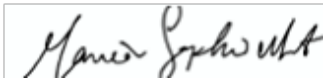
TRAFFIC IMPACT ANALYSIS

Environmental Assessment Study for Williams Parkway from Dixie Road to Torbram Road

May 2023

Prepared for: City of Brampton

Prepared By:



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Version	Date	Description
0	Feb 15, 2023	Initial Submission [Draft]
1	March 23, 2023	Revised Submission [Draft]
2	May 04, 2023	Revised Submission [Draft]
3	May 10, 2023	Final Submission

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

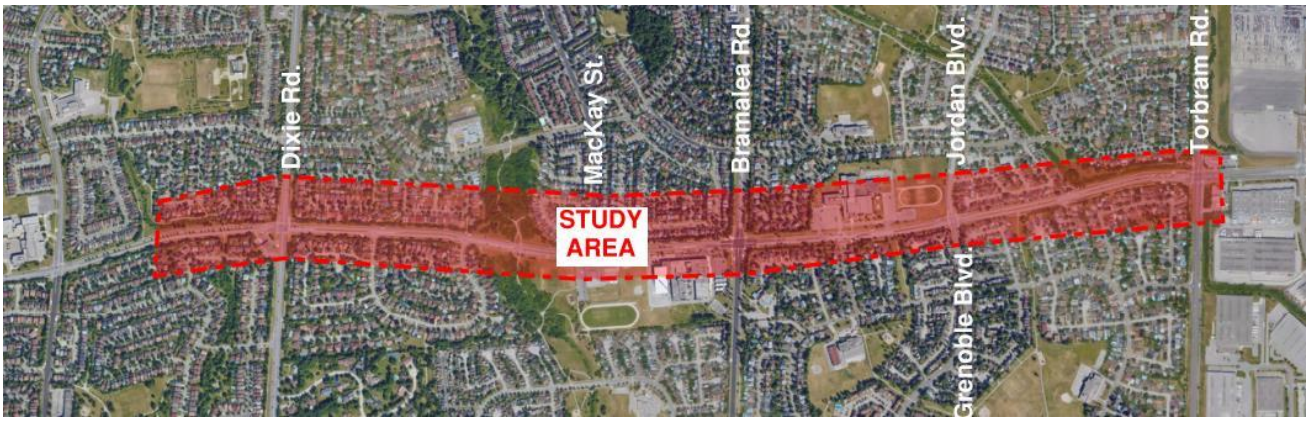
1 Introduction

1.1 Background

The City of Brampton (the City) has retained Parsons Inc. to conduct Williams Parkway Municipal Class Environmental Assessment (MCEA) Study along Williams Parkway from Dixie Road to Torbram Road, illustrated in Figure 1. The MCEA Study will support transitioning from a historically suburban urban form to a more urban development context that is in line with the Provincial Growth Plan and Brampton's strategic plans. These plans aim to guide the City in developing complete, sustainable, and well-designed communities. This vision is expected to be achieved through:

- Providing improved capacity needs for existing and future conditions from the perspective of moving people safely and efficiently within the study area.
- Creating a safer and more comfortable multi-modal environment within the study area while addressing the population/employment growth and travel demand management components.
- Providing a pedestrian traffic and cycling space requirements, with regard for connectivity to the active transportation network.
- Accommodating and encouraging sustainable development.

FIGURE 1 - STUDY AREA



This Traffic Impact Analysis Report is a supporting technical document for the MCEA. It consists of:

- An overview of relevant background information, including policies, plans, and technical studies;
- A review of the existing (2022) transportation infrastructure conditions to establish the transportation context within the study area;
- A road safety performance assessment based on collision history.
- The estimated traffic growth and traffic forecasts for the 2031 horizon year for 'Do-Nothing' and infrastructure improvement scenarios;
- A transportation network screenline(s) analysis to determine the corridor capacity needs Williams Parkway based on the Peel Region's travel demand forecast model (EMME) outputs for 2031 horizon year;
- An assessment of travel demand management (TDM) measures to support the mode split and traffic forecasts assumptions made as part of this traffic assessment study; and
- A Multi-modal Transportation Level of Service (MMLOS) analysis for the existing and future (2031) conditions for all modes of travel, including auto, transit, bicycle, and walking, to support the need of improvement for the study corridor on Williams Parkway.

1.2 Planning Context

The City has established a planning vision and conducted various studies and plans that support the development of complete, sustainable, and well-designed communities. Such initiatives among others are elaborated in the following sections.

1.2.1 GROWTH PLAN FOR THE GREATER GOLDEN HORSESHOE (2013)

The Provincial Growth Plan for The Greater Golden Horseshoe (Growth Plan) plan aims to promote dense, mixed-use communities that support public transit, walking and cycling as viable transportation options. It directs future growth of municipalities to develop mixed-use communities that serve the surrounding communities and are less automobile oriented to reduce reliance on single occupant vehicles. These communities have the potential to influence mode choice as more people may choose to take alternative forms of transportation than the car to their destination.

1.2.2 CITY OF BRAMPTON OFFICIAL PLAN (2006)

The Brampton Official Plan establishes a set of policies and land use designations that are meant to guide the physical development and redevelopment of Brampton. The intent of the Official Plan is to build upon the sense of civic pride in Brampton and to move more aggressively towards a sustainable community that caters to the needs and desires of its residents now and in the future.

The official plan recognizes the importance of transportation in supporting the City's growth and economic developments. The plan includes policies and guidelines to manage and improve the transportation network in Brampton, including roadways, transit, active transportation, and goods movement. The Official Plan's transportation policies focus on improving connectivity, reducing congestion, enhancing safety, and promoting sustainable modes of transportation.

1.2.3 CITY OF BRAMPTON 2040 VISION (2018)

The City of Brampton 2040 Vision is a long-term plan for the growth and development of the city, with a focus on sustainability, innovation, and community engagement. From a traffic engineering perspective, the plan aims to improve the safety and efficiency of the city's transportation network, while also promoting alternative modes of transportation such as cycling and walking.

Some key initiatives in the plan include:

- Transportation Master Plan: The City of Brampton has developed a Transportation Master Plan (TMP) to guide the development of the transportation network over the next 20 years. The TMP includes a number of strategies to improve traffic flow and safety, such as the development of a network of arterial roads, the expansion of the public transit system, and the creation of active transportation infrastructure such as bike lanes and pedestrian walkways.
- Complete Streets: The City of Brampton has adopted a Complete Streets policy, which aims to design streets that are safe and accessible for all users, regardless of their age, ability, or mode of transportation. Complete Streets typically include features such as sidewalks, bike lanes, crosswalks, and transit stops, and are designed to prioritize pedestrians and cyclists over cars.
- Transit-Oriented Development: The City of Brampton has identified several key areas for Transit-Oriented Development (TOD), which involves the integration of land use and transportation planning to create more walkable, livable, and sustainable communities. TOD typically involves the development of mixed-use developments, such as residential or commercial buildings, close to transit hubs or corridors.
- Intelligent Transportation Systems: The City of Brampton is exploring the use of Intelligent Transportation Systems (ITS) to improve the efficiency and safety of the transportation network. ITS typically involves the use of technology such as traffic sensors, cameras, and communication systems to monitor and manage traffic flow, improve safety, and provide real-time information to drivers and other road users.

Overall, the City of Brampton 2040 Vision represents a forward-looking approach to traffic engineering, with a focus on sustainable, accessible, and safe transportation for all residents. By implementing the key initiatives outlined in the plan, the city can work towards creating more livable and prosperous community.

1.2.4 CITY OF BRAMPTON TRANSPORTATION MASTER PLAN (2015)

The City of Brampton Transportation Master Plan (TMP) was first adopted in 2015 to provide a long-term vision and strategic direction for the city's transportation network. The TMP aimed to address the increasing demand for transportation infrastructure and services as the city continues to grow and develop. The 2015 TMP included a comprehensive analysis of the existing transportation network, including roadways, public transit, cycling, and pedestrian facilities. It also identified key challenges and opportunities facing the city, such as increasing traffic congestion, the need for improved transit connectivity, and the promotion of active transportation. To address these challenges, the 2015 TMP proposed a series of transportation initiatives, including the expansion of public transit services, the implementation of active transportation infrastructure, and the optimization of the existing road network. The plan also emphasized the importance of sustainable transportation options and reducing the reliance on single-occupancy vehicles.

Since the adoption of the 2015 TMP, the City of Brampton has undergone significant changes in its transportation landscape, including the introduction of new transit services and the completion of major roadway projects. As a result, the city is currently updating its TMP to reflect these changes and address new challenges and opportunities. Some of the key issues that are being addressed in the updated TMP include the need to promote active transportation, improve transit connectivity, reduce congestion and emissions, and ensure equitable access to transportation services across the city.

Overall, the City of Brampton's TMP provides a comprehensive and strategic framework for addressing the city's transportation needs and challenges. As the current TMP of 2015 is under update, the updated TMP is expected to build on the successes of the previous plan and provide a roadmap for a sustainable and efficient transportation system for years to come.

1.2.5 CITY OF BRAMPTON ACTIVE TRANSPORTATION MASTER PLAN (2019)

In the year 2019, the City completed the construction of several major cycling infrastructure projects, including Chinguacousy Trail extension and the Williams Parkway multi-use trail, which have helped to improve connectivity and safety for cyclists. The City has also continued to prioritize pedestrian infrastructure, with ongoing sidewalk and crosswalk improvements throughout the city.

In addition, the City has launched a number of active transportation-focused programs and initiatives, such as the Community Rides program, which provides guided bike tours of the city's trails and cycling infrastructure, and the Active Transportation Champion program, which recognizes and supports community members who are actively promoting and encouraging active transportation.

The City's Active Transportation Master Plan represents a proactive and innovative approach to transportation planning that prioritizes the needs of pedestrians and cyclists while also considering the broader traffic impacts of these modes of transportation. By creating more walkable and bike-friendly city, the plan has the potential to not only reduce traffic volumes but also improve the quality of life for Brampton residents.

1.2.6 REGIONAL PLANNING CONTEXT

Peel Sustainable Transportation Strategy – Region of Peel (2018): The strategy aims to promote sustainable transportation options and reduce the reliance on single-occupancy vehicles in the region. The Region of Peel is made up of three municipalities: the cities of Brampton and Mississauga, and the town of Caledon. The strategy includes several key objectives:

- Increasing the use of sustainable transportation options, such as walking, cycling, and public transit.

- Improving the safety and accessibility of the transportation network for all users, including pedestrians, cyclists, and transit riders.
- Reducing greenhouse gas emissions from the transportation sector.
- Supporting economic development by improving transportation connections to key employment areas.
- Encouraging sustainable land use and development patterns that reduce the need for car travel.

To achieve these objectives, the strategy includes several specific actions and initiatives such as:

- Developing new cycling and pedestrian infrastructure, including trails and bike lanes.
- Improving transit service and infrastructure, including bus rapid transit (BRT) and light rail transit (LRT) projects.
- Implementing transportation demand management (TDM) measures, such as carpooling and telecommuting programs.
- Promoting sustainable land use and development through policies and regulations that support compact, mixed-use development and transit-oriented development (TOD).
- Providing education and outreach to encourage sustainable transportation choices among residents, business, and institutions.

The Strategy provides important context for the planning and design of transportation infrastructure within the Region of Peel. It can help in the analysis of current and futures travel patterns, demand for different modes of transportation, and the potential impacts of different transportation projects and policies on safety, accessibility, and sustainability.

Region of Peel Vision Zero Initiative (2018): Is a comprehensive plan to eliminate all traffic fatalities and serious injuries in the Region of Peel. The initiative includes several strategies to improve road safety and reduce the number of crashes, injuries, and fatalities on regional roads. Some of the key strategies of the initiative include:

- Reducing speed limits: calls for reducing speed limits on certain roads to improve safety for all road users.
- Enhancing pedestrian and cycling infrastructure: create more pedestrian and cycling-friendly infrastructure to make it safer and easier for people to walk or bike throughout the region.
- Improving public education and awareness: education and awareness campaigns to promote safe driving, walking, and cycling behavior, and to educate the public on the dangers of distracted and impaired driving.
- Increasing enforcement: working with local law enforcement to increase traffic enforcement, targeting aggressive and dangerous driving behaviors.
- Engaging with the community: working to engage with the community to understand their concerns and to involve them in the planning and implementation of road safety initiatives.

For the purposes of this environmental study, the City is investigating improvements to the existing Williams Parkway from Dixie Road to Torbram Road. These improvements will address, capacity needs (both existing and future), structural conditions, safety considerations, and strategies for managing travel demand. The aim is to support the policies and initiatives mentioned earlier that are relevant to this project. By undertaking these improvements, the City hopes to enhance the road's functionality and safety for all users while ensuring that it aligns with its broader sustainability goals.

1.3 Assumptions and Analysis Methodologies

1.3.1 ANALYSIS HORIZON AND TIME PERIOD

The analysis has been conducted for 2022 existing traffic conditions and 2031 future traffic conditions with and "without improvements" to infrastructure. Existing turning movement counts (TMCs) were collected by Parsons through data collection contractor (Pyramid Traffic Inc.) for the weekday AM and PM peak hours. Existing link volumes were estimated based on the balanced TMCs at links between the adjacent intersections. The future traffic demand was estimated based on growth rates determined through a review of the Region's EMME model outputs for the 2031 horizon year and the relevant transportation demand management (TDM) measures which are further discussed in **Section 3.2.** The analysis originally included the year 2041 as part of the scope, but it was not thoroughly examined due to the results of the EMME model outputs from the Region, which indicate a negative growth.

