will be completed to establish an average value for gaps accepted (in seconds) to override the resultant value for the HCM-calculated critical gap in the signing window.

For horizon year analysis with an existing two-lane road, if the road is forecasted to be widened to four lanes by the respective horizon year, the analysis will override the resultant value for the HCM-calculated critical gap in the signing window by inputting recommended values for critical gap of left-turning and right-turning movements onto a four-lane road as identified in the Ministry of Transportation, Ontario (MTO) Geometric Design Standards for Ontario Highways.

2.1.5 Sight Distance Evaluation

The TIS will complete a review and analysis of the sight distance availability for all proposed accesses. The sight distance requirements will be determined based on the most current standards and guidelines used by the Region of Peel. Available sight distance will be taken from actual field measurements to ensure accurate conditions.

The sightlines will be assessed based on the Region of Peel's standard practice, eye height and object height of 1.05 metres and 0.38 metres above road surface, respectively. The assessment will adhere to the Region's requirement that the access meets the following sightline requirements:

- Stopping sight distance; and
- Turning sight distance.

Sight distances will be in accordance with the Transportation Association of Canada (TAC) Geometric Design Guide for Canadian Roads methodology. Folded full size and to scale drawings of the sightline analysis will be provided for review and comment.

2.1.6 Safety

Identification of potential safety or operational issues will be reviewed that are associated with:

- weaving
- merging
- corner clearances
- sight distances
- vehicle/pedestrian conflicts
- traffic infiltration
- access conflicts
- cyclist movements
- heavy truck movement conflicts

In addition, Regional Traffic Safety staff will be contacted to determine if there are any intersections within the study area with a significant collision history that should be further evaluated.

2.1.7 Functional Design

A functional design detailing a recommended access configuration and/or proposed intersection geometrics will be provided if requested by Regional staff.

2.1.8 Final Report

The structure of the final report will include the following:

- Site/development description
- Study area, including map
- Existing conditions (with an exhibit)
- Analysis periods
- Background, existing, future background and future total traffic demand (with an exhibit)

- Site generated traffic (with an exhibit)
- Improvement alternatives
- Traffic impacts for future background and total traffic with and without mitigation (tabular summaries)
- Access considerations
- Recommendations

The technical appendices will include the detailed analysis along with relevant data utilized in the study such as traffic counts and traffic signal timings.

One electronic copy and one hard copy, along with the supporting documentation, will be provided to Peel Region's Traffic Engineering section of Public Works.

2.1.9 Appendices

The appendices will include the following:

- Turning movement counts (including date counted) with breakdown of heavy vehicle counts;
- Signal timing plan(s) for signalized intersections;
- Synchro reports showing HCM 2000 results and queuing, as well as electronic Synchro files (CD copy or sent concurrently with the TIS via email).



Appendix C

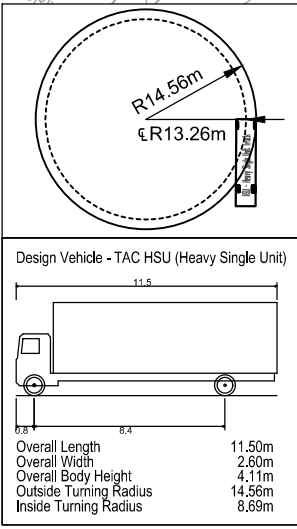
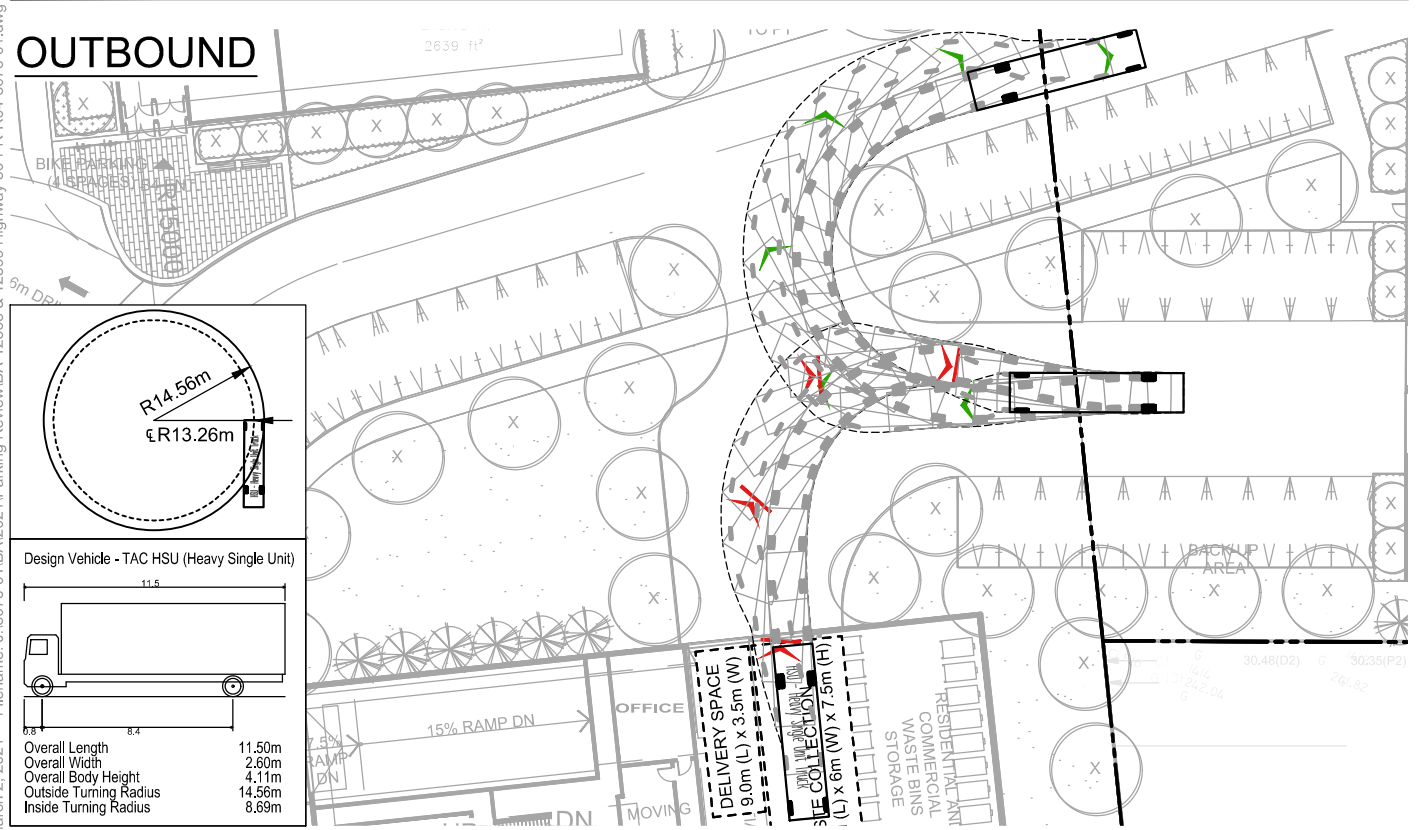
Vehicle Manoeuvring Diagrams



INBOUND



OUTBOUND



NOTE: VEHICLE TURNING PATHS ILLUSTRATED HAVE BEEN PREPARED TO ASSIST WITH THE DESIGN OF THE ARCHITECTURAL SITE PLAN. DESIGN VEHICLE TURN DYNAMICS AND DIMENSIONAL SIZE ESTABLISHED BY TRANSPORTATION OF CANADA (TAC) AND MINISTRY OF ONTARIO (MTO) HAVE BEEN APPLIED TO ASSESS THE TURN REQUIREMENTS TO POSITION THE VEHICLE AS SHOWN. ACTUAL TRAVEL PATH AND MANOEUVRES MAY VARY DEPENDING ON THE DRIVER OF THE VEHICLE AND VEHICLE'S DIMENSIONS.

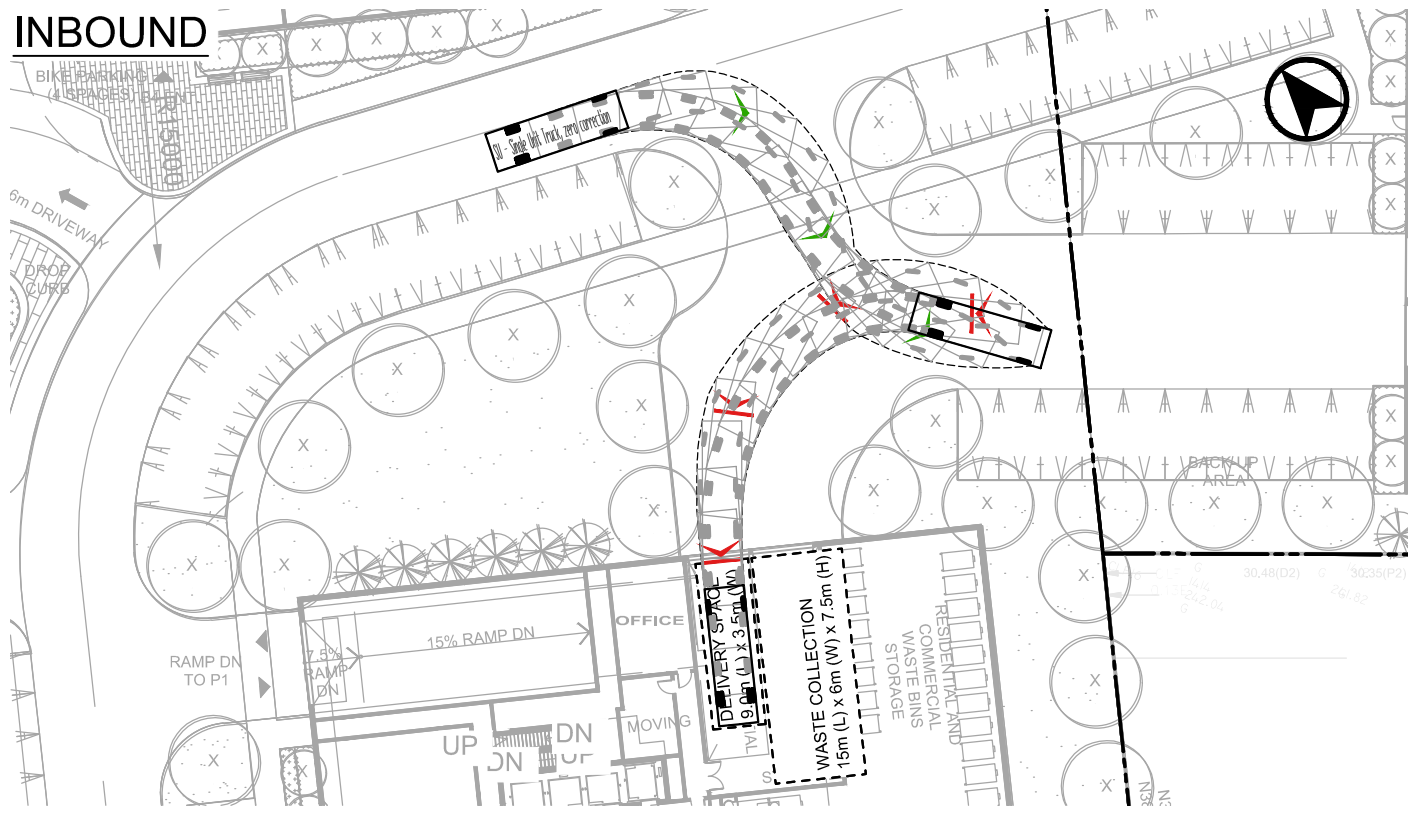


VEHICLE MANOEUVRING DIAGRAM BUILDING 1 - WASTE COLLECTION REPRESENTATIVE REGION OF PEEL FRONT-LOADER VEHICLE

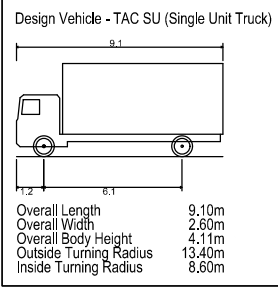
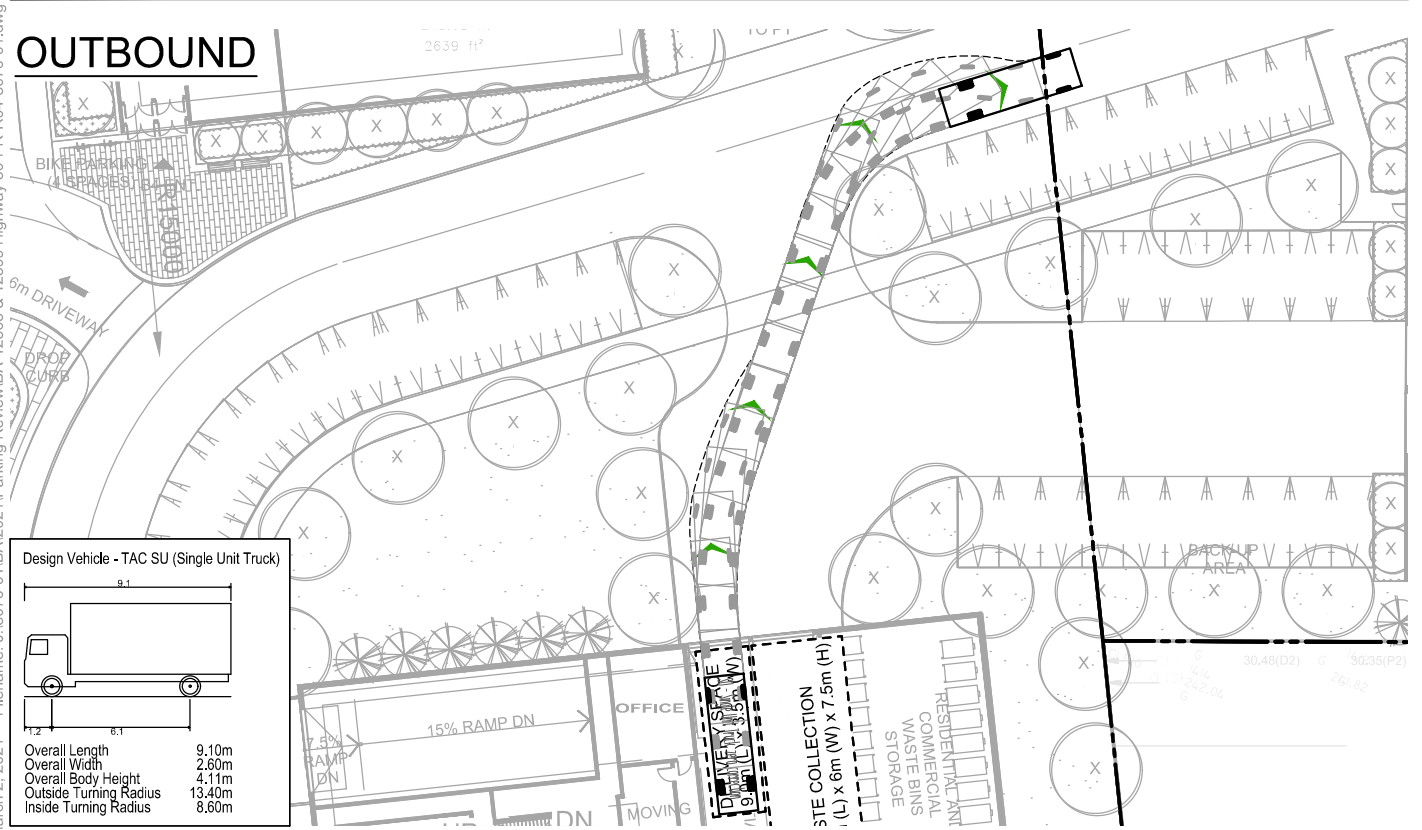
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Project No.:	8076-01
Date:	MARCH 2, 2021
Revised:	--
Drawing No.:	VMD-01A

Date Plotted: March 2, 2021 File name: J:\8076-01\BA\2021\Parking Review\BA-12563 & 12599 Highway 50-PR-R04-8076-01.dwg

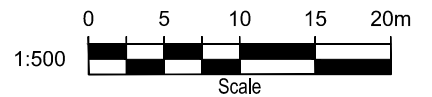
INBOUND



OUTBOUND



NOTE: VEHICLE TURNING PATHS ILLUSTRATED HAVE BEEN PREPARED TO ASSIST WITH THE DESIGN OF THE ARCHITECTURAL SITE PLAN. DESIGN VEHICLE TURN DYNAMICS AND DIMENSIONAL SIZE ESTABLISHED BY TRANSPORTATION OF CANADA (TAC) AND MINISTRY OF ONTARIO (MTO) HAVE BEEN APPLIED TO ASSESS THE TURN REQUIREMENTS TO POSITION THE VEHICLE AS SHOWN. ACTUAL TRAVEL PATH AND MANOEUVRES MAY VARY DEPENDING ON THE DRIVER OF THE VEHICLE AND VEHICLE'S DIMENSIONS.



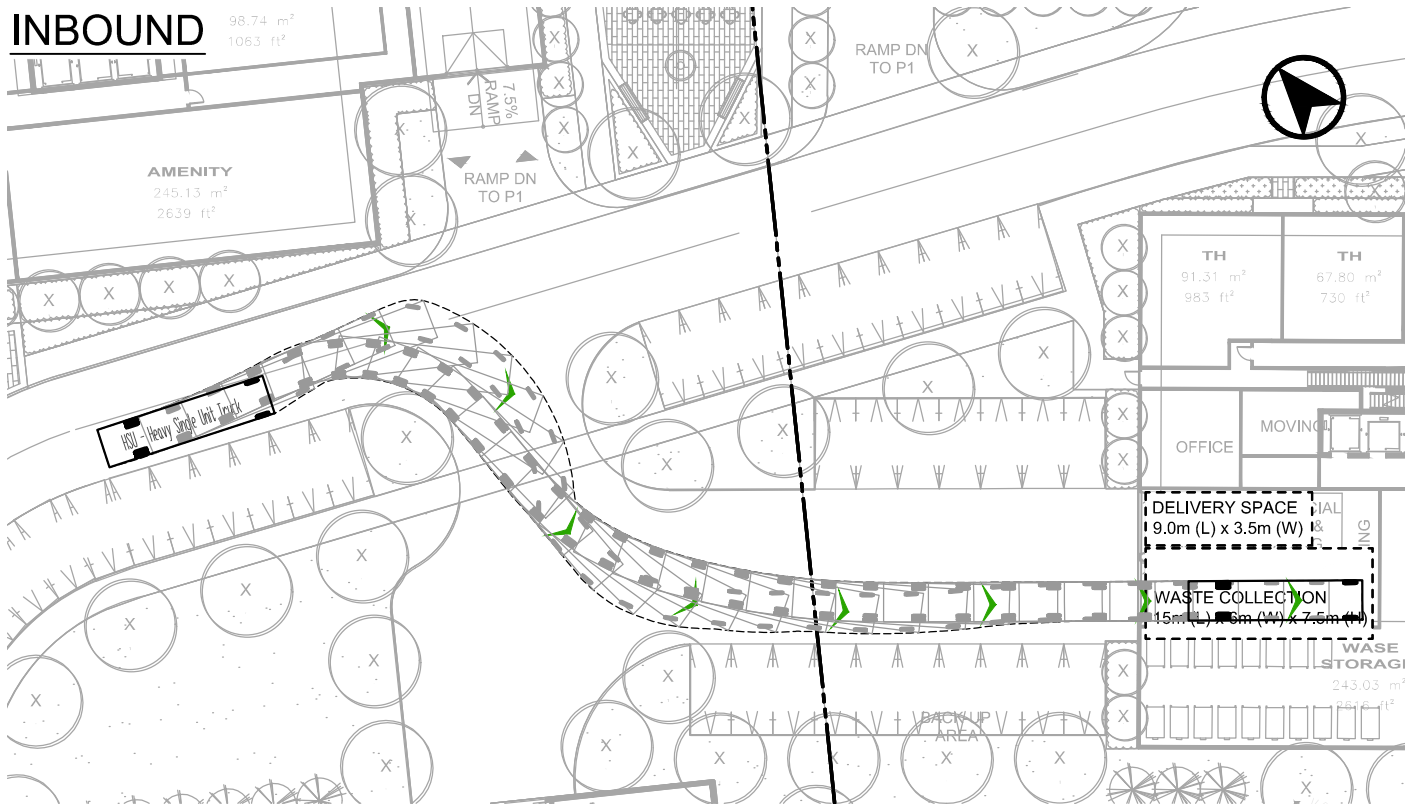
VEHICLE MANOEUVRING DIAGRAM BUILDING 1 - DELIVERY SPACE TAC SINGLE-UNIT VEHICLE

Project:	12563 & 12599 HWY 50
Project No.:	8076-01
Date:	MARCH 2, 2021
Revised:	--
Drawing No.:	VMD-01B

Date Plotted: March 2, 2021 File: J:\8076-01\BA\2021\Parking Review\BA-12563 & 12599 Highway 50-PR-R04-8076-01.dwg

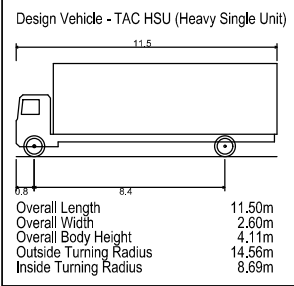
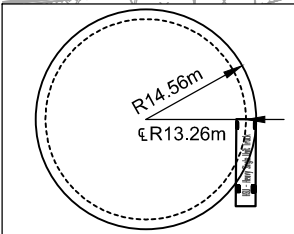
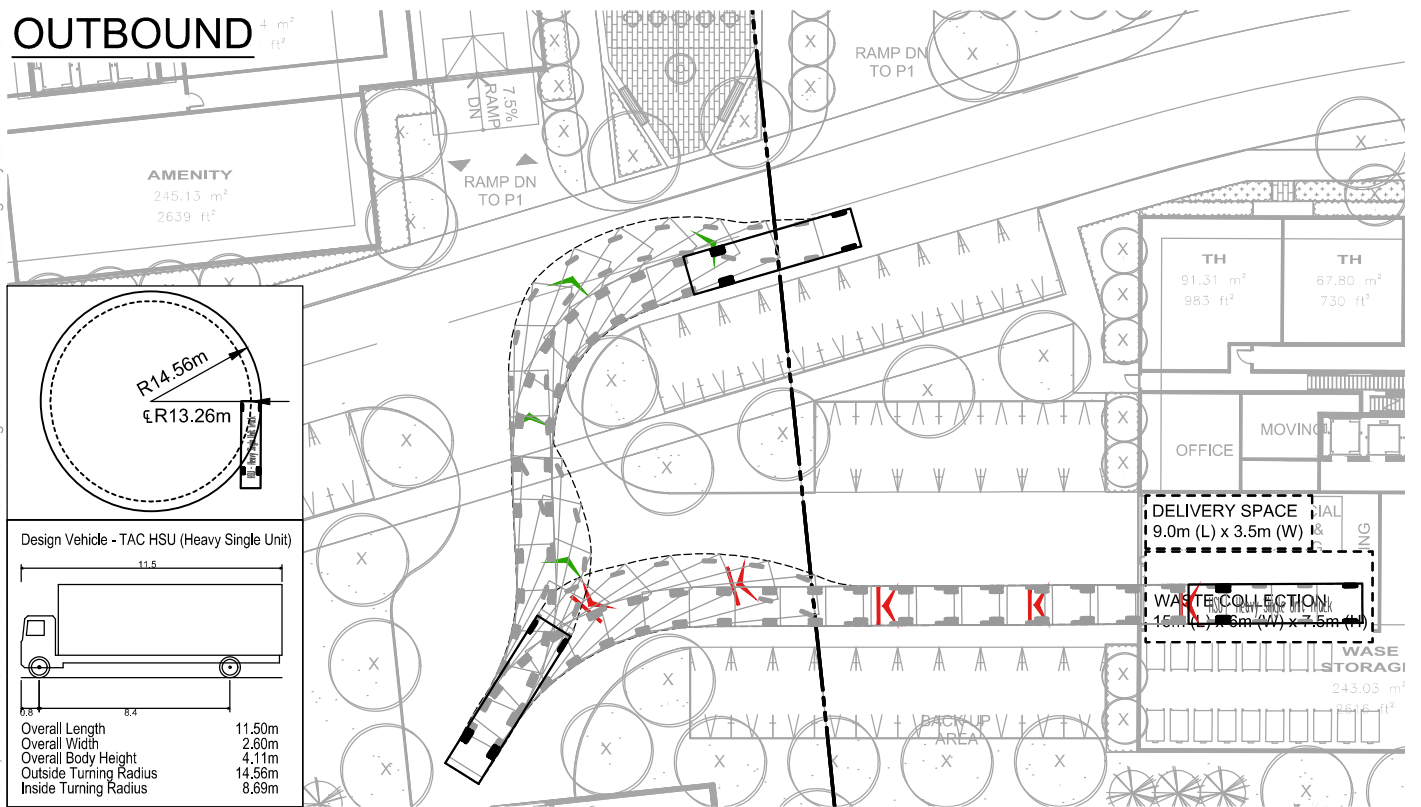
INBOUND

98.74 m²
1063 ft²

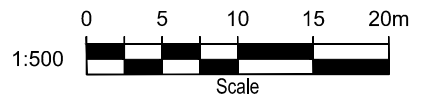


OUTBOUND

98.74 m²
1063 ft²



NOTE: VEHICLE TURNING PATHS ILLUSTRATED HAVE BEEN PREPARED TO ASSIST WITH THE DESIGN OF THE ARCHITECTURAL SITE PLAN. DESIGN VEHICLE TURN DYNAMICS AND DIMENSIONAL SIZE ESTABLISHED BY TRANSPORTATION OF CANADA (TAC) AND MINISTRY OF ONTARIO (MTO) HAVE BEEN APPLIED TO ASSESS THE TURN REQUIREMENTS TO POSITION THE VEHICLE AS SHOWN. ACTUAL TRAVEL PATH AND MANOEUVRES MAY VARY DEPENDING ON THE DRIVER OF THE VEHICLE AND VEHICLE'S DIMENSIONS.



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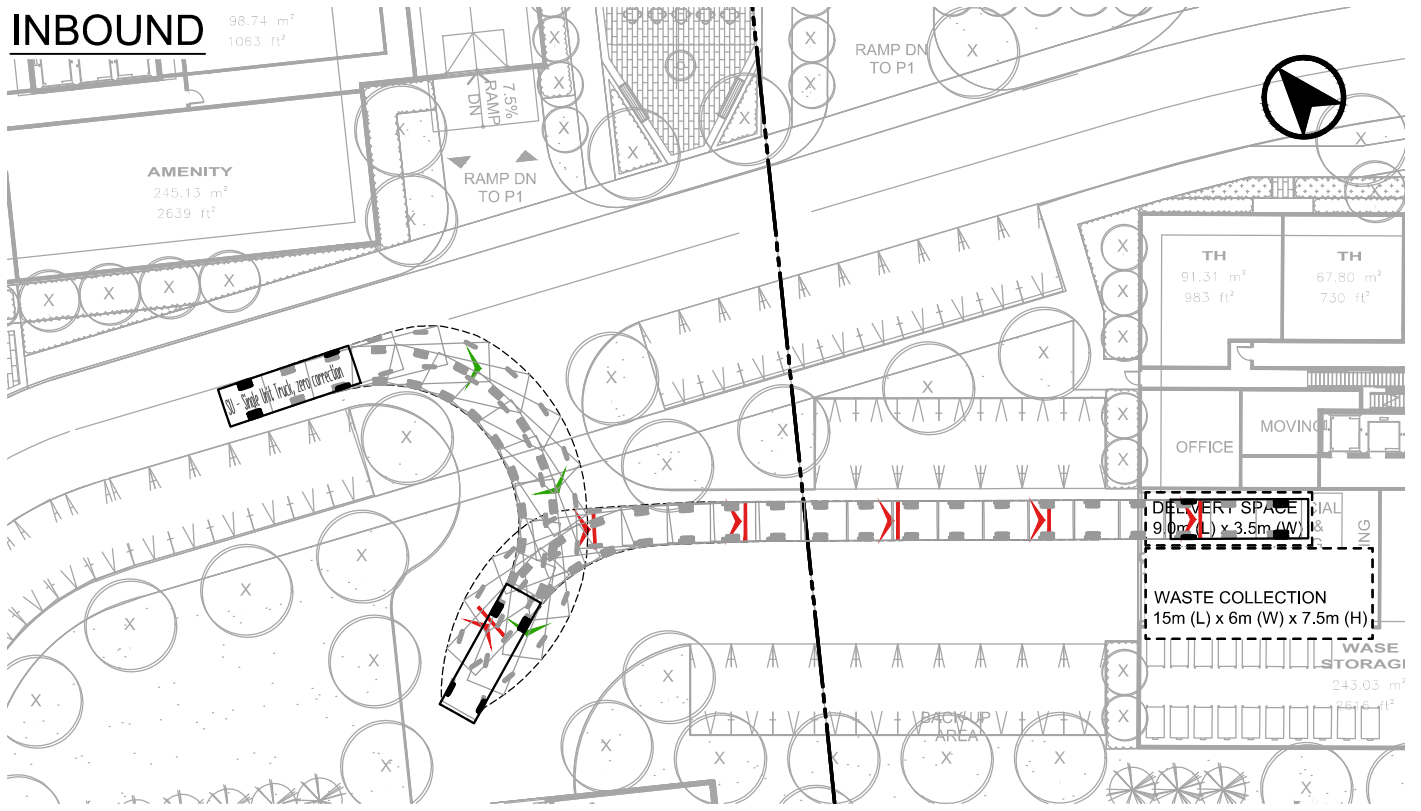


VEHICLE MANOEUVRING DIAGRAM BUILDING 2 - WASTE COLLECTION REPRESENTATIVE REGION OF PEEL FRONT-LOADER VEHICLE

Project:	12563 & 12599 HWY 50
Project No.:	8076-01
Date:	MARCH 2, 2021
Revised:	--
Drawing No.:	VMD-02A

INBOUND

98.74 m²
1063 ft²

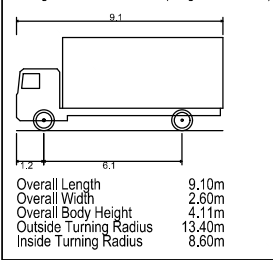


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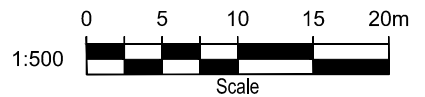
98.74 m²
1063 ft²



Design Vehicle - TAC SU (Single Unit Truck)



NOTE: VEHICLE TURNING PATHS ILLUSTRATED HAVE BEEN PREPARED TO ASSIST WITH THE DESIGN OF THE ARCHITECTURAL SITE PLAN. DESIGN VEHICLE TURN DYNAMICS AND DIMENSIONAL SIZE ESTABLISHED BY TRANSPORTATION OF CANADA (TAC) AND MINISTRY OF ONTARIO (MTO) HAVE BEEN APPLIED TO ASSESS THE TURN REQUIREMENTS TO POSITION THE VEHICLE AS SHOWN. ACTUAL TRAVEL PATH AND MANOEUVRES MAY VARY DEPENDING ON THE DRIVER OF THE VEHICLE AND VEHICLE'S DIMENSIONS.



VEHICLE MANOEUVRING DIAGRAM

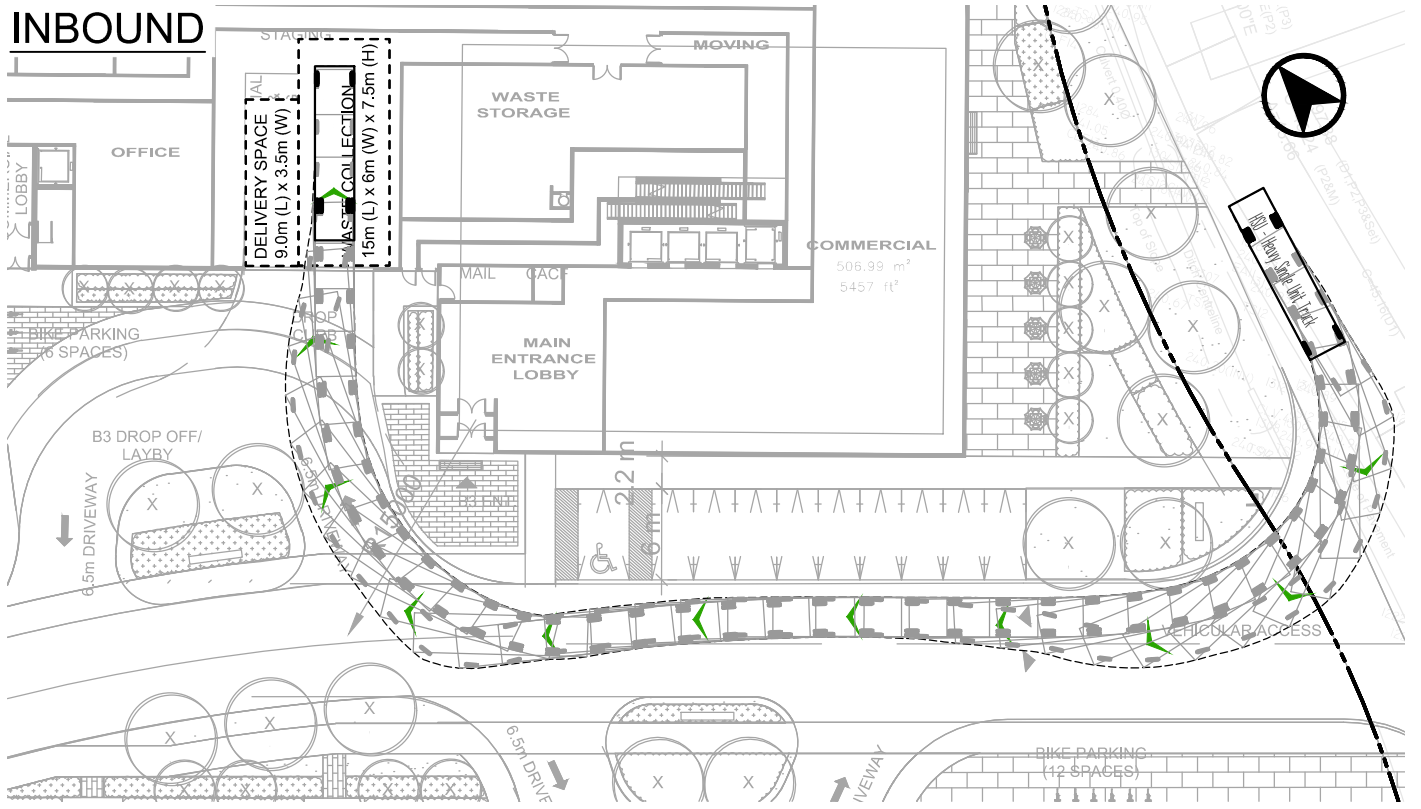
BUILDING 2 - DELIVERY SPACE

TAC SINGLE-UNIT VEHICLE

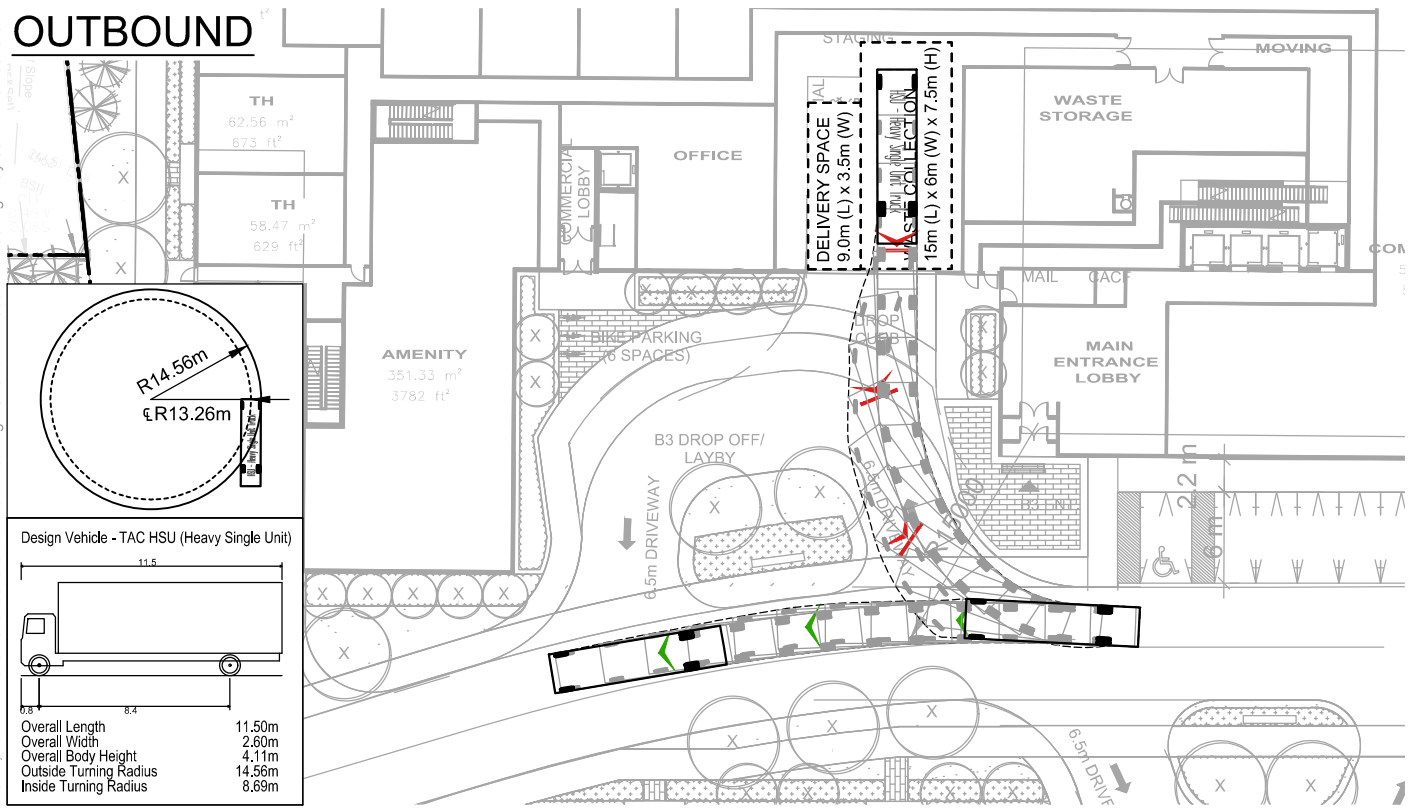
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Project No.:	8076-01
Date:	MARCH 2, 2021
Revised:	--
Drawing No.:	VMD-02B

Date Plotted: March 2, 2021 File: J:\8076-01\BA\2021\Parking Review\BA-12563 & 12599 Highway 50-PR-04-8076-01.dwg

INBOUND



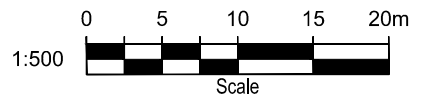
OUTBOUND



Design Vehicle - TAC HSU (Heavy Single Unit)

Overall Length: 11.50m
 Overall Width: 2.60m
 Overall Body Height: 4.11m
 Outside Turning Radius: 14.56m
 Inside Turning Radius: 8.69m

NOTE: VEHICLE TURNING PATHS ILLUSTRATED HAVE BEEN PREPARED TO ASSIST WITH THE DESIGN OF THE ARCHITECTURAL SITE PLAN. DESIGN VEHICLE TURN DYNAMICS AND DIMENSIONAL SIZE ESTABLISHED BY TRANSPORTATION OF CANADA (TAC) AND MINISTRY OF ONTARIO (MTO) HAVE BEEN APPLIED TO ASSESS THE TURN REQUIREMENTS TO POSITION THE VEHICLE AS SHOWN. ACTUAL TRAVEL PATH AND MANOEUVRES MAY VARY DEPENDING ON THE DRIVER OF THE VEHICLE AND VEHICLE'S DIMENSIONS.

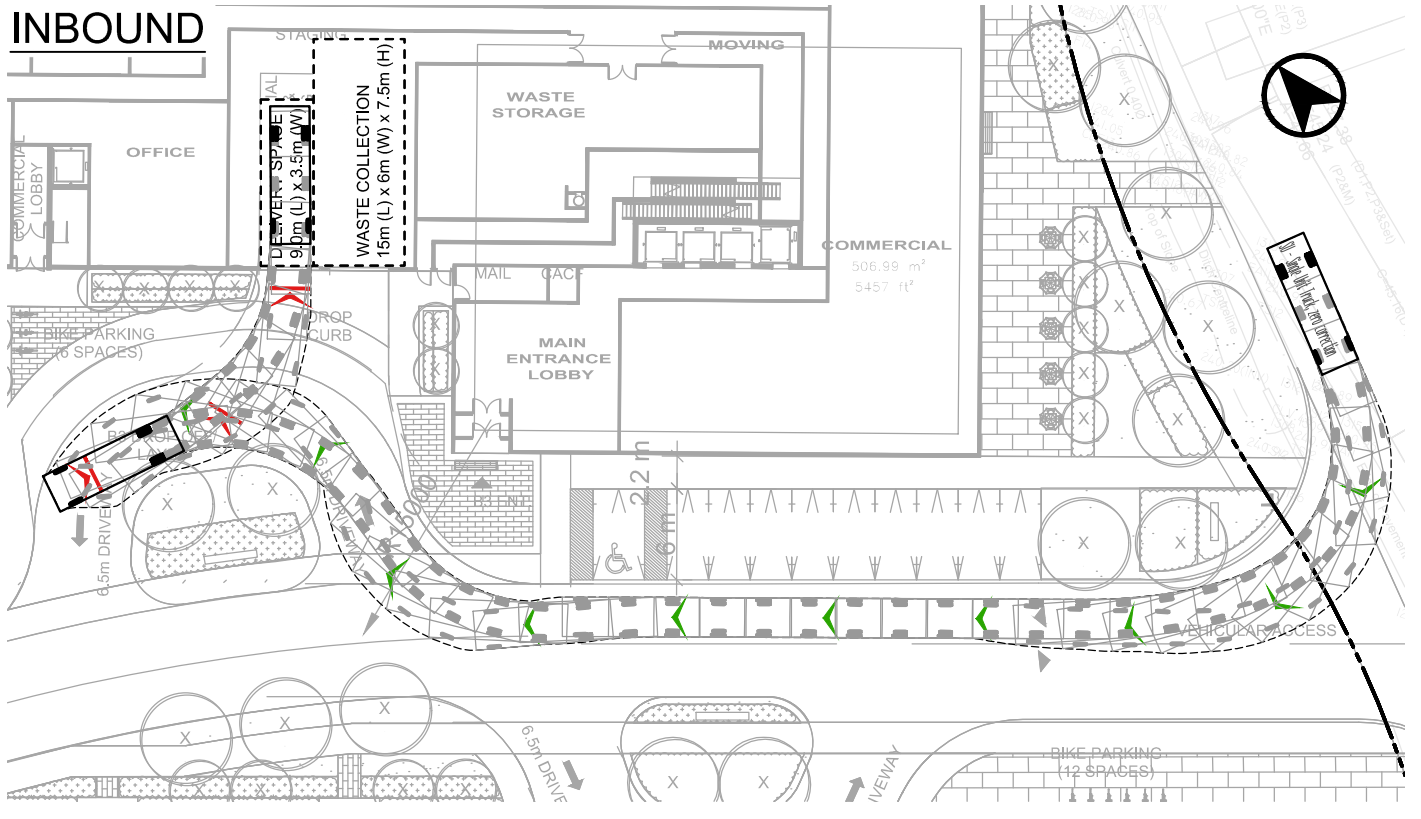


VEHICLE MANOEUVRING DIAGRAM BUILDING 3 - WASTE COLLECTION REPRESENTATIVE REGION OF PEEL FRONT-LOADER VEHICLE

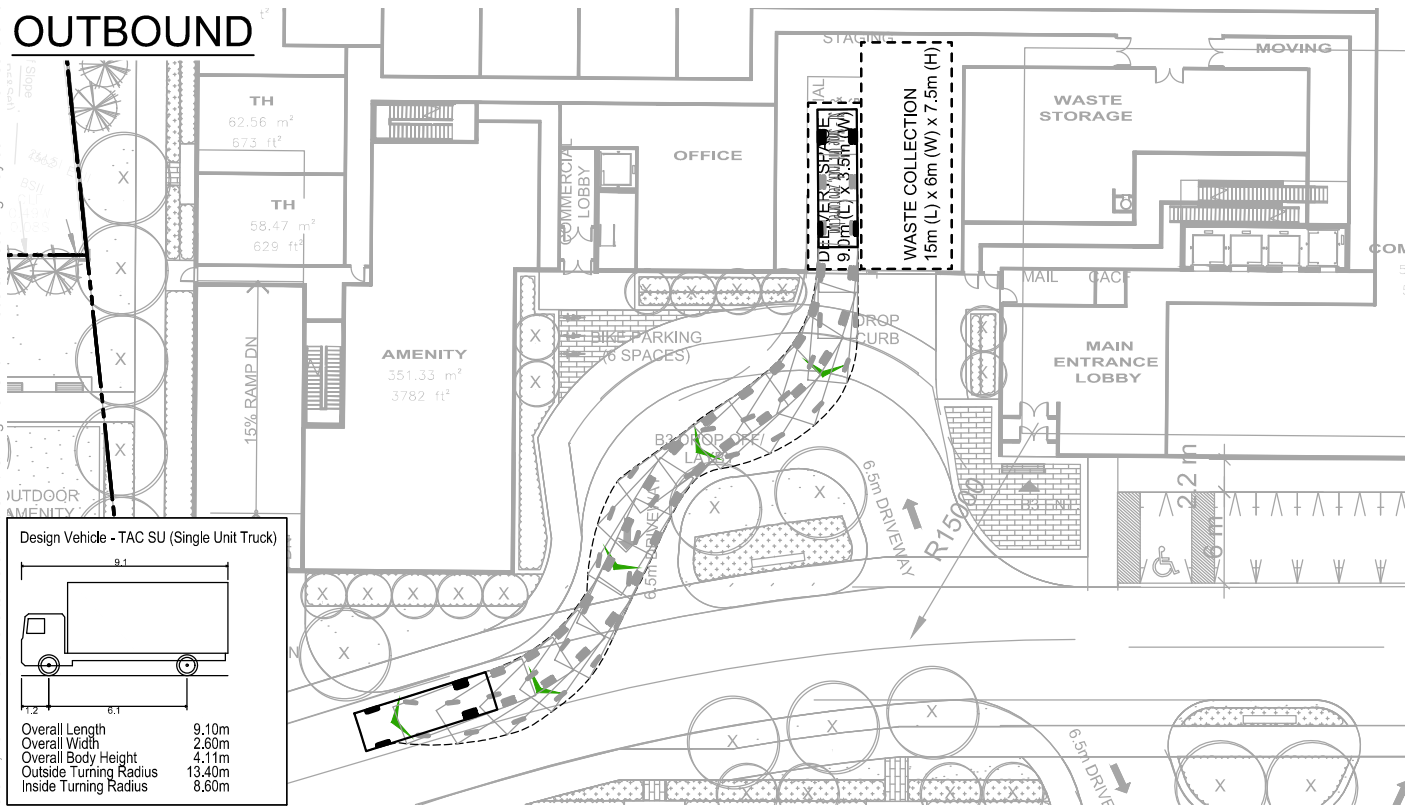
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Project No.:	8076-01
Date:	MARCH 2, 2021
Revised:	--
Drawing No.:	VMD-03A

Date Plotted: March 2, 2021 File: J:\8076-01\BA\2021\Parking Review\BA-12563 & 12599 Highway 50-PR-R04-8076-01.dwg

INBOUND



OUTBOUND

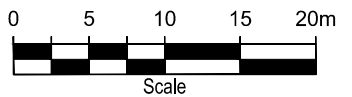


Design Vehicle - TAC SU (Single Unit Truck)

Overall Length	9.10m
Overall Width	2.60m
Overall Body Height	4.11m
Outside Turning Radius	13.40m
Inside Turning Radius	8.60m

NOTE: VEHICLE TURNING PATHS ILLUSTRATED HAVE BEEN PREPARED TO ASSIST WITH THE DESIGN OF THE ARCHITECTURAL SITE PLAN. DESIGN VEHICLE TURN DYNAMICS AND DIMENSIONAL SIZE ESTABLISHED BY TRANSPORTATION OF CANADA (TAC) AND MINISTRY OF ONTARIO (MTO) HAVE BEEN APPLIED TO ASSESS THE TURN REQUIREMENTS TO POSITION THE VEHICLE AS SHOWN. ACTUAL TRAVEL PATH AND MANOEUVRES MAY VARY DEPENDING ON THE DRIVER OF THE VEHICLE AND VEHICLE'S DIMENSIONS.

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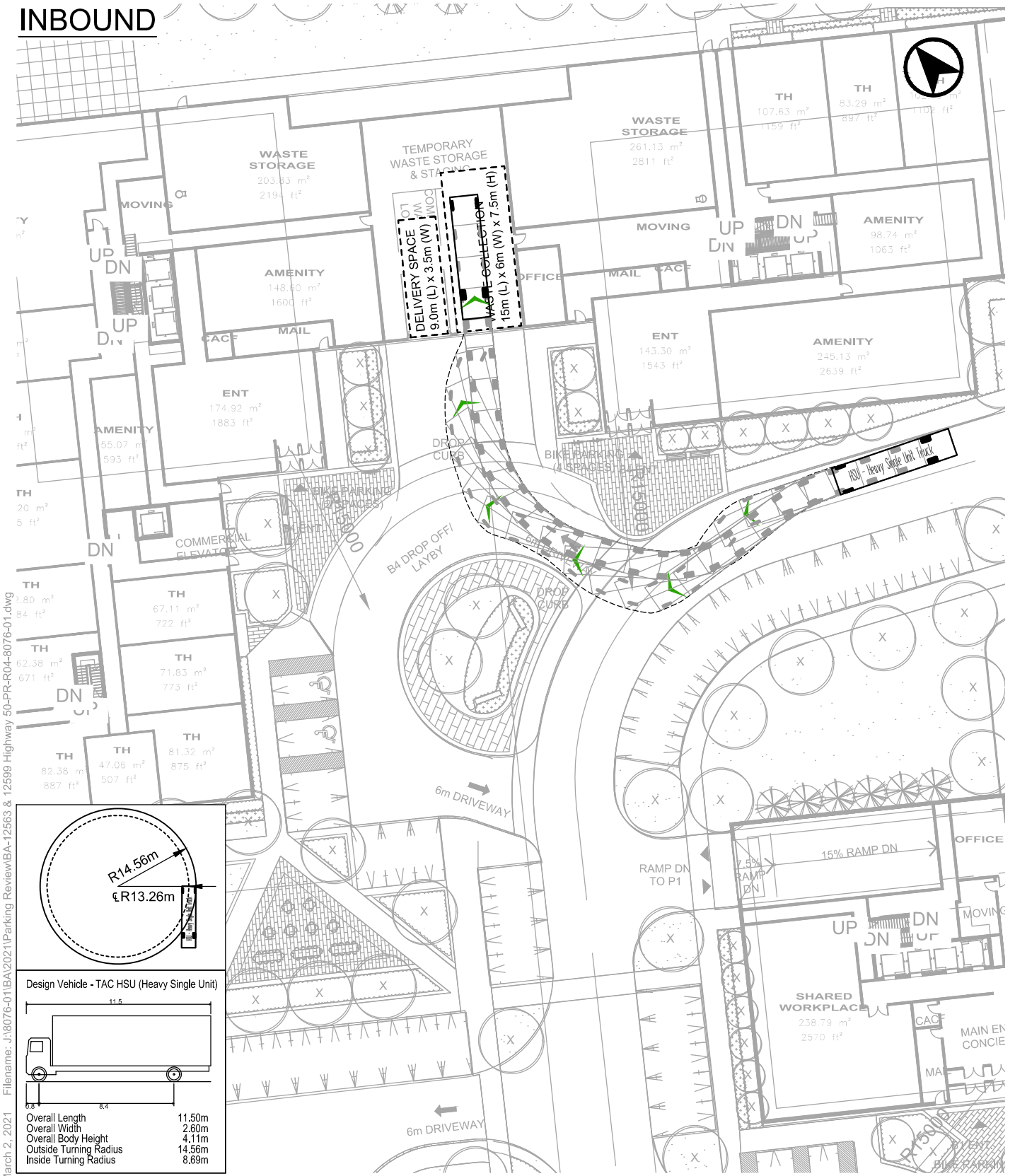


VEHICLE MANOEUVRING DIAGRAM BUILDING 3 - DELIVERY SPACE TAC SINGLE-UNIT VEHICLE

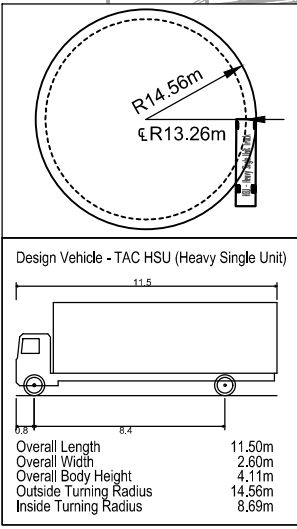
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Date:	MARCH 2, 2021
Revised:	--
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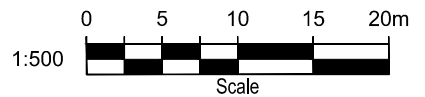
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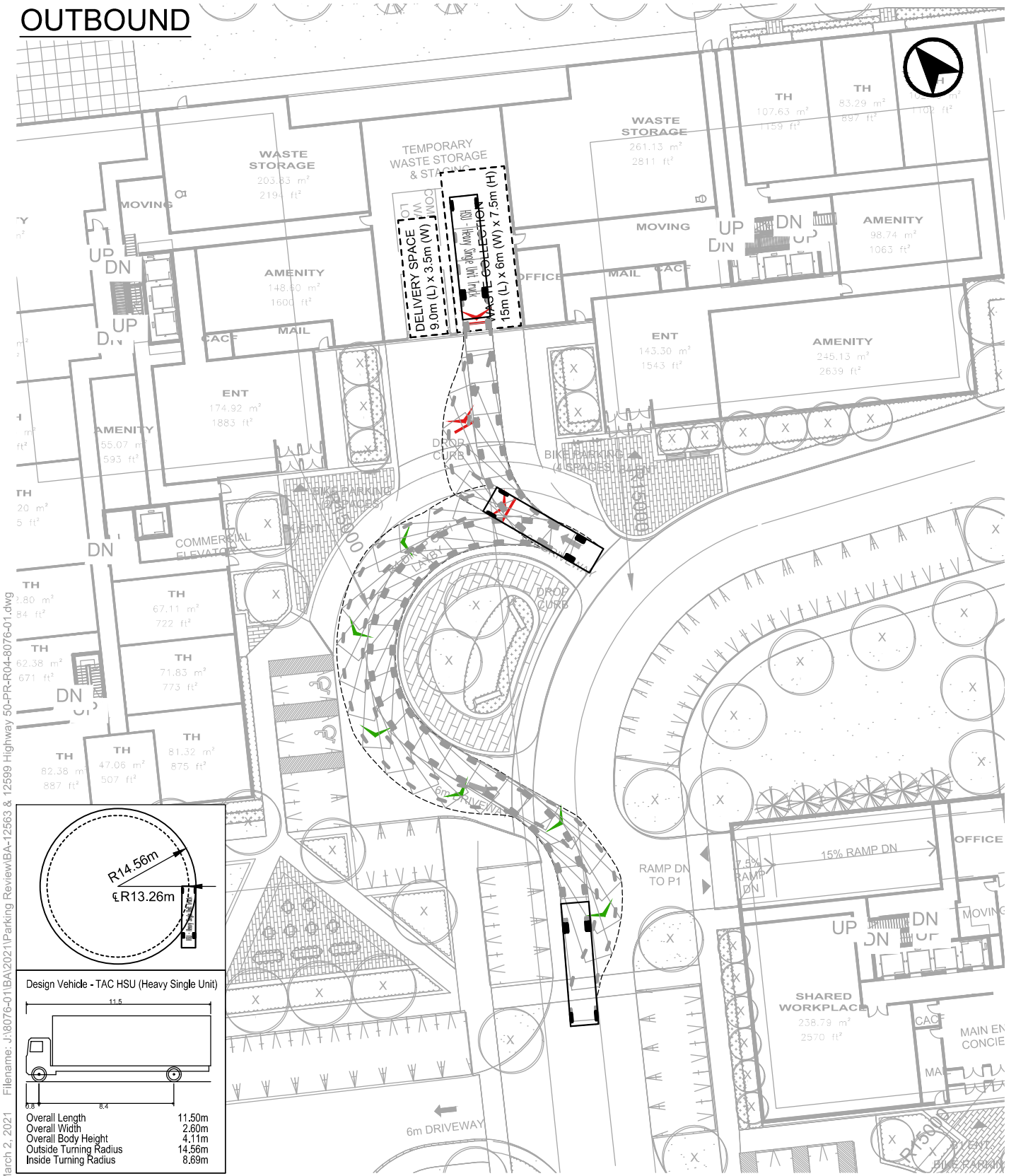
NOTE: VEHICLE TURNING PATHS ILLUSTRATED HAVE BEEN PREPARED TO ASSIST WITH THE DESIGN OF THE ARCHITECTURAL SITE PLAN. DESIGN VEHICLE TURN DYNAMICS AND DIMENSIONAL SIZE ESTABLISHED BY TRANSPORTATION OF CANADA (TAC) AND MINISTRY OF ONTARIO (MTO) HAVE BEEN APPLIED TO ASSESS THE TURN REQUIREMENTS TO POSITION THE VEHICLE AS SHOWN. ACTUAL TRAVEL PATH AND MANOEUVRES MAY VARY DEPENDING ON THE DRIVER OF THE VEHICLE AND VEHICLE'S DIMENSIONS.



VEHICLE MANOEUVRING DIAGRAM BUILDING 4 - WASTE COLLECTION REPRESENTATIVE REGION OF PEEL FRONT-LOADER VEHICLE

Project:	12563 & 12599 HWY 50
Project No.:	8076-01
Date:	MARCH 2, 2021
Revised:	--
Drawing No.:	VMD-04A

OUTBOUND



Date Plotted: March 2, 2021 File name: J:\8076-01\BA\2021\Parking Review\BA-12563 & 12599 Highway 50-PR-R04-8076-01.dwg

R14.56m
rR13.26m

Design Vehicle - TAC HSU (Heavy Single Unit)

Overall Length	11.50m
Overall Width	2.60m
Overall Body Height	4.11m
Outside Turning Radius	14.56m
Inside Turning Radius	8.69m

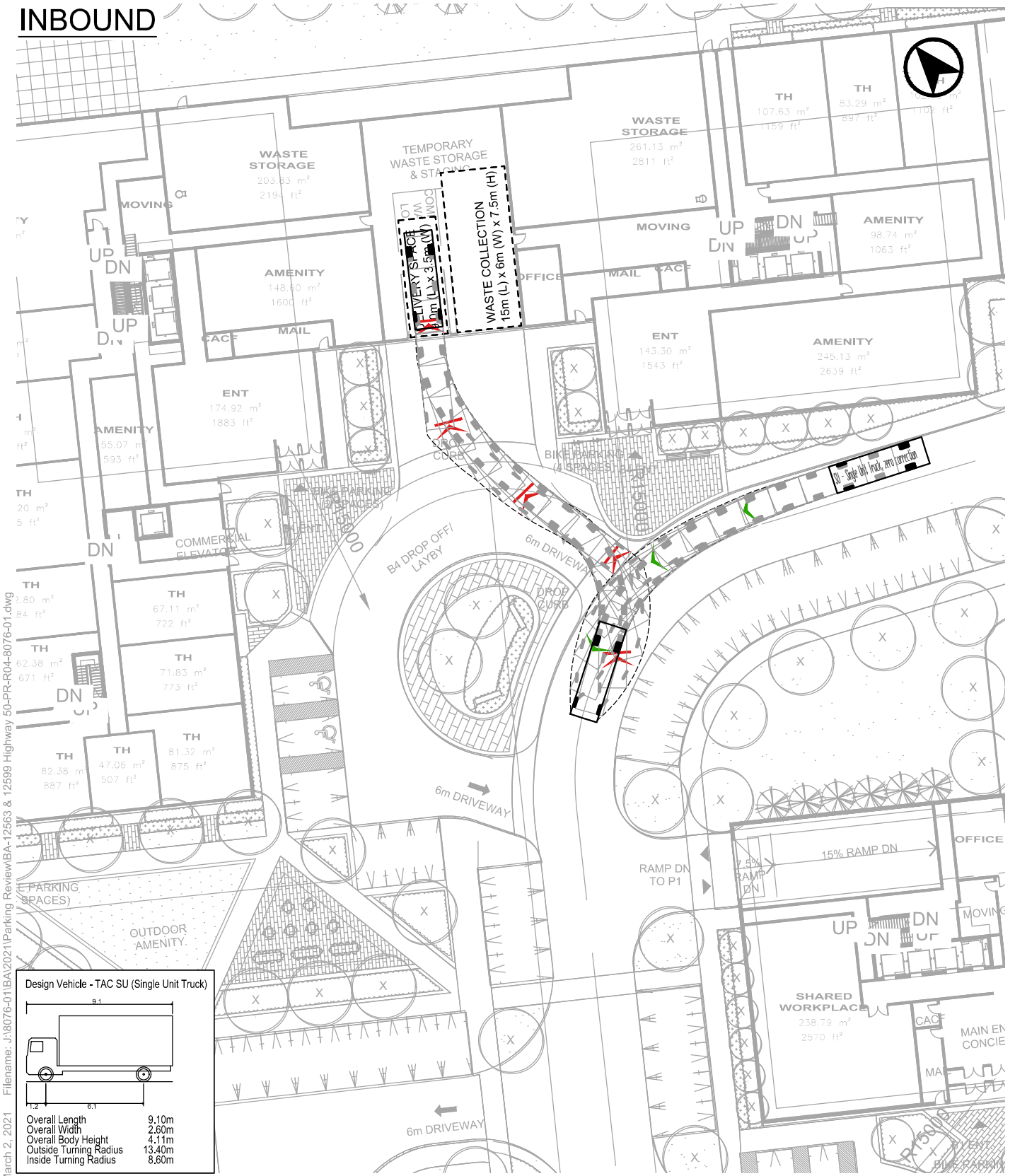
NOTE: VEHICLE TURNING PATHS ILLUSTRATED HAVE BEEN PREPARED TO ASSIST WITH THE DESIGN OF THE ARCHITECTURAL SITE PLAN. DESIGN VEHICLE TURN DYNAMICS AND DIMENSIONAL SIZE ESTABLISHED BY TRANSPORTATION OF CANADA (TAC) AND MINISTRY OF ONTARIO (MTO) HAVE BEEN APPLIED TO ASSESS THE TURN REQUIREMENTS TO POSITION THE VEHICLE AS SHOWN. ACTUAL TRAVEL PATH AND MANOEUVRES MAY VARY DEPENDING ON THE DRIVER OF THE VEHICLE AND VEHICLE'S DIMENSIONS.



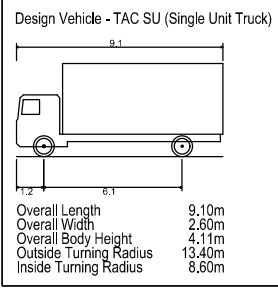
VEHICLE MANOEUVRING DIAGRAM BUILDING 4 - WASTE COLLECTION REPRESENTATIVE REGION OF PEEL FRONT-LOADER VEHICLE

Project:	12563 & 12599 HWY 50
Project No.:	8076-01
Date:	MARCH 2, 2021
Revised:	--
Drawing No.:	VMD-04B

INBOUND



Date Plotted: March 2, 2021
 Filename: J:\8076-01\BA\2021\Parking Review\BA-12563 & 12599 Highway 50-PR-R04-8076-01.dwg



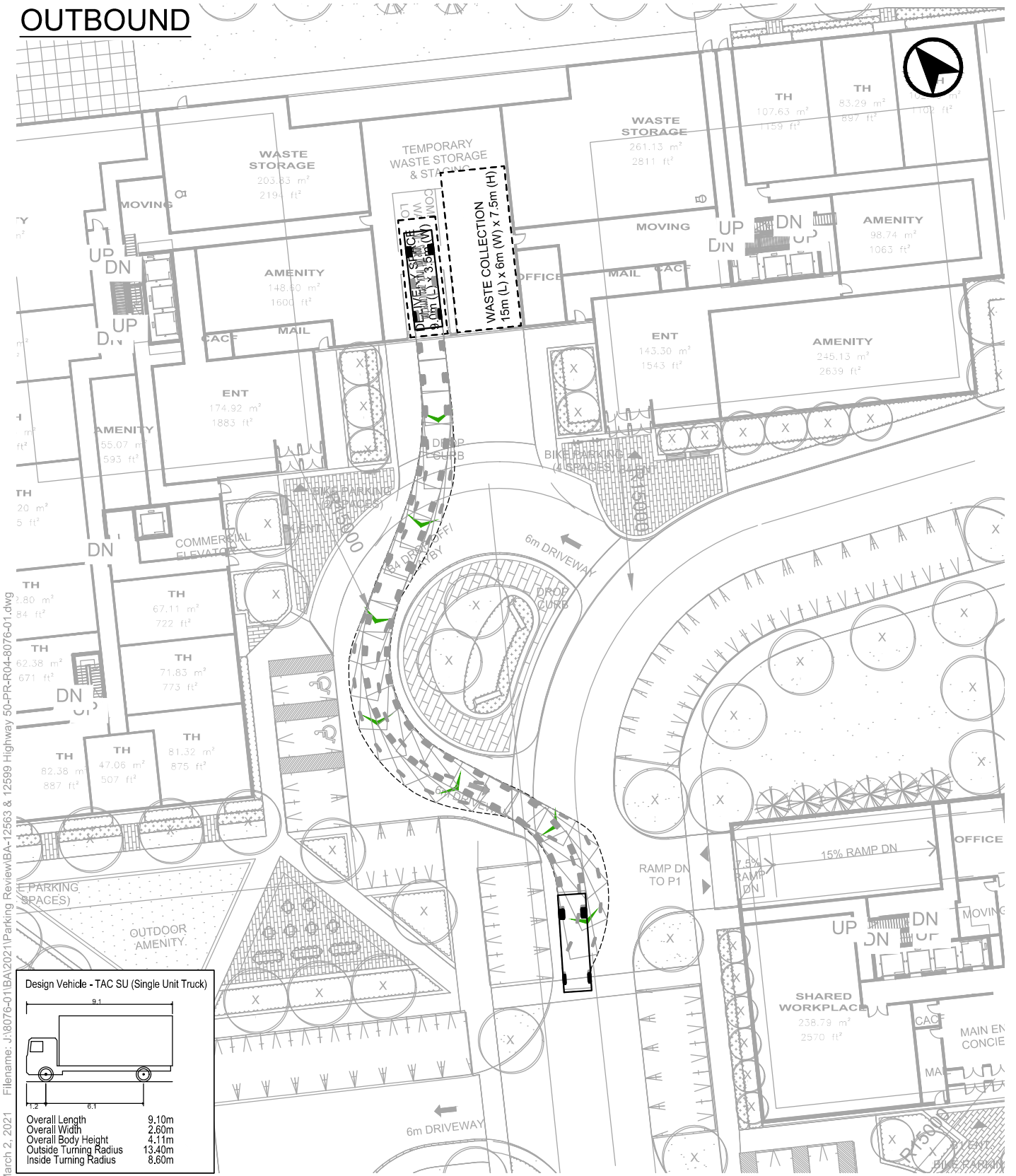
NOTE: VEHICLE TURNING PATHS ILLUSTRATED HAVE BEEN PREPARED TO ASSIST WITH THE DESIGN OF THE ARCHITECTURAL SITE PLAN. DESIGN VEHICLE TURN DYNAMICS AND DIMENSIONAL SIZE ESTABLISHED BY TRANSPORTATION OF CANADA (TAC) AND MINISTRY OF ONTARIO (MTO) HAVE BEEN APPLIED TO ASSESS THE TURN REQUIREMENTS TO POSITION THE VEHICLE AS SHOWN. ACTUAL TRAVEL PATH AND MANOEUVRES MAY VARY DEPENDING ON THE DRIVER OF THE VEHICLE AND VEHICLE'S DIMENSIONS.



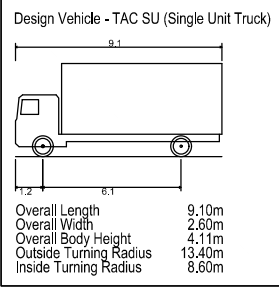
VEHICLE MANOEUVRING DIAGRAM BUILDING 4 - DELIVERY SPACE TAC SINGLE-UNIT VEHICLE INBOUND

Project:	12563 & 12599 HWY 50
Project No.:	8076-01
Date:	MARCH 2, 2021
Revised:	--
Drawing No.:	VMD-04C

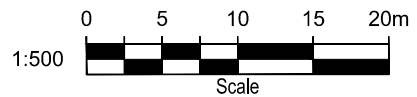
OUTBOUND



Date Plotted: March 2, 2021 File name: J:\8076-01\BA\2021\Parking Review\BA-12563 & 12599 Highway 50-PR-R04-8076-01.dwg



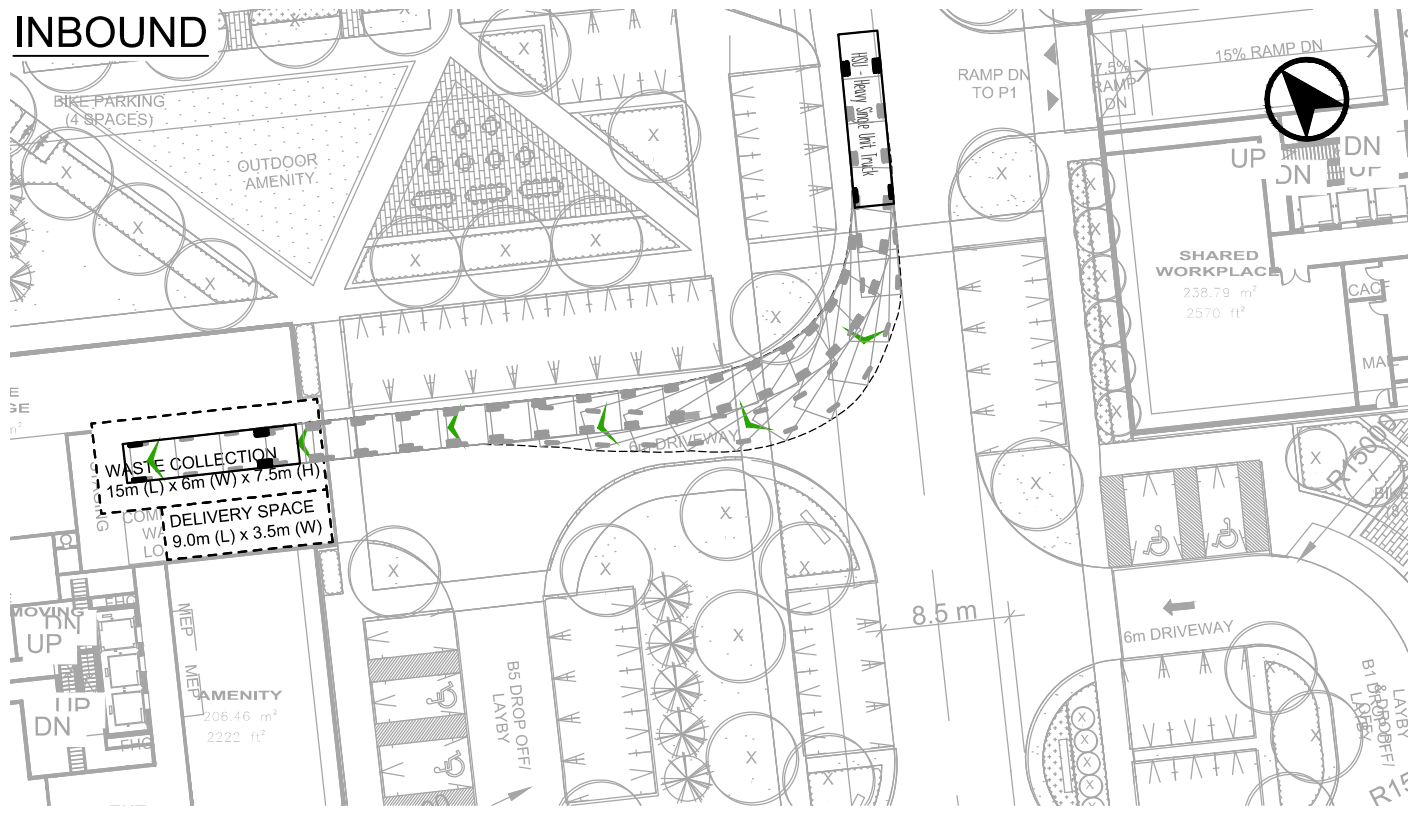
NOTE: VEHICLE TURNING PATHS ILLUSTRATED HAVE BEEN PREPARED TO ASSIST WITH THE DESIGN OF THE ARCHITECTURAL SITE PLAN. DESIGN VEHICLE TURN DYNAMICS AND DIMENSIONAL SIZE ESTABLISHED BY TRANSPORTATION OF CANADA (TAC) AND MINISTRY OF ONTARIO (MTO) HAVE BEEN APPLIED TO ASSESS THE TURN REQUIREMENTS TO POSITION THE VEHICLE AS SHOWN. ACTUAL TRAVEL PATH AND MANOEUVRES MAY VARY DEPENDING ON THE DRIVER OF THE VEHICLE AND VEHICLE'S DIMENSIONS.