1.3.2 INTERSECTION OPERATIONS ANALYSIS – CAPACITY AND LOS

Intersection operations are analyzed using the Synchro 11 software package following the Highway Capacity Manual (HCM) methodologies for signalized and unsignalized intersections. The intersection control delay is used to characterize level of service (LOS) for the entire intersection or approach. The thresholds used to determine the LOS are presented in **Table 1** for signalized intersections and **Table 2** for unsignalized intersections.

TABLE 1 - SIGNALIZED INTERSECTION LOS CHARACTERISTICS

Level Service	Features	Control delay (sec/veh)
A	Describes operations with very low control delay, up to 10 seconds/vehicle. This LOS occurs when progression is extremely favorable, and most vehicles arrive during the green phase. Most vehicles do not stop at all at this LOS. Short signal cycle lengths may also contribute to low delay.	≤ 10
B	Describes operations with control delay greater than 10 seconds and up to 20 seconds /vehicle. This level generally occurs with good progression, short signal cycle lengths, or both. More vehicles stop at this level than at LOS "A", causing longer average delays.	> 10 to 20
C	Describes operations with control delay greater than 20 seconds and up to 35 seconds/vehicle. These higher delays may result from fair progression, longer signal cycle lengths, or both. Individual cycle failures may begin to appear at this level. The number of vehicles stopping is significant, though many still pass through the intersection without stopping.	> 20 to 35
D	Describes operations with control delay greater than 35 seconds and up to 55 seconds/vehicle. At level D, the influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavourable progression, long signal cycle lengths, or high volume/capacity (v/c) ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures become noticeable.	> 35 to 55
E	Describes operations with control delay greater than 55 seconds and up to 80 seconds/vehicle. This level is considered by many agencies to be the limit of acceptable delay. These high delay values generally indicate poor progression, long signal cycle lengths, and high v/c ratios. Individual cycle failures are frequent occurrences.	> 55 to 80
F	LOS "F" describes operations with control delay in excess of 80 seconds/vehicle. This oversaturation, considered to be unacceptable to most drivers, occurs when arrival flow rates exceed the design capacity of the intersection. It may also occur at high v/c ratios below 1.0 with many individual cycle failures. Poor progression and long signal cycle lengths may also be major contributing factors to such high delay levels.	> 80

Source: Highway Capacity Manual (HCM) 2000

TABLE 2 - UNSIGNALIZED INTERSECTION LOS CHARACTERISTICS

Level of Service	Expected Delay to Minor Street Traffic	Average Control Delay "D" (sec/veh)
A	Little or no delays	0 ≤ 10
B	Short traffic delays	10 ≤ 15
C	Average traffic delays	15 ≤ 25
D	Long traffic delays	25 ≤ 35
E	Very long traffic delays	35 ≤ 50
F	Extreme delays with queuing which may cause congestion affecting other traffic movements in the intersection	> 50

Source: Highway Capacity Manual (HCM) 2000

The following parameters, specified in the City's Traffic Impact and Parking Study Terms of Reference 2019 (the TIS Guidelines), have been used in Synchro 11.

- Saturation flow rate of 1,900 vehicles per hour per lane
- 3.7 m lane width on regional roads
- 3.5 m lane width on the city's roadways

The measures of effectiveness (MOEs) listed below have been identified as critical for signalized and unsignalized intersections in accordance with the City's TIS Guidelines:

- 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 exceeding 1.00
- 95th percentile queue lengths for individual movements exceeding the existing storage capacity

Link analysis has been conducted based on the lane capacity LOS characteristics shown in **Table 3**, a planning level corridor LOS determined using the estimated v/c values.

TABLE 3 - LANE CAPACITY LOS CHARACTERISTICS

V/C Ratios	Level of Service	General Conditions
< 0.75	A to C	Stable flows with acceptable delays
0.75 < 0.85	D	Approaching unstable flows and tolerable delays
0.85 < 1.00	E	Unstable flows and intolerable delays
≥ 1.00	F	Forced flows and significant delays

Source: Highway Capacity Manual (HCM) 2000

1.3.3 MULTI-MODAL LEVEL OF SERVICE

MMLOS analysis is conducted following the City of Ottawa's MultiModal Level of Service (MMLOS) Guidelines (2015). The methodologies used to determine LOS of pedestrians, bicycles, trucks, transit, and autos are summarized below and excerpts of the ranking scales are included in **Appendix A.** A letter value is assigned based on the inputs provided for each mode at both intersections and segments (see **Appendix D** for inputs used).

Figure 2 shows the LOS defined in the guideline for different modes, with a focus on influences such as comfort, level of risk and travel delay. A LOS "A" represents the highest LOS, and a LOS "F" represents the lowest LOS.

FIGURE 2 - CITY OF OTTAWA MMLOS RANKING SCALE

Mode	Element	Level of Service (A B C D E F)	
Pedestrians (PLOS)	Segments	High level of comfort	Low level of comfort
	Intersections	Short delay, high level of comfort, low risk	Long delay, low level of comfort, high risk
Bicycles (BLOS)	Segments	High level of comfort	Low level of comfort
	Intersections	Low level of risk/stress	High level of risk/stress
Trucks (TrkLOS)	Segments	Unimpeded Movement	Impeded Movement
	Intersections	Unimpeded Movement/long delay	Impeded Movement/long delay
Transit (TLOS)	Segments	High level of reliability	Low level of reliability

	Intersections	Short delay	Long delay
Vehicles (VLOS)	Segments	Low lane utilization	High lane utilization

1.3.3.1 Pedestrian Level of Service

Factors which influence pedestrian level of service (PLOS) at intersections include the number of lanes crossed, nature of conflicting turns (permissive vs. protected), crossing delay, corner radii and crosswalk types. PLOS along road segments is influenced by factors such as sidewalk widths, offset from road edges and roadway operating speeds. Wider sidewalks along segments and intersections provide measures to reduce crossing distance and delay which typically results in higher levels of pedestrian service. PLOS at intersections is measured with consideration of both the Pedestrian Exposure to Traffic (PETSI) score shown in **Table 4** and Pedestrian Crossing delay scale shown in **Table 5**. Overall PLOS is measured by selecting the worst condition as the final score, either PETSI score or delay score. PETSI point tables and ranking scales for PLOS for segments are provided in **Appendix A.**

TABLE 4 - PETSI SCORE EVALUATION TABLE

PETSI LOS	
Points threshold	**LOS**
≥ 90	A
≥ 75	B
≥ 60	C
≥ 45	D
≥ 30	E
< 30	F

TABLE 5 - PEDESTRIAN DELAY EVALUATION TABLE

Average Pedestrian Crossing Delay Component	
Delay = 0.5 x	$\frac{(\text{Signal Cycle Length} - \text{Pedestrian Effective Walk Time})^2}{\text{Signal Cycle Length}}$
≤ 10 sec per intersection leg	"A"
≥ 10 to 20 sec	"B"
> 20 to 30 sec	"C"
> 30 to 40 sec	"D"
> 40 to 60 sec	"E"
> 60 sec	"F"

1.3.3.2 Bicycle Level of Service

Factors which influence bicycle level of service (BLOS) at intersections include facility type on approaches and requirements to turn left and right (number of lanes crossed and operating speeds). BLOS along segments are influenced by facility type and operating speeds. Intersections which provide protected designs for turning cyclists (e.g., channels or bike boxes) and separated cycling facilities along roadway segments typically result in higher levels of bicycle service. The ranking scales for BLOS at intersections and segments are provided in **Appendix A.**

1.3.3.3 Transit Level of Service

Transit level of service (TLOS) at intersections is influenced by average signals delays, whereas service along segments is influenced by factors such as facility type (e.g., bus lanes vs. mixed traffic) and the potential for blockage (e.g., on-street parking). Intersections which feature transit priority measures to reduce wait times; and segments which feature dedicated transit facilities typically result in higher levels of transit service. The ranking scales for TLOS at intersections and segments are provided in **Appendix A.**

1.3.3.4 Truck Level of Service

Truck level of service (TrkLOS) at intersections is influenced by the turn radii and number of receiving lanes for the direction of travel. TrkLOS along road segments is influenced by the number of travel lanes per direction and lane widths. Intersections with wider turn radii and more than one receiving lane for the direction of travel; and segments with more than one travel lane per direction with the curb lane in excess of 3.5 metres typically result in higher levels of truck service. The ranking scales for TrkLOS at intersections and segments are provided in **Appendix A.**

1.3.3.5 Auto Level of Service

The City of Ottawa's MMLOS methodology analyses overall auto level of service (ALOS) for intersections, measured using the volume to capacity (v/c) ratio which is then translated into letter scores from "A" to "F". Intersections which feature lower v/c ratios generally result in higher levels of service. Intersections which feature v/c ratios less than 0.80 are within the "A" to "C" range and are considered higher levels of service. The ranking scale for an ALOS at signalized intersections is provided in **Appendix A.**

1.3.4 FUTURE MMLOS TARGETS

The City of Ottawa's MMLOS Guidelines (2015) was adopted for establishing future MMLOS targets for the Williams Parkway corridor. However, it is important to note that Ottawa has a unique urban fabric with a major urban centre and a variety of street types, which differs from Brampton's and the study corridor's urban context that is predominately suburban with roadways consisting of 4 to 6 lanes. Thereby, it may be difficult to achieve high LOS scores for active modes in Brampton at intersections where users are required to cross several lanes of vehicle traffic.

In an absence of a relevant City policy, the MMLOS targets used by the City of Ottawa based on *land uses* (**Appendix A**) were applied to the Williams Parkway corridor. These targets for pedestrians, bicycles, transit, trucks, and vehicles are presented in **Table 6.**

According to the MMLOS guidelines (See **Appendix A**), the designation of "General Urban Area" was considered applicable to the Williams Parkway corridor, as it is similar to the land use characteristic in the vicinity of the Williams Parkway corridor, which is designated as "Residential" and "Institutional" in the City of Brampton Official Plan. The arterial road LOS targets for pedestrians, bicycles, transit, and trucks are the same for the "General Urban Areas" as defined in the Ottawa's MMLOS guidelines.

TABLE 6 - SUGGESTED FUTURE MMLOS TARGETS

Road Segment	Suggested LOS Targets				
	Pedestrian	Bicycle	Transit	Truck	Auto[1]
Dixie Rd to MacKay St	C	C	D	E	D
MacKay St to Bramalea Rd	C	C	D	E	D
Bramalea Rd to Glenridge Rd	C	C	D	E	D
Glenridge Rd to Grenoble Blvd	C	C	D	E	D
Grenoble Blvd to Graymar Rd	C	C	D	E	D
Grenoble Blvd to Torbram Rd	C	C	D	E	D

[1]*Measured at intersection only.*

1.3.4.1 Pedestrian Target LOS

Areas designated as "residential" and "institutional" within the Brampton Official Plan (2006) should feature a PLOS target of at least "C" along arterial roads, with higher targets within close proximity to rapid transit stations and schools. It is noted that Williams Parkway Senior Public School and Judith Nyman Secondary School are located on the south side of the Williams Parkway corridor between MacKay Street and Bramalea Road, and Chinguacousy Secondary School is located on the north side of Williams Parkway corridor between Glenridge Road and Grenoble Boulevard/Jordan Boulevard.

1.3.4.2 Bicycle Target LOS

Residential and institutional areas within the Williams Parkway corridor should feature a BLOS target of at least "C" along arterial roads where cycling facilities are planned as part of the city-wide cycling network. There is a planned multi-use path/boulevard path (MUP) along the Williams Parkway corridor similar in nature to the "Spine Route" designation found in the City of Ottawa's MMLOS methodology, which provides a consistent space for cyclists on arterial roads.

1.3.4.3 Transit Target LOS

Arterial roads should feature a TLOS target of at least "D" when in an urban area and not identified as part of a rapid transit corridor or a potential candidate for transit lanes. No rapid transit facilities or continuous bus lanes are planned for the Williams Parkway Corridor.

1.3.4.4 Truck Target LOS

Arterial roads should feature a TrkLOS target of at least "D" on designated routes and a TrkLOS 'E' within close proximity to transit stations and schools. As previously noted, Williams Parkway Senior Public School, Judith Nyman Secondary School, and Chinguacousy Secondary School are located within the study corridor.

1.3.4.5 Auto (Vehicles) Target LOS

Arterial roads should feature an Auto LOS (ALOS) or VLOS target of at least "D", and an ALOS/VLOS 'E' within close proximity to schools.

2 Existing Conditions

2.1 Active Transportation Network

As shown in **Figure 3**, existing cycling facilities in the study area consist of three types of trails and cycling routes that connect with Williams Parkway. These include:

- **Recreational trails**, which are paths located within parks, adjacent to rivers/ravines, or along hydro corridors. These are found west of Dixie Road, west of MacKay Street, west of Grenoble Boulevard, and at the Don Doan Recreational Trail.
- **Boulevard bike paths**, which are paved bike paths exclusive to cyclists located adjacent to the sidewalks within the roadway boulevard. A boulevard bike path runs along Williams Parkway between Don Doan Trail and Torbram Road.
- **Urban shoulder**, which are signed routes designated by a painted line along the shoulder of the road. These routes are preferred for cycling but can be used for short-term parking. These routes travel along MacKay Street and Grenoble Boulevard, both terminating at Williams Parkway.

All streets within the study area have sidewalks on both sides of the corridor with good separation from traffic lanes in form of concrete or grass boulevard.

FIGURE 3 - EXISTING BIKE FACILITIES

Source: Brampton's Cycling map

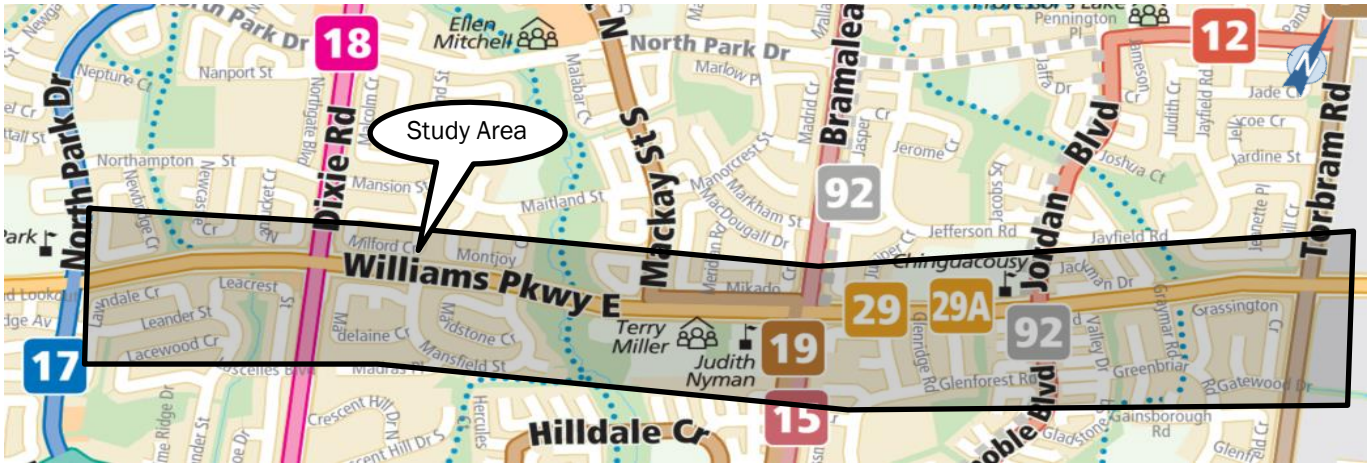
The Active Transportation Master Plan (2019) proposes a multi-use path/boulevard path (MUP) on both sides of Williams Parkway from McLaughlin Road North to Airport Road. The section travelling through the study corridor is part of the City's 6-10 Year Capital Program.

2.2 Transit Network

Existing transit network within the study area is shown in

Figure 4. Brampton Transit operates regular bus routes within the study area along Williams Parkway (Routes 29 and 29A) and on intersecting roads of Dixie Road (Route 18), MacKay Street (Route 19), Bramalea Road (Route 15), Jordan Boulevard (Route 12), Grenoble Boulevard (Route 12) and Torbram Road (Route 14). Regular buses operate at a 10–60 minute frequency during peak periods and 15-60 minute frequency during off-peak periods. Bus routes 12,19 and 29/29A have limited or no evening service on Saturdays and Sundays, and bus route19 has no evening service (after 7 PM) Monday-Friday.

FIGURE 4 - EXISTING TRANSIT NETWORK



Source: Brampton Transit (BT) System Map October 2022, downloaded in January 2023

2.3 Road Network

Williams Parkway is an east-west minor arterial road with a four-lane. It has a posted speed limit of 50-60 km/hr. For road segments in school vicinities, the speed limit is 40 km/hr during the school hours or when the applicable speed sign indicates.

Dixie Road is a north-south flowing major arterial road with a four-lane cross-section. It has a posted speed limit of 60 km/hr. Dixie Road serves primarily residential land use and some commercial land use.

Mansfield Street is a two-lane north-south flowing local road with a two-lane cross-section. It primarily serves residential land uses. In the absence of a posted speed limit sign, a speed of 50 km/h is assumed.

MacKay Steet is a two-lane north-south flowing collector road. It primarily serves residential land uses. In the absence of a posted speed limit sign, a speed of 50 km/h is assumed.

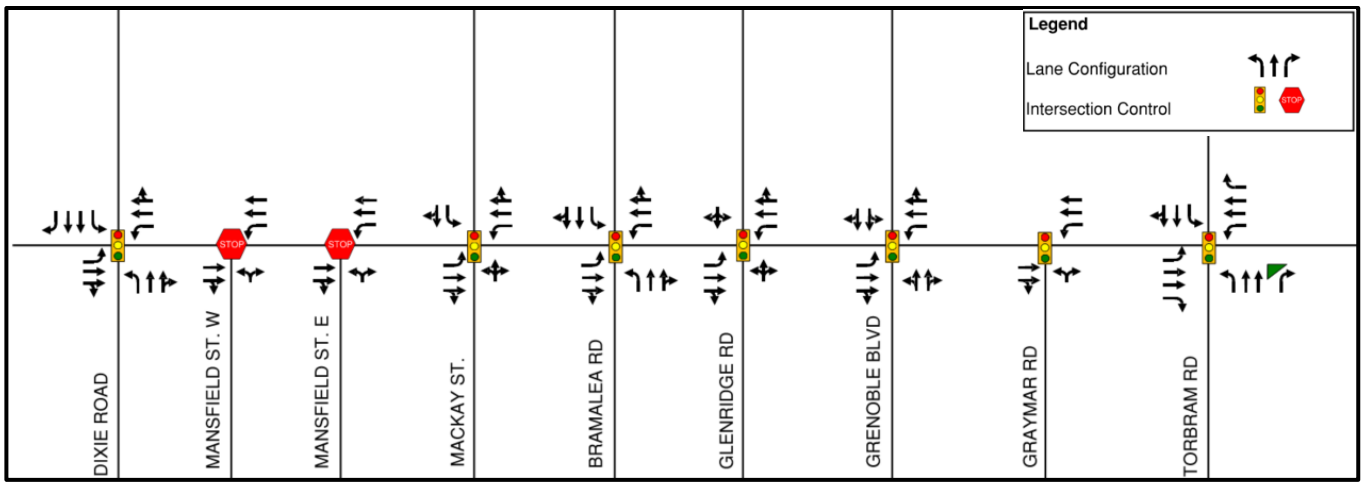
Bramalea Road is a north-south flowing minor arterial road with a four-lane cross-section. It serves a mix of residential and commercial land uses. The speed limit of Bramalea Road north of William Parkway is 60 km/hr and south of Williams parkway is 50 km/hour due to the presence of a school zone.

Glenridge Road is a north-south flowing local road with a two-lane cross-section. It mainly serves residential land uses. In the absence of a posted speed limit sign, a speed of 50 km/h is assumed.

Torbram Road is a north-south flowing minor arterial road with a four-lane cross-section. It serves a mix of residential and commercial land uses. It has a posted speed limit of 60 km/hr.

The existing roadway lane configurations and traffic control types at intersections within the study area are presented in **Figure 5**.

FIGURE 5 - EXISTING LANE CONFIGURATIONS AND INTERSECTION CONTROLS

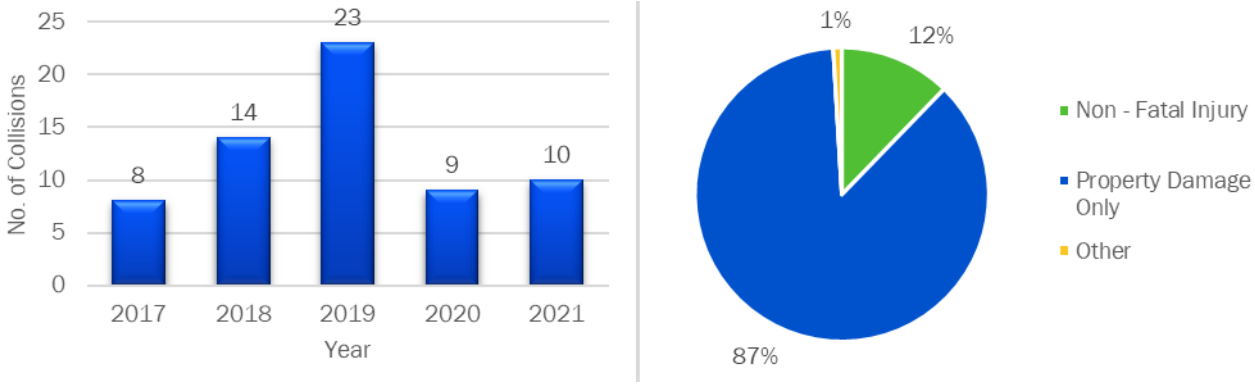


2.4 Collision Data

Intersection collision data from 2017 to 2021 was provided by the City of Brampton (see **Appendix I**). The data provided at Williams Parkway intersections with Dixie Road, Mansfield Street W. and Graymar Road does not include information such as the year collected, surface condition, classification and impact type, therefore, this information was not included in the anlaysis.

Based on a review of the avaialble data, a total of 106 collisions were identified along the Williams Parkway corridor between Dixie Road and Torbram Road. **Figure 6** presents the number of collisions by year and classification of collision.

FIGURE 6 - COLLISIONS BY YEAR AND CLASSIFICATION



The number of collisions increased from 2017 to 2019 with the highest number of collisions (23 in total) recorded in 2019. However, in 2020 and 2021 the number of collisions declined, most likely due to the impact of the COVID-19 pandemic as travel was discouraged and working from home became more common. Among the total collisions identified along Williams Parkway, 87% caused property damage, 12% caused non-fatal injury, and 1% were recorded as other type of collisions. There was no record of fatal injury.

Figure 7 and **Figure 8** present a summary of collisions with the study area recorded at midblocks and intersections. The highest number of collisions is identifed at Williams Parkway and Torbram Road, accounting for 40% (42 collisions) of the

total collisions within the corridor, followed by collisions that occurred at Wiliams Parkway and Bramalea Road, accounting for 23% (24 collisions) of the total collisions within the corridor.

FIGURE 7 - COLLISIONS BY LOCATION

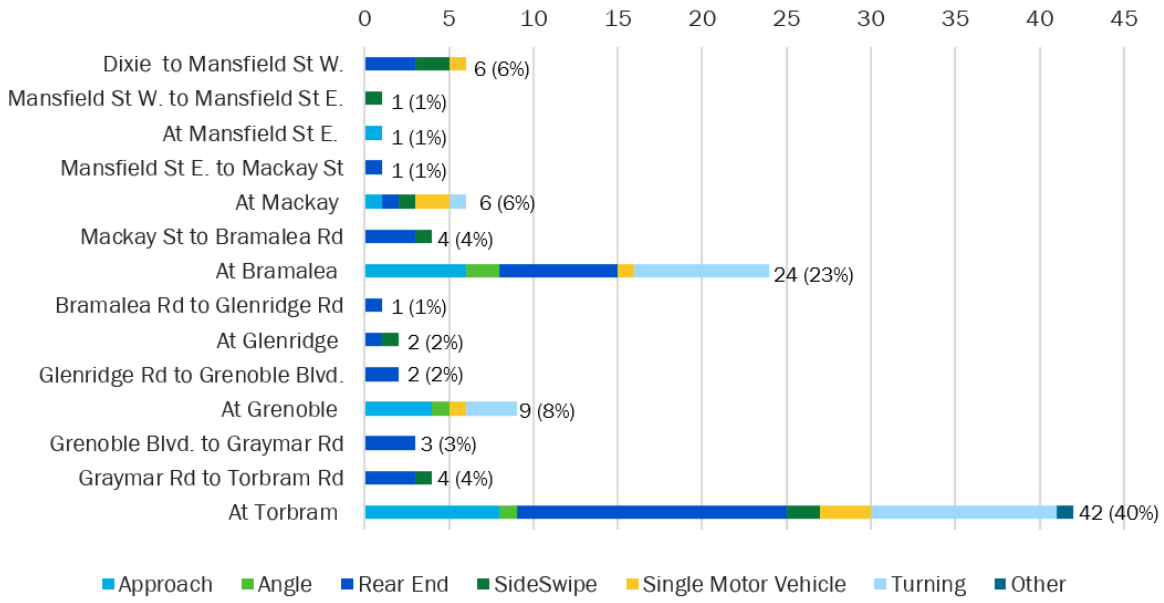
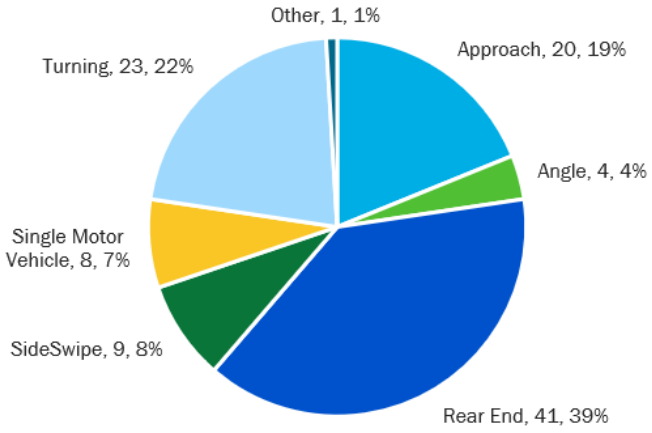


FIGURE 8 - COLLISIONS BY IMPACT TYPE



Rear-end collisions are the most common type of collision recorded. In the collision reports, it was noted that this type of collision generally occured due to the car following too close to the car ahead and not leaving enough of a gap to allow for a safe stop.

Turning collisions are the second most common type of recorded collision, especially at intersections along Torbram Road, Grenoble Boulevard, and Bramalea Road. Most of these collisions are associated with left-turning maneuvers. Upon examination of the intersection geometry and sightline configurations, it was confirmed that the intersections on Torbram Road and Bramalea Road have adequate sightlines for left-turning vehicles. However, at the Grenoble Boulevard intersection, it was noticed that there are no dedicated left turn lanes on the northbound and southbound approaches,

and left turn volumes are relatively high resulting in poor operational conditions which could be the potential cause of collision.

2.5 Traffic Data

Historical traffic counts collected between 2017-2021 were provided by the City of Brampton for only a few intersections within the study area. To fill in the data gap, a new set of traffic counts was collected in June 2022 as part of this study. The source of the data and the count dates are listed in **Table 7**. Signal timing plans for the signalized intersections were provided by the City of Brampton. Traffic volume diagrams and raw data including intersection TMCs and signal timing plans (STPs) are attached in **Appendix B**.