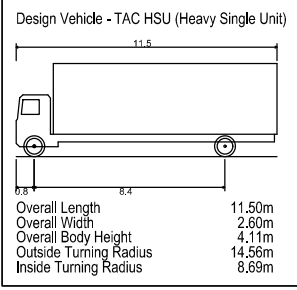
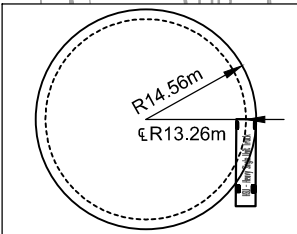
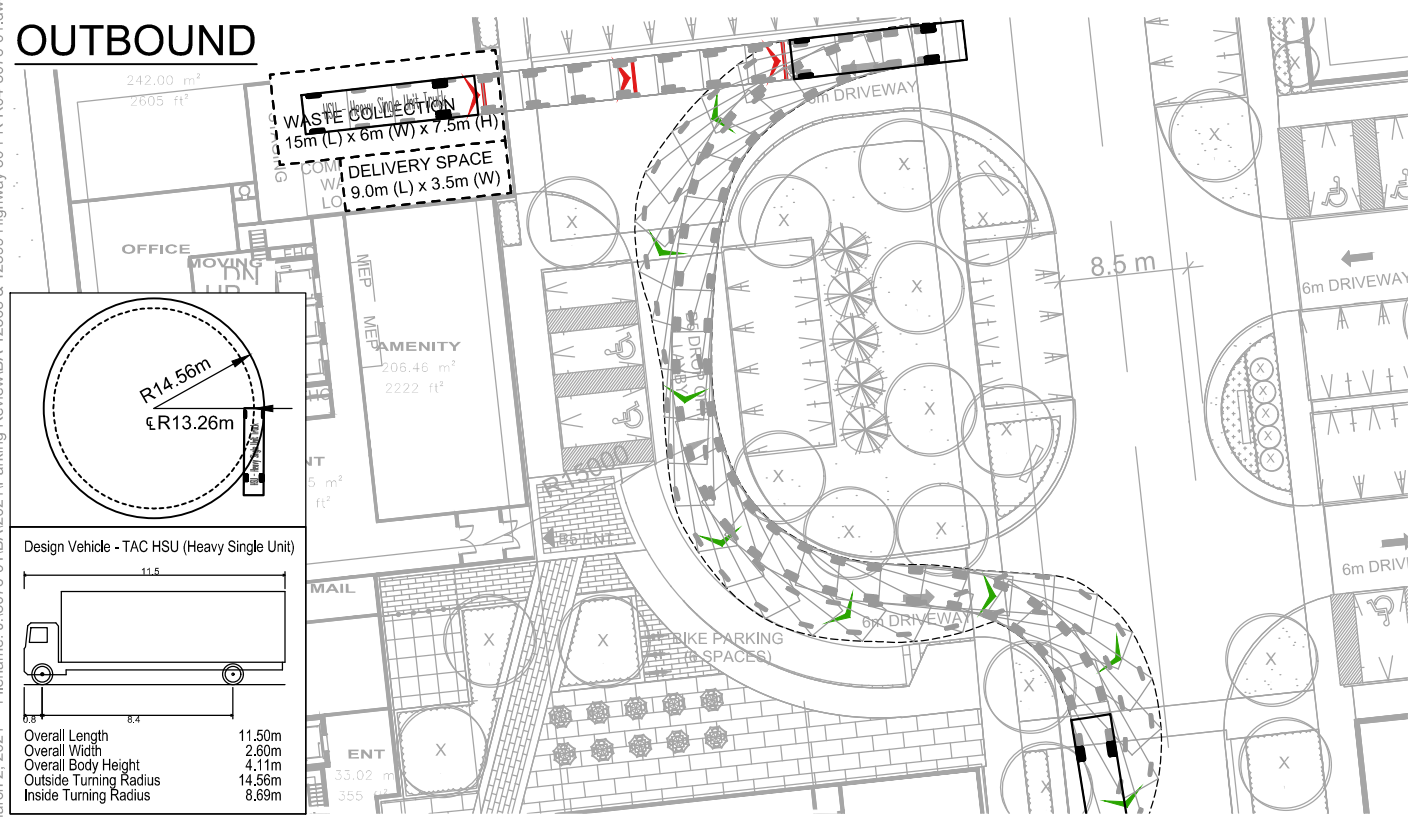
VEHICLE MANOEUVRING DIAGRAM BUILDING 4 - DELIVERY SPACE TAC SINGLE-UNIT VEHICLE OUTBOUND

Project:	12563 & 12599 HWY 50
Project No.:	8076-01
Date:	MARCH 2, 2021
Revised:	--
Drawing No.:	VMD-04D

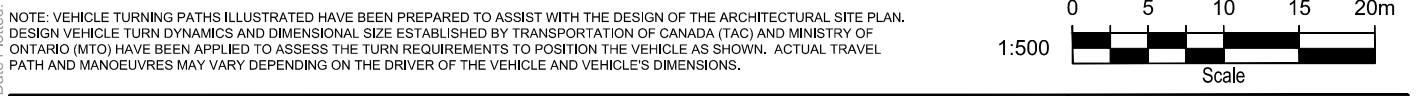
INBOUND



OUTBOUND



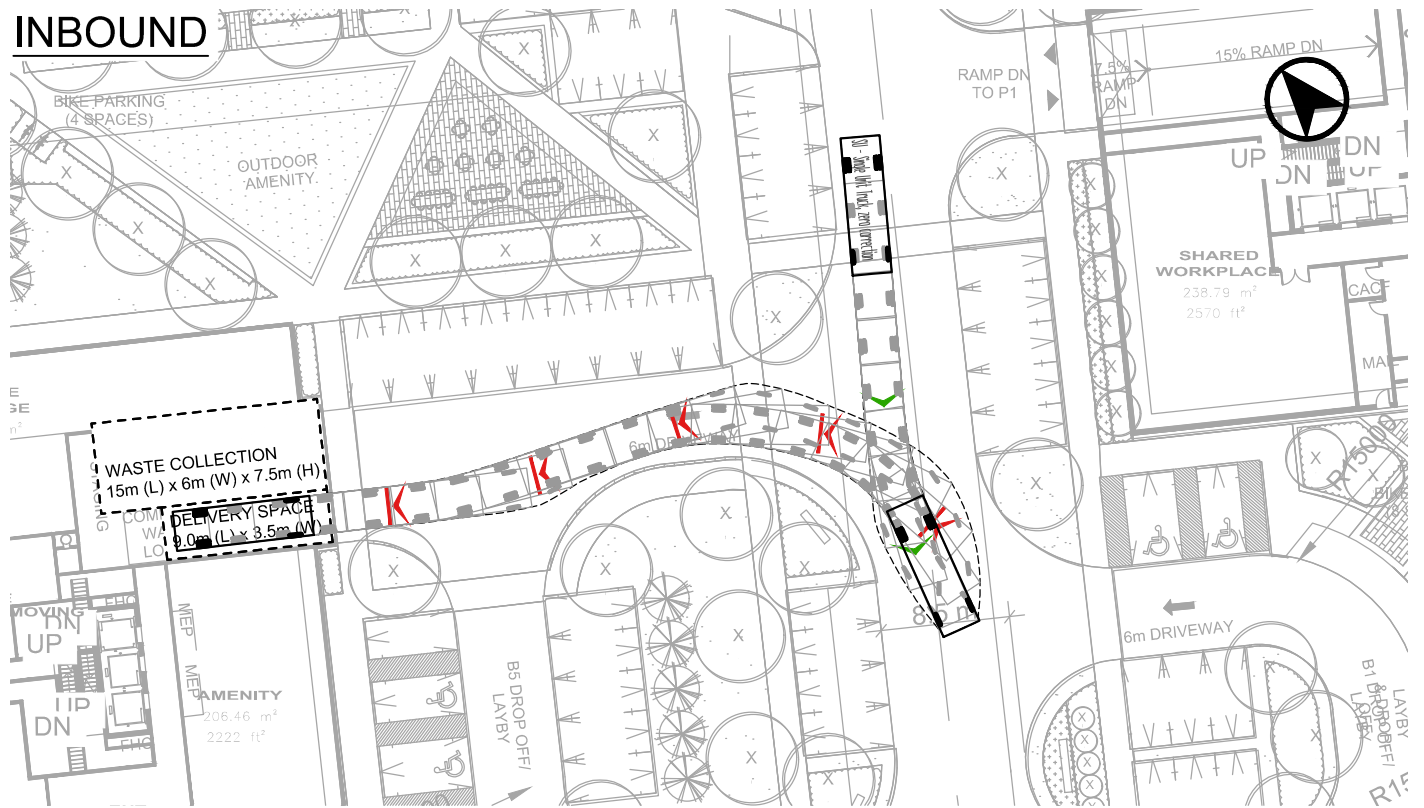
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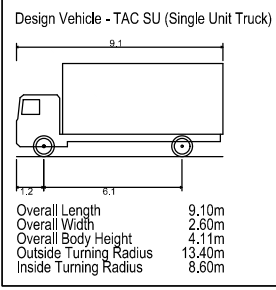
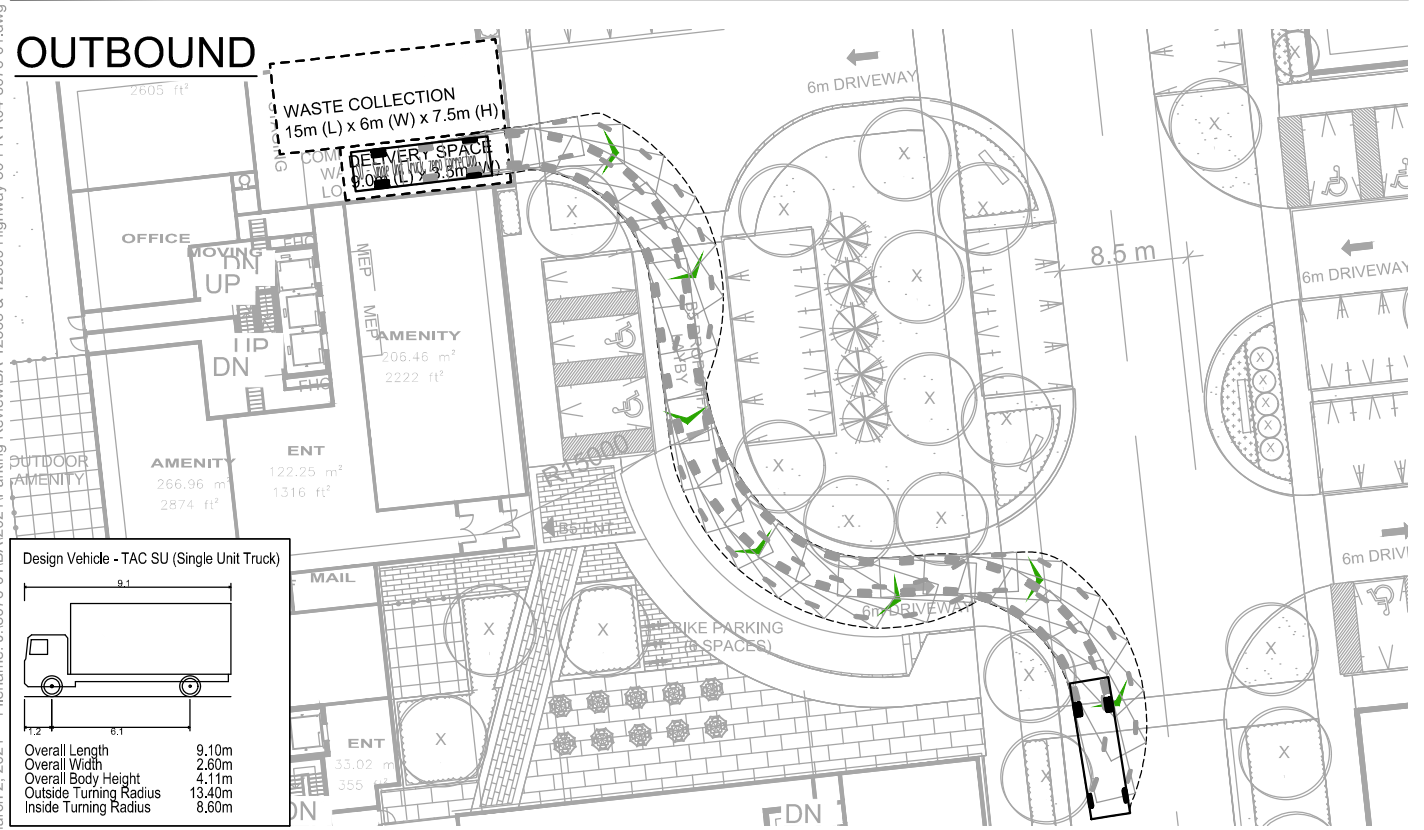
	<h2>VEHICLE MANOEUVRING DIAGRAM</h2> <h3>BUILDING 5 - WASTE COLLECTION</h3> <h3>REPRESENTATIVE REGION OF PEEL</h3> <h3>FRONT-LOADER VEHICLE</h3>	Project: 12563 & 12599 HWY 50
		Project No. 8076-01
		Date: MARCH 2, 2021
		Revised: --
		Drawing No. VMD-05A

Date Plotted: March 2, 2021 File: J:\8076-01\BA\2021\Parking Review\BA-12563 & 12599 Highway 50-PR-R04-8076-01.dwg

INBOUND



OUTBOUND



NOTE: VEHICLE TURNING PATHS ILLUSTRATED HAVE BEEN PREPARED TO ASSIST WITH THE DESIGN OF THE ARCHITECTURAL SITE PLAN. DESIGN VEHICLE TURN DYNAMICS AND DIMENSIONAL SIZE ESTABLISHED BY TRANSPORTATION OF CANADA (TAC) AND MINISTRY OF ONTARIO (MTO) HAVE BEEN APPLIED TO ASSESS THE TURN REQUIREMENTS TO POSITION THE VEHICLE AS SHOWN. ACTUAL TRAVEL PATH AND MANOEUVRES MAY VARY DEPENDING ON THE DRIVER OF THE VEHICLE AND VEHICLE'S DIMENSIONS.



VEHICLE MANOEUVRING DIAGRAM BUILDING 5 - DELIVERY SPACE TAC SINGLE-UNIT VEHICLE

Project:	12563 & 12599 HWY 50
Project No.:	8076-01
Date:	MARCH 2, 2021
Revised:	--
Drawing No.:	VMD-05B

Date Plotted: March 2, 2021 File: J:\8076-01\BA\2021\Parking Review\BA-12563 & 12599 Highway 50-PR-R04-8076-01.dwg

Appendix D

Turning Movement Counts





Turning Movement Count (5 . ALBION VAUGHAN RD & COMMERCIAL RD)

Start Time	N Approach ALBION VAUGHAN RD					S Approach ALBION VAUGHAN RD					W Approach COMMERCIAL RD					Int. Total (15 min)	Int. Total (1 hr)
	Right N:W	Thru N:S	UTurn N:N	Peds N:	Approach Total	Thru S:N	Left S:W	UTurn S:S	Peds S:	Approach Total	Right W:S	Left W:N	UTurn W:W	Peds W:	Approach Total		
07:00:00	31	129	0	0	160	27	4	0	0	31	3	6	0	0	9	200	
07:15:00	35	140	0	0	175	36	4	0	0	40	3	6	0	0	9	224	
07:30:00	30	155	0	0	185	36	3	0	0	39	1	7	0	0	8	232	
07:45:00	44	137	0	0	181	55	8	0	0	63	4	6	0	0	10	254	910
08:00:00	40	110	0	0	150	49	8	0	0	57	0	4	0	0	4	211	921
08:15:00	34	121	0	0	155	61	7	0	0	68	1	7	0	0	8	231	928
08:30:00	49	104	0	0	153	40	8	0	0	48	3	6	0	0	9	210	906
08:45:00	57	118	0	0	175	43	7	0	0	50	6	7	0	0	13	238	890
BREAK																	
16:00:00	35	59	0	0	94	145	6	0	0	151	3	31	0	0	34	279	
16:15:00	19	44	0	0	63	101	11	0	0	112	7	10	2	0	19	194	
16:30:00	25	68	0	0	93	176	7	0	0	183	16	26	0	0	42	318	
16:45:00	27	61	0	0	88	147	7	0	0	154	6	19	0	0	25	267	1058
17:00:00	26	56	0	0	82	165	2	0	0	167	11	30	0	0	41	290	1069
17:15:00	27	59	0	0	86	138	4	0	0	142	5	18	0	0	23	251	1126
17:30:00	29	62	0	0	91	146	2	0	0	148	4	18	0	0	22	261	1069
17:45:00	25	52	0	0	77	124	2	0	0	126	5	15	0	0	20	223	1025
Grand Total	533	1475	0	0	2008	1489	90	0	0	1579	78	216	2	0	296	3883	-
Approach%	26.5%	73.5%	0%	-	-	94.3%	5.7%	0%	-	-	26.4%	73%	0.7%	-	-	-	-
Totals %	13.7%	38%	0%	-	51.7%	38.3%	2.3%	0%	-	40.7%	2%	5.6%	0.1%	-	7.6%	-	-
Heavy	26	107	0	-	-	80	6	0	-	-	9	22	0	-	-	-	-
Heavy %	4.9%	7.3%	0%	-	-	5.4%	6.7%	0%	-	-	11.5%	10.2%	0%	-	-	-	-
Bicycles	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bicycle %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Peak Hour: 07:30 AM - 08:30 AM Weather: Light Rain (2.76 °C)

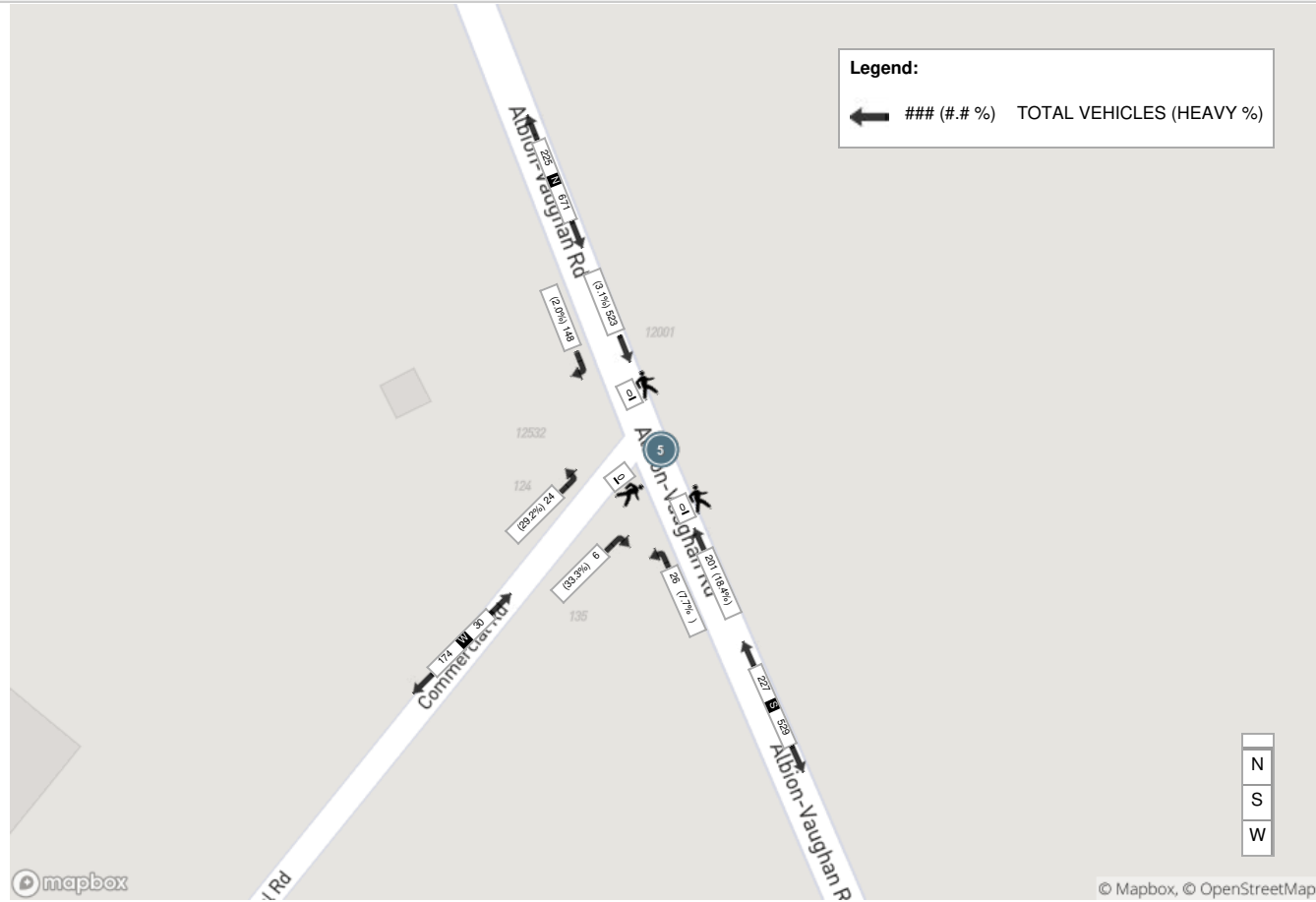
Start Time	N Approach ALBION VAUGHAN RD					S Approach ALBION VAUGHAN RD					W Approach COMMERCIAL RD					Int. Total (15 min)
	Right	Thru	UTurn	Peds	Approach Total	Thru	Left	UTurn	Peds	Approach Total	Right	Left	UTurn	Peds	Approach Total	
07:30:00	30	155	0	0	185	36	3	0	0	39	1	7	0	0	8	232
07:45:00	44	137	0	0	181	55	8	0	0	63	4	6	0	0	10	254
08:00:00	40	110	0	0	150	49	8	0	0	57	0	4	0	0	4	211
08:15:00	34	121	0	0	155	61	7	0	0	68	1	7	0	0	8	231
Grand Total	148	523	0	0	671	201	26	0	0	227	6	24	0	0	30	928
Approach%	22.1%	77.9%	0%	-	-	88.5%	11.5%	0%	-	-	20%	80%	0%	-	-	-
Totals %	15.9%	56.4%	0%	72.3%	72.3%	21.7%	2.8%	0%	24.5%	24.5%	0.6%	2.6%	0%	3.2%	3.2%	-
PHF	0.84	0.84	0	0.91	0.91	0.82	0.81	0	0.83	0.83	0.38	0.86	0	0.75	0.75	-
Heavy	3	16	0	19	19	37	2	0	39	39	2	7	0	9	9	-
Heavy %	2%	3.1%	0%	2.8%	2.8%	18.4%	7.7%	0%	17.2%	17.2%	33.3%	29.2%	0%	30%	30%	-
Lights	145	507	0	652	652	164	24	0	188	188	4	17	0	21	21	-
Lights %	98%	96.9%	0%	97.2%	97.2%	81.6%	92.3%	0%	82.8%	82.8%	66.7%	70.8%	0%	70%	70%	-
Single-Unit Trucks	1	7	0	8	8	20	2	0	22	22	1	3	0	4	4	-
Single-Unit Trucks %	0.7%	1.3%	0%	1.2%	1.2%	10%	7.7%	0%	9.7%	9.7%	16.7%	12.5%	0%	13.3%	13.3%	-
Buses	0	2	0	2	2	8	0	0	8	8	1	0	0	1	1	-
Buses %	0%	0.4%	0%	0.3%	0.3%	4%	0%	0%	3.5%	3.5%	16.7%	0%	0%	3.3%	3.3%	-
Articulated Trucks	2	7	0	9	9	9	0	0	9	9	0	4	0	4	4	-
Articulated Trucks %	1.4%	1.3%	0%	1.3%	1.3%	4.5%	0%	0%	4%	4%	0%	16.7%	0%	13.3%	13.3%	-



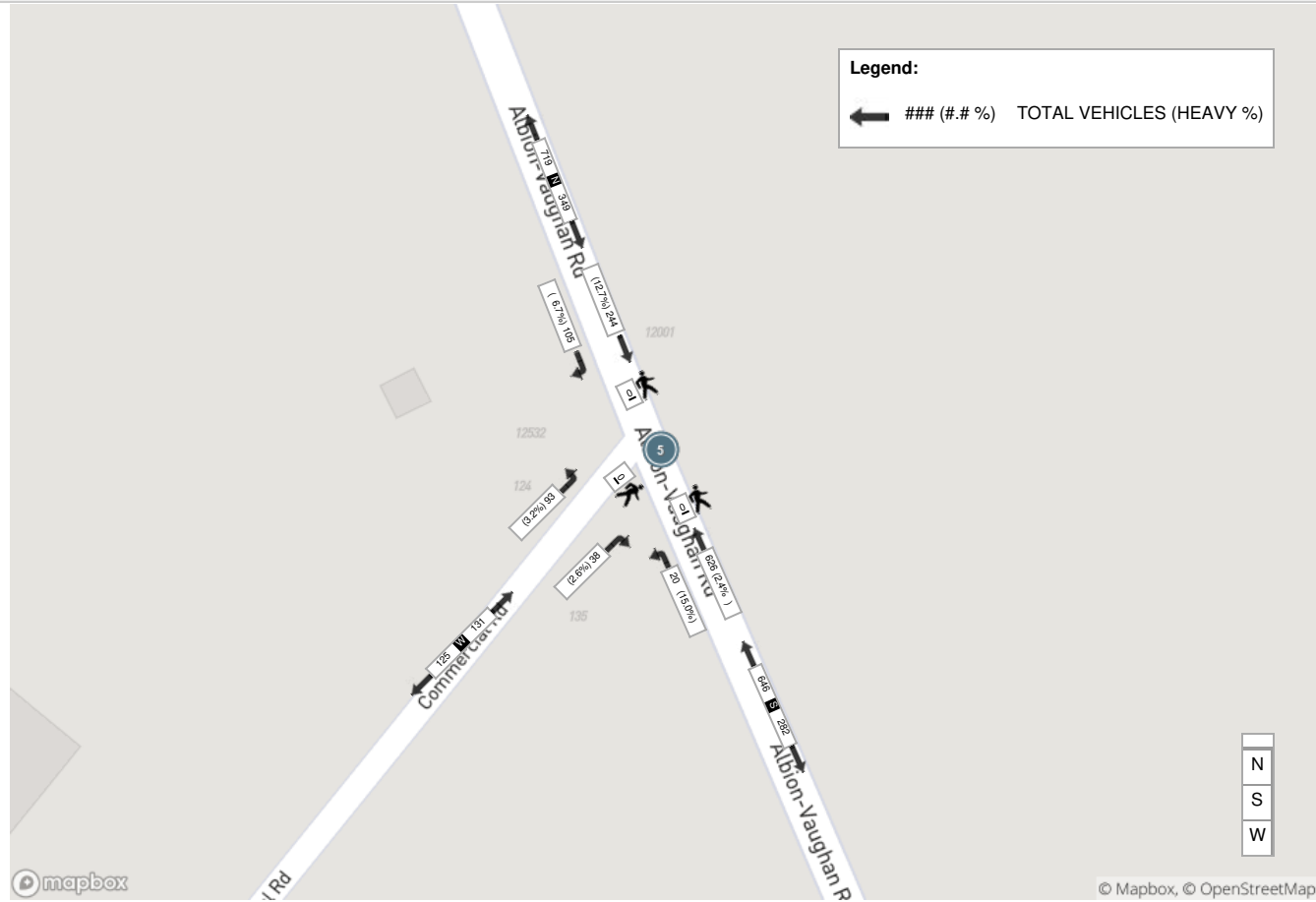
Peak Hour: 04:30 PM - 05:30 PM Weather: Mist (5.74 °C)

Start Time	N Approach ALBION VAUGHAN RD					S Approach ALBION VAUGHAN RD					W Approach COMMERCIAL RD					Int. Total (15 min)
	Right	Thru	UTurn	Peds	Approach Total	Thru	Left	UTurn	Peds	Approach Total	Right	Left	UTurn	Peds	Approach Total	
16:30:00	25	68	0	0	93	176	7	0	0	183	16	26	0	0	42	318
16:45:00	27	61	0	0	88	147	7	0	0	154	6	19	0	0	25	267
17:00:00	26	56	0	0	82	165	2	0	0	167	11	30	0	0	41	290
17:15:00	27	59	0	0	86	138	4	0	0	142	5	18	0	0	23	251
Grand Total	105	244	0	0	349	626	20	0	0	646	38	93	0	0	131	1126
Approach%	30.1%	69.9%	0%	-	-	96.9%	3.1%	0%	-	-	29%	71%	0%	-	-	-
Totals %	9.3%	21.7%	0%	31%	55.6%	1.8%	0%	57.4%	3.4%	8.3%	0%	11.6%	-	-	-	-
PHF	0.97	0.9	0	0.94	0.89	0.71	0	0.88	0.59	0.78	0	0.78	-	-	-	-
Heavy	7	31	0	38	15	3	0	18	1	3	0	4	-	-	-	-
Heavy %	6.7%	12.7%	0%	10.9%	2.4%	15%	0%	2.8%	2.6%	3.2%	0%	3.1%	-	-	-	-
Lights	98	213	0	311	611	17	0	628	37	90	0	127	-	-	-	-
Lights %	93.3%	87.3%	0%	89.1%	97.6%	85%	0%	97.2%	97.4%	96.8%	0%	96.9%	-	-	-	-
Single-Unit Trucks	5	10	0	15	11	2	0	13	1	3	0	4	-	-	-	-
Single-Unit Trucks %	4.8%	4.1%	0%	4.3%	1.8%	10%	0%	2%	2.6%	3.2%	0%	3.1%	-	-	-	-
Buses	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-
Buses %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	-	-	-	-
Articulated Trucks	2	21	0	23	4	1	0	5	0	0	0	0	-	-	-	-
Articulated Trucks %	1.9%	8.6%	0%	6.6%	0.6%	5%	0%	0.8%	0%	0%	0%	0%	-	-	-	-

Peak Hour: 07:30 AM - 08:30 AM Weather: Light Rain (2.76 °C)



Peak Hour: 04:30 PM - 05:30 PM Weather: Mist (5.74 °C)





Turning Movement Count (4 . ALBION VAUGHAN RD & INDUSTRIAL RD)

Start Time	N Approach ALBION VAUGHAN RD					S Approach ALBION VAUGHAN RD					W Approach INDUSTRIAL RD					Int. Total (15 min)	Int. Total (1 hr)
	Right N:W	Thru N:S	UTurn N:N	Peds N:	Approach Total	Thru S:N	Left S:W	UTurn S:S	Peds S:	Approach Total	Right W:S	Left W:N	UTurn W:W	Peds W:	Approach Total		
07:00:00	13	120	0	0	133	29	7	0	0	36	2	1	0	0	3	172	
07:15:00	14	124	0	0	138	39	6	0	0	45	3	4	0	0	7	190	
07:30:00	16	139	0	0	155	44	7	0	0	51	5	1	0	0	6	212	
07:45:00	18	123	0	0	141	53	11	0	0	64	3	4	0	0	7	212	786
08:00:00	13	101	0	0	114	53	13	0	0	66	2	3	0	0	5	185	799
08:15:00	19	108	0	0	127	63	7	0	0	70	8	6	0	0	14	211	820
08:30:00	13	92	0	0	105	43	7	0	0	50	6	5	0	0	11	166	774
08:45:00	24	102	0	0	126	41	8	0	0	49	10	8	0	0	18	193	755
BREAK																	
16:00:00	7	54	0	0	61	129	8	0	0	137	20	11	0	0	31	229	
16:15:00	8	46	0	0	54	125	5	0	0	130	9	9	0	0	18	202	
16:30:00	5	81	0	0	86	152	13	0	0	165	14	16	0	0	30	281	
16:45:00	8	59	0	0	67	145	12	0	0	157	15	5	0	0	20	244	956
17:00:00	5	63	0	0	68	152	3	0	0	155	15	17	0	0	32	255	982
17:15:00	2	60	0	0	62	127	5	0	0	132	11	16	0	0	27	221	1001
17:30:00	2	67	0	0	69	139	4	0	0	143	11	8	0	0	19	231	951
17:45:00	3	55	0	0	58	119	6	0	0	125	6	6	0	0	12	195	902
Grand Total	170	1394	0	0	1564	1453	122	0	0	1575	140	120	0	0	260	3399	-
Approach%	10.9%	89.1%	0%	-	-	92.3%	7.7%	0%	-	-	53.8%	46.2%	0%	-	-	-	-
Totals %	5%	41%	0%	46%	42.7%	3.6%	0%	46.3%	4.1%	3.5%	0%	7.6%	-	-	-	-	
Heavy	8	109	0	-	77	27	0	-	12	11	0	-	-	-	-	-	
Heavy %	4.7%	7.8%	0%	-	5.3%	22.1%	0%	-	8.6%	9.2%	0%	-	-	-	-	-	
Bicycles	0	0	0	-	0	1	0	-	1	0	0	-	-	-	-	-	
Bicycle %	0%	0%	0%	-	0%	0.8%	0%	-	0.7%	0%	0%	-	-	-	-	-	



Peak Hour: 07:30 AM - 08:30 AM Weather: Light Rain (2.76 °C)

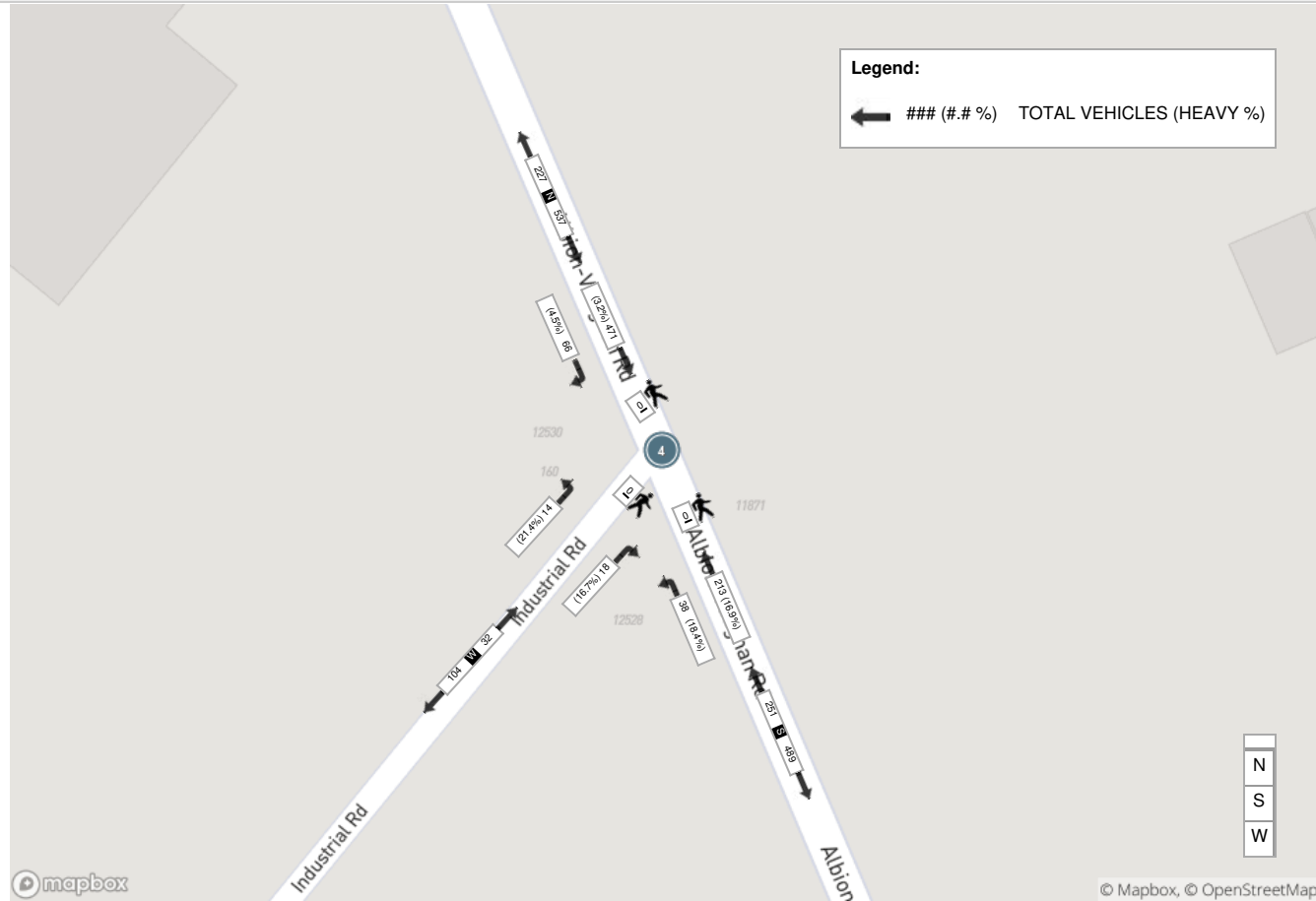
Start Time	N Approach ALBION VAUGHAN RD					S Approach ALBION VAUGHAN RD					W Approach INDUSTRIAL RD					Int. Total (15 min)
	Right	Thru	UTurn	Peds	Approach Total	Thru	Left	UTurn	Peds	Approach Total	Right	Left	UTurn	Peds	Approach Total	
07:30:00	16	139	0	0	155	44	7	0	0	51	5	1	0	0	6	212
07:45:00	18	123	0	0	141	53	11	0	0	64	3	4	0	0	7	212
08:00:00	13	101	0	0	114	53	13	0	0	66	2	3	0	0	5	185
08:15:00	19	108	0	0	127	63	7	0	0	70	8	6	0	0	14	211
Grand Total	66	471	0	0	537	213	38	0	0	251	18	14	0	0	32	820
Approach%	12.3%	87.7%	0%		-	84.9%	15.1%	0%		-	56.3%	43.8%	0%		-	-
Totals %	8%	57.4%	0%		65.5%	26%	4.6%	0%		30.6%	2.2%	1.7%	0%		3.9%	-
PHF	0.87	0.85	0		0.87	0.85	0.73	0		0.9	0.56	0.58	0		0.57	-
Heavy	3	15	0		18	36	7	0		43	3	3	0		6	-
Heavy %	4.5%	3.2%	0%		3.4%	16.9%	18.4%	0%		17.1%	16.7%	21.4%	0%		18.8%	-
Lights	63	456	0		519	177	31	0		208	15	11	0		26	-
Lights %	95.5%	96.8%	0%		96.6%	83.1%	81.6%	0%		82.9%	83.3%	78.6%	0%		81.3%	-
Single-Unit Trucks	1	7	0		8	19	5	0		24	1	3	0		4	-
Single-Unit Trucks %	1.5%	1.5%	0%		1.5%	8.9%	13.2%	0%		9.6%	5.6%	21.4%	0%		12.5%	-
Buses	0	3	0		3	8	0	0		8	2	0	0		2	-
Buses %	0%	0.6%	0%		0.6%	3.8%	0%	0%		3.2%	11.1%	0%	0%		6.3%	-
Articulated Trucks	2	5	0		7	9	2	0		11	0	0	0		0	-
Articulated Trucks %	3%	1.1%	0%		1.3%	4.2%	5.3%	0%		4.4%	0%	0%	0%		0%	-
Bicycles on Road	0	0	0	0	-	0	0	0	0	-	0	0	0	0	-	-
Bicycles on Road%	-	-	-	%		-	-	-	%		-	-	-	%		-



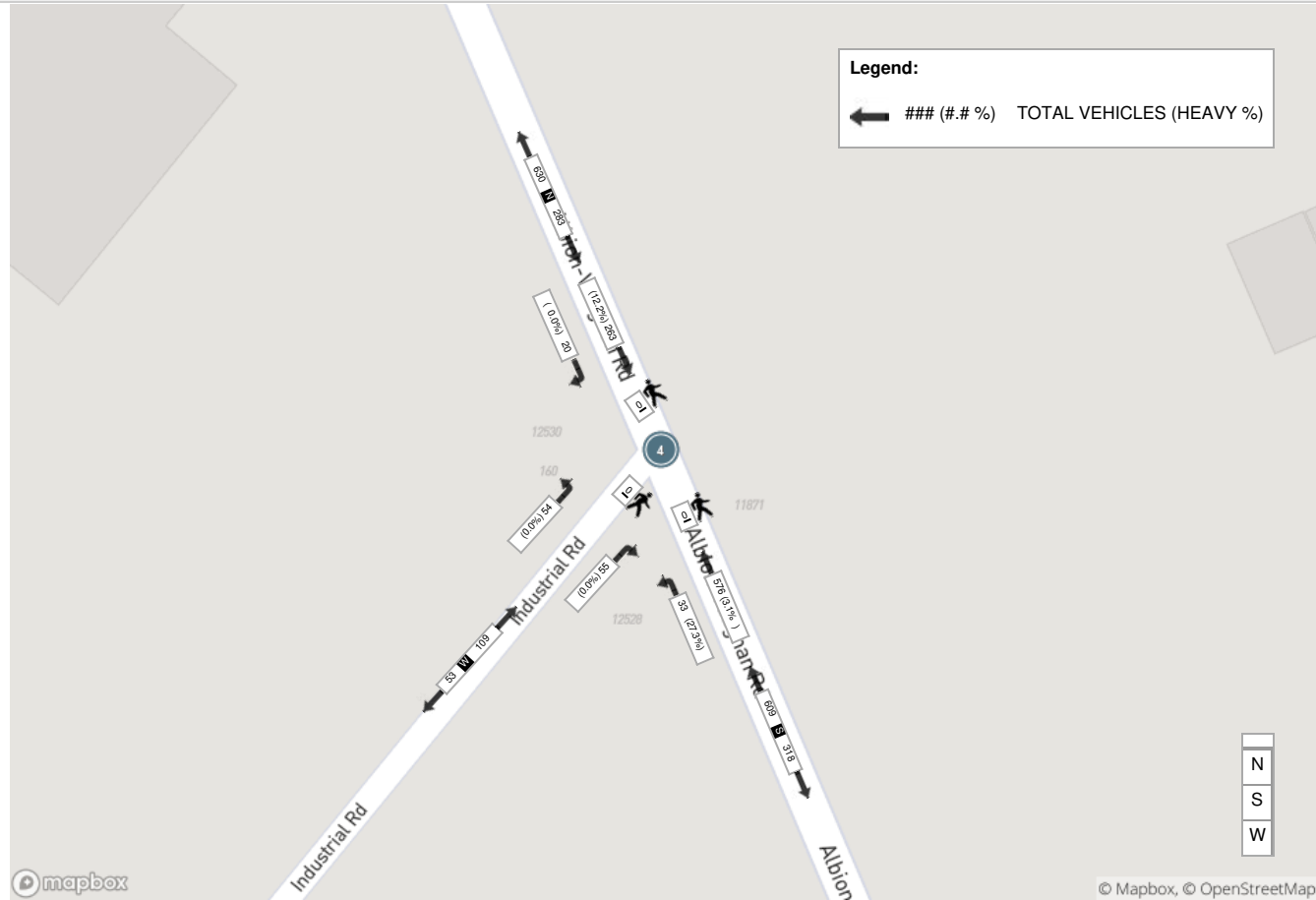
Peak Hour: 04:30 PM - 05:30 PM Weather: Mist (5.74 °C)

Start Time	N Approach ALBION VAUGHAN RD					S Approach ALBION VAUGHAN RD					W Approach INDUSTRIAL RD					Int. Total (15 min)
	Right	Thru	UTurn	Peds	Approach Total	Thru	Left	UTurn	Peds	Approach Total	Right	Left	UTurn	Peds	Approach Total	
16:30:00	5	81	0	0	86	152	13	0	0	165	14	16	0	0	30	281
16:45:00	8	59	0	0	67	145	12	0	0	157	15	5	0	0	20	244
17:00:00	5	63	0	0	68	152	3	0	0	155	15	17	0	0	32	255
17:15:00	2	60	0	0	62	127	5	0	0	132	11	16	0	0	27	221
Grand Total	20	263	0	0	283	576	33	0	0	609	55	54	0	0	109	1001
Approach%	7.1%	92.9%	0%		-	94.6%	5.4%	0%		-	50.5%	49.5%	0%		-	-
Totals %	2%	26.3%	0%		28.3%	57.5%	3.3%	0%		60.8%	5.5%	5.4%	0%		10.9%	-
PHF	0.63	0.81	0		0.82	0.95	0.63	0		0.92	0.92	0.79	0		0.85	-
Heavy	0	32	0		32	18	9	0		27	0	0	0		0	-
Heavy %	0%	12.2%	0%		11.3%	3.1%	27.3%	0%		4.4%	0%	0%	0%		0%	-
Lights	20	231	0		251	558	24	0		582	55	54	0		109	-
Lights %	100%	87.8%	0%		88.7%	96.9%	72.7%	0%		95.6%	100%	100%	0%		100%	-
Single-Unit Trucks	0	11	0		11	13	5	0		18	0	0	0		0	-
Single-Unit Trucks %	0%	4.2%	0%		3.9%	2.3%	15.2%	0%		3%	0%	0%	0%		0%	-
Buses	0	0	0		0	0	0	0		0	0	0	0		0	-
Buses %	0%	0%	0%		0%	0%	0%	0%		0%	0%	0%	0%		0%	-
Articulated Trucks	0	21	0		21	5	4	0		9	0	0	0		0	-
Articulated Trucks %	0%	8%	0%		7.4%	0.9%	12.1%	0%		1.5%	0%	0%	0%		0%	-
Bicycles on Road	0	0	0	0	-	0	0	0	0	-	0	0	0	0	-	-
Bicycles on Road%	-	-	-	%		-	-	-	%		-	-	-	%		-

Peak Hour: 07:30 AM - 08:30 AM Weather: Light Rain (2.76 °C)



Peak Hour: 04:30 PM - 05:30 PM Weather: Mist (5.74 °C)





Turning Movement Count (3 . ALBION VAUGHAN RD & KIRBY RD)

Start Time	N Approach ALBION VAUGHAN RD					E Approach KIRBY RD					S Approach ALBION VAUGHAN RD					Int. Total (15 min)	Int. Total (1 hr)
	Thru N:S	Left N:E	UTurn N:N	Peds N:	Approach Total	Right E:N	Left E:S	UTurn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	UTurn S:S	Peds S:	Approach Total		
07:00:00	119	10	0	0	129	0	0	0	0	0	0	36	0	0	36	165	
07:15:00	113	11	0	0	124	7	0	0	0	7	1	36	0	0	37	168	
07:30:00	126	15	0	0	141	7	0	0	0	7	2	43	0	0	45	193	
07:45:00	124	19	0	0	143	5	0	0	0	5	1	51	0	0	52	200	726
08:00:00	104	12	0	0	116	7	3	0	0	10	3	58	0	0	61	187	748
08:15:00	113	14	0	0	127	5	0	0	0	5	0	59	0	0	59	191	771
08:30:00	91	13	0	0	104	6	0	0	0	6	0	40	0	0	40	150	728
08:45:00	98	16	0	0	114	6	1	0	0	7	3	41	0	0	44	165	693
BREAK																	
16:00:00	71	8	0	0	79	9	0	0	0	9	2	138	0	0	140	228	
16:15:00	50	11	0	0	61	12	1	0	0	13	2	122	0	0	124	198	
16:30:00	78	12	0	0	90	21	0	0	0	21	0	143	0	0	143	254	
16:45:00	54	7	0	0	61	23	3	0	0	26	1	141	0	0	142	229	909
17:00:00	70	8	0	0	78	17	4	0	0	21	0	144	0	0	144	243	924
17:15:00	57	9	0	0	66	10	2	0	0	12	1	141	0	0	142	220	946
17:30:00	70	5	0	0	75	10	0	0	0	10	0	124	0	0	124	209	901
17:45:00	47	5	0	0	52	15	0	0	0	15	0	117	0	0	117	184	856
Grand Total	1385	175	0	0	1560	160	14	0	0	174	16	1434	0	0	1450	3184	-
Approach%	88.8%	11.2%	0%	-	-	92%	8%	0%	-	-	1.1%	98.9%	0%	-	-	-	-
Totals %	43.5%	5.5%	0%	-	49%	5%	0.4%	0%	-	5.5%	0.5%	45%	0%	-	45.5%	-	-
Heavy	114	10	0	-	-	11	4	0	-	-	2	93	0	-	-	-	-
Heavy %	8.2%	5.7%	0%	-	-	6.9%	28.6%	0%	-	-	12.5%	6.5%	0%	-	-	-	-
Bicycles	0	1	0	-	-	1	0	0	-	-	0	0	0	-	-	-	-
Bicycle %	0%	0.6%	0%	-	-	0.6%	0%	0%	-	-	0%	0%	0%	-	-	-	-



Peak Hour: 07:30 AM - 08:30 AM Weather: Light Rain (2.76 °C)

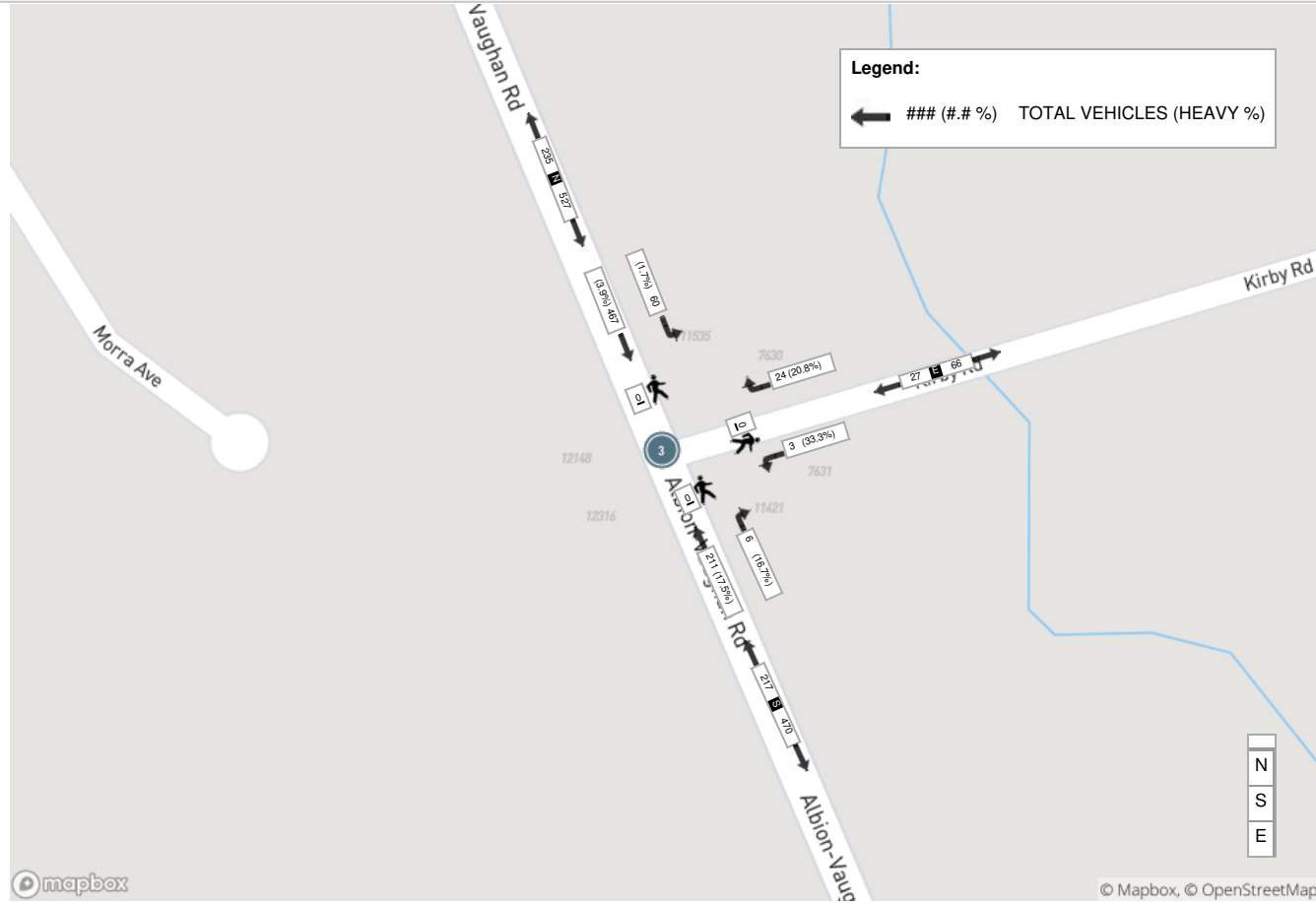
Start Time	N Approach ALBION VAUGHAN RD					E Approach KIRBY RD					S Approach ALBION VAUGHAN RD					Int. Total (15 min)
	Thru	Left	UTurn	Peds	Approach Total	Right	Left	UTurn	Peds	Approach Total	Right	Thru	UTurn	Peds	Approach Total	
07:30:00	126	15	0	0	141	7	0	0	0	7	2	43	0	0	45	193
07:45:00	124	19	0	0	143	5	0	0	0	5	1	51	0	0	52	200
08:00:00	104	12	0	0	116	7	3	0	0	10	3	58	0	0	61	187
08:15:00	113	14	0	0	127	5	0	0	0	5	0	59	0	0	59	191
Grand Total	467	60	0	0	527	24	3	0	0	27	6	211	0	0	217	771
Approach%	88.6%	11.4%	0%		-	88.9%	11.1%	0%		-	2.8%	97.2%	0%		-	-
Totals %	60.6%	7.8%	0%		68.4%	3.1%	0.4%	0%		3.5%	0.8%	27.4%	0%		28.1%	-
PHF	0.93	0.79	0		0.92	0.86	0.25	0		0.68	0.5	0.89	0		0.89	-
Heavy	18	1	0		19	5	1	0		6	1	37	0		38	-
Heavy %	3.9%	1.7%	0%		3.6%	20.8%	33.3%	0%		22.2%	16.7%	17.5%	0%		17.5%	-
Lights	449	59	0		508	19	2	0		21	5	174	0		179	-
Lights %	96.1%	98.3%	0%		96.4%	79.2%	66.7%	0%		77.8%	83.3%	82.5%	0%		82.5%	-
Single-Unit Trucks	9	1	0		10	5	1	0		6	1	19	0		20	-
Single-Unit Trucks %	1.9%	1.7%	0%		1.9%	20.8%	33.3%	0%		22.2%	16.7%	9%	0%		9.2%	-
Buses	3	0	0		3	0	0	0		0	0	7	0		7	-
Buses %	0.6%	0%	0%		0.6%	0%	0%	0%		0%	0%	3.3%	0%		3.2%	-
Articulated Trucks	6	0	0		6	0	0	0		0	0	11	0		11	-
Articulated Trucks %	1.3%	0%	0%		1.1%	0%	0%	0%		0%	0%	5.2%	0%		5.1%	-
Bicycles on Road	0	0	0	0	-	0	0	0	0	-	0	0	0	0	-	-
Bicycles on Road%	-	-	-	%	-	-	-	-	%	-	-	-	-	%	-	-



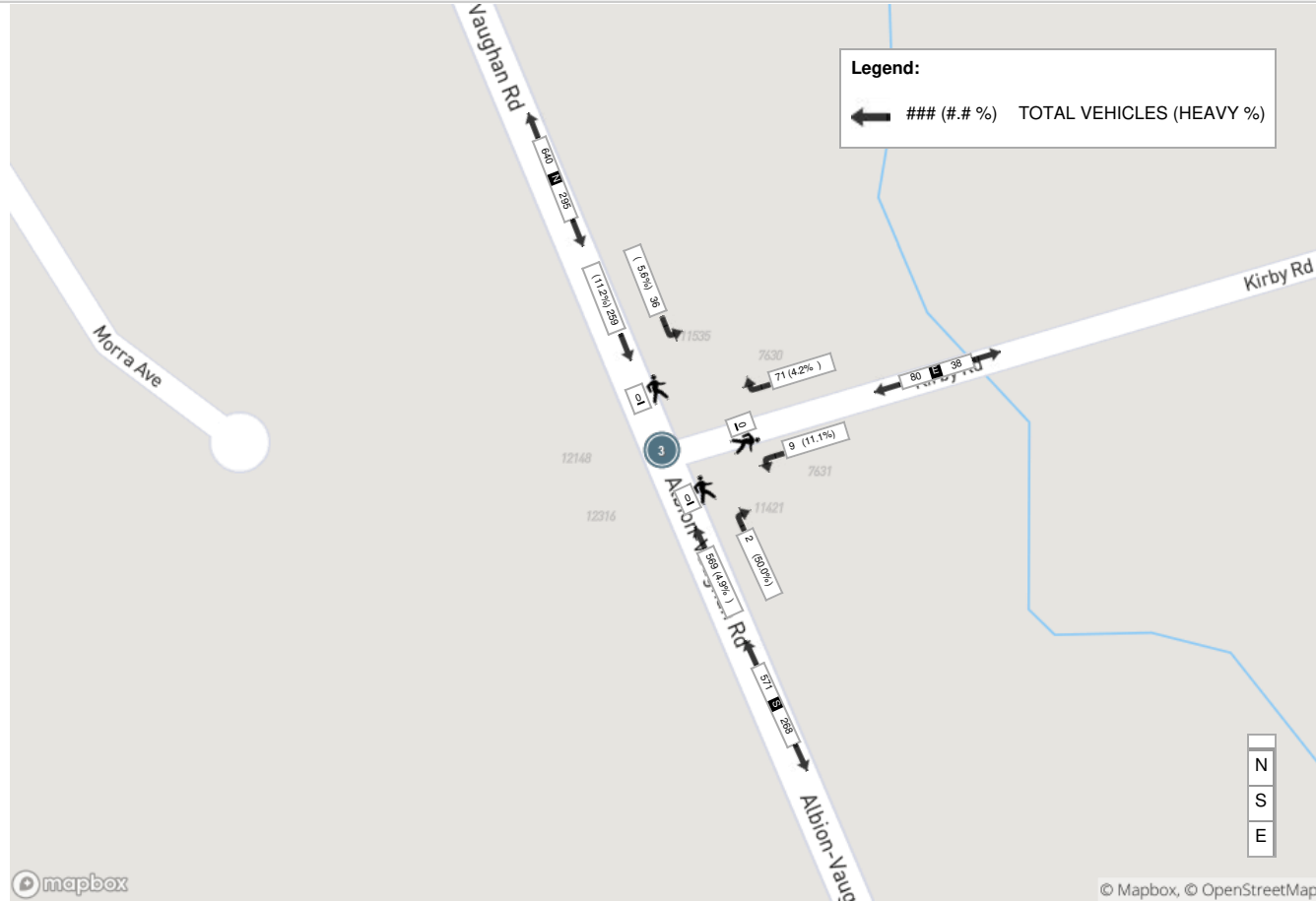
Peak Hour: 04:30 PM - 05:30 PM Weather: Mist (5.74 °C)

Start Time	N Approach ALBION VAUGHAN RD					E Approach KIRBY RD					S Approach ALBION VAUGHAN RD					Int. Total (15 min)
	Thru	Left	UTurn	Peds	Approach Total	Right	Left	UTurn	Peds	Approach Total	Right	Thru	UTurn	Peds	Approach Total	
16:30:00	78	12	0	0	90	21	0	0	0	21	0	143	0	0	143	254
16:45:00	54	7	0	0	61	23	3	0	0	26	1	141	0	0	142	229
17:00:00	70	8	0	0	78	17	4	0	0	21	0	144	0	0	144	243
17:15:00	57	9	0	0	66	10	2	0	0	12	1	141	0	0	142	220
Grand Total	259	36	0	0	295	71	9	0	0	80	2	569	0	0	571	946
Approach%	87.8%	12.2%	0%		-	88.8%	11.3%	0%		-	0.4%	99.6%	0%		-	-
Totals %	27.4%	3.8%	0%		31.2%	7.5%	1%	0%		8.5%	0.2%	60.1%	0%		60.4%	-
PHF	0.83	0.75	0		0.82	0.77	0.56	0		0.77	0.5	0.99	0		0.99	-
Heavy	29	2	0		31	3	1	0		4	1	28	0		29	-
Heavy %	11.2%	5.6%	0%		10.5%	4.2%	11.1%	0%		5%	50%	4.9%	0%		5.1%	-
Lights	230	34	0		264	68	8	0		76	1	541	0		542	-
Lights %	88.8%	94.4%	0%		89.5%	95.8%	88.9%	0%		95%	50%	95.1%	0%		94.9%	-
Single-Unit Trucks	9	2	0		11	3	1	0		4	1	16	0		17	-
Single-Unit Trucks %	3.5%	5.6%	0%		3.7%	4.2%	11.1%	0%		5%	50%	2.8%	0%		3%	-
Buses	0	0	0		0	0	0	0		0	0	0	0		0	-
Buses %	0%	0%	0%		0%	0%	0%	0%		0%	0%	0%	0%		0%	-
Articulated Trucks	20	0	0		20	0	0	0		0	0	12	0		12	-
Articulated Trucks %	7.7%	0%	0%		6.8%	0%	0%	0%		0%	0%	2.1%	0%		2.1%	-
Bicycles on Road	0	0	0	0	-	0	0	0	0	-	0	0	0	0	-	-
Bicycles on Road%	-	-	-	%		-	-	-	%		-	-	-	%		-

Peak Hour: 07:30 AM - 08:30 AM Weather: Light Rain (2.76 °C)



Peak Hour: 04:30 PM - 05:30 PM Weather: Mist (5.74 °C)



mapbox

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Turning Movement Count (38 . HIGHWAY 50 & PARR BLVD) CustID: 05012559 MioID:

Start Time	Southbound						Westbound						Northbound						Eastbound						Int. Total (15 min)	
	Left	Thru	Right	UTurn	Peds	Approach Total	Left	Thru	Right	UTurn	Peds	Approach Total	Left	Thru	Right	UTurn	Peds	Approach Total	Left	Thru	Right	UTurn	Peds	Approach Total		
07:00:00	0	293	16	0	0	309	0	0	0	0	0	0	20	181	1	0	0	202	3	0	6	0	0	9	520	
07:15:00	0	253	15	0	0	268	0	0	0	0	0	0	19	184	0	0	0	203	4	0	5	0	0	9	480	
07:30:00	0	223	18	0	0	241	0	0	0	0	0	0	23	181	0	0	0	204	2	0	11	0	0	13	458	
07:45:00	0	241	35	0	0	276	0	0	0	0	0	0	23	260	1	0	0	284	6	0	14	0	0	20	580	
Hourly	0	1010	84	0	0	1094	0	0	0	0	0	0	85	806	2	0	0	893	15	0	36	0	0	51	2038	
08:00:00	0	278	24	0	0	302	0	0	0	0	0	0	32	210	0	0	0	242	4	0	9	0	0	13	557	
08:15:00	0	259	24	0	0	283	0	0	0	0	0	0	33	180	0	0	0	213	8	0	11	0	0	19	515	
08:30:00	0	252	26	0	0	278	1	0	0	0	0	1	32	196	1	0	0	229	13	0	11	0	0	24	532	
08:45:00	0	223	35	0	0	258	0	0	2	0	0	2	24	210	0	0	0	234	18	1	20	0	0	39	533	
Hourly	0	1012	109	0	0	1121	1	0	2	0	0	3	121	796	1	0	0	918	43	1	51	0	0	95	2137	
BREAK																										
11:00:00	0	176	16	0	0	192	1	0	0	0	0	1	19	176	2	0	0	197	14	1	12	0	0	27	417	
11:15:00	1	206	19	0	0	226	0	0	3	0	0	3	22	151	0	0	0	173	18	0	14	0	0	32	434	
11:30:00	0	197	16	0	0	213	0	0	0	0	0	0	19	173	1	0	0	193	14	0	11	0	1	25	431	
11:45:00	1	191	18	0	0	210	1	0	1	0	0	2	8	178	1	0	0	187	31	1	14	1	0	47	446	
Hourly	2	770	69	0	0	841	2	0	4	0	0	6	68	678	4	0	0	750	77	2	51	1	1	131	1728	
12:00:00	0	176	31	0	0	207	0	0	2	0	0	2	18	156	1	0	0	175	38	0	14	0	0	52	436	
12:15:00	1	182	18	0	0	201	0	0	0	0	0	0	18	216	0	0	0	234	31	0	17	0	0	48	483	
12:30:00	0	188	30	1	0	219	0	0	1	0	0	1	18	237	1	0	0	256	19	0	10	0	0	29	505	
12:45:00	0	179	26	1	0	206	0	0	0	0	0	0	17	185	0	0	0	202	20	0	15	0	0	35	443	
Hourly	1	725	105	2	0	833	0	0	3	0	0	3	71	794	2	0	0	867	108	0	56	0	0	164	1867	
13:00:00	2	181	33	0	0	216	0	0	2	0	0	2	21	202	0	0	0	223	24	0	18	0	0	42	483	
13:15:00	1	201	20	0	0	222	0	0	1	0	0	1	14	233	0	0	0	247	20	0	16	0	0	36	506	
13:30:00	0	181	14	0	0	195	0	0	1	0	0	1	15	213	0	0	0	228	23	0	14	0	0	37	461	
13:45:00	0	182	25	0	0	207	1	0	0	0	0	1	14	235	1	0	0	250	15	0	16	0	0	31	489	
Hourly	3	745	92	0	0	840	1	0	4	0	0	5	64	883	1	0	0	948	82	0	64	0	0	146	1939	
BREAK																										
15:00:00	0	219	18	2	0	239	0	0	1	0	0	1	14	297	1	0	0	312	10	0	17	0	1	27	579	
15:15:00	0	214	27	0	0	241	0	0	0	0	0	0	25	275	0	0	0	300	28	0	33	0	0	61	602	
15:30:00	0	255	16	0	0	271	1	0	1	0	0	2	12	287	0	0	0	299	23	0	21	0	0	44	616	
15:45:00	0	200	23	1	0	224	1	0	0	0	0	1	17	244	0	0	0	261	22	0	23	0	0	45	531	
Hourly	0	888	84	3	0	975	2	0	2	0	0	4	68	1103	1	0	0	1172	83	0	94	0	1	177	2328	
16:00:00	1	289	14	0	0	304	0	0	2	0	0	2	7	332	0	0	0	339	23	0	41	0	0	64	709	
16:15:00	1	211	15	0	0	227	0	0	0	0	0	0	16	289	0	1	0	306	32	0	12	0	0	44	577	
16:30:00	0	279	11	0	0	290	0	0	0	0	0	0	19	375	0	0	0	394	33	0	27	0	0	60	744	
16:45:00	0	223	11	0	0	234	0	0	0	0	0	0	11	317	0	0	0	328	26	0	26	0	0	52	614	
Hourly	2	1002	51	0	0	1055	0	0	2	0	0	2	53	1313	0	1	0	1367	114	0	106	0	0	220	2644	
17:00:00	0	352	14	0	0	366	0	0	0	0	0	0	9	338	0	0	0	347	35	0	23	0	0	58	771	
17:15:00	0	229	9	0	0	238	1	0	1	0	0	2	9	309	0	0	0	318	31	0	20	0	0	51	609	
17:30:00	0	236	19	0	0	255	0	0	0	0	0	0	7	311	0	0	0	318	21	0	26	0	0	47	620	
17:45:00	0	168	14	0	0	182	0	0	0	0	0	0	11	255	0	0	0	266	22	0	13	0	0	35	483	
Hourly	0	985	56	0	0	1041	1	0	1	0	0	2	36	1213	0	0	0	1249	109	0	82	0	0	191	2483	
Grand Total	8	7137	650	5	0	7800	7	0	18	0	0	25	566	7586	11	1	0	8164	631	3	540	1	2	1175	17164	
Approach%	0.1%	91.5%	8.3%	0.1%	-	-	28%	0%	72%	0%	-	-	6.9%	92.9%	0.1%	0%	-	53.7%	0.3%	46%	0.1%	-	-	-		
Totals %	0%	41.6%	3.8%	0%	45.4%	0%	0%	0.1%	0%	0.1%	3.3%	44.2%	0.1%	0%	47.6%	3.7%	0%	3.1%	0%	6.8%	-	-	-	-		



Turning Movement Count
Location Name: HIGHWAY 50 & PARR BLVD
Date: Wed, Oct 02, 2019 Deployment Lead: Patrick Filopoulos

Heavy	2	626	37	0	-	0	0	3	0	-	107	663	2	0	-	23	0	120	0	-	-
Heavy %	25%	8.6%	5.7%	0%	-	0%	0%	16.7%	0%	-	18.9%	8.7%	18.2%	0%	-	3.6%	0%	22.2%	0%	-	-
Bicycles	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bicycle %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Peak Hour: 08:00 AM - 09:00 AM Weather: Light Rain (16.39 °C)

Start Time	Southbound						Westbound						Northbound						Eastbound						Int. Total (15 min)
	Left	Thru	Right	UTurn	Peds	Approach Total	Left	Thru	Right	UTurn	Peds	Approach Total	Left	Thru	Right	UTurn	Peds	Approach Total	Left	Thru	Right	UTurn	Peds	Approach Total	
08:00:00	0	278	24	0	0	302	0	0	0	0	0	0	32	210	0	0	0	242	4	0	9	0	0	13	557
08:15:00	0	259	24	0	0	283	0	0	0	0	0	0	33	180	0	0	0	213	8	0	11	0	0	19	515
08:30:00	0	252	26	0	0	278	1	0	0	0	0	1	32	196	1	0	0	229	13	0	11	0	0	24	532
08:45:00	0	223	35	0	0	258	0	0	2	0	0	2	24	210	0	0	0	234	18	1	20	0	0	39	533
Grand Total	0	1012	109	0	0	1121	1	0	2	0	0	3	121	796	1	0	0	918	43	1	51	0	0	95	2137
Approach%	0%	90.3%	9.7%	0%	-	-	33.3%	0%	66.7%	0%	-	-	13.2%	86.7%	0.1%	0%	-	45.3%	1.1%	53.7%	0%	-	-	-	
Totals %	0%	47.4%	5.1%	0%	52.5%	0%	0%	0.1%	0%	0.1%	5.7%	37.2%	0%	0%	43%	2%	0%	2.4%	0%	4.4%	-	-	-	-	
PHF	0	0.91	0.78	0	0.93	0.25	0	0.25	0	0.38	0.92	0.95	0.25	0	0.95	0.6	0.25	0.64	0	0.61	-	-	-	-	
Heavy	0	94	4	0	98	0	0	1	0	1	8	68	0	0	76	3	0	13	0	16	-	-	-		
Heavy %	0%	9.3%	3.7%	0%	8.7%	0%	0%	50%	0%	33.3%	6.6%	8.5%	0%	0%	8.3%	7%	0%	25.5%	0%	16.8%	-	-	-		
Lights	0	918	105	0	1023	1	0	1	0	2	113	728	1	0	842	40	1	38	0	79	-	-	-		
Lights %	0%	90.7%	96.3%	0%	91.3%	100%	0%	50%	0%	66.7%	93.4%	91.5%	100%	0%	91.7%	93%	100%	74.5%	0%	83.2%	-	-	-		
Single-Unit Trucks	0	47	2	0	49	0	0	1	0	1	5	38	0	0	43	1	0	5	0	6	-	-	-		
Single-Unit Trucks %	0%	4.6%	1.8%	0%	4.4%	0%	0%	50%	0%	33.3%	4.1%	4.8%	0%	0%	4.7%	2.3%	0%	9.8%	0%	6.3%	-	-	-		
Buses	0	6	0	0	6	0	0	0	0	0	0	5	0	0	5	1	0	0	0	1	-	-	-		
Buses %	0%	0.6%	0%	0%	0.5%	0%	0%	0%	0%	0%	0%	0.6%	0%	0%	0.5%	2.3%	0%	0%	0%	1.1%	-	-	-		
Articulated Trucks	0	41	2	0	43	0	0	0	0	0	3	25	0	0	28	1	0	8	0	9	-	-	-		
Articulated Trucks %	0%	4.1%	1.8%	0%	3.8%	0%	0%	0%	0%	0%	2.5%	3.1%	0%	0%	3.1%	2.3%	0%	15.7%	0%	9.5%	-	-	-		
Pedestrians	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	
Pedestrians%	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-	



Peak Hour: 01:00 PM - 02:00 PM Weather: Light Rain (15.56 °C)

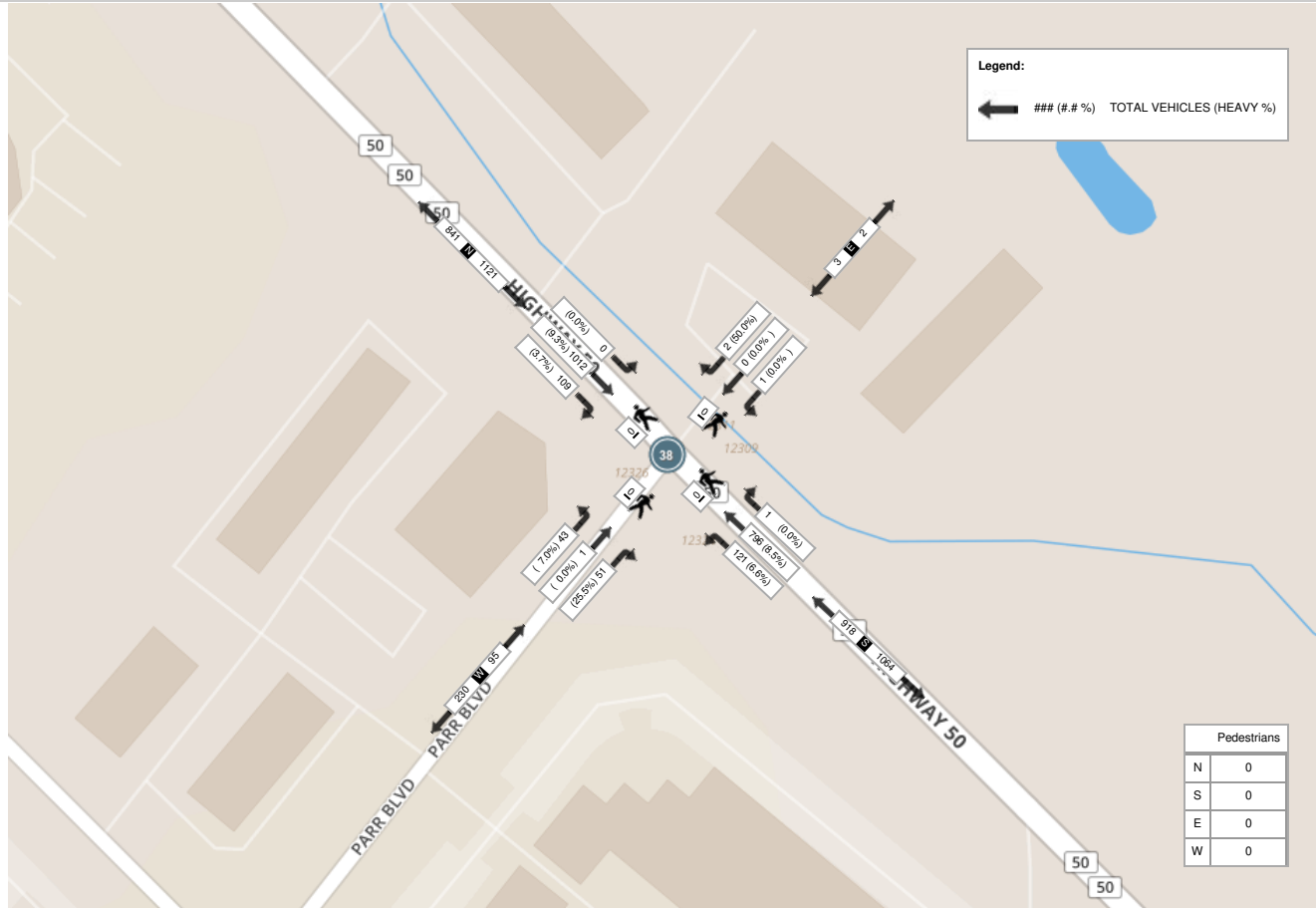
Start Time	Southbound						Westbound						Northbound						Eastbound						Int. Total (15 min)
	Left	Thru	Right	UTurn	Peds	Approach Total	Left	Thru	Right	UTurn	Peds	Approach Total	Left	Thru	Right	UTurn	Peds	Approach Total	Left	Thru	Right	UTurn	Peds	Approach Total	
13:00:00	2	181	33	0	0	216	0	0	2	0	0	2	21	202	0	0	0	223	24	0	18	0	0	42	483
13:15:00	1	201	20	0	0	222	0	0	1	0	0	1	14	233	0	0	0	247	20	0	16	0	0	36	506
13:30:00	0	181	14	0	0	195	0	0	1	0	0	1	15	213	0	0	0	228	23	0	14	0	0	37	461
13:45:00	0	182	25	0	0	207	1	0	0	0	0	1	14	235	1	0	0	250	15	0	16	0	0	31	489
Grand Total	3	745	92	0	0	840	1	0	4	0	0	5	64	883	1	0	0	948	82	0	64	0	0	146	1939
Approach%	0.4%	88.7%	11%	0%		-	20%	0%	80.7%	0%		-	6.8%	93.1%	0.1%	0%		-	56.2%	0%	43.8%	0%		-	-
Totals %	0.2%	38.4%	4.7%	0%		43.3%	0.1%	0%	0.2%	0%		0.3%	3.3%	45.5%	0.1%	0%		48.9%	4.2%	0%	3.3%	0%		7.5%	-
PHF	0.38	0.93	0.7	0		0.95	0.25	0	0.5	0		0.63	0.76	0.94	0.25	0		0.95	0.85	0	0.89	0		0.87	-
Heavy	1	86	2	0		89	0	0	1	0		1	15	106	0	0		121	3	0	23	0		26	-
Heavy %	33.3%	11.5%	2.2%	0%		10.6%	0%	0%	25%	0%		20%	23.4%	12%	0%	0%		12.8%	3.7%	0%	35.9%	0%		17.8%	-
Lights	2	659	90	0		751	1	0	3	0		4	49	777	1	0		827	79	0	41	0		120	-
Lights %	66.7%	88.5%	97.8%	0%		89.4%	100%	0%	75%	0%		80%	76.6%	88%	100%	0%		87.2%	96.3%	0%	64.1%	0%		82.2%	-
Single-Unit Trucks	1	45	1	0		47	0	0	1	0		1	7	55	0	0		62	1	0	6	0		7	-
Single-Unit Trucks %	33.3%	6%	1.1%	0%		5.6%	0%	0%	25%	0%		20%	10.9%	6.2%	0%	0%		6.5%	1.2%	0%	9.4%	0%		4.8%	-
Buses	0	1	0	0		1	0	0	0	0		0	0	1	0	0		1	1	0	0	0		1	-
Buses %	0%	0.1%	0%	0%		0.1%	0%	0%	0%	0%		0%	0%	0.1%	0%	0%		0.1%	1.2%	0%	0%	0%		0.7%	-
Articulated Trucks	0	40	1	0		41	0	0	0	0		0	8	50	0	0		58	1	0	17	0		18	-
Articulated Trucks %	0%	5.4%	1.1%	0%		4.9%	0%	0%	0%	0%		0%	12.5%	5.7%	0%	0%		6.1%	1.2%	0%	26.6%	0%		12.3%	-
Pedestrians	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
Pedestrians%	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-



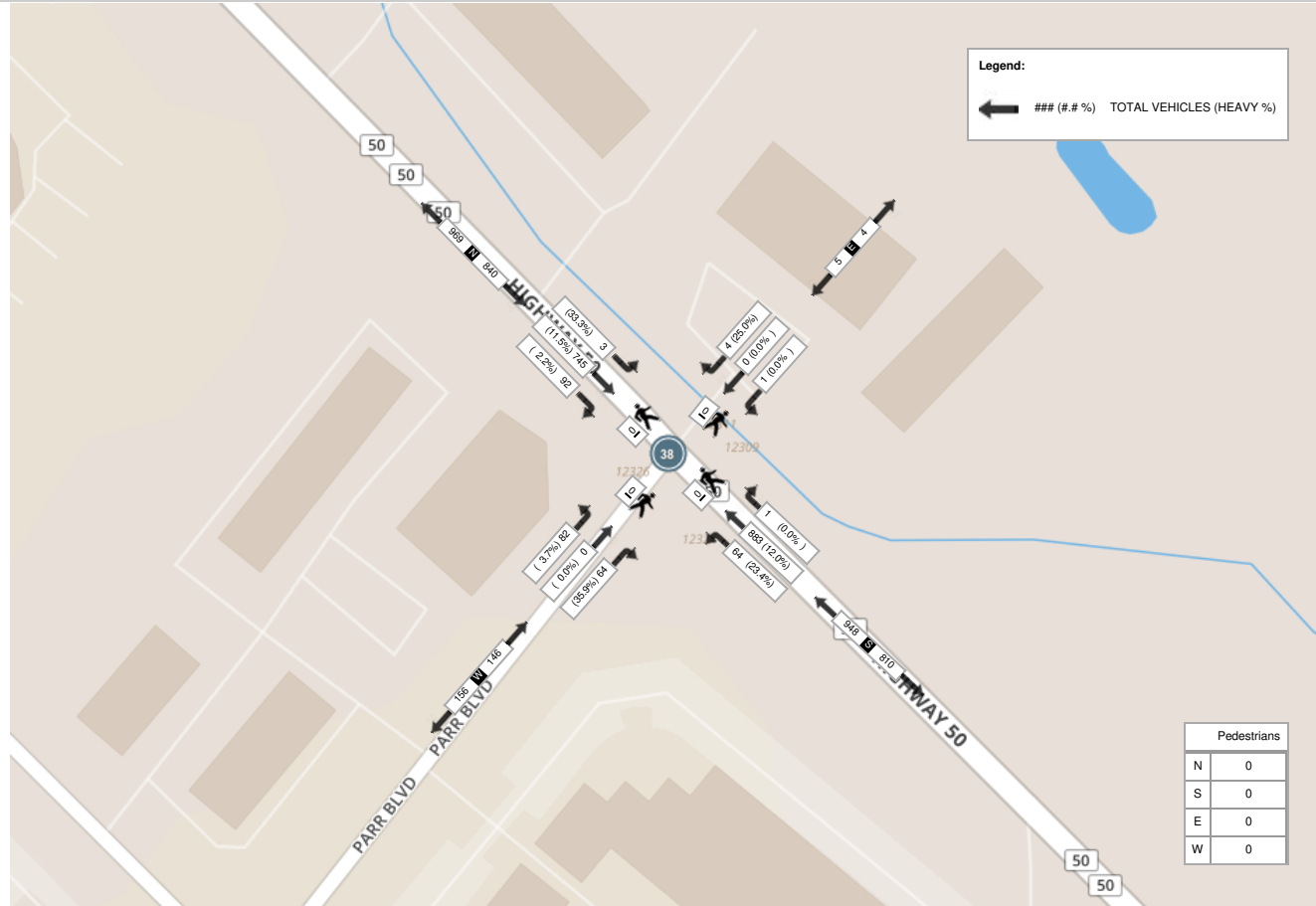
Peak Hour: 04:00 PM - 05:00 PM Weather: Light Rain (14.01 °C)

Start Time	Southbound						Westbound						Northbound						Eastbound						Int. Total (15 min)
	Left	Thru	Right	UTurn	Peds	Approach Total	Left	Thru	Right	UTurn	Peds	Approach Total	Left	Thru	Right	UTurn	Peds	Approach Total	Left	Thru	Right	UTurn	Peds	Approach Total	
16:00:00	1	289	14	0	0	304	0	0	2	0	0	2	7	332	0	0	0	339	23	0	41	0	0	64	709
16:15:00	1	211	15	0	0	227	0	0	0	0	0	0	16	289	0	1	0	306	32	0	12	0	0	44	577
16:30:00	0	279	11	0	0	290	0	0	0	0	0	0	19	375	0	0	0	394	33	0	27	0	0	60	744
16:45:00	0	223	11	0	0	234	0	0	0	0	0	0	11	317	0	0	0	328	26	0	26	0	0	52	614
Grand Total	2	1002	51	0	0	1055	0	0	2	0	0	2	53	1313	0	1	0	1367	114	0	106	0	0	220	2644
Approach%	0.2%	95%	4.8%	0%		-	0%	0%	100%	0%		-	3.9%	96%	0%	0.1%		-	51.8%	0%	48.2%	0%		-	-
Totals %	0.1%	37.9%	1.9%	0%		39.9%	0%	0%	0.1%	0%		0.1%	2%	49.7%	0%	0%		51.7%	4.3%	0%	4%	0%		8.3%	-
PHF	0.5	0.87	0.85	0		0.87	0	0	0.25	0		0.25	0.7	0.88	0	0.25		0.87	0.86	0	0.65	0		0.86	-
Heavy	0	50	4	0		54	0	0	0	0		0	12	77	0	0		89	2	0	12	0		14	-
Heavy %	0%	5%	7.8%	0%		5.1%	0%	0%	0%	0%		0%	22.6%	5.9%	0%	0%		6.5%	1.8%	0%	11.3%	0%		6.4%	-
Lights	2	952	47	0		1001	0	0	2	0		2	41	1236	0	1		1278	112	0	94	0		206	-
Lights %	100%	95%	92.2%	0%		94.9%	0%	0%	100%	0%		100%	77.4%	94.1%	0%	100%		93.5%	98.2%	0%	88.7%	0%		93.6%	-
Single-Unit Trucks	0	27	1	0		28	0	0	0	0		0	4	45	0	0		49	2	0	7	0		9	-
Single-Unit Trucks %	0%	2.7%	2%	0%		2.7%	0%	0%	0%	0%		0%	7.5%	3.4%	0%	0%		3.6%	1.8%	0%	6.6%	0%		4.1%	-
Buses	0	4	2	0		6	0	0	0	0		0	0	3	0	0		3	0	0	0	0		0	-
Buses %	0%	0.4%	3.9%	0%		0.6%	0%	0%	0%	0%		0%	0%	0.2%	0%	0%		0.2%	0%	0%	0%	0%		0%	-
Articulated Trucks	0	19	1	0		20	0	0	0	0		0	8	29	0	0		37	0	0	5	0		5	-
Articulated Trucks %	0%	1.9%	2%	0%		1.9%	0%	0%	0%	0%		0%	15.1%	2.2%	0%	0%		2.7%	0%	0%	4.7%	0%		2.3%	-
Pedestrians	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
Pedestrians%	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-