TABLE 7 - INTERSECTION TURNING MOVEMENT COUNTS, COUNT DATES AND SOURCES

Intersection with Williams Pkwy	Source	Count date
Signalized Intersections		
at Dixie Rd	Region of Peel Pyramid Traffic Inc.	June 22, 2021 June 15, 2022
at MacKay Street	Pyramid Traffic Inc.	June 15, 2022
at Bramalea Rd	City of Brampton Pyramid Traffic Inc.	June 12, 2018 June 15, 2022
at Glenridge Rd	Pyramid Traffic Inc.	June 15, 2022
at Grenoble Blvd/Jordan Blvd	City of Brampton Pyramid Traffic Inc.	November 8, 2018 June 15, 2022
at Graymar Road	Pyramid Traffic Inc.	June 15, 2022
at Torbram Rd	City of Brampton Pyramid Traffic Inc.	May 18, 2017 June 15, 2022
Unsignalized Intersections		
at Mansfield St West	Pyramid Traffic Inc.	June 15, 2022
at Mansfield St East	Pyramid Traffic Inc.	June 15, 2022

2.6 Existing Intersection Operation Conditions

Intersection capacity and LOS for existing conditions were conducted based on 2022 traffic volumes and existing signal timing plans provided by the City. Summaries of the analysis results are presented in **Table 8** for the signalized intersections and **Table 9** for the unsignalized intersections**.** Movements operate at LOS "E" or "F" are highlighted in red. Intersections with an overall v/c ratio of 0.8 or higher, as well as individual movements with a v/c ratio of 1.0, are also highlighted in red. Detailed Synchro reports are provided in **Appendix C.**

2.6.1 SIGNALIZED INTERSECTIONS

Overall, all the signalized intersections operate at LOS "D" or better. The intersection at Dixie Road is highlighted due to the overall v/c ratio is greater than 0.8. Individual movements experiencing higher delay and poor LOS are mainly turning movements, especially left turns, and many of them are observed during PM peak.

TABLE 8 - EXISTING CONDITIONS SIGNALIZED INTERSECTION CAPACITY ANALYSIS

Intersection with Williams Pkwy	Direction	Existing Storage Length (m)	AM Peak Hour			PM Peak Hour		
			Delay (s)/ LOS	V/C	95th Queue (m)	Delay (s)/ LOS	V/C	95th Queue (m)
Dixie Rd	Overall		37 / D	0.73	--	48 / D	0.94	--
	EBL	42	37 / D	0.5	32	83 / F	0.9	67

Intersection with Williams Pkwy	Direction	Existing Storage Length (m)	AM Peak Hour			PM Peak Hour		
			Delay (s)/ LOS	V/C	95th Queue (m)	Delay (s)/ LOS	V/C	95th Queue (m)
	EBTR	-	52 / D	0.8	140	45 / D	0.7	155
	WBL	67	66 / E	0.8	42	33 / C	0.4	26
	WBTR	-	44 / D	0.6	92	58 / E	0.9	218
	NBL	88	27 / C	0.5	23	31 / C	0.6	53
	NBTR	-	18 / B	0.3	57	42 / D	0.8	218
	SBL	55	26 / C	0.3	46	160 / F	1.0	52
	SBT	-	33 / C	0.7	191	40 / D	0.5	99
	SBR	25	23 / C	0.2	36	35 / D	0.2	35
MacKay St	Overall		20 / B	0.41	--	9 / A	0.49	--
	EBL	50	8 / A	0.2	17	11 / B	0.5	40
	EBTR	-	8 / A	0.3	69	4 / A	0.3	58
	WBL	30	7 / A	0.1	7	3 / A	0.0	2
	WBTR	-	8 / A	0.3	53	5 / A	0.5	110
	NBLTR	-	58 / E	0.4	36	64 / E	0.1	7
	SBL	40	72 / E	0.7	74	72 / E	0.5	36
	SBTR	-	54 / D	0.2	24	64 / E	0.1	15
Bramalea Rd	Overall		37 / D	0.68	--	42 / D	0.79	--
	EBL	45	33 / C	0.4	30	60 / E	0.7	38
	EBTR	-	49 / D	0.8	148	38 / D	0.5	99
	WBL	20	39 / D	0.5	24	31 / C	0.2	18
	WBTR	-	39 / D	0.5	84	51 / D	0.9	194
	NBL	40	33 / C	0.6	37	45 / D	0.7	66
	NBTR	-	28 / C	0.3	66	41 / D	0.7	189
	SBL	55	23 / C	0.3	36	34 / C	0.4	17
	SBTR	-	33 / C	0.6	135	34 / C	0.5	97
Glenridge Rd	Overall		11 / B	0.3	--	8 / A	0.36	--
	EBL	30	5 / A	0.2	20	4 / A	0.1	4
	EBTR	-	5 / A	0.3	42	4 / A	0.3	52
	WBL	25	4 / A	0.0	2	5 / A	0.1	7
	WBTR	-	4 / A	0.2	23	7 / A	0.4	126
	NBLTR	-	60 / E	0.1	19	64 / E	0.2	19
	SBLTR	-	67 / E	0.5	49	62 / E	0.1	11
Grenoble Blvd/Jordan Blvd	Overall		21 / C	0.29	--	13 / B	0.4	--
	EBL	30	8 / A	0.1	9	8 / A	0.3	33
	EBTR	-	9 / A	0.3	69	5 / A	0.3	60
	WBL	30	5 / A	0.1	5	3 / A	0.1	7
	WBTR	-	5 / A	0.2	33	5 / A	0.4	87
	NBLTR	-	60 / E	0.3	24	68 / E	0.4	29
	SBLTR	-	61 / E	0.3	31	65 / E	0.2	19
Graymar Rd	Overall		4 / A	0.3	--	4 / A	0.4	--

Intersection with Williams Pkwy	Direction	Existing Storage Length (m)	AM Peak Hour			PM Peak Hour		
			Delay (s)/ LOS	V/C	95th Queue (m)	Delay (s)/ LOS	V/C	95th Queue (m)
	EBTR	-	3 / A	0.3	46	3 / A	0.2	40
	WBL	30	2 / A	0.0	2	2 / A	0.0	4
	WBT	-	2 / A	0.2	25	4 / A	0.4	71
	NBLR	-	60/ E	0.2	15	62/ E	0.1	13
Torbram Rd	Overall		27 / C	0.65	--	31 / C	0.69	--
	EBL	30	45 / D	0.3	29	78 / E	0.8	47
	EBT	-	52 / D	0.7	100	43 / D	0.6	86
	EBR	30	43 / D	0.2	28	36 / D	0.1	17
	WBL	45	39 / D	0.3	17	33 / C	0.2	13
	WBT	-	37 / D	0.3	45	41 / D	0.7	115
	WBR	-	34 / C	0.0	9	35 / C	0.3	47
	NBL	40	20 / C	0.3	17	30 / C	0.5	65
	NBT	-	17 / B	0.2	51	27 / C	0.6	162
	NBR	40	0 / A	0.0	0	0 / A	0.1	0
	SBL	60	16 / B	0.5	57	23 / C	0.6	35
	SBTR	-	18 / B	0.6	157	16 / B	0.4	90

2.6.2 UNSIGNALIZED INTERSECTIONS

Overall, all the unsignalized intersections operate at LOS “A”. The northbound shared left/right movement at the Mansfield Street East intersection operates at LOS "E" due to a relatively high delay, however, the v/c ratio is 0.3 indicating that this movement has sufficient capacity.

TABLE 9 - EXISTING CONDITIONS UNSIGNALIZED INTERSECTION CAPACITY ANALYSIS

Intersection with Williams Pkwy	Direction	Existing Storage Length (m)	AM Peak Hour			PM Peak Hour		
			Delay (s)/ LOS	V/C	95th Queue (m)	Delay (s)/ LOS	V/C	95th Queue (m)
Mansfield St W	Overall		1 / A	--	--	0 / A	--	--
	EBTR	-	0 / A	0.4	0	0 / A	0.4	0
	WBL	50	9 / A	0.0	0	10 / A	0.0	0
	WBT	-	0 / A	0.2	0	0 / A	0.4	0
	NBLR	-	22 / C	0.2	5	33 / D	0.2	5
Mansfield St E	Overall		1 / A	--	--	1 / A	--	--
	EBTR	-	0 / A	0.4	0	0 / A	0.4	0
	WBL	50	11 / B	0.0	0	11 / B	0.1	2
	WBT	-	0 / A	0.2	0	0 / A	0.4	0
	NBLR	-	22 / C	0.2	5	45 / E	0.3	9

2.7 Existing Corridor Operation Conditions

Corridor capacity and LOS for existing conditions were conducted based on the estimated link volumes from TMCs and an assumption of the lane capacity, i.e., 800 vehicles per hour per lane, referring to the Region’s EMME model. Summary of the analysis results is presented in **Table 10.** All segments along the Williams Parkway corridor within the study area operate

acceptably, at a minimum LOS “D” or better, except for the westbound traffic immediately west of Dixie Road that shows LOS “E” and v/c ratio 0.85 in the PM peak period.

TABLE 10 - EXISTING CONDITIONS LINK ASSESSMENT

Williams Pkwy Sections/Direction		Capacity Per Lane	No. of Lanes	Total Capacity	AM Peak Hour			PM Peak Hour		
					Projected Volumes	V/C	LOS	Projected Volumes	V/C	LOS
Immediately west of Dixie Rd	EB	800	2	1600	868	0.54	A to C	977	0.61	A to C
	WB	800	2	1600	756	0.47	A to C	1359	0.85	E
Dixie Rd to Mansfield St W	EB	800	2	1600	901`	0.56	A to C	984	0.62	A to C
	WB	800	2	1600	777	0.49	A to C	1223	0.76	D
Mansfield St W to Mansfield St E	EB	800	2	1600	906	0.57	A to C	963	0.6	A to C
	WB	800	2	1600	753	0.47	A to C	1219	0.76	D
Mansfield St E to MacKay St	EB	800	2	1600	887	0.55	A to C	960	0.6	A to C
	WB	800	2	1600	739	0.46	A to C	1251	0.78	D
MacKay St to Bramalea Rd	EB	800	2	1600	957	0.6	A to C	884	0.55	A to C
	WB	800	2	1600	654	0.41	A to C	1290	0.81	D
Bramalea Rd to Glenridge Rd	EB	800	2	1600	785	0.49	A to C	782	0.49	A to C
	WB	800	2	1600	612	0.38	A to C	1092	0.68	A to C
Glenridge Rd to Grenoble Blvd	EB	800	2	1600	695	0.43	A to C	750	0.47	A to C
	WB	800	2	1600	630	0.39	A to C	1052	0.66	A to C
Grenoble Blvd to Graymar Rd	EB	800	2	1600	733	0.46	A to C	655	0.41	A to C
	WB	800	2	1600	465	0.29	A to C	1049	0.66	A to C
Graymar Rd to Torbram Rd	EB	800	2	1600	736	0.46	A to C	681	0.43	A to C
	WB	800	2	1600	427	0.27	A to C	1057	0.66	A to C
Immediately east of Torbram Rd	EB	800	2	1600	843	0.53	A to C	735	0.46	A to C
	WB	800	2	1600	365	0.23	A to C	1020	0.64	A to C

2.8 Existing Multi-Modal Level of Service (LOS)

2.8.1 PEDESTRIAN LOS

Intersections within the study corridor were analyzed to determine both the overall LOS and the LOS for each pedestrian crossing. As shown in **Table 11**, all the study intersections show overall LOS “E” or “F” based on the PETSI scores (noted in **Table 4**) and Pedestrian Delay (noted separately in **Table 5**). Intersections at Dixie Road and Torbram Road are the worst performing due to the high number of lanes that need to be crossed by pedestrians. Inputs are attached in **Appendix D.**

TABLE 11 - EXISTING PEDESTRIAN LOS AT SIGNALIZED INTERSECTIONS

Crossing Side	Intersection with Williams Pkwy						
	Dixie Rd	MacKay St	Bramalea Rd	Glenridge Rd	Grenoble Blvd	Graymar Rd	Torbram Rd
Overall PLOS[2] AM/PM	F/F	E/F	E/E	E/F	F/F	F/F	F/F
North Side	F (21)	C (73)	E (38)	B (88)	D (56)	-	E (38)
South Side	E (38)	B (89)	E (38)	B (88)	D (56)	A (96)	F (27)
East Side	E (40)	E (40)	E (38)	E (40)	E (40)	D (48)	F (5)
West Side	E (38)	E (41)	E (38)	E (40)	E (40)	C (64)	F (21)

(xx) = PETSI Score

Table 12 provides an overview of the **Pedestrian Delay** Level of Service at intersections for the AM and PM peak periods. Pedestrian delay was determined by examining existing signal timing plans (see **Appendix B**) to define the relationship between total signal cycle length and the effective walking time for each direction (see **Appendix D**). The scores below were considered in the overall PLOS, for intersections presented in **Table 11**.

TABLE 12 - EXISTING PEDESTRIAN DELAY LOS (LOS/AVG. DELAY (SEC))

Crossing Side	Intersection with Williams Pkwy						
	Dixie Rd	MacKay St	Bramalea Rd	Glenridge Rd	Grenoble Blvd	Graymar Rd	Torbram Rd
AM PEAK							
Overall PLOS[2]	F	E	E	E	F	F	F
North Side	D /37s	E /49s	E /38s	E /56s	F /61s	-	C /29s
South Side	D /31s	E /49s	E /38s	E /56s	F /61s	F /61s	D /36s
East Side	E /50s	C /21s	E /38s	B /12s	B /19s	B /12s	E /41s
West Side	E /50s	C /21s	E /38s	B /12s	B /19s	B /12s	E /49s
PM PEAK							
Overall PLOS[2]	F	F	E	F	F	F	F
North Side	E /45s	F /61s	E /41s	F /65s	F /68s	-	C /29s
South Side	D /34s	F /61s	E /41s	F /65s	F /68s	F /68s	D /36s
East Side	E /49s	B /14s	E /44s	A /8s	B /15s	A /9s	E /41s
West Side	E /49s	B /14s	E /44s	A /8s	B /15s	A /9s	E /49s

[2] *Overall intersection Level of Service is measured by the lowest performing level from PETSI and Pedestrian Delay.*

As shown in **Table 13**, road segments along Williams Parkway between Dixie Road and MacKay Street perform at LOS "E", while between MacKay Street and Bramalea Road perform at LOS of "D" as the sidewalk positioned at an offset from the road of greater than 2 metres. The remaining segments from Bramalea Road to Torbram Road perform at LOS "F" due to a decrease in sidewalk width to less than 1.5 meters.

PLOS along segments was measured by considering the most consistent configuration, for example, if a 200-metre segment had an overall LOS "C" and 20 metres of the segment was LOS "D", the score for this section would be an LOS "C".

TABLE 13 - EXISTING PEDESTRIAN LOS ALONG ROAD SEGMENTS

Road Segment	Pedestrian Level of Service	
	Eastbound	Westbound
Overall PLOS	F	F
Dixie Rd to MacKay St	E	E
MacKay St to Bramalea Rd	D	D
Bramalea Rd to Glenridge Rd	F	F
Glenridge Rd to Grenoble Blvd	F	F
Grenoble Blvd to Graymar Rd	F	F
Graymar Rd to Torbram Rd	F	F

2.8.2 BICYCLE LOS

Intersections within the study corridor were analyzed to determine cyclist LOS for the overall intersection and for each approaching direction. As shown in **Table 14**, all intersections performed at an overall LOS "F" due to a lack of dedicated cycling facilities within the corridor. Cyclists are required to operate in mixed traffic when travelling along Williams Parkway, which has high (over 40 km/h) operating speeds. This result in an overall poor BLOS, with a BLOS "F" for all intersections and "D" to "E" for road segments. An exception was for the segment between Graymar Road and Torbram Road, where a separated boulevard bike path is available, which perform at BLOS "A", as shown in **Table 14**.

TABLE 14 - EXISTING BICYCLE LOS AT SIGNALIZED INTERSECTIONS

Approach From	Intersection with Williams Pkwy						
	Dixie Rd	MacKay St	Bramalea Rd	Glenridge Rd	Grenoble Blvd	Graymar Rd	Torbram Rd
Overall BLOS	F	F	F	F	F	F	F
From North	F	F	F	D	F	-	F
From South	F	D	F	F	D	D	F
From East	F	F	F	F	F	F	F
From West	F	F	F	F	F	D	F

TABLE 15 - EXISTING BICYCLE LOS ALONG ROAD SEGMENTS

Road Segment of Williams Pkwy	Bicycle Level of Service	
	Eastbound	Westbound
Overall BLOS	E	D
Dixie Rd to MacKay St	E	E
MacKay St to Bramalea Rd	E	E
Bramalea Rd to Glenridge Rd	D	D
Glenridge Rd to Grenoble Blvd	D	D
Grenoble Blvd to Graymar Rd	D	D
Graymar Rd to Torbram Rd	A	A

2.8.3 TRANSIT LOS

Transit LOS was measured at an intersection level and on road segments along the Williams Parkway corridor. Intersections were analyzed during the AM and PM peak periods based on the signal cycle length during each peak and the availability of Transit Signal Priority (TSP) (Table 16). All intersections perform at TLOS "F" due to long signal cycle lengths and lack of TSP through the corridor.

All road segments operate at TLOS "D" which is typical for a mixed traffic environment with limited on-street parking and intersecting driveways. A TLOS "D" performance for road segments along Williams Parkway is consistent with the identified TLOS targets discussed in Section 1.3.4.3.

TABLE 16 - EXISTING TRANSIT LOS AT SIGNALIZED INTERSECTIONS

Approach From	Intersection with Williams Pkwy						
	Dixie Rd	MacKay St	Bramalea Rd	Glenridge Rd	Grenoble Blvd	Graymar Rd	Torbram Rd
AM PEAK							
Overall TLOS	F	F	F	F	F	F	F
From North	F	F	F	F	F	F	F
From South	F	F	F	F	F	F	F
From East	F	F	F	F	F	F	F
From West	F	F	F	F	F	F	F
PM PEAK							
Overall TLOS	F	F	F	F	F	F	F
From North	F	F	F	F	F	F	F
From South	F	F	F	F	F	F	F
From East	F	F	F	F	F	F	F
From West	F	F	F	F	F	F	F

TABLE 17 - EXISTING TRANSIT LOS ALONG ROAD SEGMENTS

Road Segment along Williams Pkwy	Transit Level of Service	
	Eastbound	Westbound
Overall TLOS	D	D
Dixie Rd to MacKay St	D	D
MacKay St to Bramalea Rd	D	D
Bramalea Rd to Glenridge Rd	D	D
Glenridge Rd to Grenoble Blvd	D	D
Grenoble Blvd to Graymar Rd	D	D
Graymar Rd to Torbram Rd	D	D

2.8.4 TRUCK LOS

Intersections and road segments were analyzed to determine existing TrkLOS. Trucks usually require larger operating space in terms of lane width and turn radii. The results presented in **Table 18** and **Table 19** show that most of the corridor operates well, with most intersections operating at a TrkLOS of "A" or 'B' due to the wide turn radii at intersections and lane width at or greater than 3.5 metres, and all road segments operating at a TrkLOS "A".

The overall TrkLOS for the intersection at MacKay Street is "F" when approaching from the west due to a narrow turn radius at the entrance to Williams Parkway Senior Public School; nevertheless, the entrance is expected to be used mainly by single occupant vehicles. The intersections at Glenridge Road and Graymar Road also operate poorly, at a TrkLOS "E".

TABLE 18 - EXISTING TRUCK LOS AT SIGNALIZED INTERSECTIONS

Approach From	Intersection with Williams Pkwy						
	Dixie Rd	MacKay St	Bramalea Rd	Glenridge Rd	Grenoble Blvd	Graymar Rd	Torbram Rd
Overall TrkLOS	B	F	A	E	B	E	B
From North	A	B	A	B	B	N/A	A
From South	A	D	A	B	B	B	A
From East	B	B	A	E	B	N/A	A
From West	A	F	A	E	B	E	A

TABLE 19 - EXISTING TRUCK LOS ALONG ROAD SEGMENTS

Road Segment along Williams Pkwy	Truck Level of Service (TrkLOS)	
	Eastbound	Westbound
Overall TrkLOS	A	A
Dixie Rd to MacKay St	A	A
MacKay St to Bramalea Rd	A	A
Bramalea Rd to Glenridge Rd	A	A

Road Segment along Williams Pkwy	Truck Level of Service (TrkLOS)	
	Eastbound	Westbound
Glenridge Rd to Grenoble Blvd	A	A
Grenoble Blvd to Graymar Rd	A	A
Graymar Rd to Torbram Rd	A	A

2.8.5 VEHICLE LOS

Based on the overall v/c ratio presented in **Table 8**, VLOS was determined for signalized intersections within the corridor (**Table 20**). The intersection at Dixie Road features a low VLOS compared to other intersections due to a higher v/c ratio.

TABLE 20 - EXISTING VEHICLE LOS AT SIGNALIZED INTERSECTIONS

Vehicle Level of Service	Intersection with Williams Pkwy						
	Dixie	MacKay	Bramalea	Glenridge	Grenoble	Graymar	Torbram
AM PEAK							
Overall VLOS	C	A	B	A	A	A	B
PM PEAK							
Overall VLOS	E	A	C	A	A	A	B

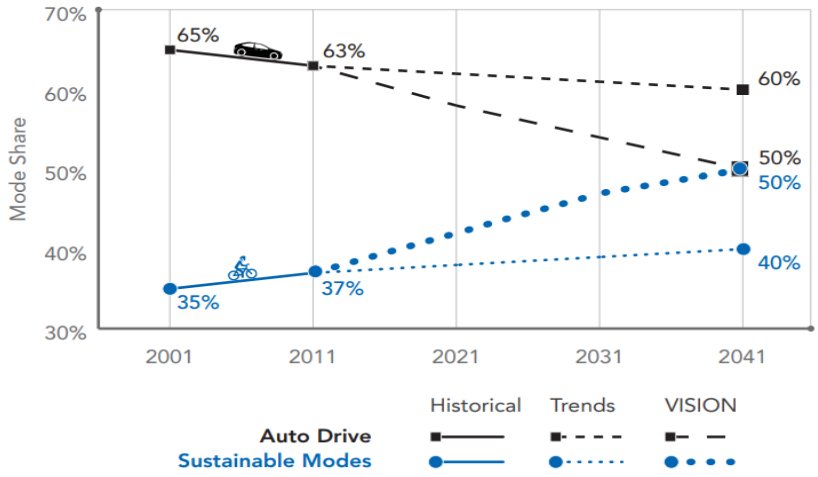
3 Future Conditions

3.1 Modal Split

Brampton's 2020 Transportation Master Plan Update (TMPU) and Peel's Sustainable Transportation Strategy have set ambitious mode share targets for the City. To 2041, 50% of the A.M. and P.M. peak periods trips would be private automobiles, and the rest of the 50% would be modes other than the single occupancy vehicles.

To determine appropriate mode share targets for the Williams Parkway Corridor for 2031/2041 per mode, 2016 TTS data (A.M. peak period) from Wards 7 and 8, where the study area is situated, was used as a basis for analysis. A summary of the recommended modal split is presented in **Table 21**.

FIGURE 9 - 2041 MODE SHARE "VISION" AND "TREND"



Source: 2018 Peel Sustainable Transportation Strategy

Public Transit: Based on 2016 TTS data, current public transit use within and surrounding the Williams Parkway Corridor (Wards 7 and 8) is approximately 10% to 11%, of which 8% is local transit and 2%-3% is GO transit. The TMPU sets a public transit mode share target for the whole city of 16% by 2031/2041. This target is deemed appropriate for the Williams Parkway Corridor for the 2031/2041 horizon as a result of the optimized role of transit within Brampton in strategic locations, and Williams Parkway acting as a transit support corridor, as designated in the TMPU, with connections to a major station and rapid transit service along Hurontario Street, and ZUM service along Bramalea Road by 2031.

Active transportation: Based on the 2016 TTS data, active transportation mode (primarily walking and cycling) share within and surrounding the Williams Parkway Corridor (Wards 7 and 8) is approximately 8%, down from 9-10% in 2011. The TMPU active transportation mode share targets for 2041 are 10% and 11%, respectively. With the planned implementation of active transportation facilities along the for Williams Parkway Corridor, such as a MUP, and improvements to the broader active transportation network, an active transportation mode share of 11% is achievable for 2031/2041.

Private Automobile Drivers: According to 2016 TTS data, private automobile drivers accounted for 65% of trips made by residents within Wards 7 and 8. As mentioned, the City's target for 2041 is a mode share target of 50% of peak periods trips. Meeting the modal split goals of the other modes will result in reaching this target.

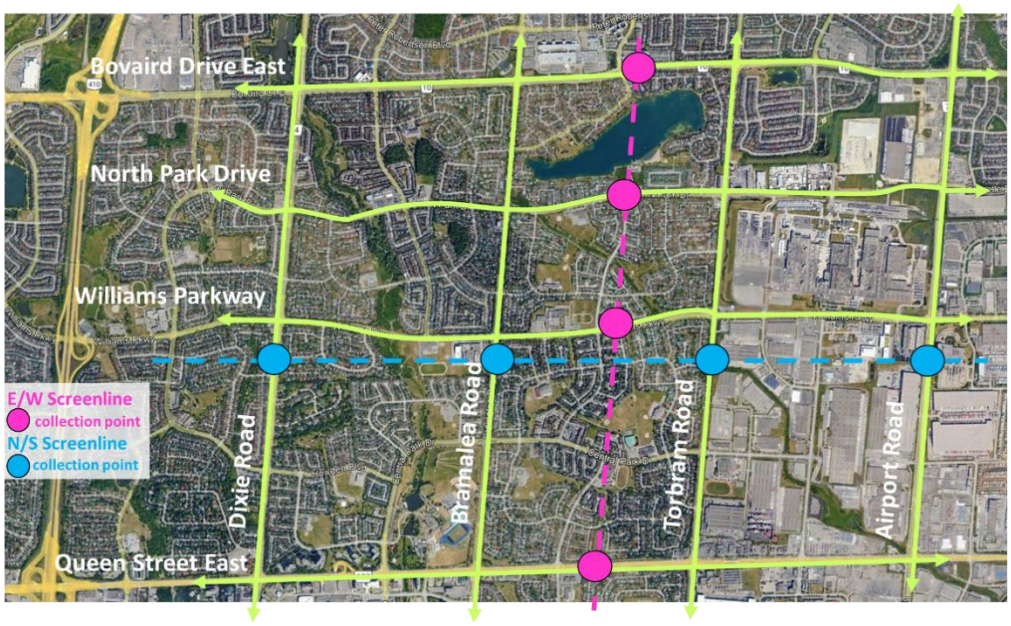
TABLE 21 - RECOMMENDED MODAL SPLIT

Mode	2016 Mode Share for Wards 7 and 8	Recommended 2031/2041 Modal Split for Williams Parkway Corridor
Single occupant vehicle	65%	50%
Auto passenger/carpooling	14%	23%
Public Transit	10%	16%
Active transportation	8%	11%
Other	3%	-

3.2 Traffic Growth

The city's travel demand forecast (EMME) model outputs were used to determine the traffic growth for 2031 and 2041 study horizons. The growth rates were estimated based on link volumes at screenline level (see **Figure 10**).