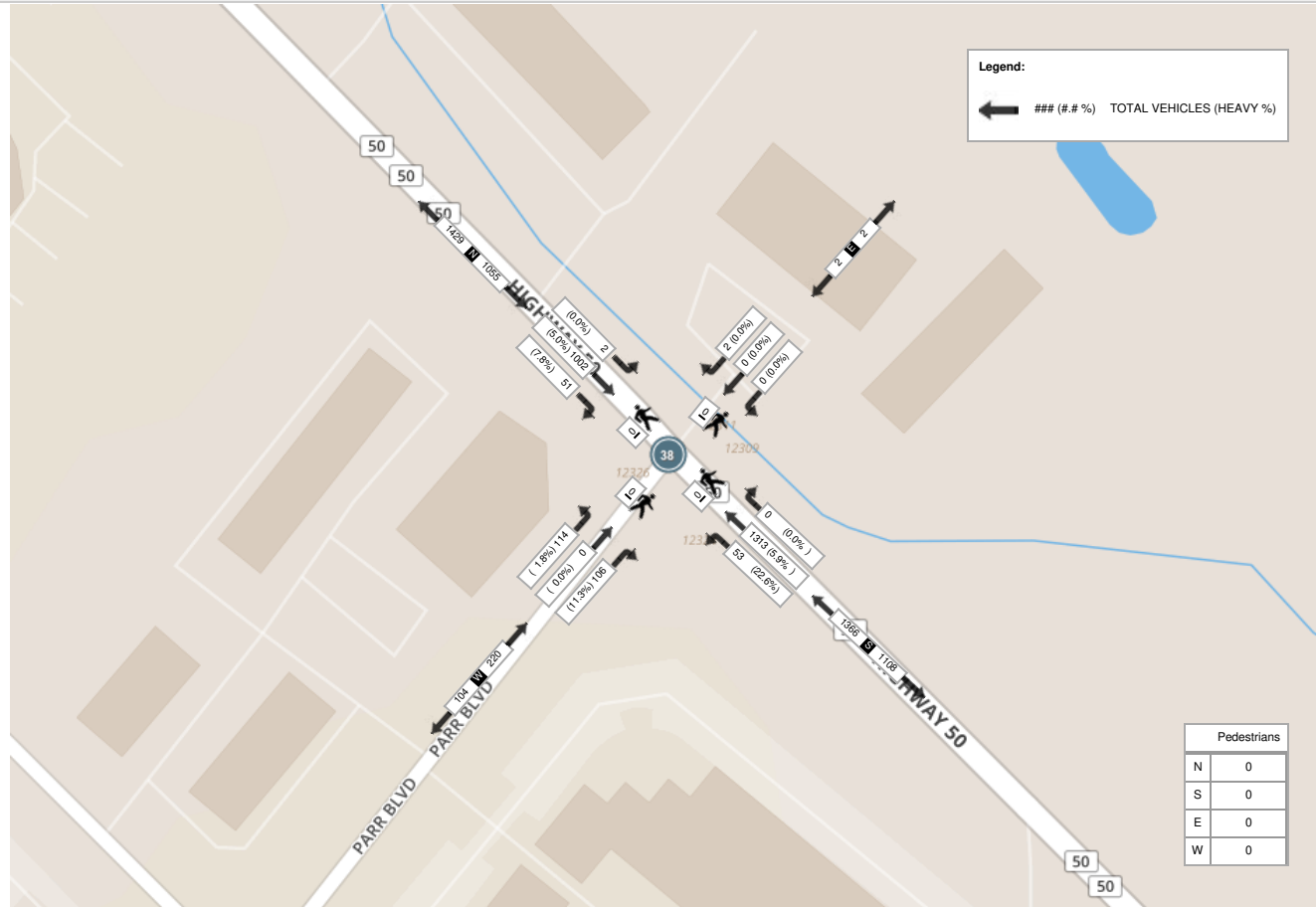
Peak Hour: 08:00 AM - 09:00 AM Weather: Light Rain (16.39 °C)



Peak Hour: 01:00 PM - 02:00 PM Weather: Light Rain (15.56 °C)



Peak Hour: 04:00 PM - 05:00 PM Weather: Light Rain (14.01 °C)





Turning Movement Count (47 . HWY 50 & GEORGE BOLTON PKWY) CustID: 05013164 MioID: 506039

Start Time	Southbound HWY 50						Westbound ACCESS					Northbound HWY 50					Eastbound GEORGE BOLTON PKWY						Int. Total (15 min)		
	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn		Peds	Approach Total
07:00:00	1	321	15	0	0	337	0	0	1	0	0	1	11	144	0	0	1	155	5	0	14	0	1	19	512
07:15:00	0	327	17	0	0	344	0	0	2	0	0	2	22	152	0	0	0	174	2	0	19	0	1	21	541
07:30:00	0	343	23	0	0	366	0	0	2	0	0	2	19	144	1	0	0	164	6	0	10	0	0	16	548
07:45:00	1	301	31	0	0	333	0	0	0	0	0	0	22	272	0	0	0	294	14	0	14	0	0	28	655
Hourly	2	1292	86	0	0	1380	0	0	5	0	0	5	74	712	1	0	1	787	27	0	57	0	2	84	2256
08:00:00	0	307	22	0	0	329	0	0	0	1	0	1	16	165	0	0	0	181	12	0	14	0	0	26	537
08:15:00	0	280	32	0	0	312	0	0	0	0	0	0	22	178	0	0	0	200	16	0	17	0	0	33	545
08:30:00	0	314	24	0	0	338	0	0	0	2	0	2	15	201	0	0	0	216	16	0	22	0	0	38	594
08:45:00	1	271	27	0	0	299	0	0	1	1	0	2	18	196	0	0	0	214	15	0	13	0	0	28	543
Hourly	1	1172	105	0	0	1278	0	0	1	4	0	5	71	740	0	0	0	811	59	0	66	0	0	125	2219
BREAK																									
11:00:00	0	193	17	0	0	210	0	1	0	0	0	1	16	175	0	0	0	191	21	1	24	0	0	46	448
11:15:00	0	194	18	0	0	212	0	0	1	0	0	1	10	155	0	0	0	165	14	0	15	0	1	29	407
11:30:00	0	216	29	0	0	245	1	0	0	0	0	1	12	189	0	0	0	201	23	0	15	0	0	38	485
11:45:00	1	194	22	0	0	217	0	0	1	0	0	1	17	199	0	0	0	216	26	0	9	0	0	35	469
Hourly	1	797	86	0	0	884	1	1	2	0	0	4	55	718	0	0	0	773	84	1	63	0	1	148	1809
12:00:00	1	192	37	0	1	230	0	0	1	0	0	1	11	210	0	0	0	221	27	0	21	0	0	48	500
12:15:00	1	176	32	0	0	209	0	0	0	0	0	0	16	199	0	0	0	215	26	0	11	0	1	37	461
12:30:00	0	186	35	0	0	221	0	0	0	0	0	0	15	211	0	0	0	226	31	0	20	0	0	51	498
12:45:00	1	178	37	0	1	216	0	0	1	0	1	1	12	192	0	0	0	204	30	0	16	0	0	46	467
Hourly	3	732	141	0	2	876	0	0	2	0	1	2	54	812	0	0	0	866	114	0	68	0	1	182	1926
13:00:00	1	219	29	0	0	249	0	0	1	0	0	1	14	218	0	0	0	232	28	0	13	0	0	41	523
13:15:00	1	203	26	0	0	230	0	0	1	0	0	1	17	212	0	0	0	229	25	0	22	0	0	47	507
13:30:00	0	171	28	0	0	199	0	0	0	0	0	0	16	215	0	1	0	232	15	0	12	0	0	27	458
13:45:00	0	189	27	1	0	217	0	0	0	0	0	0	12	243	0	0	0	255	9	0	11	0	0	20	492
Hourly	2	782	110	1	0	895	0	0	2	0	0	2	59	888	0	1	0	948	77	0	58	0	0	135	1980
BREAK																									
15:00:00	0	215	28	0	0	243	0	0	0	0	0	0	9	297	0	0	0	306	23	0	28	0	1	51	600
15:15:00	0	200	27	0	0	227	0	1	1	0	0	2	29	308	1	0	0	338	28	0	22	0	0	50	617
15:30:00	0	231	31	0	0	262	0	0	0	0	0	0	21	325	0	0	0	346	26	0	22	0	0	48	656
15:45:00	1	195	27	0	0	223	0	0	0	0	0	0	14	345	0	0	0	359	25	0	19	0	1	44	626
Hourly	1	841	113	0	0	955	0	1	1	0	0	2	73	1275	1	0	0	1349	102	0	91	0	2	193	2499
16:00:00	0	218	29	1	0	248	0	0	0	0	0	0	10	342	0	0	0	352	38	0	42	0	0	80	680
16:15:00	0	224	23	0	0	247	0	0	0	0	2	0	21	361	0	0	0	382	24	0	34	0	0	58	687
16:30:00	1	235	22	0	0	258	0	0	0	0	0	0	19	368	0	0	0	387	37	0	35	0	0	72	717
16:45:00	0	208	21	0	0	229	1	2	0	0	0	3	8	337	0	0	0	345	26	0	21	0	0	47	624
Hourly	1	885	95	1	0	982	1	2	0	0	2	3	58	1408	0	0	0	1466	125	0	132	0	0	257	2708
17:00:00	0	240	27	0	0	267	0	3	2	0	0	5	21	329	0	0	0	350	31	0	41	0	1	72	694
17:15:00	0	218	22	0	0	240	0	0	3	0	1	3	14	315	0	0	1	329	40	0	26	0	0	66	638
17:30:00	0	242	21	0	0	263	0	0	0	0	0	0	13	314	0	0	0	327	29	0	25	0	0	54	644
17:45:00	0	197	18	0	0	215	0	0	0	0	0	0	15	294	0	0	0	309	24	0	18	0	0	42	566
Hourly	0	897	88	0	0	985	0	3	5	0	1	8	63	1252	0	0	1	1315	124	0	110	0	1	234	2542
Grand Total	11	7398	824	2	2	8235	2	7	18	4	4	31	507	7805	2	1	2	8315	712	1	645	0	7	1358	17939
Approach%	0.1%	89.8%	10%	0%	-	-	6.5%	22.6%	58.1%	12.9%	-	-	6.1%	93.9%	0%	0%	-	-	52.4%	0.1%	47.5%	0%	-	-	-
Totals %	0.1%	41.2%	4.6%	0%	-	45.9%	0%	0%	0.1%	0%	0.2%	2.8%	43.5%	0%	0%	-	46.4%	4%	0%	3.6%	0%	-	-	7.6%	-



Turning Movement Count
 Location Name: HWY 50 & GEORGE BOLTON PKWY
 Date: Tue, Mar 20, 2018 Deployment Lead: Patrick Filopoulos

Heavy	0	552	26	0	-	0	0	0	0	-	113	509	0	0	-	26	0	108	0	-	-
Heavy %	0%	7.5%	3.2%	0%	-	0%	0%	0%	0%	-	22.3%	6.5%	0%	0%	-	3.7%	0%	16.7%	0%	-	-
Bicycles	0	0	1	0	-	0	0	0	0	-	0	1	0	0	-	0	0	0	0	-	-
Bicycle %	0%	0%	0.1%	0%	-	0%	0%	0%	0%	-	0%	0%	0%	0%	-	0%	0%	0%	0%	-	-



Turning Movement Count
 Location Name: HWY 50 & GEORGE BOLTON PKWY
 Date: Tue, Mar 20, 2018 Deployment Lead: Patrick Filopoulos

Peak Hour: 07:00 AM - 08:00 AM Weather: Clear (-6.4 °C)

Start Time	Southbound HWY 50						Westbound ACCESS						Northbound HWY 50						Eastbound GEORGE BOLTON PKWY						Int. Total (15 min)
	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	
07:00:00	1	321	15	0	0	337	0	0	1	0	0	1	11	144	0	0	1	155	5	0	14	0	1	19	512
07:15:00	0	327	17	0	0	344	0	0	2	0	0	2	22	152	0	0	0	174	2	0	19	0	1	21	541
07:30:00	0	343	23	0	0	366	0	0	2	0	0	2	19	144	1	0	0	164	6	0	10	0	0	16	548
07:45:00	1	301	31	0	0	333	0	0	0	0	0	0	22	272	0	0	0	294	14	0	14	0	0	28	655
Grand Total	2	1292	86	0	0	1380	0	0	5	0	0	5	74	712	1	0	1	787	27	0	57	0	2	84	2256
Approach%	0.1%	93.6%	6.2%	0%		-	0%	0%	100%	0%		-	9.4%	90.5%	0.1%	0%		-	32.1%	0%	67.9%	0%		-	-
Totals %	0.1%	57.3%	3.8%	0%		61.2%	0%	0%	0.2%	0%		0.2%	3.3%	31.6%	0%	0%		34.9%	1.2%	0%	2.5%	0%		3.7%	-
PHF	0.5	0.94	0.69	0		0.94	0	0	0.63	0		0.63	0.84	0.65	0.25	0		0.67	0.48	0	0.75	0		0.75	-
Heavy	0	76	0	0		76	0	0	0	0		0	8	53	0	0		61	1	0	23	0		24	-
Heavy %	0%	5.9%	0%	0%		5.5%	0%	0%	0%	0%		0%	10.8%	7.4%	0%	0%		7.8%	3.7%	0%	40.4%	0%		28.6%	-
Lights	2	1216	86	0		1304	0	0	5	0		5	66	659	1	0		726	26	0	34	0		60	-
Lights %	100%	94.1%	100%	0%		94.5%	0%	0%	100%	0%		100%	89.2%	92.6%	100%	0%		92.2%	96.3%	0%	59.6%	0%		71.4%	-
Single-Unit Trucks	0	32	0	0		32	0	0	0	0		0	3	26	0	0		29	1	0	13	0		14	-
Single-Unit Trucks %	0%	2.5%	0%	0%		2.3%	0%	0%	0%	0%		0%	4.1%	3.7%	0%	0%		3.7%	3.7%	0%	22.8%	0%		16.7%	-
Buses	0	8	0	0		8	0	0	0	0		0	0	11	0	0		11	0	0	0	0		0	-
Buses %	0%	0.6%	0%	0%		0.6%	0%	0%	0%	0%		0%	0%	1.5%	0%	0%		1.4%	0%	0%	0%	0%		0%	-
Articulated Trucks	0	36	0	0		36	0	0	0	0		0	5	16	0	0		21	0	0	10	0		10	-
Articulated Trucks %	0%	2.8%	0%	0%		2.6%	0%	0%	0%	0%		0%	6.8%	2.2%	0%	0%		2.7%	0%	0%	17.5%	0%		11.9%	-
Pedestrians	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	2	-	-
Pedestrians%	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	33.3%	-	-	-	-	-	66.7%	-	-
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%	-	-



Turning Movement Count
 Location Name: HWY 50 & GEORGE BOLTON PKWY
 Date: Tue, Mar 20, 2018 Deployment Lead: Patrick Filopoulos

Peak Hour: 01:00 PM - 02:00 PM Weather: Partly Cloudy (-2 °C)

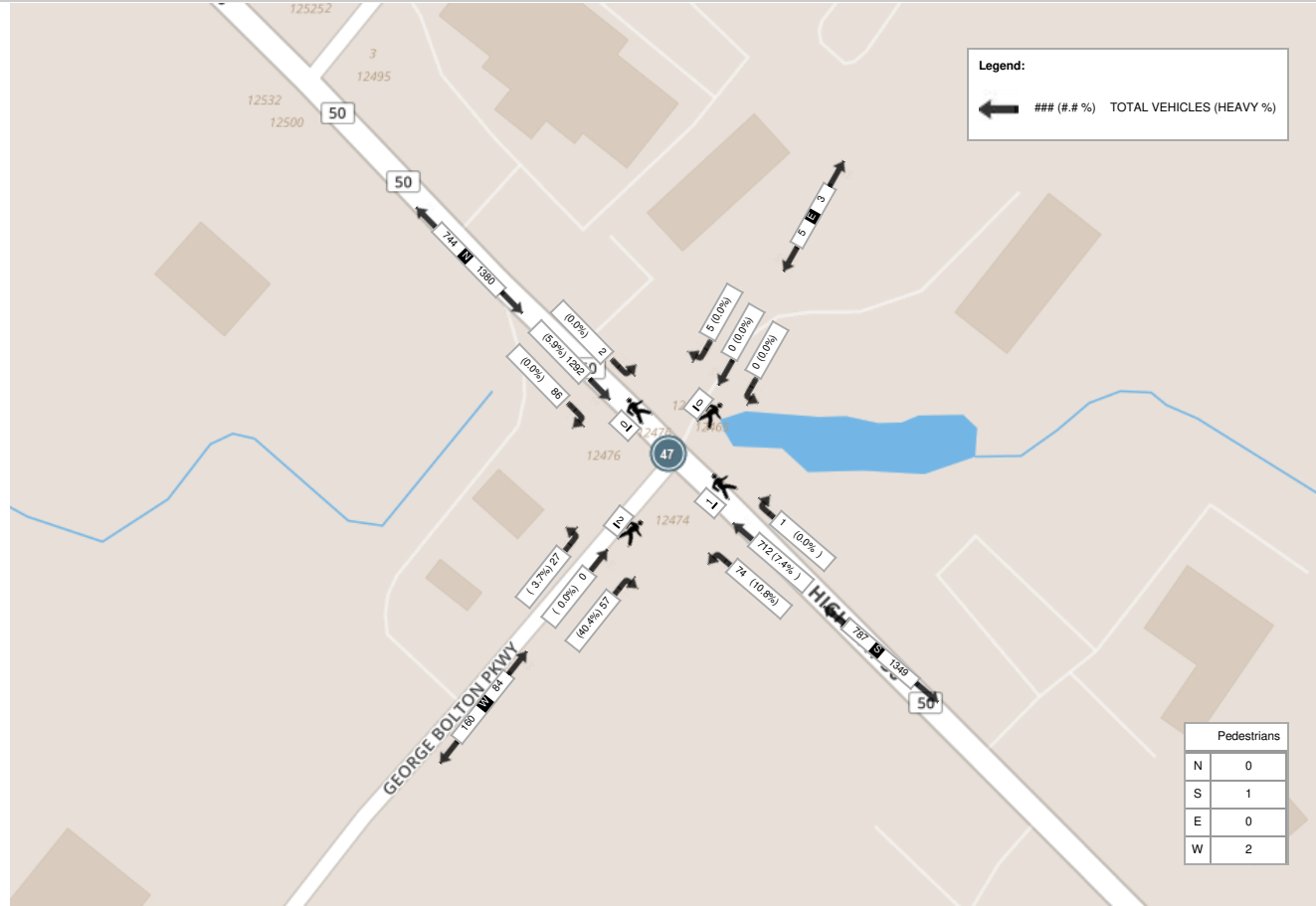
Start Time	Southbound HWY 50						Westbound ACCESS						Northbound HWY 50						Eastbound GEORGE BOLTON PKWY						Int. Total (15 min)
	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	
13:00:00	1	219	29	0	0	249	0	0	1	0	0	1	14	218	0	0	0	232	28	0	13	0	0	41	523
13:15:00	1	203	26	0	0	230	0	0	1	0	0	1	17	212	0	0	0	229	25	0	22	0	0	47	507
13:30:00	0	171	28	0	0	199	0	0	0	0	0	0	16	215	0	1	0	232	15	0	12	0	0	27	458
13:45:00	0	189	27	1	0	217	0	0	0	0	0	0	12	243	0	0	0	255	9	0	11	0	0	20	492
Grand Total	2	782	110	1	0	895	0	0	2	0	0	2	59	888	0	1	0	948	77	0	58	0	0	135	1980
Approach%	0.2%	87.4%	12.3%	0.1%		-	0%	0%	100%	0%		-	6.2%	93.7%	0%	0.1%		-	57%	0%	43%	0%		-	-
Totals %	0.1%	39.5%	5.6%	0.1%		45.2%	0%	0%	0.1%	0%		0.1%	3%	44.8%	0%	0.1%		47.9%	3.9%	0%	2.9%	0%		6.8%	-
PHF	0.5	0.89	0.95	0.25		0.9	0	0	0.5	0		0.5	0.87	0.91	0	0.25		0.93	0.69	0	0.66	0		0.72	-
Heavy	0	86	6	0		92	0	0	0	0		0	18	66	0	0		84	4	0	17	0		21	-
Heavy %	0%	11%	5.5%	0%		10.3%	0%	0%	0%	0%		0%	30.5%	7.4%	0%	0%		8.9%	5.2%	0%	29.3%	0%		15.6%	-
Lights	2	696	104	1		803	0	0	2	0		2	41	822	0	1		864	73	0	41	0		114	-
Lights %	100%	89%	94.5%	100%		89.7%	0%	0%	100%	0%		100%	69.5%	92.6%	0%	100%		91.1%	94.8%	0%	70.7%	0%		84.4%	-
Single-Unit Trucks	0	43	4	0		47	0	0	0	0		0	9	39	0	0		48	2	0	8	0		10	-
Single-Unit Trucks %	0%	5.5%	3.6%	0%		5.3%	0%	0%	0%	0%		0%	15.3%	4.4%	0%	0%		5.1%	2.6%	0%	13.8%	0%		7.4%	-
Buses	0	3	0	0		3	0	0	0	0		0	0	2	0	0		2	0	0	0	0		0	-
Buses %	0%	0.4%	0%	0%		0.3%	0%	0%	0%	0%		0%	0%	0.2%	0%	0%		0.2%	0%	0%	0%	0%		0%	-
Articulated Trucks	0	40	2	0		42	0	0	0	0		0	9	25	0	0		34	2	0	9	0		11	-
Articulated Trucks %	0%	5.1%	1.8%	0%		4.7%	0%	0%	0%	0%		0%	15.3%	2.8%	0%	0%		3.6%	2.6%	0%	15.5%	0%		8.1%	-
Pedestrians	-	-	-	0		-	-	-	-	0		-	-	-	-	0		-	-	-	-	0		-	-
Pedestrians%	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-
Bicycles on Road	0	0	0	0		-	0	0	0	0		-	0	0	0	0		-	0	0	0	0		-	-
Bicycles on Road%	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-



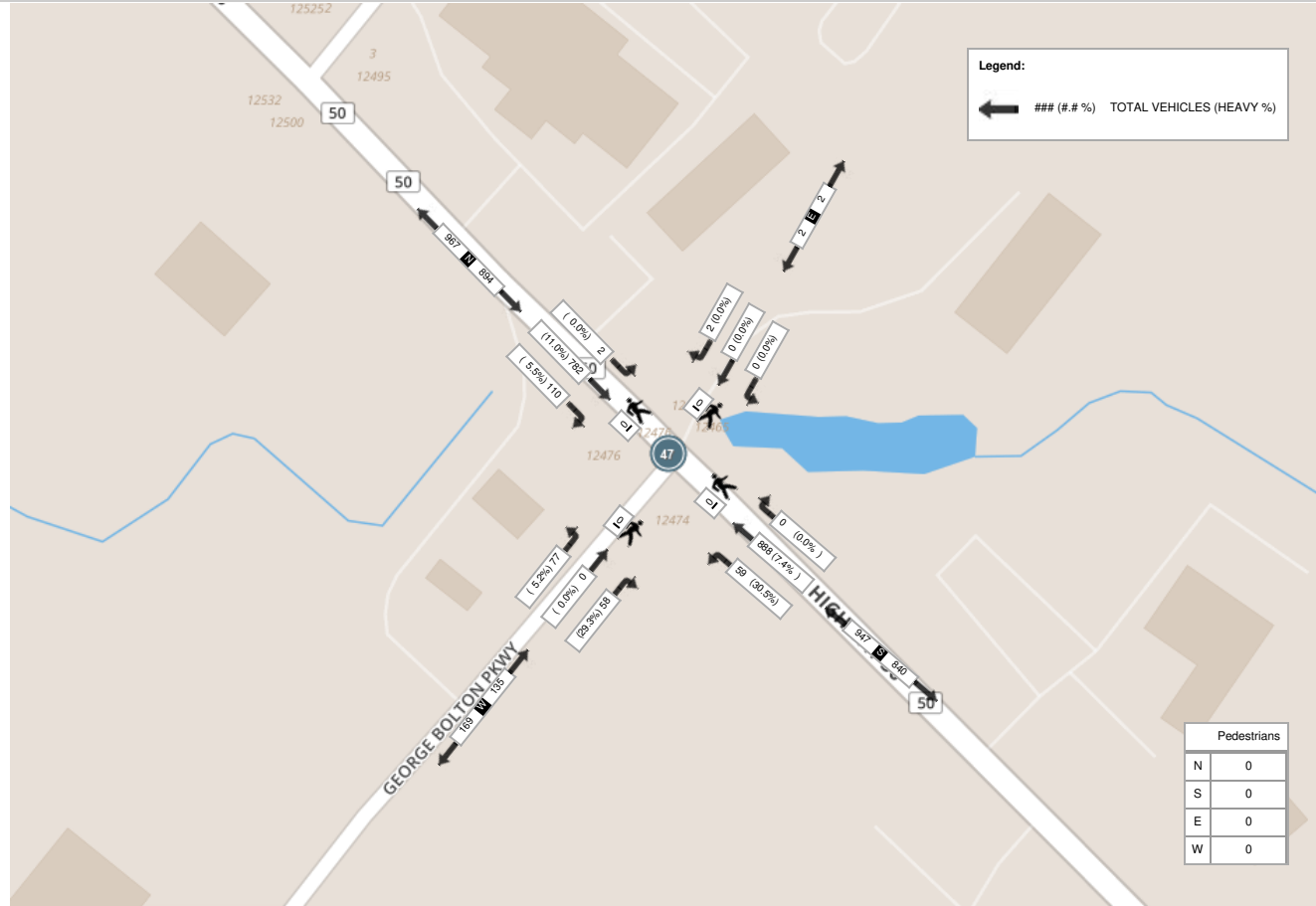
Peak Hour: 04:00 PM - 05:00 PM Weather: Clear (1.4 °C)

Start Time	Southbound HWY 50						Westbound ACCESS						Northbound HWY 50						Eastbound GEORGE BOLTON PKWY						Int. Total (15 min)
	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	
16:00:00	0	218	29	1	0	248	0	0	0	0	0	0	10	342	0	0	0	352	38	0	42	0	0	80	680
16:15:00	0	224	23	0	0	247	0	0	0	0	2	0	21	361	0	0	0	382	24	0	34	0	0	58	687
16:30:00	1	235	22	0	0	258	0	0	0	0	0	0	19	368	0	0	0	387	37	0	35	0	0	72	717
16:45:00	0	208	21	0	0	229	1	2	0	0	0	3	8	337	0	0	0	345	26	0	21	0	0	47	624
Grand Total	1	885	95	1	0	982	1	2	0	0	2	3	58	1408	0	0	0	1466	125	0	132	0	0	257	2708
Approach%	0.1%	90.1%	9.7%	0.1%	-	-	33.3%	66.7%	0%	0%	-	-	4%	96%	0%	0%	-	-	48.6%	0%	51.4%	0%	0%	-	-
Totals %	0%	32.7%	3.5%	0%	36.3%	0%	0%	0.1%	0%	0%	0.1%	0%	2.1%	52%	0%	0%	54.1%	0%	4.6%	0%	4.9%	0%	9.5%	-	-
PHF	0.25	0.94	0.82	0.25	0.95	0.25	0.25	0.25	0	0	0.25	0.69	0.96	0	0	0.95	0.82	0	0.79	0	0	0.8	-	-	
Heavy	0	46	5	0	51	0	0	0	0	0	0	16	67	0	0	83	3	0	5	0	0	8	-	-	
Heavy %	0%	5.2%	5.3%	0%	5.2%	0%	0%	0%	0%	0%	0%	27.6%	4.8%	0%	0%	5.7%	2.4%	0%	3.8%	0%	0%	3.1%	-	-	
Lights	1	839	90	1	931	1	2	0	0	3	42	1341	0	0	1383	122	0	127	0	0	249	-	-		
Lights %	100%	94.8%	94.7%	100%	94.8%	100%	100%	0%	0%	100%	72.4%	95.2%	0%	0%	94.3%	97.6%	0%	96.2%	0%	0%	96.9%	-	-		
Single-Unit Trucks	0	38	4	0	42	0	0	0	0	0	12	34	0	0	46	3	0	1	0	0	4	-	-		
Single-Unit Trucks %	0%	4.3%	4.2%	0%	4.3%	0%	0%	0%	0%	0%	20.7%	2.4%	0%	0%	3.1%	2.4%	0%	0.8%	0%	0%	1.6%	-	-		
Buses	0	4	0	0	4	0	0	0	0	0	0	5	0	0	5	0	0	0	0	0	0	-	-		
Buses %	0%	0.5%	0%	0%	0.4%	0%	0%	0%	0%	0%	0%	0.4%	0%	0%	0.3%	0%	0%	0%	0%	0%	0%	-	-		
Articulated Trucks	0	4	1	0	5	0	0	0	0	0	4	28	0	0	32	0	0	4	0	0	4	-	-		
Articulated Trucks %	0%	0.5%	1.1%	0%	0.5%	0%	0%	0%	0%	0%	6.9%	2%	0%	0%	2.2%	0%	0%	3%	0%	0%	1.6%	-	-		
Pedestrians	-	-	-	-	0	-	-	-	-	2	-	-	-	0	-	-	-	-	-	-	0	-	-		
Pedestrians%	-	-	-	-	0%	-	-	-	-	100%	-	-	-	0%	-	-	-	-	-	-	0%	-	-		
Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-		
Bicycles on Road%	-	-	-	-	0%	-	-	-	-	0%	-	-	-	0%	-	-	-	-	-	-	0%	-	-		

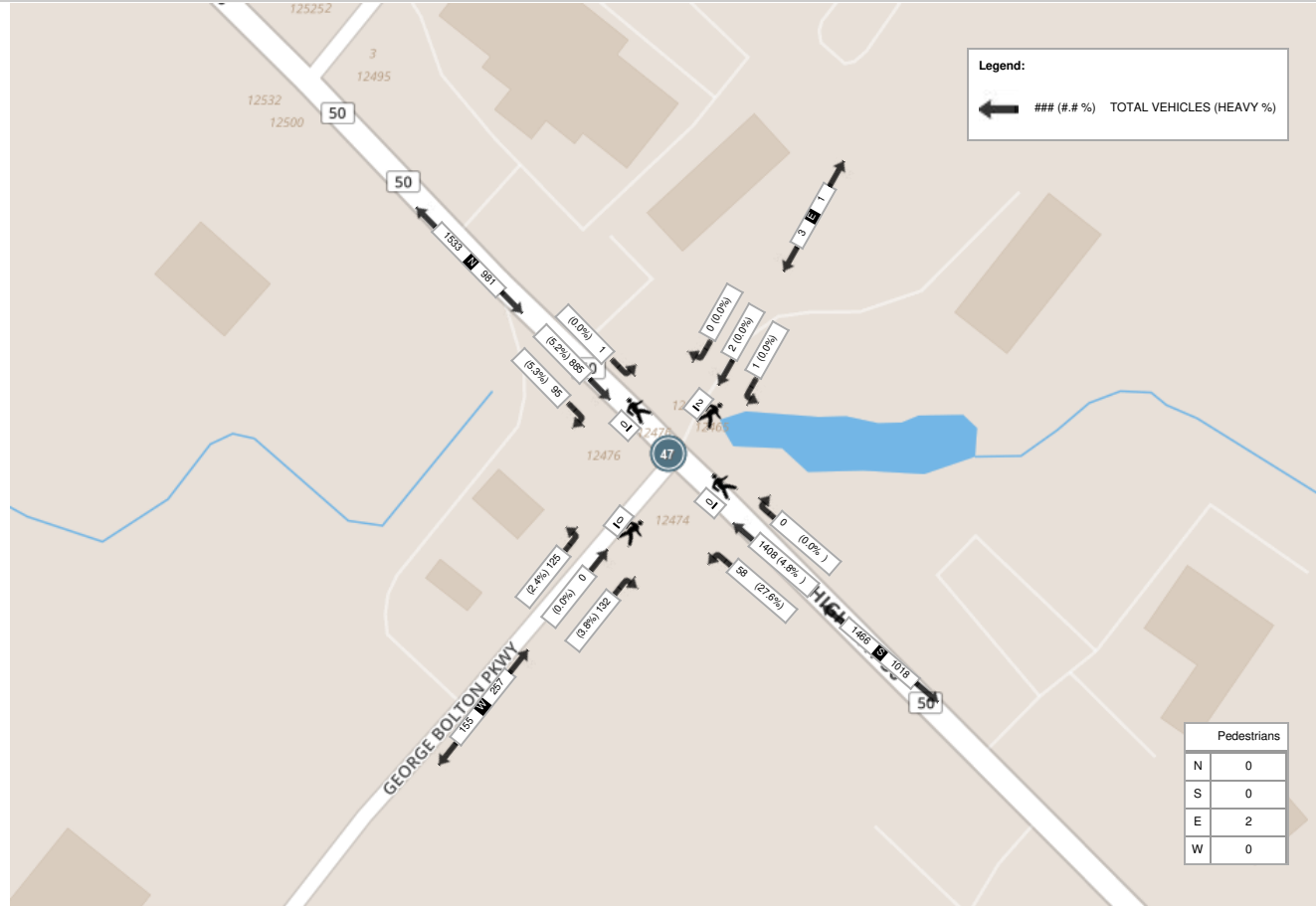
Peak Hour: 07:00 AM - 08:00 AM Weather: Clear (-6.4 °C)



Peak Hour: 01:00 PM - 02:00 PM Weather: Partly Cloudy (-2 °C)



Peak Hour: 04:00 PM - 05:00 PM Weather: Clear (1.4 °C)





Turning Movement Count (22 . HWY 50 & INDUSTRIAL RD) CustID: 05013323 MiID: 653649

Start Time	N Approach HWY 50					E Approach INDUSTRIAL RD					S Approach HWY 50					Int. Total (15 min)	Int. Total (1 hr)
	Left N:E	Thru N:S	U-Turn N:N	Peds N:	Approach Total	Left E:S	Right E:N	U-Turn E:E	Peds E:	Approach Total	Thru S:N	Right S:E	U-Turn S:S	Peds S:	Approach Total		
07:00:00	7	345	0	0	352	8	6	0	0	14	147	4	0	0	151	517	
07:15:00	4	379	0	0	383	10	5	0	0	15	179	7	0	0	186	584	
07:30:00	7	333	0	0	340	13	8	0	0	21	186	9	0	0	195	556	
07:45:00	5	355	0	0	360	13	8	0	0	21	249	5	0	0	254	635	2292
08:00:00	11	349	0	0	360	11	8	0	0	19	217	4	0	0	221	600	2375
08:15:00	8	298	0	0	306	9	7	0	0	16	190	8	0	0	198	520	2311
08:30:00	11	316	0	0	327	7	9	0	0	16	205	6	0	0	211	554	2309
08:45:00	21	330	0	0	351	9	12	0	0	21	220	4	0	0	224	596	2270
BREAK																	
11:00:00	13	224	0	0	237	13	11	0	0	24	211	10	0	0	221	482	
11:15:00	11	221	0	0	232	11	22	0	0	33	227	13	0	1	240	505	
11:30:00	13	239	0	0	252	3	25	0	0	28	199	8	0	0	207	487	
11:45:00	13	224	0	0	237	12	18	0	0	30	244	11	0	0	255	522	1996
12:00:00	16	239	0	0	255	6	17	0	0	23	242	15	0	0	257	535	2049
12:15:00	20	263	0	0	283	4	24	0	0	28	265	10	0	0	275	586	2130
12:30:00	18	229	0	0	247	7	22	0	0	29	266	9	0	0	275	551	2194
12:45:00	12	252	0	0	264	9	24	0	0	33	219	11	0	2	230	527	2199
13:00:00	16	270	0	0	286	5	17	0	0	22	248	14	0	0	262	570	2234
13:15:00	11	224	0	0	235	9	21	0	0	30	262	8	0	0	270	535	2183
13:30:00	19	222	0	0	241	11	16	0	0	27	232	12	0	0	244	512	2144
13:45:00	13	248	0	0	261	5	13	0	0	18	235	9	0	0	244	523	2140
BREAK																	
15:00:00	11	252	0	0	263	9	17	0	0	26	296	18	0	0	314	603	
15:15:00	7	230	0	0	237	6	20	0	0	26	322	19	0	0	341	604	
15:30:00	14	294	0	0	308	11	14	0	0	25	337	13	0	0	350	683	
15:45:00	10	223	0	0	233	5	17	0	0	22	364	19	0	0	383	638	2528
16:00:00	8	299	0	0	307	22	25	0	0	47	387	14	0	0	401	755	2680
16:15:00	15	260	0	0	275	2	16	0	0	18	331	18	0	0	349	642	2718
16:30:00	7	273	0	0	280	9	31	0	0	40	416	8	0	1	424	744	2779
16:45:00	18	279	0	0	297	6	24	1	0	31	360	16	0	0	376	704	2845
17:00:00	8	314	0	0	322	9	15	0	0	24	421	19	0	0	440	786	2876
17:15:00	13	251	0	0	264	5	9	0	2	14	385	14	0	0	399	677	2911
17:30:00	9	239	0	0	248	3	12	0	1	15	330	10	0	1	340	603	2770



17:45:00	7	227	0	0	234	7	10	0	0	17	371	6	0	0	377	628	2694
Grand Total	376	8701	0	0	9077	269	503	1	3	773	8763	351	0	5	9114	18964	-
Approach%	4.1%	95.9%	0%		-	34.8%	65.1%	0.1%		-	96.1%	3.9%	0%		-	-	-
Totals %	2%	45.9%	0%		47.9%	1.4%	2.7%	0%		4.1%	46.2%	1.9%	0%		48.1%	-	-
Heavy	16	657	0		-	27	28	0		-	598	61	0		-	-	-
Heavy %	4.3%	7.6%	0%		-	10%	5.6%	0%		-	6.8%	17.4%	0%		-	-	-
Bicycles	0	2	0		-	0	0	0		-	0	0	0		-	-	-
Bicycle %	0%	0%	0%		-	0%	0%	0%		-	0%	0%	0%		-	-	-



Peak Hour: 07:15 AM - 08:15 AM Weather: Broken Clouds (4.4 °C)

Start Time	N Approach HWY 50					E Approach INDUSTRIAL RD					S Approach HWY 50					Int. Total (15 min)
	Left	Thru	U-Turn	Peds	Approach Total	Left	Right	U-Turn	Peds	Approach Total	Thru	Right	U-Turn	Peds	Approach Total	
07:15:00	4	379	0	0	383	10	5	0	0	15	179	7	0	0	186	584
07:30:00	7	333	0	0	340	13	8	0	0	21	186	9	0	0	195	556
07:45:00	5	355	0	0	360	13	8	0	0	21	249	5	0	0	254	635
08:00:00	11	349	0	0	360	11	8	0	0	19	217	4	0	0	221	600
Grand Total	27	1416	0	0	1443	47	29	0	0	76	831	25	0	0	856	2375
Approach%	1.9%	98.1%	0%		-	61.8%	38.2%	0%		-	97.1%	2.9%	0%		-	-
Totals %	1.1%	59.6%	0%		60.8%	2%	1.2%	0%		3.2%	35%	1.1%	0%		36%	-
PHF	0.61	0.93	0		0.94	0.9	0.91	0		0.9	0.83	0.69	0		0.84	-
Heavy	0	111	0		111	5	6	0		11	63	4	0		67	-
Heavy %	0%	7.8%	0%		7.7%	10.6%	20.7%	0%		14.5%	7.6%	16%	0%		7.8%	-
Lights	27	1305	0		1332	42	23	0		65	768	21	0		789	-
Lights %	100%	92.2%	0%		92.3%	89.4%	79.3%	0%		85.5%	92.4%	84%	0%		92.2%	-
Single-Unit Trucks	0	51	0		51	2	4	0		6	40	2	0		42	-
Single-Unit Trucks %	0%	3.6%	0%		3.5%	4.3%	13.8%	0%		7.9%	4.8%	8%	0%		4.9%	-
Buses	0	9	0		9	0	1	0		1	4	0	0		4	-
Buses %	0%	0.6%	0%		0.6%	0%	3.4%	0%		1.3%	0.5%	0%	0%		0.5%	-
Articulated Trucks	0	51	0		51	3	1	0		4	19	2	0		21	-
Articulated Trucks %	0%	3.6%	0%		3.5%	6.4%	3.4%	0%		5.3%	2.3%	8%	0%		2.5%	-
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
Pedestrians%	-	-	-	0%	-	-	-	-	0%	-	-	-	-	0%	-	-
Bicycles on Road	0	0	0	0	-	0	0	0	0	-	0	0	0	0	-	-
Bicycles on Road%	-	-	-	0%	-	-	-	-	0%	-	-	-	-	0%	-	-



Peak Hour: 12:15 PM - 01:15 PM Weather: Scattered Clouds (9.84 °C)

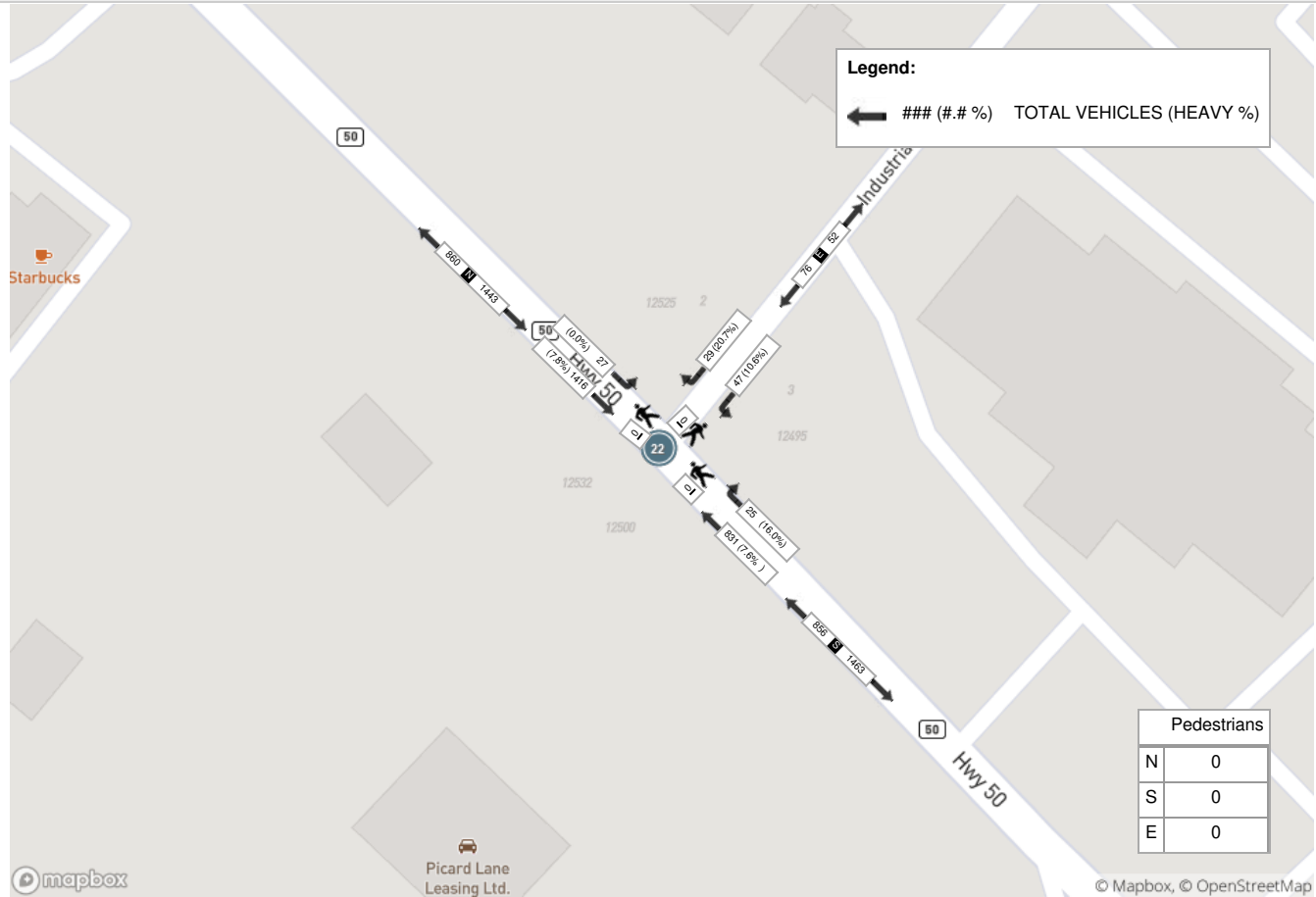
Start Time	N Approach HWY 50					E Approach INDUSTRIAL RD					S Approach HWY 50					Int. Total (15 min)
	Left	Thru	U-Turn	Peds	Approach Total	Left	Right	U-Turn	Peds	Approach Total	Thru	Right	U-Turn	Peds	Approach Total	
12:15:00	20	263	0	0	283	4	24	0	0	28	265	10	0	0	275	586
12:30:00	18	229	0	0	247	7	22	0	0	29	266	9	0	0	275	551
12:45:00	12	252	0	0	264	9	24	0	0	33	219	11	0	2	230	527
13:00:00	16	270	0	0	286	5	17	0	0	22	248	14	0	0	262	570
Grand Total	66	1014	0	0	1080	25	87	0	0	112	998	44	0	2	1042	2234
Approach%	6.1%	93.9%	0%		-	22.3%	77.7%	0%		-	95.8%	4.2%	0%		-	-
Totals %	3%	45.4%	0%		48.3%	1.1%	3.9%	0%		5%	44.7%	2%	0%		46.6%	-
PHF	0.83	0.94	0		0.94	0.69	0.91	0		0.85	0.94	0.79	0		0.95	-
Heavy	4	83	0		87	1	5	0		6	83	7	0		90	-
Heavy %	6.1%	8.2%	0%		8.1%	4%	5.7%	0%		5.4%	8.3%	15.9%	0%		8.6%	-
Lights	62	931	0		993	24	82	0		106	915	37	0		952	-
Lights %	93.9%	91.8%	0%		91.9%	96%	94.3%	0%		94.6%	91.7%	84.1%	0%		91.4%	-
Single-Unit Trucks	4	41	0		45	1	5	0		6	45	3	0		48	-
Single-Unit Trucks %	6.1%	4%	0%		4.2%	4%	5.7%	0%		5.4%	4.5%	6.8%	0%		4.6%	-
Buses	0	3	0		3	0	0	0		0	5	1	0		6	-
Buses %	0%	0.3%	0%		0.3%	0%	0%	0%		0%	0.5%	2.3%	0%		0.6%	-
Articulated Trucks	0	39	0		39	0	0	0		0	33	3	0		36	-
Articulated Trucks %	0%	3.8%	0%		3.6%	0%	0%	0%		0%	3.3%	6.8%	0%		3.5%	-
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	2	-	-
Pedestrians%	-	-	-	0%	-	-	-	-	0%	-	-	-	-	100%	-	-
Bicycles on Road	0	0	0	0	-	0	0	0	0	-	0	0	0	0	-	-
Bicycles on Road%	-	-	-	0%	-	-	-	-	0%	-	-	-	-	0%	-	-



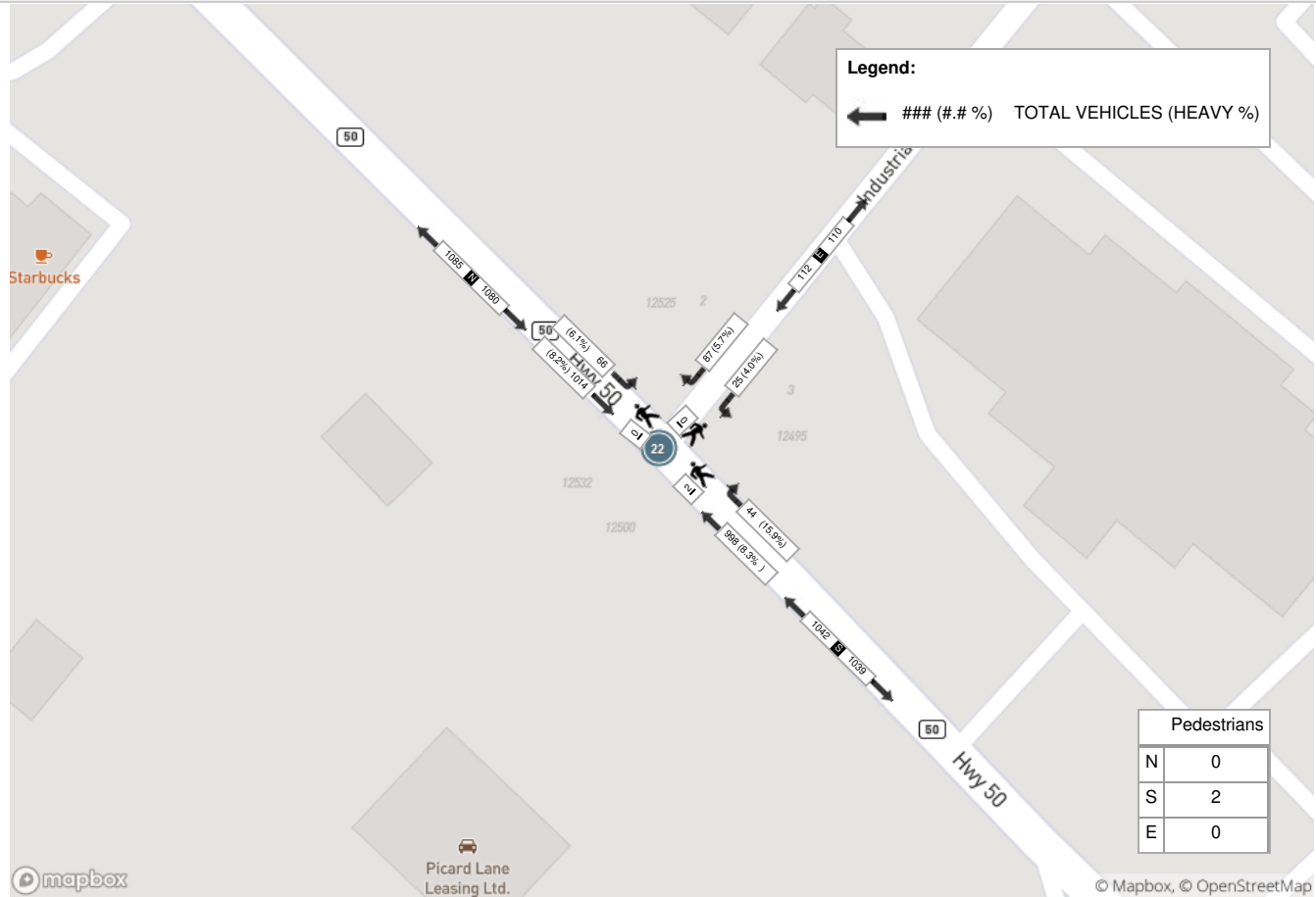
Peak Hour: 04:30 PM - 05:30 PM Weather: Broken Clouds (10.63 °C)

Start Time	N Approach HWY 50					E Approach INDUSTRIAL RD					S Approach HWY 50					Int. Total (15 min)
	Left	Thru	U-Turn	Peds	Approach Total	Left	Right	U-Turn	Peds	Approach Total	Thru	Right	U-Turn	Peds	Approach Total	
16:30:00	7	273	0	0	280	9	31	0	0	40	416	8	0	1	424	744
16:45:00	18	279	0	0	297	6	24	1	0	31	360	16	0	0	376	704
17:00:00	8	314	0	0	322	9	15	0	0	24	421	19	0	0	440	786
17:15:00	13	251	0	0	264	5	9	0	2	14	385	14	0	0	399	677
Grand Total	46	1117	0	0	1163	29	79	1	2	109	1582	57	0	1	1639	2911
Approach%	4%	96%	0%	-	-	26.6%	72.5%	0.9%	-	-	96.5%	3.5%	0%	-	-	-
Totals %	1.6%	38.4%	0%	40%	40%	1%	2.7%	0%	3.7%	54.3%	2%	0%	56.3%	56.3%	56.3%	-
PHF	0.64	0.89	0	0.9	0.9	0.81	0.64	0.25	0.68	0.94	0.75	0	0.93	0.93	0.93	-
Heavy	4	54	0	58	58	4	3	0	7	74	10	0	84	84	84	-
Heavy %	8.7%	4.8%	0%	5%	5%	13.8%	3.8%	0%	6.4%	4.7%	17.5%	0%	5.1%	5.1%	5.1%	-
Lights	42	1063	0	1105	1105	25	76	1	102	1508	47	0	1555	1555	1555	-
Lights %	91.3%	95.2%	0%	95%	95%	86.2%	96.2%	100%	93.6%	95.3%	82.5%	0%	94.9%	94.9%	94.9%	-
Single-Unit Trucks	3	30	0	33	33	2	1	0	3	39	6	0	45	45	45	-
Single-Unit Trucks %	6.5%	2.7%	0%	2.8%	2.8%	6.9%	1.3%	0%	2.8%	2.5%	10.5%	0%	2.7%	2.7%	2.7%	-
Buses	1	1	0	2	2	0	1	0	1	6	1	0	7	7	7	-
Buses %	2.2%	0.1%	0%	0.2%	0.2%	0%	1.3%	0%	0.9%	0.4%	1.8%	0%	0.4%	0.4%	0.4%	-
Articulated Trucks	0	23	0	23	23	2	1	0	3	29	3	0	32	32	32	-
Articulated Trucks %	0%	2.1%	0%	2%	2%	6.9%	1.3%	0%	2.8%	1.8%	5.3%	0%	2%	2%	2%	-
Pedestrians	-	-	-	0	-	-	-	-	2	-	-	-	1	-	-	-
Pedestrians%	-	-	-	0%	-	-	-	-	66.7%	-	-	-	33.3%	-	-	-
Bicycles on Road	0	0	0	0	-	0	0	0	0	-	0	0	0	-	-	-
Bicycles on Road%	-	-	-	0%	-	-	-	-	0%	-	-	-	0%	-	-	-

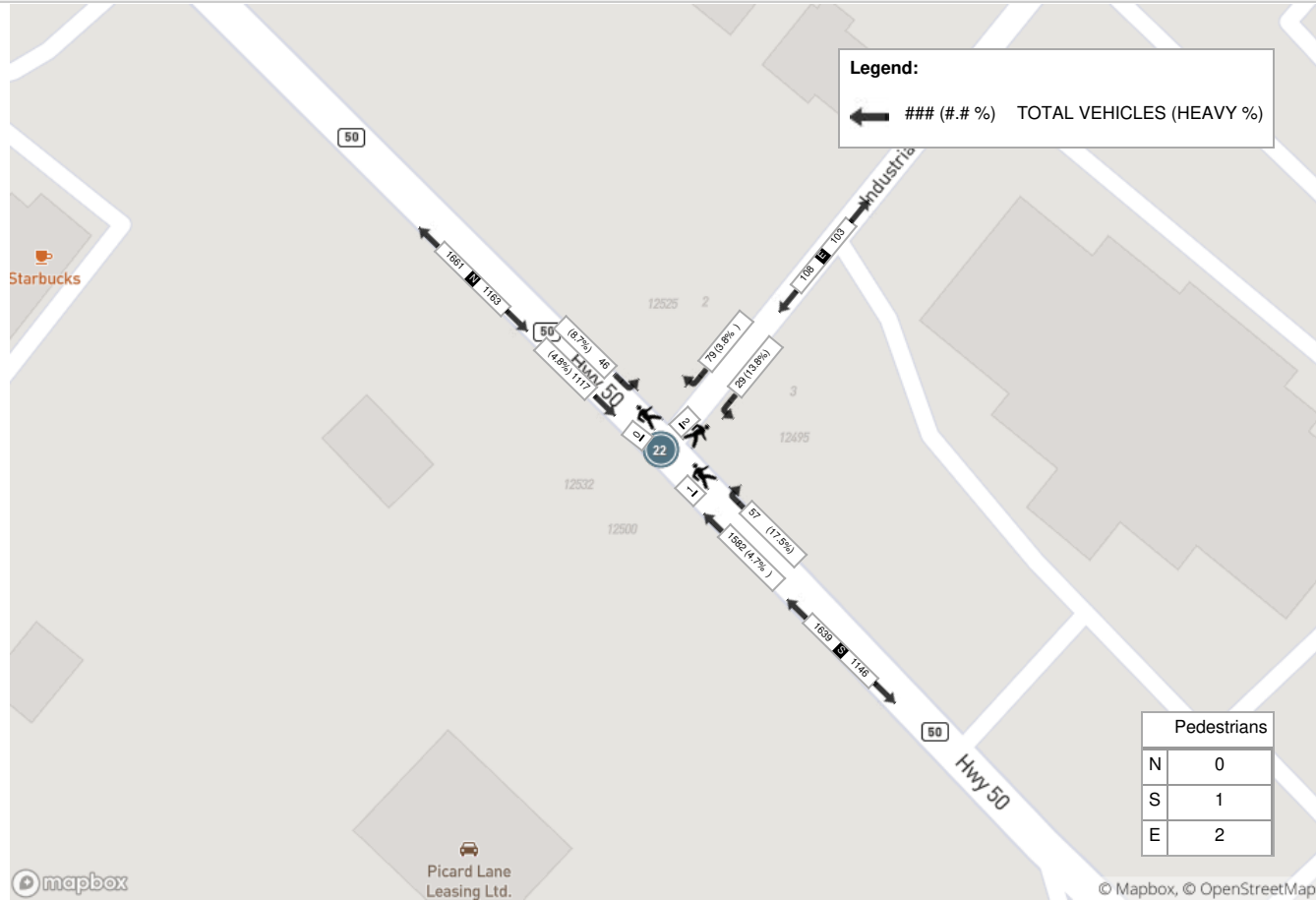
Peak Hour: 07:15 AM - 08:15 AM Weather: Broken Clouds (4.4 °C)



Peak Hour: 12:15 PM - 01:15 PM Weather: Scattered Clouds (9.84 °C)



Peak Hour: 04:30 PM - 05:30 PM Weather: Broken Clouds (10.63 °C)





Turning Movement Count (5 . HWY 50 & MAYFIELD RD) CustID: 01400000 MiID:

Start Time	Southbound						Westbound						Northbound						Eastbound						Int. Total (15 min)	
	Left	Thru	Right	UTurn	Peds	Approach Total	Left	Thru	Right	UTurn	Peds	Approach Total	Left	Thru	Right	UTurn	Peds	Approach Total	Left	Thru	Right	UTurn	Peds	Approach Total		
07:00:00	1	246	14	0	0	261	114	88	1	0	0	203	29	162	42	0	0	233	20	31	32	0	0	83	780	
07:15:00	1	319	30	0	0	350	102	85	3	0	0	190	18	196	41	0	0	255	17	25	37	0	0	79	874	
07:30:00	0	233	19	0	0	252	115	113	5	0	0	233	26	187	33	0	0	246	24	35	27	0	0	86	817	
07:45:00	4	261	24	0	0	289	118	82	6	0	0	206	32	278	45	0	0	355	27	26	47	0	0	100	950	
Hourly	6	1059	87	0	0	1152	449	368	15	0	0	832	105	823	161	0	0	1089	88	117	143	0	0	348	3421	
08:00:00	3	283	33	0	0	319	115	66	10	0	0	191	17	226	55	0	0	298	24	30	29	0	0	83	891	
08:15:00	4	231	18	0	0	253	119	60	9	0	0	188	31	232	38	0	0	301	27	29	30	0	0	86	828	
08:30:00	2	252	23	0	0	277	100	44	7	0	0	151	29	221	54	0	0	304	32	34	21	0	0	87	819	
08:45:00	6	255	21	0	0	282	116	41	7	0	0	164	22	237	36	0	0	295	33	30	33	0	1	96	837	
Hourly	15	1021	95	0	0	1131	450	211	33	0	0	694	99	916	183	0	0	1198	116	123	113	0	1	352	3375	
BREAK																										
11:00:00	5	198	22	0	0	225	99	14	8	0	0	121	25	162	41	0	0	228	23	17	32	0	0	72	646	
11:15:00	6	187	26	0	0	219	68	19	9	0	0	96	30	153	39	0	0	222	30	13	31	0	0	74	611	
11:30:00	7	169	21	0	0	197	56	19	8	0	0	83	43	185	57	0	0	285	18	23	39	0	0	80	645	
11:45:00	6	179	26	0	0	211	47	19	7	0	0	73	26	172	37	0	0	235	21	26	43	0	0	90	609	
Hourly	24	733	95	0	0	852	270	71	32	0	0	373	124	672	174	0	0	970	92	79	145	0	0	316	2511	
12:00:00	4	167	25	0	0	196	58	25	6	0	0	89	29	190	55	0	0	274	20	11	30	0	1	61	620	
12:15:00	3	186	25	0	0	214	56	11	4	0	0	71	34	158	53	0	0	245	28	22	39	0	0	89	619	
12:30:00	4	166	24	0	0	194	35	19	13	0	0	67	37	201	35	0	0	273	25	18	27	0	0	70	604	
12:45:00	9	163	25	0	0	197	39	23	8	0	0	70	35	180	58	0	0	273	27	20	38	0	0	85	625	
Hourly	20	682	99	0	0	801	188	78	31	0	0	297	135	729	201	0	0	1065	100	71	134	0	1	305	2468	
13:00:00	8	177	24	0	0	209	51	26	6	0	0	83	21	197	63	0	0	281	28	16	31	0	0	75	648	
13:15:00	3	153	22	0	0	178	71	18	8	0	0	97	28	193	51	0	0	272	25	14	34	0	0	73	620	
13:30:00	10	192	23	0	0	225	36	20	6	0	0	62	25	182	54	0	0	261	15	18	28	0	0	61	609	
13:45:00	9	142	21	0	0	172	55	15	9	0	0	79	26	178	51	0	0	255	40	23	24	0	0	87	593	
Hourly	30	664	90	0	0	784	213	79	29	0	0	321	100	750	219	0	0	1069	108	71	117	0	0	296	2470	
BREAK																										
15:00:00	4	169	22	0	0	195	50	26	5	0	0	81	37	254	107	0	0	398	35	32	40	0	0	107	781	
15:15:00	4	218	41	0	0	263	55	29	9	0	0	93	35	269	102	0	0	406	24	21	43	0	0	88	850	
15:30:00	4	207	35	0	0	246	56	40	1	0	0	97	31	276	117	0	0	424	45	42	30	0	0	117	884	
15:45:00	2	186	29	0	0	217	60	22	4	0	0	86	34	288	140	0	0	462	27	30	33	0	0	90	855	
Hourly	14	780	127	0	0	921	221	117	19	0	0	357	137	1087	466	0	0	1690	131	125	146	0	0	402	3370	
16:00:00	4	281	39	0	0	324	51	30	6	0	0	87	20	256	124	0	0	400	35	45	20	0	0	100	911	
16:15:00	6	217	19	0	0	242	45	36	13	0	0	94	21	281	116	0	0	418	24	51	35	0	0	110	864	
16:30:00	8	272	38	0	0	318	47	30	8	0	0	85	25	273	142	0	0	440	28	53	40	0	0	121	964	
16:45:00	4	251	37	0	0	292	57	33	5	0	0	95	17	312	131	0	0	460	29	53	30	0	0	112	959	
Hourly	22	1021	133	0	0	1176	200	129	32	0	0	361	83	1122	513	0	0	1718	116	202	125	0	0	443	3698	
17:00:00	1	292	42	0	0	335	52	28	9	0	0	89	26	285	131	0	0	442	36	64	22	0	0	122	988	
17:15:00	2	259	27	0	0	288	44	25	8	0	0	77	25	265	165	0	0	455	25	58	25	0	0	108	928	
17:30:00	4	211	32	0	0	247	46	29	2	0	0	77	15	285	165	0	0	465	27	34	26	0	0	87	876	
17:45:00	2	213	21	0	0	236	45	24	5	0	0	74	27	310	144	0	0	481	35	52	32	0	0	119	910	
Hourly	9	975	122	0	0	1106	187	106	24	0	0	317	93	1145	605	0	0	1843	123	208	105	0	0	436	3702	
Grand Total	140	6935	848	0	0	7923	2178	1159	215	0	0	3552	876	7244	2522	0	0	10642	874	996	1028	0	2	2898	25015	
Approach%	1.8%	87.5%	10.7%	0%	-	-	61.3%	32.6%	6.1%	0%	-	-	8.2%	68.1%	23.7%	0%	-	-	30.2%	34.4%	35.5%	0%	-	-	-	
Totals %	0.6%	27.7%	3.4%	0%	-	31.7%	8.7%	4.6%	0.9%	0%	-	14.2%	3.5%	29%	10.1%	0%	-	42.5%	3.5%	4%	4.1%	0%	-	11.6%	-	



Turning Movement Count
 Location Name: HWY 50 & MAYFIELD RD
 Date: Tue, Oct 08, 2019 Deployment Lead: David Chu

Heavy	25	704	75	0	-	196	226	28	0	-	574	680	341	0	-	74	200	693	0	-	-
Heavy %	17.9%	10.2%	8.8%	0%	-	9%	19.5%	13%	0%	-	65.5%	9.4%	13.5%	0%	-	8.5%	20.1%	67.4%	0%	-	-
Bicycles	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bicycle %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Peak Hour: 07:00 AM - 08:00 AM Weather: Mist (5.43 °C)

Start Time	Southbound						Westbound						Northbound						Eastbound						Int. Total (15 min)
	Left	Thru	Right	UTurn	Peds	Approach Total	Left	Thru	Right	UTurn	Peds	Approach Total	Left	Thru	Right	UTurn	Peds	Approach Total	Left	Thru	Right	UTurn	Peds	Approach Total	
07:00:00	1	246	14	0	0	261	114	88	1	0	0	203	29	162	42	0	0	233	20	31	32	0	0	83	780
07:15:00	1	319	30	0	0	350	102	85	3	0	0	190	18	196	41	0	0	255	17	25	37	0	0	79	874
07:30:00	0	233	19	0	0	252	115	113	5	0	0	233	26	187	33	0	0	246	24	35	27	0	0	86	817
07:45:00	4	261	24	0	0	289	118	82	6	0	0	206	32	278	45	0	0	355	27	26	47	0	0	100	950
Grand Total	6	1059	87	0	0	1152	449	368	15	0	0	832	105	823	161	0	0	1089	88	117	143	0	0	348	3421
Approach%	0.5%	91.9%	7.6%	0%	-	-	54%	44.2%	1.8%	0%	-	-	9.6%	75.6%	14.8%	0%	-	-	25.3%	33.6%	41.1%	0%	-	-	-
Totals %	0.2%	31%	2.5%	0%	-	33.7%	13.1%	10.8%	0.4%	0%	-	24.3%	3.1%	24.1%	4.7%	0%	-	31.8%	2.6%	3.4%	4.2%	0%	-	10.2%	-
PHF	0.38	0.83	0.73	0	-	0.82	0.95	0.81	0.63	0	-	0.89	0.82	0.74	0.89	0	-	0.77	0.81	0.84	0.76	0	-	0.87	-
Heavy	1	108	7	0	-	116	26	34	2	0	-	62	55	65	24	0	-	144	11	29	103	0	-	143	-
Heavy %	16.7%	10.2%	8%	0%	-	10.1%	5.8%	9.2%	13.3%	0%	-	7.5%	52.4%	7.9%	14.9%	0%	-	13.2%	12.5%	24.8%	72%	0%	-	41.1%	-
Lights	5	951	80	0	-	1036	423	334	13	0	-	770	50	758	137	0	-	945	77	88	40	0	-	205	-
Lights %	83.3%	89.8%	92%	0%	-	89.9%	94.2%	90.8%	86.7%	0%	-	92.5%	47.6%	92.1%	85.1%	0%	-	86.8%	87.5%	75.2%	28%	0%	-	58.9%	-
Single-Unit Trucks	1	52	4	0	-	57	12	14	1	0	-	27	30	34	15	0	-	79	5	11	41	0	-	57	-
Single-Unit Trucks %	16.7%	4.9%	4.6%	0%	-	4.9%	2.7%	3.8%	6.7%	0%	-	3.2%	28.6%	4.1%	9.3%	0%	-	7.3%	5.7%	9.4%	28.7%	0%	-	16.4%	-
Buses	0	2	3	0	-	5	3	6	0	0	-	9	1	2	1	0	-	4	4	8	0	0	-	12	-
Buses %	0%	0.2%	3.4%	0%	-	0.4%	0.7%	1.6%	0%	0%	-	1.1%	1%	0.2%	0.6%	0%	-	0.4%	4.5%	6.8%	0%	0%	-	3.4%	-
Articulated Trucks	0	54	0	0	-	54	11	14	1	0	-	26	24	29	8	0	-	61	2	10	62	0	-	74	-
Articulated Trucks %	0%	5.1%	0%	0%	-	4.7%	2.4%	3.8%	6.7%	0%	-	3.1%	22.9%	3.5%	5%	0%	-	5.6%	2.3%	8.5%	43.4%	0%	-	21.3%	-
Pedestrians	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
Pedestrians %	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-



Peak Hour: 11:00 AM - 12:00 PM Weather: Few Clouds (13.99 °C)

Start Time	Southbound						Westbound						Northbound						Eastbound						Int. Total (15 min)
	Left	Thru	Right	UTurn	Peds	Approach Total	Left	Thru	Right	UTurn	Peds	Approach Total	Left	Thru	Right	UTurn	Peds	Approach Total	Left	Thru	Right	UTurn	Peds	Approach Total	
11:00:00	5	198	22	0	0	225	99	14	8	0	0	121	25	162	41	0	0	228	23	17	32	0	0	72	646
11:15:00	6	187	26	0	0	219	68	19	9	0	0	96	30	153	39	0	0	222	30	13	31	0	0	74	611
11:30:00	7	169	21	0	0	197	56	19	8	0	0	83	43	185	57	0	0	285	18	23	39	0	0	80	645
11:45:00	6	179	26	0	0	211	47	19	7	0	0	73	26	172	37	0	0	235	21	26	43	0	0	90	609
Grand Total	24	733	95	0	0	852	270	71	32	0	0	373	124	672	174	0	0	970	92	79	145	0	0	316	2511
Approach%	2.8%	86%	11.2%	0%		-	72.4%	19%	8.6%	0%		-	12.8%	69.3%	17.9%	0%		-	29.1%	25%	45.9%	0%		-	-
Totals %	1%	29.2%	3.8%	0%		33.9%	10.8%	2.8%	1.3%	0%		14.9%	4.9%	26.8%	6.9%	0%		38.6%	3.7%	3.1%	5.8%	0%		12.6%	-
PHF	0.86	0.93	0.91	0		0.95	0.68	0.93	0.89	0		0.77	0.72	0.91	0.76	0		0.85	0.77	0.76	0.84	0		0.88	-
Heavy	4	121	12	0		137	31	23	4	0		58	89	88	47	0		224	5	20	104	0		129	-
Heavy %	16.7%	16.5%	12.6%	0%		16.1%	11.5%	32.4%	12.5%	0%		15.5%	71.8%	13.1%	27%	0%		23.1%	5.4%	25.3%	71.7%	0%		40.8%	-
Lights	20	612	83	0		715	239	48	28	0		315	35	584	127	0		746	87	59	41	0		187	-
Lights %	83.3%	83.5%	87.4%	0%		83.9%	88.5%	67.6%	87.5%	0%		84.5%	28.2%	86.9%	73%	0%		76.9%	94.6%	74.7%	28.3%	0%		59.2%	-
Single-Unit Trucks	3	59	6	0		68	18	12	3	0		33	39	52	22	0		113	2	7	41	0		50	-
Single-Unit Trucks %	12.5%	8%	6.3%	0%		8%	6.7%	16.9%	9.4%	0%		8.8%	31.5%	7.7%	12.6%	0%		11.6%	2.2%	8.9%	28.3%	0%		15.8%	-
Buses	0	3	0	0		3	0	0	0	0		0	0	0	0	0		0	0	0	1	0		1	-
Buses %	0%	0.4%	0%	0%		0.4%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0.7%	0%		0.3%	-
Articulated Trucks	1	59	6	0		66	13	11	1	0		25	50	36	25	0		111	3	13	62	0		78	-
Articulated Trucks %	4.2%	8%	6.3%	0%		7.7%	4.8%	15.5%	3.1%	0%		6.7%	40.3%	5.4%	14.4%	0%		11.4%	3.3%	16.5%	42.8%	0%		24.7%	-
Pedestrians	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
Pedestrians%	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-



Peak Hour: 05:00 PM - 06:00 PM Weather: Few Clouds (17.07 °C)

Start Time	Southbound						Westbound						Northbound						Eastbound						Int. Total (15 min)
	Left	Thru	Right	UTurn	Peds	Approach Total	Left	Thru	Right	UTurn	Peds	Approach Total	Left	Thru	Right	UTurn	Peds	Approach Total	Left	Thru	Right	UTurn	Peds	Approach Total	
17:00:00	1	292	42	0	0	335	52	28	9	0	0	89	26	285	131	0	0	442	36	64	22	0	0	122	988
17:15:00	2	259	27	0	0	288	44	25	8	0	0	77	25	265	165	0	0	455	25	58	25	0	0	108	928
17:30:00	4	211	32	0	0	247	46	29	2	0	0	77	15	285	165	0	0	465	27	34	26	0	0	87	876
17:45:00	2	213	21	0	0	236	45	24	5	0	0	74	27	310	144	0	0	481	35	52	32	0	0	119	910
Grand Total	9	975	122	0	0	1106	187	106	24	0	0	317	93	1145	605	0	0	1843	123	208	105	0	0	436	3702
Approach%	0.8%	88.2%	11%	0%	-	-	59%	33.4%	7.6%	0%	-	-	5%	62.1%	32.8%	0%	-	-	28.2%	47.7%	24.1%	0%	-	-	-
Totals %	0.2%	26.3%	3.3%	0%	-	29.9%	5.1%	2.9%	0.6%	0%	-	8.6%	2.5%	30.9%	16.3%	0%	-	49.8%	3.3%	5.6%	2.8%	0%	-	11.8%	-
PHF	0.56	0.83	0.73	0	-	0.83	0.9	0.91	0.67	0	-	0.89	0.86	0.92	0.92	0	-	0.96	0.85	0.81	0.82	0	-	0.89	-
Heavy	0	44	6	0	-	50	21	22	3	0	-	46	57	76	43	0	-	176	8	24	56	0	-	88	-
Heavy %	0%	4.5%	4.9%	0%	-	4.5%	11.2%	20.8%	12.5%	0%	-	14.5%	61.3%	6.6%	7.1%	0%	-	9.5%	6.5%	11.5%	53.3%	0%	-	20.2%	-
Lights	9	931	116	0	-	1056	166	84	21	0	-	271	36	1069	562	0	-	1667	115	184	49	0	-	348	-
Lights %	100%	95.5%	95.1%	0%	-	95.5%	88.8%	79.2%	87.5%	0%	-	85.5%	38.7%	93.4%	92.9%	0%	-	90.5%	93.5%	88.5%	46.7%	0%	-	79.8%	-
Single-Unit Trucks	0	27	1	0	-	28	15	7	3	0	-	25	25	40	17	0	-	82	2	12	22	0	-	36	-
Single-Unit Trucks %	0%	2.8%	0.8%	0%	-	2.5%	8%	6.6%	12.5%	0%	-	7.9%	26.9%	3.5%	2.8%	0%	-	4.4%	1.6%	5.8%	21%	0%	-	8.3%	-
Buses	0	1	0	0	-	1	1	0	0	0	-	1	1	0	0	0	-	1	1	0	0	0	-	1	-
Buses %	0%	0.1%	0%	0%	-	0.1%	0.5%	0%	0%	0%	-	0.3%	1.1%	0%	0%	0%	-	0.1%	0.8%	0%	0%	0%	-	0.2%	-
Articulated Trucks	0	16	5	0	-	21	5	15	0	0	-	20	31	36	26	0	-	93	5	12	34	0	-	51	-
Articulated Trucks %	0%	1.6%	4.1%	0%	-	1.9%	2.7%	14.2%	0%	0%	-	6.3%	33.3%	3.1%	4.3%	0%	-	5%	4.1%	5.8%	32.4%	0%	-	11.7%	-
Pedestrians	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
Pedestrians%	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-

Peak Hour: 07:00 AM - 08:00 AM Weather: Mist (5.43 °C)



Peak Hour: 11:00 AM - 12:00 PM Weather: Few Clouds (13.99 °C)



Peak Hour: 05:00 PM - 06:00 PM Weather: Few Clouds (17.07 °C)





Turning Movement Count (1 . HWY 50 & MCEWAN DR) CustID: 05013808 MioID:

Start Time	N Approach HWY 50						E Approach MCEWAN DR E						S Approach HWY 50						W Approach MCEWAN DR W						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	31	178	10	0	0	219	4	19	12	0	0	35	7	77	14	0	0	98	22	7	6	0	0	35	387	
07:15:00	25	239	9	0	0	273	6	15	25	0	2	46	12	94	16	0	3	122	27	9	9	0	0	45	486	
07:30:00	26	198	5	0	0	229	9	20	15	0	0	44	9	129	23	0	1	161	27	6	13	0	0	46	480	
07:45:00	18	208	18	0	0	244	11	18	23	0	0	52	15	156	27	0	0	198	24	7	11	0	0	42	536	1889
08:00:00	27	194	12	1	0	234	10	21	26	0	0	57	13	119	36	0	0	168	29	10	18	0	1	57	516	2018
08:15:00	35	177	12	0	0	224	13	22	17	0	0	52	18	128	17	0	0	163	22	14	14	0	1	50	489	2021
08:30:00	32	202	8	0	0	242	15	28	21	0	0	64	12	94	26	0	2	132	26	9	17	0	0	52	490	2031
08:45:00	41	189	21	0	1	251	8	28	18	0	0	54	24	126	28	0	1	178	27	14	26	0	0	67	550	2045
BREAK																										
16:00:00	23	163	24	0	0	210	69	30	55	0	1	154	41	240	25	0	4	306	41	44	55	0	0	140	810	
16:15:00	9	167	27	0	0	203	63	18	40	0	1	121	37	238	24	0	1	299	43	30	49	0	0	122	745	
16:30:00	29	155	13	0	0	197	52	28	45	0	0	125	49	248	28	0	0	325	48	25	54	0	1	127	774	
16:45:00	16	180	21	0	0	217	38	23	29	0	0	90	39	247	21	1	0	308	36	22	39	0	2	97	712	3041
17:00:00	12	160	23	0	0	195	71	20	52	0	0	143	61	262	27	0	0	350	52	29	51	0	0	132	820	3051
17:15:00	12	137	18	0	1	167	50	22	40	0	0	112	42	226	23	0	0	291	28	20	34	0	0	82	652	2958
17:30:00	18	114	19	0	0	151	41	21	26	0	0	88	33	200	25	2	0	260	29	21	35	0	1	85	584	2768
17:45:00	19	112	16	0	1	147	29	13	44	0	0	86	32	240	21	1	1	294	27	9	32	0	0	68	595	2651
Grand Total	373	2773	256	1	3	3403	489	346	488	0	4	1323	444	2824	381	4	13	3653	508	276	463	0	6	1247	9626	-
Approach%	11%	81.5%	7.5%	0%	-	-	37%	26.2%	36.9%	0%	-	-	12.2%	77.3%	10.4%	0.1%	-	-	40.7%	22.1%	37.1%	0%	-	-	-	-
Totals %	3.9%	28.8%	2.7%	0%	-	35.4%	5.1%	3.6%	5.1%	0%	-	13.7%	4.6%	29.3%	4%	0%	-	37.9%	5.3%	2.9%	4.8%	0%	-	13%	-	-
Heavy	9	137	10	0	-	-	11	23	26	0	-	-	19	129	79	0	-	-	91	20	7	0	-	-	-	-
Heavy %	2.4%	4.9%	3.9%	0%	-	-	2.2%	6.6%	5.3%	0%	-	-	4.3%	4.6%	20.7%	0%	-	-	17.9%	7.2%	1.5%	0%	-	-	-	-
Bicycles	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bicycle %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Peak Hour: 08:00 AM - 09:00 AM Weather: Light Rain (2.76 °C)

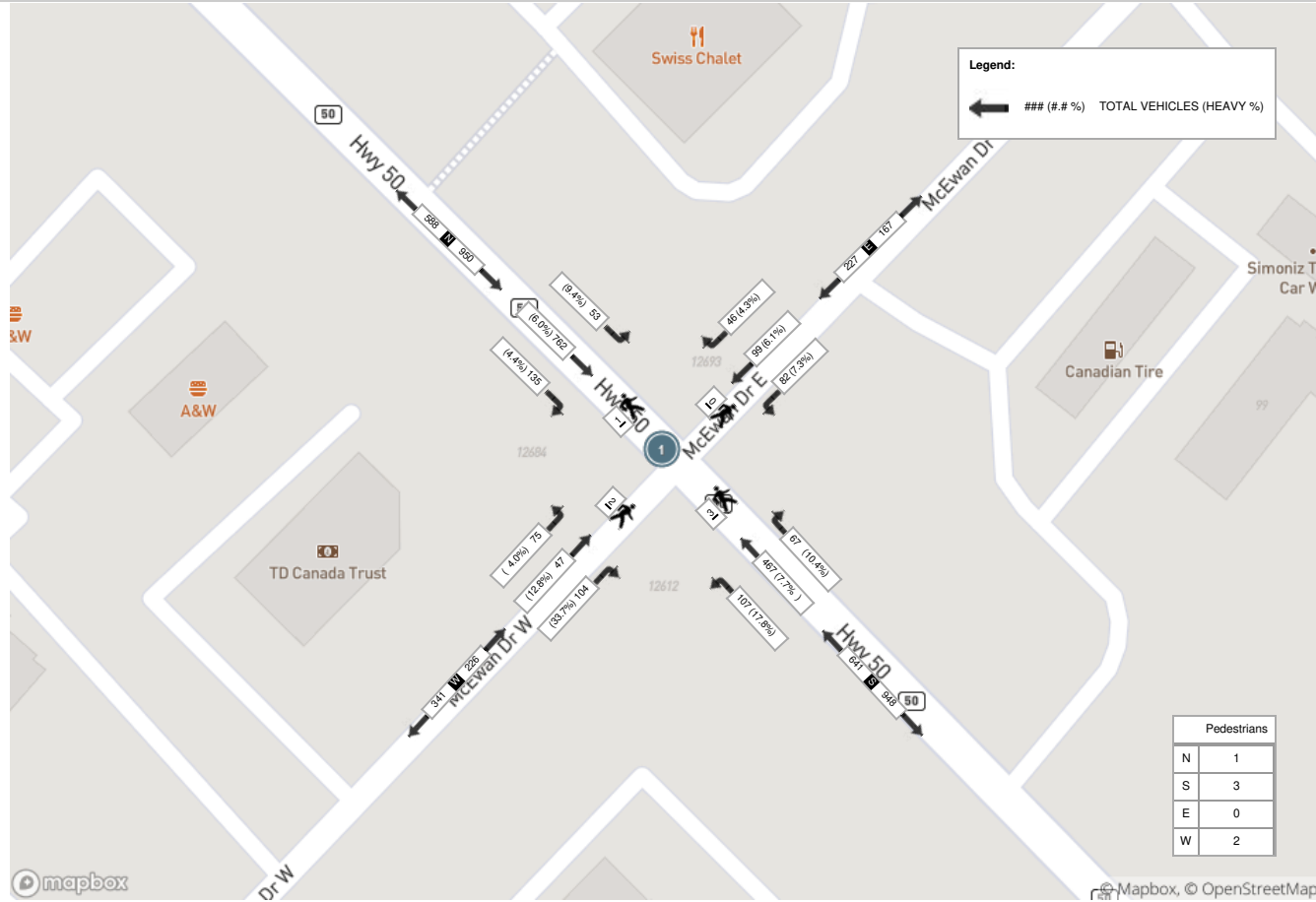
Start Time	N Approach HWY 50						E Approach MCEWAN DR E						S Approach HWY 50						W Approach MCEWAN DR W						Int. Total (15 min)	
	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total		
08:00:00	27	194	12	1	0	234	10	21	26	0	0	57	13	119	36	0	0	168	29	10	18	0	1	57	516	
08:15:00	35	177	12	0	0	224	13	22	17	0	0	52	18	128	17	0	0	163	22	14	14	0	1	50	489	
08:30:00	32	202	8	0	0	242	15	28	21	0	0	64	12	94	26	0	2	132	26	9	17	0	0	52	490	
08:45:00	41	189	21	0	1	251	8	28	18	0	0	54	24	126	28	0	1	178	27	14	26	0	0	67	550	
Grand Total	135	762	53	1	1	951	46	99	82	0	0	227	67	467	107	0	3	641	104	47	75	0	2	226	2045	
Approach%	14.2%	80.1%	5.6%	0.1%		-	20.3%	43.6%	36.1%	0%		-	10.5%	72.9%	16.7%	0%		-	46%	20.8%	33.2%	0%		-	-	
Totals %	6.6%	37.3%	2.6%	0%		46.5%	2.2%	4.8%	4%	0%		11.1%	3.3%	22.8%	5.2%	0%		31.3%	5.1%	2.3%	3.7%	0%		11.1%	-	
PHF	0.82	0.94	0.63	0.25		0.95	0.77	0.88	0.79	0		0.89	0.7	0.91	0.74	0		0.9	0.9	0.84	0.72	0		0.84	-	
Heavy	6	46	5	0		57	2	6	6	0		14	7	36	19	0		62	35	6	3	0		44	-	
Heavy %	4.4%	6%	9.4%	0%		6%	4.3%	6.1%	7.3%	0%		6.2%	10.4%	7.7%	17.8%	0%		9.7%	33.7%	12.8%	4%	0%		19.5%	-	
Lights	129	716	48	1		894	44	93	76	0		213	60	431	88	0		579	69	41	72	0		182	-	
Lights %	95.6%	94%	90.6%	100%		94%	95.7%	93.9%	92.7%	0%		93.8%	89.6%	92.3%	82.2%	0%		90.3%	66.3%	87.2%	96%	0%		80.5%	-	
Single-Unit Trucks	4	19	3	0		26	1	3	2	0		6	5	16	10	0		31	17	2	1	0		20	-	
Single-Unit Trucks %	3%	2.5%	5.7%	0%		2.7%	2.2%	3%	2.4%	0%		2.6%	7.5%	3.4%	9.3%	0%		4.8%	16.3%	4.3%	1.3%	0%		8.8%	-	
Buses	2	8	2	0		12	0	0	0	0		0	0	6	0	0		6	0	1	1	0		2	-	
Buses %	1.5%	1%	3.8%	0%		1.3%	0%	0%	0%	0%		0%	0%	1.3%	0%	0%		0.9%	0%	2.1%	1.3%	0%		0.9%	-	
Articulated Trucks	0	19	0	0		19	1	3	4	0		8	2	14	9	0		25	18	3	1	0		22	-	
Articulated Trucks %	0%	2.5%	0%	0%		2%	2.2%	3%	4.9%	0%		3.5%	3%	3%	8.4%	0%		3.9%	17.3%	6.4%	1.3%	0%		9.7%	-	
Pedestrians	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	3	-	-	-	-	-	2	-	-	-
Pedestrians%	-	-	-	-	16.7%	-	-	-	-	0%	-	-	-	-	-	50%	-	-	-	-	-	-	33.3%	-	-	-



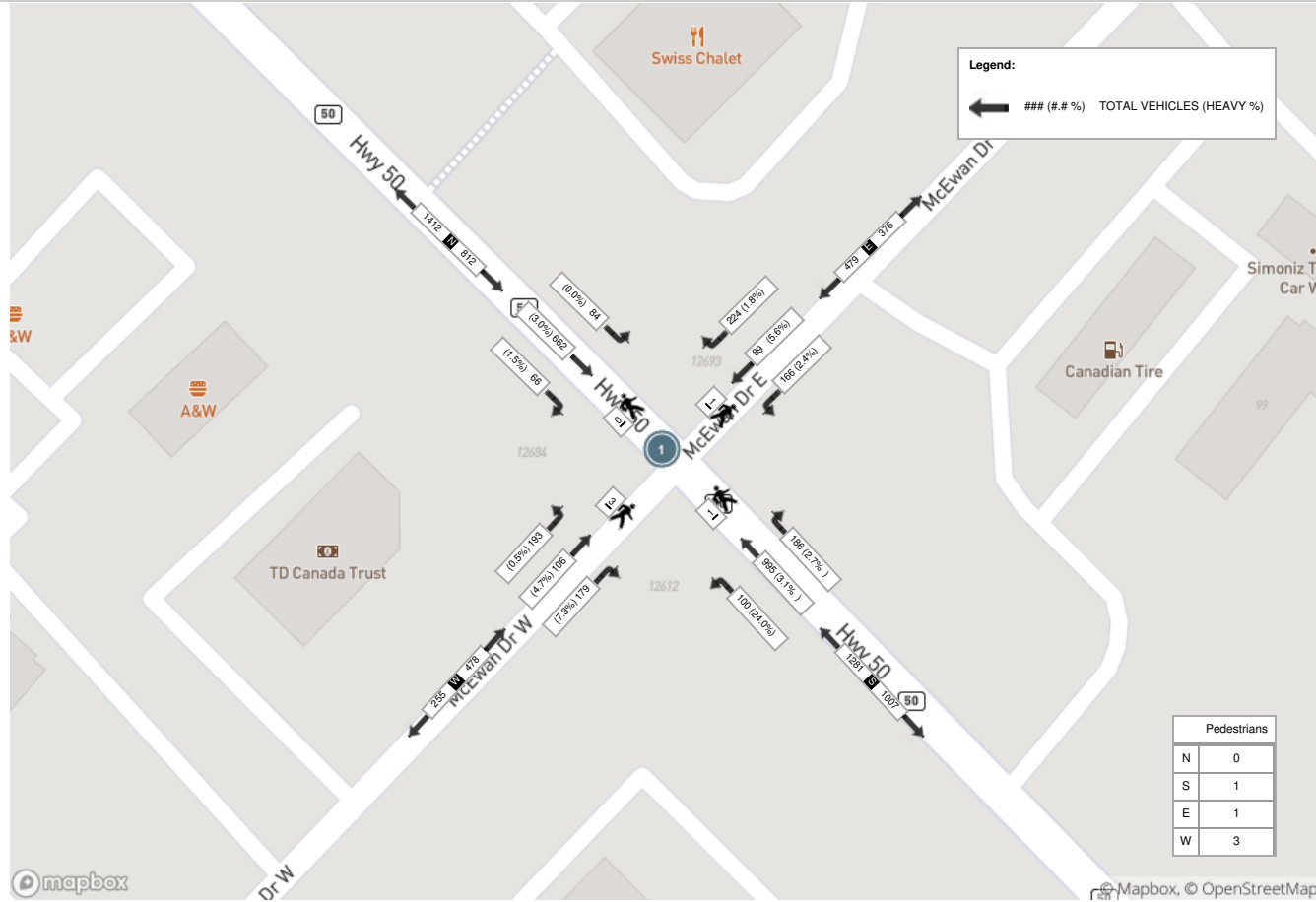
Peak Hour: 04:15 PM - 05:15 PM Weather: Mist (5.74 °C)

Start Time	N Approach HWY 50						E Approach MCEWAN DR E						S Approach HWY 50						W Approach MCEWAN DR W						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	9	167	27	0	0	203	63	18	40	0	1	121	37	238	24	0	1	299	43	30	49	0	0	122	745
16:30:00	29	155	13	0	0	197	52	28	45	0	0	125	49	248	28	0	0	325	48	25	54	0	1	127	774
16:45:00	16	180	21	0	0	217	38	23	29	0	0	90	39	247	21	1	0	308	36	22	39	0	2	97	712
17:00:00	12	160	23	0	0	195	71	20	52	0	0	143	61	262	27	0	0	350	52	29	51	0	0	132	820
Grand Total	66	662	84	0	0	812	224	89	166	0	1	479	186	995	100	1	1	1282	179	106	193	0	3	478	3051
Approach%	8.1%	81.5%	10.3%	0%		-	46.8%	18.6%	34.7%	0%		-	14.5%	77.6%	7.8%	0.1%		-	37.4%	22.2%	40.4%	0%		-	-
Totals %	2.2%	21.7%	2.8%	0%		26.6%	7.3%	2.9%	5.4%	0%		15.7%	6.1%	32.6%	3.3%	0%		42%	5.9%	3.5%	6.3%	0%		15.7%	-
PHF	0.57	0.92	0.78	0		0.94	0.79	0.79	0.8	0		0.84	0.76	0.95	0.89	0.25		0.92	0.86	0.88	0.89	0		0.91	-
Heavy	1	20	0	0		21	4	5	4	0		13	5	31	24	0		60	13	5	1	0		19	-
Heavy %	1.5%	3%	0%	0%		2.6%	1.8%	5.6%	2.4%	0%		2.7%	2.7%	3.1%	24%	0%		4.7%	7.3%	4.7%	0.5%	0%		4%	-
Lights	65	642	84	0		791	220	84	162	0		466	181	964	76	1		1222	166	101	192	0		459	-
Lights %	98.5%	97%	100%	0%		97.4%	98.2%	94.4%	97.6%	0%		97.3%	97.3%	96.9%	76%	100%		95.3%	92.7%	95.3%	99.5%	0%		96%	-
Single-Unit Trucks	1	9	0	0		10	3	2	1	0		6	2	16	13	0		31	6	4	1	0		11	-
Single-Unit Trucks %	1.5%	1.4%	0%	0%		1.2%	1.3%	2.2%	0.6%	0%		1.3%	1.1%	1.6%	13%	0%		2.4%	3.4%	3.8%	0.5%	0%		2.3%	-
Buses	0	2	0	0		2	0	0	0	0		0	0	1	0	0		1	0	0	0	0		0	-
Buses %	0%	0.3%	0%	0%		0.2%	0%	0%	0%	0%		0%	0%	0.1%	0%	0%		0.1%	0%	0%	0%	0%		0%	-
Articulated Trucks	0	9	0	0		9	1	3	3	0		7	3	14	11	0		28	7	1	0	0		8	-
Articulated Trucks %	0%	1.4%	0%	0%		1.1%	0.4%	3.4%	1.8%	0%		1.5%	1.6%	1.4%	11%	0%		2.2%	3.9%	0.9%	0%	0%		1.7%	-
Pedestrians	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	1	-	-	-	-	-	3	-	-
Pedestrians%	-	-	-	-	0%	-	-	-	-	-	20%	-	-	-	-	-	20%	-	-	-	-	-	60%	-	-

Peak Hour: 08:00 AM - 09:00 AM Weather: Light Rain (2.76 °C)



Peak Hour: 04:15 PM - 05:15 PM Weather: Mist (5.74 °C)



Appendix E

George Bolton Extension Traffic Redistribution



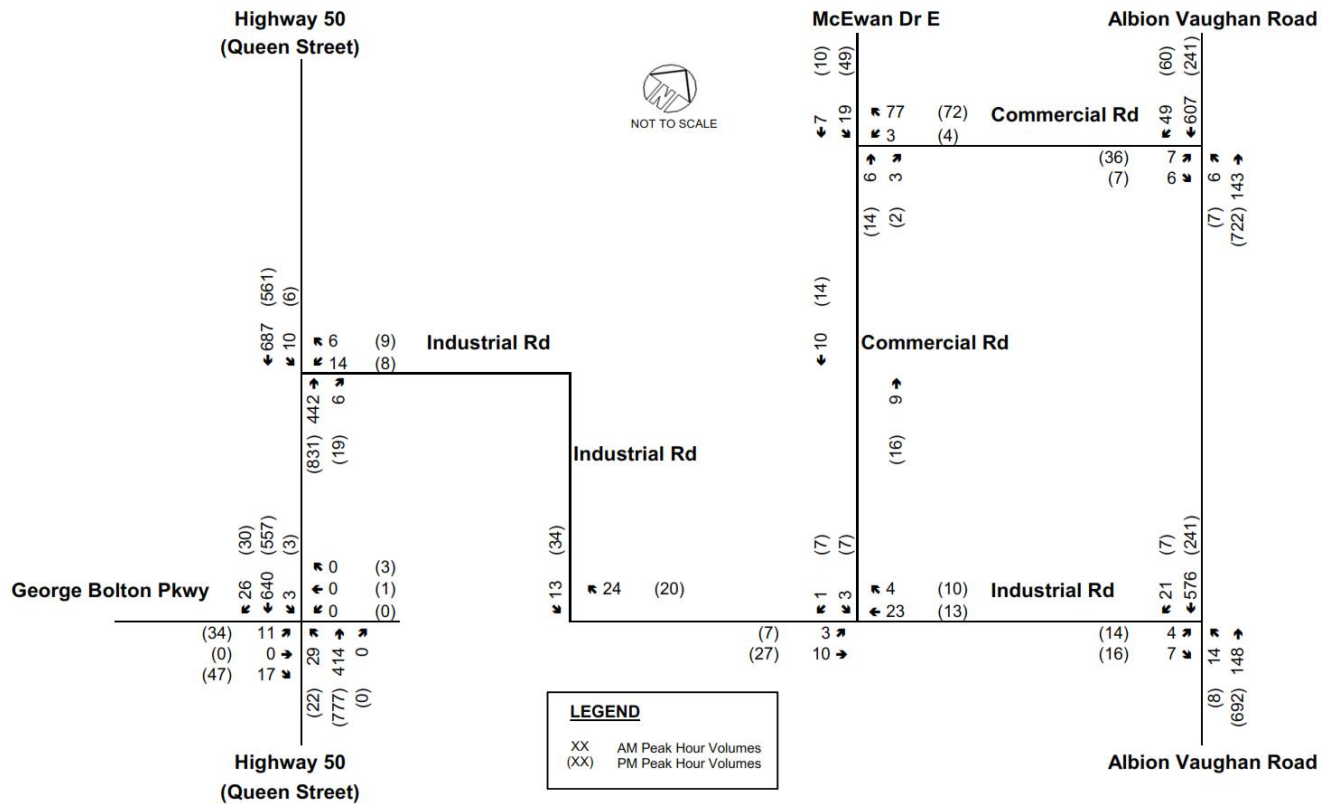


Figure 3 Future 2031 Traffic Volumes due to Background Growth

2.2.2 Future Development Traffic

Traffic generated by the following development within the study area was considered based on consultation with Town staff:

- A residential development located in the southwest quadrant of Albion Vaughan Road and Industrial Road consisting of 162 townhouse units, 31 single family units, plus a 110-unit senior’s development.

“Traffic Impact Study - Update, Bolton Gateway Developments Inc., Special Residential Area” conducted by C. F. Crozier & Associates Inc., as revised July 2013, provided the estimated development traffic (Fig. 7). An excerpt of the report is attached in Appendix C.

2.2.3 Truck Traffic Volumes Diverted to George Bolton Parkway Extension

As part of community considerations regarding downtown Bolton revitalization, the 2015 Bolton Transportation Master Plan suggested that through truck movements be restricted in the downtown core. Through an analysis of various routing alternatives, the BTMP determined that the most likely alternative for the east / west trucks would be the route consisting of King Street – Coleraine Drive – Mayfield Road – Albion Vaughan Road and returning to King Street. The assumed truck routes is illustrated in Figure 11 of the BTMP and is provided here in Appendix D.



With the completion of George Bolton Parkway, trucks will divert to the shorter route (approximately 2.6 km shorter) consisting of King Street – Coleraine Drive – George Bolton Parkway – Albion Vaughan Road – King Street.

This study uses the re-routed truck volumes on Mayfield Road (BTMP’s Figure 11) to estimate the potential re-routed truck volumes to George Bolton Parkway. The resultant potential truck volumes diverted to George Bolton Parkway extension are illustrated in Figure 4.



Figure 4 Truck Traffic Volumes Diverted to George Bolton Parkway Extension

2.2.4 Existing Traffic Volumes Diverted to George Bolton Parkway Extension

To estimate the potential of existing (car) traffic volumes diverted to George Bolton Parkway extension, the following analysis steps were taken:

- Existing traffic volumes for the greater area of Bolton were reviewed from the 2015 Bolton Transportation Master Plan Study (BTMP’s Figure 17) and attached in Appendix D.
- There are several sources of traffic that enter the network. These include volumes coming into Bolton along eastbound Mayfield Drive, along south / northbound Highway 50, Coleraine Drive and Albion Vaughan Road, and trips coming in along east/westbound King Street / Harvest Moon Drive.
- Depending on their location of origin, they will either travel north-eastbound or south-westbound to exit the Bolton area.



- Only these volumes that are coming in from outside Bolton (referred to as external trips) and going out of Bolton have been considered as potential diverted volumes.
- Any potential route that may be re-routed to George Bolton Parkway extension was identified.
- Along the potential routes, the volumes that entered the network were distributed throughout the network:
 - When an external trip volume meets an intersection while traveling through Bolton, they have three movements to take, left-turn, through or right-turn.
 - The volumes were distributed to the movements by applying turning movement ratios derived from the TMC data.
- Therefore, an external trip will enter the network from a source, travel along one of the potential routes through Bolton. Some trips are destined to stay in Bolton and these are not considered. Through trips that exit the network will be the actual volume that travels through Bolton, and are assumed to comprise the future diverted trips to the George Bolton Parkway extension.

Based on the above analysis of the existing TMC data in the greater area of Bolton, the potential existing (car) traffic volumes diverted to George Bolton Parkway extension are illustrated in Figure 5. The detail analysis sheets are provided in Appendix D.

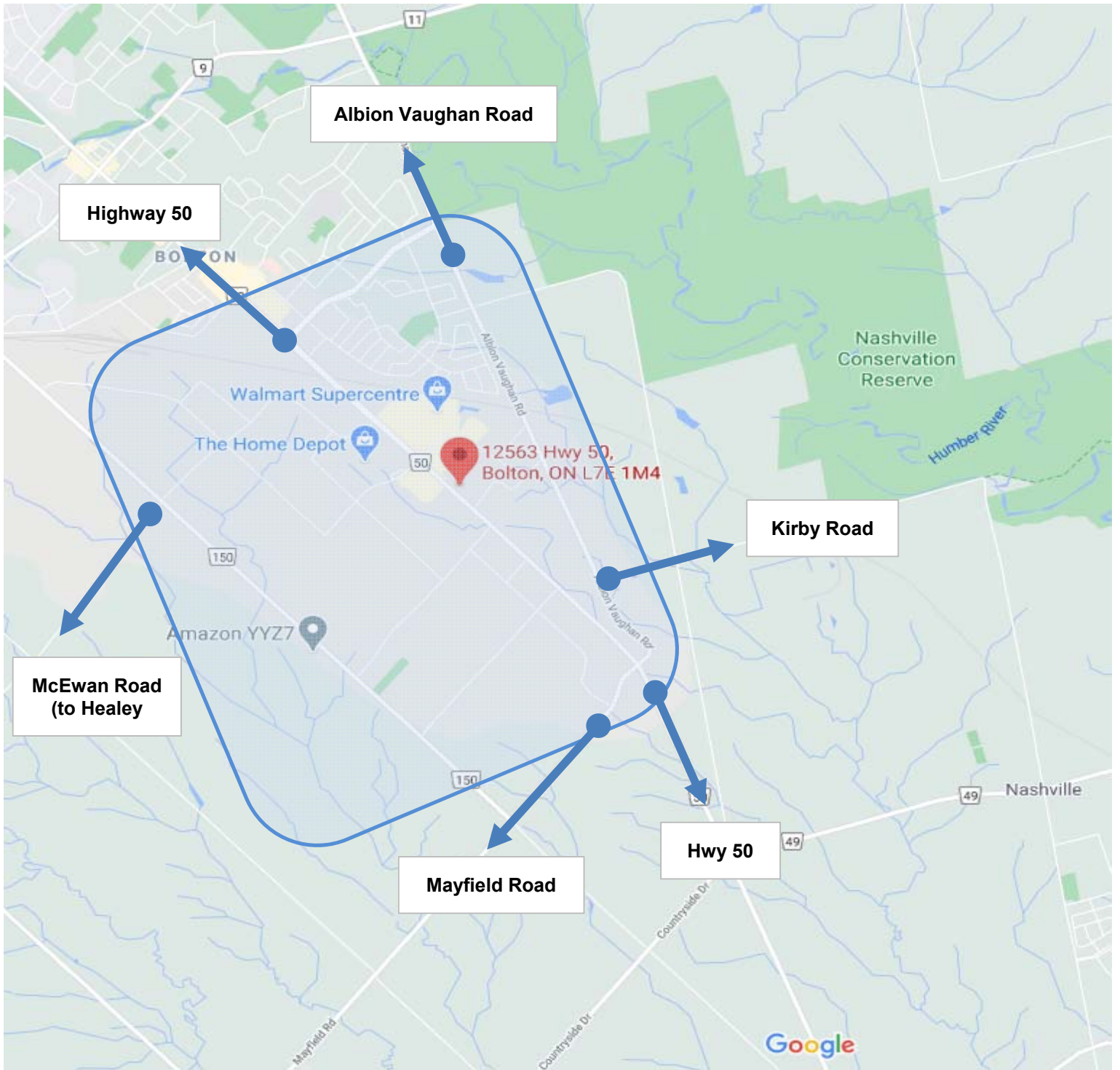


Figure 5 Existing Traffic Volumes Diverted to George Bolton Parkway Extension

Appendix F

Transportation Tomorrow Survey Data





Albion Vaughan Road

Highway 50

Kirby Road

**McEwan Road
(to Healey)**

Mayfield Road

Hwy 50

Walmart Supercentre

The Home Depot

12563 Hwy 50,
Bolton, ON L7E 1M4

Amazon YYZ7

Nashville
Conservation
Reserve

Humber River

Nashville

Google

Wed Jan 13 2021 12:20:39 GMT-0500 (Eastern Standard Time) - Run Time: 2461ms

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
 2006 GTA zone of origin - gta06_orig In 3190
 and
 Primary travel mode of trip - mode_prime In D

3192
 M P T U)

Trip 2016
 Table:

	3190	3192	TOTAL
PD 1 of Toronto	73	44	117
PD 3 of Toronto	63	17	80
PD 4 of Toronto	41	21	62
PD 7 of Toronto	0	42	42
PD 8 of Toronto	78	61	139
PD 9 of Toronto	57	144	201
PD 10 of Toronto	107	29	136
PD 12 of Toronto	0	15	15
PD 13 of Toronto	46	0	46
PD 16 of Toronto	0	15	15
Newmarket	0	64	64
Aurora	22	20	42
Richmond Hill	10	40	50
Markham	23	51	74
King	0	64	64
Vaughan	368	388	756
Caledon	445	772	1217
Brampton	112	202	314
Mississauga	152	345	497
Halton Hills	0	18	18
Burlington	0	20	20
Orangeville	20	17	37
Barrie	0	21	21
Bradford-West Gwillimbury	0	84	84
Mono	0	30	30
External	0	15	15

Wed Jan 13 2021 12:38:45 GMT-0500 (Eastern Standard Time) - Run Time: 2535ms

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
 2006 GTA zone of origin - gta06_orig In 3190
 and
 Primary travel mode of trip - mode_prime In D
 and
 Planning district of destination - pd_dest In 33

3192
 M P T U)
 34)

Trip 2016
 Table:

	3190	3192	TOTAL
2002	20	0	20
2020	20	0	20
2022	0	41	41
2023	0	43	43
2027	25	0	25
2031	0	12	12
2039	0	15	15
2040	20	0	20
2058	0	39	39
2060	68	0	68
2062	25	0	25
2067	22	0	22
2069	0	21	21
2070	0	16	16
2071	9	0	9
2072	24	0	24
2081	66	0	66
2082	8	0	8
2084	0	16	16
2091	0	39	39
2092	0	24	24
2104	0	34	34
2105	29	0	29
2111	25	21	46
2113	8	0	8
2114	0	35	35
2132	0	20	20
2133	0	12	12
3003	53	56	109
3017	0	21	21
3190	191	32	223
3191	61	275	336
3192	25	114	139
3193	114	196	310
3194	0	62	62
3196	0	15	15

Wed Jan 13 2021 12:22:10 GMT-0500 (Eastern Standard Time) - Run Time: 2442ms

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
 2006 GTA zone of destination - gta06_dest In 3190
 and
 Primary travel mode of trip - mode_prime In D

3192
 M P T U)

Trip 2016
 Table:

	3190	3192	TOTAL
PD 1 of Toronto	0	74	74
PD 3 of Toronto	27	0	27
PD 4 of Toronto	41	0	41
PD 5 of Toronto	0	15	15
PD 7 of Toronto	0	42	42
PD 8 of Toronto	78	46	124
PD 9 of Toronto	63	68	131
PD 10 of Toronto	134	58	192
PD 12 of Toronto	0	42	42
PD 13 of Toronto	46	0	46
East Gwillimbury	43	0	43
Aurora	22	20	42
Richmond Hill	10	40	50
Markham	23	0	23
King	0	37	37
Vaughan	288	297	585
Caledon	205	863	1068
Brampton	50	234	284
Mississauga	138	289	427
Cambridge	0	9	9
Barrie	0	21	21
Innisfil	0	72	72
Bradford-West Gwillimbury	0	84	84
Mono	0	30	30
External	0	15	15

Wed Jan 13 2021 12:30:43 GMT-0500 (Eastern Standard Time) - Run Time: 2360ms

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
 2006 GTA zone of destination - gta06_dest In 3190
 and
 Primary travel mode of trip - mode_prime In D
 and
 Planning district of origin - pd_orig In 33

3192
 M P T U
 34)

Trip 2016
 Table:

	3190	3192	TOTAL
2002	20	0	20
2005	0	34	34
2015	21	0	21
2020	20	0	20
2027	25	0	25
2040	20	19	39
2058	0	39	39
2060	57	0	57
2062	25	21	46
2067	22	0	22
2070	0	16	16
2081	16	0	16
2082	8	0	8
2084	0	16	16
2091	0	39	39
2092	0	24	24
2104	0	34	34
2105	29	0	29
2111	25	21	46
2131	0	12	12
2132	0	20	20
3017	0	21	21
3190	77	156	233
3191	35	177	212
3192	33	287	320
3193	58	157	215
3194	0	50	50
3196	0	15	15

AM	RESIDENTIAL VEHICLE TRIP DISTRIBUTION					
Outbound	Traffic Volume Allocation			Route Split Totals		
2021-02-05						

Zone	Trips	%	NORTH	NORTH	SOUTH	WEST	WEST	TOTAL
			Hwy 50	Albion Vaughan Road	Hwy 50	McEwan Drive (to Healey Road)	Mayfield Road	
PD 1 of Toronto	117	3%			100%			100.00%
PD 3 of Toronto	80	2%			100%			100.00%
PD 4 of Toronto	62	1%			100%			100.00%
PD 7 of Toronto	42	1%			100%			100.00%
PD 8 of Toronto	139	3%			100%			100.00%
PD 9 of Toronto	201	5%			100%			100.00%
PD 10 of Toronto	136	3%			100%			100.00%
PD 12 of Toronto	15	0%			100%			100.00%
PD 13 of Toronto	46	1%			100%			100.00%
PD 16 of Toronto	15	0%			100%			100.00%
Newmarket	64	2%	30%	70%				100.00%
Aurora	42	1%	50%	50%				100.00%
Richmond Hill	50	1%	15%	35%	50%			100.00%
Markham	74	2%		10%	90%			100.00%
King	64	2%	15%	50%	35%			100.00%
Brampton	314	8%			25%	10%	65%	100.00%
Mississauga	497	12%			25%	10%	65%	100.00%
Halton Hills	18	0%				50%	50%	100.00%
Burlington	20	0%			100%			100.00%
Orangeville	37	1%	90%	10%				100.00%
Barrie	21	1%	10%	90%				100.00%
Bradford-West Gwillimbury	84	2%	10%	90%				100.00%
Mono	30	1%	90%	10%				100.00%
External	15	0%	20%	20%	20%	20%	20%	100.00%
2002	20	0%			100%			100.00%
2020	20	0%			100%			100.00%
2022	41	1%			100%			100.00%
2023	43	1%			100%			100.00%
2027	25	1%			100%			100.00%
2031	12	0%			100%			100.00%
2039	15	0%			100%			100.00%
2040	20	0%			100%			100.00%
2058	39	1%			100%			100.00%
2060	68	2%			100%			100.00%
2062	25	1%			100%			100.00%
2067	22	1%			100%			100.00%
2069	21	1%			100%			100.00%
2070	16	0%			100%			100.00%
2071	9	0%			100%			100.00%
2072	24	1%			100%			100.00%
2081	66	2%			100%			100.00%
2082	8	0%			100%			100.00%
2084	16	0%			100%			100.00%
2091	39	1%			100%			100.00%
2092	24	1%			100%			100.00%
2104	34	1%			100%			100.00%
2105	29	1%			100%			100.00%
2111	46	1%			100%			100.00%
2113	8	0%			100%			100.00%
2114	35	1%			100%			100.00%
2132	20	0%			100%			100.00%
2133	12	0%			100%			100.00%
3003	109	3%	50%	50%				100.00%
3017	21	1%				50%	50%	100.00%
3190	223	5%	50%	50%				100.00%
3191	336	8%	50%	50%				100.00%
3192	139	3%	25%		25%	25%	25%	100.00%
3193	310	7%	50%	50%				100.00%
3194	62	1%	50%			50%		100.00%
3196	15	0%				50%	50%	100.00%
	4155	100%						

NORTH	NORTH	SOUTH	WEST	WEST	TOTAL
Hwy 50	Albion Vaughan Road	Hwy 50	McEwan Drive (to Healey Road)	Mayfield Road	TOTAL
0.00%	0.00%	2.82%	0.00%	0.00%	2.8%
0.00%	0.00%	1.93%	0.00%	0.00%	1.9%
0.00%	0.00%	1.49%	0.00%	0.00%	1.5%
0.00%	0.00%	1.01%	0.00%	0.00%	1.0%
0.00%	0.00%	3.35%	0.00%	0.00%	3.3%
0.00%	0.00%	4.84%	0.00%	0.00%	4.8%
0.00%	0.00%	3.27%	0.00%	0.00%	3.3%
0.00%	0.00%	0.36%	0.00%	0.00%	0.4%
0.00%	0.00%	1.11%	0.00%	0.00%	1.1%
0.00%	0.00%	0.36%	0.00%	0.00%	0.4%
0.46%	1.08%	0.00%	0.00%	0.00%	1.5%
0.51%	0.51%	0.00%	0.00%	0.00%	1.0%
0.18%	0.42%	0.60%	0.00%	0.00%	1.2%
0.00%	0.18%	1.60%	0.00%	0.00%	1.8%
0.23%	0.77%	0.54%	0.00%	0.00%	1.5%
0.00%	0.00%	1.89%	0.76%	4.91%	7.6%
0.00%	0.00%	2.99%	1.20%	7.77%	12.0%
0.00%	0.00%	0.00%	0.22%	0.22%	0.4%
0.00%	0.00%	0.48%	0.00%	0.00%	0.5%
0.80%	0.09%	0.00%	0.00%	0.00%	0.9%
0.05%	0.45%	0.00%	0.00%	0.00%	0.5%
0.20%	1.82%	0.00%	0.00%	0.00%	2.0%
0.65%	0.07%	0.00%	0.00%	0.00%	0.7%
0.07%	0.07%	0.07%	0.07%	0.07%	0.4%
0.00%	0.00%	0.48%	0.00%	0.00%	0.5%
0.00%	0.00%	0.48%	0.00%	0.00%	0.5%
0.00%	0.00%	0.99%	0.00%	0.00%	1.0%
0.00%	0.00%	1.03%	0.00%	0.00%	1.0%
0.00%	0.00%	0.60%	0.00%	0.00%	0.6%
0.00%	0.00%	0.29%	0.00%	0.00%	0.3%
0.00%	0.00%	0.36%	0.00%	0.00%	0.4%
0.00%	0.00%	0.48%	0.00%	0.00%	0.5%
0.00%	0.00%	0.94%	0.00%	0.00%	0.9%
0.00%	0.00%	1.64%	0.00%	0.00%	1.6%
0.00%	0.00%	0.60%	0.00%	0.00%	0.6%
0.00%	0.00%	0.53%	0.00%	0.00%	0.5%
0.00%	0.00%	0.51%	0.00%	0.00%	0.5%
0.00%	0.00%	0.39%	0.00%	0.00%	0.4%
0.00%	0.00%	0.22%	0.00%	0.00%	0.2%
0.00%	0.00%	0.58%	0.00%	0.00%	0.6%
0.00%	0.00%	1.59%	0.00%	0.00%	1.6%
0.00%	0.00%	0.19%	0.00%	0.00%	0.2%
0.00%	0.00%	0.39%	0.00%	0.00%	0.4%
0.00%	0.00%	0.94%	0.00%	0.00%	0.9%
0.00%	0.00%	0.58%	0.00%	0.00%	0.6%
0.00%	0.00%	0.82%	0.00%	0.00%	0.8%
0.00%	0.00%	0.70%	0.00%	0.00%	0.7%
0.00%	0.00%	1.11%	0.00%	0.00%	1.1%
0.00%	0.00%	0.19%	0.00%	0.00%	0.2%
0.00%	0.00%	0.84%	0.00%	0.00%	0.8%
0.00%	0.00%	0.48%	0.00%	0.00%	0.5%
0.00%	0.00%	0.29%	0.00%	0.00%	0.3%
1.31%	1.31%	0.00%	0.00%	0.00%	2.6%
0.00%	0.00%	0.00%	0.25%	0.25%	0.5%
2.68%	2.68%	0.00%	0.00%	0.00%	5.4%
4.04%	4.04%	0.00%	0.00%	0.00%	8.1%
0.84%	0.00%	0.84%	0.84%	0.84%	3.3%
3.73%	3.73%	0.00%	0.00%	0.00%	7.5%
0.75%	0.00%	0.00%	0.75%	0.00%	1.5%
0.00%	0.00%	0.00%	0.18%	0.18%	0.4%
16.5%	17.2%	47.8%	4.3%	14.2%	100%

15.00%	15.00%	50.00%	5.00%	15.00%	100%
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*NORTH: used edited splits given site's proximity to Hwy 50 over Albion Vaughan

PM	RESIDENTIAL VEHICLE TRIP DISTRIBUTION				
Inbound	Traffic Volume Allocation				
2021-02-05					

Zone	Trips	%	NORTH	NORTH	SOUTH	WEST	WEST	TOTAL
			Hwy 50	Albion Vaughan Road	Hwy 50	McEwan Drive (to Healey Road)	Mayfield Road	
PD 1 of Toronto	74	2%			100%			100.00%
PD 3 of Toronto	27	1%			100%			100.00%
PD 4 of Toronto	41	1%			100%			100.00%
PD 5 of Toronto	15	0%			100%			100.00%
PD 7 of Toronto	42	1%			100%			100.00%
PD 8 of Toronto	124	4%			100%			100.00%
PD 9 of Toronto	131	4%			100%			100.00%
PD 10 of Toronto	192	5%			100%			100.00%
PD 12 of Toronto	42	1%			100%			100.00%
PD 13 of Toronto	46	1%			100%			100.00%
East Gwillimbury	43	1%	50%	50%				100.00%
Aurora	42	1%	50%	50%				100.00%
Richmond Hill	50	1%	15%	35%	50%			100.00%
Markham	23	1%		10%	90%			100.00%
King	37	1%	15%	50%	35%			100.00%
Brampton	284	8%			25%	10%	65%	100.00%
Mississauga	427	12%			25%	10%	65%	100.00%
Cambridge	9	0%			50%	20%	30%	100.00%
Barrie	21	1%	10%	90%				100.00%
Innisfil	72	2%		10%	90%			100.00%
Bradford-West Gwillimbury	84	2%	10%	90%				100.00%
Mono	30	1%	90%	10%				100.00%
External	15	0%	20%	20%	20%	20%	20%	100.00%
2002	20	1%			100%			100.00%
2005	34	1%			100%			100.00%
2015	21	1%			100%			100.00%
2020	20	1%			100%			100.00%
2027	25	1%			100%			100.00%
2040	39	1%			100%			100.00%
2058	39	1%			100%			100.00%
2060	57	2%			100%			100.00%
2062	46	1%			100%			100.00%
2067	22	1%			100%			100.00%
2070	16	0%			100%			100.00%
2081	16	0%			100%			100.00%
2082	8	0%			100%			100.00%
2084	16	0%			100%			100.00%
2091	39	1%			100%			100.00%
2092	24	1%			100%			100.00%
2104	34	1%			100%			100.00%
2105	29	1%			100%			100.00%
2111	46	1%			100%			100.00%
2131	12	0%			100%			100.00%
2132	20	1%			100%			100.00%
3017	21	1%				50%	50%	100.00%
3190	233	7%	50%	50%				100.00%
3191	212	6%	50%	50%				100.00%
3192	320	9%			25%	25%	25%	100.00%
3193	215	6%	50%	50%				100.00%
3194	50	1%	50%			50%		100.00%
3196	15	0%				50%	50%	100.00%
	3520	100%						

Route Split Totals					
NORTH	NORTH	SOUTH	WEST	WEST	TOTAL
Hwy 50	Albion Vaughan Road	Hwy 50	McEwan Drive (to Healey Road)	Mayfield Road	
0.00%	0.00%	2.10%	0.00%	0.00%	2.1%
0.00%	0.00%	0.77%	0.00%	0.00%	0.8%
0.00%	0.00%	1.16%	0.00%	0.00%	1.2%
0.00%	0.00%	0.43%	0.00%	0.00%	0.4%
0.00%	0.00%	1.19%	0.00%	0.00%	1.2%
0.00%	0.00%	3.52%	0.00%	0.00%	3.5%
0.00%	0.00%	3.72%	0.00%	0.00%	3.7%
0.00%	0.00%	5.45%	0.00%	0.00%	5.5%
0.00%	0.00%	1.19%	0.00%	0.00%	1.2%
0.00%	0.00%	1.31%	0.00%	0.00%	1.3%
0.61%	0.61%	0.00%	0.00%	0.00%	1.2%
0.60%	0.60%	0.00%	0.00%	0.00%	1.2%
0.21%	0.50%	0.71%	0.00%	0.00%	1.4%
0.00%	0.07%	0.59%	0.00%	0.00%	0.7%
0.16%	0.53%	0.37%	0.00%	0.00%	1.1%
0.00%	0.00%	2.02%	0.81%	5.24%	8.1%
0.00%	0.00%	3.03%	1.21%	7.88%	12.1%
0.00%	0.00%	0.13%	0.05%	0.08%	0.3%
0.06%	0.54%	0.00%	0.00%	0.00%	0.6%
0.20%	1.84%	0.00%	0.00%	0.00%	2.0%
0.24%	2.15%	0.00%	0.00%	0.00%	2.4%
0.77%	0.09%	0.00%	0.00%	0.00%	0.9%
0.09%	0.09%	0.09%	0.09%	0.09%	0.4%
0.00%	0.00%	0.57%	0.00%	0.00%	0.6%
0.00%	0.00%	0.97%	0.00%	0.00%	1.0%
0.00%	0.00%	0.60%	0.00%	0.00%	0.6%
0.00%	0.00%	0.57%	0.00%	0.00%	0.6%
0.00%	0.00%	0.71%	0.00%	0.00%	0.7%
0.00%	0.00%	1.11%	0.00%	0.00%	1.1%
0.00%	0.00%	1.11%	0.00%	0.00%	1.1%
0.00%	0.00%	1.62%	0.00%	0.00%	1.6%
0.00%	0.00%	1.31%	0.00%	0.00%	1.3%
0.00%	0.00%	0.63%	0.00%	0.00%	0.6%
0.00%	0.00%	0.45%	0.00%	0.00%	0.5%
0.00%	0.00%	0.45%	0.00%	0.00%	0.5%
0.00%	0.00%	0.23%	0.00%	0.00%	0.2%
0.00%	0.00%	0.45%	0.00%	0.00%	0.5%
0.00%	0.00%	1.11%	0.00%	0.00%	1.1%
0.00%	0.00%	0.68%	0.00%	0.00%	0.7%
0.00%	0.00%	0.97%	0.00%	0.00%	1.0%
0.00%	0.00%	0.82%	0.00%	0.00%	0.8%
0.00%	0.00%	1.31%	0.00%	0.00%	1.3%
0.00%	0.00%	0.34%	0.00%	0.00%	0.3%
0.00%	0.00%	0.57%	0.00%	0.00%	0.6%
0.00%	0.00%	0.00%	0.30%	0.30%	0.6%
3.31%	3.31%	0.00%	0.00%	0.00%	6.6%
3.01%	3.01%	0.00%	0.00%	0.00%	6.0%
2.27%	0.00%	2.27%	2.27%	2.27%	9.1%
3.05%	3.05%	0.00%	0.00%	0.00%	6.1%
0.71%	0.00%	0.00%	0.71%	0.00%	1.4%
0.00%	0.00%	0.00%	0.21%	0.21%	0.4%
15.3%	16.4%	46.6%	5.7%	16.1%	100%

15.00%	15.00%	50.00%	5.00%	15.00%	100%
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*NORTH: used edited splits given site's proximity to Hwy 50 over Albion Vaughan

Appendix G

Preferred George Bolton Extension Drawing





Appendix H

Existing Traffic Signal Timing Plans



REGIONAL MUNICIPALITY OF PEEL

Traffic Signal Timing Parameters

Database Date		December 18, 2015		Prepared Date:		September 14, 2017				
Database Rev		6		Completed By:		JA				
Timing Card / Field rev		-		Checked By:		RC				
Location:		Highway 50 and George Bolton Parkway					TIME PERIOD (sec.) (Green+Amber+All Red)			
Phase #	Direction	Vehicle Minimum (sec.)	Pedestrian Minimum (sec.)		Amber (sec.)	All Red (sec.)				
			WALK	FDWALK			AM MAX	OFF MAX	PM MAX	
1	NB P.P. LT Arrow - Highway 50	5.0			3.0		10.0	10.0	10.0	
2	SB Green - Highway 50	12.0	8.0	13.0	4.0	2.3	75.0	65.0	75.0	
3										
4	WB Green - George Bolton Parkway	8.0	8.0	18.0	4.0	2.6	35.0	35.0	35.0	
5										
6	NB Green - Highway 50	12.0	8.0	13.0	4.0	2.3	85.0	75.0	85.0	
7										
8	EB Green - George Bolton Parkway	8.0	8.0	18.0	4.0	2.6	35.0	35.0	35.0	
System Control		Yes								
Local Control		No								
Semi-Actuated Mode		Yes								
				TIME (M-F)		PEAK	CYCLE LENGTH (sec.)		OFFSET (sec.)	
				06:00-09:00		AM	120		113	
				9:00 - 15:00		OFF	110		73	
				15:00 - 19:00		PM	120		116	

REGIONAL MUNICIPALITY OF PEEL

Traffic Signal Timing Parameters

Database Date		December 18, 2015		Prepared Date:		September 14, 2017			
Database Rev		6		Completed By:		JA			
Timing Card / Field rev		-		Checked By:		RC			
Location:	Highway 50 and Parr Boulevard						TIME PERIOD (sec.) (Green+Amber+All Red)		
Phase #	Direction	Vehicle Minimum (sec.)	Pedestrian Minimum (sec.)		Amber (sec.)	All Red (sec.)			
			WALK	FDWALK			AM MAX	OFF MAX	PM MAX
1	NB P.P. LT Arrow - Highway 50	5.0			3.0		10.0	10.0	10.0
2	SB Green - Highway 50	12.0	8.0	16.0	4.0	2.1	71.0	61.0	71.0
3									
4	WB Green - Private Entrance	8.0	8.0	19.0	4.0	2.9	39.0	39.0	39.0
5									
6	NB Green - Highway 50	12.0	8.0	16.0	4.0	2.1	81.0	71.0	81.0
7									
8	EB Green - Parr Boulevard	8.0	8.0	19.0	4.0	2.9	39.0	39.0	39.0
System Control		Yes							
Local Control		No							
Semi-Actuated Mode		Yes							
				TIME (M-F)		PEAK	CYCLE LENGTH (sec.)		OFFSET (sec.)
				06:00-09:00		AM	120		8
				9:00 - 15:00		OFF	110		105
				15:00 - 19:00		PM	120		3

REGIONAL MUNICIPALITY OF PEEL

Traffic Signal Timing Parameters

Database Date		March 24, 2014		Prepared Date:		June 11, 2014			
Database Rev		8		Completed By:		RC			
Timing Card / Field rev		-		Checked By:		SL			
Location: Mayfield Road at Highway 50							TIME PERIOD (sec.) (Green+Amber+All Red)		
Phase #	Direction	Vehicle Minimum (sec.)	Pedestrian Minimum (sec.)		Amber (sec.)	All Red (sec.)	AM MAX	OFF MAX	PM MAX
			WALK	FDWALK					
1	Highway 50 - NB PP LT Arrow	5.0			3.0		10.0	9.0	9.0
2	Highway 50 - N/S	20.0	8.0	18.0	4.6	2.0	60.0	48.0	66.0
3	Mayfield Road - WB PP LT Arrow	5.0			3.0		20.0	9.0	10.0
4	Mayfield Road - E/W	12.0	8.0	19.0	4.6	2.0	30.0	34.0	35.0
System Control		Yes							
Local Control		No							
Semi-Actuated Mode		No (Fully)							
				TIME (M-F)	PEAK	CYCLE LENGTH (sec.)	OFFSET (sec.)		
				06:00-09:00	AM	120	37		
				Other	OFF	100	7		
				15:30-19:00	PM	120	72		

REGIONAL MUNICIPALITY OF PEEL

Traffic Signal Timing Parameters

Database Date	December 1, 2020		Prepared Date	December 1, 2020
Database Rev	iNET		Completed By	JP
Timing Card / Field rev	-		Checked By	SJ

Location Highway 50 at McEwan Drive

Phase #	Street Name - Direction	Vehicle Minimum (s)	Pedestrian Minimum (s)		Amber (s)	All Red (s)	TIME PERIOD (s) (Green+Amber+All Red)		
			WALK	FDWALK			AM SPLITS	OFF SPLITS	PM SPLITS
			1	Highway 50 - NB PP LT			5	0	0
2	Highway 50 - SB	8	8	20	4	2.6	59	43	65
3	McEwan Drive - EB PP LT	5	0	0	3	0	8	16	15
4	McEwan Drive - WB	8	8	20	4	3	38	36	42
5	Highway 50 - SB PP LT	5	0	0	3	0	8	10	13
6	Highway 50 - NB	8	8	20	4	2.6	66	48	70
7	McEwan Drive - WB PROT. LT	8	0	0	3	2	16	16	20
8	McEwan Drive - EB	8	8	20	4	3	30	36	37

System Control		TIME (M-F)	PEAK	CYCLE LENGTH (s)	OFFSET (s)
Yes		06:00 - 09:00	AM	120	71
Semi-Actuated Mode		09:00 - 15:00	OFF	110	55
Yes		15:00 - 20:00	PM	140	72

REGIONAL MUNICIPALITY OF PEEL

Traffic Signal Timing Parameters

Database Date	2020		Prepared Date	January 28, 2021
Database Rev	20		Completed By	JP
Timing Card / Field rev	-		Checked By	BL

Location **Mayfield Road at Highway 50**

Phase #	Street Name - Direction	Vehicle Minimum (s)	Pedestrian Minimum (s)		Amber (s)	All Red (s)	TIME PERIOD (s) (Green+Amber+All Red)		
			WALK	FDWALK			AM SPLITS	OFF SPLITS	PM SPLITS
			1	Highway 50 - NB PROT LT			10	0	0
2	Highway 50 - SB	20	8	23	4.2	2.1	70	65	65
3	Mayfield Road - WB PP LT	10	0	0	3.0	0.0	25	25	20
4	Mayfield Road - EB	12	8	25	4.0	2.5	45	45	50
5	Highway 50 - SB PROT LT	10	0	0	3	2	15	15	15
6	Highway 50 - NB	20	8	23	4.2	2.1	75	75	75
7	Mayfield Road - EB PP LT	5	0	0	3.0	0.0	15	25	25
8	Mayfield Road - WB	12	8	25	4.0	2.5	55	45	45

System Control Yes		TIME (M-F)	PEAK	CYCLE LENGTH (s)	OFFSET (s)
Semi-Actuated Mode No (Fully)		06:00 - 09:00	AM	160	27
		09:00 - 15:00 19:30 - 22:00	OFF	160	7
		15:00 - 19:30	PM	160	72

Appendix I

Synchro Worksheets and Proposed Traffic Signal Timings



Existing Traffic Conditions

Timings
1: Highway 50 & McEwan Drive West/McEwan Drive East

Existing AM Synchro Model

01-28-2021



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations	↘	↗	↘↗	↕	↗	↘	↕↕	↗	↘	↗↘
Traffic Volume (vph)	75	45	80	100	45	105	620	65	55	1120
Future Volume (vph)	75	45	80	100	45	105	620	65	55	1120
Turn Type	pm+pt	NA	Prot	NA	Perm	pm+pt	NA	Perm	pm+pt	NA
Protected Phases	7	4	3	8		5	2		1	6
Permitted Phases	4				8	2		2	6	
Detector Phase	7	4	3	8	8	5	2	2	1	6
Switch Phase										
Minimum Initial (s)	5.0	8.0	8.0	8.0	8.0	5.0	8.0	8.0	5.0	8.0
Minimum Split (s)	8.0	35.0	13.0	35.0	35.0	8.0	34.6	34.6	8.0	34.6
Total Split (s)	8.0	30.0	16.0	38.0	38.0	15.0	66.0	66.0	8.0	59.0
Total Split (%)	6.7%	25.0%	13.3%	31.7%	31.7%	12.5%	55.0%	55.0%	6.7%	49.2%
Yellow Time (s)	3.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0
All-Red Time (s)	0.0	3.0	2.0	3.0	3.0	0.0	2.6	2.6	0.0	2.6
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.0	7.0	5.0	7.0	7.0	3.0	6.6	6.6	3.0	6.6
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	Min	None	Min	Min	None	C-Min	C-Min	None	C-Min
Act Effect Green (s)	23.8	13.0	8.8	14.9	14.9	84.9	74.8	74.8	80.4	70.7
Actuated g/C Ratio	0.20	0.11	0.07	0.12	0.12	0.71	0.62	0.62	0.67	0.59
v/c Ratio	0.27	0.41	0.34	0.44	0.15	0.41	0.29	0.07	0.10	0.63
Control Delay	36.4	19.4	56.5	52.6	1.1	13.6	12.5	2.4	8.1	20.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	36.4	19.4	56.5	52.6	1.1	13.6	12.5	2.4	8.1	20.3
LOS	D	B	E	D	A	B	B	A	A	C
Approach Delay		25.0		43.7			11.8			19.7
Approach LOS		C		D			B			B

Intersection Summary

Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 71 (59%), 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: 19.9
 Intersection LOS: B
 Intersection Capacity Utilization 75.8%
 ICU Level of Service D
 Analysis Period (min) 15






























Splits and Phases: 1: Highway 50 & McEwan Drive West/McEwan Drive East



HCM Signalized Intersection Capacity Analysis
 1: Highway 50 & McEwan Drive West/McEwan Drive East

Existing AM Synchro Model

01-28-2021

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		 		 		 		 	 		 		
Traffic Volume (vph)	75	45	105	80	100	45	105	620	65	55	1120	135	
Future Volume (vph)	75	45	105	80	100	45	105	620	65	55	1120	135	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5	
Total Lost time (s)	3.0	7.0		5.0	7.0	7.0	3.0	6.6	6.6	3.0	6.6		
Lane Util. Factor	1.00	0.95		0.97	1.00	1.00	1.00	0.95	1.00	1.00	0.95		
Frbp, ped/bikes	1.00	0.99		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	0.90		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		
Satd. Flow (prot)	1716	2545		3236	1812	1536	1526	3411	1452	1638	3395		
Flt Permitted	0.69	1.00		0.95	1.00	1.00	0.14	1.00	1.00	0.42	1.00		
Satd. Flow (perm)	1251	2545		3236	1812	1536	231	3411	1452	716	3395		
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	45	105	80	100	45	105	620	65	55	1120	135	
RTOR Reduction (vph)	0	94	0	0	0	39	0	0	25	0	6	0	
Lane Group Flow (vph)	75	56	0	80	100	6	105	620	40	55	1249	0	
Confl. Peds. (#/hr)			5	5									
Heavy Vehicles (%)	4%	12%	33%	7%	6%	4%	17%	7%	10%	9%	6%	4%	
Turn Type	pm+pt	NA		Prot	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		
Protected Phases	7	4		3	8		5	2		1	6		
Permitted Phases	4					8	2		2	6			
Actuated Green, G (s)	19.9	13.0		7.2	15.3	15.3	81.2	73.2	73.2	74.7	69.7		
Effective Green, g (s)	19.9	13.0		7.2	15.3	15.3	81.2	73.2	73.2	74.7	69.7		
Actuated g/C Ratio	0.17	0.11		0.06	0.13	0.13	0.68	0.61	0.61	0.62	0.58		
Clearance Time (s)	3.0	7.0		5.0	7.0	7.0	3.0	6.6	6.6	3.0	6.6		
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)	234	275		194	231	195	248	2080	885	484	1971		
v/s Ratio Prot	0.02	0.02		c0.02	c0.06		c0.03	0.18		0.00	c0.37		
v/s Ratio Perm	0.03					0.00	0.26		0.03	0.07			
v/c Ratio	0.32	0.20		0.41	0.43	0.03	0.42	0.30	0.04	0.11	0.63		
Uniform Delay, d1	43.7	48.8		54.4	48.3	45.8	10.6	11.2	9.4	8.8	16.7		
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.21	0.97	1.00	1.00	1.00		
Incremental Delay, d2	0.8	0.4		1.4	1.3	0.1	1.2	0.4	0.1	0.1	1.6		
Delay (s)	44.5	49.2		55.8	49.6	45.9	14.0	11.1	9.5	9.0	18.2		
Level of Service	D	D		E	D	D	B	B	A	A	B		
Approach Delay (s)		47.6			51.1			11.4			17.9		
Approach LOS		D			D			B			B		
Intersection Summary													
HCM 2000 Control Delay			21.4									HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.58										
Actuated Cycle Length (s)			120.0									Sum of lost time (s)	21.6
Intersection Capacity Utilization			75.8%									ICU Level of Service	D
Analysis Period (min)			15										
c	Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

2: Highway 50 & Industrial Road

Existing AM Synchro Model

01-28-2021



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↵		↑↑	↵	↵	↑↑
Traffic Volume (veh/h)	45	30	855	25	25	1455
Future Volume (Veh/h)	45	30	855	25	25	1455
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)	45	30	855	25	25	1455
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage veh			2			2
Upstream signal (m)			160			
pX, platoon unblocked	0.96	0.96			0.96	
vC, conflicting volume	1645	440			880	
vC1, stage 1 conf vol	868					
vC2, stage 2 conf vol	778					
vCu, unblocked vol	1592	340			797	
tC, single (s)	7.0	7.3			4.1	
tC, 2 stage (s)	6.0					
tF (s)	3.6	3.5			2.2	
p0 queue free %	84	95			97	
cM capacity (veh/h)	274	583			802	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	75	570	310	25	728	728
Volume Left	45	0	0	25	0	0
Volume Right	30	0	25	0	0	0
cSH	348	1700	1700	802	1700	1700
Volume to Capacity	0.22	0.34	0.18	0.03	0.43	0.43
Queue Length 95th (m)	6.5	0.0	0.0	0.8	0.0	0.0
Control Delay (s)	18.2	0.0	0.0	9.6	0.0	0.0
Lane LOS	C			A		
Approach Delay (s)	18.2	0.0		0.2		
Approach LOS	C					
Intersection Summary						
Average Delay			0.7			
Intersection Capacity Utilization			51.2%	ICU Level of Service	A	
Analysis Period (min)			15			

Timings
3: Highway 50 & George Bolton Parkway/Private Driveway

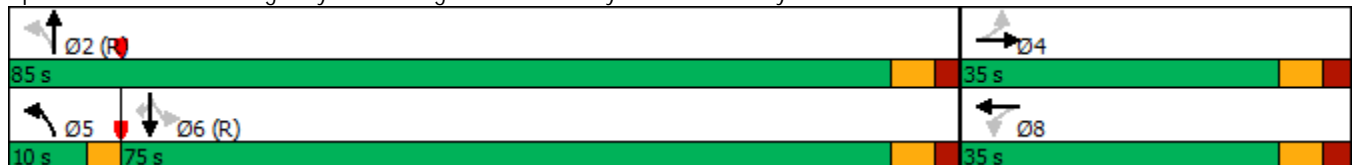


Lane Group	EBL	EBT	WBT	NBL	NBT	SBT	SBR
Lane Configurations							
Traffic Volume (vph)	25	0	0	75	740	1350	85
Future Volume (vph)	25	0	0	75	740	1350	85
Turn Type	Perm	NA	NA	pm+pt	NA	NA	Perm
Protected Phases		4	8	5	2	6	
Permitted Phases	4			2			6
Detector Phase	4	4	8	5	2	6	6
Switch Phase							
Minimum Initial (s)	8.0	8.0	8.0	5.0	12.0	12.0	12.0
Minimum Split (s)	32.6	32.6	32.6	8.0	27.3	27.3	27.3
Total Split (s)	35.0	35.0	35.0	10.0	85.0	75.0	75.0
Total Split (%)	29.2%	29.2%	29.2%	8.3%	70.8%	62.5%	62.5%
Yellow Time (s)	4.0	4.0	4.0	3.0	4.0	4.0	4.0
All-Red Time (s)	2.6	2.6	2.6	0.0	2.3	2.3	2.3
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.6	6.6	6.6	3.0	6.3	6.3	6.3
Lead/Lag				Lead		Lag	Lag
Lead-Lag Optimize?				Yes		Yes	Yes
Recall Mode	None	None	None	None	C-Min	C-Min	C-Min
Act Effect Green (s)	8.7	8.7	8.7	104.6	102.6	94.9	94.9
Actuated g/C Ratio	0.07	0.07	0.07	0.87	0.86	0.79	0.79
v/c Ratio	0.25	0.25	0.01	0.23	0.25	0.49	0.07
Control Delay	58.7	2.8	0.0	3.5	2.3	4.1	1.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	58.7	2.8	0.0	3.5	2.3	4.1	1.5
LOS	E	A	A	A	A	A	A
Approach Delay		20.3			2.4	3.9	
Approach LOS		C			A	A	

Intersection Summary

Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 113 (94%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 80
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.49
 Intersection Signal Delay: 3.9
 Intersection LOS: A
 Intersection Capacity Utilization 63.6%
 ICU Level of Service B
 Analysis Period (min) 15

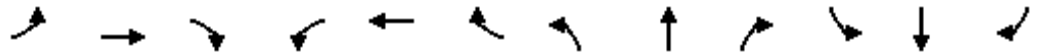
Splits and Phases: 3: Highway 50 & George Bolton Parkway/Private Driveway



HCM Signalized Intersection Capacity Analysis
 3: Highway 50 & George Bolton Parkway/Private Driveway

Existing AM Synchro Model

01-28-2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	0	55	0	0	5	75	740	0	0	1350	85
Future Volume (vph)	25	0	55	0	0	5	75	740	0	0	1350	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5
Total Lost time (s)	6.6	6.6			6.6		3.0	6.3			6.3	6.3
Lane Util. Factor	1.00	1.00			1.00		1.00	0.95			0.95	1.00
Frt	1.00	0.85			0.86		1.00	1.00			1.00	0.85
Flt Protected	0.95	1.00			1.00		0.95	1.00			1.00	1.00
Satd. Flow (prot)	1733	1166			1662		1623	3411			3476	1597
Flt Permitted	0.75	1.00			1.00		0.17	1.00			1.00	1.00
Satd. Flow (perm)	1376	1166			1662		290	3411			3476	1597
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)	25	0	55	0	0	5	75	740	0	0	1350	85
RTOR Reduction (vph)	0	52	0	0	5	0	0	0	0	0	0	14
Lane Group Flow (vph)	25	3	0	0	0	0	75	740	0	0	1350	71
Heavy Vehicles (%)	3%	0%	40%	0%	0%	0%	10%	7%	0%	0%	5%	0%
Turn Type	Perm	NA			NA		pm+pt	NA		Perm	NA	Perm
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	7.1	7.1			7.1		100.0	100.0			91.7	91.7
Effective Green, g (s)	7.1	7.1			7.1		100.0	100.0			91.7	91.7
Actuated g/C Ratio	0.06	0.06			0.06		0.83	0.83			0.76	0.76
Clearance Time (s)	6.6	6.6			6.6		3.0	6.3			6.3	6.3
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	81	68			98		300	2842			2656	1220
v/s Ratio Prot		0.00			0.00		0.01	c0.22			c0.39	
v/s Ratio Perm	c0.02						0.20					0.04
v/c Ratio	0.31	0.05			0.00		0.25	0.26			0.51	0.06
Uniform Delay, d1	54.1	53.3			53.1		3.0	2.1			5.5	3.5
Progression Factor	1.00	1.00			1.00		1.25	0.94			0.59	0.76
Incremental Delay, d2	2.2	0.3			0.0		0.4	0.2			0.6	0.1
Delay (s)	56.3	53.6			53.1		4.1	2.2			3.8	2.7
Level of Service	E	D			D		A	A			A	A
Approach Delay (s)		54.4			53.1			2.4			3.8	
Approach LOS		D			D			A			A	

Intersection Summary

HCM 2000 Control Delay	5.1	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	15.9
Intersection Capacity Utilization	63.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

4: Albion Vaughan Road & Commercial Road

Existing AM Synchro Model

01-28-2021



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	25	5	25	205	535	150
Future Volume (Veh/h)	25	5	25	205	535	150
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)	25	5	25	205	535	150
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	865	610	685			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	865	610	685			
tC, single (s)	6.7	6.5	4.2			
tC, 2 stage (s)						
tF (s)	3.8	3.6	2.3			
p0 queue free %	91	99	97			
cM capacity (veh/h)	283	442	885			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	30	230	685			
Volume Left	25	25	0			
Volume Right	5	0	150			
cSH	301	885	1700			
Volume to Capacity	0.10	0.03	0.40			
Queue Length 95th (m)	2.6	0.7	0.0			
Control Delay (s)	18.3	1.3	0.0			
Lane LOS	C	A				
Approach Delay (s)	18.3	1.3	0.0			
Approach LOS	C					
Intersection Summary						
Average Delay	0.9					
Intersection Capacity Utilization	47.3%			ICU Level of Service	A	
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
5: Albion Vaughan Road & Industrial Road

Existing AM Synchro Model
01-28-2021



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	15	20	40	220	475	65
Future Volume (Veh/h)	15	20	40	220	475	65
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)	15	20	40	220	475	65
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	808	508	540			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	808	508	540			
tC, single (s)	6.6	6.4	4.3			
tC, 2 stage (s)						
tF (s)	3.7	3.4	2.4			
p0 queue free %	95	96	96			
cM capacity (veh/h)	312	538	953			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	35	260	540			
Volume Left	15	40	0			
Volume Right	20	0	65			
cSH	411	953	1700			
Volume to Capacity	0.09	0.04	0.32			
Queue Length 95th (m)	2.2	1.1	0.0			
Control Delay (s)	14.6	1.7	0.0			
Lane LOS	B	A				
Approach Delay (s)	14.6	1.7	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay			1.2			
Intersection Capacity Utilization			55.6%	ICU Level of Service	B	
Analysis Period (min)			15			

Timings
6: Highway 50 & Parr Boulevard/Private Driveway

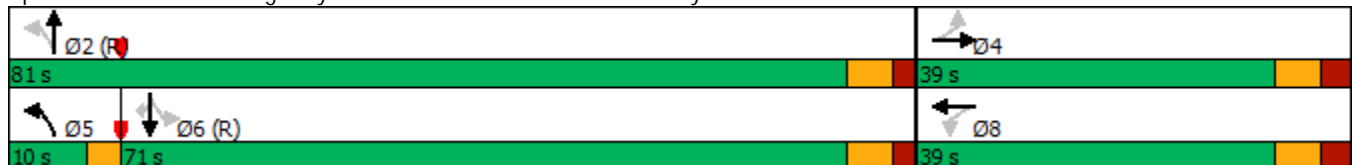


Lane Group	EBL	EBT	NBL	NBT	SBT	SBR	Ø8
Lane Configurations	↶	↷	↶	↶↷	↶↷	↷	
Traffic Volume (vph)	45	0	120	820	1140	110	
Future Volume (vph)	45	0	120	820	1140	110	
Turn Type	Perm	NA	pm+pt	NA	NA	Perm	
Protected Phases		4	5	2	6		8
Permitted Phases	4		2			6	
Detector Phase	4	4	5	2	6	6	
Switch Phase							
Minimum Initial (s)	8.0	8.0	5.0	12.0	12.0	12.0	8.0
Minimum Split (s)	33.9	33.9	8.0	30.1	30.1	30.1	33.9
Total Split (s)	39.0	39.0	10.0	81.0	71.0	71.0	39.0
Total Split (%)	32.5%	32.5%	8.3%	67.5%	59.2%	59.2%	33%
Yellow Time (s)	4.0	4.0	3.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.9	2.9	0.0	2.1	2.1	2.1	2.9
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.9	6.9	3.0	6.1	6.1	6.1	
Lead/Lag			Lead		Lag	Lag	
Lead-Lag Optimize?			Yes		Yes	Yes	
Recall Mode	None	None	None	C-Min	C-Min	C-Min	None
Act Effect Green (s)	10.0	10.0	103.0	101.2	90.0	90.0	
Actuated g/C Ratio	0.08	0.08	0.86	0.84	0.75	0.75	
v/c Ratio	0.41	0.19	0.30	0.29	0.45	0.09	
Control Delay	62.4	1.6	3.8	3.0	7.0	3.9	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	62.4	1.6	3.8	3.0	7.0	3.9	
LOS	E	A	A	A	A	A	
Approach Delay		30.4		3.1	6.8		
Approach LOS		C		A	A		

Intersection Summary

Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 8 (7%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 75
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.45
 Intersection Signal Delay: 6.2
 Intersection Capacity Utilization 59.0%
 Analysis Period (min) 15
 Intersection LOS: A
 ICU Level of Service B

Splits and Phases: 6: Highway 50 & Parr Boulevard/Private Driveway



HCM Signalized Intersection Capacity Analysis
6: Highway 50 & Parr Boulevard/Private Driveway

Existing AM Synchro Model
01-28-2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗			↔		↖	↕		↖	↗	↗
Traffic Volume (vph)	45	0	50	0	0	0	120	820	0	0	1140	110
Future Volume (vph)	45	0	50	0	0	0	120	820	0	0	1140	110
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5
Total Lost time (s)	6.9	6.9					3.0	6.1			6.1	6.1
Lane Util. Factor	1.00	1.00					1.00	0.95			0.95	1.00
Frt	1.00	0.85					1.00	1.00			1.00	0.85
Flt Protected	0.95	1.00					0.95	1.00			1.00	1.00
Satd. Flow (prot)	1668	1306					1684	3380			3349	1551
Flt Permitted	0.76	1.00					0.21	1.00			1.00	1.00
Satd. Flow (perm)	1330	1306					381	3380			3349	1551
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	0	50	0	0	0	120	820	0	0	1140	110
RTOR Reduction (vph)	0	47	0	0	0	0	0	0	0	0	0	17
Lane Group Flow (vph)	45	4	0	0	0	0	120	820	0	0	1140	93
Heavy Vehicles (%)	7%	0%	25%	0%	0%	50%	6%	8%	0%	0%	9%	3%
Turn Type	Perm	NA					pm+pt	NA		Perm	NA	Perm
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	8.4	8.4					98.6	98.6			88.6	88.6
Effective Green, g (s)	8.4	8.4					98.6	98.6			88.6	88.6
Actuated g/C Ratio	0.07	0.07					0.82	0.82			0.74	0.74
Clearance Time (s)	6.9	6.9					3.0	6.1			6.1	6.1
Vehicle Extension (s)	3.0	3.0					3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	93	91					389	2777			2472	1145
v/s Ratio Prot		0.00					0.02	c0.24			c0.34	
v/s Ratio Perm	c0.03						0.24					0.06
v/c Ratio	0.48	0.04					0.31	0.30			0.46	0.08
Uniform Delay, d1	53.7	52.0					3.0	2.5			6.2	4.4
Progression Factor	1.00	1.00					1.00	1.00			0.96	1.43
Incremental Delay, d2	3.9	0.2					0.5	0.3			0.6	0.1
Delay (s)	57.6	52.2					3.4	2.8			6.6	6.4
Level of Service	E	D					A	A			A	A
Approach Delay (s)		54.8			0.0			2.9			6.5	
Approach LOS		D			A			A			A	

Intersection Summary

HCM 2000 Control Delay	7.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	59.0%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Timings
7: Highway 50 & Mayfield Road/Albion Vaughan Road

Existing AM Synchro Model

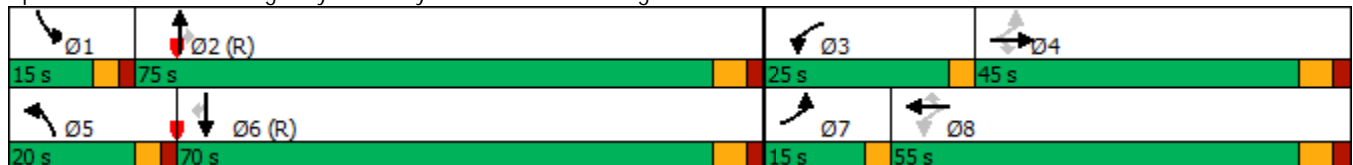
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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	90	115	145	450	370	15	105	850	160	5	1090	85
Future Volume (vph)	90	115	145	450	370	15	105	850	160	5	1090	85
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	12.0	12.0	10.0	12.0	12.0	10.0	20.0	20.0	10.0	20.0	20.0
Minimum Split (s)	8.0	39.5	39.5	13.0	39.5	39.5	15.0	37.3	37.3	15.0	37.3	37.3
Total Split (s)	15.0	45.0	45.0	25.0	55.0	55.0	20.0	75.0	75.0	15.0	70.0	70.0
Total Split (%)	9.4%	28.1%	28.1%	15.6%	34.4%	34.4%	12.5%	46.9%	46.9%	9.4%	43.8%	43.8%
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.2	4.2	3.0	4.2	4.2
All-Red Time (s)	0.0	2.5	2.5	0.0	2.5	2.5	2.0	2.1	2.1	2.0	2.1	2.1
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.0	6.5	6.5	3.0	6.5	6.5	5.0	6.3	6.3	5.0	6.3	6.3
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Min	C-Min	None	C-Min	C-Min
Act Effect Green (s)	37.6	23.3	23.3	59.4	42.2	42.2	19.2	88.3	88.3	10.0	67.0	67.0
Actuated g/C Ratio	0.24	0.15	0.15	0.37	0.26	0.26	0.12	0.55	0.55	0.06	0.42	0.42
v/c Ratio	0.40	0.51	0.56	0.91	0.80	0.03	0.74	0.45	0.19	0.05	0.78	0.13
Control Delay	39.1	68.5	15.8	68.4	68.2	0.1	96.7	24.0	3.8	72.0	46.0	4.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	39.1	68.5	15.8	68.4	68.2	0.1	96.7	24.0	3.8	72.0	46.0	4.0
LOS	D	E	B	E	E	A	F	C	A	E	D	A
Approach Delay		39.1			67.1			28.0			43.1	
Approach LOS		D			E			C			D	

Intersection Summary

























Cycle Length: 160
 Actuated Cycle Length: 160
 Offset: 27 (17%), Referenced to phase 2:NBT and 6:SBT, Start of Green
 Natural Cycle: 105
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.91
 Intersection Signal Delay: 43.6
 Intersection LOS: D
 Intersection Capacity Utilization 91.6%
 ICU Level of Service F
 Analysis Period (min) 15

Splits and Phases: 7: Highway 50 & Mayfield Road/Albion Vaughan Road



HCM Signalized Intersection Capacity Analysis
 7: Highway 50 & Mayfield Road/Albion Vaughan Road