FIGURE 10 - SCREENLINE LOCATION AND DATA COLLECTION POINTS



The EMME model outputs for the following scenarios were provided by the City of Brampton (COB). Detailed model outputs are provided in **Appendix E.**

- Base Year 2011
- Future Condition 2031
- Future Condition 2041

As shown in **Figure 10**, two screenlines were defined for the study area; one for northbound-southbound (NB/SB) traffic and another for eastbound-westbound (EB/WB) traffic. The NB/SB screenline captures traffic volumes on Dixie Road, Bramalea Road, Torbram Road and Airport Road, while the EB/WB screenline captures vehicle volumes on Queens Street East, Williams Parkway, North Park Drive and Bovaird Drive East.

Table 22 summarizes the link attributes and traffic volumes extracted from the Region's EMME model for 2011, 2031 and 2041 horizons.

TABLE 22 - SCREENLINE LINK ATTRIBUTES AND TRAFFIC VOLUMES

Corridor	No. of Lanes	Posted Speed (km/h)	AM Volume (veh/h)		PM Volume (veh/h)		Capacity Per Lane (veh/h)
2011							
	NB/SB	NB/SB	NB	SB	NB	SB	NB/SB
Dixie Rd	2	60	176	1188	1156	368	700
Bramalea Rd	2	60	242	1616	1507	406	800
Torbram Rd	2	60	175	969	1278	361	800
Airport Rd	3	80	565	2649	2744	997	900
Totals	9	--	1158	6422	6685	2132	--
	EB/WB	EB/WB	EB	WB	EB	WB	EB/WB

Corridor	No. of Lanes	Posted Speed (km/h)	AM Volume (veh/h)		PM Volume (veh/h)		Capacity Per Lane (veh/h)
Queen St E	3	60	2355	930	1135	1973	900
Williams Pkwy	2	50	1462	314	613	1303	800
North Park Dr	2	50	623	419	600	267	500
Bovaird Dr E	3	60	1910	828	936	1650	900
Totals	10	--	6350	2491	3284	5193	--
2031							
	NB/SB	NB/SB	NB	SB	NB	SB	NB/SB
Dixie Rd	3	60	200	1948	1886	436	700
Bramalea Rd	3	60	302	2647	2440	550	800
Torbram Rd	2	60	207	1702	1621	365	800
Airport Rd	3	80	559	3179	2809	1229	900
Totals	11	--	1268	9476	8756	2580	--
	EB/WB	EB/WB	EB	WB	EB	WB	EB/WB
Queen St E	3	60	2322	1378	1525	2162	900
Williams Pkwy	2	50	1622	409	773	1484	800
North Park Dr	2	50	622	807	801	638	500
Bovaird Dr E	3	60	1927	1506	1495	1872	900
Totals	10	--	6493	4100	4594	6156	--
2041							
	NB/SB	NB/SB	NB	SB	NB	SB	NB/SB
Dixie Rd	3	60	226	2095	2008	504	700
Bramalea Rd	3	60	340	2722	2560	706	800
Torbram Rd	2	60	268	1751	1665	369	800
Airport Rd	3	80	539	3295	2964	1151	900
Totals	11	--	1373	9863	9197	2730	--
	EB/WB	EB/WB	EB	WB	EB	WB	EB/WB
Queen St E*	2	60	1634	890	1078	1552	900
Williams Pkwy	2	50	1592	444	713	1500	800
North Park Dr	2	50	747	652	712	791	500
Bovaird Dr E	3	60	1960	1552	1581	1870	900
Totals	9	--	5933	3538	4084	5713	--

*BRT Implementation by 2041

The annual growth rates were calculated by comparing the results between 2011 and 2031, and between 2031 and 2041. As presented in **Table 23**, the AM and PM peak period growth rates were estimated to be 1.5% and 1.39% respectively for a period from 2011 to 2031, and negative growth is expected from 2031 to 2041.

TABLE 23 - ESTIMATED VEHICLE VOLUME GROWTH RATES

Direction	AM Peak Hour			PM Peak Hour		
	2011	2031	2041	2011	2031	2041
Northbound	1158	1268	1373	6685	8756	9197
Southbound	6422	9476	9863	2132	2580	2730
Total Volumes	7580	10744	11236	8817	11336	11927

Direction	AM Peak Hour			PM Peak Hour		
	2011	2031	2041	2011	2031	2041
Eastbound	6350	6493	5933	3284	4594	4084
Westbound	2491	4100	3538	5193	6156	5713
Total Volumes	8841	10593	9471	8477	10750	9797
Overall	16421	21337	20707	17294	22086	21724
Per Year Growth Rate from 2011-2031	1.50%		--	1.39%		--
Per Year Growth Rate from 2031-2041	--	-0.30%		--	-0.16%	

Considering the City's current EMME model outputs for 2031 and 2041 are based on modal share from 2011 Transportation Tomorrow Survey (TTS), an adjustment to the growth rate is deemed necessary to reflect the expected modal shift in future.

City of Brampton and Peel Region's targeted 2041 active transportation mode share are 10% and 11%, respectively. With the implementation of the proposed MUP along the study corridor, 11% share of active transportation mode is considered reasonable for the Williams Parkway, which is approximately 2-3% higher than the data estimated based on 2011 TTS. Accordingly, the growth rates for vehicular traffic estimated using the EMME model outputs are adjusted and assumed to be 1% for all vehicle through movements, and 0.5% for all vehicle turning movements for 2031 study horizon. Given negative growth is expected beyond 2031, traffic analysis for future conditions was completed only for 2031 horizon in this study. The 2031 traffic volume forecasts are included in **Appendix F**.

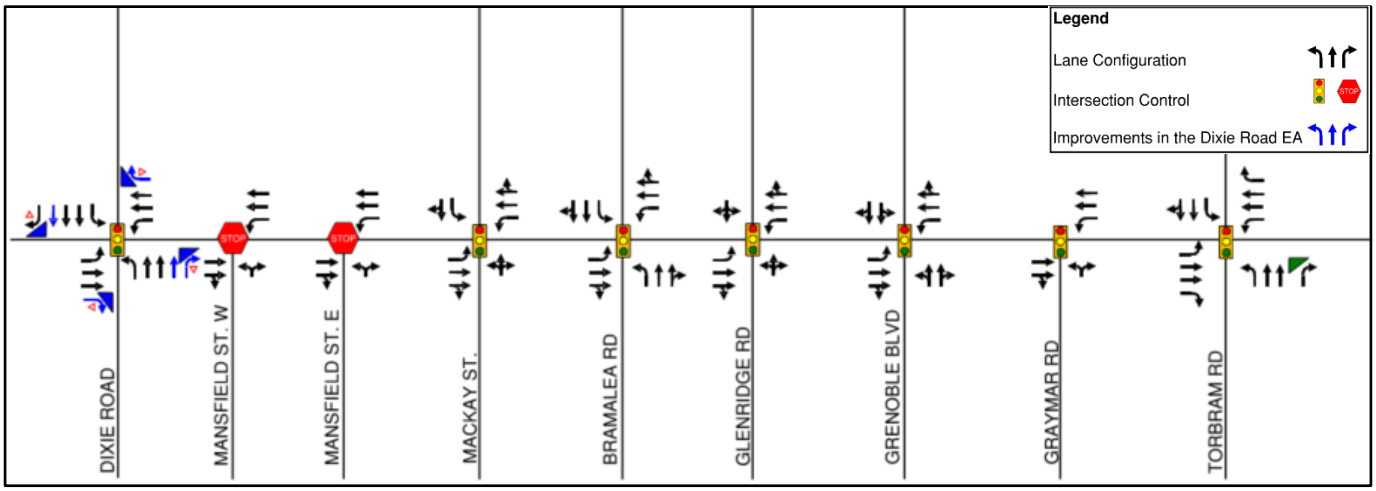
3.3 Future Intersection Operation Conditions

This section presents the traffic operations analysis for the 2031 horizon year. The traffic analysis for the Williams Parkway and Dixie Road intersection used the intersection design developed during the Municipal Class EA (undertaken by Peel Region) for the widening of Dixie Road, from north of Queen Street to north of Countryside Drive. The preferred design from the EA recommended widening from four (4) through lanes, plus turning lanes, to six (6) through lanes plus turning lanes. Additional improvements include dedicated turn lanes at intersections, maintaining the urban cross section on both sides of the road, and providing streetscape and landscape enhancements. Peel Region completed the Municipal Class EA in 2011 and is currently undertaking the detailed design for widening of the Dixie Road corridor, which includes the Williams Parkway/Dixie Road intersection, resulting in some changes to lane configurations at the intersection that have not been incorporated into the traffic analysis. As such, traffic volumes and counts should be reviewed and confirmed prior to construction. The design of the Williams Parkway corridor will tie into the latest design of the Dixie Road intersection to facilitate smooth operations.

Two scenarios were examined, based on whether improvements to traffic signal timings and/or intersection geometric configurations will be implemented along the Williams Parkway corridor (to be known as scenarios "with improvements" scenario and "without improvements" going forward).

As noted above, the future 2031 traffic operations analysis adopted the traffic signal timing and intersection geometric configuration improvements proposed for Dixie Road/Williams Parkway from the Dixie Road Widening Municipal Class Environmental Assessment (EA) (2011), illustrated in **Figure 11.**

FIGURE 11 - FUTURE (2031) LANE CONFIGURATIONS AND INTERSECTION CONTROLS



3.3.1 SIGNALIZED INTERSECTIONS

Intersection capacity and LOS analysis results for the future 2031 scenarios "without improvements" and "with improvements" are summarized in **Table 24**. Movements operate at LOS "E" or "F" are highlighted in red. Detailed Synchro reports are provided in **Appendix G**. In the scenario "with improvements", signal timing optimization was conducted to optimize phasing/split of the existing cycle length.

TABLE 24 - FUTURE (2031) SIGNALIZED INTERSECTION ANALYSIS, WITHOUT AND WITH IMPROVEMENT

Intersection with Williams Pkwy	Direction	Existing Storage Length (m)	AM Peak Hour			PM Peak Hour		
			Delay (s)/LOS	V/C	95th Queue (m)	Delay (s)/LOS	V/C	95th Queue (m)
2031 Traffic Condition – Without Improvement								
Dixie Rd	Overall		34 / C	0.61	--	43 / D	0.75	--
	EBL	92	38 / D	0.5	32	86 / F	0.9	68
	EBT	-	51 / D	0.8	133	44 / D	0.7	154
	EBR	92	36 / D	0.1	12	32 / C	0.0	6
	WBL	90	64 / E	0.8	42	33 / C	0.4	27
	WBT	-	45 / D	0.6	94	58 / E	0.9	219
	WBR	90	36 / D	0.0	0	32 / C	0.0	8
	NBL	66	21 / C	0.4	23	30 / C	0.6	54
	NBT	-	16 / B	0.2	33	32 / C	0.5	120
	NBR	67	15 / B	0.1	8	24 / C	0.1	14
	SBL	127	25 / C	0.3	45	55 / E	0.5	34
	SBT	-	27 / C	0.5	118	37 / D	0.4	68
	SBR	58	22 / C	0.2	23	34 / C	0.1	16
MacKay Street	Overall		19 / B	0.43	--	9 / A	0.55	--
	EBL	50	8 / A	0.2	17	14 / B	0.6	51
	EBTR	-	9 / A	0.3	75	4 / A	0.3	62
	WBL	30	7 / A	0.1	7	3 / A	0.0	2
	WBTR	-	8 / A	0.3	56	6 / A	0.5	120

Intersection with Williams Pkwy	Direction	Existing Storage Length (m)	AM Peak Hour			PM Peak Hour		
			Delay (s)/LOS	V/C	95th Queue (m)	Delay (s)/LOS	V/C	95th Queue (m)
	NBLTR	-	58 / E	0.4	36	64 / E	0.1	7
	SBL	40	72 / E	0.7	75	72 / E	0.5	37
	SBTR	-	53 / D	0.2	25	64 / E	0.1	15
Bramalea Rd	Overall		39 / D	0.73	--	45 / D	0.84	--
	EBL	45	32 / C	0.4	30	68 / E	0.8	42
	EBTR	-	49 / D	0.8	158	38 / D	0.5	105
	WBL	20	40 / D	0.6	24	30 / C	0.2	18
	WBTR	-	38 / D	0.5	89	52 / D	0.9	210
	NBL	40	40 / D	0.7	44	55 / D	0.8	75
	NBTR	-	29 / C	0.3	70	44 / D	0.8	205
	SBL	55	24 / C	0.3	37	40 / D	0.5	18
	SBTR	-	35 / D	0.6	147	35 / D	0.5	103
Glenridge Rd	Overall		11 / B	0.31	--	8 / A	0.38	--
	EBL	30	6 / A	0.2	20	4 / A	0.1	4
	EBTR	-	5 / A	0.3	44	5 / A	0.3	56
	WBL	25	4 / A	0.0	2	5 / A	0.1	7
	WBTR	-	4 / A	0.2	25	7 / A	0.4	139
	NBLTR	-	60 / E	0.1	20	64 / E	0.2	21
	SBLTR	-	67 / E	0.5	49	62 / E	0.1	10
Grenoble Blvd/Jordan Blvd	Overall		21 / C	0.3	--	13 / B	0.42	--
	EBL	30	8 / A	0.1	9	10 / A	0.3	38
	EBTR	-	10 / A	0.3	75	5 / A	0.3	67
	WBL	30	5 / A	0.1	5	3 / A	0.1	7
	WBTR	-	6 / A	0.2	35	5 / A	0.4	94
	NBLTR	-	60 / E	0.3	24	68 / E	0.5	29
	SBLTR	-	61 / E	0.4	31	65 / E	0.3	19
Graymar Rd	Overall		4 / A	0.3	--	4 / A	0.4	--
	EBTR	-	2 / A	0.3	33	3 / A	0.3	42
	WBL	30	2 / A	0.0	1	2 / A	0.0	4
	WBT	-	2 / A	0.2	18	4 / A	0.4	77
	NBLR	-	61 / E	0.2	16	61 / E	0.1	13
Torbram Rd	Overall		28 / C	0.68	--	33 / C	0.75	--
	EBL	30	44 / D	0.3	29	86 / F	0.8	50
	EBT	-	52 / D	0.7	106	43 / D	0.6	91
	EBR	30	42 / D	0.2	28	36 / D	0.1	17
	WBL	45	39 / D	0.3	17	33 / C	0.2	13
	WBT	-	37 / D	0.3	47	41 / D	0.7	122
	WBR	-	34 / C	0.0	9	34 / C	0.3	49
	NBL	40	23 / C	0.3	19	34 / C	0.6	71