Existing AM Synchro Model
 01-28-2021

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	90	115	145	450	370	15	105	850	160	5	1090	85
Future Volume (vph)	90	115	145	450	370	15	105	850	160	5	1090	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5
Total Lost time (s)	3.0	6.5	6.5	3.0	6.5	6.5	5.0	6.3	6.3	5.0	6.3	6.3
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1594	1549	929	1700	1762	1413	1174	3411	1401	1539	3318	1479
Flt Permitted	0.42	1.00	1.00	0.53	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	707	1549	929	953	1762	1413	1174	3411	1401	1539	3318	1479
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)	90	115	145	450	370	15	105	850	160	5	1090	85
RTOR Reduction (vph)	0	0	124	0	0	11	0	0	76	0	0	49
Lane Group Flow (vph)	90	115	21	450	370	4	105	850	84	5	1090	36
Heavy Vehicles (%)	12%	24%	72%	5%	9%	13%	52%	7%	14%	16%	10%	8%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)	34.2	23.4	23.4	56.0	42.2	42.2	19.2	84.2	84.2	2.0	67.0	67.0
Effective Green, g (s)	34.2	23.4	23.4	56.0	42.2	42.2	19.2	84.2	84.2	2.0	67.0	67.0
Actuated g/C Ratio	0.21	0.15	0.15	0.35	0.26	0.26	0.12	0.53	0.53	0.01	0.42	0.42
Clearance Time (s)	3.0	6.5	6.5	3.0	6.5	6.5	5.0	6.3	6.3	5.0	6.3	6.3
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	210	226	135	471	464	372	140	1795	737	19	1389	619
v/s Ratio Prot	0.03	0.07		c0.18	0.21		c0.09	0.25		0.00	c0.33	
v/s Ratio Perm	0.06		0.02	c0.16		0.00			0.06			0.02
v/c Ratio	0.43	0.51	0.16	0.96	0.80	0.01	0.75	0.47	0.11	0.26	0.78	0.06
Uniform Delay, d1	52.5	63.0	59.7	47.7	54.9	43.5	68.1	23.9	19.1	78.3	40.3	27.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.4	1.8	0.5	30.1	9.2	0.0	20.0	0.9	0.3	7.3	4.5	0.2
Delay (s)	53.9	64.8	60.2	77.8	64.1	43.5	88.1	24.8	19.4	85.6	44.8	27.9
Level of Service	D	E	E	E	E	D	F	C	B	F	D	C
Approach Delay (s)		60.1			71.2			30.0			43.7	
Approach LOS		E			E			C			D	
Intersection Summary												
HCM 2000 Control Delay			47.6			HCM 2000 Level of Service		D				
HCM 2000 Volume to Capacity ratio			0.86									
Actuated Cycle Length (s)			160.0			Sum of lost time (s)		20.8				
Intersection Capacity Utilization			91.6%			ICU Level of Service		F				
Analysis Period (min)			15									

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

8: Albion Vaughan Road & Kirby Road

Existing AM Synchro Model

01-28-2021



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	5	25	215	5	60	470
Future Volume (Veh/h)	5	25	215	5	60	470
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)	5	25	215	5	60	470
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	808	218			220	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	808	218			220	
tC, single (s)	6.7	6.4			4.1	
tC, 2 stage (s)						
tF (s)	3.8	3.5			2.2	
p0 queue free %	98	97			96	
cM capacity (veh/h)	298	779			1355	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	30	220	530			
Volume Left	5	0	60			
Volume Right	25	5	0			
cSH	614	1700	1355			
Volume to Capacity	0.05	0.13	0.04			
Queue Length 95th (m)	1.2	0.0	1.1			
Control Delay (s)	11.2	0.0	1.3			
Lane LOS	B		A			
Approach Delay (s)	11.2	0.0	1.3			
Approach LOS	B					
Intersection Summary						
Average Delay			1.3			
Intersection Capacity Utilization			53.0%	ICU Level of Service	A	
Analysis Period (min)			15			

Timings
1: Highway 50 & McEwan Drive West/McEwan Drive East

Existing PM Synchro Model

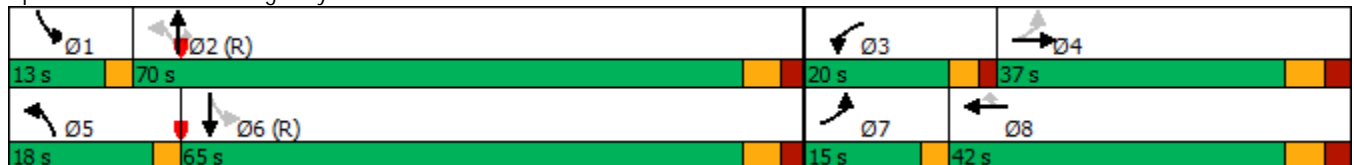
01-28-2021

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	195	105	165	90	225	100	1260	185	85	720
Future Volume (vph)	195	105	165	90	225	100	1260	185	85	720
Turn Type	pm+pt	NA	Prot	NA	Perm	pm+pt	NA	Perm	pm+pt	NA
Protected Phases	7	4	3	8		5	2		1	6
Permitted Phases	4				8	2		2	6	
Detector Phase	7	4	3	8	8	5	2	2	1	6
Switch Phase										
Minimum Initial (s)	5.0	8.0	8.0	8.0	8.0	5.0	8.0	8.0	5.0	8.0
Minimum Split (s)	8.0	35.0	13.0	35.0	35.0	8.0	34.6	34.6	8.0	34.6
Total Split (s)	15.0	37.0	20.0	42.0	42.0	18.0	70.0	70.0	13.0	65.0
Total Split (%)	10.7%	26.4%	14.3%	30.0%	30.0%	12.9%	50.0%	50.0%	9.3%	46.4%
Yellow Time (s)	3.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0
All-Red Time (s)	0.0	3.0	2.0	3.0	3.0	0.0	2.6	2.6	0.0	2.6
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.0	7.0	5.0	7.0	7.0	3.0	6.6	6.6	3.0	6.6
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	Min	None	Min	Min	None	C-Min	C-Min	None	C-Min
Act Effct Green (s)	35.8	15.5	12.1	12.3	12.3	95.0	82.6	82.6	93.8	82.0
Actuated g/C Ratio	0.26	0.11	0.09	0.09	0.09	0.68	0.59	0.59	0.67	0.59
v/c Ratio	0.54	0.57	0.56	0.56	0.69	0.27	0.60	0.19	0.31	0.38
Control Delay	47.9	25.6	68.6	74.1	22.2	9.7	20.9	5.7	10.7	17.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	47.9	25.6	68.6	74.1	22.2	9.7	20.9	5.7	10.7	17.0
LOS	D	C	E	E	C	A	C	A	B	B
Approach Delay		34.7		47.9			18.4			16.4
Approach LOS		C		D			B			B

Intersection Summary

Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 72 (51%), 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: 24.4
 Intersection LOS: C
 Intersection Capacity Utilization 75.0%
 ICU Level of Service D
 Analysis Period (min) 15




























Splits and Phases: 1: Highway 50 & McEwan Drive West/McEwan Drive East



HCM Signalized Intersection Capacity Analysis
 1: Highway 50 & McEwan Drive West/McEwan Drive East

Existing PM Synchro Model

01-28-2021

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 		 				 			 	
Traffic Volume (vph)	195	105	180	165	90	225	100	1260	185	85	720	65
Future Volume (vph)	195	105	180	165	90	225	100	1260	185	85	720	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5
Total Lost time (s)	3.0	7.0		5.0	7.0	7.0	3.0	6.6	6.6	3.0	6.6	
Lane Util. Factor	1.00	0.95		0.97	1.00	1.00	1.00	0.95	1.00	1.00	0.95	
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	0.91		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1785	3120		3395	1830	1581	1438	3544	1566	1785	3496	
Flt Permitted	0.56	1.00		0.95	1.00	1.00	0.31	1.00	1.00	0.15	1.00	
Satd. Flow (perm)	1055	3120		3395	1830	1581	463	3544	1566	282	3496	
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)	195	105	180	165	90	225	100	1260	185	85	720	65
RTOR Reduction (vph)	0	160	0	0	0	186	0	0	53	0	3	0
Lane Group Flow (vph)	195	125	0	165	90	39	100	1260	132	85	782	0
Confl. Peds. (#/hr)							5					5
Heavy Vehicles (%)	0%	4%	7%	2%	5%	1%	24%	3%	2%	0%	3%	1%
Turn Type	pm+pt	NA		Prot	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4					8	2		2	6		
Actuated Green, G (s)	32.6	15.5		12.1	12.3	12.3	91.4	82.5	82.5	90.2	81.9	
Effective Green, g (s)	32.6	15.5		12.1	12.3	12.3	91.4	82.5	82.5	90.2	81.9	
Actuated g/C Ratio	0.23	0.11		0.09	0.09	0.09	0.65	0.59	0.59	0.64	0.59	
Clearance Time (s)	3.0	7.0		5.0	7.0	7.0	3.0	6.6	6.6	3.0	6.6	
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)	335	345		293	160	138	364	2088	922	270	2045	
v/s Ratio Prot	c0.07	0.04		0.05	0.05		c0.02	c0.36		c0.02	0.22	
v/s Ratio Perm	c0.06					0.02	0.16		0.08	0.18		
v/c Ratio	0.58	0.36		0.56	0.56	0.28	0.27	0.60	0.14	0.31	0.38	
Uniform Delay, d1	46.3	57.7		61.4	61.3	59.7	9.6	18.3	12.9	12.4	15.5	
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	2.6	0.7		2.5	4.5	1.1	0.4	1.3	0.3	0.7	0.5	
Delay (s)	48.9	58.3		63.9	65.7	60.8	10.0	19.6	13.2	13.1	16.1	
Level of Service	D	E		E	E	E	B	B	B	B	B	
Approach Delay (s)		54.5			62.8			18.2			15.8	
Approach LOS		D			E			B			B	
Intersection Summary												
HCM 2000 Control Delay			29.1				HCM 2000 Level of Service			C		
HCM 2000 Volume to Capacity ratio			0.60									
Actuated Cycle Length (s)			140.0				Sum of lost time (s)		21.6			
Intersection Capacity Utilization			75.0%				ICU Level of Service			D		
Analysis Period (min)			15									
c	Critical Lane Group											

HCM Unsignalized Intersection Capacity Analysis

2: Highway 50 & Industrial Road

Existing PM Synchro Model

01-28-2021



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	30	80	1625	55	45	1150
Future Volume (Veh/h)	30	80	1625	55	45	1150
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)	30	80	1625	55	45	1150
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage (veh)			2			2
Upstream signal (m)			160			
pX, platoon unblocked	0.81	0.81			0.81	
vC, conflicting volume	2318	840			1680	
vC1, stage 1 conf vol	1652					
vC2, stage 2 conf vol	665					
vCu, unblocked vol	2160	343			1376	
tC, single (s)	7.1	7.0			4.3	
tC, 2 stage (s)	6.1					
tF (s)	3.6	3.3			2.3	
p0 queue free %	78	85			88	
cM capacity (veh/h)	139	529			377	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	110	1083	597	45	575	575
Volume Left	30	0	0	45	0	0
Volume Right	80	0	55	0	0	0
cSH	300	1700	1700	377	1700	1700
Volume to Capacity	0.37	0.64	0.35	0.12	0.34	0.34
Queue Length 95th (m)	13.0	0.0	0.0	3.2	0.0	0.0
Control Delay (s)	23.8	0.0	0.0	15.8	0.0	0.0
Lane LOS	C			C		
Approach Delay (s)	23.8	0.0		0.6		
Approach LOS	C					
Intersection Summary						
Average Delay			1.1			
Intersection Capacity Utilization			59.9%	ICU Level of Service	B	
Analysis Period (min)			15			

Timings
3: Highway 50 & George Bolton Parkway/Private Driveway

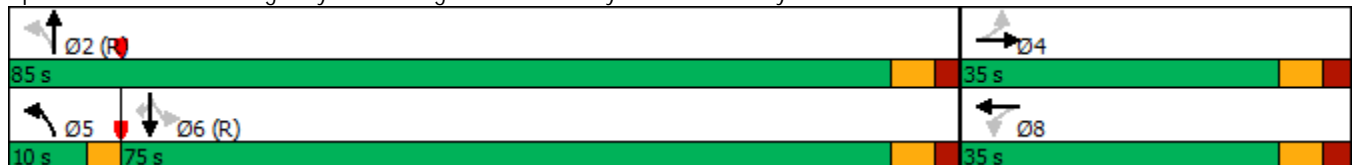


Lane Group	EBL	EBT	NBL	NBT	SBT	SBR	Ø8
Lane Configurations	↶	↷	↶	↶↷	↶↷	↷	
Traffic Volume (vph)	125	0	60	1475	925	95	
Future Volume (vph)	125	0	60	1475	925	95	
Turn Type	Perm	NA	pm+pt	NA	NA	Perm	
Protected Phases		4	5	2	6		8
Permitted Phases	4		2			6	
Detector Phase	4	4	5	2	6	6	
Switch Phase							
Minimum Initial (s)	8.0	8.0	5.0	12.0	12.0	12.0	8.0
Minimum Split (s)	32.6	32.6	8.0	27.3	27.3	27.3	32.6
Total Split (s)	35.0	35.0	10.0	85.0	75.0	75.0	35.0
Total Split (%)	29.2%	29.2%	8.3%	70.8%	62.5%	62.5%	29%
Yellow Time (s)	4.0	4.0	3.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.6	2.6	0.0	2.3	2.3	2.3	2.6
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.6	6.6	3.0	6.3	6.3	6.3	
Lead/Lag			Lead		Lag	Lag	
Lead-Lag Optimize?			Yes		Yes	Yes	
Recall Mode	None	None	None	C-Min	C-Min	C-Min	None
Act Effect Green (s)	16.0	16.0	94.4	91.1	83.0	83.0	
Actuated g/C Ratio	0.13	0.13	0.79	0.76	0.69	0.69	
v/c Ratio	0.67	0.33	0.16	0.55	0.38	0.09	
Control Delay	66.2	2.1	4.2	6.2	9.4	2.2	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	66.2	2.1	4.2	6.2	9.4	2.2	
LOS	E	A	A	A	A	A	
Approach Delay		33.5		6.2	8.7		
Approach LOS		C		A	A		

Intersection Summary

Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 116 (97%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 70
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.67
 Intersection Signal Delay: 9.6
 Intersection LOS: A
 Intersection Capacity Utilization 68.7%
 ICU Level of Service C
 Analysis Period (min) 15

Splits and Phases: 3: Highway 50 & George Bolton Parkway/Private Driveway



HCM Signalized Intersection Capacity Analysis
 3: Highway 50 & George Bolton Parkway/Private Driveway

Existing PM Synchro Model
 01-28-2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	125	0	130	0	0	0	60	1475	0	0	925	95
Future Volume (vph)	125	0	130	0	0	0	60	1475	0	0	925	95
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5
Total Lost time (s)	6.6	6.6					3.0	6.3			6.3	6.3
Lane Util. Factor	1.00	1.00					1.00	0.95			0.95	1.00
Frt	1.00	0.85					1.00	1.00			1.00	0.85
Flt Protected	0.95	1.00					0.95	1.00			1.00	1.00
Satd. Flow (prot)	1750	1585					1405	3510			3476	1521
Flt Permitted	0.76	1.00					0.27	1.00			1.00	1.00
Satd. Flow (perm)	1395	1585					400	3510			3476	1521
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)	125	0	130	0	0	0	60	1475	0	0	925	95
RTOR Reduction (vph)	0	113	0	0	0	0	0	0	0	0	0	28
Lane Group Flow (vph)	125	17	0	0	0	0	60	1475	0	0	925	67
Heavy Vehicles (%)	2%	0%	3%	0%	0%	0%	27%	4%	0%	0%	5%	5%
Turn Type	Perm	NA					pm+pt	NA		Perm	NA	Perm
Protected Phases		4			8		5	2		6		6
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	16.0	16.0					91.1	91.1			82.5	82.5
Effective Green, g (s)	16.0	16.0					91.1	91.1			82.5	82.5
Actuated g/C Ratio	0.13	0.13					0.76	0.76			0.69	0.69
Clearance Time (s)	6.6	6.6					3.0	6.3			6.3	6.3
Vehicle Extension (s)	3.0	3.0					3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	186	211					350	2664			2389	1045
v/s Ratio Prot		0.01					0.01	c0.42			0.27	
v/s Ratio Perm	c0.09						0.12					0.04
v/c Ratio	0.67	0.08					0.17	0.55			0.39	0.06
Uniform Delay, d1	49.5	45.6					4.2	6.0			8.0	6.1
Progression Factor	1.00	1.00					0.93	0.82			1.00	1.00
Incremental Delay, d2	9.2	0.2					0.2	0.7			0.5	0.1
Delay (s)	58.7	45.7					4.1	5.7			8.5	6.2
Level of Service	E	D					A	A			A	A
Approach Delay (s)		52.1			0.0			5.6			8.3	
Approach LOS		D			A			A			A	

Intersection Summary

HCM 2000 Control Delay	10.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	15.9
Intersection Capacity Utilization	68.7%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

4: Albion Vaughan Road & Commercial Road

Existing PM Synchro Model

01-28-2021



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	95	40	20	635	250	105
Future Volume (Veh/h)	95	40	20	635	250	105
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)	95	40	20	635	250	105
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	978	302	355			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	978	302	355			
tC, single (s)	6.4	6.2	4.2			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.3			
p0 queue free %	65	95	98			
cM capacity (veh/h)	272	737	1135			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	135	655	355			
Volume Left	95	20	0			
Volume Right	40	0	105			
cSH	334	1135	1700			
Volume to Capacity	0.40	0.02	0.21			
Queue Length 95th (m)	15.1	0.4	0.0			
Control Delay (s)	22.9	0.5	0.0			
Lane LOS	C	A				
Approach Delay (s)	22.9	0.5	0.0			
Approach LOS	C					
Intersection Summary						
Average Delay				3.0		
Intersection Capacity Utilization				63.9%	ICU Level of Service	B
Analysis Period (min)				15		

HCM Unsignalized Intersection Capacity Analysis
5: Albion Vaughan Road & Industrial Road

Existing PM Synchro Model
01-28-2021



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	55	55	35	585	270	20
Future Volume (Veh/h)	55	55	35	585	270	20
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)	55	55	35	585	270	20
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	935	280	290			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	935	280	290			
tC, single (s)	6.4	6.2	4.4			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.4			
p0 queue free %	81	93	97			
cM capacity (veh/h)	288	764	1142			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	110	620	290			
Volume Left	55	35	0			
Volume Right	55	0	20			
cSH	418	1142	1700			
Volume to Capacity	0.26	0.03	0.17			
Queue Length 95th (m)	8.3	0.8	0.0			
Control Delay (s)	16.7	0.8	0.0			
Lane LOS	C	A				
Approach Delay (s)	16.7	0.8	0.0			
Approach LOS	C					
Intersection Summary						
Average Delay			2.3			
Intersection Capacity Utilization			64.6%	ICU Level of Service	C	
Analysis Period (min)			15			

Timings
6: Highway 50 & Parr Boulevard/Private Driveway



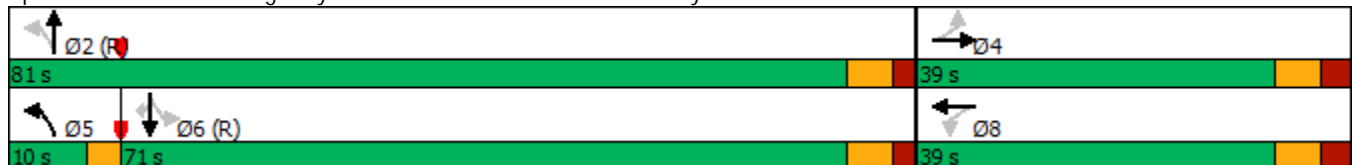
Lane Group	EBL	EBT	NBL	NBT	SBT	SBR	Ø8
Lane Configurations	↶	↷	↶	↶↷	↶↷	↷	
Traffic Volume (vph)	115	0	55	1355	1030	50	
Future Volume (vph)	115	0	55	1355	1030	50	
Turn Type	Perm	NA	pm+pt	NA	NA	Perm	
Protected Phases		4	5	2	6		8
Permitted Phases	4		2			6	
Detector Phase	4	4	5	2	6	6	
Switch Phase							
Minimum Initial (s)	8.0	8.0	5.0	12.0	12.0	12.0	8.0
Minimum Split (s)	33.9	33.9	8.0	30.1	30.1	30.1	33.9
Total Split (s)	39.0	39.0	10.0	81.0	71.0	71.0	39.0
Total Split (%)	32.5%	32.5%	8.3%	67.5%	59.2%	59.2%	33%
Yellow Time (s)	4.0	4.0	3.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.9	2.9	0.0	2.1	2.1	2.1	2.9
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.9	6.9	3.0	6.1	6.1	6.1	
Lead/Lag			Lead		Lag	Lag	
Lead-Lag Optimize?			Yes		Yes	Yes	
Recall Mode	None	None	None	C-Min	C-Min	C-Min	None
Act Effect Green (s)	15.1	15.1	95.0	91.9	84.0	84.0	
Actuated g/C Ratio	0.13	0.13	0.79	0.77	0.70	0.70	
v/c Ratio	0.65	0.30	0.16	0.51	0.42	0.05	
Control Delay	65.9	2.2	4.4	6.7	7.4	1.3	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	65.9	2.2	4.4	6.7	7.4	1.3	
LOS	E	A	A	A	A	A	
Approach Delay		35.5		6.6	7.1		
Approach LOS		D		A	A		

Intersection Summary

Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 3 (3%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 75
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.65
 Intersection Signal Delay: 9.2
 Intersection Capacity Utilization 63.2%
 Analysis Period (min) 15

Intersection LOS: A
 ICU Level of Service B

Splits and Phases: 6: Highway 50 & Parr Boulevard/Private Driveway



HCM Signalized Intersection Capacity Analysis
6: Highway 50 & Parr Boulevard/Private Driveway

Existing PM Synchro Model
01-28-2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	115	0	105	0	0	0	55	1355	0	0	1030	50
Future Volume (vph)	115	0	105	0	0	0	55	1355	0	0	1030	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5
Total Lost time (s)	6.9	6.9					3.0	6.1			6.1	6.1
Lane Util. Factor	1.00	1.00					1.00	0.95			0.95	1.00
Frt	1.00	0.85					1.00	1.00			1.00	0.85
Flt Protected	0.95	1.00					0.95	1.00			1.00	1.00
Satd. Flow (prot)	1767	1471					1463	3476			3476	1493
Flt Permitted	0.76	1.00					0.24	1.00			1.00	1.00
Satd. Flow (perm)	1409	1471					366	3476			3476	1493
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)	115	0	105	0	0	0	55	1355	0	0	1030	50
RTOR Reduction (vph)	0	92	0	0	0	0	0	0	0	0	0	15
Lane Group Flow (vph)	115	13	0	0	0	0	55	1355	0	0	1030	35
Heavy Vehicles (%)	1%	0%	11%	0%	0%	0%	22%	5%	0%	0%	5%	7%
Turn Type	Perm	NA					pm+pt	NA		Perm	NA	Perm
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	15.1	15.1					91.9	91.9			83.4	83.4
Effective Green, g (s)	15.1	15.1					91.9	91.9			83.4	83.4
Actuated g/C Ratio	0.13	0.13					0.77	0.77			0.70	0.70
Clearance Time (s)	6.9	6.9					3.0	6.1			6.1	6.1
Vehicle Extension (s)	3.0	3.0					3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	177	185					330	2662			2415	1037
v/s Ratio Prot		0.01					0.01	c0.39			0.30	
v/s Ratio Perm	c0.08						0.12					0.02
v/c Ratio	0.65	0.07					0.17	0.51			0.43	0.03
Uniform Delay, d1	49.9	46.3					4.2	5.4			7.9	5.7
Progression Factor	1.00	1.00					1.00	1.00			0.79	0.81
Incremental Delay, d2	8.0	0.2					0.2	0.7			0.5	0.1
Delay (s)	57.9	46.4					4.4	6.1			6.8	4.7
Level of Service	E	D					A	A			A	A
Approach Delay (s)		52.4			0.0			6.0			6.7	
Approach LOS		D			A			A			A	

Intersection Summary

HCM 2000 Control Delay	10.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	63.2%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Timings
7: Highway 50 & Mayfield Road/Albion Vaughan Road

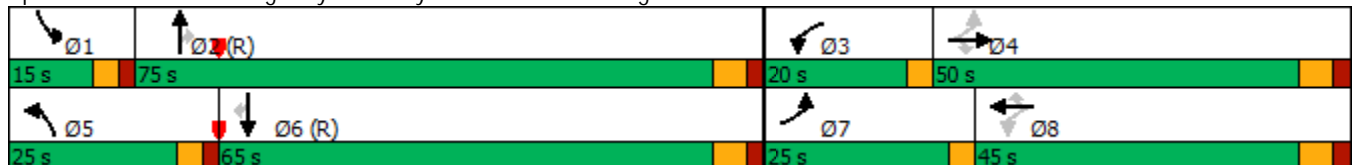
Existing PM Synchro Model
01-28-2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	125	210	105	185	105	25	95	1180	605	10	1005	120
Future Volume (vph)	125	210	105	185	105	25	95	1180	605	10	1005	120
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	12.0	12.0	10.0	12.0	12.0	10.0	20.0	20.0	10.0	20.0	20.0
Minimum Split (s)	8.0	39.5	39.5	13.0	39.5	39.5	15.0	37.3	37.3	15.0	37.3	37.3
Total Split (s)	25.0	50.0	50.0	20.0	45.0	45.0	25.0	75.0	75.0	15.0	65.0	65.0
Total Split (%)	15.6%	31.3%	31.3%	12.5%	28.1%	28.1%	15.6%	46.9%	46.9%	9.4%	40.6%	40.6%
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.2	4.2	3.0	4.2	4.2
All-Red Time (s)	0.0	2.5	2.5	0.0	2.5	2.5	2.0	2.1	2.1	2.0	2.1	2.1
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.0	6.5	6.5	3.0	6.5	6.5	5.0	6.3	6.3	5.0	6.3	6.3
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Min	C-Min	None	C-Min	C-Min
Act Effect Green (s)	42.6	24.9	24.9	47.9	28.2	28.2	19.3	95.8	95.8	10.0	77.5	77.5
Actuated g/C Ratio	0.27	0.16	0.16	0.30	0.18	0.18	0.12	0.60	0.60	0.06	0.48	0.48
v/c Ratio	0.34	0.78	0.41	0.68	0.37	0.07	0.71	0.57	0.53	0.09	0.59	0.15
Control Delay	42.8	84.1	12.7	55.7	61.0	0.4	94.1	23.4	3.4	72.8	34.0	3.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	42.8	84.1	12.7	55.7	61.0	0.4	94.1	23.4	3.4	72.8	34.0	3.8
LOS	D	F	B	E	E	A	F	C	A	E	C	A
Approach Delay		55.3			53.1			20.6			31.1	
Approach LOS		E			D			C			C	

Intersection Summary

Cycle Length: 160
 Actuated Cycle Length: 160
 Offset: 72 (45%), Referenced to phase 2:NBT and 6:SBT, Start of Green
 Natural Cycle: 105
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.78
 Intersection Signal Delay: 30.5
 Intersection LOS: C
 Intersection Capacity Utilization 80.4%
 ICU Level of Service D
 Analysis Period (min) 15

Splits and Phases: 7: Highway 50 & Mayfield Road/Albion Vaughan Road



HCM Signalized Intersection Capacity Analysis
 7: Highway 50 & Mayfield Road/Albion Vaughan Road

Existing PM Synchro Model
 01-28-2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↘	↑	↗	↘	↑	↗	↘	↑↑	↗	↘	↑↑	↗
Traffic Volume (vph)	125	210	105	185	105	25	95	1180	605	10	1005	120
Future Volume (vph)	125	210	105	185	105	25	95	1180	605	10	1005	120
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5
Total Lost time (s)	3.0	6.5	6.5	3.0	6.5	6.5	5.0	6.3	6.3	5.0	6.3	6.3
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1684	1731	1044	1608	1601	1426	1109	3444	1493	1785	3510	1536
Flt Permitted	0.69	1.00	1.00	0.30	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1222	1731	1044	515	1601	1426	1109	3444	1493	1785	3510	1536
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)	125	210	105	185	105	25	95	1180	605	10	1005	120
RTOR Reduction (vph)	0	0	89	0	0	21	0	0	254	0	0	62
Lane Group Flow (vph)	125	210	16	185	105	4	95	1180	351	10	1005	58
Heavy Vehicles (%)	6%	11%	53%	11%	20%	12%	61%	6%	7%	0%	4%	4%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)	39.1	24.9	24.9	45.4	28.2	28.2	19.3	92.8	92.8	4.0	77.5	77.5
Effective Green, g (s)	39.1	24.9	24.9	45.4	28.2	28.2	19.3	92.8	92.8	4.0	77.5	77.5
Actuated g/C Ratio	0.24	0.16	0.16	0.28	0.18	0.18	0.12	0.58	0.58	0.02	0.48	0.48
Clearance Time (s)	3.0	6.5	6.5	3.0	6.5	6.5	5.0	6.3	6.3	5.0	6.3	6.3
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	339	269	162	265	282	251	133	1997	865	44	1700	744
v/s Ratio Prot	0.03	c0.12		c0.08	0.07		c0.09	c0.34		0.01	0.29	
v/s Ratio Perm	0.06		0.02	0.12		0.00			0.24			0.04
v/c Ratio	0.37	0.78	0.10	0.70	0.37	0.02	0.71	0.59	0.41	0.23	0.59	0.08
Uniform Delay, d1	49.3	64.9	57.9	47.2	58.1	54.5	67.7	21.5	18.5	76.5	29.8	22.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.7	13.6	0.3	7.8	0.8	0.0	16.6	1.3	1.4	2.6	1.5	0.2
Delay (s)	50.0	78.6	58.2	54.9	58.9	54.5	84.3	22.8	19.9	79.1	31.3	22.3
Level of Service	D	E	E	D	E	D	F	C	B	E	C	C
Approach Delay (s)		65.6			56.2			24.9			30.8	
Approach LOS		E			E			C			C	

Intersection Summary		
HCM 2000 Control Delay	34.1	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	0.67	C
Actuated Cycle Length (s)	160.0	Sum of lost time (s)
Intersection Capacity Utilization	80.4%	20.8
Analysis Period (min)	15	ICU Level of Service
		D

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

8: Albion Vaughan Road & Kirby Road

Existing PM Synchro Model

01-28-2021



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	10	70	580	0	35	265
Future Volume (Veh/h)	10	70	580	0	35	265
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)	10	70	580	0	35	265
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	915	580			580	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	915	580			580	
tC, single (s)	6.5	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.6	3.3			2.2	
p0 queue free %	96	86			96	
cM capacity (veh/h)	281	510			979	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	80	580	300			
Volume Left	10	0	35			
Volume Right	70	0	0			
cSH	463	1700	979			
Volume to Capacity	0.17	0.34	0.04			
Queue Length 95th (m)	4.9	0.0	0.9			
Control Delay (s)	14.4	0.0	1.4			
Lane LOS	B		A			
Approach Delay (s)	14.4	0.0	1.4			
Approach LOS	B					
Intersection Summary						
Average Delay			1.6			
Intersection Capacity Utilization			54.9%	ICU Level of Service	A	
Analysis Period (min)			15			

Future Background Traffic Conditions 2036

Timings

1: Highway 50 & McEwan Drive West/McEwan Drive East

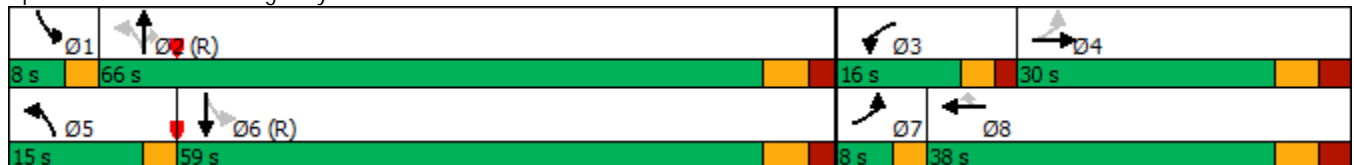


Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations	↖	↗	↖↗	↕	↖	↖	↕↕	↖	↖	↗↖
Traffic Volume (vph)	80	45	80	105	50	120	679	65	60	1188
Future Volume (vph)	80	45	80	105	50	120	679	65	60	1188
Turn Type	pm+pt	NA	Prot	NA	Perm	pm+pt	NA	Perm	pm+pt	NA
Protected Phases	7	4	3	8		5	2		1	6
Permitted Phases	4				8	2		2	6	
Detector Phase	7	4	3	8	8	5	2	2	1	6
Switch Phase										
Minimum Initial (s)	5.0	8.0	8.0	8.0	8.0	5.0	8.0	8.0	5.0	8.0
Minimum Split (s)	8.0	35.0	13.0	35.0	35.0	8.0	34.6	34.6	8.0	34.6
Total Split (s)	8.0	30.0	16.0	38.0	38.0	15.0	66.0	66.0	8.0	59.0
Total Split (%)	6.7%	25.0%	13.3%	31.7%	31.7%	12.5%	55.0%	55.0%	6.7%	49.2%
Yellow Time (s)	3.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0
All-Red Time (s)	0.0	3.0	2.0	3.0	3.0	0.0	2.6	2.6	0.0	2.6
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.0	7.0	5.0	7.0	7.0	3.0	6.6	6.6	3.0	6.6
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	Min	None	Min	Min	None	C-Min	C-Min	None	C-Min
Act Effect Green (s)	22.4	12.4	8.8	15.1	15.1	85.9	75.4	75.4	80.5	70.7
Actuated g/C Ratio	0.19	0.10	0.07	0.13	0.13	0.72	0.63	0.63	0.67	0.59
v/c Ratio	0.31	0.44	0.34	0.46	0.17	0.49	0.32	0.07	0.12	0.66
Control Delay	38.1	19.4	56.5	53.0	1.3	18.5	17.0	3.9	7.9	21.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	38.1	19.4	56.5	53.0	1.3	18.5	17.0	3.9	7.9	21.1
LOS	D	B	E	D	A	B	B	A	A	C
Approach Delay		25.7		43.2			16.2			20.5
Approach LOS		C		D			B			C

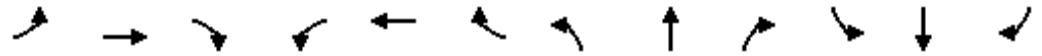
Intersection Summary

Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 71 (59%), 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: 21.6
 Intersection LOS: C
 Intersection Capacity Utilization 78.8%
 ICU Level of Service D
 Analysis Period (min) 15

Splits and Phases: 1: Highway 50 & McEwan Drive West/McEwan Drive East



HCM Signalized Intersection Capacity Analysis Future Background 2036 AM Synchro Model
 1: Highway 50 & McEwan Drive West/McEwan Drive East 01-28-2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗	↖	↖	↗	↖	↖	↗	↖
Traffic Volume (vph)	80	45	115	80	105	50	120	679	65	60	1188	145
Future Volume (vph)	80	45	115	80	105	50	120	679	65	60	1188	145
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5
Total Lost time (s)	3.0	7.0		5.0	7.0	7.0	3.0	6.6	6.6	3.0	6.6	
Lane Util. Factor	1.00	0.95		0.97	1.00	1.00	1.00	0.95	1.00	1.00	0.95	
Frbp, ped/bikes	1.00	0.99		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	0.89		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1716	2529		3236	1812	1536	1526	3411	1452	1638	3394	
Flt Permitted	0.69	1.00		0.95	1.00	1.00	0.12	1.00	1.00	0.39	1.00	
Satd. Flow (perm)	1245	2529		3236	1812	1536	200	3411	1452	671	3394	
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)	80	45	115	80	105	50	120	679	65	60	1188	145
RTOR Reduction (vph)	0	103	0	0	0	44	0	0	25	0	6	0
Lane Group Flow (vph)	80	57	0	80	105	6	120	679	40	60	1327	0
Confl. Peds. (#/hr)			5	5								
Heavy Vehicles (%)	4%	12%	33%	7%	6%	4%	17%	7%	10%	9%	6%	4%
Turn Type	pm+pt	NA		Prot	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4					8	2		2	6		
Actuated Green, G (s)	18.5	12.4		7.2	15.5	15.5	81.8	73.8	73.8	74.7	69.7	
Effective Green, g (s)	18.5	12.4		7.2	15.5	15.5	81.8	73.8	73.8	74.7	69.7	
Actuated g/C Ratio	0.15	0.10		0.06	0.13	0.13	0.68	0.61	0.61	0.62	0.58	
Clearance Time (s)	3.0	7.0		5.0	7.0	7.0	3.0	6.6	6.6	3.0	6.6	
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)	215	261		194	234	198	236	2097	892	457	1971	
v/s Ratio Prot	0.02	0.02		c0.02	c0.06		c0.04	0.20		0.01	c0.39	
v/s Ratio Perm	0.04					0.00	0.31		0.03	0.08		
v/c Ratio	0.37	0.22		0.41	0.45	0.03	0.51	0.32	0.04	0.13	0.67	
Uniform Delay, d1	45.0	49.4		54.4	48.3	45.7	11.9	11.1	9.1	8.9	17.3	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.68	1.33	1.00	1.00	1.00	
Incremental Delay, d2	1.1	0.4		1.4	1.4	0.1	1.7	0.4	0.1	0.1	1.9	
Delay (s)	46.1	49.8		55.8	49.7	45.8	21.7	15.2	9.2	9.0	19.2	
Level of Service	D	D		E	D	D	C	B	A	A	B	
Approach Delay (s)		48.6			50.9			15.6			18.7	
Approach LOS		D			D			B			B	

Intersection Summary		
HCM 2000 Control Delay	23.1	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	0.62	C
Actuated Cycle Length (s)	120.0	Sum of lost time (s)
Intersection Capacity Utilization	78.8%	21.6
Analysis Period (min)	15	ICU Level of Service
c Critical Lane Group		D

HCM Unsignalized Intersection Capacity Analysis Future Background 2036 AM Synchro Model 2: Highway 50 & Industrial Road

01-28-2021



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↗	↕↗			↕↖
Traffic Volume (veh/h)	0	30	929	25	0	1538
Future Volume (Veh/h)	0	30	929	25	0	1538
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	929	25	0	1538
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage veh			2			2
Upstream signal (m)			160			
pX, platoon unblocked	0.91	0.91			0.91	
vC, conflicting volume	1710	477			954	
vC1, stage 1 conf vol	942					
vC2, stage 2 conf vol	769					
vCu, unblocked vol	1585	231			755	
tC, single (s)	7.0	7.3			4.1	
tC, 2 stage (s)	6.0					
tF (s)	3.6	3.5			2.2	
p0 queue free %	100	95			100	
cM capacity (veh/h)	278	655			788	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	30	619	335	769	769	
Volume Left	0	0	0	0	0	
Volume Right	30	0	25	0	0	
cSH	655	1700	1700	1700	1700	
Volume to Capacity	0.05	0.36	0.20	0.45	0.45	
Queue Length 95th (m)	1.2	0.0	0.0	0.0	0.0	
Control Delay (s)	10.8	0.0	0.0	0.0	0.0	
Lane LOS	B					
Approach Delay (s)	10.8	0.0		0.0		
Approach LOS	B					
Intersection Summary						
Average Delay			0.1			
Intersection Capacity Utilization			45.8%	ICU Level of Service	A	
Analysis Period (min)			15			

Timings

3: Highway 50 & George Bolton Parkway/George Bolton Parkway Extension

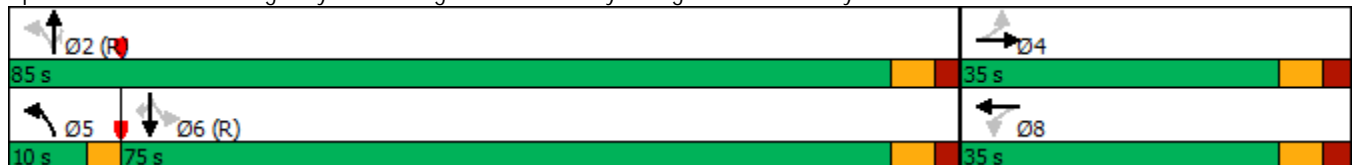


Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗	↖	↗	↖	↕	↗	↖	↕	↗
Traffic Volume (vph)	25	23	190	239	75	814	165	25	1363	85
Future Volume (vph)	25	23	190	239	75	814	165	25	1363	85
Turn Type	Perm	NA	Perm	NA	pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases		4		8	5	2			6	
Permitted Phases	4		8		2		2	6		6
Detector Phase	4	4	8	8	5	2	2	6	6	6
Switch Phase										
Minimum Initial (s)	8.0	8.0	8.0	8.0	5.0	12.0	12.0	12.0	12.0	12.0
Minimum Split (s)	32.6	32.6	32.6	32.6	8.0	27.3	27.3	27.3	27.3	27.3
Total Split (s)	35.0	35.0	35.0	35.0	10.0	85.0	85.0	75.0	75.0	75.0
Total Split (%)	29.2%	29.2%	29.2%	29.2%	8.3%	70.8%	70.8%	62.5%	62.5%	62.5%
Yellow Time (s)	4.0	4.0	4.0	4.0	3.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.6	2.6	2.6	2.6	0.0	2.3	2.3	2.3	2.3	2.3
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.6	6.6	6.6	6.6	3.0	6.3	6.3	6.3	6.3	6.3
Lead/Lag					Lead			Lag	Lag	Lag
Lead-Lag Optimize?					Yes			Yes	Yes	Yes
Recall Mode	None	None	None	None	None	C-Min	C-Min	C-Min	C-Min	C-Min
Act Effect Green (s)	22.3	22.3	22.3	22.3	88.1	84.8	84.8	76.4	76.4	76.4
Actuated g/C Ratio	0.19	0.19	0.19	0.19	0.73	0.71	0.71	0.64	0.64	0.64
v/c Ratio	0.19	0.27	0.77	0.67	0.30	0.34	0.14	0.06	0.62	0.08
Control Delay	42.0	17.1	68.9	56.9	9.1	7.2	1.2	4.3	6.4	0.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	42.0	17.1	68.9	56.9	9.1	7.2	1.2	4.3	6.4	0.4
LOS	D	B	E	E	A	A	A	A	A	A
Approach Delay		23.1		62.2		6.4			6.0	
Approach LOS		C		E		A			A	

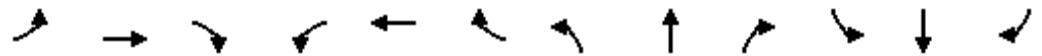
Intersection Summary

Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 113 (94%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 80
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.77
 Intersection Signal Delay: 14.6
 Intersection Capacity Utilization 76.7%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service D

Splits and Phases: 3: Highway 50 & George Bolton Parkway/George Bolton Parkway Extension



HCM Signalized Intersection Capacity Analysis Future Background 2036 AM Synchro Model
 3: Highway 50 & George Bolton Parkway/George Bolton Parkway Extension 01-28-2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	23	55	190	239	0	75	814	165	25	1363	85
Future Volume (vph)	25	23	55	190	239	0	75	814	165	25	1363	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5
Total Lost time (s)	6.6	6.6		6.6	6.6		3.0	6.3	6.3	6.3	6.3	6.3
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95	1.00	1.00	0.95	1.00
Fr _t	1.00	0.89		1.00	1.00		1.00	1.00	0.85	1.00	1.00	0.85
Fl _t Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1733	1340		1785	1921		1623	3411	1597	1785	3476	1597
Fl _t Permitted	0.38	1.00		0.71	1.00		0.13	1.00	1.00	0.34	1.00	1.00
Satd. Flow (perm)	696	1340		1327	1921		228	3411	1597	647	3476	1597
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)	25	23	55	190	239	0	75	814	165	25	1363	85
RTOR Reduction (vph)	0	45	0	0	0	0	0	0	48	0	0	22
Lane Group Flow (vph)	25	33	0	190	239	0	75	814	117	25	1363	63
Heavy Vehicles (%)	3%	0%	40%	0%	0%	0%	10%	7%	0%	0%	5%	0%
Turn Type	Perm	NA		Perm	NA		pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	22.3	22.3		22.3	22.3		84.8	84.8	84.8	75.7	75.7	75.7
Effective Green, g (s)	22.3	22.3		22.3	22.3		84.8	84.8	84.8	75.7	75.7	75.7
Actuated g/C Ratio	0.19	0.19		0.19	0.19		0.71	0.71	0.71	0.63	0.63	0.63
Clearance Time (s)	6.6	6.6		6.6	6.6		3.0	6.3	6.3	6.3	6.3	6.3
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)	129	249		246	356		232	2410	1128	408	2192	1007
v/s Ratio Prot		0.02			0.12		0.02	c0.24			c0.39	
v/s Ratio Perm	0.04			c0.14			0.21		0.07	0.04		0.04
v/c Ratio	0.19	0.13		0.77	0.67		0.32	0.34	0.10	0.06	0.62	0.06
Uniform Delay, d ₁	41.3	40.8		46.4	45.4		9.0	6.8	5.6	8.5	13.5	8.5
Progression Factor	1.00	1.00		1.07	1.07		1.11	0.90	0.80	0.35	0.35	0.06
Incremental Delay, d ₂	0.7	0.2		13.5	4.8		0.8	0.4	0.2	0.2	1.1	0.1
Delay (s)	42.0	41.0		63.3	53.4		10.8	6.5	4.6	3.2	5.8	0.6
Level of Service	D	D		E	D		B	A	A	A	A	A
Approach Delay (s)		41.3			57.8			6.5			5.5	
Approach LOS		D			E			A			A	

Intersection Summary		
HCM 2000 Control Delay	14.4	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	0.64	B
Actuated Cycle Length (s)	120.0	Sum of lost time (s)
Intersection Capacity Utilization	76.7%	15.9
Analysis Period (min)	15	ICU Level of Service
		D

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis Future Background 2036 AM Synchro Model

4: Albion Vaughan Road & Commercial Road

01-28-2021



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	25	5	25	308	762	150
Future Volume (Veh/h)	25	5	25	308	762	150
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)	25	5	25	308	762	150
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)	251					
pX, platoon unblocked						
vC, conflicting volume	1041	456	912			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1041	456	912			
tC, single (s)	7.4	7.6	4.2			
tC, 2 stage (s)						
tF (s)	3.8	3.6	2.3			
p0 queue free %	86	99	96			
cM capacity (veh/h)	179	475	712			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	30	128	205	508	404	
Volume Left	25	25	0	0	0	
Volume Right	5	0	0	0	150	
cSH	199	712	1700	1700	1700	
Volume to Capacity	0.15	0.04	0.12	0.30	0.24	
Queue Length 95th (m)	4.2	0.9	0.0	0.0	0.0	
Control Delay (s)	26.2	2.3	0.0	0.0	0.0	
Lane LOS	D	A				
Approach Delay (s)	26.2	0.9		0.0		
Approach LOS	D					
Intersection Summary						
Average Delay	0.8					
Intersection Capacity Utilization	37.6%			ICU Level of Service	A	
Analysis Period (min)	15					

Timings
5: Albion Vaughan Road & Industrial Road

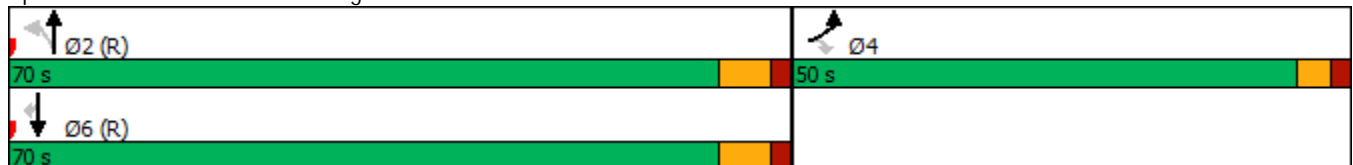


Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↖	↗	↖	↑↑	↑↑	↗
Traffic Volume (vph)	203	20	40	135	318	449
Future Volume (vph)	203	20	40	135	318	449
Turn Type	Prot	Perm	Perm	NA	NA	Perm
Protected Phases	4			2	6	
Permitted Phases		4	2			6
Detector Phase	4	4	2	2	6	6
Switch Phase						
Minimum Initial (s)	5.0	5.0	7.0	7.0	7.0	7.0
Minimum Split (s)	30.0	30.0	31.6	31.6	31.6	31.6
Total Split (s)	50.0	50.0	70.0	70.0	70.0	70.0
Total Split (%)	41.7%	41.7%	58.3%	58.3%	58.3%	58.3%
Yellow Time (s)	3.0	3.0	4.6	4.6	4.6	4.6
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	6.6	6.6	6.6	6.6
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	C-Min	C-Min	C-Min	C-Min
Act Effect Green (s)	22.2	22.2	86.2	86.2	86.2	86.2
Actuated g/C Ratio	0.18	0.18	0.72	0.72	0.72	0.72
v/c Ratio	0.75	0.07	0.06	0.06	0.12	0.37
Control Delay	60.9	15.5	6.7	5.9	6.0	1.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	60.9	15.5	6.7	5.9	6.0	1.6
LOS	E	B	A	A	A	A
Approach Delay	56.8			6.1	3.4	
Approach LOS	E			A	A	

Intersection Summary

Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green
 Natural Cycle: 65
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.75
 Intersection Signal Delay: 14.0
 Intersection LOS: B
 Intersection Capacity Utilization 44.6%
 ICU Level of Service A
 Analysis Period (min) 15

Splits and Phases: 5: Albion Vaughan Road & Industrial Road



HCM Signalized Intersection Capacity Analysis Future Background 2036 AM Synchro Model
 5: Albion Vaughan Road & Industrial Road 01-28-2021



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	203	20	40	135	318	449
Future Volume (vph)	203	20	40	135	318	449
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.7	3.7	3.5
Total Lost time (s)	5.0	5.0	6.6	6.6	6.6	6.6
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1475	1377	1513	3147	3544	1536
Flt Permitted	0.95	1.00	0.56	1.00	1.00	1.00
Satd. Flow (perm)	1475	1377	890	3147	3544	1536
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	203	20	40	135	318	449
RTOR Reduction (vph)	0	16	0	0	0	126
Lane Group Flow (vph)	203	4	40	135	318	323
Heavy Vehicles (%)	21%	16%	18%	16%	3%	4%
Turn Type	Prot	Perm	Perm	NA	NA	Perm
Protected Phases	4			2	6	
Permitted Phases		4	2			6
Actuated Green, G (s)	22.2	22.2	86.2	86.2	86.2	86.2
Effective Green, g (s)	22.2	22.2	86.2	86.2	86.2	86.2
Actuated g/C Ratio	0.18	0.18	0.72	0.72	0.72	0.72
Clearance Time (s)	5.0	5.0	6.6	6.6	6.6	6.6
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	272	254	639	2260	2545	1103
v/s Ratio Prot	c0.14			0.04	0.09	
v/s Ratio Perm		0.00	0.04			c0.21
v/c Ratio	0.75	0.01	0.06	0.06	0.12	0.29
Uniform Delay, d1	46.2	40.0	5.0	5.0	5.2	6.0
Progression Factor	0.97	1.07	1.00	1.00	1.00	1.00
Incremental Delay, d2	10.6	0.0	0.2	0.1	0.1	0.7
Delay (s)	55.4	42.9	5.2	5.0	5.3	6.7
Level of Service	E	D	A	A	A	A
Approach Delay (s)	54.3			5.1	6.1	
Approach LOS	D			A	A	

Intersection Summary			
HCM 2000 Control Delay	15.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.38		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	11.6
Intersection Capacity Utilization	44.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Timings
6: Highway 50 & Parr Boulevard/Private Driveway

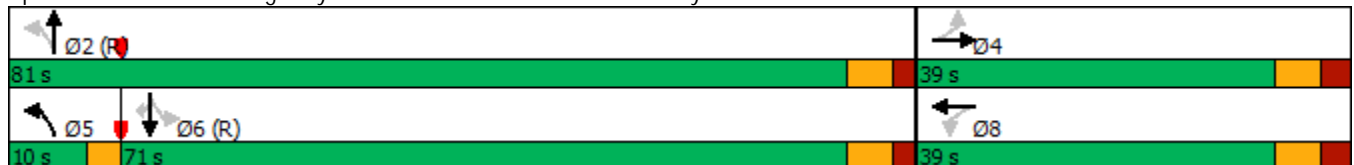


Lane Group	EBL	EBT	NBL	NBT	SBT	SBR	Ø8
Lane Configurations	↶	↷	↶	↶↷	↶↷	↷	
Traffic Volume (vph)	45	0	120	1059	1343	110	
Future Volume (vph)	45	0	120	1059	1343	110	
Turn Type	Perm	NA	pm+pt	NA	NA	Perm	
Protected Phases		4	5	2	6		8
Permitted Phases	4		2			6	
Detector Phase	4	4	5	2	6	6	
Switch Phase							
Minimum Initial (s)	8.0	8.0	5.0	12.0	12.0	12.0	8.0
Minimum Split (s)	33.9	33.9	8.0	30.1	30.1	30.1	33.9
Total Split (s)	39.0	39.0	10.0	81.0	71.0	71.0	39.0
Total Split (%)	32.5%	32.5%	8.3%	67.5%	59.2%	59.2%	33%
Yellow Time (s)	4.0	4.0	3.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.9	2.9	0.0	2.1	2.1	2.1	2.9
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.9	6.9	3.0	6.1	6.1	6.1	
Lead/Lag			Lead		Lag	Lag	
Lead-Lag Optimize?			Yes		Yes	Yes	
Recall Mode	None	None	None	C-Min	C-Min	C-Min	None
Act Effect Green (s)	10.0	10.0	103.0	101.2	89.7	89.7	
Actuated g/C Ratio	0.08	0.08	0.86	0.84	0.75	0.75	
v/c Ratio	0.41	0.21	0.36	0.37	0.54	0.09	
Control Delay	62.4	2.0	4.9	3.4	7.7	3.7	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	62.4	2.0	4.9	3.4	7.7	3.7	
LOS	E	A	A	A	A	A	
Approach Delay		30.6		3.6	7.4		
Approach LOS		C		A	A		

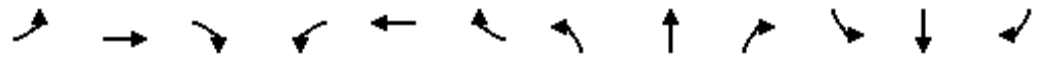
Intersection Summary

Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 8 (7%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 80
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.54
 Intersection Signal Delay: 6.6
 Intersection LOS: A
 Intersection Capacity Utilization 64.6%
 ICU Level of Service C
 Analysis Period (min) 15

Splits and Phases: 6: Highway 50 & Parr Boulevard/Private Driveway



HCM Signalized Intersection Capacity Analysis Future Background 2036 AM Synchro Model
 6: Highway 50 & Parr Boulevard/Private Driveway 01-28-2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↗	↘			↔		↗	↕		↘	↕	↗
Traffic Volume (vph)	45	0	50	0	0	0	120	1059	0	0	1343	110
Future Volume (vph)	45	0	50	0	0	0	120	1059	0	0	1343	110
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5
Total Lost time (s)	6.9	6.9					3.0	6.1			6.1	6.1
Lane Util. Factor	1.00	1.00					1.00	0.95			0.95	1.00
Frt	1.00	0.85					1.00	1.00			1.00	0.85
Flt Protected	0.95	1.00					0.95	1.00			1.00	1.00
Satd. Flow (prot)	1668	1306					1684	3380			3349	1551
Flt Permitted	0.76	1.00					0.16	1.00			1.00	1.00
Satd. Flow (perm)	1330	1306					292	3380			3349	1551
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	0	50	0	0	0	120	1059	0	0	1343	110
RTOR Reduction (vph)	0	47	0	0	0	0	0	0	0	0	0	17
Lane Group Flow (vph)	45	4	0	0	0	0	120	1059	0	0	1343	93
Heavy Vehicles (%)	7%	0%	25%	0%	0%	50%	6%	8%	0%	0%	9%	3%
Turn Type	Perm	NA					pm+pt	NA		Perm	NA	Perm
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	8.4	8.4					98.6	98.6			88.3	88.3
Effective Green, g (s)	8.4	8.4					98.6	98.6			88.3	88.3
Actuated g/C Ratio	0.07	0.07					0.82	0.82			0.74	0.74
Clearance Time (s)	6.9	6.9					3.0	6.1			6.1	6.1
Vehicle Extension (s)	3.0	3.0					3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	93	91					324	2777			2464	1141
v/s Ratio Prot		0.00					0.02	c0.31			c0.40	
v/s Ratio Perm	c0.03						0.28					0.06
v/c Ratio	0.48	0.04					0.37	0.38			0.55	0.08
Uniform Delay, d1	53.7	52.0					3.9	2.8			7.0	4.5
Progression Factor	1.00	1.00					1.00	1.00			0.92	1.27
Incremental Delay, d2	3.9	0.2					0.7	0.4			0.7	0.1
Delay (s)	57.6	52.2					4.7	3.2			7.1	5.8
Level of Service	E	D					A	A			A	A
Approach Delay (s)		54.8			0.0			3.3			7.0	
Approach LOS		D			A			A			A	

Intersection Summary			
HCM 2000 Control Delay	7.1	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	64.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Timings

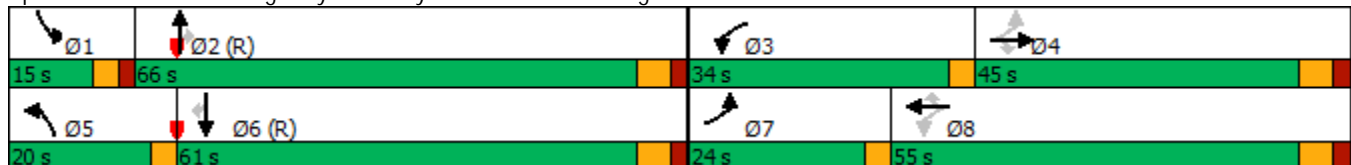
7: Highway 50 & Mayfield Road/Albion Vaughan Road

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	90	115	145	450	370	15	105	1089	160	5	1293	85
Future Volume (vph)	90	115	145	450	370	15	105	1089	160	5	1293	85
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	12.0	12.0	10.0	12.0	12.0	10.0	20.0	20.0	10.0	20.0	20.0
Minimum Split (s)	8.0	39.5	39.5	13.0	39.5	39.5	13.0	37.3	37.3	15.0	37.3	37.3
Total Split (s)	24.0	45.0	45.0	34.0	55.0	55.0	20.0	66.0	66.0	15.0	61.0	61.0
Total Split (%)	15.0%	28.1%	28.1%	21.3%	34.4%	34.4%	12.5%	41.3%	41.3%	9.4%	38.1%	38.1%
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.2	4.2	3.0	4.2	4.2
All-Red Time (s)	0.0	2.5	2.5	0.0	2.5	2.5	0.0	2.1	2.1	2.0	2.1	2.1
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.0	6.5	6.5	3.0	6.5	6.5	3.0	6.3	6.3	5.0	6.3	6.3
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Min	C-Min	None	C-Min	C-Min
Act Effect Green (s)	36.4	21.1	21.1	58.6	40.4	40.4	20.0	89.1	89.1	10.0	69.1	69.1
Actuated g/C Ratio	0.23	0.13	0.13	0.37	0.25	0.25	0.12	0.56	0.56	0.06	0.43	0.43
v/c Ratio	0.41	0.56	0.58	0.92	0.83	0.03	0.72	0.57	0.19	0.05	0.86	0.12
Control Delay	39.3	74.0	17.7	69.4	72.9	0.1	93.0	27.0	4.1	72.0	48.5	2.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	39.3	74.0	17.7	69.4	72.9	0.1	93.0	27.0	4.1	72.0	48.5	2.2
LOS	D	E	B	E	E	A	F	C	A	E	D	A
Approach Delay		41.7			69.7			29.4			45.8	
Approach LOS		D			E			C			D	

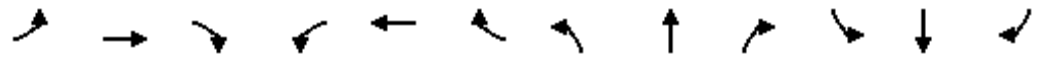
Intersection Summary

Cycle Length: 160
 Actuated Cycle Length: 160
 Offset: 27 (17%), Referenced to phase 2:NBT and 6:SBT, Start of Green
 Natural Cycle: 115
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.92
 Intersection Signal Delay: 44.9
 Intersection LOS: D
 Intersection Capacity Utilization 96.3%
 ICU Level of Service F
 Analysis Period (min) 15

Splits and Phases: 7: Highway 50 & Mayfield Road/Albion Vaughan Road



HCM Signalized Intersection Capacity Analysis Future Background 2036 AM Synchro Model
 7: Highway 50 & Mayfield Road/Albion Vaughan Road 01-28-2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↙	↑	↘	↙	↑	↘	↙	↑↑	↘	↙	↑↑	↘
Traffic Volume (vph)	90	115	145	450	370	15	105	1089	160	5	1293	85
Future Volume (vph)	90	115	145	450	370	15	105	1089	160	5	1293	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5
Total Lost time (s)	3.0	6.5	6.5	3.0	6.5	6.5	3.0	6.3	6.3	5.0	6.3	6.3
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	*1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1594	1549	929	1700	1762	1413	1174	3411	1401	1539	3493	1479
Flt Permitted	0.41	1.00	1.00	0.51	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	686	1549	929	919	1762	1413	1174	3411	1401	1539	3493	1479
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)	90	115	145	450	370	15	105	1089	160	5	1293	85
RTOR Reduction (vph)	0	0	126	0	0	11	0	0	75	0	0	48
Lane Group Flow (vph)	90	115	19	450	370	4	105	1089	85	5	1293	37
Heavy Vehicles (%)	12%	24%	72%	5%	9%	13%	52%	7%	14%	16%	10%	8%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)	32.8	21.1	21.1	55.1	40.4	40.4	20.0	85.1	85.1	2.0	69.1	69.1
Effective Green, g (s)	32.8	21.1	21.1	55.1	40.4	40.4	20.0	85.1	85.1	2.0	69.1	69.1
Actuated g/C Ratio	0.20	0.13	0.13	0.34	0.25	0.25	0.12	0.53	0.53	0.01	0.43	0.43
Clearance Time (s)	3.0	6.5	6.5	3.0	6.5	6.5	3.0	6.3	6.3	5.0	6.3	6.3
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	207	204	122	467	444	356	146	1814	745	19	1508	638
v/s Ratio Prot	0.03	0.07		c0.19	0.21		c0.09	0.32		0.00	c0.37	
v/s Ratio Perm	0.06		0.02	c0.14		0.00			0.06			0.02
v/c Ratio	0.43	0.56	0.16	0.96	0.83	0.01	0.72	0.60	0.11	0.26	0.86	0.06
Uniform Delay, d1	53.7	65.1	61.6	48.3	56.6	44.8	67.3	25.8	18.7	78.3	41.0	26.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.5	3.5	0.6	32.2	12.6	0.0	15.6	1.5	0.3	7.3	6.5	0.2
Delay (s)	55.1	68.7	62.2	80.5	69.2	44.8	82.9	27.2	19.0	85.6	47.5	26.7
Level of Service	E	E	E	F	E	D	F	C	B	F	D	C
Approach Delay (s)		62.5			74.9			30.6			46.4	
Approach LOS		E			E			C			D	

Intersection Summary		
HCM 2000 Control Delay	48.4	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	0.91	D
Actuated Cycle Length (s)	160.0	Sum of lost time (s)
Intersection Capacity Utilization	96.3%	20.8
Analysis Period (min)	15	ICU Level of Service
		F

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis Future Background 2036 AM Synchro Model

8: Albion Vaughan Road & Kirby Road

01-28-2021



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	5	25	130	5	60	313
Future Volume (Veh/h)	5	25	130	5	60	313
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)	5	25	130	5	60	313
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	409	68			135	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	409	68			135	
tC, single (s)	7.5	7.3			4.1	
tC, 2 stage (s)						
tF (s)	3.8	3.5			2.2	
p0 queue free %	99	97			96	
cM capacity (veh/h)	476	927			1454	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	30	87	48	164	209	
Volume Left	5	0	0	60	0	
Volume Right	25	0	5	0	0	
cSH	801	1700	1700	1454	1700	
Volume to Capacity	0.04	0.05	0.03	0.04	0.12	
Queue Length 95th (m)	0.9	0.0	0.0	1.0	0.0	
Control Delay (s)	9.7	0.0	0.0	3.0	0.0	
Lane LOS	A		A			
Approach Delay (s)	9.7	0.0		1.3		
Approach LOS	A					
Intersection Summary						
Average Delay			1.4			
Intersection Capacity Utilization			27.5%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis Future Background 2036 AM Synchro Model
 11: George Bolton Parkway Extension & Industrial Road

01-28-2021



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↔		↕	
Traffic Volume (veh/h)	25	188	384	75	50	45
Future Volume (Veh/h)	25	188	384	75	50	45
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)	25	188	384	75	50	45
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		TWLTL	TWLTL			
Median storage (veh)		2	2			
Upstream signal (m)		290	274			
pX, platoon unblocked						
vC, conflicting volume	459				660	422
vC1, stage 1 conf vol					422	
vC2, stage 2 conf vol					238	
vCu, unblocked vol	459				660	422
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)	2.2				3.5	3.3
p0 queue free %	98				92	93
cM capacity (veh/h)	1113				600	636
Direction, Lane #						
	EB 1	WB 1	SB 1			
Volume Total	213	459	95			
Volume Left	25	0	50			
Volume Right	0	75	45			
cSH	1113	1700	617			
Volume to Capacity	0.02	0.27	0.15			
Queue Length 95th (m)	0.6	0.0	4.3			
Control Delay (s)	1.2	0.0	11.9			
Lane LOS	A		B			
Approach Delay (s)	1.2	0.0	11.9			
Approach LOS			B			
Intersection Summary						
Average Delay			1.8			
Intersection Capacity Utilization			43.1%	ICU Level of Service		A
Analysis Period (min)			15			

Timings

1: Highway 50 & McEwan Drive West/McEwan Drive East

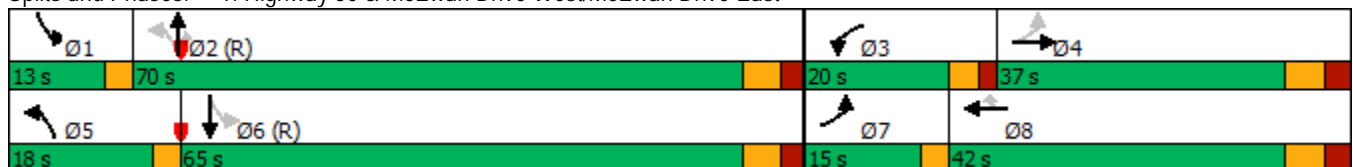


Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations	↙	↕	↙↘	↕	↗	↙	↕↕	↗	↙	↕↕
Traffic Volume (vph)	225	110	165	95	230	110	1370	185	100	841
Future Volume (vph)	225	110	165	95	230	110	1370	185	100	841
Turn Type	pm+pt	NA	Prot	NA	Perm	pm+pt	NA	Perm	pm+pt	NA
Protected Phases	7	4	3	8		5	2		1	6
Permitted Phases	4				8	2		2	6	
Detector Phase	7	4	3	8	8	5	2	2	1	6
Switch Phase										
Minimum Initial (s)	5.0	8.0	8.0	8.0	8.0	5.0	8.0	8.0	5.0	8.0
Minimum Split (s)	8.0	35.0	13.0	35.0	35.0	8.0	34.6	34.6	8.0	34.6
Total Split (s)	15.0	37.0	20.0	42.0	42.0	18.0	70.0	70.0	13.0	65.0
Total Split (%)	10.7%	26.4%	14.3%	30.0%	30.0%	12.9%	50.0%	50.0%	9.3%	46.4%
Yellow Time (s)	3.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0
All-Red Time (s)	0.0	3.0	2.0	3.0	3.0	0.0	2.6	2.6	0.0	2.6
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.0	7.0	5.0	7.0	7.0	3.0	6.6	6.6	3.0	6.6
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	Min	None	Min	Min	None	C-Min	C-Min	None	C-Min
Act Effect Green (s)	36.2	16.8	12.0	13.4	13.4	92.6	79.7	79.7	93.9	80.3
Actuated g/C Ratio	0.26	0.12	0.09	0.10	0.10	0.66	0.57	0.57	0.67	0.57
v/c Ratio	0.62	0.56	0.57	0.55	0.71	0.34	0.68	0.20	0.40	0.46
Control Delay	51.4	24.6	69.0	70.9	25.6	11.1	24.5	6.8	12.6	18.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	51.4	24.6	69.0	70.9	25.6	11.1	24.5	6.8	12.6	18.8
LOS	D	C	E	E	C	B	C	A	B	B
Approach Delay		36.0		49.0			21.7			18.2
Approach LOS		D		D			C			B
























Intersection Summary

Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 72 (51%), 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: 26.4
 Intersection LOS: C
 Intersection Capacity Utilization 80.5%
 ICU Level of Service D
 Analysis Period (min) 15

Splits and Phases: 1: Highway 50 & McEwan Drive West/McEwan Drive East



HCM Signalized Intersection Capacity Analysis Future Background 2036 PM Synchro Model
 1: Highway 50 & McEwan Drive West/McEwan Drive East 01-28-2021

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	225	110	195	165	95	230	110	1370	185	100	841	75	
Future Volume (vph)	225	110	195	165	95	230	110	1370	185	100	841	75	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5	
Total Lost time (s)	3.0	7.0		5.0	7.0	7.0	3.0	6.6	6.6	3.0	6.6		
Lane Util. Factor	1.00	0.95		0.97	1.00	1.00	1.00	0.95	1.00	1.00	0.95		
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	0.90		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		
Satd. Flow (prot)	1785	3116		3395	1830	1581	1439	3544	1566	1785	3497		
Flt Permitted	0.57	1.00		0.95	1.00	1.00	0.25	1.00	1.00	0.11	1.00		
Satd. Flow (perm)	1063	3116		3395	1830	1581	385	3544	1566	213	3497		
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)	225	110	195	165	95	230	110	1370	185	100	841	75	
RTOR Reduction (vph)	0	172	0	0	0	172	0	0	51	0	3	0	
Lane Group Flow (vph)	225	133	0	165	95	58	110	1370	134	100	913	0	
Confl. Peds. (#/hr)							5					5	
Heavy Vehicles (%)	0%	4%	7%	2%	5%	1%	24%	3%	2%	0%	3%	1%	
Turn Type	pm+pt	NA		Prot	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		
Protected Phases	7	4		3	8		5	2		1	6		
Permitted Phases	4					8	2		2	6			
Actuated Green, G (s)	33.8	16.8		12.0	13.4	13.4	89.0	79.7	79.7	90.2	80.3		
Effective Green, g (s)	33.8	16.8		12.0	13.4	13.4	89.0	79.7	79.7	90.2	80.3		
Actuated g/C Ratio	0.24	0.12		0.09	0.10	0.10	0.64	0.57	0.57	0.64	0.57		
Clearance Time (s)	3.0	7.0		5.0	7.0	7.0	3.0	6.6	6.6	3.0	6.6		
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)	346	373		291	175	151	314	2017	891	248	2005		
v/s Ratio Prot	c0.08	0.04		0.05	0.05		0.02	c0.39		c0.03	0.26		
v/s Ratio Perm	c0.08					0.04	0.20		0.09	0.23			
v/c Ratio	0.65	0.36		0.57	0.54	0.39	0.35	0.68	0.15	0.40	0.46		
Uniform Delay, d1	46.1	56.6		61.5	60.4	59.4	11.1	21.2	14.2	15.1	17.2		
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	4.3	0.6		2.5	3.4	1.6	0.7	1.9	0.4	1.1	0.7		
Delay (s)	50.5	57.2		64.0	63.8	61.1	11.7	23.0	14.6	16.2	18.0		
Level of Service	D	E		E	E	E	B	C	B	B	B		
Approach Delay (s)		54.4			62.6			21.3			17.8		
Approach LOS		D			E			C			B		
Intersection Summary													
HCM 2000 Control Delay			30.6									HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.68										
Actuated Cycle Length (s)			140.0									Sum of lost time (s)	21.6
Intersection Capacity Utilization			80.5%									ICU Level of Service	D
Analysis Period (min)			15										
c Critical Lane Group													

HCM Unsignalized Intersection Capacity Analysis Future Background 2036 PM Synchro Model 2: Highway 50 & Industrial Road

01-28-2021



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↗	↕↗			↕↗
Traffic Volume (veh/h)	0	80	1745	55	0	1391
Future Volume (Veh/h)	0	80	1745	55	0	1391
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	80	1745	55	0	1391
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage veh			2			2
Upstream signal (m)			160			
pX, platoon unblocked	0.70	0.70			0.70	
vC, conflicting volume	2468	900			1800	
vC1, stage 1 conf vol	1772					
vC2, stage 2 conf vol	696					
vCu, unblocked vol	2244	15			1294	
tC, single (s)	7.1	7.0			4.3	
tC, 2 stage (s)	6.1					
tF (s)	3.6	3.3			2.3	
p0 queue free %	100	89			100	
cM capacity (veh/h)	137	744			352	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	80	1163	637	696	696	
Volume Left	0	0	0	0	0	
Volume Right	80	0	55	0	0	
cSH	744	1700	1700	1700	1700	
Volume to Capacity	0.11	0.68	0.37	0.41	0.41	
Queue Length 95th (m)	2.9	0.0	0.0	0.0	0.0	
Control Delay (s)	10.4	0.0	0.0	0.0	0.0	
Lane LOS	B					
Approach Delay (s)	10.4	0.0		0.0		
Approach LOS	B					
Intersection Summary						
Average Delay			0.3			
Intersection Capacity Utilization			61.6%	ICU Level of Service	B	
Analysis Period (min)			15			

Timings

3: Highway 50 & George Bolton Parkway/George Bolton Parkway Extension



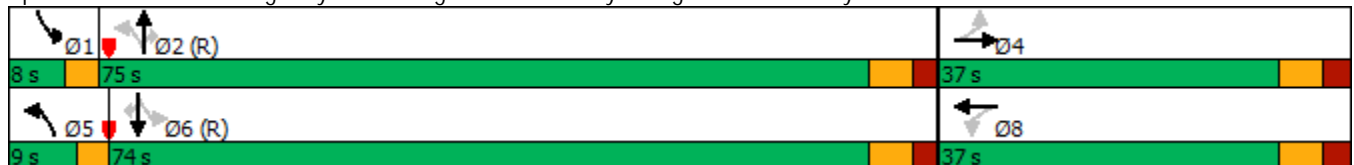
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	125	22	134	126	60	1595	346	50	1086	95
Future Volume (vph)	125	22	134	126	60	1595	346	50	1086	95
Turn Type	Perm	NA	Perm	NA	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases		4		8	5	2		1	6	
Permitted Phases	4		8		2		2	6		6
Detector Phase	4	4	8	8	5	2	2	1	6	6
Switch Phase										
Minimum Initial (s)	8.0	8.0	8.0	8.0	5.0	12.0	12.0	5.0	12.0	12.0
Minimum Split (s)	32.6	32.6	32.6	32.6	8.0	27.3	27.3	8.0	27.3	27.3
Total Split (s)	37.0	37.0	37.0	37.0	9.0	75.0	75.0	8.0	74.0	74.0
Total Split (%)	30.8%	30.8%	30.8%	30.8%	7.5%	62.5%	62.5%	6.7%	61.7%	61.7%
Yellow Time (s)	4.0	4.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	2.6	2.6	2.6	2.6	0.0	2.3	2.3	0.0	2.3	2.3
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.6	6.6	6.6	6.6	3.0	6.3	6.3	3.0	6.3	6.3
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-Min	C-Min	None	C-Min	C-Min
Act Effect Green (s)	19.0	19.0	19.0	19.0	89.5	80.4	80.4	88.5	79.9	79.9
Actuated g/C Ratio	0.16	0.16	0.16	0.16	0.75	0.67	0.67	0.74	0.67	0.67
v/c Ratio	0.67	0.41	0.80	0.42	0.20	0.68	0.29	0.22	0.47	0.09
Control Delay	64.0	13.3	83.3	52.3	5.2	9.9	0.9	7.0	12.0	3.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	64.0	13.3	83.3	52.3	5.2	9.9	0.9	7.0	12.0	3.5
LOS	E	B	F	D	A	A	A	A	B	A
Approach Delay		36.2		68.3		8.2			11.1	
Approach LOS		D		E		A			B	

Intersection Summary

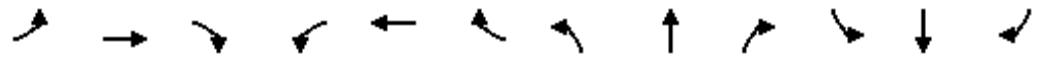
Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.80
 Intersection Signal Delay: 15.4
 Intersection Capacity Utilization 82.7%
 Analysis Period (min) 15

Intersection LOS: B
 ICU Level of Service E

Splits and Phases: 3: Highway 50 & George Bolton Parkway/George Bolton Parkway Extension



HCM Signalized Intersection Capacity Analysis Future Background 2036 PM Synchro Model
 3: Highway 50 & George Bolton Parkway/George Bolton Parkway Extension 01-28-2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↑↑	↗	↖	↑↑	↗
Traffic Volume (vph)	125	22	130	134	126	0	60	1595	346	50	1086	95
Future Volume (vph)	125	22	130	134	126	0	60	1595	346	50	1086	95
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5
Total Lost time (s)	6.6	6.6		6.6	6.6		3.0	6.3	6.3	3.0	6.3	6.3
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.87		1.00	1.00		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)	1750	1633		1785	1921		1405	3510	1597	1785	3476	1521
Flt Permitted	0.64	1.00		0.57	1.00		0.22	1.00	1.00	0.10	1.00	1.00
Satd. Flow (perm)	1180	1633		1063	1921		325	3510	1597	190	3476	1521
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)	125	22	130	134	126	0	60	1595	346	50	1086	95
RTOR Reduction (vph)	0	109	0	0	0	0	0	0	116	0	0	26
Lane Group Flow (vph)	125	43	0	134	126	0	60	1595	230	50	1086	69
Heavy Vehicles (%)	2%	0%	3%	0%	0%	0%	27%	4%	0%	0%	5%	5%
Turn Type	Perm	NA		Perm	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	19.0	19.0		19.0	19.0		85.6	79.8	79.8	84.6	79.3	79.3
Effective Green, g (s)	19.0	19.0		19.0	19.0		85.6	79.8	79.8	84.6	79.3	79.3
Actuated g/C Ratio	0.16	0.16		0.16	0.16		0.71	0.66	0.66	0.70	0.66	0.66
Clearance Time (s)	6.6	6.6		6.6	6.6		3.0	6.3	6.3	3.0	6.3	6.3
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)	186	258		168	304		284	2334	1062	204	2297	1005
v/s Ratio Prot		0.03			0.07		0.01	c0.45		c0.01	0.31	
v/s Ratio Perm	0.11			c0.13			0.14		0.14	0.16		0.05
v/c Ratio	0.67	0.17		0.80	0.41		0.21	0.68	0.22	0.25	0.47	0.07
Uniform Delay, d1	47.6	43.6		48.6	45.5		6.0	12.3	7.9	9.4	10.0	7.2
Progression Factor	1.00	1.00		1.09	1.10		0.88	0.62	0.37	1.00	1.00	1.00
Incremental Delay, d2	9.2	0.3		22.4	0.9		0.3	1.3	0.4	0.6	0.7	0.1
Delay (s)	56.8	43.9		75.4	50.7		5.5	8.9	3.2	10.0	10.7	7.4
Level of Service	E	D		E	D		A	A	A	B	B	A
Approach Delay (s)		49.7			63.5			7.8			10.4	
Approach LOS		D			E			A			B	

Intersection Summary		
HCM 2000 Control Delay	15.6	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	0.68	B
Actuated Cycle Length (s)	120.0	Sum of lost time (s)
Intersection Capacity Utilization	82.7%	15.9
Analysis Period (min)	15	ICU Level of Service
		E

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis Future Background 2036 PM Synchro Model

4: Albion Vaughan Road & Commercial Road

01-28-2021



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	95	40	20	838	404	105
Future Volume (Veh/h)	95	40	20	838	404	105
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)	95	40	20	838	404	105
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)	251					
pX, platoon unblocked	0.96					
vC, conflicting volume	916	254	509			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	836	254	509			
tC, single (s)	6.9	6.9	4.4			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.4			
p0 queue free %	67	95	98			
cM capacity (veh/h)	287	745	967			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	135	299	559	269	240	
Volume Left	95	20	0	0	0	
Volume Right	40	0	0	0	105	
cSH	351	967	1700	1700	1700	
Volume to Capacity	0.39	0.02	0.33	0.16	0.14	
Queue Length 95th (m)	14.1	0.5	0.0	0.0	0.0	
Control Delay (s)	21.6	0.8	0.0	0.0	0.0	
Lane LOS	C	A				
Approach Delay (s)	21.6	0.3		0.0		
Approach LOS	C					
Intersection Summary						
Average Delay	2.1					
Intersection Capacity Utilization	51.9%			ICU Level of Service	A	
Analysis Period (min)	15					

Timings
5: Albion Vaughan Road & Industrial Road



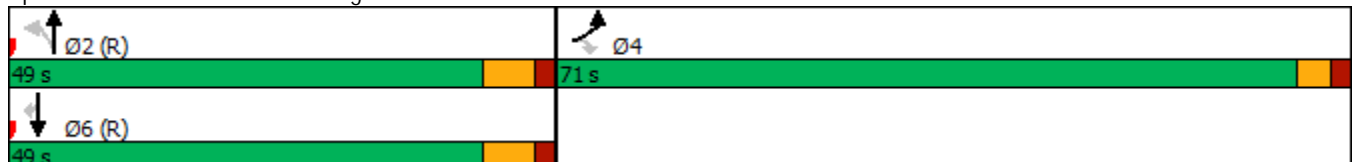
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↖	↗	↖	↑↑	↑↑	↗
Traffic Volume (vph)	428	55	35	415	194	250
Future Volume (vph)	428	55	35	415	194	250
Turn Type	Prot	Perm	Perm	NA	NA	Perm
Protected Phases	4			2	6	
Permitted Phases		4	2			6
Detector Phase	4	4	2	2	6	6
Switch Phase						
Minimum Initial (s)	5.0	5.0	7.0	7.0	7.0	7.0
Minimum Split (s)	30.0	30.0	31.6	31.6	31.6	31.6
Total Split (s)	71.0	71.0	49.0	49.0	49.0	49.0
Total Split (%)	59.2%	59.2%	40.8%	40.8%	40.8%	40.8%
Yellow Time (s)	3.0	3.0	4.6	4.6	4.6	4.6
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	6.6	6.6	6.6	6.6
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	C-Min	C-Min	C-Min	C-Min
Act Effect Green (s)	36.8	36.8	71.6	71.6	71.6	71.6
Actuated g/C Ratio	0.31	0.31	0.60	0.60	0.60	0.60
v/c Ratio	0.78	0.10	0.06	0.20	0.10	0.24
Control Delay	47.4	8.9	13.3	12.6	12.0	2.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	47.4	8.9	13.3	12.6	12.0	2.4
LOS	D	A	B	B	B	A
Approach Delay	43.0			12.6	6.6	
Approach LOS	D			B	A	

Intersection Summary

Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
 Natural Cycle: 65
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.78
 Intersection Signal Delay: 21.3
 Intersection Capacity Utilization 50.5%
 Analysis Period (min) 15

Intersection LOS: C
 ICU Level of Service A

Splits and Phases: 5: Albion Vaughan Road & Industrial Road



HCM Signalized Intersection Capacity Analysis Future Background 2036 PM Synchro Model
 5: Albion Vaughan Road & Industrial Road 01-28-2021



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	428	55	35	415	194	250
Future Volume (vph)	428	55	35	415	194	250
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.7	3.7	3.5
Total Lost time (s)	5.0	5.0	6.6	6.6	6.6	6.6
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1785	1597	1405	3544	3259	1597
Flt Permitted	0.95	1.00	0.63	1.00	1.00	1.00
Satd. Flow (perm)	1785	1597	932	3544	3259	1597
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	428	55	35	415	194	250
RTOR Reduction (vph)	0	38	0	0	0	101
Lane Group Flow (vph)	428	17	35	415	194	149
Heavy Vehicles (%)	0%	0%	27%	3%	12%	0%
Turn Type	Prot	Perm	Perm	NA	NA	Perm
Protected Phases	4			2	6	
Permitted Phases		4	2			6
Actuated Green, G (s)	36.8	36.8	71.6	71.6	71.6	71.6
Effective Green, g (s)	36.8	36.8	71.6	71.6	71.6	71.6
Actuated g/C Ratio	0.31	0.31	0.60	0.60	0.60	0.60
Clearance Time (s)	5.0	5.0	6.6	6.6	6.6	6.6
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	547	489	556	2114	1944	952
v/s Ratio Prot	c0.24			c0.12	0.06	
v/s Ratio Perm		0.01	0.04			0.09
v/c Ratio	0.78	0.03	0.06	0.20	0.10	0.16
Uniform Delay, d1	37.9	29.2	10.1	11.1	10.4	10.8
Progression Factor	0.99	1.38	1.00	1.00	1.00	1.00
Incremental Delay, d2	7.1	0.0	0.2	0.2	0.1	0.4
Delay (s)	44.8	40.2	10.4	11.3	10.5	11.1
Level of Service	D	D	B	B	B	B
Approach Delay (s)	44.3			11.2	10.8	
Approach LOS	D			B	B	

Intersection Summary			
HCM 2000 Control Delay	22.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	11.6
Intersection Capacity Utilization	50.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Timings
6: Highway 50 & Parr Boulevard/Private Driveway

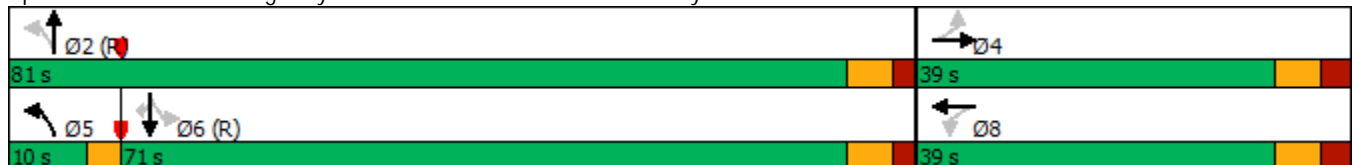


Lane Group	EBL	EBT	NBL	NBT	SBT	SBR	Ø8
Lane Configurations	↶	↷	↶	↶↷	↶↷	↷	
Traffic Volume (vph)	115	0	55	1821	1325	50	
Future Volume (vph)	115	0	55	1821	1325	50	
Turn Type	Perm	NA	pm+pt	NA	NA	Perm	
Protected Phases		4	5	2	6		8
Permitted Phases	4		2			6	
Detector Phase	4	4	5	2	6	6	
Switch Phase							
Minimum Initial (s)	8.0	8.0	5.0	12.0	12.0	12.0	8.0
Minimum Split (s)	33.9	33.9	8.0	30.1	30.1	30.1	33.9
Total Split (s)	39.0	39.0	10.0	81.0	71.0	71.0	39.0
Total Split (%)	32.5%	32.5%	8.3%	67.5%	59.2%	59.2%	33%
Yellow Time (s)	4.0	4.0	3.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.9	2.9	0.0	2.1	2.1	2.1	2.9
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.9	6.9	3.0	6.1	6.1	6.1	
Lead/Lag			Lead		Lag	Lag	
Lead-Lag Optimize?			Yes		Yes	Yes	
Recall Mode	None	None	None	C-Min	C-Min	C-Min	None
Act Effect Green (s)	15.1	15.1	95.0	91.9	84.0	84.0	
Actuated g/C Ratio	0.13	0.13	0.79	0.77	0.70	0.70	
v/c Ratio	0.65	0.34	0.21	0.68	0.54	0.05	
Control Delay	65.9	5.6	5.3	9.3	9.2	1.6	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	65.9	5.6	5.3	9.3	9.2	1.6	
LOS	E	A	A	A	A	A	
Approach Delay		37.1		9.2	8.9		
Approach LOS		D		A	A		

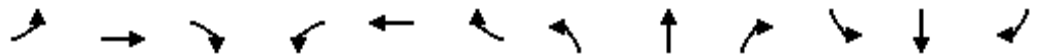
Intersection Summary

Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 3 (3%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.68
 Intersection Signal Delay: 10.8
 Intersection LOS: B
 Intersection Capacity Utilization 67.8%
 ICU Level of Service C
 Analysis Period (min) 15

Splits and Phases: 6: Highway 50 & Parr Boulevard/Private Driveway



HCM Signalized Intersection Capacity Analysis Future Background 2036 PM Synchro Model
 6: Highway 50 & Parr Boulevard/Private Driveway 01-28-2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	115	0	105	0	0	0	55	1821	0	0	1325	50
Future Volume (vph)	115	0	105	0	0	0	55	1821	0	0	1325	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5
Total Lost time (s)	6.9	6.9					3.0	6.1			6.1	6.1
Lane Util. Factor	1.00	1.00					1.00	0.95			0.95	1.00
Frt	1.00	0.85					1.00	1.00			1.00	0.85
Flt Protected	0.95	1.00					0.95	1.00			1.00	1.00
Satd. Flow (prot)	1767	1471					1463	3476			3476	1493
Flt Permitted	0.76	1.00					0.16	1.00			1.00	1.00
Satd. Flow (perm)	1409	1471					245	3476			3476	1493
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)	115	0	105	0	0	0	55	1821	0	0	1325	50
RTOR Reduction (vph)	0	92	0	0	0	0	0	0	0	0	0	15
Lane Group Flow (vph)	115	13	0	0	0	0	55	1821	0	0	1325	35
Heavy Vehicles (%)	1%	0%	11%	0%	0%	0%	22%	5%	0%	0%	5%	7%
Turn Type	Perm	NA					pm+pt	NA		Perm	NA	Perm
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	15.1	15.1					91.9	91.9			83.4	83.4
Effective Green, g (s)	15.1	15.1					91.9	91.9			83.4	83.4
Actuated g/C Ratio	0.13	0.13					0.77	0.77			0.70	0.70
Clearance Time (s)	6.9	6.9					3.0	6.1			6.1	6.1
Vehicle Extension (s)	3.0	3.0					3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	177	185					243	2662			2415	1037
v/s Ratio Prot		0.01					0.01	c0.52			0.38	
v/s Ratio Perm	c0.08						0.16					0.02
v/c Ratio	0.65	0.07					0.23	0.68			0.55	0.03
Uniform Delay, d1	49.9	46.3					5.4	6.9			9.0	5.7
Progression Factor	1.00	1.00					1.00	1.00			0.83	0.99
Incremental Delay, d2	8.0	0.2					0.5	1.4			0.8	0.1
Delay (s)	57.9	46.4					5.9	8.4			8.3	5.7
Level of Service	E	D					A	A			A	A
Approach Delay (s)		52.4			0.0			8.3			8.2	
Approach LOS		D			A			A			A	

Intersection Summary		
HCM 2000 Control Delay	11.1	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	0.70	B
Actuated Cycle Length (s)	120.0	Sum of lost time (s)
Intersection Capacity Utilization	67.8%	16.0
Analysis Period (min)	15	ICU Level of Service
		C

c Critical Lane Group

Timings

Future Background 2036 PM Synchro Model

7: Highway 50 & Mayfield Road/Albion Vaughan Road

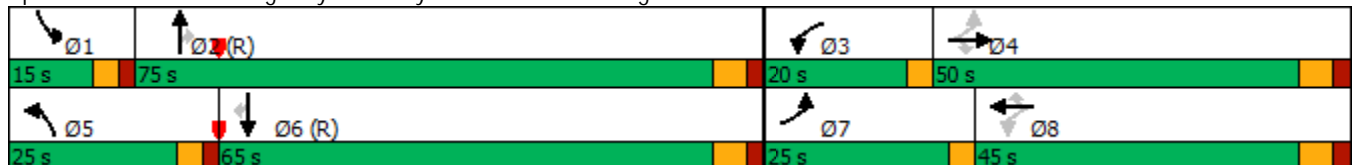
01-28-2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	125	210	105	185	105	25	95	1646	605	10	1300	120
Future Volume (vph)	125	210	105	185	105	25	95	1646	605	10	1300	120
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	12.0	12.0	10.0	12.0	12.0	10.0	20.0	20.0	10.0	20.0	20.0
Minimum Split (s)	8.0	39.5	39.5	13.0	39.5	39.5	15.0	37.3	37.3	15.0	37.3	37.3
Total Split (s)	25.0	50.0	50.0	20.0	45.0	45.0	25.0	75.0	75.0	15.0	65.0	65.0
Total Split (%)	15.6%	31.3%	31.3%	12.5%	28.1%	28.1%	15.6%	46.9%	46.9%	9.4%	40.6%	40.6%
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.2	4.2	3.0	4.2	4.2
All-Red Time (s)	0.0	2.5	2.5	0.0	2.5	2.5	2.0	2.1	2.1	2.0	2.1	2.1
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.0	6.5	6.5	3.0	6.5	6.5	5.0	6.3	6.3	5.0	6.3	6.3
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Min	C-Min	None	C-Min	C-Min
Act Effct Green (s)	42.7	24.9	24.9	46.3	26.9	26.9	19.3	96.9	96.9	10.0	78.6	78.6
Actuated g/C Ratio	0.27	0.16	0.16	0.29	0.17	0.17	0.12	0.61	0.61	0.06	0.49	0.49
v/c Ratio	0.34	0.78	0.41	0.70	0.39	0.07	0.71	0.79	0.55	0.09	0.75	0.15
Control Delay	43.8	84.1	12.7	58.5	62.9	0.4	94.1	29.7	6.8	72.8	38.2	3.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	43.8	84.1	12.7	58.5	62.9	0.4	94.1	29.7	6.8	72.8	38.2	3.8
LOS	D	F	B	E	E	A	F	C	A	E	D	A
Approach Delay		55.6			55.4			26.4			35.6	
Approach LOS		E			E			C			D	

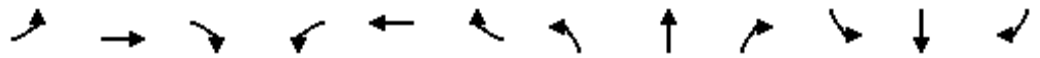
Intersection Summary

Cycle Length: 160
 Actuated Cycle Length: 160
 Offset: 72 (45%), Referenced to phase 2:NBT and 6:SBT, Start of Green
 Natural Cycle: 135
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.79
 Intersection Signal Delay: 34.1
 Intersection LOS: C
 Intersection Capacity Utilization 93.3%
 ICU Level of Service F
 Analysis Period (min) 15

Splits and Phases: 7: Highway 50 & Mayfield Road/Albion Vaughan Road



HCM Signalized Intersection Capacity Analysis Future Background 2036 PM Synchro Model
 7: Highway 50 & Mayfield Road/Albion Vaughan Road 01-28-2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↑	↗	↖	↑	↗	↖	↑↑	↗	↖	↑↑	↗
Traffic Volume (vph)	125	210	105	185	105	25	95	1646	605	10	1300	120
Future Volume (vph)	125	210	105	185	105	25	95	1646	605	10	1300	120
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5
Total Lost time (s)	3.0	6.5	6.5	3.0	6.5	6.5	5.0	6.3	6.3	5.0	6.3	6.3
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1684	1731	1044	1608	1601	1426	1109	3444	1493	1785	3510	1536
Flt Permitted	0.69	1.00	1.00	0.31	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1222	1731	1044	532	1601	1426	1109	3444	1493	1785	3510	1536
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)	125	210	105	185	105	25	95	1646	605	10	1300	120
RTOR Reduction (vph)	0	0	89	0	0	21	0	0	196	0	0	61
Lane Group Flow (vph)	125	210	16	185	105	4	95	1646	409	10	1300	59
Heavy Vehicles (%)	6%	11%	53%	11%	20%	12%	61%	6%	7%	0%	4%	4%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)	39.2	24.9	24.9	43.4	27.0	27.0	19.3	93.9	93.9	4.0	78.6	78.6
Effective Green, g (s)	39.2	24.9	24.9	43.4	27.0	27.0	19.3	93.9	93.9	4.0	78.6	78.6
Actuated g/C Ratio	0.25	0.16	0.16	0.27	0.17	0.17	0.12	0.59	0.59	0.02	0.49	0.49
Clearance Time (s)	3.0	6.5	6.5	3.0	6.5	6.5	5.0	6.3	6.3	5.0	6.3	6.3
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	340	269	162	254	270	240	133	2021	876	44	1724	754
v/s Ratio Prot	0.03	0.12		c0.07	0.07		c0.09	c0.48		0.01	0.37	
v/s Ratio Perm	0.06		0.02	c0.12		0.00			0.27			0.04
v/c Ratio	0.37	0.78	0.10	0.73	0.39	0.02	0.71	0.81	0.47	0.23	0.75	0.08
Uniform Delay, d1	49.3	64.9	57.9	48.7	59.2	55.4	67.7	26.2	18.8	76.5	32.9	21.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.7	13.6	0.3	10.0	0.9	0.0	16.6	3.7	1.8	2.6	3.1	0.2
Delay (s)	49.9	78.6	58.2	58.7	60.1	55.5	84.3	29.9	20.6	79.1	36.0	21.7
Level of Service	D	E	E	E	E	E	F	C	C	E	D	C
Approach Delay (s)		65.6			58.9			29.7			35.1	
Approach LOS		E			E			C			D	

Intersection Summary		
HCM 2000 Control Delay	36.9	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	0.81	D
Actuated Cycle Length (s)	160.0	Sum of lost time (s)
Intersection Capacity Utilization	93.3%	20.8
Analysis Period (min)	15	ICU Level of Service
		F

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis Future Background 2036 PM Synchro Model

8: Albion Vaughan Road & Kirby Road

01-28-2021



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	10	70	410	0	35	189
Future Volume (Veh/h)	10	70	410	0	35	189
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)	10	70	410	0	35	189
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	574	205			410	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	574	205			410	
tC, single (s)	7.0	7.0			4.2	
tC, 2 stage (s)						
tF (s)	3.6	3.3			2.2	
p0 queue free %	98	91			97	
cM capacity (veh/h)	415	795			1124	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	80	273	137	98	126	
Volume Left	10	0	0	35	0	
Volume Right	70	0	0	0	0	
cSH	713	1700	1700	1124	1700	
Volume to Capacity	0.11	0.16	0.08	0.03	0.07	
Queue Length 95th (m)	3.0	0.0	0.0	0.8	0.0	
Control Delay (s)	10.7	0.0	0.0	3.1	0.0	
Lane LOS	B			A		
Approach Delay (s)	10.7	0.0	1.4			
Approach LOS	B					
Intersection Summary						
Average Delay			1.6			
Intersection Capacity Utilization			32.5%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis Future Background 2036 PM Synchro Model
 11: George Bolton Parkway Extension & Industrial Road

01-28-2021



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	45	373	230	110	100	30
Future Volume (Veh/h)	45	373	230	110	100	30
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)	45	373	230	110	100	30
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		TWLTL	TWLTL			
Median storage veh		2	2			
Upstream signal (m)		279	285			
pX, platoon unblocked						
vC, conflicting volume	340				748	285
vC1, stage 1 conf vol					285	
vC2, stage 2 conf vol					463	
vCu, unblocked vol	340				748	285
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)	2.2				3.5	3.3
p0 queue free %	96				82	96
cM capacity (veh/h)	1230				554	759
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	418	340	130			
Volume Left	45	0	100			
Volume Right	0	110	30			
cSH	1230	1700	591			
Volume to Capacity	0.04	0.20	0.22			
Queue Length 95th (m)	0.9	0.0	6.7			
Control Delay (s)	1.2	0.0	12.8			
Lane LOS	A		B			
Approach Delay (s)	1.2	0.0	12.8			
Approach LOS			B			
Intersection Summary						
Average Delay			2.4			
Intersection Capacity Utilization			58.3%		ICU Level of Service	B
Analysis Period (min)			15			

Future Total Traffic Conditions 2036

Timings

1: Highway 50 & McEwan Drive West/McEwan Drive East



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations	↙	↗	↙↗	↑	↗	↙	↑↑	↗	↙	↗↘
Traffic Volume (vph)	80	45	80	105	50	145	804	65	60	1213
Future Volume (vph)	80	45	80	105	50	145	804	65	60	1213
Turn Type	pm+pt	NA	Prot	NA	Perm	pm+pt	NA	Perm	pm+pt	NA
Protected Phases	7	4	3	8		5	2		1	6
Permitted Phases	4				8	2		2	6	
Detector Phase	7	4	3	8	8	5	2	2	1	6
Switch Phase										
Minimum Initial (s)	5.0	8.0	8.0	8.0	8.0	5.0	8.0	8.0	5.0	8.0
Minimum Split (s)	8.0	35.0	13.0	35.0	35.0	8.0	34.6	34.6	8.0	34.6
Total Split (s)	8.0	30.0	16.0	38.0	38.0	15.0	66.0	66.0	8.0	59.0
Total Split (%)	6.7%	25.0%	13.3%	31.7%	31.7%	12.5%	55.0%	55.0%	6.7%	49.2%
Yellow Time (s)	3.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0
All-Red Time (s)	0.0	3.0	2.0	3.0	3.0	0.0	2.6	2.6	0.0	2.6
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.0	7.0	5.0	7.0	7.0	3.0	6.6	6.6	3.0	6.6
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	Min	None	Min	Min	None	C-Min	C-Min	None	C-Min
Act Effect Green (s)	22.1	12.3	8.8	15.5	15.5	86.3	75.4	75.4	79.1	69.4
Actuated g/C Ratio	0.18	0.10	0.07	0.13	0.13	0.72	0.63	0.63	0.66	0.58
v/c Ratio	0.31	0.46	0.34	0.45	0.17	0.58	0.38	0.07	0.14	0.69
Control Delay	38.7	18.9	56.5	52.2	1.2	17.2	14.8	3.0	8.1	22.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	38.7	18.9	56.5	52.2	1.2	17.2	14.8	3.0	8.1	22.5
LOS	D	B	E	D	A	B	B	A	A	C
Approach Delay		25.2		42.8			14.4			21.9
Approach LOS		C		D			B			C

Intersection Summary

Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 71 (59%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 105
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.69
 Intersection Signal Delay: 21.2
 Intersection LOS: C
 Intersection Capacity Utilization 80.9%
 ICU Level of Service D
 Analysis Period (min) 15

Splits and Phases: 1: Highway 50 & McEwan Drive West/McEwan Drive East



HCM Signalized Intersection Capacity Analysis
 1: Highway 50 & McEwan Drive West/McEwan Drive East

Future Total 2036 AM Synchro Model

01-28-2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	80	45	125	80	105	50	145	804	65	60	1213	145
Future Volume (vph)	80	45	125	80	105	50	145	804	65	60	1213	145
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5
Total Lost time (s)	3.0	7.0		5.0	7.0	7.0	3.0	6.6	6.6	3.0	6.6	
Lane Util. Factor	1.00	0.95		0.97	1.00	1.00	1.00	0.95	1.00	1.00	0.95	
Frbp, ped/bikes	1.00	0.99		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	0.89		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1716	2514		3236	1812	1536	1526	3411	1452	1638	3395	
Flt Permitted	0.69	1.00		0.95	1.00	1.00	0.12	1.00	1.00	0.34	1.00	
Satd. Flow (perm)	1245	2514		3236	1812	1536	185	3411	1452	581	3395	
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)	80	45	125	80	105	50	145	804	65	60	1213	145
RTOR Reduction (vph)	0	112	0	0	0	43	0	0	25	0	6	0
Lane Group Flow (vph)	80	58	0	80	105	7	145	804	40	60	1352	0
Confl. Peds. (#/hr)			5	5								
Heavy Vehicles (%)	4%	12%	33%	7%	6%	4%	17%	7%	10%	9%	6%	4%
Turn Type	pm+pt	NA		Prot	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4					8	2		2	6		
Actuated Green, G (s)	18.0	12.3		7.2	15.8	15.8	81.9	73.9	73.9	73.5	68.5	
Effective Green, g (s)	18.0	12.3		7.2	15.8	15.8	81.9	73.9	73.9	73.5	68.5	
Actuated g/C Ratio	0.15	0.10		0.06	0.13	0.13	0.68	0.62	0.62	0.61	0.57	
Clearance Time (s)	3.0	7.0		5.0	7.0	7.0	3.0	6.6	6.6	3.0	6.6	
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)	209	257		194	238	202	242	2100	894	399	1937	
v/s Ratio Prot	0.02	0.02		c0.02	c0.06		c0.05	0.24		0.01	c0.40	
v/s Ratio Perm	0.04					0.00	0.36		0.03	0.09		
v/c Ratio	0.38	0.22		0.41	0.44	0.03	0.60	0.38	0.04	0.15	0.70	
Uniform Delay, d1	45.5	49.5		54.4	48.0	45.4	13.7	11.6	9.1	9.4	18.4	
Progression Factor	1.00	1.00		1.00	1.00	1.00	0.81	1.10	1.00	1.00	1.00	
Incremental Delay, d2	1.2	0.4		1.4	1.3	0.1	3.8	0.5	0.1	0.2	2.1	
Delay (s)	46.6	49.9		55.8	49.3	45.5	14.9	13.2	9.2	9.5	20.5	
Level of Service	D	D		E	D	D	B	B	A	A	C	
Approach Delay (s)		48.9			50.7			13.2			20.0	
Approach LOS		D			D			B			C	
Intersection Summary												
HCM 2000 Control Delay			22.6								HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.65									
Actuated Cycle Length (s)			120.0								Sum of lost time (s)	21.6
Intersection Capacity Utilization			80.9%								ICU Level of Service	D
Analysis Period (min)			15									
c	Critical Lane Group											

HCM Unsignalized Intersection Capacity Analysis
2: Highway 50 & Industrial Road

Future Total 2036 AM Synchro Model
01-28-2021



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↗	↕↗			↕↖
Traffic Volume (veh/h)	0	60	989	55	0	1588
Future Volume (Veh/h)	0	60	989	55	0	1588
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	60	989	55	0	1588
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage veh			2			2
Upstream signal (m)			160			
pX, platoon unblocked	0.85	0.85			0.85	
vC, conflicting volume	1810	522			1044	
vC1, stage 1 conf vol	1016					
vC2, stage 2 conf vol	794					
vCu, unblocked vol	1597	77			693	
tC, single (s)	7.0	7.3			4.1	
tC, 2 stage (s)	6.0					
tF (s)	3.6	3.5			2.2	
p0 queue free %	100	92			100	
cM capacity (veh/h)	276	774			773	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	60	659	385	794	794	
Volume Left	0	0	0	0	0	
Volume Right	60	0	55	0	0	
cSH	774	1700	1700	1700	1700	
Volume to Capacity	0.08	0.39	0.23	0.47	0.47	
Queue Length 95th (m)	2.0	0.0	0.0	0.0	0.0	
Control Delay (s)	10.0	0.0	0.0	0.0	0.0	
Lane LOS	B					
Approach Delay (s)	10.0	0.0		0.0		
Approach LOS	B					
Intersection Summary						
Average Delay			0.2			
Intersection Capacity Utilization			47.2%		ICU Level of Service	A
Analysis Period (min)			15			

Timings

3: Highway 50 & George Bolton Parkway/George Bolton Parkway Extension

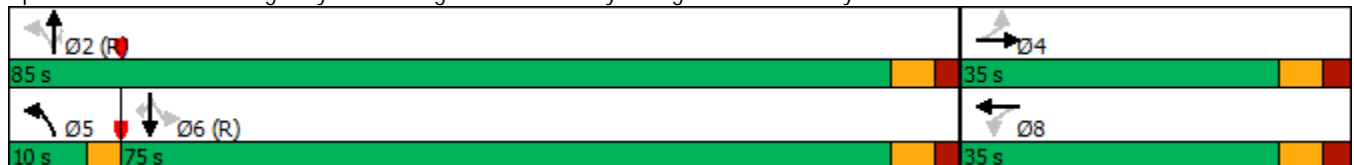


Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗	↖	↗	↖	↑↑	↗	↖	↑↑	↗
Traffic Volume (vph)	25	23	350	239	75	904	165	40	1398	85
Future Volume (vph)	25	23	350	239	75	904	165	40	1398	85
Turn Type	Perm	NA	Perm	NA	pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases		4		8	5	2			6	
Permitted Phases	4		8		2		2	6		6
Detector Phase	4	4	8	8	5	2	2	6	6	6
Switch Phase										
Minimum Initial (s)	8.0	8.0	8.0	8.0	5.0	12.0	12.0	12.0	12.0	12.0
Minimum Split (s)	32.6	32.6	32.6	32.6	8.0	27.3	27.3	27.3	27.3	27.3
Total Split (s)	35.0	35.0	35.0	35.0	10.0	85.0	85.0	75.0	75.0	75.0
Total Split (%)	29.2%	29.2%	29.2%	29.2%	8.3%	70.8%	70.8%	62.5%	62.5%	62.5%
Yellow Time (s)	4.0	4.0	4.0	4.0	3.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.6	2.6	2.6	2.6	0.0	2.3	2.3	2.3	2.3	2.3
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.6	6.6	6.6	6.6	3.0	6.3	6.3	6.3	6.3	6.3
Lead/Lag					Lead			Lag	Lag	Lag
Lead-Lag Optimize?					Yes			Yes	Yes	Yes
Recall Mode	None	None	None	None	None	C-Min	C-Min	C-Min	C-Min	C-Min
Act Effect Green (s)	38.2	38.2	38.2	38.2	72.2	68.9	68.9	60.9	60.9	60.9
Actuated g/C Ratio	0.32	0.32	0.32	0.32	0.60	0.57	0.57	0.51	0.51	0.51
v/c Ratio	0.08	0.17	0.83	0.39	0.46	0.46	0.17	0.14	0.79	0.10
Control Delay	34.1	14.7	58.6	38.4	24.3	13.5	1.4	8.4	23.9	2.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.1	14.7	58.6	38.4	24.3	13.5	1.4	8.4	23.9	2.5
LOS	C	B	E	D	C	B	A	A	C	A
Approach Delay		19.4		50.4		12.4			22.3	
Approach LOS		B		D		B			C	

Intersection Summary

Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 113 (94%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.83
 Intersection Signal Delay: 23.8
 Intersection Capacity Utilization 83.0%
 Analysis Period (min) 15
 Intersection LOS: C
 ICU Level of Service E

Splits and Phases: 3: Highway 50 & George Bolton Parkway/George Bolton Parkway Extension

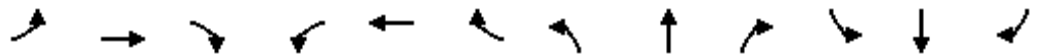


HCM Signalized Intersection Capacity Analysis

Future Total 2036 AM Synchro Model

3: Highway 50 & George Bolton Parkway/George Bolton Parkway Extension

01-28-2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↑↑	↗	↖	↑↑	↗
Traffic Volume (vph)	25	23	55	350	239	0	75	904	165	40	1398	85
Future Volume (vph)	25	23	55	350	239	0	75	904	165	40	1398	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5
Total Lost time (s)	6.6	6.6		6.6	6.6		3.0	6.3	6.3	6.3	6.3	6.3
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95	1.00	1.00	0.95	1.00
Fr _t	1.00	0.89		1.00	1.00		1.00	1.00	0.85	1.00	1.00	0.85
Fl _t Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1733	1340		1785	1921		1623	3411	1597	1785	3476	1597
Fl _t Permitted	0.52	1.00		0.71	1.00		0.08	1.00	1.00	0.30	1.00	1.00
Satd. Flow (perm)	940	1340		1327	1921		131	3411	1597	558	3476	1597
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)	25	23	55	350	239	0	75	904	165	40	1398	85
RTOR Reduction (vph)	0	37	0	0	0	0	0	0	70	0	0	30
Lane Group Flow (vph)	25	41	0	350	239	0	75	904	95	40	1398	55
Heavy Vehicles (%)	3%	0%	40%	0%	0%	0%	10%	7%	0%	0%	5%	0%
Turn Type	Perm	NA		Perm	NA		pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	38.2	38.2		38.2	38.2		68.9	68.9	68.9	60.3	60.3	60.3
Effective Green, g (s)	38.2	38.2		38.2	38.2		68.9	68.9	68.9	60.3	60.3	60.3
Actuated g/C Ratio	0.32	0.32		0.32	0.32		0.57	0.57	0.57	0.50	0.50	0.50
Clearance Time (s)	6.6	6.6		6.6	6.6		3.0	6.3	6.3	6.3	6.3	6.3
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)	299	426		422	611		144	1958	916	280	1746	802
v/s Ratio Prot		0.03			0.12		c0.02	0.27			c0.40	
v/s Ratio Perm	0.03			c0.26			0.27		0.06	0.07		0.03
v/c Ratio	0.08	0.10		0.83	0.39		0.52	0.46	0.10	0.14	0.80	0.07
Uniform Delay, d ₁	28.6	28.8		37.9	31.8		19.2	14.8	11.6	16.0	24.8	15.4
Progression Factor	1.00	1.00		1.03	1.06		1.73	0.89	0.84	0.51	0.86	0.46
Incremental Delay, d ₂	0.1	0.1		12.5	0.4		3.2	0.7	0.2	0.9	3.4	0.1
Delay (s)	28.8	28.8		51.6	34.0		36.4	13.9	10.0	9.1	24.7	7.2
Level of Service	C	C		D	C		D	B	A	A	C	A
Approach Delay (s)		28.8			44.5			14.8			23.3	
Approach LOS		C			D			B			C	

Intersection Summary

HCM 2000 Control Delay	24.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	15.9
Intersection Capacity Utilization	83.0%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
4: Albion Vaughan Road & Commercial Road

Future Total 2036 AM Synchro Model
01-28-2021



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	25	5	25	333	787	150
Future Volume (Veh/h)	25	5	25	333	787	150
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)	25	5	25	333	787	150
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)	251					
pX, platoon unblocked						
vC, conflicting volume	1078	468	937			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1078	468	937			
tC, single (s)	7.4	7.6	4.2			
tC, 2 stage (s)						
tF (s)	3.8	3.6	2.3			
p0 queue free %	85	99	96			
cM capacity (veh/h)	168	465	697			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	30	136	222	525	412	
Volume Left	25	25	0	0	0	
Volume Right	5	0	0	0	150	
cSH	188	697	1700	1700	1700	
Volume to Capacity	0.16	0.04	0.13	0.31	0.24	
Queue Length 95th (m)	4.4	0.9	0.0	0.0	0.0	
Control Delay (s)	27.8	2.2	0.0	0.0	0.0	
Lane LOS	D	A				
Approach Delay (s)	27.8	0.8		0.0		
Approach LOS	D					
Intersection Summary						
Average Delay	0.9					
Intersection Capacity Utilization	38.2%			ICU Level of Service	A	
Analysis Period (min)	15					

Timings
5: Albion Vaughan Road & Industrial Road

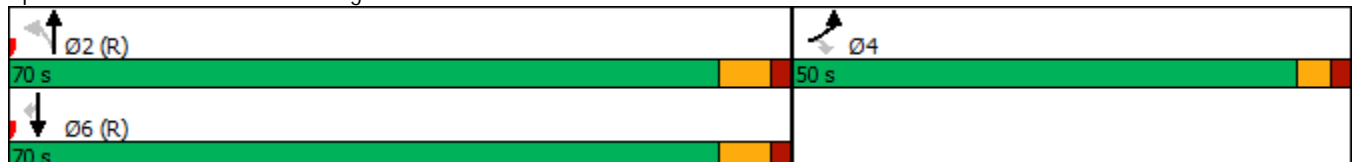


Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↖	↗	↖	↑↑	↑↑	↗
Traffic Volume (vph)	228	140	55	135	318	474
Future Volume (vph)	228	140	55	135	318	474
Turn Type	Prot	Perm	Perm	NA	NA	Perm
Protected Phases	4			2	6	
Permitted Phases		4	2			6
Detector Phase	4	4	2	2	6	6
Switch Phase						
Minimum Initial (s)	5.0	5.0	7.0	7.0	7.0	7.0
Minimum Split (s)	30.0	30.0	31.6	31.6	31.6	31.6
Total Split (s)	50.0	50.0	70.0	70.0	70.0	70.0
Total Split (%)	41.7%	41.7%	58.3%	58.3%	58.3%	58.3%
Yellow Time (s)	3.0	3.0	4.6	4.6	4.6	4.6
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	6.6	6.6	6.6	6.6
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	C-Min	C-Min	C-Min	C-Min
Act Effct Green (s)	24.3	24.3	84.1	84.1	84.1	84.1
Actuated g/C Ratio	0.20	0.20	0.70	0.70	0.70	0.70
v/c Ratio	0.77	0.36	0.09	0.06	0.13	0.39
Control Delay	62.8	10.6	7.7	6.7	6.8	1.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	62.8	10.6	7.7	6.7	6.8	1.7
LOS	E	B	A	A	A	A
Approach Delay	43.0			7.0	3.8	
Approach LOS	D			A	A	

Intersection Summary

Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green
 Natural Cycle: 65
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.77
 Intersection Signal Delay: 14.9
 Intersection LOS: B
 Intersection Capacity Utilization 46.2%
 ICU Level of Service A
 Analysis Period (min) 15

Splits and Phases: 5: Albion Vaughan Road & Industrial Road



HCM Signalized Intersection Capacity Analysis
5: Albion Vaughan Road & Industrial Road

Future Total 2036 AM Synchro Model
01-28-2021



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	228	140	55	135	318	474
Future Volume (vph)	228	140	55	135	318	474
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.7	3.7	3.5
Total Lost time (s)	5.0	5.0	6.6	6.6	6.6	6.6
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1475	1377	1513	3147	3544	1536
Flt Permitted	0.95	1.00	0.56	1.00	1.00	1.00
Satd. Flow (perm)	1475	1377	890	3147	3544	1536
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	228	140	55	135	318	474
RTOR Reduction (vph)	0	112	0	0	0	142
Lane Group Flow (vph)	228	28	55	135	318	332
Heavy Vehicles (%)	21%	16%	18%	16%	3%	4%
Turn Type	Prot	Perm	Perm	NA	NA	Perm
Protected Phases	4			2	6	
Permitted Phases		4	2			6
Actuated Green, G (s)	24.3	24.3	84.1	84.1	84.1	84.1
Effective Green, g (s)	24.3	24.3	84.1	84.1	84.1	84.1
Actuated g/C Ratio	0.20	0.20	0.70	0.70	0.70	0.70
Clearance Time (s)	5.0	5.0	6.6	6.6	6.6	6.6
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	298	278	623	2205	2483	1076
v/s Ratio Prot	c0.15			0.04	0.09	
v/s Ratio Perm		0.02	0.06			c0.22
v/c Ratio	0.77	0.10	0.09	0.06	0.13	0.31
Uniform Delay, d1	45.2	39.0	5.7	5.6	5.9	6.9
Progression Factor	1.04	1.39	1.00	1.00	1.00	1.00
Incremental Delay, d2	11.1	0.2	0.3	0.1	0.1	0.7
Delay (s)	57.9	54.5	6.0	5.7	6.0	7.6
Level of Service	E	D	A	A	A	A
Approach Delay (s)	56.6			5.8	7.0	
Approach LOS	E			A	A	

Intersection Summary

HCM 2000 Control Delay	20.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	11.6
Intersection Capacity Utilization	46.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Timings
6: Highway 50 & Parr Boulevard/Private Driveway

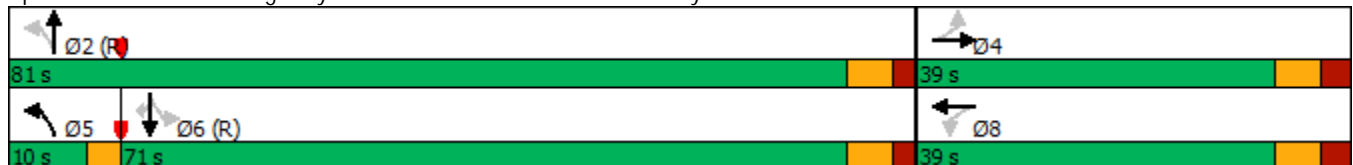


Lane Group	EBL	EBT	NBL	NBT	SBT	SBR	Ø8
Lane Configurations	↶	↷	↶	↶↷	↶↷	↷	
Traffic Volume (vph)	45	0	120	1149	1538	110	
Future Volume (vph)	45	0	120	1149	1538	110	
Turn Type	Perm	NA	pm+pt	NA	NA	Perm	
Protected Phases		4	5	2	6		8
Permitted Phases	4		2			6	
Detector Phase	4	4	5	2	6	6	
Switch Phase							
Minimum Initial (s)	8.0	8.0	5.0	12.0	12.0	12.0	8.0
Minimum Split (s)	33.9	33.9	8.0	30.1	30.1	30.1	33.9
Total Split (s)	39.0	39.0	10.0	81.0	71.0	71.0	39.0
Total Split (%)	32.5%	32.5%	8.3%	67.5%	59.2%	59.2%	33%
Yellow Time (s)	4.0	4.0	3.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.9	2.9	0.0	2.1	2.1	2.1	2.9
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.9	6.9	3.0	6.1	6.1	6.1	
Lead/Lag			Lead		Lag	Lag	
Lead-Lag Optimize?			Yes		Yes	Yes	
Recall Mode	None	None	None	C-Min	C-Min	C-Min	None
Act Effect Green (s)	10.0	10.0	103.0	101.2	87.6	87.6	
Actuated g/C Ratio	0.08	0.08	0.86	0.84	0.73	0.73	
v/c Ratio	0.41	0.22	0.40	0.40	0.63	0.10	
Control Delay	62.4	2.3	6.0	3.6	13.7	5.4	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	62.4	2.3	6.0	3.6	13.7	5.4	
LOS	E	A	A	A	B	A	
Approach Delay		30.8		3.8	13.2		
Approach LOS		C		A	B		

Intersection Summary

Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 8 (7%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.63
 Intersection Signal Delay: 9.8
 Intersection Capacity Utilization 70.0%
 Analysis Period (min) 15
 Intersection LOS: A
 ICU Level of Service C






















Splits and Phases: 6: Highway 50 & Parr Boulevard/Private Driveway



HCM Signalized Intersection Capacity Analysis
6: Highway 50 & Parr Boulevard/Private Driveway

Future Total 2036 AM Synchro Model

01-28-2021

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	45	0	50	0	0	0	120	1149	0	0	1538	110
Future Volume (vph)	45	0	50	0	0	0	120	1149	0	0	1538	110
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5
Total Lost time (s)	6.9	6.9					3.0	6.1			6.1	6.1
Lane Util. Factor	1.00	1.00					1.00	0.95			0.95	1.00
Frt	1.00	0.85					1.00	1.00			1.00	0.85
Flt Protected	0.95	1.00					0.95	1.00			1.00	1.00
Satd. Flow (prot)	1668	1306					1684	3380			3349	1551
Flt Permitted	0.76	1.00					0.12	1.00			1.00	1.00
Satd. Flow (perm)	1330	1306					215	3380			3349	1551
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	0	50	0	0	0	120	1149	0	0	1538	110
RTOR Reduction (vph)	0	47	0	0	0	0	0	0	0	0	0	18
Lane Group Flow (vph)	45	4	0	0	0	0	120	1149	0	0	1538	92
Heavy Vehicles (%)	7%	0%	25%	0%	0%	50%	6%	8%	0%	0%	9%	3%
Turn Type	Perm	NA					pm+pt	NA		Perm	NA	Perm
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	8.4	8.4					98.6	98.6			86.3	86.3
Effective Green, g (s)	8.4	8.4					98.6	98.6			86.3	86.3
Actuated g/C Ratio	0.07	0.07					0.82	0.82			0.72	0.72
Clearance Time (s)	6.9	6.9					3.0	6.1			6.1	6.1
Vehicle Extension (s)	3.0	3.0					3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	93	91					290	2777			2408	1115
v/s Ratio Prot		0.00					0.03	c0.34			c0.46	
v/s Ratio Perm	c0.03						0.31					0.06
v/c Ratio	0.48	0.04					0.41	0.41			0.64	0.08
Uniform Delay, d1	53.7	52.0					6.2	2.9			8.8	5.0
Progression Factor	1.00	1.00					1.00	1.00			1.30	1.59
Incremental Delay, d2	3.9	0.2					1.0	0.5			0.9	0.1
Delay (s)	57.6	52.2					7.2	3.3			12.3	8.1
Level of Service	E	D					A	A			B	A
Approach Delay (s)		54.8			0.0			3.7			12.0	
Approach LOS		D			A			A			B	
Intersection Summary												
HCM 2000 Control Delay			9.8				HCM 2000 Level of Service				A	
HCM 2000 Volume to Capacity ratio			0.61									
Actuated Cycle Length (s)			120.0				Sum of lost time (s)				16.0	
Intersection Capacity Utilization			70.0%				ICU Level of Service				C	
Analysis Period (min)			15									

c Critical Lane Group

Timings

Future Total 2036 AM Synchro Model

7: Highway 50 & Mayfield Road/Albion Vaughan Road

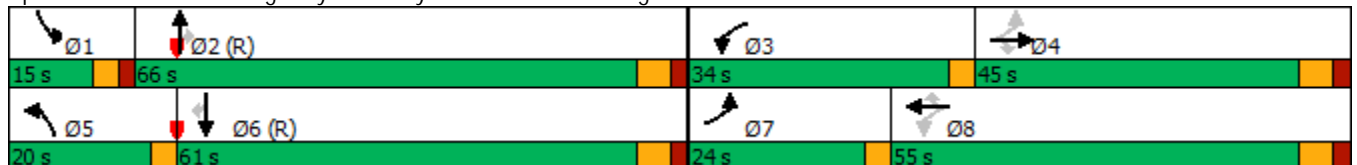
01-28-2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	115	115	145	450	370	15	105	1154	160	5	1413	160
Future Volume (vph)	115	115	145	450	370	15	105	1154	160	5	1413	160
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	12.0	12.0	10.0	12.0	12.0	10.0	20.0	20.0	10.0	20.0	20.0
Minimum Split (s)	8.0	39.5	39.5	13.0	39.5	39.5	13.0	37.3	37.3	15.0	37.3	37.3
Total Split (s)	24.0	45.0	45.0	34.0	55.0	55.0	20.0	66.0	66.0	15.0	61.0	61.0
Total Split (%)	15.0%	28.1%	28.1%	21.3%	34.4%	34.4%	12.5%	41.3%	41.3%	9.4%	38.1%	38.1%
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.2	4.2	3.0	4.2	4.2
All-Red Time (s)	0.0	2.5	2.5	0.0	2.5	2.5	0.0	2.1	2.1	2.0	2.1	2.1
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.0	6.5	6.5	3.0	6.5	6.5	3.0	6.3	6.3	5.0	6.3	6.3
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Min	C-Min	None	C-Min	C-Min
Act Effct Green (s)	39.6	22.5	22.5	60.0	39.9	39.9	19.5	87.7	87.7	10.0	68.2	68.2
Actuated g/C Ratio	0.25	0.14	0.14	0.38	0.25	0.25	0.12	0.55	0.55	0.06	0.43	0.43
v/c Ratio	0.49	0.53	0.57	0.90	0.84	0.04	0.73	0.62	0.19	0.05	0.95	0.23
Control Delay	40.5	70.4	16.6	64.7	74.3	0.1	95.4	29.1	4.3	72.0	57.9	11.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	40.5	70.4	16.6	64.7	74.3	0.1	95.4	29.1	4.3	72.0	57.9	11.2
LOS	D	E	B	E	E	A	F	C	A	E	E	B
Approach Delay		40.4			67.8			31.2			53.2	
Approach LOS		D			E			C			D	

Intersection Summary

























Cycle Length: 160	
Actuated Cycle Length: 160	
Offset: 27 (17%), Referenced to phase 2:NBT and 6:SBT, Start of Green	
Natural Cycle: 115	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.95	
Intersection Signal Delay: 47.6	Intersection LOS: D
Intersection Capacity Utilization 99.7%	ICU Level of Service F
Analysis Period (min) 15	

Splits and Phases: 7: Highway 50 & Mayfield Road/Albion Vaughan Road



HCM Signalized Intersection Capacity Analysis
7: Highway 50 & Mayfield Road/Albion Vaughan Road

Future Total 2036 AM Synchro Model
01-28-2021

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	115	115	145	450	370	15	105	1154	160	5	1413	160
Future Volume (vph)	115	115	145	450	370	15	105	1154	160	5	1413	160
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5
Total Lost time (s)	3.0	6.5	6.5	3.0	6.5	6.5	3.0	6.3	6.3	5.0	6.3	6.3
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	*1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1594	1549	929	1700	1762	1413	1174	3411	1401	1539	3493	1479
Flt Permitted	0.37	1.00	1.00	0.53	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	618	1549	929	940	1762	1413	1174	3411	1401	1539	3493	1479
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)	115	115	145	450	370	15	105	1154	160	5	1413	160
RTOR Reduction (vph)	0	0	125	0	0	11	0	0	76	0	0	68
Lane Group Flow (vph)	115	115	20	450	370	4	105	1154	84	5	1413	92
Heavy Vehicles (%)	12%	24%	72%	5%	9%	13%	52%	7%	14%	16%	10%	8%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)	36.1	22.5	22.5	56.5	39.9	39.9	19.5	83.7	83.7	2.0	68.2	68.2
Effective Green, g (s)	36.1	22.5	22.5	56.5	39.9	39.9	19.5	83.7	83.7	2.0	68.2	68.2
Actuated g/C Ratio	0.23	0.14	0.14	0.35	0.25	0.25	0.12	0.52	0.52	0.01	0.43	0.43
Clearance Time (s)	3.0	6.5	6.5	3.0	6.5	6.5	3.0	6.3	6.3	5.0	6.3	6.3
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	222	217	130	479	439	352	143	1784	732	19	1488	630
v/s Ratio Prot	0.04	0.07		c0.18	0.21		c0.09	0.34		0.00	c0.40	
v/s Ratio Perm	0.07		0.02	c0.15		0.00			0.06			0.06
v/c Ratio	0.52	0.53	0.16	0.94	0.84	0.01	0.73	0.65	0.11	0.26	0.95	0.15
Uniform Delay, d1	51.9	63.8	60.4	46.9	57.1	45.2	67.8	27.5	19.4	78.3	44.2	28.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.0	2.3	0.6	26.3	13.7	0.0	17.6	1.8	0.3	7.3	14.1	0.5
Delay (s)	53.9	66.2	61.0	73.3	70.8	45.2	85.4	29.3	19.7	85.6	58.3	28.6
Level of Service	D	E	E	E	E	D	F	C	B	F	E	C
Approach Delay (s)		60.4			71.7			32.4			55.4	
Approach LOS		E			E			C			E	
Intersection Summary												
HCM 2000 Control Delay			51.3			HCM 2000 Level of Service			D			
HCM 2000 Volume to Capacity ratio			0.95									
Actuated Cycle Length (s)			160.0	Sum of lost time (s)				20.8				
Intersection Capacity Utilization			99.7%	ICU Level of Service			F					
Analysis Period (min)			15									

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
8: Albion Vaughan Road & Kirby Road

Future Total 2036 AM Synchro Model
01-28-2021



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	5	25	145	5	60	433
Future Volume (Veh/h)	5	25	145	5	60	433
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)	5	25	145	5	60	433
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	484	75			150	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	484	75			150	
tC, single (s)	7.5	7.3			4.1	
tC, 2 stage (s)						
tF (s)	3.8	3.5			2.2	
p0 queue free %	99	97			96	
cM capacity (veh/h)	423	916			1436	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	30	97	53	204	289	
Volume Left	5	0	0	60	0	
Volume Right	25	0	5	0	0	
cSH	767	1700	1700	1436	1700	
Volume to Capacity	0.04	0.06	0.03	0.04	0.17	
Queue Length 95th (m)	1.0	0.0	0.0	1.0	0.0	
Control Delay (s)	9.9	0.0	0.0	2.5	0.0	
Lane LOS	A			A		
Approach Delay (s)	9.9	0.0		1.0		
Approach LOS	A					
Intersection Summary						
Average Delay			1.2			
Intersection Capacity Utilization			31.2%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
9: Highway 50 & Site Access

Future Total 2036 AM Synchro Model
01-28-2021



Movement	WBL	WBR	NBT	NBR	SBL	SBT	
Lane Configurations							
Traffic Volume (veh/h)	40	125	984	65	25	1568	
Future Volume (Veh/h)	40	125	984	65	25	1568	
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)	40	125	984	65	25	1568	
Pedestrians							
Lane Width (m)							
Walking Speed (m/s)							
Percent Blockage							
Right turn flare (veh)							
Median type	TWLTL			TWLTL			
Median storage veh	2			2			
Upstream signal (m)	331			311			
pX, platoon unblocked	0.80	0.86			0.86		
vC, conflicting volume	1850	524			1049		
vC1, stage 1 conf vol	1016						
vC2, stage 2 conf vol	834						
vCu, unblocked vol	769	121			731		
tC, single (s)	6.8	6.9			4.1		
tC, 2 stage (s)	5.8						
tF (s)	3.5	3.3			2.2		
p0 queue free %	89	84			97		
cM capacity (veh/h)	380	785			759		
Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	40	125	656	393	25	784	784
Volume Left	40	0	0	0	25	0	0
Volume Right	0	125	0	65	0	0	0
cSH	380	785	1700	1700	759	1700	1700
Volume to Capacity	0.11	0.16	0.39	0.23	0.03	0.46	0.46
Queue Length 95th (m)	2.8	4.5	0.0	0.0	0.8	0.0	0.0
Control Delay (s)	15.6	10.4	0.0	0.0	9.9	0.0	0.0
Lane LOS	C	B			A		
Approach Delay (s)	11.7	0.0		0.2			
Approach LOS	B						
Intersection Summary							
Average Delay			0.8				
Intersection Capacity Utilization			53.3%		ICU Level of Service		A
Analysis Period (min)			15				

HCM Unsignalized Intersection Capacity Analysis
 10: Industrial Road & Site Access

Future Total 2036 AM Synchro Model
 01-28-2021



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↶	↷		↘	
Traffic Volume (veh/h)	30	25	30	55	305	30
Future Volume (Veh/h)	30	25	30	55	305	30
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)	30	25	30	55	305	30
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	85				142	58
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	85				142	58
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	98				64	97
cM capacity (veh/h)	1524				838	1014
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	55	85	335			
Volume Left	30	0	305			
Volume Right	0	55	30			
cSH	1524	1700	851			
Volume to Capacity	0.02	0.05	0.39			
Queue Length 95th (m)	0.5	0.0	15.1			
Control Delay (s)	4.1	0.0	11.9			
Lane LOS	A		B			
Approach Delay (s)	4.1	0.0	11.9			
Approach LOS			B			
Intersection Summary						
Average Delay			8.9			
Intersection Capacity Utilization		35.0%		ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
 11: George Bolton Parkway Extension & Industrial Road

Future Total 2036 AM Synchro Model
 01-28-2021



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↔		↙	↘
Traffic Volume (veh/h)	40	188	384	115	195	205
Future Volume (Veh/h)	40	188	384	115	195	205
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)	40	188	384	115	195	205
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		TWLTL	TWLTL			
Median storage veh		2	2			
Upstream signal (m)		290	274			
pX, platoon unblocked						
vC, conflicting volume	499				710	442
vC1, stage 1 conf vol					442	
vC2, stage 2 conf vol					268	
vCu, unblocked vol	499				710	442
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)	2.2				3.5	3.3
p0 queue free %	96				66	67
cM capacity (veh/h)	1075				577	620
Direction, Lane #						
	EB 1	WB 1	SB 1			
Volume Total	228	499	400			
Volume Left	40	0	195			
Volume Right	0	115	205			
cSH	1075	1700	598			
Volume to Capacity	0.04	0.29	0.67			
Queue Length 95th (m)	0.9	0.0	40.3			
Control Delay (s)	1.8	0.0	22.3			
Lane LOS	A		C			
Approach Delay (s)	1.8	0.0	22.3			
Approach LOS			C			
Intersection Summary						
Average Delay			8.3			
Intersection Capacity Utilization			72.7%	ICU Level of Service		C
Analysis Period (min)			15			

Timings

1: Highway 50 & McEwan Drive West/McEwan Drive East

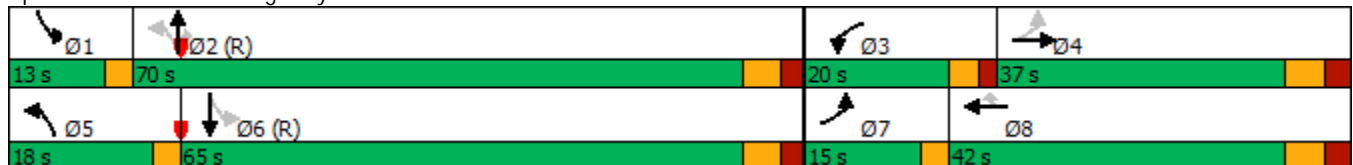


Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations	↖	↗	↖↗	↖	↗	↖	↗↗	↗	↖	↗↗
Traffic Volume (vph)	225	110	165	95	230	125	1455	185	100	911
Future Volume (vph)	225	110	165	95	230	125	1455	185	100	911
Turn Type	pm+pt	NA	Prot	NA	Perm	pm+pt	NA	Perm	pm+pt	NA
Protected Phases	7	4	3	8		5	2		1	6
Permitted Phases	4				8	2		2	6	
Detector Phase	7	4	3	8	8	5	2	2	1	6
Switch Phase										
Minimum Initial (s)	5.0	8.0	8.0	8.0	8.0	5.0	8.0	8.0	5.0	8.0
Minimum Split (s)	8.0	35.0	13.0	35.0	35.0	8.0	34.6	34.6	8.0	34.6
Total Split (s)	15.0	37.0	20.0	42.0	42.0	18.0	70.0	70.0	13.0	65.0
Total Split (%)	10.7%	26.4%	14.3%	30.0%	30.0%	12.9%	50.0%	50.0%	9.3%	46.4%
Yellow Time (s)	3.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0
All-Red Time (s)	0.0	3.0	2.0	3.0	3.0	0.0	2.6	2.6	0.0	2.6
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.0	7.0	5.0	7.0	7.0	3.0	6.6	6.6	3.0	6.6
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	Min	None	Min	Min	None	C-Min	C-Min	None	C-Min
Act Effect Green (s)	34.2	15.5	12.0	13.5	13.5	94.5	81.2	81.2	94.5	81.2
Actuated g/C Ratio	0.24	0.11	0.09	0.10	0.10	0.68	0.58	0.58	0.68	0.58
v/c Ratio	0.64	0.62	0.57	0.54	0.71	0.40	0.71	0.19	0.42	0.49
Control Delay	53.9	25.4	69.0	70.5	25.8	11.7	24.5	6.9	13.1	18.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	53.9	25.4	69.0	70.5	25.8	11.7	24.5	6.9	13.1	18.8
LOS	D	C	E	E	C	B	C	A	B	B
Approach Delay		36.9		49.0			21.7			18.3
Approach LOS		D		D			C			B

Intersection Summary

Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 72 (51%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 105
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.71
 Intersection Signal Delay: 26.4
 Intersection LOS: C
 Intersection Capacity Utilization 82.9%
 ICU Level of Service E
 Analysis Period (min) 15

Splits and Phases: 1: Highway 50 & McEwan Drive West/McEwan Drive East

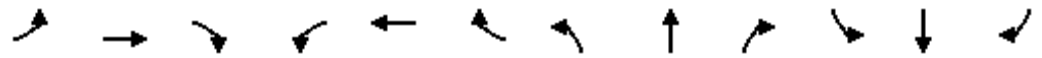


HCM Signalized Intersection Capacity Analysis

Future Total 2036 PM Synchro Model

1: Highway 50 & McEwan Drive West/McEwan Drive East

01-28-2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗	↖	↖	↗	↖	↖	↗	↖
Traffic Volume (vph)	225	110	225	165	95	230	125	1455	185	100	911	75
Future Volume (vph)	225	110	225	165	95	230	125	1455	185	100	911	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5
Total Lost time (s)	3.0	7.0		5.0	7.0	7.0	3.0	6.6	6.6	3.0	6.6	
Lane Util. Factor	1.00	0.95		0.97	1.00	1.00	1.00	0.95	1.00	1.00	0.95	
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	0.90		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1785	3096		3395	1830	1581	1439	3544	1566	1785	3500	
Flt Permitted	0.60	1.00		0.95	1.00	1.00	0.23	1.00	1.00	0.10	1.00	
Satd. Flow (perm)	1127	3096		3395	1830	1581	346	3544	1566	185	3500	
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)	225	110	225	165	95	230	125	1455	185	100	911	75
RTOR Reduction (vph)	0	195	0	0	0	171	0	0	47	0	3	0
Lane Group Flow (vph)	225	140	0	165	95	59	125	1455	138	100	983	0
Confl. Peds. (#/hr)							5					5
Heavy Vehicles (%)	0%	4%	7%	2%	5%	1%	24%	3%	2%	0%	3%	1%
Turn Type	pm+pt	NA		Prot	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4					8	2		2	6		
Actuated Green, G (s)	31.7	15.6		12.0	13.5	13.5	90.8	81.1	81.1	90.8	81.1	
Effective Green, g (s)	31.7	15.6		12.0	13.5	13.5	90.8	81.1	81.1	90.8	81.1	
Actuated g/C Ratio	0.23	0.11		0.09	0.10	0.10	0.65	0.58	0.58	0.65	0.58	
Clearance Time (s)	3.0	7.0		5.0	7.0	7.0	3.0	6.6	6.6	3.0	6.6	
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)	330	344		291	176	152	300	2052	907	230	2027	
v/s Ratio Prot	c0.08	0.05		0.05	0.05		0.03	c0.41		c0.03	0.28	
v/s Ratio Perm	c0.08					0.04	0.24		0.09	0.25		
v/c Ratio	0.68	0.41		0.57	0.54	0.39	0.42	0.71	0.15	0.43	0.48	
Uniform Delay, d1	48.0	57.9		61.5	60.3	59.4	11.0	21.0	13.6	16.1	17.2	
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	5.7	0.8		2.5	3.2	1.7	0.9	2.1	0.4	1.3	0.8	
Delay (s)	53.7	58.7		64.0	63.5	61.0	11.9	23.1	13.9	17.4	18.1	
Level of Service	D	E		E	E	E	B	C	B	B	B	
Approach Delay (s)		56.7			62.5			21.4			18.0	
Approach LOS		E			E			C			B	

Intersection Summary

HCM 2000 Control Delay	30.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	21.6
Intersection Capacity Utilization	82.9%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
2: Highway 50 & Industrial Road

Future Total 2036 PM Synchro Model
01-28-2021



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↗	↕↗			↖↖
Traffic Volume (veh/h)	0	100	1915	160	0	1441
Future Volume (Veh/h)	0	100	1915	160	0	1441
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	100	1915	160	0	1441
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage veh			2			2
Upstream signal (m)			160			
pX, platoon unblocked	0.48	0.48			0.48	
vC, conflicting volume	2716	1038			2075	
vC1, stage 1 conf vol	1995					
vC2, stage 2 conf vol	720					
vCu, unblocked vol	2408	0			1074	
tC, single (s)	7.1	7.0			4.3	
tC, 2 stage (s)	6.1					
tF (s)	3.6	3.3			2.3	
p0 queue free %	100	81			100	
cM capacity (veh/h)	141	519			293	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	100	1277	798	720	720	
Volume Left	0	0	0	0	0	
Volume Right	100	0	160	0	0	
cSH	519	1700	1700	1700	1700	
Volume to Capacity	0.19	0.75	0.47	0.42	0.42	
Queue Length 95th (m)	5.6	0.0	0.0	0.0	0.0	
Control Delay (s)	13.6	0.0	0.0	0.0	0.0	
Lane LOS	B					
Approach Delay (s)	13.6	0.0		0.0		
Approach LOS	B					
Intersection Summary						
Average Delay			0.4			
Intersection Capacity Utilization			70.9%		ICU Level of Service	C
Analysis Period (min)			15			

Timings

3: Highway 50 & George Bolton Parkway/George Bolton Parkway Extension

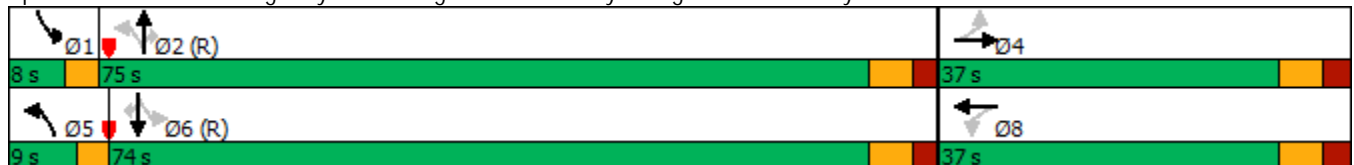


Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗	↖	↗	↖	↑↑	↗	↖	↑↑	↗
Traffic Volume (vph)	125	22	264	126	60	1870	346	95	1091	95
Future Volume (vph)	125	22	264	126	60	1870	346	95	1091	95
Turn Type	Perm	NA	Perm	NA	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases		4		8	5	2		1	6	
Permitted Phases	4		8		2		2	6		6
Detector Phase	4	4	8	8	5	2	2	1	6	6
Switch Phase										
Minimum Initial (s)	8.0	8.0	8.0	8.0	5.0	12.0	12.0	3.5	12.0	12.0
Minimum Split (s)	32.6	32.6	32.6	32.6	8.0	27.3	27.3	8.0	27.3	27.3
Total Split (s)	37.0	37.0	37.0	37.0	9.0	75.0	75.0	8.0	74.0	74.0
Total Split (%)	30.8%	30.8%	30.8%	30.8%	7.5%	62.5%	62.5%	6.7%	61.7%	61.7%
Yellow Time (s)	4.0	4.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	2.6	2.6	2.6	2.6	0.0	2.3	2.3	0.0	2.3	2.3
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.6	6.6	6.6	6.6	3.0	6.3	6.3	3.0	6.3	6.3
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-Min	C-Min	None	C-Min	C-Min
Act Effct Green (s)	29.1	29.1	29.1	29.1	78.9	69.7	69.7	78.1	70.8	70.8
Actuated g/C Ratio	0.24	0.24	0.24	0.24	0.66	0.58	0.58	0.65	0.59	0.59
v/c Ratio	0.42	0.31	0.94	0.27	0.24	0.92	0.32	0.66	0.53	0.10
Control Delay	42.7	10.4	87.5	42.3	9.2	24.7	2.9	38.6	16.6	4.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	42.7	10.4	87.5	42.3	9.2	24.7	2.9	38.6	16.6	4.1
LOS	D	B	F	D	A	C	A	D	B	A
Approach Delay		25.0		72.9		21.0			17.3	
Approach LOS		C		E		C			B	

Intersection Summary

Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 116 (97%), 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: 24.9
 Intersection Capacity Utilization 100.3%
 Analysis Period (min) 15
 Intersection LOS: C
 ICU Level of Service G

Splits and Phases: 3: Highway 50 & George Bolton Parkway/George Bolton Parkway Extension

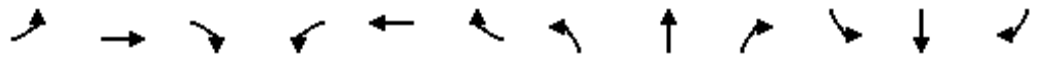


HCM Signalized Intersection Capacity Analysis

Future Total 2036 PM Synchro Model

3: Highway 50 & George Bolton Parkway/George Bolton Parkway Extension

01-28-2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	125	22	130	264	126	0	60	1870	346	95	1091	95
Future Volume (vph)	125	22	130	264	126	0	60	1870	346	95	1091	95
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5
Total Lost time (s)	6.6	6.6		6.6	6.6		3.0	6.3	6.3	3.0	6.3	6.3
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.87		1.00	1.00		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)	1750	1633		1785	1921		1405	3510	1597	1785	3476	1521
Flt Permitted	0.67	1.00		0.62	1.00		0.20	1.00	1.00	0.06	1.00	1.00
Satd. Flow (perm)	1235	1633		1165	1921		295	3510	1597	107	3476	1521
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)	125	22	130	264	126	0	60	1870	346	95	1091	95
RTOR Reduction (vph)	0	98	0	0	0	0	0	0	140	0	0	31
Lane Group Flow (vph)	125	54	0	264	126	0	60	1870	206	95	1091	64
Heavy Vehicles (%)	2%	0%	3%	0%	0%	0%	27%	4%	0%	0%	5%	5%
Turn Type	Perm	NA		Perm	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	29.1	29.1		29.1	29.1		74.5	69.7	69.7	75.5	70.2	70.2
Effective Green, g (s)	29.1	29.1		29.1	29.1		74.5	69.7	69.7	75.5	70.2	70.2
Actuated g/C Ratio	0.24	0.24		0.24	0.24		0.62	0.58	0.58	0.63	0.59	0.59
Clearance Time (s)	6.6	6.6		6.6	6.6		3.0	6.3	6.3	3.0	6.3	6.3
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)	299	396		282	465		227	2038	927	141	2033	889
v/s Ratio Prot		0.03			0.07		0.01	c0.53		c0.03	0.31	
v/s Ratio Perm	0.10			c0.23			0.15		0.13	0.39		0.04
v/c Ratio	0.42	0.14		0.94	0.27		0.26	0.92	0.22	0.67	0.54	0.07
Uniform Delay, d1	38.3	35.6		44.5	36.8		10.4	22.6	12.1	24.3	15.1	10.8
Progression Factor	1.00	1.00		1.09	1.11		1.09	0.81	1.51	1.00	1.00	1.00
Incremental Delay, d2	0.9	0.2		36.5	0.3		0.4	5.6	0.4	12.0	1.0	0.2
Delay (s)	39.3	35.8		84.9	41.4		11.7	23.8	18.7	36.3	16.1	10.9
Level of Service	D	D		F	D		B	C	B	D	B	B
Approach Delay (s)		37.3			70.8			22.7			17.2	
Approach LOS		D			E			C			B	

Intersection Summary

HCM 2000 Control Delay	26.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	15.9
Intersection Capacity Utilization	100.3%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
4: Albion Vaughan Road & Commercial Road

Future Total 2036 PM Synchro Model
01-28-2021



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	95	40	20	858	484	105
Future Volume (Veh/h)	95	40	20	858	484	105
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)	95	40	20	858	484	105
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)	251					
pX, platoon unblocked	0.96					
vC, conflicting volume	1006	294	589			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	925	294	589			
tC, single (s)	6.9	6.9	4.4			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.4			
p0 queue free %	62	94	98			
cM capacity (veh/h)	250	702	898			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	135	306	572	323	266	
Volume Left	95	20	0	0	0	
Volume Right	40	0	0	0	105	
cSH	309	898	1700	1700	1700	
Volume to Capacity	0.44	0.02	0.34	0.19	0.16	
Queue Length 95th (m)	16.9	0.5	0.0	0.0	0.0	
Control Delay (s)	25.4	0.8	0.0	0.0	0.0	
Lane LOS	D	A				
Approach Delay (s)	25.4	0.3		0.0		
Approach LOS	D					
Intersection Summary						
Average Delay	2.3					
Intersection Capacity Utilization	52.4%			ICU Level of Service	A	
Analysis Period (min)	15					

Timings
5: Albion Vaughan Road & Industrial Road

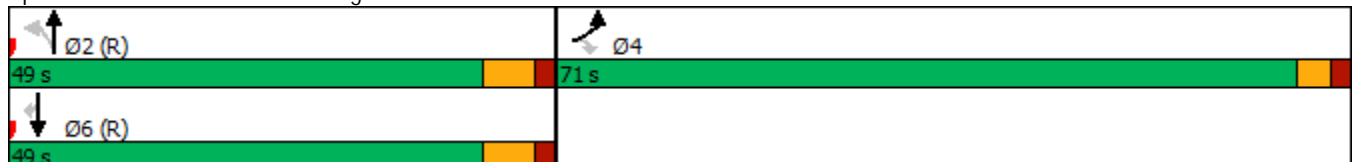


Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↖	↗	↖	↑↑	↑↑	↗
Traffic Volume (vph)	448	125	80	415	194	330
Future Volume (vph)	448	125	80	415	194	330
Turn Type	Prot	Perm	Perm	NA	NA	Perm
Protected Phases	4			2	6	
Permitted Phases		4	2			6
Detector Phase	4	4	2	2	6	6
Switch Phase						
Minimum Initial (s)	5.0	5.0	7.0	7.0	7.0	7.0
Minimum Split (s)	30.0	30.0	31.6	31.6	31.6	31.6
Total Split (s)	71.0	71.0	49.0	49.0	49.0	49.0
Total Split (%)	59.2%	59.2%	40.8%	40.8%	40.8%	40.8%
Yellow Time (s)	3.0	3.0	4.6	4.6	4.6	4.6
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	6.6	6.6	6.6	6.6
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	C-Min	C-Min	C-Min	C-Min
Act Effect Green (s)	38.3	38.3	70.1	70.1	70.1	70.1
Actuated g/C Ratio	0.32	0.32	0.58	0.58	0.58	0.58
v/c Ratio	0.79	0.21	0.15	0.20	0.10	0.31
Control Delay	48.4	6.6	14.7	13.4	12.8	2.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	48.4	6.6	14.7	13.4	12.8	2.5
LOS	D	A	B	B	B	A
Approach Delay	39.3			13.6	6.3	
Approach LOS	D			B	A	

Intersection Summary

Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
 Natural Cycle: 65
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.79
 Intersection Signal Delay: 20.5
 Intersection LOS: C
 Intersection Capacity Utilization 51.7%
 ICU Level of Service A
 Analysis Period (min) 15

Splits and Phases: 5: Albion Vaughan Road & Industrial Road



HCM Signalized Intersection Capacity Analysis

5: Albion Vaughan Road & Industrial Road

Future Total 2036 PM Synchro Model

01-28-2021



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	448	125	80	415	194	330
Future Volume (vph)	448	125	80	415	194	330
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.7	3.7	3.5
Total Lost time (s)	5.0	5.0	6.6	6.6	6.6	6.6
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1785	1597	1405	3544	3259	1597
Flt Permitted	0.95	1.00	0.63	1.00	1.00	1.00
Satd. Flow (perm)	1785	1597	932	3544	3259	1597
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	448	125	80	415	194	330
RTOR Reduction (vph)	0	85	0	0	0	137
Lane Group Flow (vph)	448	40	80	415	194	193
Heavy Vehicles (%)	0%	0%	27%	3%	12%	0%
Turn Type	Prot	Perm	Perm	NA	NA	Perm
Protected Phases	4			2	6	
Permitted Phases		4	2			6
Actuated Green, G (s)	38.3	38.3	70.1	70.1	70.1	70.1
Effective Green, g (s)	38.3	38.3	70.1	70.1	70.1	70.1
Actuated g/C Ratio	0.32	0.32	0.58	0.58	0.58	0.58
Clearance Time (s)	5.0	5.0	6.6	6.6	6.6	6.6
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	569	509	544	2070	1903	932
v/s Ratio Prot	c0.25			0.12	0.06	
v/s Ratio Perm		0.02	0.09			c0.12
v/c Ratio	0.79	0.08	0.15	0.20	0.10	0.21
Uniform Delay, d1	37.1	28.5	11.4	11.8	11.0	11.8
Progression Factor	1.06	1.46	1.00	1.00	1.00	1.00
Incremental Delay, d2	7.0	0.1	0.6	0.2	0.1	0.5
Delay (s)	46.2	41.7	11.9	12.0	11.1	12.3
Level of Service	D	D	B	B	B	B
Approach Delay (s)	45.2			12.0	11.9	
Approach LOS	D			B	B	

Intersection Summary

HCM 2000 Control Delay	23.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	11.6
Intersection Capacity Utilization	51.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Timings
6: Highway 50 & Parr Boulevard/Private Driveway

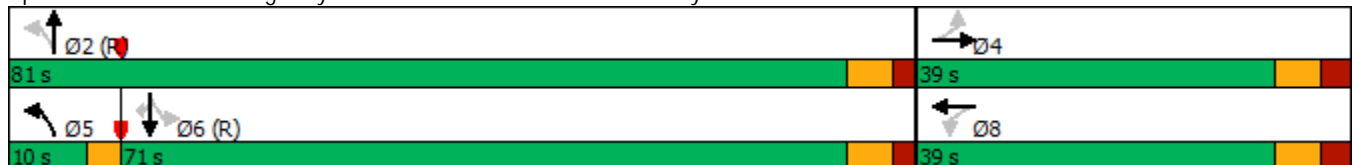


Lane Group	EBL	EBT	NBL	NBT	SBT	SBR	Ø8
Lane Configurations	↶	↷	↶	↶↷	↶↷	↷	
Traffic Volume (vph)	115	0	55	2096	1460	50	
Future Volume (vph)	115	0	55	2096	1460	50	
Turn Type	Perm	NA	pm+pt	NA	NA	Perm	
Protected Phases		4	5	2	6		8
Permitted Phases	4		2			6	
Detector Phase	4	4	5	2	6	6	
Switch Phase							
Minimum Initial (s)	8.0	8.0	5.0	12.0	12.0	12.0	8.0
Minimum Split (s)	33.9	33.9	8.0	30.1	30.1	30.1	33.9
Total Split (s)	39.0	39.0	10.0	81.0	71.0	71.0	39.0
Total Split (%)	32.5%	32.5%	8.3%	67.5%	59.2%	59.2%	33%
Yellow Time (s)	4.0	4.0	3.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.9	2.9	0.0	2.1	2.1	2.1	2.9
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.9	6.9	3.0	6.1	6.1	6.1	
Lead/Lag			Lead		Lag	Lag	
Lead-Lag Optimize?			Yes		Yes	Yes	
Recall Mode	None	None	None	C-Min	C-Min	C-Min	None
Act Effect Green (s)	15.1	15.1	95.0	91.9	84.0	84.0	
Actuated g/C Ratio	0.13	0.13	0.79	0.77	0.70	0.70	
v/c Ratio	0.65	0.35	0.24	0.79	0.60	0.05	
Control Delay	65.9	6.9	6.0	12.0	8.5	0.5	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	65.9	6.9	6.0	12.0	8.5	0.5	
LOS	E	A	A	B	A	A	
Approach Delay		37.7		11.9	8.2		
Approach LOS		D		B	A		

Intersection Summary

Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 3 (3%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 100
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.79
 Intersection Signal Delay: 11.9
 Intersection LOS: B
 Intersection Capacity Utilization 75.4%
 ICU Level of Service D
 Analysis Period (min) 15






















Splits and Phases: 6: Highway 50 & Parr Boulevard/Private Driveway



HCM Signalized Intersection Capacity Analysis
6: Highway 50 & Parr Boulevard/Private Driveway