Intersection with Williams Pkwy	Direction	Existing Storage Length (m)	AM Peak Hour			PM Peak Hour		
			Delay (s)/LOS	V/C	95th Queue (m)	Delay (s)/LOS	V/C	95th Queue (m)
	NBT	-	18 / B	0.3	56	30 / C	0.7	186
	NBR	40	0 / A	0.0	0	0 / A	0.1	0
	SBL	60	18 / B	0.5	59	30 / C	0.7	47
	SBTR	-	19 / B	0.7	177	17 / B	0.4	103
2031 Traffic Condition – With Improvement								
Dixie Rd	Overall		37 / D	0.64	--	41 / D	0.76	--
	EBL	92	33 / C	0.4	30	71 / E	0.8	64
	EBT	-	52 / D	0.8	136	41 / D	0.7	147
	EBR	92	37 / D	0.1	12	29 / C	0.0	6
	WBL	90	35 / C	0.5	33	32 / C	0.4	25
	WBT	-	43 / D	0.6	93	54 / D	0.9	214
	WBR	90	35 / C	0.0	0	31 / C	0.0	8
	NBL	66	25 / C	0.4	25	36 / D	0.6	56
	NBT	-	20 / B	0.2	37	33 / C	0.6	125
	NBR	67	19 / B	0.1	10	26 / C	0.1	15
	SBL	127	33 / C	0.4	53	59 / E	0.6	37
	SBT	-	35 / C	0.6	137	37 / D	0.4	68
	SBR	58	28 / C	0.2	31	33 / C	0.1	16
MacKay Street	Overall		19 / B	0.43	--	9 / A	0.55	--
	EBL	50	8 / A	0.2	17	14 / B	0.6	51
	EBTR	-	9 / A	0.4	76	4 / A	0.3	62
	WBL	30	7 / A	0.1	7	3 / A	0.0	2
	WBTR	-	8 / A	0.3	57	6 / A	0.5	120
	NBLTR	-	58 / E	0.4	35	65 / E	0.1	7
	SBL	40	72 / E	0.7	75	72 / E	0.5	37
	SBTR	-	53 / D	0.2	25	64 / E	0.1	15
Bramalea Rd	Overall		44 / D	0.73	--	47 / D	0.84	--
	EBL	45	32 / C	0.4	32	40 / D	0.6	30
	EBTR	-	55 / D	0.9	171	35 / C	0.5	103
	WBL	20	39 / D	0.5	25	30 / C	0.2	18
	WBTR	-	43 / D	0.5	97	54 / D	0.9	214
	NBL	40	31 / C	0.6	37	37 / D	0.7	65
	NBTR	-	33 / C	0.3	70	48 / D	0.8	209
	SBL	55	27 / C	0.3	35	51 / D	0.6	18
	SBTR	-	44 / D	0.7	159	50 / D	0.6	127
Glenridge Rd	Overall		11 / B	0.31	--	8 / A	0.38	--
	EBL	30	6 / A	0.2	20	4 / A	0.1	4
	EBTR	-	5 / A	0.3	44	5 / A	0.3	56
	WBL	25	4 / A	0.0	2	5 / A	0.1	7

Intersection with Williams Pkwy	Direction	Existing Storage Length (m)	AM Peak Hour			PM Peak Hour		
			Delay (s)/LOS	V/C	95th Queue (m)	Delay (s)/LOS	V/C	95th Queue (m)
	WBTR	-	4 / A	0.2	25	7 / A	0.4	139
	NBLTR	-	60 / E	0.1	20	64 / E	0.2	19
	SBLTR	-	67 / E	0.5	49	62 / E	0.1	10
Grenoble Blvd/Jordan Blvd	Overall		21 / C	0.3	--	13 / B	0.42	--
	EBL	30	8 / A	0.1	9	10 / A	0.3	38
	EBTR	-	10 / A	0.3	75	5 / A	0.3	67
	WBL	30	5 / A	0.1	5	3 / A	0.1	7
	WBTR	-	6 / A	0.2	35	5 / A	0.4	94
	NBLTR	-	60 / E	0.3	24	68 / E	0.5	29
	SBLTR	-	61 / E	0.4	31	65 / E	0.3	19
Graymar Rd	Overall		4 / A	0.28	--	4 / A	0.38	--
	EBTR	-	3 / A	0.3	49	3 / A	0.3	42
	WBL	30	2 / A	0.0	2	2 / A	0.0	4
	WBTR	-	2 / A	0.2	26	4 / A	0.4	77
	NBLR	-	60 / E	0.2	15	61 / E	0.1	13
Torbram Rd	Overall		30 / C	0.68	--	39 / D	0.74	--
	EBL	30	39 / D	0.3	25	45 / D	0.6	30
	EBT	-	53 / D	0.7	107	47 / D	0.6	103
	EBR	30	43 / D	0.2	29	39 / D	0.1	19
	WBL	45	42 / D	0.3	17	39 / D	0.2	15
	WBT	-	45 / D	0.4	53	59 / E	0.8	157
	WBR	-	41 / D	0.0	6	46 / D	0.4	55
	NBL	40	29 / C	0.3	22	40 / D	0.6	68
	NBT	-	24 / C	0.3	69	35 / D	0.7	178
	NBR	40	0 / A	0.0	0	0 / A	0.1	0
	SBL	60	14 / B	0.5	58	35 / D	0.7	37
	SBTR	-	19 / B	0.6	175	21 / C	0.4	95

Under the future (2031) traffic conditions in the scenario “without improvements”, all the signalized intersections operate at LOS “D” or better. Individual vehicle movements experiencing higher delay and poor LOS are predominately turning movements, particularly left turns, and many of them are observed during PM peak. Of note are the intersections on Dixie Road and Torbram Road where the eastbound left turn movements operate at LOS “F”.

As for the future (2031) traffic conditions in the scenario “with improvements”, all the signalized intersections operate at LOS “D” or better. Similar to the scenario “without improvements”, some individual movements experience higher delay and poor LOS. However, there are no failing movements (LOS “F”) to be noted at the intersections after performing signal timing and split optimization. This is noticed particularly at the intersection with Torbram Road where an advanced left turn phase for the eastbound approach at the Williams Parkway/Torbram Road intersection was implemented. The improvement is incorporated into the traffic signal cycle not as an additional left turn lane (i.e., dual left turn lanes).

Moreover, the 95th % queue analysis shows that some movements exceed the current turn storage length, as highlighted in red colour in **Table 25.** It is recommended to extend the existing turn storage length to improve the turning lane operation conditions.

TABLE 25 - RECOMMENDED STORAGE IMPROVEMENT

Intersection with Williams Pkwy	Movement	Synchro 95th % Queue Length (m) AM/PM	Existing Storage Length (m)	Proposed Storage Length (m)
MacKay St	SBL	75/37	40	75
Bramalea Rd	WBL	25/18	20	25
	NBL	37/65	40	65
Grenoble Blvd	EBL	9/38	30	40
Torbram Rd	NBL	22/68	40	70

**Recommended Storage length is rounded to the nearest 5 meters*

3.3.2 UNSIGNALIZED INTERSECTIONS

Table 26 summarizes the unsignalized intersection analysis results for future (2031) scenarios "with" and "without improvements". Movements operate at LOS "E" or "F" are highlighted in red. Detailed Synchro reports are included in **Appendix G.**

TABLE 26 - FUTURE (2031) UNSIGNALIZED INTERSECTION ANALYSIS, WITHOUT AND WITH IMPROVEMENT

Intersection with Williams Pkwy	Direction	Existing Storage Length (m)	AM Peak Hour			PM Peak Hour		
			Delay s/LOS	V/C	95th Queue (m)	Delay s/LOS	V/C	95th Queue (m)
2031 Traffic Condition – Without Improvement								
Mansfield St W	Overall		1 / A	--	--	1 / A	--	--
	EBTR	-	0 / A	0.4	0	0 / A	0.4	0
	WBL	50	10 / A	0.0	0	10 / A	0.0	0
	WBT	-	0 / A	0.3	0	0 / A	0.4	0
	NBLR	-	25 / D	0.2	6	40 / E	0.2	6
Mansfield Street E	Overall		1 / A	--	--	1 / A	--	--
	EBTR	-	0 / A	0.4	0	0 / A	0.4	0
	WBL	50	11 / B	0.0	0	11 / B	0.1	2
	WBT	-	0 / A	0.2	0	0 / A	0.4	0
	NBLR	-	25 / C	0.2	6	56 / F	0.4	11
2031 Traffic Condition – With Improvement								
Mansfield St W	Overall		1 / A	--	--	1 / A	--	--
	EBTR	-	0 / A	0.4	0	0 / A	0.4	0
	WBL	50	10 / A	0.0	0	10 / A	0.0	0
	WBT	-	0 / A	0.3	0	0 / A	0.4	0
	NBLR	-	25 / D	0.2	6	41 / E	0.2	6
	Overall		1 / A	--	--	1 / A	--	--

Intersection with Williams Pkwy	Direction	Existing Storage Length (m)	AM Peak Hour			PM Peak Hour		
			Delay s/LOS	V/C	95th Queue (m)	Delay s/LOS	V/C	95th Queue (m)
Mansfield Street E	EBTR	-	0 / A	0.4	0	0 / A	0.4	0
	WBL	50	11 / B	0.0	0	11 / B	0.1	2
	WBT	-	0 / A	0.2	0	0 / A	0.4	0
	NBLR	-	25 / C	0.2	6	56 / F	0.4	11

The analysis results show that the northbound approach at both Mansfield Street West and Mansfield Street East experience longer delay and poor LOS. A signal warrant analysis was conducted for the future (2031) conditions using the methodology in section 4.10 "Justification 7: Projected Volumes" of the Ontario Traffic Manual (OTM) Book 12: Traffic Signals. As the results presented in **Table 27**, a traffic signal is not warranted for either of these two intersections due to the low volume. Details are provided in **Appendix H**.

TABLE 27 - MANSFIELD STREET/WILLIAMS PARKWAY SIGNAL WARRANT ANALYSIS

Intersection with Williams Pkwy	Confi guration	2031 Traffic Condition				
		OTM Book 12 Justification 7 Met?	Warrant Compliance			
			1A	1B	2A	2B
Mansfield St E	T Intersection	NO	41%	4%	40%	2%
Mansfield St W	T Intersection	NO	43%	5%	42%	3%

3.4 Future Corridor Operation Conditions

A future corridor capacity and LOS analysis was conducted, and the results are summarized in **Table 28**. The traffic volume on each segment/link was determined based on EMME model outputs for the year 2031. In the EMME model, the lane capacity along the corridor is considered as 800 vehicles per hour per lane.

As seen in **Table 28,** most segments along the study corridor operate at a good LOS, i.e. "D" or better, except the segments west of Dixie Road, between Mansfield Street East and MacKay Street, and between MacKay Street and Bramalea Road. These segments show LOS "E" with v/c ratio from 0.85 to 0.92. Considering these are all localized issues, and the volumes are still within capacity (i.e., v/c is lower than 1.00), further improvements are not recommended.

TABLE 28 - FUTURE (2031) CONDITIONS LINK ASSESSMENT

Road Segment along William Pkwy/Direction		Capacity Per Lane	Number of Lanes	Total Capacity	AM Peak Hour			PM Peak Hour		
					Projected Volumes	V/C	LOS	Projected Volumes	V/C	LOS
Immediately west of Dixie Rd	EB	800	2	1600	941	0.59	A to C	1060	0.66	A to C
	WB	800	2	1600	815	0.51	A to C	1471	0.92	E
Dixie Rd to Mansfield St W	EB	800	2	1600	985	0.62	A to C	1074	0.67	A to C
	WB	800	2	1600	848	0.53	A to C	1337	0.84	D
Mansfield St W to Mansfield St E	EB	800	2	1600	990	0.62	A to C	1052	0.66	A to C
	WB	800	2	1600	823	0.51	A to C	1332	0.83	D

Mansfield St E to MacKay St	EB	800	2	1600	969	0.61	A to C	1049	0.66	A to C
	WB	800	2	1600	799	0.5	A to C	1364	0.85	E
MacKay St to Bramalea Rd	EB	800	2	1600	1031	0.64	A to C	963	0.6	A to C
	WB	800	2	1600	705	0.44	A to C	1405	0.88	E
Bramalea Rd to Glenridge Rd	EB	800	2	1600	851	0.53	A to C	854	0.53	A to C
	WB	800	2	1600	661	0.41	A to C	1188	0.74	A to C
Glenridge Rd to Grenoble Blvd	EB	800	2	1600	759	0.47	A to C	819	0.51	A to C
	WB	800	2	1600	679	0.42	A to C	1145	0.72	A to C
Grenoble Blvd to Graymar Rd	EB	800	2	1600	801	0.5	A to C	716	0.45	A to C
	WB	800	2	1600	507	0.32	A to C	1146	0.72	A to C
Graymar Rd to Torbram Rd	EB	800	2	1600	804	0.5	A to C	737	0.46	A to C
	WB	800	2	1600	467	0.29	A to C	1155	0.72	A to C
Immediately east of Torbram Rd	EB	800	2	1600	908	0.57	A to C	794	0.5	A to C
	WB	800	2	1600	395	0.25	A to C	1101	0.69	A to C

3.5 Future Multi-Modal Level of Service (LOS)

An assessment of future (2031) MMLOS conditions along the Williams Parkway corridor was completed based on the implementation of the proposed MUP on both sides of the corridor by the year 2031, as recommended in the City of Brampton's Public Works & Engineering-2021-701 report. The changes proposed to the intersection at Dixie Road from the Dixie Road Widening Municipal Class EA (2011) were also considered in the analysis.