Future Total 2036 PM Synchro Model

01-28-2021

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	115	0	105	0	0	0	55	2096	0	0	1460	50	
Future Volume (vph)	115	0	105	0	0	0	55	2096	0	0	1460	50	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5	
Total Lost time (s)	6.9	6.9					3.0	6.1			6.1	6.1	
Lane Util. Factor	1.00	1.00					1.00	0.95			0.95	1.00	
Frt	1.00	0.85					1.00	1.00			1.00	0.85	
Flt Protected	0.95	1.00					0.95	1.00			1.00	1.00	
Satd. Flow (prot)	1767	1471					1463	3476			3476	1493	
Flt Permitted	0.76	1.00					0.13	1.00			1.00	1.00	
Satd. Flow (perm)	1409	1471					200	3476			3476	1493	
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)	115	0	105	0	0	0	55	2096	0	0	1460	50	
RTOR Reduction (vph)	0	92	0	0	0	0	0	0	0	0	0	15	
Lane Group Flow (vph)	115	13	0	0	0	0	55	2096	0	0	1460	35	
Heavy Vehicles (%)	1%	0%	11%	0%	0%	0%	22%	5%	0%	0%	5%	7%	
Turn Type	Perm	NA					pm+pt	NA		Perm	NA	Perm	
Protected Phases		4			8		5	2			6		
Permitted Phases	4			8			2			6		6	
Actuated Green, G (s)	15.1	15.1					91.9	91.9			83.4	83.4	
Effective Green, g (s)	15.1	15.1					91.9	91.9			83.4	83.4	
Actuated g/C Ratio	0.13	0.13					0.77	0.77			0.70	0.70	
Clearance Time (s)	6.9	6.9					3.0	6.1			6.1	6.1	
Vehicle Extension (s)	3.0	3.0					3.0	3.0			3.0	3.0	
Lane Grp Cap (vph)	177	185					211	2662			2415	1037	
v/s Ratio Prot		0.01					0.01	c0.60			0.42		
v/s Ratio Perm	c0.08						0.19					0.02	
v/c Ratio	0.65	0.07					0.26	0.79			0.60	0.03	
Uniform Delay, d1	49.9	46.3					6.5	8.3			9.6	5.7	
Progression Factor	1.00	1.00					1.00	1.00			0.70	0.30	
Incremental Delay, d2	8.0	0.2					0.7	2.4			0.9	0.0	
Delay (s)	57.9	46.4					7.1	10.7			7.7	1.8	
Level of Service	E	D					A	B			A	A	
Approach Delay (s)		52.4			0.0			10.6			7.5		
Approach LOS		D			A			B			A		
Intersection Summary													
HCM 2000 Control Delay			11.8				HCM 2000 Level of Service				B		
HCM 2000 Volume to Capacity ratio			0.79										
Actuated Cycle Length (s)			120.0				Sum of lost time (s)			16.0			
Intersection Capacity Utilization			75.4%				ICU Level of Service			D			
Analysis Period (min)			15										

c Critical Lane Group

Timings

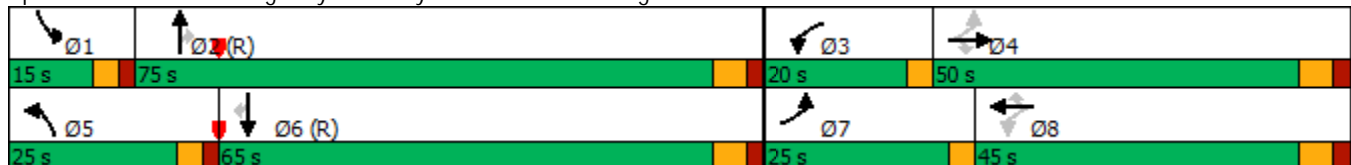
7: Highway 50 & Mayfield Road/Albion Vaughan Road

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	200	210	105	185	105	25	95	1846	605	10	1385	170
Future Volume (vph)	200	210	105	185	105	25	95	1846	605	10	1385	170
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	12.0	12.0	10.0	12.0	12.0	10.0	20.0	20.0	10.0	20.0	20.0
Minimum Split (s)	8.0	39.5	39.5	13.0	39.5	39.5	15.0	37.3	37.3	15.0	37.3	37.3
Total Split (s)	25.0	50.0	50.0	20.0	45.0	45.0	25.0	75.0	75.0	15.0	65.0	65.0
Total Split (%)	15.6%	31.3%	31.3%	12.5%	28.1%	28.1%	15.6%	46.9%	46.9%	9.4%	40.6%	40.6%
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.2	4.2	3.0	4.2	4.2
All-Red Time (s)	0.0	2.5	2.5	0.0	2.5	2.5	2.0	2.1	2.1	2.0	2.1	2.1
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.0	6.5	6.5	3.0	6.5	6.5	5.0	6.3	6.3	5.0	6.3	6.3
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Min	C-Min	None	C-Min	C-Min
Act Effect Green (s)	46.8	24.9	24.9	41.8	21.9	21.9	19.3	96.9	96.9	10.0	78.6	78.6
Actuated g/C Ratio	0.29	0.16	0.16	0.26	0.14	0.14	0.12	0.61	0.61	0.06	0.49	0.49
v/c Ratio	0.54	0.78	0.41	0.69	0.48	0.08	0.71	0.88	0.56	0.09	0.80	0.21
Control Delay	49.2	84.1	12.7	57.7	70.4	0.5	94.1	34.6	8.5	72.8	40.2	8.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	49.2	84.1	12.7	57.7	70.4	0.5	94.1	34.6	8.5	72.8	40.2	8.2
LOS	D	F	B	E	E	A	F	C	A	E	D	A
Approach Delay		56.0			57.4			30.6			37.0	
Approach LOS		E			E			C			D	

Intersection Summary

























Cycle Length: 160
 Actuated Cycle Length: 160
 Offset: 72 (45%), Referenced to phase 2:NBT and 6:SBT, Start of Green
 Natural Cycle: 145
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.88
 Intersection Signal Delay: 37.0
 Intersection LOS: D
 Intersection Capacity Utilization 98.8%
 ICU Level of Service F
 Analysis Period (min) 15

Splits and Phases: 7: Highway 50 & Mayfield Road/Albion Vaughan Road



HCM Signalized Intersection Capacity Analysis
7: Highway 50 & Mayfield Road/Albion Vaughan Road

Future Total 2036 PM Synchro Model
01-28-2021

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	200	210	105	185	105	25	95	1846	605	10	1385	170	
Future Volume (vph)	200	210	105	185	105	25	95	1846	605	10	1385	170	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5	
Total Lost time (s)	3.0	6.5	6.5	3.0	6.5	6.5	5.0	6.3	6.3	5.0	6.3	6.3	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Flt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1684	1731	1044	1608	1601	1426	1109	3444	1493	1785	3510	1536	
Flt Permitted	0.55	1.00	1.00	0.39	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	
Satd. Flow (perm)	974	1731	1044	656	1601	1426	1109	3444	1493	1785	3510	1536	
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)	200	210	105	185	105	25	95	1846	605	10	1385	170	
RTOR Reduction (vph)	0	0	89	0	0	22	0	0	175	0	0	68	
Lane Group Flow (vph)	200	210	16	185	105	3	95	1846	430	10	1385	102	
Heavy Vehicles (%)	6%	11%	53%	11%	20%	12%	61%	6%	7%	0%	4%	4%	
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	
Protected Phases	7	4		3	8		5	2		1	6		
Permitted Phases	4		4	8		8			2			6	
Actuated Green, G (s)	44.3	24.9	24.9	38.3	21.9	21.9	19.3	93.9	93.9	4.0	78.6	78.6	
Effective Green, g (s)	44.3	24.9	24.9	38.3	21.9	21.9	19.3	93.9	93.9	4.0	78.6	78.6	
Actuated g/C Ratio	0.28	0.16	0.16	0.24	0.14	0.14	0.12	0.59	0.59	0.02	0.49	0.49	
Clearance Time (s)	3.0	6.5	6.5	3.0	6.5	6.5	5.0	6.3	6.3	5.0	6.3	6.3	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	355	269	162	254	219	195	133	2021	876	44	1724	754	
v/s Ratio Prot	c0.07	c0.12		c0.07	0.07		c0.09	c0.54		0.01	0.39		
v/s Ratio Perm	0.09		0.02	0.10		0.00			0.29			0.07	
v/c Ratio	0.56	0.78	0.10	0.73	0.48	0.02	0.71	0.91	0.49	0.23	0.80	0.14	
Uniform Delay, d1	47.6	64.9	57.9	52.6	63.8	59.7	67.7	29.4	19.2	76.5	34.2	22.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	2.0	13.6	0.3	10.0	1.7	0.0	16.6	7.8	2.0	2.6	4.1	0.4	
Delay (s)	49.6	78.6	58.2	62.5	65.4	59.8	84.3	37.3	21.1	79.1	38.3	22.6	
Level of Service	D	E	E	E	E	E	F	D	C	E	D	C	
Approach Delay (s)		63.2			63.3			35.2			36.8		
Approach LOS		E			E			D			D		
Intersection Summary													
HCM 2000 Control Delay			40.4									HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio			0.88										
Actuated Cycle Length (s)			160.0									Sum of lost time (s)	20.8
Intersection Capacity Utilization			98.8%									ICU Level of Service	F
Analysis Period (min)			15										

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
8: Albion Vaughan Road & Kirby Road













Future Total 2036 PM Synchro Model
01-28-2021



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	10	70	455	0	35	259
Future Volume (Veh/h)	10	70	455	0	35	259
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)	10	70	455	0	35	259
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	654	228			455	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	654	228			455	
tC, single (s)	7.0	7.0			4.2	
tC, 2 stage (s)						
tF (s)	3.6	3.3			2.2	
p0 queue free %	97	91			97	
cM capacity (veh/h)	367	769			1081	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	80	303	152	121	173	
Volume Left	10	0	0	35	0	
Volume Right	70	0	0	0	0	
cSH	677	1700	1700	1081	1700	
Volume to Capacity	0.12	0.18	0.09	0.03	0.10	
Queue Length 95th (m)	3.2	0.0	0.0	0.8	0.0	
Control Delay (s)	11.0	0.0	0.0	2.6	0.0	
Lane LOS	B			A		
Approach Delay (s)	11.0	0.0	1.1			
Approach LOS	B					
Intersection Summary						
Average Delay			1.5			
Intersection Capacity Utilization			35.6%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
 9: Highway 50 & Site Access

Future Total 2036 PM Synchro Model
 01-28-2021

							
Movement	WBL	WBR	NBT	NBR	SBL	SBT	
Lane Configurations							
Traffic Volume (veh/h)	20	100	1825	190	70	1361	
Future Volume (Veh/h)	20	100	1825	190	70	1361	
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)	20	100	1825	190	70	1361	
Pedestrians							
Lane Width (m)							
Walking Speed (m/s)							
Percent Blockage							
Right turn flare (veh)							
Median type	TWLTL			TWLTL			
Median storage veh	2			2			
Upstream signal (m)	331			311			
pX, platoon unblocked	0.56	0.49			0.49		
vC, conflicting volume	2740	1008			2015		
vC1, stage 1 conf vol	1920						
vC2, stage 2 conf vol	820						
vCu, unblocked vol	1338	0			977		
tC, single (s)	6.8	6.9			4.1		
tC, 2 stage (s)	5.8						
tF (s)	3.5	3.3			2.2		
p0 queue free %	89	81			80		
cM capacity (veh/h)	185	531			348		
Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	20	100	1217	798	70	680	680
Volume Left	20	0	0	0	70	0	0
Volume Right	0	100	0	190	0	0	0
cSH	185	531	1700	1700	348	1700	1700
Volume to Capacity	0.11	0.19	0.72	0.47	0.20	0.40	0.40
Queue Length 95th (m)	2.9	5.5	0.0	0.0	5.9	0.0	0.0
Control Delay (s)	26.8	13.3	0.0	0.0	17.9	0.0	0.0
Lane LOS	D	B			C		
Approach Delay (s)	15.6		0.0		0.9		
Approach LOS	C						
Intersection Summary							
Average Delay			0.9				
Intersection Capacity Utilization			69.4%		ICU Level of Service		C
Analysis Period (min)			15				

HCM Unsignalized Intersection Capacity Analysis
 10: Industrial Road & Site Access

Future Total 2036 PM Synchro Model
 01-28-2021



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	105	55	80	170	220	20
Future Volume (Veh/h)	105	55	80	170	220	20
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)	105	55	80	170	220	20
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	250				430	165
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	250				430	165
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	92				59	98
cM capacity (veh/h)	1327				540	885
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	160	250	240			
Volume Left	105	0	220			
Volume Right	0	170	20			
cSH	1327	1700	558			
Volume to Capacity	0.08	0.15	0.43			
Queue Length 95th (m)	2.1	0.0	17.2			
Control Delay (s)	5.4	0.0	16.2			
Lane LOS	A		C			
Approach Delay (s)	5.4	0.0	16.2			
Approach LOS			C			
Intersection Summary						
Average Delay			7.3			
Intersection Capacity Utilization			46.8%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
 11: George Bolton Parkway Extension & Industrial Road

Future Total 2036 PM Synchro Model
 01-28-2021



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Volume (veh/h)	90	373	230	235	190	160
Future Volume (Veh/h)	90	373	230	235	190	160
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)	90	373	230	235	190	160
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		TWLTL	TWLTL			
Median storage veh		2	2			
Upstream signal (m)		279	285			
pX, platoon unblocked						
vC, conflicting volume	465				900	348
vC1, stage 1 conf vol					348	
vC2, stage 2 conf vol					553	
vCu, unblocked vol	465				900	348
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)	2.2				3.5	3.3
p0 queue free %	92				60	77
cM capacity (veh/h)	1107				479	700
Direction, Lane #						
	EB 1	WB 1	SB 1			
Volume Total	463	465	350			
Volume Left	90	0	190			
Volume Right	0	235	160			
cSH	1107	1700	560			
Volume to Capacity	0.08	0.27	0.63			
Queue Length 95th (m)	2.1	0.0	34.4			
Control Delay (s)	2.4	0.0	21.5			
Lane LOS	A		C			
Approach Delay (s)	2.4	0.0	21.5			
Approach LOS			C			
Intersection Summary						
Average Delay			6.8			
Intersection Capacity Utilization			81.4%		ICU Level of Service	D
Analysis Period (min)			15			

Future Background Traffic Conditions 2041

Timings

1: Highway 50 & McEwan Drive West/McEwan Drive East



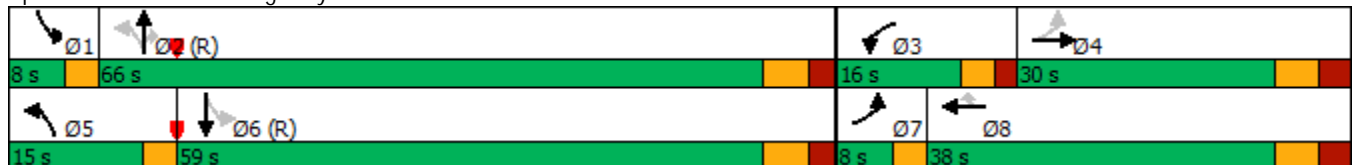
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations	↖	↗	↖	↖	↖	↖	↖	↖	↖	↗
Traffic Volume (vph)	80	45	80	105	50	120	704	65	60	1228
Future Volume (vph)	80	45	80	105	50	120	704	65	60	1228
Turn Type	pm+pt	NA	Prot	NA	Perm	pm+pt	NA	Perm	pm+pt	NA
Protected Phases	7	4	3	8		5	2		1	6
Permitted Phases	4				8	2		2	6	
Detector Phase	7	4	3	8	8	5	2	2	1	6
Switch Phase										
Minimum Initial (s)	5.0	8.0	8.0	8.0	8.0	5.0	8.0	8.0	5.0	8.0
Minimum Split (s)	8.0	35.0	13.0	35.0	35.0	8.0	34.6	34.6	8.0	34.6
Total Split (s)	8.0	30.0	16.0	38.0	38.0	15.0	66.0	66.0	8.0	59.0
Total Split (%)	6.7%	25.0%	13.3%	31.7%	31.7%	12.5%	55.0%	55.0%	6.7%	49.2%
Yellow Time (s)	3.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0
All-Red Time (s)	0.0	3.0	2.0	3.0	3.0	0.0	2.6	2.6	0.0	2.6
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.0	7.0	5.0	7.0	7.0	3.0	6.6	6.6	3.0	6.6
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	Min	None	Min	Min	None	C-Min	C-Min	None	C-Min
Act Effect Green (s)	22.0	12.3	8.8	15.4	15.4	85.9	75.4	75.4	80.5	70.8
Actuated g/C Ratio	0.18	0.10	0.07	0.13	0.13	0.72	0.63	0.63	0.67	0.59
v/c Ratio	0.31	0.44	0.34	0.45	0.17	0.51	0.33	0.07	0.12	0.68
Control Delay	38.8	19.5	56.5	52.2	1.2	18.8	16.0	3.4	7.9	21.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	38.8	19.5	56.5	52.2	1.2	18.8	16.0	3.4	7.9	21.6
LOS	D	B	E	D	A	B	B	A	A	C
Approach Delay		25.9		42.8			15.4			21.0
Approach LOS		C		D			B			C

Intersection Summary

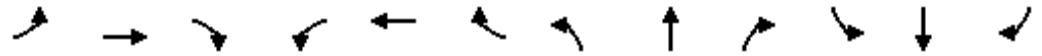
Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 71 (59%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 95
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.68
 Intersection Signal Delay: 21.5
 Intersection Capacity Utilization 79.9%
 Analysis Period (min) 15

Intersection LOS: C
 ICU Level of Service D

Splits and Phases: 1: Highway 50 & McEwan Drive West/McEwan Drive East



HCM Signalized Intersection Capacity Analysis Future Background 2041 AM Synchro Model
 1: Highway 50 & McEwan Drive West/McEwan Drive East 01-28-2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗	↖	↖	↗	↖	↖	↗	↗
Traffic Volume (vph)	80	45	115	80	105	50	120	704	65	60	1228	145
Future Volume (vph)	80	45	115	80	105	50	120	704	65	60	1228	145
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5
Total Lost time (s)	3.0	7.0		5.0	7.0	7.0	3.0	6.6	6.6	3.0	6.6	
Lane Util. Factor	1.00	0.95		0.97	1.00	1.00	1.00	0.95	1.00	1.00	0.95	
Frbp, ped/bikes	1.00	0.99		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	0.89		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1716	2529		3236	1812	1536	1526	3411	1452	1638	3396	
Flt Permitted	0.69	1.00		0.95	1.00	1.00	0.12	1.00	1.00	0.38	1.00	
Satd. Flow (perm)	1245	2529		3236	1812	1536	186	3411	1452	650	3396	
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)	80	45	115	80	105	50	120	704	65	60	1228	145
RTOR Reduction (vph)	0	103	0	0	0	43	0	0	25	0	5	0
Lane Group Flow (vph)	80	57	0	80	105	7	120	704	40	60	1368	0
Confl. Peds. (#/hr)			5	5								
Heavy Vehicles (%)	4%	12%	33%	7%	6%	4%	17%	7%	10%	9%	6%	4%
Turn Type	pm+pt	NA		Prot	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4					8	2		2	6		
Actuated Green, G (s)	18.0	12.3		7.2	15.8	15.8	81.9	73.9	73.9	74.8	69.8	
Effective Green, g (s)	18.0	12.3		7.2	15.8	15.8	81.9	73.9	73.9	74.8	69.8	
Actuated g/C Ratio	0.15	0.10		0.06	0.13	0.13	0.68	0.62	0.62	0.62	0.58	
Clearance Time (s)	3.0	7.0		5.0	7.0	7.0	3.0	6.6	6.6	3.0	6.6	
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)	209	259		194	238	202	228	2100	894	446	1975	
v/s Ratio Prot	0.02	0.02		c0.02	c0.06		c0.04	0.21		0.01	c0.40	
v/s Ratio Perm	0.04					0.00	0.32		0.03	0.08		
v/c Ratio	0.38	0.22		0.41	0.44	0.03	0.53	0.34	0.04	0.13	0.69	
Uniform Delay, d1	45.5	49.4		54.4	48.0	45.4	12.6	11.2	9.1	8.8	17.6	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.45	1.24	1.00	1.00	1.00	
Incremental Delay, d2	1.2	0.4		1.4	1.3	0.1	2.1	0.4	0.1	0.1	2.0	
Delay (s)	46.6	49.9		55.8	49.3	45.5	20.4	14.2	9.2	9.0	19.6	
Level of Service	D	D		E	D	D	C	B	A	A	B	
Approach Delay (s)		48.8			50.7			14.7			19.2	
Approach LOS		D			D			B			B	

Intersection Summary		
HCM 2000 Control Delay	22.9	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	0.64	C
Actuated Cycle Length (s)	120.0	Sum of lost time (s)
Intersection Capacity Utilization	79.9%	21.6
Analysis Period (min)	15	ICU Level of Service
c Critical Lane Group		D

HCM Unsignalized Intersection Capacity Analysis Future Background 2041 AM Synchro Model

2: Highway 50 & Industrial Road

01-28-2021



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↗	↕↗			↕↖
Traffic Volume (veh/h)	0	30	954	25	0	1578
Future Volume (Veh/h)	0	30	954	25	0	1578
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	954	25	0	1578
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage veh			2			2
Upstream signal (m)			160			
pX, platoon unblocked	0.91	0.91			0.91	
vC, conflicting volume	1756	490			979	
vC1, stage 1 conf vol	966					
vC2, stage 2 conf vol	789					
vCu, unblocked vol	1628	233			772	
tC, single (s)	7.0	7.3			4.1	
tC, 2 stage (s)	6.0					
tF (s)	3.6	3.5			2.2	
p0 queue free %	100	95			100	
cM capacity (veh/h)	270	651			773	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	30	636	343	789	789	
Volume Left	0	0	0	0	0	
Volume Right	30	0	25	0	0	
cSH	651	1700	1700	1700	1700	
Volume to Capacity	0.05	0.37	0.20	0.46	0.46	
Queue Length 95th (m)	1.2	0.0	0.0	0.0	0.0	
Control Delay (s)	10.8	0.0	0.0	0.0	0.0	
Lane LOS	B					
Approach Delay (s)	10.8	0.0		0.0		
Approach LOS	B					
Intersection Summary						
Average Delay			0.1			
Intersection Capacity Utilization			47.0%		ICU Level of Service	A
Analysis Period (min)			15			

Timings

3: Highway 50 & George Bolton Parkway/George Bolton Parkway Extension

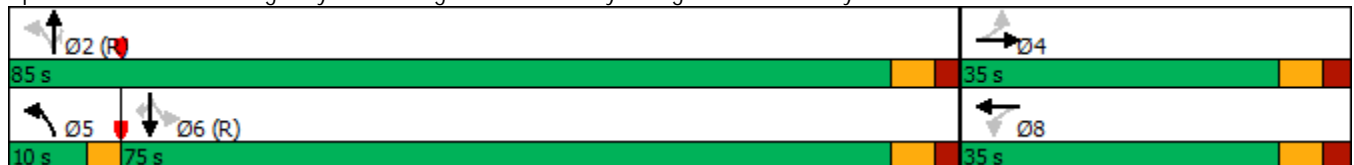


Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗	↖	↗	↖	↕	↗	↖	↕	↗
Traffic Volume (vph)	25	23	190	239	75	839	165	25	1403	85
Future Volume (vph)	25	23	190	239	75	839	165	25	1403	85
Turn Type	Perm	NA	Perm	NA	pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases		4		8	5	2			6	
Permitted Phases	4		8		2		2	6		6
Detector Phase	4	4	8	8	5	2	2	6	6	6
Switch Phase										
Minimum Initial (s)	8.0	8.0	8.0	8.0	5.0	12.0	12.0	12.0	12.0	12.0
Minimum Split (s)	32.6	32.6	32.6	32.6	8.0	27.3	27.3	27.3	27.3	27.3
Total Split (s)	35.0	35.0	35.0	35.0	10.0	85.0	85.0	75.0	75.0	75.0
Total Split (%)	29.2%	29.2%	29.2%	29.2%	8.3%	70.8%	70.8%	62.5%	62.5%	62.5%
Yellow Time (s)	4.0	4.0	4.0	4.0	3.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.6	2.6	2.6	2.6	0.0	2.3	2.3	2.3	2.3	2.3
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.6	6.6	6.6	6.6	3.0	6.3	6.3	6.3	6.3	6.3
Lead/Lag					Lead			Lag	Lag	Lag
Lead-Lag Optimize?					Yes			Yes	Yes	Yes
Recall Mode	None	None	None	None	None	C-Min	C-Min	C-Min	C-Min	C-Min
Act Effct Green (s)	22.3	22.3	22.3	22.3	88.1	84.8	84.8	76.7	76.7	76.7
Actuated g/C Ratio	0.19	0.19	0.19	0.19	0.73	0.71	0.71	0.64	0.64	0.64
v/c Ratio	0.19	0.27	0.77	0.67	0.32	0.35	0.14	0.06	0.63	0.08
Control Delay	42.0	17.1	69.2	57.3	9.8	7.3	1.3	4.2	6.7	0.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	42.0	17.1	69.2	57.3	9.8	7.3	1.3	4.2	6.7	0.4
LOS	D	B	E	E	A	A	A	A	A	A
Approach Delay		23.1		62.6		6.6			6.3	
Approach LOS		C		E		A			A	

Intersection Summary

Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 113 (94%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 80
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.77
 Intersection Signal Delay: 14.7
 Intersection Capacity Utilization 77.8%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service D

Splits and Phases: 3: Highway 50 & George Bolton Parkway/George Bolton Parkway Extension



HCM Signalized Intersection Capacity Analysis Future Background 2041 AM Synchro Model
 3: Highway 50 & George Bolton Parkway/George Bolton Parkway Extension 01-28-2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↑↑	↗	↖	↑↑	↗
Traffic Volume (vph)	25	23	55	190	239	0	75	839	165	25	1403	85
Future Volume (vph)	25	23	55	190	239	0	75	839	165	25	1403	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5
Total Lost time (s)	6.6	6.6		6.6	6.6		3.0	6.3	6.3	6.3	6.3	6.3
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95	1.00	1.00	0.95	1.00
Fr _t	1.00	0.89		1.00	1.00		1.00	1.00	0.85	1.00	1.00	0.85
Fl _t Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1733	1340		1785	1921		1623	3411	1597	1785	3476	1597
Fl _t Permitted	0.38	1.00		0.71	1.00		0.13	1.00	1.00	0.34	1.00	1.00
Satd. Flow (perm)	696	1340		1327	1921		214	3411	1597	632	3476	1597
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)	25	23	55	190	239	0	75	839	165	25	1403	85
RTOR Reduction (vph)	0	45	0	0	0	0	0	0	48	0	0	22
Lane Group Flow (vph)	25	33	0	190	239	0	75	839	117	25	1403	63
Heavy Vehicles (%)	3%	0%	40%	0%	0%	0%	10%	7%	0%	0%	5%	0%
Turn Type	Perm	NA		Perm	NA		pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	22.3	22.3		22.3	22.3		84.8	84.8	84.8	76.1	76.1	76.1
Effective Green, g (s)	22.3	22.3		22.3	22.3		84.8	84.8	84.8	76.1	76.1	76.1
Actuated g/C Ratio	0.19	0.19		0.19	0.19		0.71	0.71	0.71	0.63	0.63	0.63
Clearance Time (s)	6.6	6.6		6.6	6.6		3.0	6.3	6.3	6.3	6.3	6.3
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)	129	249		246	356		218	2410	1128	400	2204	1012
v/s Ratio Prot		0.02			0.12		0.02	c0.25			c0.40	
v/s Ratio Perm	0.04			c0.14			0.23		0.07	0.04		0.04
v/c Ratio	0.19	0.13		0.77	0.67		0.34	0.35	0.10	0.06	0.64	0.06
Uniform Delay, d ₁	41.3	40.8		46.4	45.4		9.4	6.8	5.6	8.4	13.5	8.4
Progression Factor	1.00	1.00		1.08	1.08		1.17	0.92	0.84	0.35	0.37	0.06
Incremental Delay, d ₂	0.7	0.2		13.5	4.8		0.9	0.4	0.2	0.2	1.2	0.1
Delay (s)	42.0	41.0		63.7	53.8		11.9	6.6	4.9	3.2	6.2	0.6
Level of Service	D	D		E	D		B	A	A	A	A	A
Approach Delay (s)		41.3			58.2			6.7			5.8	
Approach LOS		D			E			A			A	

Intersection Summary		
HCM 2000 Control Delay	14.5	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	0.65	B
Actuated Cycle Length (s)	120.0	Sum of lost time (s)
Intersection Capacity Utilization	77.8%	15.9
Analysis Period (min)	15	ICU Level of Service
		D

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis Future Background 2041 AM Synchro Model

4: Albion Vaughan Road & Commercial Road

01-28-2021



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	25	5	25	313	777	150
Future Volume (Veh/h)	25	5	25	313	777	150
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)	25	5	25	313	777	150
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)	251					
pX, platoon unblocked						
vC, conflicting volume	1058	464	927			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1058	464	927			
tC, single (s)	7.4	7.6	4.2			
tC, 2 stage (s)						
tF (s)	3.8	3.6	2.3			
p0 queue free %	86	99	96			
cM capacity (veh/h)	173	469	703			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	30	129	209	518	409	
Volume Left	25	25	0	0	0	
Volume Right	5	0	0	0	150	
cSH	194	703	1700	1700	1700	
Volume to Capacity	0.15	0.04	0.12	0.30	0.24	
Queue Length 95th (m)	4.3	0.9	0.0	0.0	0.0	
Control Delay (s)	26.9	2.3	0.0	0.0	0.0	
Lane LOS	D	A				
Approach Delay (s)	26.9	0.9		0.0		
Approach LOS	D					
Intersection Summary						
Average Delay	0.9					
Intersection Capacity Utilization	37.7%			ICU Level of Service	A	
Analysis Period (min)	15					

Timings
5: Albion Vaughan Road & Industrial Road

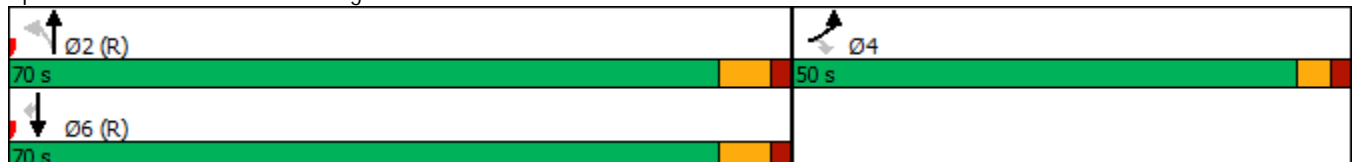


Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↖	↗	↖	↑↑	↑↑	↗
Traffic Volume (vph)	203	20	40	140	333	449
Future Volume (vph)	203	20	40	140	333	449
Turn Type	Prot	Perm	Perm	NA	NA	Perm
Protected Phases	4			2	6	
Permitted Phases		4	2			6
Detector Phase	4	4	2	2	6	6
Switch Phase						
Minimum Initial (s)	5.0	5.0	7.0	7.0	7.0	7.0
Minimum Split (s)	30.0	30.0	31.6	31.6	31.6	31.6
Total Split (s)	50.0	50.0	70.0	70.0	70.0	70.0
Total Split (%)	41.7%	41.7%	58.3%	58.3%	58.3%	58.3%
Yellow Time (s)	3.0	3.0	4.6	4.6	4.6	4.6
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	6.6	6.6	6.6	6.6
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	C-Min	C-Min	C-Min	C-Min
Act Effect Green (s)	22.2	22.2	86.2	86.2	86.2	86.2
Actuated g/C Ratio	0.18	0.18	0.72	0.72	0.72	0.72
v/c Ratio	0.75	0.07	0.06	0.06	0.13	0.37
Control Delay	63.2	18.2	6.7	5.9	6.0	1.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	63.2	18.2	6.7	5.9	6.0	1.6
LOS	E	B	A	A	A	A
Approach Delay	59.2			6.1	3.5	
Approach LOS	E			A	A	

Intersection Summary

Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green
 Natural Cycle: 65
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.75
 Intersection Signal Delay: 14.4
 Intersection LOS: B
 Intersection Capacity Utilization 44.6%
 ICU Level of Service A
 Analysis Period (min) 15

Splits and Phases: 5: Albion Vaughan Road & Industrial Road



HCM Signalized Intersection Capacity Analysis Future Background 2041 AM Synchro Model
 5: Albion Vaughan Road & Industrial Road 01-28-2021



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	203	20	40	140	333	449
Future Volume (vph)	203	20	40	140	333	449
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.7	3.7	3.5
Total Lost time (s)	5.0	5.0	6.6	6.6	6.6	6.6
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1475	1377	1513	3147	3544	1536
Flt Permitted	0.95	1.00	0.55	1.00	1.00	1.00
Satd. Flow (perm)	1475	1377	877	3147	3544	1536
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	203	20	40	140	333	449
RTOR Reduction (vph)	0	16	0	0	0	126
Lane Group Flow (vph)	203	4	40	140	333	323
Heavy Vehicles (%)	21%	16%	18%	16%	3%	4%
Turn Type	Prot	Perm	Perm	NA	NA	Perm
Protected Phases	4			2	6	
Permitted Phases		4	2			6
Actuated Green, G (s)	22.2	22.2	86.2	86.2	86.2	86.2
Effective Green, g (s)	22.2	22.2	86.2	86.2	86.2	86.2
Actuated g/C Ratio	0.18	0.18	0.72	0.72	0.72	0.72
Clearance Time (s)	5.0	5.0	6.6	6.6	6.6	6.6
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	272	254	629	2260	2545	1103
v/s Ratio Prot	c0.14			0.04	0.09	
v/s Ratio Perm		0.00	0.05			c0.21
v/c Ratio	0.75	0.01	0.06	0.06	0.13	0.29
Uniform Delay, d1	46.2	40.0	5.0	5.0	5.3	6.0
Progression Factor	1.02	1.27	1.00	1.00	1.00	1.00
Incremental Delay, d2	10.6	0.0	0.2	0.1	0.1	0.7
Delay (s)	57.8	50.8	5.2	5.0	5.4	6.7
Level of Service	E	D	A	A	A	A
Approach Delay (s)	57.1			5.1	6.1	
Approach LOS	E			A	A	

Intersection Summary			
HCM 2000 Control Delay	15.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.38		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	11.6
Intersection Capacity Utilization	44.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Timings
6: Highway 50 & Parr Boulevard/Private Driveway

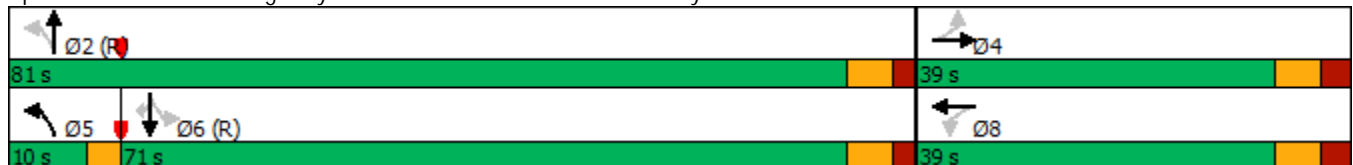


Lane Group	EBL	EBT	NBL	NBT	SBT	SBR	Ø8
Lane Configurations	↶	↷	↶	↶↷	↶↷	↷	
Traffic Volume (vph)	45	0	120	1084	1383	110	
Future Volume (vph)	45	0	120	1084	1383	110	
Turn Type	Perm	NA	pm+pt	NA	NA	Perm	
Protected Phases		4	5	2	6		8
Permitted Phases	4		2			6	
Detector Phase	4	4	5	2	6	6	
Switch Phase							
Minimum Initial (s)	8.0	8.0	5.0	12.0	12.0	12.0	8.0
Minimum Split (s)	33.9	33.9	8.0	30.1	30.1	30.1	33.9
Total Split (s)	39.0	39.0	10.0	81.0	71.0	71.0	39.0
Total Split (%)	32.5%	32.5%	8.3%	67.5%	59.2%	59.2%	33%
Yellow Time (s)	4.0	4.0	3.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.9	2.9	0.0	2.1	2.1	2.1	2.9
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.9	6.9	3.0	6.1	6.1	6.1	
Lead/Lag			Lead		Lag	Lag	
Lead-Lag Optimize?			Yes		Yes	Yes	
Recall Mode	None	None	None	C-Min	C-Min	C-Min	None
Act Effect Green (s)	10.0	10.0	103.0	101.2	87.6	87.6	
Actuated g/C Ratio	0.08	0.08	0.86	0.84	0.73	0.73	
v/c Ratio	0.41	0.21	0.35	0.38	0.57	0.10	
Control Delay	62.4	2.1	4.8	3.5	8.0	3.7	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	62.4	2.1	4.8	3.5	8.0	3.7	
LOS	E	A	A	A	A	A	
Approach Delay		30.7		3.6	7.7		
Approach LOS		C		A	A		

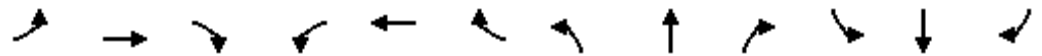
Intersection Summary

Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 8 (7%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 80
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.57
 Intersection Signal Delay: 6.7
 Intersection Capacity Utilization 65.7%
 Analysis Period (min) 15
 Intersection LOS: A
 ICU Level of Service C

Splits and Phases: 6: Highway 50 & Parr Boulevard/Private Driveway



HCM Signalized Intersection Capacity Analysis Future Background 2041 AM Synchro Model
 6: Highway 50 & Parr Boulevard/Private Driveway 01-28-2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗			↔		↖	↕		↖	↗	↖
Traffic Volume (vph)	45	0	50	0	0	0	120	1084	0	0	1383	110
Future Volume (vph)	45	0	50	0	0	0	120	1084	0	0	1383	110
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5
Total Lost time (s)	6.9	6.9					3.0	6.1			6.1	6.1
Lane Util. Factor	1.00	1.00					1.00	0.95			0.95	1.00
Frt	1.00	0.85					1.00	1.00			1.00	0.85
Flt Protected	0.95	1.00					0.95	1.00			1.00	1.00
Satd. Flow (prot)	1668	1306					1684	3380			3349	1551
Flt Permitted	0.76	1.00					0.15	1.00			1.00	1.00
Satd. Flow (perm)	1330	1306					269	3380			3349	1551
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	0	50	0	0	0	120	1084	0	0	1383	110
RTOR Reduction (vph)	0	47	0	0	0	0	0	0	0	0	0	18
Lane Group Flow (vph)	45	4	0	0	0	0	120	1084	0	0	1383	92
Heavy Vehicles (%)	7%	0%	25%	0%	0%	50%	6%	8%	0%	0%	9%	3%
Turn Type	Perm	NA					pm+pt	NA		Perm	NA	Perm
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	8.4	8.4					98.6	98.6			86.3	86.3
Effective Green, g (s)	8.4	8.4					98.6	98.6			86.3	86.3
Actuated g/C Ratio	0.07	0.07					0.82	0.82			0.72	0.72
Clearance Time (s)	6.9	6.9					3.0	6.1			6.1	6.1
Vehicle Extension (s)	3.0	3.0					3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	93	91					330	2777			2408	1115
v/s Ratio Prot		0.00					0.03	c0.32			c0.41	
v/s Ratio Perm	c0.03						0.27					0.06
v/c Ratio	0.48	0.04					0.36	0.39			0.57	0.08
Uniform Delay, d1	53.7	52.0					4.6	2.8			8.1	5.0
Progression Factor	1.00	1.00					1.00	1.00			0.80	1.07
Incremental Delay, d2	3.9	0.2					0.7	0.4			0.8	0.1
Delay (s)	57.6	52.2					5.2	3.2			7.3	5.5
Level of Service	E	D					A	A			A	A
Approach Delay (s)		54.8			0.0			3.4			7.1	
Approach LOS		D			A			A			A	

Intersection Summary			
HCM 2000 Control Delay	7.2	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	65.7%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Timings

Future Background 2041 AM Synchro Model

7: Highway 50 & Mayfield Road/Albion Vaughan Road

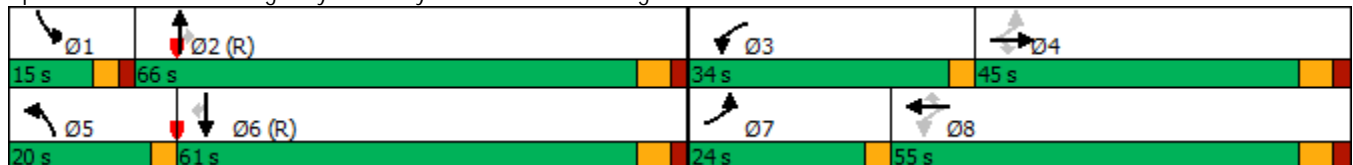
01-28-2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	90	115	145	450	370	15	105	1114	160	5	1333	85
Future Volume (vph)	90	115	145	450	370	15	105	1114	160	5	1333	85
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	12.0	12.0	10.0	12.0	12.0	10.0	20.0	20.0	10.0	20.0	20.0
Minimum Split (s)	8.0	39.5	39.5	13.0	39.5	39.5	13.0	37.3	37.3	15.0	37.3	37.3
Total Split (s)	24.0	45.0	45.0	34.0	55.0	55.0	20.0	66.0	66.0	15.0	61.0	61.0
Total Split (%)	15.0%	28.1%	28.1%	21.3%	34.4%	34.4%	12.5%	41.3%	41.3%	9.4%	38.1%	38.1%
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.2	4.2	3.0	4.2	4.2
All-Red Time (s)	0.0	2.5	2.5	0.0	2.5	2.5	0.0	2.1	2.1	2.0	2.1	2.1
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.0	6.5	6.5	3.0	6.5	6.5	3.0	6.3	6.3	5.0	6.3	6.3
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Min	C-Min	None	C-Min	C-Min
Act Effect Green (s)	36.4	21.1	21.1	58.6	40.4	40.4	20.0	89.1	89.1	10.0	69.1	69.1
Actuated g/C Ratio	0.23	0.13	0.13	0.37	0.25	0.25	0.12	0.56	0.56	0.06	0.43	0.43
v/c Ratio	0.41	0.56	0.58	0.92	0.83	0.03	0.72	0.59	0.19	0.05	0.88	0.12
Control Delay	39.3	74.0	17.7	69.4	72.9	0.1	93.0	27.3	4.1	72.0	50.3	2.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	39.3	74.0	17.7	69.4	72.9	0.1	93.0	27.3	4.1	72.0	50.3	2.2
LOS	D	E	B	E	E	A	F	C	A	E	D	A
Approach Delay		41.7			69.7			29.6			47.5	
Approach LOS		D			E			C			D	

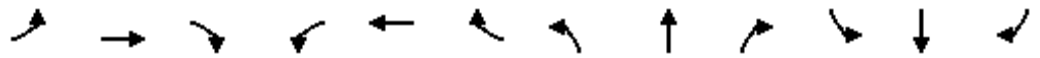
Intersection Summary

Cycle Length: 160
 Actuated Cycle Length: 160
 Offset: 27 (17%), Referenced to phase 2:NBT and 6:SBT, Start of Green
 Natural Cycle: 115
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.92
 Intersection Signal Delay: 45.5
 Intersection LOS: D
 Intersection Capacity Utilization 97.4%
 ICU Level of Service F
 Analysis Period (min) 15

Splits and Phases: 7: Highway 50 & Mayfield Road/Albion Vaughan Road



HCM Signalized Intersection Capacity Analysis Future Background 2041 AM Synchro Model
 7: Highway 50 & Mayfield Road/Albion Vaughan Road 01-28-2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	90	115	145	450	370	15	105	1114	160	5	1333	85
Future Volume (vph)	90	115	145	450	370	15	105	1114	160	5	1333	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5
Total Lost time (s)	3.0	6.5	6.5	3.0	6.5	6.5	3.0	6.3	6.3	5.0	6.3	6.3
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	*1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1594	1549	929	1700	1762	1413	1174	3411	1401	1539	3493	1479
Flt Permitted	0.41	1.00	1.00	0.51	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	686	1549	929	919	1762	1413	1174	3411	1401	1539	3493	1479
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)	90	115	145	450	370	15	105	1114	160	5	1333	85
RTOR Reduction (vph)	0	0	126	0	0	11	0	0	75	0	0	48
Lane Group Flow (vph)	90	115	19	450	370	4	105	1114	85	5	1333	37
Heavy Vehicles (%)	12%	24%	72%	5%	9%	13%	52%	7%	14%	16%	10%	8%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)	32.8	21.1	21.1	55.1	40.4	40.4	20.0	85.1	85.1	2.0	69.1	69.1
Effective Green, g (s)	32.8	21.1	21.1	55.1	40.4	40.4	20.0	85.1	85.1	2.0	69.1	69.1
Actuated g/C Ratio	0.20	0.13	0.13	0.34	0.25	0.25	0.12	0.53	0.53	0.01	0.43	0.43
Clearance Time (s)	3.0	6.5	6.5	3.0	6.5	6.5	3.0	6.3	6.3	5.0	6.3	6.3
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	207	204	122	467	444	356	146	1814	745	19	1508	638
v/s Ratio Prot	0.03	0.07		c0.19	0.21		c0.09	0.33		0.00	c0.38	
v/s Ratio Perm	0.06		0.02	c0.14		0.00			0.06			0.02
v/c Ratio	0.43	0.56	0.16	0.96	0.83	0.01	0.72	0.61	0.11	0.26	0.88	0.06
Uniform Delay, d1	53.7	65.1	61.6	48.3	56.6	44.8	67.3	26.0	18.7	78.3	41.8	26.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.5	3.5	0.6	32.2	12.6	0.0	15.6	1.6	0.3	7.3	7.9	0.2
Delay (s)	55.1	68.7	62.2	80.5	69.2	44.8	82.9	27.6	19.0	85.6	49.7	26.7
Level of Service	E	E	E	F	E	D	F	C	B	F	D	C
Approach Delay (s)		62.5			74.9			30.8			48.4	
Approach LOS		E			E			C			D	

Intersection Summary		
HCM 2000 Control Delay	49.1	HCM 2000 Level of Service D
HCM 2000 Volume to Capacity ratio	0.92	
Actuated Cycle Length (s)	160.0	Sum of lost time (s) 20.8
Intersection Capacity Utilization	97.4%	ICU Level of Service F
Analysis Period (min)	15	

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis Future Background 2041 AM Synchro Model

8: Albion Vaughan Road & Kirby Road

01-28-2021



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	5	25	135	5	60	328
Future Volume (Veh/h)	5	25	135	5	60	328
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)	5	25	135	5	60	328
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	422	70			140	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	422	70			140	
tC, single (s)	7.5	7.3			4.1	
tC, 2 stage (s)						
tF (s)	3.8	3.5			2.2	
p0 queue free %	99	97			96	
cM capacity (veh/h)	467	923			1448	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	30	90	50	169	219	
Volume Left	5	0	0	60	0	
Volume Right	25	0	5	0	0	
cSH	794	1700	1700	1448	1700	
Volume to Capacity	0.04	0.05	0.03	0.04	0.13	
Queue Length 95th (m)	0.9	0.0	0.0	1.0	0.0	
Control Delay (s)	9.7	0.0	0.0	2.9	0.0	
Lane LOS	A		A			
Approach Delay (s)	9.7	0.0		1.3		
Approach LOS	A					
Intersection Summary						
Average Delay			1.4			
Intersection Capacity Utilization			28.0%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis Future Background 2041 AM Synchro Model
 11: George Bolton Parkway Extension & Industrial Road

01-28-2021



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	25	188	384	75	50	45
Future Volume (Veh/h)	25	188	384	75	50	45
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)	25	188	384	75	50	45
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		TWLTL	TWLTL			
Median storage (veh)		2	2			
Upstream signal (m)		290	274			
pX, platoon unblocked						
vC, conflicting volume	459				660	422
vC1, stage 1 conf vol					422	
vC2, stage 2 conf vol					238	
vCu, unblocked vol	459				660	422
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)	2.2				3.5	3.3
p0 queue free %	98				92	93
cM capacity (veh/h)	1113				600	636
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	213	459	95			
Volume Left	25	0	50			
Volume Right	0	75	45			
cSH	1113	1700	617			
Volume to Capacity	0.02	0.27	0.15			
Queue Length 95th (m)	0.6	0.0	4.3			
Control Delay (s)	1.2	0.0	11.9			
Lane LOS	A		B			
Approach Delay (s)	1.2	0.0	11.9			
Approach LOS			B			
Intersection Summary						
Average Delay			1.8			
Intersection Capacity Utilization			43.1%	ICU Level of Service		A
Analysis Period (min)			15			

Timings

1: Highway 50 & McEwan Drive West/McEwan Drive East

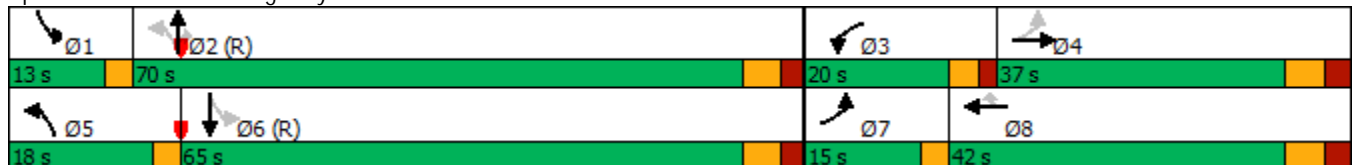


Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations	↖	↗	↖↗	↖	↗	↖	↗↗	↗	↖	↗↗
Traffic Volume (vph)	225	110	165	95	230	110	1415	185	100	871
Future Volume (vph)	225	110	165	95	230	110	1415	185	100	871
Turn Type	pm+pt	NA	Prot	NA	Perm	pm+pt	NA	Perm	pm+pt	NA
Protected Phases	7	4	3	8		5	2		1	6
Permitted Phases	4				8	2		2	6	
Detector Phase	7	4	3	8	8	5	2	2	1	6
Switch Phase										
Minimum Initial (s)	5.0	8.0	8.0	8.0	8.0	5.0	8.0	8.0	5.0	8.0
Minimum Split (s)	8.0	35.0	13.0	35.0	35.0	8.0	34.6	34.6	8.0	34.6
Total Split (s)	15.0	37.0	20.0	42.0	42.0	18.0	70.0	70.0	13.0	65.0
Total Split (%)	10.7%	26.4%	14.3%	30.0%	30.0%	12.9%	50.0%	50.0%	9.3%	46.4%
Yellow Time (s)	3.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0
All-Red Time (s)	0.0	3.0	2.0	3.0	3.0	0.0	2.6	2.6	0.0	2.6
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.0	7.0	5.0	7.0	7.0	3.0	6.6	6.6	3.0	6.6
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	Min	None	Min	Min	None	C-Min	C-Min	None	C-Min
Act Effect Green (s)	35.5	16.1	12.0	13.4	13.4	93.3	80.4	80.4	94.5	81.0
Actuated g/C Ratio	0.25	0.12	0.09	0.10	0.10	0.67	0.57	0.57	0.68	0.58
v/c Ratio	0.63	0.57	0.57	0.55	0.71	0.35	0.69	0.20	0.41	0.47
Control Delay	52.5	25.2	69.0	70.9	26.0	11.0	24.5	6.9	12.8	18.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	52.5	25.2	69.0	70.9	26.0	11.0	24.5	6.9	12.8	18.6
LOS	D	C	E	E	C	B	C	A	B	B
Approach Delay		36.8		49.2			21.7			18.0
Approach LOS		D		D			C			B
























Intersection Summary

Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 72 (51%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 105
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.71
 Intersection Signal Delay: 26.4
 Intersection LOS: C
 Intersection Capacity Utilization 81.8%
 ICU Level of Service D
 Analysis Period (min) 15

Splits and Phases: 1: Highway 50 & McEwan Drive West/McEwan Drive East



HCM Signalized Intersection Capacity Analysis Future Background 2041 PM Synchro Model
 1: Highway 50 & McEwan Drive West/McEwan Drive East 01-28-2021

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	225	110	195	165	95	230	110	1415	185	100	871	75	
Future Volume (vph)	225	110	195	165	95	230	110	1415	185	100	871	75	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5	
Total Lost time (s)	3.0	7.0		5.0	7.0	7.0	3.0	6.6	6.6	3.0	6.6		
Lane Util. Factor	1.00	0.95		0.97	1.00	1.00	1.00	0.95	1.00	1.00	0.95		
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	0.90		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		
Satd. Flow (prot)	1785	3116		3395	1830	1581	1439	3544	1566	1785	3498		
Flt Permitted	0.57	1.00		0.95	1.00	1.00	0.24	1.00	1.00	0.10	1.00		
Satd. Flow (perm)	1077	3116		3395	1830	1581	370	3544	1566	197	3498		
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)	225	110	195	165	95	230	110	1415	185	100	871	75	
RTOR Reduction (vph)	0	172	0	0	0	171	0	0	49	0	3	0	
Lane Group Flow (vph)	225	133	0	165	95	59	110	1415	136	100	943	0	
Confl. Peds. (#/hr)							5					5	
Heavy Vehicles (%)	0%	4%	7%	2%	5%	1%	24%	3%	2%	0%	3%	1%	
Turn Type	pm+pt	NA		Prot	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		
Protected Phases	7	4		3	8		5	2		1	6		
Permitted Phases	4					8	2		2	6			
Actuated Green, G (s)	33.0	16.2		12.0	13.4	13.4	89.6	80.4	80.4	90.8	81.0		
Effective Green, g (s)	33.0	16.2		12.0	13.4	13.4	89.6	80.4	80.4	90.8	81.0		
Actuated g/C Ratio	0.24	0.12		0.09	0.10	0.10	0.64	0.57	0.57	0.65	0.58		
Clearance Time (s)	3.0	7.0		5.0	7.0	7.0	3.0	6.6	6.6	3.0	6.6		
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)	338	360		291	175	151	307	2035	899	238	2023		
v/s Ratio Prot	c0.08	0.04		0.05	0.05		0.02	c0.40		c0.03	0.27		
v/s Ratio Perm	c0.08					0.04	0.21		0.09	0.24			
v/c Ratio	0.67	0.37		0.57	0.54	0.39	0.36	0.70	0.15	0.42	0.47		
Uniform Delay, d1	46.8	57.2		61.5	60.4	59.5	10.9	21.1	13.9	15.6	17.0		
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	4.9	0.6		2.5	3.4	1.7	0.7	2.0	0.4	1.2	0.8		
Delay (s)	51.7	57.8		64.0	63.8	61.1	11.7	23.1	14.3	16.8	17.8		
Level of Service	D	E		E	E	E	B	C	B	B	B		
Approach Delay (s)		55.2			62.6			21.4			17.7		
Approach LOS		E			E			C			B		
Intersection Summary													
HCM 2000 Control Delay			30.5									HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.69										
Actuated Cycle Length (s)			140.0									Sum of lost time (s)	21.6
Intersection Capacity Utilization			81.8%									ICU Level of Service	D
Analysis Period (min)			15										
c Critical Lane Group													

HCM Unsignalized Intersection Capacity Analysis Future Background 2041 PM Synchro Model 2: Highway 50 & Industrial Road

01-28-2021



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↗	↕↗			↕↗
Traffic Volume (veh/h)	0	80	1790	55	0	1421
Future Volume (Veh/h)	0	80	1790	55	0	1421
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	80	1790	55	0	1421
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			TWLTL		TWLTL	
Median storage veh			2		2	
Upstream signal (m)			160			
pX, platoon unblocked	0.69	0.69			0.69	
vC, conflicting volume	2528	922			1845	
vC1, stage 1 conf vol	1818					
vC2, stage 2 conf vol	710					
vCu, unblocked vol	2312	0			1317	
tC, single (s)	7.1	7.0			4.3	
tC, 2 stage (s)	6.1					
tF (s)	3.6	3.3			2.3	
p0 queue free %	100	89			100	
cM capacity (veh/h)	130	742			336	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	80	1193	652	710	710	
Volume Left	0	0	0	0	0	
Volume Right	80	0	55	0	0	
cSH	742	1700	1700	1700	1700	
Volume to Capacity	0.11	0.70	0.38	0.42	0.42	
Queue Length 95th (m)	2.9	0.0	0.0	0.0	0.0	
Control Delay (s)	10.4	0.0	0.0	0.0	0.0	
Lane LOS	B					
Approach Delay (s)	10.4	0.0		0.0		
Approach LOS	B					
Intersection Summary						
Average Delay			0.2			
Intersection Capacity Utilization			62.8%		ICU Level of Service	B
Analysis Period (min)			15			

Timings

3: Highway 50 & George Bolton Parkway/George Bolton Parkway Extension

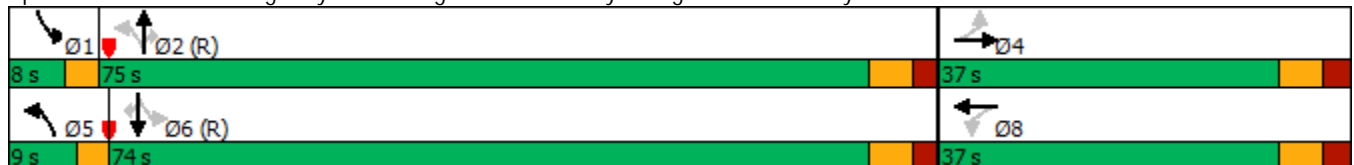


Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗	↖	↗	↖	↕	↗	↖	↕	↗
Traffic Volume (vph)	125	22	134	126	60	1640	346	50	1116	95
Future Volume (vph)	125	22	134	126	60	1640	346	50	1116	95
Turn Type	Perm	NA	Perm	NA	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases		4		8	5	2		1	6	
Permitted Phases	4		8		2		2	6		6
Detector Phase	4	4	8	8	5	2	2	1	6	6
Switch Phase										
Minimum Initial (s)	8.0	8.0	8.0	8.0	5.0	12.0	12.0	5.0	12.0	12.0
Minimum Split (s)	32.6	32.6	32.6	32.6	8.0	27.3	27.3	8.0	27.3	27.3
Total Split (s)	37.0	37.0	37.0	37.0	9.0	75.0	75.0	8.0	74.0	74.0
Total Split (%)	30.8%	30.8%	30.8%	30.8%	7.5%	62.5%	62.5%	6.7%	61.7%	61.7%
Yellow Time (s)	4.0	4.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	2.6	2.6	2.6	2.6	0.0	2.3	2.3	0.0	2.3	2.3
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.6	6.6	6.6	6.6	3.0	6.3	6.3	3.0	6.3	6.3
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-Min	C-Min	None	C-Min	C-Min
Act Effect Green (s)	19.0	19.0	19.0	19.0	89.5	80.4	80.4	88.5	79.9	79.9
Actuated g/C Ratio	0.16	0.16	0.16	0.16	0.75	0.67	0.67	0.74	0.67	0.67
v/c Ratio	0.67	0.41	0.80	0.42	0.20	0.70	0.29	0.23	0.48	0.09
Control Delay	64.0	13.3	82.7	51.7	6.0	11.6	1.8	7.3	12.2	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	64.0	13.3	82.7	51.7	6.0	11.6	1.8	7.3	12.2	3.6
LOS	E	B	F	D	A	B	A	A	B	A
Approach Delay		36.2		67.7		9.8			11.3	
Approach LOS		D		E		A			B	

Intersection Summary

Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 116 (97%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.80
 Intersection Signal Delay: 16.1
 Intersection Capacity Utilization 82.7%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service E

Splits and Phases: 3: Highway 50 & George Bolton Parkway/George Bolton Parkway Extension



HCM Signalized Intersection Capacity Analysis Future Background 2041 PM Synchro Model
 3: Highway 50 & George Bolton Parkway/George Bolton Parkway Extension 01-28-2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↑↑	↗	↖	↑↑	↗
Traffic Volume (vph)	125	22	130	134	126	0	60	1640	346	50	1116	95
Future Volume (vph)	125	22	130	134	126	0	60	1640	346	50	1116	95
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5
Total Lost time (s)	6.6	6.6		6.6	6.6		3.0	6.3	6.3	3.0	6.3	6.3
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.87		1.00	1.00		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)	1750	1633		1785	1921		1405	3510	1597	1785	3476	1521
Flt Permitted	0.64	1.00		0.57	1.00		0.21	1.00	1.00	0.09	1.00	1.00
Satd. Flow (perm)	1180	1633		1063	1921		312	3510	1597	175	3476	1521
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)	125	22	130	134	126	0	60	1640	346	50	1116	95
RTOR Reduction (vph)	0	109	0	0	0	0	0	0	116	0	0	25
Lane Group Flow (vph)	125	43	0	134	126	0	60	1640	230	50	1116	70
Heavy Vehicles (%)	2%	0%	3%	0%	0%	0%	27%	4%	0%	0%	5%	5%
Turn Type	Perm	NA		Perm	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	19.0	19.0		19.0	19.0		85.6	79.8	79.8	84.6	79.3	79.3
Effective Green, g (s)	19.0	19.0		19.0	19.0		85.6	79.8	79.8	84.6	79.3	79.3
Actuated g/C Ratio	0.16	0.16		0.16	0.16		0.71	0.66	0.66	0.70	0.66	0.66
Clearance Time (s)	6.6	6.6		6.6	6.6		3.0	6.3	6.3	3.0	6.3	6.3
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)	186	258		168	304		275	2334	1062	194	2297	1005
v/s Ratio Prot		0.03			0.07		0.01	c0.47		c0.01	0.32	
v/s Ratio Perm	0.11			c0.13			0.14		0.14	0.17		0.05
v/c Ratio	0.67	0.17		0.80	0.41		0.22	0.70	0.22	0.26	0.49	0.07
Uniform Delay, d1	47.6	43.6		48.6	45.5		6.1	12.6	7.9	10.0	10.2	7.2
Progression Factor	1.00	1.00		1.08	1.08		1.04	0.71	1.12	1.00	1.00	1.00
Incremental Delay, d2	9.2	0.3		22.4	0.9		0.3	1.4	0.4	0.7	0.7	0.1
Delay (s)	56.8	43.9		74.9	50.2		6.7	10.4	9.2	10.7	10.9	7.4
Level of Service	E	D		E	D		A	B	A	B	B	A
Approach Delay (s)		49.7			62.9			10.1			10.6	
Approach LOS		D			E			B			B	

Intersection Summary		
HCM 2000 Control Delay	16.7	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	0.70	B
Actuated Cycle Length (s)	120.0	Sum of lost time (s)
Intersection Capacity Utilization	82.7%	15.9
Analysis Period (min)	15	ICU Level of Service
		E

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis Future Background 2041 PM Synchro Model

4: Albion Vaughan Road & Commercial Road

01-28-2021



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	95	40	20	853	414	105
Future Volume (Veh/h)	95	40	20	853	414	105
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)	95	40	20	853	414	105
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)	251					
pX, platoon unblocked	0.96					
vC, conflicting volume	933	260	519			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	847	260	519			
tC, single (s)	6.9	6.9	4.4			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.4			
p0 queue free %	66	95	98			
cM capacity (veh/h)	281	739	958			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	135	304	569	276	243	
Volume Left	95	20	0	0	0	
Volume Right	40	0	0	0	105	
cSH	344	958	1700	1700	1700	
Volume to Capacity	0.39	0.02	0.33	0.16	0.14	
Queue Length 95th (m)	14.5	0.5	0.0	0.0	0.0	
Control Delay (s)	22.1	0.8	0.0	0.0	0.0	
Lane LOS	C	A				
Approach Delay (s)	22.1	0.3		0.0		
Approach LOS	C					
Intersection Summary						
Average Delay	2.1					
Intersection Capacity Utilization	52.3%			ICU Level of Service	A	
Analysis Period (min)	15					

Timings
5: Albion Vaughan Road & Industrial Road

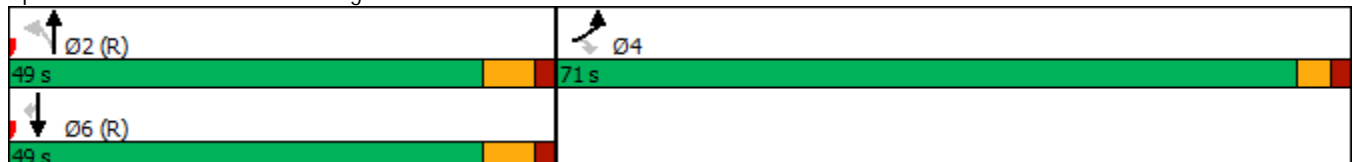


Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↖	↗	↖	↑↑	↑↑	↗
Traffic Volume (vph)	428	55	35	430	204	250
Future Volume (vph)	428	55	35	430	204	250
Turn Type	Prot	Perm	Perm	NA	NA	Perm
Protected Phases	4			2	6	
Permitted Phases		4	2			6
Detector Phase	4	4	2	2	6	6
Switch Phase						
Minimum Initial (s)	5.0	5.0	7.0	7.0	7.0	7.0
Minimum Split (s)	30.0	30.0	31.6	31.6	31.6	31.6
Total Split (s)	71.0	71.0	49.0	49.0	49.0	49.0
Total Split (%)	59.2%	59.2%	40.8%	40.8%	40.8%	40.8%
Yellow Time (s)	3.0	3.0	4.6	4.6	4.6	4.6
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	6.6	6.6	6.6	6.6
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	C-Min	C-Min	C-Min	C-Min
Act Effect Green (s)	36.8	36.8	71.6	71.6	71.6	71.6
Actuated g/C Ratio	0.31	0.31	0.60	0.60	0.60	0.60
v/c Ratio	0.78	0.10	0.06	0.20	0.10	0.24
Control Delay	47.6	8.8	13.4	12.6	12.0	2.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	47.6	8.8	13.4	12.6	12.0	2.4
LOS	D	A	B	B	B	A
Approach Delay	43.2			12.7	6.7	
Approach LOS	D			B	A	

Intersection Summary

Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
 Natural Cycle: 65
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.78
 Intersection Signal Delay: 21.3
 Intersection Capacity Utilization 50.5%
 Analysis Period (min) 15
 Intersection LOS: C
 ICU Level of Service A

Splits and Phases: 5: Albion Vaughan Road & Industrial Road



HCM Signalized Intersection Capacity Analysis Future Background 2041 PM Synchro Model
 5: Albion Vaughan Road & Industrial Road 01-28-2021



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	428	55	35	430	204	250
Future Volume (vph)	428	55	35	430	204	250
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.7	3.7	3.5
Total Lost time (s)	5.0	5.0	6.6	6.6	6.6	6.6
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1785	1597	1405	3544	3259	1597
Flt Permitted	0.95	1.00	0.62	1.00	1.00	1.00
Satd. Flow (perm)	1785	1597	923	3544	3259	1597
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	428	55	35	430	204	250
RTOR Reduction (vph)	0	38	0	0	0	101
Lane Group Flow (vph)	428	17	35	430	204	149
Heavy Vehicles (%)	0%	0%	27%	3%	12%	0%
Turn Type	Prot	Perm	Perm	NA	NA	Perm
Protected Phases	4			2	6	
Permitted Phases		4	2			6
Actuated Green, G (s)	36.8	36.8	71.6	71.6	71.6	71.6
Effective Green, g (s)	36.8	36.8	71.6	71.6	71.6	71.6
Actuated g/C Ratio	0.31	0.31	0.60	0.60	0.60	0.60
Clearance Time (s)	5.0	5.0	6.6	6.6	6.6	6.6
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	547	489	550	2114	1944	952
v/s Ratio Prot	c0.24			c0.12	0.06	
v/s Ratio Perm		0.01	0.04			0.09
v/c Ratio	0.78	0.03	0.06	0.20	0.10	0.16
Uniform Delay, d1	37.9	29.2	10.1	11.1	10.4	10.8
Progression Factor	1.00	1.36	1.00	1.00	1.00	1.00
Incremental Delay, d2	7.1	0.0	0.2	0.2	0.1	0.4
Delay (s)	45.1	39.6	10.4	11.3	10.5	11.1
Level of Service	D	D	B	B	B	B
Approach Delay (s)	44.4			11.3	10.8	
Approach LOS	D			B	B	

Intersection Summary			
HCM 2000 Control Delay	22.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	11.6
Intersection Capacity Utilization	50.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Timings
6: Highway 50 & Parr Boulevard/Private Driveway

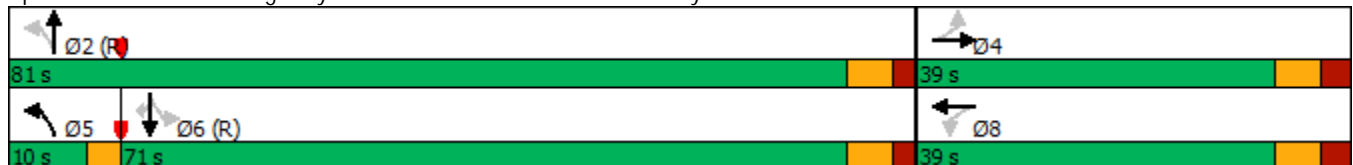


Lane Group	EBL	EBT	NBL	NBT	SBT	SBR	Ø8
Lane Configurations	↶	↷	↶	↶↷	↶↷	↷	
Traffic Volume (vph)	115	0	55	1866	1355	50	
Future Volume (vph)	115	0	55	1866	1355	50	
Turn Type	Perm	NA	pm+pt	NA	NA	Perm	
Protected Phases		4	5	2	6		8
Permitted Phases	4		2			6	
Detector Phase	4	4	5	2	6	6	
Switch Phase							
Minimum Initial (s)	8.0	8.0	5.0	12.0	12.0	12.0	8.0
Minimum Split (s)	33.9	33.9	8.0	30.1	30.1	30.1	33.9
Total Split (s)	39.0	39.0	10.0	81.0	71.0	71.0	39.0
Total Split (%)	32.5%	32.5%	8.3%	67.5%	59.2%	59.2%	33%
Yellow Time (s)	4.0	4.0	3.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.9	2.9	0.0	2.1	2.1	2.1	2.9
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.9	6.9	3.0	6.1	6.1	6.1	
Lead/Lag			Lead		Lag	Lag	
Lead-Lag Optimize?			Yes		Yes	Yes	
Recall Mode	None	None	None	C-Min	C-Min	C-Min	None
Act Effect Green (s)	15.1	15.1	95.0	91.9	84.0	84.0	
Actuated g/C Ratio	0.13	0.13	0.79	0.77	0.70	0.70	
v/c Ratio	0.65	0.34	0.22	0.70	0.56	0.05	
Control Delay	65.9	5.9	5.5	9.6	8.4	0.8	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	65.9	5.9	5.5	9.6	8.4	0.8	
LOS	E	A	A	A	A	A	
Approach Delay		37.3		9.5	8.2		
Approach LOS		D		A	A		

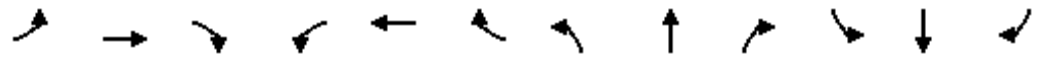
Intersection Summary

Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 3 (3%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.70
 Intersection Signal Delay: 10.7
 Intersection LOS: B
 Intersection Capacity Utilization 69.1%
 ICU Level of Service C
 Analysis Period (min) 15

Splits and Phases: 6: Highway 50 & Parr Boulevard/Private Driveway



HCM Signalized Intersection Capacity Analysis Future Background 2041 PM Synchro Model
 6: Highway 50 & Parr Boulevard/Private Driveway 01-28-2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	115	0	105	0	0	0	55	1866	0	0	1355	50
Future Volume (vph)	115	0	105	0	0	0	55	1866	0	0	1355	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5
Total Lost time (s)	6.9	6.9					3.0	6.1			6.1	6.1
Lane Util. Factor	1.00	1.00					1.00	0.95			0.95	1.00
Frt	1.00	0.85					1.00	1.00			1.00	0.85
Flt Protected	0.95	1.00					0.95	1.00			1.00	1.00
Satd. Flow (prot)	1767	1471					1463	3476			3476	1493
Flt Permitted	0.76	1.00					0.15	1.00			1.00	1.00
Satd. Flow (perm)	1409	1471					234	3476			3476	1493
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)	115	0	105	0	0	0	55	1866	0	0	1355	50
RTOR Reduction (vph)	0	92	0	0	0	0	0	0	0	0	0	15
Lane Group Flow (vph)	115	13	0	0	0	0	55	1866	0	0	1355	35
Heavy Vehicles (%)	1%	0%	11%	0%	0%	0%	22%	5%	0%	0%	5%	7%
Turn Type	Perm	NA					pm+pt	NA		Perm	NA	Perm
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	15.1	15.1					91.9	91.9			83.4	83.4
Effective Green, g (s)	15.1	15.1					91.9	91.9			83.4	83.4
Actuated g/C Ratio	0.13	0.13					0.77	0.77			0.70	0.70
Clearance Time (s)	6.9	6.9					3.0	6.1			6.1	6.1
Vehicle Extension (s)	3.0	3.0					3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	177	185					235	2662			2415	1037
v/s Ratio Prot		0.01					0.01	c0.54			0.39	
v/s Ratio Perm	c0.08						0.17					0.02
v/c Ratio	0.65	0.07					0.23	0.70			0.56	0.03
Uniform Delay, d1	49.9	46.3					5.6	7.1			9.1	5.7
Progression Factor	1.00	1.00					1.00	1.00			0.74	0.46
Incremental Delay, d2	8.0	0.2					0.5	1.6			0.9	0.1
Delay (s)	57.9	46.4					6.1	8.7			7.7	2.7
Level of Service	E	D					A	A			A	A
Approach Delay (s)		52.4			0.0			8.6			7.5	
Approach LOS		D			A			A			A	

Intersection Summary		
HCM 2000 Control Delay	10.9	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	0.71	B
Actuated Cycle Length (s)	120.0	Sum of lost time (s)
Intersection Capacity Utilization	69.1%	16.0
Analysis Period (min)	15	ICU Level of Service
		C

c Critical Lane Group

Timings

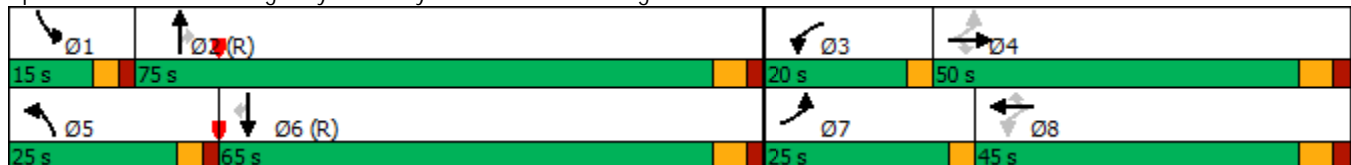
7: Highway 50 & Mayfield Road/Albion Vaughan Road

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	125	210	105	185	105	25	95	1691	605	10	1330	120
Future Volume (vph)	125	210	105	185	105	25	95	1691	605	10	1330	120
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	12.0	12.0	10.0	12.0	12.0	10.0	20.0	20.0	10.0	20.0	20.0
Minimum Split (s)	8.0	39.5	39.5	13.0	39.5	39.5	15.0	37.3	37.3	15.0	37.3	37.3
Total Split (s)	25.0	50.0	50.0	20.0	45.0	45.0	25.0	75.0	75.0	15.0	65.0	65.0
Total Split (%)	15.6%	31.3%	31.3%	12.5%	28.1%	28.1%	15.6%	46.9%	46.9%	9.4%	40.6%	40.6%
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.2	4.2	3.0	4.2	4.2
All-Red Time (s)	0.0	2.5	2.5	0.0	2.5	2.5	2.0	2.1	2.1	2.0	2.1	2.1
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.0	6.5	6.5	3.0	6.5	6.5	5.0	6.3	6.3	5.0	6.3	6.3
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Min	C-Min	None	C-Min	C-Min
Act Effect Green (s)	42.7	24.9	24.9	46.3	26.9	26.9	19.3	96.9	96.9	10.0	78.6	78.6
Actuated g/C Ratio	0.27	0.16	0.16	0.29	0.17	0.17	0.12	0.61	0.61	0.06	0.49	0.49
v/c Ratio	0.34	0.78	0.41	0.70	0.39	0.07	0.71	0.81	0.56	0.09	0.77	0.15
Control Delay	43.8	84.1	12.7	58.5	62.9	0.4	94.1	30.6	7.2	72.8	38.9	3.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	43.8	84.1	12.7	58.5	62.9	0.4	94.1	30.6	7.2	72.8	38.9	3.8
LOS	D	F	B	E	E	A	F	C	A	E	D	A
Approach Delay		55.6			55.4			27.2			36.2	
Approach LOS		E			E			C			D	

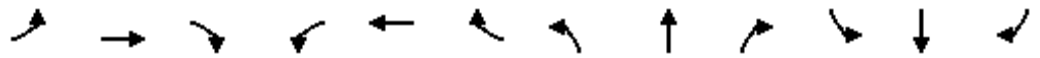
Intersection Summary

Cycle Length: 160
 Actuated Cycle Length: 160
 Offset: 72 (45%), Referenced to phase 2:NBT and 6:SBT, Start of Green
 Natural Cycle: 145
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.81
 Intersection Signal Delay: 34.7
 Intersection LOS: C
 Intersection Capacity Utilization 94.5%
 ICU Level of Service F
 Analysis Period (min) 15

Splits and Phases: 7: Highway 50 & Mayfield Road/Albion Vaughan Road



HCM Signalized Intersection Capacity Analysis Future Background 2041 PM Synchro Model
 7: Highway 50 & Mayfield Road/Albion Vaughan Road 01-28-2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↑	↗	↖	↑	↗	↖	↑↑	↗	↖	↑↑	↗
Traffic Volume (vph)	125	210	105	185	105	25	95	1691	605	10	1330	120
Future Volume (vph)	125	210	105	185	105	25	95	1691	605	10	1330	120
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5
Total Lost time (s)	3.0	6.5	6.5	3.0	6.5	6.5	5.0	6.3	6.3	5.0	6.3	6.3
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1684	1731	1044	1608	1601	1426	1109	3444	1493	1785	3510	1536
Flt Permitted	0.69	1.00	1.00	0.31	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1222	1731	1044	532	1601	1426	1109	3444	1493	1785	3510	1536
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)	125	210	105	185	105	25	95	1691	605	10	1330	120
RTOR Reduction (vph)	0	0	89	0	0	21	0	0	191	0	0	61
Lane Group Flow (vph)	125	210	16	185	105	4	95	1691	414	10	1330	59
Heavy Vehicles (%)	6%	11%	53%	11%	20%	12%	61%	6%	7%	0%	4%	4%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)	39.2	24.9	24.9	43.4	27.0	27.0	19.3	93.9	93.9	4.0	78.6	78.6
Effective Green, g (s)	39.2	24.9	24.9	43.4	27.0	27.0	19.3	93.9	93.9	4.0	78.6	78.6
Actuated g/C Ratio	0.25	0.16	0.16	0.27	0.17	0.17	0.12	0.59	0.59	0.02	0.49	0.49
Clearance Time (s)	3.0	6.5	6.5	3.0	6.5	6.5	5.0	6.3	6.3	5.0	6.3	6.3
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	340	269	162	254	270	240	133	2021	876	44	1724	754
v/s Ratio Prot	0.03	0.12		c0.07	0.07		c0.09	c0.49		0.01	0.38	
v/s Ratio Perm	0.06		0.02	c0.12		0.00			0.28			0.04
v/c Ratio	0.37	0.78	0.10	0.73	0.39	0.02	0.71	0.84	0.47	0.23	0.77	0.08
Uniform Delay, d1	49.3	64.9	57.9	48.7	59.2	55.4	67.7	26.8	18.9	76.5	33.3	21.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.7	13.6	0.3	10.0	0.9	0.0	16.6	4.3	1.8	2.6	3.4	0.2
Delay (s)	49.9	78.6	58.2	58.7	60.1	55.5	84.3	31.1	20.7	79.1	36.8	21.7
Level of Service	D	E	E	E	E	E	F	C	C	E	D	C
Approach Delay (s)		65.6			58.9			30.6			35.8	
Approach LOS		E			E			C			D	

Intersection Summary		
HCM 2000 Control Delay	37.5	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	0.82	D
Actuated Cycle Length (s)	160.0	Sum of lost time (s)
Intersection Capacity Utilization	94.5%	20.8
Analysis Period (min)	15	ICU Level of Service
		F

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis Future Background 2041 PM Synchro Model

8: Albion Vaughan Road & Kirby Road

01-28-2021



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	10	70	425	0	35	199
Future Volume (Veh/h)	10	70	425	0	35	199
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)	10	70	425	0	35	199
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	594	212			425	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	594	212			425	
tC, single (s)	7.0	7.0			4.2	
tC, 2 stage (s)						
tF (s)	3.6	3.3			2.2	
p0 queue free %	98	91			97	
cM capacity (veh/h)	402	787			1110	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	80	283	142	101	133	
Volume Left	10	0	0	35	0	
Volume Right	70	0	0	0	0	
cSH	703	1700	1700	1110	1700	
Volume to Capacity	0.11	0.17	0.08	0.03	0.08	
Queue Length 95th (m)	3.1	0.0	0.0	0.8	0.0	
Control Delay (s)	10.8	0.0	0.0	3.1	0.0	
Lane LOS	B			A		
Approach Delay (s)	10.8	0.0			1.3	
Approach LOS	B					
Intersection Summary						
Average Delay			1.6			
Intersection Capacity Utilization			33.1%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis Future Background 2041 PM Synchro Model
 11: George Bolton Parkway Extension & Industrial Road

01-28-2021



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	45	373	230	110	100	30
Future Volume (Veh/h)	45	373	230	110	100	30
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)	45	373	230	110	100	30
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		TWLTL	TWLTL			
Median storage veh		2	2			
Upstream signal (m)		279	285			
pX, platoon unblocked						
vC, conflicting volume	340			748	285	
vC1, stage 1 conf vol					285	
vC2, stage 2 conf vol					463	
vCu, unblocked vol	340			748	285	
tC, single (s)	4.1			6.4	6.2	
tC, 2 stage (s)					5.4	
tF (s)	2.2			3.5	3.3	
p0 queue free %	96			82	96	
cM capacity (veh/h)	1230			554	759	
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	418	340	130			
Volume Left	45	0	100			
Volume Right	0	110	30			
cSH	1230	1700	591			
Volume to Capacity	0.04	0.20	0.22			
Queue Length 95th (m)	0.9	0.0	6.7			
Control Delay (s)	1.2	0.0	12.8			
Lane LOS	A		B			
Approach Delay (s)	1.2	0.0	12.8			
Approach LOS			B			
Intersection Summary						
Average Delay			2.4			
Intersection Capacity Utilization			58.3%	ICU Level of Service	B	
Analysis Period (min)			15			

Future Total Traffic Conditions 2041

Timings

1: Highway 50 & McEwan Drive West/McEwan Drive East

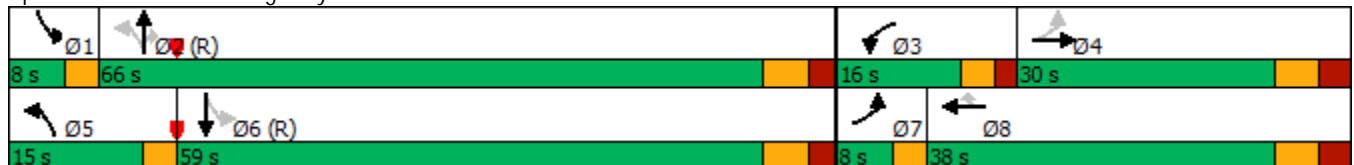


Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations	↙	↗	↙↗	↑	↗	↙	↑↑	↗	↙	↗↘
Traffic Volume (vph)	80	45	80	105	50	145	829	65	60	1253
Future Volume (vph)	80	45	80	105	50	145	829	65	60	1253
Turn Type	pm+pt	NA	Prot	NA	Perm	pm+pt	NA	Perm	pm+pt	NA
Protected Phases	7	4	3	8		5	2		1	6
Permitted Phases	4				8	2		2	6	
Detector Phase	7	4	3	8	8	5	2	2	1	6
Switch Phase										
Minimum Initial (s)	5.0	8.0	8.0	8.0	8.0	5.0	8.0	8.0	5.0	8.0
Minimum Split (s)	8.0	35.0	13.0	35.0	35.0	8.0	34.6	34.6	8.0	34.6
Total Split (s)	8.0	30.0	16.0	38.0	38.0	15.0	66.0	66.0	8.0	59.0
Total Split (%)	6.7%	25.0%	13.3%	31.7%	31.7%	12.5%	55.0%	55.0%	6.7%	49.2%
Yellow Time (s)	3.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0
All-Red Time (s)	0.0	3.0	2.0	3.0	3.0	0.0	2.6	2.6	0.0	2.6
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.0	7.0	5.0	7.0	7.0	3.0	6.6	6.6	3.0	6.6
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	Min	None	Min	Min	None	C-Min	C-Min	None	C-Min
Act Effect Green (s)	21.1	11.8	8.8	15.4	15.4	86.8	75.9	75.9	79.7	69.9
Actuated g/C Ratio	0.18	0.10	0.07	0.13	0.13	0.72	0.63	0.63	0.66	0.58
v/c Ratio	0.33	0.47	0.34	0.45	0.17	0.60	0.38	0.07	0.14	0.70
Control Delay	39.5	19.3	56.5	52.2	1.2	18.7	15.1	2.8	8.0	22.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	39.5	19.3	56.5	52.2	1.2	18.7	15.1	2.8	8.0	22.6
LOS	D	B	E	D	A	B	B	A	A	C
Approach Delay		25.8		42.8			14.8			22.0
Approach LOS		C		D			B			C

Intersection Summary

Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 71 (59%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 105
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.70
 Intersection Signal Delay: 21.5
 Intersection LOS: C
 Intersection Capacity Utilization 82.0%
 ICU Level of Service E
 Analysis Period (min) 15



























Splits and Phases: 1: Highway 50 & McEwan Drive West/McEwan Drive East



HCM Signalized Intersection Capacity Analysis
 1: Highway 50 & McEwan Drive West/McEwan Drive East

Future Total 2041 AM Synchro Model

01-28-2021

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		 		 				 			 		
Traffic Volume (vph)	80	45	125	80	105	50	145	829	65	60	1253	145	
Future Volume (vph)	80	45	125	80	105	50	145	829	65	60	1253	145	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5	
Total Lost time (s)	3.0	7.0		5.0	7.0	7.0	3.0	6.6	6.6	3.0	6.6		
Lane Util. Factor	1.00	0.95		0.97	1.00	1.00	1.00	0.95	1.00	1.00	0.95		
Frbp, ped/bikes	1.00	0.99		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	0.89		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		
Satd. Flow (prot)	1716	2514		3236	1812	1536	1526	3411	1452	1638	3397		
Flt Permitted	0.69	1.00		0.95	1.00	1.00	0.11	1.00	1.00	0.33	1.00		
Satd. Flow (perm)	1245	2514		3236	1812	1536	173	3411	1452	563	3397		
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)	80	45	125	80	105	50	145	829	65	60	1253	145	
RTOR Reduction (vph)	0	113	0	0	0	43	0	0	25	0	6	0	
Lane Group Flow (vph)	80	57	0	80	105	7	145	829	40	60	1392	0	
Confl. Peds. (#/hr)			5	5									
Heavy Vehicles (%)	4%	12%	33%	7%	6%	4%	17%	7%	10%	9%	6%	4%	
Turn Type	pm+pt	NA		Prot	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		
Protected Phases	7	4		3	8		5	2		1	6		
Permitted Phases	4					8	2		2	6			
Actuated Green, G (s)	17.0	11.8		7.2	15.8	15.8	82.4	74.4	74.4	74.0	69.0		
Effective Green, g (s)	17.0	11.8		7.2	15.8	15.8	82.4	74.4	74.4	74.0	69.0		
Actuated g/C Ratio	0.14	0.10		0.06	0.13	0.13	0.69	0.62	0.62	0.62	0.58		
Clearance Time (s)	3.0	7.0		5.0	7.0	7.0	3.0	6.6	6.6	3.0	6.6		
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)	196	247		194	238	202	236	2114	900	391	1953		
v/s Ratio Prot	0.02	0.02		c0.02	c0.06		c0.05	0.24		0.01	c0.41		
v/s Ratio Perm	0.04					0.00	0.37		0.03	0.09			
v/c Ratio	0.41	0.23		0.41	0.44	0.03	0.61	0.39	0.04	0.15	0.71		
Uniform Delay, d1	46.4	49.9		54.4	48.0	45.4	14.4	11.4	8.9	9.2	18.4		
Progression Factor	1.00	1.00		1.00	1.00	1.00	0.79	1.13	1.00	1.00	1.00		
Incremental Delay, d2	1.4	0.5		1.4	1.3	0.1	4.5	0.5	0.1	0.2	2.3		
Delay (s)	47.8	50.4		55.8	49.3	45.5	15.9	13.5	9.0	9.4	20.6		
Level of Service	D	D		E	D	D	B	B	A	A	C		
Approach Delay (s)		49.6			50.7			13.6			20.2		
Approach LOS		D			D			B			C		
Intersection Summary													
HCM 2000 Control Delay			22.7									HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.66										
Actuated Cycle Length (s)			120.0									Sum of lost time (s)	21.6
Intersection Capacity Utilization			82.0%									ICU Level of Service	E
Analysis Period (min)			15										
c	Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis
2: Highway 50 & Industrial Road

Future Total 2041 AM Synchro Model
01-28-2021



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↵	↕↵			↕↕
Traffic Volume (veh/h)	0	60	1014	55	0	1628
Future Volume (Veh/h)	0	60	1014	55	0	1628
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	60	1014	55	0	1628
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage veh			2			2
Upstream signal (m)			160			
pX, platoon unblocked	0.85	0.85			0.85	
vC, conflicting volume	1856	534			1069	
vC1, stage 1 conf vol	1042					
vC2, stage 2 conf vol	814					
vCu, unblocked vol	1646	84			716	
tC, single (s)	7.0	7.3			4.1	
tC, 2 stage (s)	6.0					
tF (s)	3.6	3.5			2.2	
p0 queue free %	100	92			100	
cM capacity (veh/h)	267	764			756	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	60	676	393	814	814	
Volume Left	0	0	0	0	0	
Volume Right	60	0	55	0	0	
cSH	764	1700	1700	1700	1700	
Volume to Capacity	0.08	0.40	0.23	0.48	0.48	
Queue Length 95th (m)	2.0	0.0	0.0	0.0	0.0	
Control Delay (s)	10.1	0.0	0.0	0.0	0.0	
Lane LOS	B					
Approach Delay (s)	10.1	0.0		0.0		
Approach LOS	B					
Intersection Summary						
Average Delay			0.2			
Intersection Capacity Utilization			48.3%	ICU Level of Service	A	
Analysis Period (min)			15			

Timings

3: Highway 50 & George Bolton Parkway/George Bolton Parkway Extension

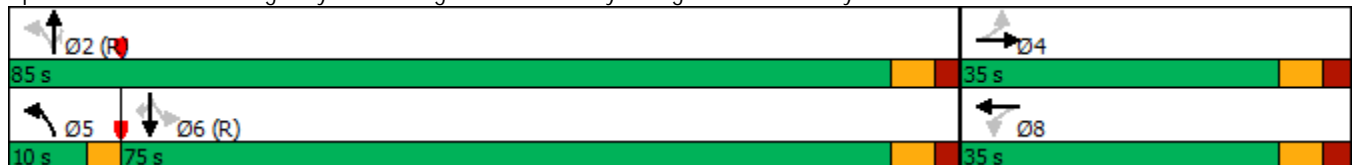


Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	25	23	350	239	75	929	165	40	1438	85
Future Volume (vph)	25	23	350	239	75	929	165	40	1438	85
Turn Type	Perm	NA	Perm	NA	pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases		4		8	5	2			6	
Permitted Phases	4		8		2		2	6		6
Detector Phase	4	4	8	8	5	2	2	6	6	6
Switch Phase										
Minimum Initial (s)	8.0	8.0	8.0	8.0	5.0	12.0	12.0	12.0	12.0	12.0
Minimum Split (s)	32.6	32.6	32.6	32.6	8.0	27.3	27.3	27.3	27.3	27.3
Total Split (s)	35.0	35.0	35.0	35.0	10.0	85.0	85.0	75.0	75.0	75.0
Total Split (%)	29.2%	29.2%	29.2%	29.2%	8.3%	70.8%	70.8%	62.5%	62.5%	62.5%
Yellow Time (s)	4.0	4.0	4.0	4.0	3.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.6	2.6	2.6	2.6	0.0	2.3	2.3	2.3	2.3	2.3
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.6	6.6	6.6	6.6	3.0	6.3	6.3	6.3	6.3	6.3
Lead/Lag					Lead			Lag	Lag	Lag
Lead-Lag Optimize?					Yes			Yes	Yes	Yes
Recall Mode	None	None	None	None	None	C-Min	C-Min	C-Min	C-Min	C-Min
Act Effct Green (s)	37.0	37.0	37.0	37.0	73.4	70.1	70.1	62.1	62.1	62.1
Actuated g/C Ratio	0.31	0.31	0.31	0.31	0.61	0.58	0.58	0.52	0.52	0.52
v/c Ratio	0.09	0.17	0.86	0.40	0.47	0.47	0.16	0.14	0.80	0.10
Control Delay	35.0	15.0	62.8	39.5	25.6	13.0	1.4	7.8	23.3	2.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	35.0	15.0	62.8	39.5	25.6	13.0	1.4	7.8	23.3	2.2
LOS	C	B	E	D	C	B	A	A	C	A
Approach Delay		19.9		53.3		12.1			21.8	
Approach LOS		B		D		B			C	

Intersection Summary

Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 113 (94%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.86
 Intersection Signal Delay: 23.9
 Intersection Capacity Utilization 84.1%
 Analysis Period (min) 15
 Intersection LOS: C
 ICU Level of Service E

Splits and Phases: 3: Highway 50 & George Bolton Parkway/George Bolton Parkway Extension



HCM Signalized Intersection Capacity Analysis

Future Total 2041 AM Synchro Model

3: Highway 50 & George Bolton Parkway/George Bolton Parkway Extension

01-28-2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↑↑	↗	↖	↑↑	↗
Traffic Volume (vph)	25	23	55	350	239	0	75	929	165	40	1438	85
Future Volume (vph)	25	23	55	350	239	0	75	929	165	40	1438	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5
Total Lost time (s)	6.6	6.6		6.6	6.6		3.0	6.3	6.3	6.3	6.3	6.3
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95	1.00	1.00	0.95	1.00
Fr _t	1.00	0.89		1.00	1.00		1.00	1.00	0.85	1.00	1.00	0.85
Fl _t Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1733	1340		1785	1921		1623	3411	1597	1785	3476	1597
Fl _t Permitted	0.51	1.00		0.71	1.00		0.07	1.00	1.00	0.29	1.00	1.00
Satd. Flow (perm)	929	1340		1327	1921		124	3411	1597	543	3476	1597
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)	25	23	55	350	239	0	75	929	165	40	1438	85
RTOR Reduction (vph)	0	38	0	0	0	0	0	0	69	0	0	29
Lane Group Flow (vph)	25	40	0	350	239	0	75	929	96	40	1438	56
Heavy Vehicles (%)	3%	0%	40%	0%	0%	0%	10%	7%	0%	0%	5%	0%
Turn Type	Perm	NA		Perm	NA		pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	37.0	37.0		37.0	37.0		70.1	70.1	70.1	61.5	61.5	61.5
Effective Green, g (s)	37.0	37.0		37.0	37.0		70.1	70.1	70.1	61.5	61.5	61.5
Actuated g/C Ratio	0.31	0.31		0.31	0.31		0.58	0.58	0.58	0.51	0.51	0.51
Clearance Time (s)	6.6	6.6		6.6	6.6		3.0	6.3	6.3	6.3	6.3	6.3
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)	286	413		409	592		142	1992	932	278	1781	818
v/s Ratio Prot		0.03			0.12		c0.02	0.27			c0.41	
v/s Ratio Perm	0.03			c0.26			0.28		0.06	0.07		0.03
v/c Ratio	0.09	0.10		0.86	0.40		0.53	0.47	0.10	0.14	0.81	0.07
Uniform Delay, d ₁	29.5	29.6		39.0	32.8		19.3	14.3	11.0	15.4	24.3	14.8
Progression Factor	1.00	1.00		1.03	1.05		1.76	0.89	0.85	0.49	0.85	0.41
Incremental Delay, d ₂	0.1	0.1		15.7	0.4		3.3	0.7	0.2	0.9	3.4	0.1
Delay (s)	29.6	29.7		55.9	35.0		37.2	13.4	9.6	8.4	24.1	6.3
Level of Service	C	C		E	D		D	B	A	A	C	A
Approach Delay (s)		29.7			47.4			14.4			22.7	
Approach LOS		C			D			B			C	

Intersection Summary

HCM 2000 Control Delay	24.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	15.9
Intersection Capacity Utilization	84.1%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
4: Albion Vaughan Road & Commercial Road

Future Total 2041 AM Synchro Model
01-28-2021



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	25	5	25	338	802	150
Future Volume (Veh/h)	25	5	25	338	802	150
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)	25	5	25	338	802	150
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)	251					
pX, platoon unblocked						
vC, conflicting volume	1096	476	952			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1096	476	952			
tC, single (s)	7.4	7.6	4.2			
tC, 2 stage (s)						
tF (s)	3.8	3.6	2.3			
p0 queue free %	85	99	96			
cM capacity (veh/h)	163	460	687			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	30	138	225	535	417	
Volume Left	25	25	0	0	0	
Volume Right	5	0	0	0	150	
cSH	183	687	1700	1700	1700	
Volume to Capacity	0.16	0.04	0.13	0.31	0.25	
Queue Length 95th (m)	4.6	0.9	0.0	0.0	0.0	
Control Delay (s)	28.5	2.2	0.0	0.0	0.0	
Lane LOS	D	A				
Approach Delay (s)	28.5	0.8		0.0		
Approach LOS	D					
Intersection Summary						
Average Delay	0.9					
Intersection Capacity Utilization	38.3%			ICU Level of Service	A	
Analysis Period (min)	15					

Timings
5: Albion Vaughan Road & Industrial Road

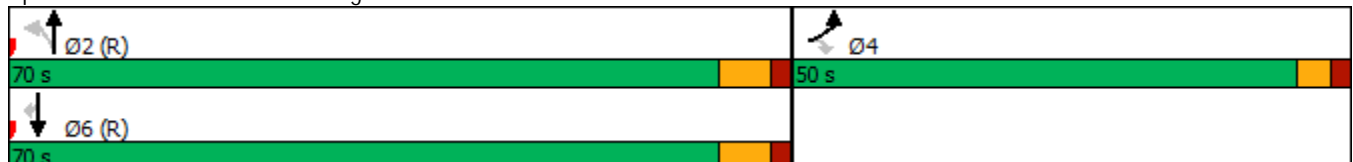


Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↖	↗	↖	↑↑	↑↑	↗
Traffic Volume (vph)	228	140	55	140	333	474
Future Volume (vph)	228	140	55	140	333	474
Turn Type	Prot	Perm	Perm	NA	NA	Perm
Protected Phases	4			2	6	
Permitted Phases		4	2			6
Detector Phase	4	4	2	2	6	6
Switch Phase						
Minimum Initial (s)	5.0	5.0	7.0	7.0	7.0	7.0
Minimum Split (s)	30.0	30.0	31.6	31.6	31.6	31.6
Total Split (s)	50.0	50.0	70.0	70.0	70.0	70.0
Total Split (%)	41.7%	41.7%	58.3%	58.3%	58.3%	58.3%
Yellow Time (s)	3.0	3.0	4.6	4.6	4.6	4.6
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	6.6	6.6	6.6	6.6
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	C-Min	C-Min	C-Min	C-Min
Act Effct Green (s)	24.3	24.3	84.1	84.1	84.1	84.1
Actuated g/C Ratio	0.20	0.20	0.70	0.70	0.70	0.70
v/c Ratio	0.77	0.36	0.09	0.06	0.13	0.39
Control Delay	63.3	11.0	7.7	6.7	6.8	1.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	63.3	11.0	7.7	6.7	6.8	1.7
LOS	E	B	A	A	A	A
Approach Delay	43.4			7.0	3.8	
Approach LOS	D			A	A	

Intersection Summary

Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green
 Natural Cycle: 65
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.77
 Intersection Signal Delay: 14.9
 Intersection LOS: B
 Intersection Capacity Utilization 46.2%
 ICU Level of Service A
 Analysis Period (min) 15

Splits and Phases: 5: Albion Vaughan Road & Industrial Road



HCM Signalized Intersection Capacity Analysis
5: Albion Vaughan Road & Industrial Road

Future Total 2041 AM Synchro Model
01-28-2021



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	228	140	55	140	333	474
Future Volume (vph)	228	140	55	140	333	474
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.7	3.7	3.5
Total Lost time (s)	5.0	5.0	6.6	6.6	6.6	6.6
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1475	1377	1513	3147	3544	1536
Flt Permitted	0.95	1.00	0.55	1.00	1.00	1.00
Satd. Flow (perm)	1475	1377	877	3147	3544	1536
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	228	140	55	140	333	474
RTOR Reduction (vph)	0	112	0	0	0	142
Lane Group Flow (vph)	228	28	55	140	333	332
Heavy Vehicles (%)	21%	16%	18%	16%	3%	4%
Turn Type	Prot	Perm	Perm	NA	NA	Perm
Protected Phases	4			2	6	
Permitted Phases		4	2			6
Actuated Green, G (s)	24.3	24.3	84.1	84.1	84.1	84.1
Effective Green, g (s)	24.3	24.3	84.1	84.1	84.1	84.1
Actuated g/C Ratio	0.20	0.20	0.70	0.70	0.70	0.70
Clearance Time (s)	5.0	5.0	6.6	6.6	6.6	6.6
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	298	278	614	2205	2483	1076
v/s Ratio Prot	c0.15			0.04	0.09	
v/s Ratio Perm		0.02	0.06			c0.22
v/c Ratio	0.77	0.10	0.09	0.06	0.13	0.31
Uniform Delay, d1	45.2	39.0	5.7	5.6	5.9	6.9
Progression Factor	1.05	1.47	1.00	1.00	1.00	1.00
Incremental Delay, d2	11.1	0.2	0.3	0.1	0.1	0.7
Delay (s)	58.4	57.4	6.0	5.7	6.0	7.6
Level of Service	E	E	A	A	A	A
Approach Delay (s)	58.0			5.8	7.0	
Approach LOS	E			A	A	

Intersection Summary

HCM 2000 Control Delay	20.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	11.6
Intersection Capacity Utilization	46.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Timings
6: Highway 50 & Parr Boulevard/Private Driveway

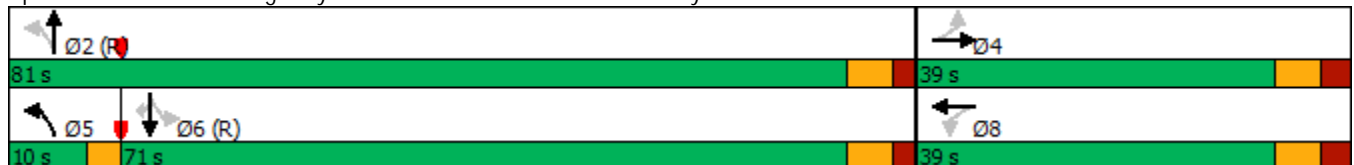


Lane Group	EBL	EBT	NBL	NBT	SBT	SBR	Ø8
Lane Configurations	↶	↷	↶	↶↷	↶↷	↷	
Traffic Volume (vph)	45	0	120	1174	1578	110	
Future Volume (vph)	45	0	120	1174	1578	110	
Turn Type	Perm	NA	pm+pt	NA	NA	Perm	
Protected Phases		4	5	2	6		8
Permitted Phases	4		2			6	
Detector Phase	4	4	5	2	6	6	
Switch Phase							
Minimum Initial (s)	8.0	8.0	5.0	12.0	12.0	12.0	8.0
Minimum Split (s)	33.9	33.9	8.0	30.1	30.1	30.1	33.9
Total Split (s)	39.0	39.0	10.0	81.0	71.0	71.0	39.0
Total Split (%)	32.5%	32.5%	8.3%	67.5%	59.2%	59.2%	33%
Yellow Time (s)	4.0	4.0	3.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.9	2.9	0.0	2.1	2.1	2.1	2.9
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.9	6.9	3.0	6.1	6.1	6.1	
Lead/Lag			Lead		Lag	Lag	
Lead-Lag Optimize?			Yes		Yes	Yes	
Recall Mode	None	None	None	C-Min	C-Min	C-Min	None
Act Effect Green (s)	10.0	10.0	103.0	101.2	87.6	87.6	
Actuated g/C Ratio	0.08	0.08	0.86	0.84	0.73	0.73	
v/c Ratio	0.41	0.22	0.42	0.41	0.65	0.10	
Control Delay	62.4	2.3	6.3	3.6	13.4	5.2	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	62.4	2.3	6.3	3.6	13.4	5.2	
LOS	E	A	A	A	B	A	
Approach Delay		30.8		3.9	12.9		
Approach LOS		C		A	B		

Intersection Summary

Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 8 (7%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.65
 Intersection Signal Delay: 9.6
 Intersection LOS: A
 Intersection Capacity Utilization 71.1%
 ICU Level of Service C
 Analysis Period (min) 15

Splits and Phases: 6: Highway 50 & Parr Boulevard/Private Driveway



HCM Signalized Intersection Capacity Analysis
6: Highway 50 & Parr Boulevard/Private Driveway

Future Total 2041 AM Synchro Model

01-28-2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	45	0	50	0	0	0	120	1174	0	0	1578	110
Future Volume (vph)	45	0	50	0	0	0	120	1174	0	0	1578	110
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5
Total Lost time (s)	6.9	6.9					3.0	6.1			6.1	6.1
Lane Util. Factor	1.00	1.00					1.00	0.95			0.95	1.00
Frt	1.00	0.85					1.00	1.00			1.00	0.85
Flt Protected	0.95	1.00					0.95	1.00			1.00	1.00
Satd. Flow (prot)	1668	1306					1684	3380			3349	1551
Flt Permitted	0.76	1.00					0.11	1.00			1.00	1.00
Satd. Flow (perm)	1330	1306					202	3380			3349	1551
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	0	50	0	0	0	120	1174	0	0	1578	110
RTOR Reduction (vph)	0	47	0	0	0	0	0	0	0	0	0	18
Lane Group Flow (vph)	45	4	0	0	0	0	120	1174	0	0	1578	92
Heavy Vehicles (%)	7%	0%	25%	0%	0%	50%	6%	8%	0%	0%	9%	3%
Turn Type	Perm	NA					pm+pt	NA		Perm	NA	Perm
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	8.4	8.4					98.6	98.6			86.3	86.3
Effective Green, g (s)	8.4	8.4					98.6	98.6			86.3	86.3
Actuated g/C Ratio	0.07	0.07					0.82	0.82			0.72	0.72
Clearance Time (s)	6.9	6.9					3.0	6.1			6.1	6.1
Vehicle Extension (s)	3.0	3.0					3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	93	91					280	2777			2408	1115
v/s Ratio Prot		0.00					0.03	c0.35			c0.47	
v/s Ratio Perm	c0.03						0.32					0.06
v/c Ratio	0.48	0.04					0.43	0.42			0.66	0.08
Uniform Delay, d1	53.7	52.0					6.8	2.9			9.0	5.0
Progression Factor	1.00	1.00					1.00	1.00			1.23	1.54
Incremental Delay, d2	3.9	0.2					1.1	0.5			0.9	0.1
Delay (s)	57.6	52.2					7.9	3.4			11.9	7.9
Level of Service	E	D					A	A			B	A
Approach Delay (s)		54.8			0.0			3.8			11.7	
Approach LOS		D			A			A			B	

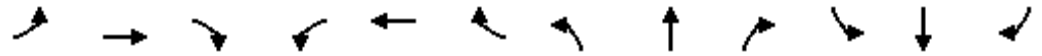
Intersection Summary

HCM 2000 Control Delay	9.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	71.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Timings

7: Highway 50 & Mayfield Road/Albion Vaughan Road

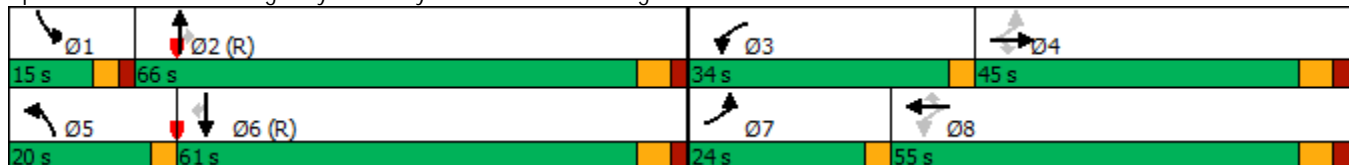


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗	↖	↖	↗	↖	↖	↗↗	↖	↖	↗↗	↖
Traffic Volume (vph)	115	115	145	450	370	15	105	1179	160	5	1453	160
Future Volume (vph)	115	115	145	450	370	15	105	1179	160	5	1453	160
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	12.0	12.0	10.0	12.0	12.0	10.0	20.0	20.0	10.0	20.0	20.0
Minimum Split (s)	8.0	39.5	39.5	13.0	39.5	39.5	13.0	37.3	37.3	15.0	37.3	37.3
Total Split (s)	24.0	45.0	45.0	34.0	55.0	55.0	20.0	66.0	66.0	15.0	61.0	61.0
Total Split (%)	15.0%	28.1%	28.1%	21.3%	34.4%	34.4%	12.5%	41.3%	41.3%	9.4%	38.1%	38.1%
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.2	4.2	3.0	4.2	4.2
All-Red Time (s)	0.0	2.5	2.5	0.0	2.5	2.5	0.0	2.1	2.1	2.0	2.1	2.1
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.0	6.5	6.5	3.0	6.5	6.5	3.0	6.3	6.3	5.0	6.3	6.3
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Min	C-Min	None	C-Min	C-Min
Act Effect Green (s)	39.6	22.5	22.5	60.0	39.9	39.9	19.5	87.7	87.7	10.0	68.2	68.2
Actuated g/C Ratio	0.25	0.14	0.14	0.38	0.25	0.25	0.12	0.55	0.55	0.06	0.43	0.43
v/c Ratio	0.49	0.53	0.57	0.90	0.84	0.04	0.73	0.63	0.19	0.05	0.98	0.23
Control Delay	40.5	70.4	16.6	64.7	74.3	0.1	95.4	29.4	4.3	72.0	62.6	11.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	40.5	70.4	16.6	64.7	74.3	0.1	95.4	29.4	4.3	72.0	62.6	11.2
LOS	D	E	B	E	E	A	F	C	A	E	E	B
Approach Delay		40.4			67.8			31.4			57.6	
Approach LOS		D			E			C			E	

Intersection Summary

























Cycle Length: 160
 Actuated Cycle Length: 160
 Offset: 27 (17%), Referenced to phase 2:NBT and 6:SBT, Start of Green
 Natural Cycle: 125
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.98
 Intersection Signal Delay: 49.2
 Intersection LOS: D
 Intersection Capacity Utilization 100.8%
 ICU Level of Service G
 Analysis Period (min) 15

Splits and Phases: 7: Highway 50 & Mayfield Road/Albion Vaughan Road



HCM Signalized Intersection Capacity Analysis
7: Highway 50 & Mayfield Road/Albion Vaughan Road

Future Total 2041 AM Synchro Model
01-28-2021

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	115	115	145	450	370	15	105	1179	160	5	1453	160	
Future Volume (vph)	115	115	145	450	370	15	105	1179	160	5	1453	160	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5	
Total Lost time (s)	3.0	6.5	6.5	3.0	6.5	6.5	3.0	6.3	6.3	5.0	6.3	6.3	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	*1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1594	1549	929	1700	1762	1413	1174	3411	1401	1539	3493	1479	
Flt Permitted	0.37	1.00	1.00	0.53	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	
Satd. Flow (perm)	618	1549	929	940	1762	1413	1174	3411	1401	1539	3493	1479	
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)	115	115	145	450	370	15	105	1179	160	5	1453	160	
RTOR Reduction (vph)	0	0	125	0	0	11	0	0	76	0	0	68	
Lane Group Flow (vph)	115	115	20	450	370	4	105	1179	84	5	1453	92	
Heavy Vehicles (%)	12%	24%	72%	5%	9%	13%	52%	7%	14%	16%	10%	8%	
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	
Protected Phases	7	4		3	8		5	2		1	6		
Permitted Phases	4		4	8		8			2			6	
Actuated Green, G (s)	36.1	22.5	22.5	56.5	39.9	39.9	19.5	83.7	83.7	2.0	68.2	68.2	
Effective Green, g (s)	36.1	22.5	22.5	56.5	39.9	39.9	19.5	83.7	83.7	2.0	68.2	68.2	
Actuated g/C Ratio	0.23	0.14	0.14	0.35	0.25	0.25	0.12	0.52	0.52	0.01	0.43	0.43	
Clearance Time (s)	3.0	6.5	6.5	3.0	6.5	6.5	3.0	6.3	6.3	5.0	6.3	6.3	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	222	217	130	479	439	352	143	1784	732	19	1488	630	
v/s Ratio Prot	0.04	0.07		c0.18	0.21		c0.09	0.35		0.00	c0.42		
v/s Ratio Perm	0.07		0.02	c0.15		0.00			0.06			0.06	
v/c Ratio	0.52	0.53	0.16	0.94	0.84	0.01	0.73	0.66	0.11	0.26	0.98	0.15	
Uniform Delay, d1	51.9	63.8	60.4	46.9	57.1	45.2	67.8	27.8	19.4	78.3	45.1	28.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	2.0	2.3	0.6	26.3	13.7	0.0	17.6	1.9	0.3	7.3	18.4	0.5	
Delay (s)	53.9	66.2	61.0	73.3	70.8	45.2	85.4	29.7	19.7	85.6	63.5	28.6	
Level of Service	D	E	E	E	E	D	F	C	B	F	E	C	
Approach Delay (s)		60.4			71.7			32.7			60.1		
Approach LOS		E			E			C			E		
Intersection Summary													
HCM 2000 Control Delay			53.1									HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio			0.96										
Actuated Cycle Length (s)			160.0									Sum of lost time (s)	20.8
Intersection Capacity Utilization			100.8%									ICU Level of Service	G
Analysis Period (min)			15										

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
8: Albion Vaughan Road & Kirby Road

Future Total 2041 AM Synchro Model
01-28-2021



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔		↑↔			↔↑
Traffic Volume (veh/h)	5	25	150	5	60	448
Future Volume (Veh/h)	5	25	150	5	60	448
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)	5	25	150	5	60	448
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	496	78			155	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	496	78			155	
tC, single (s)	7.5	7.3			4.1	
tC, 2 stage (s)						
tF (s)	3.8	3.5			2.2	
p0 queue free %	99	97			96	
cM capacity (veh/h)	414	913			1430	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	30	100	55	209	299	
Volume Left	5	0	0	60	0	
Volume Right	25	0	5	0	0	
cSH	760	1700	1700	1430	1700	
Volume to Capacity	0.04	0.06	0.03	0.04	0.18	
Queue Length 95th (m)	1.0	0.0	0.0	1.1	0.0	
Control Delay (s)	9.9	0.0	0.0	2.4	0.0	
Lane LOS	A			A		
Approach Delay (s)	9.9	0.0		1.0		
Approach LOS	A					
Intersection Summary						
Average Delay			1.2			
Intersection Capacity Utilization			31.8%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
 9: Highway 50 & Site Access

Future Total 2041 AM Synchro Model
 01-28-2021



Movement	WBL	WBR	NBT	NBR	SBL	SBT	
Lane Configurations							
Traffic Volume (veh/h)	40	125	1009	65	25	1608	
Future Volume (Veh/h)	40	125	1009	65	25	1608	
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)	40	125	1009	65	25	1608	
Pedestrians							
Lane Width (m)							
Walking Speed (m/s)							
Percent Blockage							
Right turn flare (veh)							
Median type	TWLTL			TWLTL			
Median storage veh	2			2			
Upstream signal (m)	331			311			
pX, platoon unblocked	0.79	0.86			0.86		
vC, conflicting volume	1896	537			1074		
vC1, stage 1 conf vol	1042						
vC2, stage 2 conf vol	854						
vCu, unblocked vol	776	126			753		
tC, single (s)	6.8	6.9			4.1		
tC, 2 stage (s)	5.8						
tF (s)	3.5	3.3			2.2		
p0 queue free %	89	84			97		
cM capacity (veh/h)	370	777			742		
Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	40	125	673	401	25	804	804
Volume Left	40	0	0	0	25	0	0
Volume Right	0	125	0	65	0	0	0
cSH	370	777	1700	1700	742	1700	1700
Volume to Capacity	0.11	0.16	0.40	0.24	0.03	0.47	0.47
Queue Length 95th (m)	2.9	4.6	0.0	0.0	0.8	0.0	0.0
Control Delay (s)	15.9	10.5	0.0	0.0	10.0	0.0	0.0
Lane LOS	C	B			B		
Approach Delay (s)	11.8		0.0		0.2		
Approach LOS	B						
Intersection Summary							
Average Delay			0.8				
Intersection Capacity Utilization			54.4%		ICU Level of Service		A
Analysis Period (min)			15				

HCM Unsignalized Intersection Capacity Analysis
 10: Industrial Road & Site Access

Future Total 2041 AM Synchro Model
 01-28-2021



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↖	↗		↘	
Traffic Volume (veh/h)	30	25	30	55	305	30
Future Volume (Veh/h)	30	25	30	55	305	30
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)	30	25	30	55	305	30
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	85				142	58
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	85				142	58
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	98				64	97
cM capacity (veh/h)	1524				838	1014
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	55	85	335			
Volume Left	30	0	305			
Volume Right	0	55	30			
cSH	1524	1700	851			
Volume to Capacity	0.02	0.05	0.39			
Queue Length 95th (m)	0.5	0.0	15.1			
Control Delay (s)	4.1	0.0	11.9			
Lane LOS	A		B			
Approach Delay (s)	4.1	0.0	11.9			
Approach LOS			B			
Intersection Summary						
Average Delay			8.9			
Intersection Capacity Utilization			35.0%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
 11: George Bolton Parkway Extension & Industrial Road

Future Total 2041 AM Synchro Model
 01-28-2021



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔	↔		↔	
Traffic Volume (veh/h)	40	188	384	115	195	205
Future Volume (Veh/h)	40	188	384	115	195	205
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)	40	188	384	115	195	205
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		TWLTL	TWLTL			
Median storage (veh)		2	2			
Upstream signal (m)		290	274			
pX, platoon unblocked						
vC, conflicting volume	499				710	442
vC1, stage 1 conf vol					442	
vC2, stage 2 conf vol					268	
vCu, unblocked vol	499				710	442
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)	2.2				3.5	3.3
p0 queue free %	96				66	67
cM capacity (veh/h)	1075				577	620
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	228	499	400			
Volume Left	40	0	195			
Volume Right	0	115	205			
cSH	1075	1700	598			
Volume to Capacity	0.04	0.29	0.67			
Queue Length 95th (m)	0.9	0.0	40.3			
Control Delay (s)	1.8	0.0	22.3			
Lane LOS	A		C			
Approach Delay (s)	1.8	0.0	22.3			
Approach LOS			C			
Intersection Summary						
Average Delay			8.3			
Intersection Capacity Utilization			72.7%	ICU Level of Service		C
Analysis Period (min)			15			

Timings

1: Highway 50 & McEwan Drive West/McEwan Drive East

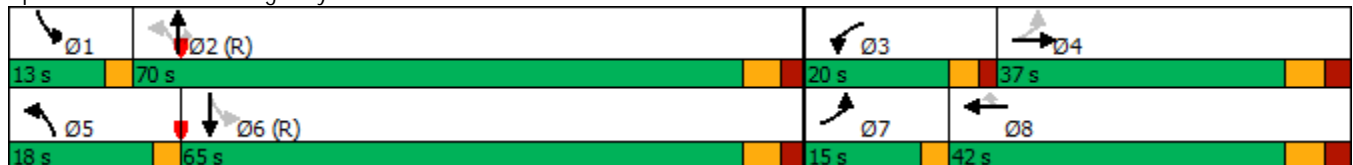


Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations	↖	↗	↖↗	↕	↖↗	↖	↕	↖↗	↖	↗
Traffic Volume (vph)	225	110	165	95	230	125	1500	185	100	941
Future Volume (vph)	225	110	165	95	230	125	1500	185	100	941
Turn Type	pm+pt	NA	Prot	NA	Perm	pm+pt	NA	Perm	pm+pt	NA
Protected Phases	7	4	3	8		5	2		1	6
Permitted Phases	4				8	2		2	6	
Detector Phase	7	4	3	8	8	5	2	2	1	6
Switch Phase										
Minimum Initial (s)	5.0	8.0	8.0	8.0	8.0	5.0	8.0	8.0	5.0	8.0
Minimum Split (s)	8.0	35.0	13.0	35.0	35.0	8.0	34.6	34.6	8.0	34.6
Total Split (s)	15.0	37.0	20.0	42.0	42.0	18.0	70.0	70.0	13.0	65.0
Total Split (%)	10.7%	26.4%	14.3%	30.0%	30.0%	12.9%	50.0%	50.0%	9.3%	46.4%
Yellow Time (s)	3.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0
All-Red Time (s)	0.0	3.0	2.0	3.0	3.0	0.0	2.6	2.6	0.0	2.6
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.0	7.0	5.0	7.0	7.0	3.0	6.6	6.6	3.0	6.6
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	Min	None	Min	Min	None	C-Min	C-Min	None	C-Min
Act Effect Green (s)	33.5	15.4	12.0	14.0	14.0	94.7	81.5	81.5	94.5	81.3
Actuated g/C Ratio	0.24	0.11	0.09	0.10	0.10	0.68	0.58	0.58	0.68	0.58
v/c Ratio	0.64	0.63	0.57	0.52	0.70	0.42	0.73	0.19	0.45	0.50
Control Delay	54.4	26.3	69.0	68.5	24.5	11.9	25.0	7.1	14.1	19.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	54.4	26.3	69.0	68.5	24.5	11.9	25.0	7.1	14.1	19.0
LOS	D	C	E	E	C	B	C	A	B	B
Approach Delay		37.6		48.0			22.2			18.6
Approach LOS		D		D			C			B

Intersection Summary

Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 72 (51%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 105
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.73
 Intersection Signal Delay: 26.5
 Intersection LOS: C
 Intersection Capacity Utilization 84.1%
 ICU Level of Service E
 Analysis Period (min) 15

Splits and Phases: 1: Highway 50 & McEwan Drive West/McEwan Drive East



HCM Signalized Intersection Capacity Analysis
 1: Highway 50 & McEwan Drive West/McEwan Drive East

Future Total 2041 PM Synchro Model

01-28-2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	225	110	225	165	95	230	125	1500	185	100	941	75	
Future Volume (vph)	225	110	225	165	95	230	125	1500	185	100	941	75	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5	
Total Lost time (s)	3.0	7.0		5.0	7.0	7.0	3.0	6.6	6.6	3.0	6.6		
Lane Util. Factor	1.00	0.95		0.97	1.00	1.00	1.00	0.95	1.00	1.00	0.95		
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	0.90		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		
Satd. Flow (prot)	1785	3096		3395	1830	1581	1439	3544	1566	1785	3501		
Flt Permitted	0.64	1.00		0.95	1.00	1.00	0.22	1.00	1.00	0.09	1.00		
Satd. Flow (perm)	1195	3096		3395	1830	1581	331	3544	1566	169	3501		
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)	225	110	225	165	95	230	125	1500	185	100	941	75	
RTOR Reduction (vph)	0	192	0	0	0	171	0	0	45	0	3	0	
Lane Group Flow (vph)	225	143	0	165	95	59	125	1500	140	100	1013	0	
Confl. Peds. (#/hr)							5					5	
Heavy Vehicles (%)	0%	4%	7%	2%	5%	1%	24%	3%	2%	0%	3%	1%	
Turn Type	pm+pt	NA		Prot	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		
Protected Phases	7	4		3	8		5	2		1	6		
Permitted Phases	4					8	2		2	6			
Actuated Green, G (s)	30.7	15.4		12.0	14.1	14.1	91.1	81.4	81.4	90.9	81.3		
Effective Green, g (s)	30.7	15.4		12.0	14.1	14.1	91.1	81.4	81.4	90.9	81.3		
Actuated g/C Ratio	0.22	0.11		0.09	0.10	0.10	0.65	0.58	0.58	0.65	0.58		
Clearance Time (s)	3.0	7.0		5.0	7.0	7.0	3.0	6.6	6.6	3.0	6.6		
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)	326	340		291	184	159	292	2060	910	220	2033		
v/s Ratio Prot	c0.08	0.05		0.05	0.05		0.03	c0.42		c0.03	0.29		
v/s Ratio Perm	c0.08					0.04	0.25		0.09	0.26			
v/c Ratio	0.69	0.42		0.57	0.52	0.37	0.43	0.73	0.15	0.45	0.50		
Uniform Delay, d1	48.9	58.1		61.5	59.7	58.8	11.0	21.3	13.5	17.0	17.3		
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	6.2	0.8		2.5	2.4	1.5	1.0	2.3	0.4	1.5	0.9		
Delay (s)	55.0	59.0		64.0	62.2	60.3	12.1	23.6	13.8	18.5	18.2		
Level of Service	E	E		E	E	E	B	C	B	B	B		
Approach Delay (s)		57.4			61.9			21.8			18.2		
Approach LOS		E			E			C			B		
Intersection Summary													
HCM 2000 Control Delay			30.7									HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.72										
Actuated Cycle Length (s)			140.0									Sum of lost time (s)	21.6
Intersection Capacity Utilization			84.1%									ICU Level of Service	E
Analysis Period (min)			15										
c Critical Lane Group													

HCM Unsignalized Intersection Capacity Analysis
2: Highway 50 & Industrial Road

Future Total 2041 PM Synchro Model
01-28-2021



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↗	↕↗			↕↖
Traffic Volume (veh/h)	0	100	1960	160	0	1471
Future Volume (Veh/h)	0	100	1960	160	0	1471
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	100	1960	160	0	1471
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage veh			2			2
Upstream signal (m)			160			
pX, platoon unblocked	0.45	0.45			0.45	
vC, conflicting volume	2776	1060			2120	
vC1, stage 1 conf vol	2040					
vC2, stage 2 conf vol	736					
vCu, unblocked vol	2496	0			1023	
tC, single (s)	7.1	7.0			4.3	
tC, 2 stage (s)	6.1					
tF (s)	3.6	3.3			2.3	
p0 queue free %	100	79			100	
cM capacity (veh/h)	141	481			285	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	100	1307	813	736	736	
Volume Left	0	0	0	0	0	
Volume Right	100	0	160	0	0	
cSH	481	1700	1700	1700	1700	
Volume to Capacity	0.21	0.77	0.48	0.43	0.43	
Queue Length 95th (m)	6.2	0.0	0.0	0.0	0.0	
Control Delay (s)	14.4	0.0	0.0	0.0	0.0	
Lane LOS	B					
Approach Delay (s)	14.4	0.0		0.0		
Approach LOS	B					
Intersection Summary						
Average Delay			0.4			
Intersection Capacity Utilization			72.1%		ICU Level of Service	C
Analysis Period (min)			15			

Timings

3: Highway 50 & George Bolton Parkway/George Bolton Parkway Extension

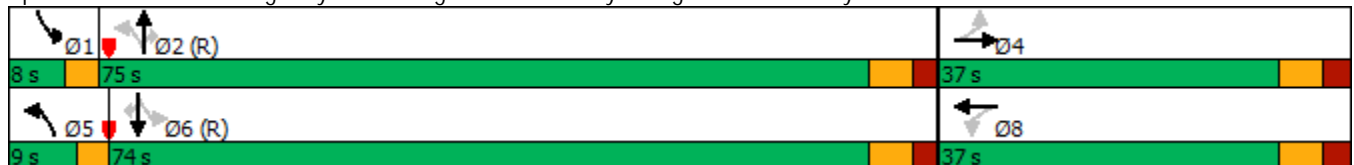


Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗	↖	↗	↖	↑↑	↗	↖	↑↑	↗
Traffic Volume (vph)	125	22	264	126	60	1915	346	95	1121	95
Future Volume (vph)	125	22	264	126	60	1915	346	95	1121	95
Turn Type	Perm	NA	Perm	NA	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases		4		8	5	2		1	6	
Permitted Phases	4		8		2		2	6		6
Detector Phase	4	4	8	8	5	2	2	1	6	6
Switch Phase										
Minimum Initial (s)	8.0	8.0	8.0	8.0	5.0	12.0	12.0	5.0	12.0	12.0
Minimum Split (s)	32.6	32.6	32.6	32.6	8.0	27.3	27.3	8.0	27.3	27.3
Total Split (s)	37.0	37.0	37.0	37.0	9.0	75.0	75.0	8.0	74.0	74.0
Total Split (%)	30.8%	30.8%	30.8%	30.8%	7.5%	62.5%	62.5%	6.7%	61.7%	61.7%
Yellow Time (s)	4.0	4.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	2.6	2.6	2.6	2.6	0.0	2.3	2.3	0.0	2.3	2.3
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.6	6.6	6.6	6.6	3.0	6.3	6.3	3.0	6.3	6.3
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-Min	C-Min	None	C-Min	C-Min
Act Effct Green (s)	29.1	29.1	29.1	29.1	78.9	69.7	69.7	78.1	70.8	70.8
Actuated g/C Ratio	0.24	0.24	0.24	0.24	0.66	0.58	0.58	0.65	0.59	0.59
v/c Ratio	0.42	0.31	0.94	0.27	0.25	0.94	0.33	0.66	0.55	0.10
Control Delay	42.7	10.4	87.5	42.3	9.5	26.7	3.1	38.6	16.9	4.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	42.7	10.4	87.5	42.3	9.5	26.7	3.1	38.6	16.9	4.3
LOS	D	B	F	D	A	C	A	D	B	A
Approach Delay		25.0		72.9		22.8			17.5	
Approach LOS		C		E		C			B	

Intersection Summary

Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 116 (97%), 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: 25.9
 Intersection Capacity Utilization 101.6%
 Analysis Period (min) 15
 Intersection LOS: C
 ICU Level of Service G

Splits and Phases: 3: Highway 50 & George Bolton Parkway/George Bolton Parkway Extension

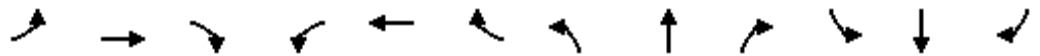


HCM Signalized Intersection Capacity Analysis

Future Total 2041 PM Synchro Model

3: Highway 50 & George Bolton Parkway/George Bolton Parkway Extension

01-28-2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	125	22	130	264	126	0	60	1915	346	95	1121	95
Future Volume (vph)	125	22	130	264	126	0	60	1915	346	95	1121	95
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5
Total Lost time (s)	6.6	6.6		6.6	6.6		3.0	6.3	6.3	3.0	6.3	6.3
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95	1.00	1.00	0.95	1.00
Fr _t	1.00	0.87		1.00	1.00		1.00	1.00	0.85	1.00	1.00	0.85
Fl _t Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1750	1633		1785	1921		1405	3510	1597	1785	3476	1521
Fl _t Permitted	0.67	1.00		0.62	1.00		0.19	1.00	1.00	0.06	1.00	1.00
Satd. Flow (perm)	1235	1633		1165	1921		282	3510	1597	107	3476	1521
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)	125	22	130	264	126	0	60	1915	346	95	1121	95
RTOR Reduction (vph)	0	98	0	0	0	0	0	0	136	0	0	30
Lane Group Flow (vph)	125	54	0	264	126	0	60	1915	210	95	1121	65
Heavy Vehicles (%)	2%	0%	3%	0%	0%	0%	27%	4%	0%	0%	5%	5%
Turn Type	Perm	NA		Perm	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	29.1	29.1		29.1	29.1		74.5	69.7	69.7	75.5	70.2	70.2
Effective Green, g (s)	29.1	29.1		29.1	29.1		74.5	69.7	69.7	75.5	70.2	70.2
Actuated g/C Ratio	0.24	0.24		0.24	0.24		0.62	0.58	0.58	0.63	0.59	0.59
Clearance Time (s)	6.6	6.6		6.6	6.6		3.0	6.3	6.3	3.0	6.3	6.3
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)	299	396		282	465		219	2038	927	141	2033	889
v/s Ratio Prot		0.03			0.07		0.01	c0.55		c0.03	0.32	
v/s Ratio Perm	0.10			c0.23			0.16		0.13	0.39		0.04
v/c Ratio	0.42	0.14		0.94	0.27		0.27	0.94	0.23	0.67	0.55	0.07
Uniform Delay, d ₁	38.3	35.6		44.5	36.8		10.5	23.2	12.1	25.4	15.3	10.8
Progression Factor	1.00	1.00		1.09	1.11		1.12	0.81	1.52	1.00	1.00	1.00
Incremental Delay, d ₂	0.9	0.2		36.5	0.3		0.4	6.9	0.4	12.0	1.1	0.2
Delay (s)	39.3	35.8		84.9	41.4		12.2	25.8	18.8	37.3	16.3	11.0
Level of Service	D	D		F	D		B	C	B	D	B	B
Approach Delay (s)		37.3			70.9			24.4			17.5	
Approach LOS		D			E			C			B	

Intersection Summary

HCM 2000 Control Delay	27.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	15.9
Intersection Capacity Utilization	101.6%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
4: Albion Vaughan Road & Commercial Road

Future Total 2041 PM Synchro Model
01-28-2021



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	95	40	20	873	494	105
Future Volume (Veh/h)	95	40	20	873	494	105
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)	95	40	20	873	494	105
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)	251					
pX, platoon unblocked	0.96					
vC, conflicting volume	1023	300	599			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	936	300	599			
tC, single (s)	6.9	6.9	4.4			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.4			
p0 queue free %	61	94	98			
cM capacity (veh/h)	245	697	890			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	135	311	582	329	270	
Volume Left	95	20	0	0	0	
Volume Right	40	0	0	0	105	
cSH	303	890	1700	1700	1700	
Volume to Capacity	0.44	0.02	0.34	0.19	0.16	
Queue Length 95th (m)	17.4	0.6	0.0	0.0	0.0	
Control Delay (s)	26.0	0.8	0.0	0.0	0.0	
Lane LOS	D	A				
Approach Delay (s)	26.0	0.3		0.0		
Approach LOS	D					
Intersection Summary						
Average Delay	2.3					
Intersection Capacity Utilization	52.8%			ICU Level of Service	A	
Analysis Period (min)	15					

Timings
5: Albion Vaughan Road & Industrial Road

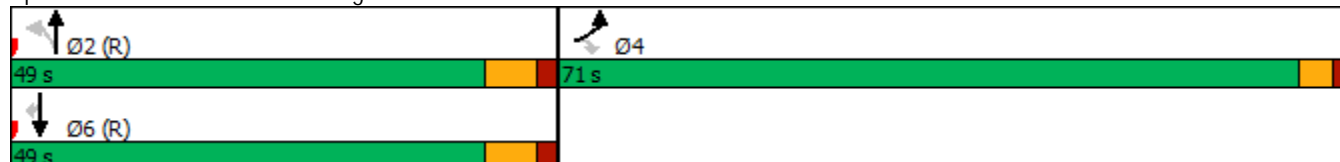


Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↖	↗	↖	↑↑	↑↑	↗
Traffic Volume (vph)	448	125	80	430	204	330
Future Volume (vph)	448	125	80	430	204	330
Turn Type	Prot	Perm	Perm	NA	NA	Perm
Protected Phases	4			2	6	
Permitted Phases		4	2			6
Detector Phase	4	4	2	2	6	6
Switch Phase						
Minimum Initial (s)	5.0	5.0	7.0	7.0	7.0	7.0
Minimum Split (s)	30.0	30.0	31.6	31.6	31.6	31.6
Total Split (s)	71.0	71.0	49.0	49.0	49.0	49.0
Total Split (%)	59.2%	59.2%	40.8%	40.8%	40.8%	40.8%
Yellow Time (s)	3.0	3.0	4.6	4.6	4.6	4.6
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	6.6	6.6	6.6	6.6
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	C-Min	C-Min	C-Min	C-Min
Act Effct Green (s)	38.3	38.3	70.1	70.1	70.1	70.1
Actuated g/C Ratio	0.32	0.32	0.58	0.58	0.58	0.58
v/c Ratio	0.79	0.21	0.15	0.21	0.11	0.31
Control Delay	49.4	6.5	14.7	13.4	12.8	2.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	49.4	6.5	14.7	13.4	12.8	2.5
LOS	D	A	B	B	B	A
Approach Delay	40.0			13.6	6.5	
Approach LOS	D			B	A	

Intersection Summary

Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
 Natural Cycle: 65
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.79
 Intersection Signal Delay: 20.6
 Intersection LOS: C
 Intersection Capacity Utilization 51.7%
 ICU Level of Service A
 Analysis Period (min) 15

Splits and Phases: 5: Albion Vaughan Road & Industrial Road



HCM Signalized Intersection Capacity Analysis
5: Albion Vaughan Road & Industrial Road

Future Total 2041 PM Synchro Model
01-28-2021



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	448	125	80	430	204	330
Future Volume (vph)	448	125	80	430	204	330
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.7	3.7	3.5
Total Lost time (s)	5.0	5.0	6.6	6.6	6.6	6.6
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1785	1597	1405	3544	3259	1597
Flt Permitted	0.95	1.00	0.62	1.00	1.00	1.00
Satd. Flow (perm)	1785	1597	923	3544	3259	1597
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	448	125	80	430	204	330
RTOR Reduction (vph)	0	85	0	0	0	137
Lane Group Flow (vph)	448	40	80	430	204	193
Heavy Vehicles (%)	0%	0%	27%	3%	12%	0%
Turn Type	Prot	Perm	Perm	NA	NA	Perm
Protected Phases	4			2	6	
Permitted Phases		4	2			6
Actuated Green, G (s)	38.3	38.3	70.1	70.1	70.1	70.1
Effective Green, g (s)	38.3	38.3	70.1	70.1	70.1	70.1
Actuated g/C Ratio	0.32	0.32	0.58	0.58	0.58	0.58
Clearance Time (s)	5.0	5.0	6.6	6.6	6.6	6.6
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	569	509	539	2070	1903	932
v/s Ratio Prot	c0.25			c0.12	0.06	
v/s Ratio Perm		0.02	0.09			0.12
v/c Ratio	0.79	0.08	0.15	0.21	0.11	0.21
Uniform Delay, d1	37.1	28.5	11.4	11.8	11.1	11.8
Progression Factor	1.08	1.43	1.00	1.00	1.00	1.00
Incremental Delay, d2	7.0	0.1	0.6	0.2	0.1	0.5
Delay (s)	47.2	41.0	11.9	12.0	11.2	12.3
Level of Service	D	D	B	B	B	B
Approach Delay (s)	45.8			12.0	11.9	
Approach LOS	D			B	B	

Intersection Summary

HCM 2000 Control Delay	23.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	11.6
Intersection Capacity Utilization	51.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Timings

6: Highway 50 & Parr Boulevard/Private Driveway



Lane Group	EBL	EBT	NBL	NBT	SBT	SBR	Ø8
Lane Configurations	↶	↷	↶	↶↷	↶↷	↷	
Traffic Volume (vph)	115	0	55	2141	1490	50	
Future Volume (vph)	115	0	55	2141	1490	50	
Turn Type	Perm	NA	pm+pt	NA	NA	Perm	
Protected Phases		4	5	2	6		8
Permitted Phases	4		2			6	
Detector Phase	4	4	5	2	6	6	
Switch Phase							
Minimum Initial (s)	8.0	8.0	5.0	12.0	12.0	12.0	8.0
Minimum Split (s)	33.9	33.9	8.0	30.1	30.1	30.1	33.9
Total Split (s)	39.0	39.0	10.0	81.0	71.0	71.0	39.0
Total Split (%)	32.5%	32.5%	8.3%	67.5%	59.2%	59.2%	33%
Yellow Time (s)	4.0	4.0	3.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.9	2.9	0.0	2.1	2.1	2.1	2.9
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.9	6.9	3.0	6.1	6.1	6.1	
Lead/Lag			Lead		Lag	Lag	
Lead-Lag Optimize?			Yes		Yes	Yes	
Recall Mode	None	None	None	C-Min	C-Min	C-Min	None
Act Effect Green (s)	15.1	15.1	95.0	91.9	84.0	84.0	
Actuated g/C Ratio	0.13	0.13	0.79	0.77	0.70	0.70	
v/c Ratio	0.65	0.35	0.25	0.80	0.61	0.05	
Control Delay	65.9	7.3	6.2	12.7	8.1	0.5	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	65.9	7.3	6.2	12.7	8.1	0.5	
LOS	E	A	A	B	A	A	
Approach Delay		37.9		12.5	7.8		
Approach LOS		D		B	A		

Intersection Summary

Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 3 (3%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 100
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.80
 Intersection Signal Delay: 12.1
 Intersection LOS: B
 Intersection Capacity Utilization 76.7%
 ICU Level of Service D
 Analysis Period (min) 15

Splits and Phases: 6: Highway 50 & Parr Boulevard/Private Driveway



HCM Signalized Intersection Capacity Analysis
6: Highway 50 & Parr Boulevard/Private Driveway

Future Total 2041 PM Synchro Model

01-28-2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	115	0	105	0	0	0	55	2141	0	0	1490	50
Future Volume (vph)	115	0	105	0	0	0	55	2141	0	0	1490	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5
Total Lost time (s)	6.9	6.9					3.0	6.1			6.1	6.1
Lane Util. Factor	1.00	1.00					1.00	0.95			0.95	1.00
Frt	1.00	0.85					1.00	1.00			1.00	0.85
Flt Protected	0.95	1.00					0.95	1.00			1.00	1.00
Satd. Flow (prot)	1767	1471					1463	3476			3476	1493
Flt Permitted	0.76	1.00					0.12	1.00			1.00	1.00
Satd. Flow (perm)	1409	1471					191	3476			3476	1493
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)	115	0	105	0	0	0	55	2141	0	0	1490	50
RTOR Reduction (vph)	0	92	0	0	0	0	0	0	0	0	0	15
Lane Group Flow (vph)	115	13	0	0	0	0	55	2141	0	0	1490	35
Heavy Vehicles (%)	1%	0%	11%	0%	0%	0%	22%	5%	0%	0%	5%	7%
Turn Type	Perm	NA					pm+pt	NA		Perm	NA	Perm
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	15.1	15.1					91.9	91.9			83.4	83.4
Effective Green, g (s)	15.1	15.1					91.9	91.9			83.4	83.4
Actuated g/C Ratio	0.13	0.13					0.77	0.77			0.70	0.70
Clearance Time (s)	6.9	6.9					3.0	6.1			6.1	6.1
Vehicle Extension (s)	3.0	3.0					3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	177	185					204	2662			2415	1037
v/s Ratio Prot		0.01					0.01	c0.62			0.43	
v/s Ratio Perm	c0.08						0.19					0.02
v/c Ratio	0.65	0.07					0.27	0.80			0.62	0.03
Uniform Delay, d1	49.9	46.3					6.7	8.6			9.8	5.7
Progression Factor	1.00	1.00					1.00	1.00			0.65	0.32
Incremental Delay, d2	8.0	0.2					0.7	2.7			1.0	0.0
Delay (s)	57.9	46.4					7.4	11.3			7.3	1.9
Level of Service	E	D					A	B			A	A
Approach Delay (s)		52.4			0.0			11.2			7.2	
Approach LOS		D			A			B			A	

Intersection Summary

HCM 2000 Control Delay	11.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	76.7%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Timings

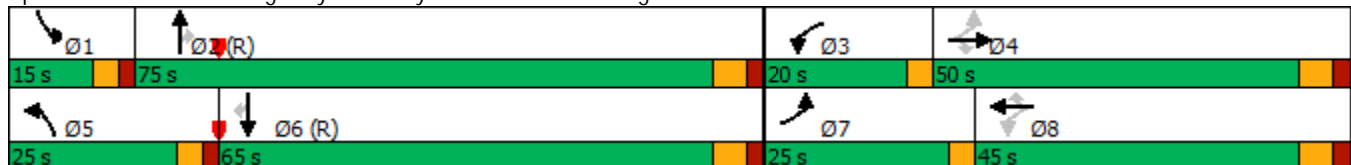
7: Highway 50 & Mayfield Road/Albion Vaughan Road

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	200	210	105	185	105	25	95	1891	605	10	1415	170
Future Volume (vph)	200	210	105	185	105	25	95	1891	605	10	1415	170
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	12.0	12.0	10.0	12.0	12.0	10.0	20.0	20.0	10.0	20.0	20.0
Minimum Split (s)	8.0	39.5	39.5	13.0	39.5	39.5	15.0	37.3	37.3	15.0	37.3	37.3
Total Split (s)	25.0	50.0	50.0	20.0	45.0	45.0	25.0	75.0	75.0	15.0	65.0	65.0
Total Split (%)	15.6%	31.3%	31.3%	12.5%	28.1%	28.1%	15.6%	46.9%	46.9%	9.4%	40.6%	40.6%
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.2	4.2	3.0	4.2	4.2
All-Red Time (s)	0.0	2.5	2.5	0.0	2.5	2.5	2.0	2.1	2.1	2.0	2.1	2.1
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.0	6.5	6.5	3.0	6.5	6.5	5.0	6.3	6.3	5.0	6.3	6.3
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Min	C-Min	None	C-Min	C-Min
Act Effct Green (s)	46.8	24.9	24.9	41.8	21.9	21.9	19.3	96.9	96.9	10.0	78.6	78.6
Actuated g/C Ratio	0.29	0.16	0.16	0.26	0.14	0.14	0.12	0.61	0.61	0.06	0.49	0.49
v/c Ratio	0.54	0.78	0.41	0.69	0.48	0.08	0.71	0.91	0.57	0.09	0.82	0.21
Control Delay	49.2	84.1	12.7	57.7	70.4	0.5	94.1	36.2	8.9	72.8	41.1	8.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	49.2	84.1	12.7	57.7	70.4	0.5	94.1	36.2	8.9	72.8	41.1	8.2
LOS	D	F	B	E	E	A	F	D	A	E	D	A
Approach Delay		56.0			57.4			31.9			37.8	
Approach LOS		E			E			C			D	

Intersection Summary

























Cycle Length: 160
 Actuated Cycle Length: 160
 Offset: 72 (45%), Referenced to phase 2:NBT and 6:SBT, Start of Green
 Natural Cycle: 145
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.91
 Intersection Signal Delay: 37.9
 Intersection LOS: D
 Intersection Capacity Utilization 100.1%
 ICU Level of Service G
 Analysis Period (min) 15

Splits and Phases: 7: Highway 50 & Mayfield Road/Albion Vaughan Road



HCM Signalized Intersection Capacity Analysis
7: Highway 50 & Mayfield Road/Albion Vaughan Road

Future Total 2041 PM Synchro Model
01-28-2021

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	200	210	105	185	105	25	95	1891	605	10	1415	170	
Future Volume (vph)	200	210	105	185	105	25	95	1891	605	10	1415	170	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5	
Total Lost time (s)	3.0	6.5	6.5	3.0	6.5	6.5	5.0	6.3	6.3	5.0	6.3	6.3	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1684	1731	1044	1608	1601	1426	1109	3444	1493	1785	3510	1536	
Flt Permitted	0.55	1.00	1.00	0.39	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	
Satd. Flow (perm)	974	1731	1044	656	1601	1426	1109	3444	1493	1785	3510	1536	
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)	200	210	105	185	105	25	95	1891	605	10	1415	170	
RTOR Reduction (vph)	0	0	89	0	0	22	0	0	171	0	0	68	
Lane Group Flow (vph)	200	210	16	185	105	3	95	1891	434	10	1415	102	
Heavy Vehicles (%)	6%	11%	53%	11%	20%	12%	61%	6%	7%	0%	4%	4%	
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	
Protected Phases	7	4		3	8		5	2		1	6		
Permitted Phases	4		4	8		8			2			6	
Actuated Green, G (s)	44.3	24.9	24.9	38.3	21.9	21.9	19.3	93.9	93.9	4.0	78.6	78.6	
Effective Green, g (s)	44.3	24.9	24.9	38.3	21.9	21.9	19.3	93.9	93.9	4.0	78.6	78.6	
Actuated g/C Ratio	0.28	0.16	0.16	0.24	0.14	0.14	0.12	0.59	0.59	0.02	0.49	0.49	
Clearance Time (s)	3.0	6.5	6.5	3.0	6.5	6.5	5.0	6.3	6.3	5.0	6.3	6.3	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	355	269	162	254	219	195	133	2021	876	44	1724	754	
v/s Ratio Prot	c0.07	c0.12		c0.07	0.07		c0.09	c0.55		0.01	0.40		
v/s Ratio Perm	0.09		0.02	0.10		0.00			0.29			0.07	
v/c Ratio	0.56	0.78	0.10	0.73	0.48	0.02	0.71	0.94	0.50	0.23	0.82	0.14	
Uniform Delay, d1	47.6	64.9	57.9	52.6	63.8	59.7	67.7	30.3	19.3	76.5	34.7	22.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	2.0	13.6	0.3	10.0	1.7	0.0	16.6	9.7	2.0	2.6	4.5	0.4	
Delay (s)	49.6	78.6	58.2	62.5	65.4	59.8	84.3	40.0	21.3	79.1	39.2	22.6	
Level of Service	D	E	E	E	E	E	F	D	C	E	D	C	
Approach Delay (s)		63.2			63.3			37.2			37.7		
Approach LOS		E			E			D			D		
Intersection Summary													
HCM 2000 Control Delay			41.7									HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio			0.90										
Actuated Cycle Length (s)			160.0									Sum of lost time (s)	20.8
Intersection Capacity Utilization			100.1%									ICU Level of Service	G
Analysis Period (min)			15										

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
8: Albion Vaughan Road & Kirby Road













Future Total 2041 PM Synchro Model
01-28-2021



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	10	70	470	0	35	269
Future Volume (Veh/h)	10	70	470	0	35	269
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)	10	70	470	0	35	269
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	674	235			470	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	674	235			470	
tC, single (s)	7.0	7.0			4.2	
tC, 2 stage (s)						
tF (s)	3.6	3.3			2.2	
p0 queue free %	97	91			97	
cM capacity (veh/h)	356	761			1067	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	80	313	157	125	179	
Volume Left	10	0	0	35	0	
Volume Right	70	0	0	0	0	
cSH	666	1700	1700	1067	1700	
Volume to Capacity	0.12	0.18	0.09	0.03	0.11	
Queue Length 95th (m)	3.3	0.0	0.0	0.8	0.0	
Control Delay (s)	11.1	0.0	0.0	2.6	0.0	
Lane LOS	B			A		
Approach Delay (s)	11.1	0.0	1.1			
Approach LOS	B					
Intersection Summary						
Average Delay			1.4			
Intersection Capacity Utilization			36.3%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
 9: Highway 50 & Site Access

Future Total 2041 PM Synchro Model
 01-28-2021

							
Movement	WBL	WBR	NBT	NBR	SBL	SBT	
Lane Configurations							
Traffic Volume (veh/h)	20	100	1870	190	70	1391	
Future Volume (Veh/h)	20	100	1870	190	70	1391	
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)	20	100	1870	190	70	1391	
Pedestrians							
Lane Width (m)							
Walking Speed (m/s)							
Percent Blockage							
Right turn flare (veh)							
Median type	TWLTL			TWLTL			
Median storage veh	2			2			
Upstream signal (m)	331			311			
pX, platoon unblocked	0.54	0.46			0.46		
vC, conflicting volume	2800	1030			2060		
vC1, stage 1 conf vol	1965						
vC2, stage 2 conf vol	836						
vCu, unblocked vol	1325	0			970		
tC, single (s)	6.8	6.9			4.1		
tC, 2 stage (s)	5.8						
tF (s)	3.5	3.3			2.2		
p0 queue free %	89	80			79		
cM capacity (veh/h)	180	505			333		
Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	20	100	1247	813	70	696	696
Volume Left	20	0	0	0	70	0	0
Volume Right	0	100	0	190	0	0	0
cSH	180	505	1700	1700	333	1700	1700
Volume to Capacity	0.11	0.20	0.73	0.48	0.21	0.41	0.41
Queue Length 95th (m)	2.9	5.8	0.0	0.0	6.2	0.0	0.0
Control Delay (s)	27.5	13.9	0.0	0.0	18.7	0.0	0.0
Lane LOS	D	B			C		
Approach Delay (s)	16.1		0.0		0.9		
Approach LOS	C						
Intersection Summary							
Average Delay			0.9				
Intersection Capacity Utilization			70.6%		ICU Level of Service		C
Analysis Period (min)			15				

HCM Unsignalized Intersection Capacity Analysis
 10: Industrial Road & Site Access



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↖	↗		↘	
Traffic Volume (veh/h)	105	55	80	170	220	20
Future Volume (Veh/h)	105	55	80	170	220	20
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)	105	55	80	170	220	20
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	250				430	165
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	250				430	165
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	92				59	98
cM capacity (veh/h)	1327				540	885
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	160	250	240			
Volume Left	105	0	220			
Volume Right	0	170	20			
cSH	1327	1700	558			
Volume to Capacity	0.08	0.15	0.43			
Queue Length 95th (m)	2.1	0.0	17.2			
Control Delay (s)	5.4	0.0	16.2			
Lane LOS	A		C			
Approach Delay (s)	5.4	0.0	16.2			
Approach LOS			C			
Intersection Summary						
Average Delay			7.3			
Intersection Capacity Utilization			46.8%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
 11: George Bolton Parkway Extension & Industrial Road

Future Total 2041 PM Synchro Model
 01-28-2021



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔	↔		↔	
Traffic Volume (veh/h)	90	373	230	235	190	160
Future Volume (Veh/h)	90	373	230	235	190	160
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)	90	373	230	235	190	160
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		TWLTL	TWLTL			
Median storage veh		2	2			
Upstream signal (m)		279	285			
pX, platoon unblocked						
vC, conflicting volume	465				900	348
vC1, stage 1 conf vol					348	
vC2, stage 2 conf vol					553	
vCu, unblocked vol	465				900	348
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)	2.2				3.5	3.3
p0 queue free %	92				60	77
cM capacity (veh/h)	1107				479	700
Direction, Lane #						
	EB 1	WB 1	SB 1			
Volume Total	463	465	350			
Volume Left	90	0	190			
Volume Right	0	235	160			
cSH	1107	1700	560			
Volume to Capacity	0.08	0.27	0.63			
Queue Length 95th (m)	2.1	0.0	34.4			
Control Delay (s)	2.4	0.0	21.5			
Lane LOS	A		C			
Approach Delay (s)	2.4	0.0	21.5			
Approach LOS			C			
Intersection Summary						
Average Delay			6.8			
Intersection Capacity Utilization			81.4%	ICU Level of Service		D
Analysis Period (min)			15			

Appendix J
OTM Book 12 Justification 7 Excerpt



- e) Pedestrian Grade Separations In cases of very heavy pedestrian and traffic volumes, it may be economically viable to construct pedestrian bridges or tunnels.
4. The priority placed on implementing a new pedestrian crossing device should reflect the proximity and convenience of existing crossings; a higher priority should be placed on crossings where no reasonable alternatives exist within walking distance.

impact study, transportation planning study, environmental assessment or other similar evaluation. The preferred approach is that eight-hour volume projections are estimated as part of the engineering study and evaluated against Justifications 1, 2 or 3. It is incumbent upon the road authority to ensure that the calculation methodology is sound and is based on good data, so that there is a high level of confidence in the predicted traffic volumes.

4.10 Justification 7 – Projected Volumes

In some cases, it is desired to determine the future need for traffic signals at an existing or planned intersection. There are two basic scenarios. The first is that the intersection may exist and all that is changing is the addition of one or more developments which will add traffic to the intersection. The second is a development which will require, or be associated with, the construction of one or more new legs at an existing intersection or a completely new intersection or roadway.

For future development, especially where the intersection or road may not exist, eight-hour volumes may be difficult to obtain or predict with the necessary accuracy. If eight-hour volumes are unavailable or not considered to be of sufficient accuracy, Peak Hour Volumes (PHV) may be estimated as part of the transportation studies and reduced to Average Hourly Volumes (AHV) for comparison with traffic signal justifications for projected volumes.

The prediction of future traffic demands is based on knowledge of growth in roadway usage, growth of local traffic generators and predicted traffic volumes, obtained from a traffic

Table 21 – Justification 7 – Projected Volumes

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

*Note: For “T” intersections, these values should be increased by 50%.

The Average Hourly Volume for a typical day can be estimated from the Peak Hour Volumes using the following relationships:

$$AHV = \frac{PHV}{2} \text{ or } AHV = \frac{amPHV + pmPHV}{4}$$

Alternately, the Average Hourly Volume for the eight highest hours of an average day can be estimated from Annual Average Daily Traffic (AADT) volume using the following relationship:

$$AHV = \frac{AADT}{16}$$

Where:

AHV = Average hourly volume

AADT = Annual average daily traffic

Analysis Using Eight-hour Volumes

If eight-hour projections are available, Justifications 1, 2 or 3 should be used. For the situation of an existing intersection with new development, Justifications 1 or 2 need to be met to 100%, or Justification 3 needs to be met to 80%.

For developments where new intersections or roadways are to be built, there is more uncertainty in the volume projections as the estimate requires projections of background traffic as well as development traffic. For this reason, where new intersection or roadway construction is required, Justifications 1 or 2 must be met to 120%.

Analysis Using Average Hour Volume

In the case that the volume estimates are based on the expansion of peak hour volumes or average daily traffic, the effect on Justifications 1 or 2 of the requirement to meet the warrant for each of eight hours would be lessened by averaging. As well, increased uncertainty is introduced by estimating from as little as one hour of traffic volume. For this reason, the thresholds are raised and, 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. For example, under restricted flow and two lanes, the AHV for Part 1A of Justification 7 must be met to $900 \times 1.20 = 1080$ vph.

Note that future volumes may include side street traffic attracted to the new traffic signal since the signal may provide a significant reduction in delay.

Table 22 – Future Development: Volume Expansion Required to Meet Justifications

Roadway Condition	Full Eight-hour Count Estimate Available		AHV Only Available
	Justification 1 or 2	Justification 3	Justification 7
Both Intersecting Roads Exist; Development is Future	100%	80%	120%
One Road, Both Roads and/or Intersection are Future; Development is Future	120%	N/A	150%