The City of Brampton does not currently have a methodology for establishing MMLOS targets, therefore, the City of Ottawa's MMLOS methodology was used to assess the future (2031) MMLOS conditions. As mentioned in **Section 1.3.4** of this report, the urban fabric considered in the Ottawa's MMLOS methodology differs from that of Brampton's, therefore it may be difficult to achieve high MMLOS scores for active modes at select intersections where the crossing of several lanes of traffic is often required.

3.5.1 FUTURE PEDESTRIAN LOS

Under future conditions (2031), PLOS is likely to decrease at the intersection with Dixie Road from the PLOS in existing conditions due to additional traffic lanes proposed in the Dixie Road Municipal Class EA (2011) intersection layout update. As shown in **Table 29,** the intersection's south, east, and west sides perform at a LOS "F", which is one letter score below "E" reported for the same intersection sides in the existing conditions. Other intersections' PLOS remain the same as no change to the geometry of the roadway is expected.

TABLE 29 - FUTURE (2031) PLOS AT SIGNALIZED INTERSECTIONS

Crossing Side	Intersection with Williams Pkwy						
	Dixie Rd	MacKay St	Bramalea Rd	Glenridge Rd	Grenoble Blvd	Graymar Rd	Torbram Rd
Overall PLOS[2] (AM)	F	E	E	E	F	F	F
Overall PLOS[2] (PM)	F	F	E	F	F	F	F
North Side	F (-1)	C (73)	E (38)	B (88)	D (56)	-	E (38)

Crossing Side	Intersection with Williams Pkwy						
	Dixie Rd	MacKay St	Bramalea Rd	Glenridge Rd	Grenoble Blvd	Graymar Rd	Torbram Rd
South Side	F (-1)	B (89)	E (38)	B (88)	D (56)	A (96)	F (27)
East Side	F (29)	E (40)	E (38)	E (40)	E (40)	D (48)	F (5)
West Side	F (29)	E (41)	E (38)	E (40)	E (40)	C (64)	F (21)

(xx) = PETSI Score

Table 30 provides a separate overview of future Pedestrian Delay LOS at signalized intersections within the study corridor for the AM and PM peak periods. Optimized signal timing plans for 2031 conditions (see Appendix G) were used to determine the relationship between total signal cycle length and the effective walking time for each direction (see Appendix D for inputs). The results show that overall PLOS for the AM and PM peaks remain the same as existing conditions, with only slight differences for certain sides.

TABLE 30 - FUTURE (2031) PEDESTRIAN DELAY LOS AT SIGNALIZED INTERSECTIONS

Crossing Side	Intersection with Williams Pkwy						
	Dixie Rd	MacKay St	Bramalea Rd	Glenridge Rd	Grenoble Blvd	Graymar Rd	Torbram Rd
AM PEAK							
Overall PLOS[2]	F	E	E	E	F	F	F
North Side	E (45)	E (43)	E (49)	E (56)	F (61)	-	C (29)
South Side	D (34)	E (43)	E (43)	E (56)	F (61)	F (60)	E (48)
East Side	E (50)	C (25)	E (36)	B (12)	B (19)	B (12)	E (50)
West Side	E (52)	C (25)	E (37)	B (12)	B (19)	B (12)	E (50)
PM PEAK							
Overall PLOS[2]	F	F	E	F	F	F	F
North Side	E (45)	F (61)	E (58)	F (65)	F (68)	-	C (26)
South Side	D (36)	F (61)	E (43)	F (65)	F (68)	F (66)	D (36)
East Side	E (47)	B (14)	E (45)	A (8)	B (15)	B (10)	E (54)
West Side	E (46)	B (14)	E (42)	A (8)	B (15)	B (10)	E (53)

(xx) = Average Pedestrian Delay (s)

[2] Overall intersection LOS is measured by the lowest performing level from PETSI and Pedestrian Delay

As shown in Table 31, PLOS has improved along segments of the Williams Parkway study corridor from mostly PLOS "E" and "F" in existing conditions to PLOS "D" and "E" in future conditions. The addition of the proposed MUP along Williams Parkway leads to in a higher score, a PLOS "D", for the eastbound and westbound directions between Bramalea Road and Graymar Road segments and a PLOS "E" between Graymar Road and Torbram Road. Future PLOS input tables are provided in Appendix D.

TABLE 31 - FUTURE (2031) PLOS ALONG ROAD SEGMENTS

Road Segment along William Pkwy	Eastbound		Westbound	
	Existing PLOS	Future PLOS	Existing PLOS	Future PLOS
Overall PLOS	F	E	F	E
Dixie Rd to MacKay St	E	E	E	E

Road Segment along William Pkwy	Eastbound		Westbound	
	Existing PLOS	Future PLOS	Existing PLOS	Future PLOS
MacKay St to Bramalea Rd	D	D	D	D
Bramalea Rd to Glenridge Rd	F	D	F	D
Glenridge Rd to Grenoble Blvd	F	D	F	D
Grenoble Blvd to Graymar Rd	F	D	F	D
Graymar Rd to Torbram Rd	F	E	F	E

3.5.2 FUTURE BICYCLE LOS

Although a proposed MUP is considered for the analysis purposes along the Williams Parkway corridor, a BLOS of "F" remains at all intersections due to the lack of crossrides or two-stage left turn facilities identified at this stage. If crossrides and bike boxes were to be identified during the design stage, the BLOS would improve to "A" for eastbound and westbound movements. While along the corridor, as a result of this proposed facility, BLOS is likely to also improve from a LOS "E" and "D" to a LOS "A" for all road segments. The future BLOS at intersections and road segments within the corridor are presented in **Table 32** and **Table 33**, respectively. Future BLOS input tables are provided in **Appendix D**.

TABLE 32 - FUTURE (2031) BLOS AT SIGNALIZED INTERSECTIONS

Approach Direction	Intersection with Williams Pkwy						
	Dixie Rd	MacKay St	Bramalea Rd	Glenridge Rd	Grenoble Blvd	Graymar Rd	Torbram Rd
Overall BLOS	F	F	F	F	F	F	F
From North	F	F	F	D	F	-	F
From South	F	D	F	F	D	D	F
From East	F	F	F	F	F	F	F
From West	F	F	F	F	F	F	F

TABLE 33 - FUTURE (2031) BLOS ALONG ROAD SEGMENTS

Road Segment along William Pkwy	Bicycle Level of Service	
	Eastbound	Westbound
Overall BLOS	E	D
Dixie Rd to MacKay St	E	E
MacKay St to Bramalea Rd	E	E
Bramalea Rd to Glenridge Rd	D	D
Glenridge Rd to Grenoble Blvd	D	D
Grenoble Blvd to Graymar Rd	D	D
Graymar Rd to Torbram Rd	A	A

*For this analysis, the segment from Steeles Avenue to the Waste Management Entrance was analyzed.

3.5.3 FUTURE TRANSIT LOS

The future year (2031) TLOS has maintained the same scores of the existing conditions at the intersections due to the long signal cycle length (same as the existing conditions) and the lack of TSP service along the Williams Parkway corridor. Buses will still operate in mixed traffic conditions with limited on-street parking and intersecting driveways. Future transit LOS input tables are provided in **Appendix D.**

3.5.4 FUTURE TRUCK LOS

By 2031, TrkLOS would maintain the same scores than the existing conditions at signalized intersections, as no geometric improvements are expected along the study corridor, with the exception of the intersection at Dixie Road, where the configuration will be updated as identified in the Dixie Road Widening Municipal Class EA (2011). The existing TrkLOS at signalized intersections within the study corridor is presented in **Table 34.** For road segments, the analysis replicated the same values as during the existing year since no change in the number of lanes in the travel directions is proposed.

TABLE 34 - EXISTING TRKLOS AT SIGNALIZED INTERSECTIONS

Approach Direction	Intersection with Williams Pkwy						
	Dixie Rd	MacKay St	Bramalea Rd	Glenridge Rd	Grenoble Blvd	Graymar Rd	Torbram Rd
Overall TrkLOS	B	F	A	E	B	E	B
From North	A	B	A	B	B	N/A	A
From South	A	D	A	B	B	B	A
From East	B	B	A	E	B	N/A	A
From West	A	F	A	E	B	E	A

3.5.5 FUTURE VEHICLE LOS

VLOS was determined for signalized intersections based on the overall v/c ratios identified through the traffic analysis completed for future (2031) conditions (**Table 24**). The intersection of Williams Parkway at Dixie Road is expected to have a better VLOS compared to the existing conditions given the updates proposed in the Dixie Road Widening Municipal Class EA (2011) study. The remaining intersections within the study corridor would experience slightly lower LOS than the existing conditions considering the increased traffic volumes in 2031. Nonetheless, the results are comparable, as shown in **Table 35.**

TABLE 35 - EXISTING VLOS AT SIGNALIZED INTERSECTIONS

Approach From	Intersection with Williams Pkwy						
	Dixie Rd	MacKay St	Bramalea Rd	Glenridge Rd	Grenoble Blvd	Graymar Rd	Torbram Rd
Overall VLOS AM/PM Peak	B/C	A/A	C/D	A/A	A/A	A/A	B/C

3.5.6 SUMMARY OF FUTURE MMLOS

Error! Reference source not found. and **Table 36** present the comparisons of the MMLOS results between existing and future conditions, against the suggested targets established in **Section 1.3.4**, for the signalized intersections and road segments, respectively.

TABLE 36 - COMPARISON TO SUGGESTED LOS TARGETS AT SIGNALIZED INTERSECTIONS

Signalized Intersection on William Pkwy	LOS Form	Level of Service				
		Pedestrian	Bicycle	Transit	Truck	Auto[1]
Dixie Rd	LOS Target	C	C	D	E	D
	Existing LOS	F	F	F	B	C/E
	Future LOS	F*	F*	F*	A	B/C
MacKay St	LOS Target	C	C	D	E	D
	Existing LOS	E/F	F	F	F	A
	Future LOS	E*/F*	F*	F*	F*	A
Bramalea Rd	LOS Target	C	C	D	E	D
	Existing LOS	E	F	F	A	B/C
	Future LOS	E*	F*	F*	A	C/D
Glenridge Rd	LOS Target	C	C	D	E	D
	Existing LOS	E/F	F	F	E	A
	Future LOS	E*/F*	F*	F*	E	A
Grenoble Blvd	LOS Target	C	C	D	E	D
	Existing LOS	F	F	F	B	A
	Future LOS	F*	F*	F*	B	A
Graymar Rd	LOS Target	C	C	D	E	D
	Existing LOS	F	F	F	E	A
	Future	F*	F*	F*	E	A
Torbram Rd	Targets	C	C	D	E	D
	Existing LOS	F	F	F	A	B
	Future	F*	F*	F*	A	B/C

X/X = AM/PM Peak Hour * = Suggested targets not achieved

TABLE 37 - COMPARISON TO SUGGESTED LOS TARGETS ALONG ROAD SEGMENTS

Road Segment along William Pkwy	LOS Form	Level of Service				
		Pedestrian	Bicycle	Transit	Truck	Auto[1]
Dixie Rd to MacKay St	LOS Target	C	C	D	E	N/A
	Existing LOS	E/E	E/E	D/D	A/A	N/A
	Future LOS	E*/E*	A/A	D/D	A/A	N/A
MacKay St to Bramalea Rd	LOS Target	C	C	D	E	N/A
	Existing LOS	D/D	E/E	D/D	A/A	N/A
	Future LOS	D*/D*	A/A	D/D	A/A	N/A

Road Segment along William Pkwy	LOS Form	Level of Service				
		Pedestrian	Bicycle	Transit	Truck	Auto[1]
Bramalea Rd to Glenridge Rd	LOS Target	C	C	D	E	N/A
	Existing LOS	F/F	D/D	D/D	A/A	N/A
	Future LOS	D*/D*	A/A	D/D	A/A	N/A
Glenridge Rd to Grennoble Blvd	LOS Target	C	C	D	E	N/A
	Existing LOS	F/F	D/D	D/D	A/A	N/A
	Future LOS	D*/D*	A/A	D/D	A/A	N/A
Grenoble Blvd to Graymar Rd	LOS Target	C	C	D	E	N/A
	Existing LOS	F/F	D/D	D/D	A/A	N/A
	Future LOS	D*/D*	A/A	D/D	A/A	N/A
Graymar Rd to Torbram Rd	LOS Target	C	C	D	E	N/A
	Existing LOS	F/F	A/A	D/D	A/A	N/A
	Future	E*/E*	A/A	D/D	A/A	N/A

X/X = Eastbound/Westbound * = Suggested targets not achieved.

[1]City of Ottawa's MMLOS methodology for Auto Level of Service (ALOS) does not apply to road segments.

Key findings through these comparisons are:

- **Pedestrian Level of Service** will likely improve along road segments with the inclusion of the proposed MUP on both sides of the Williams Parkway corridor. PLOS at intersections will likely remain the same as existing conditions except for the intersection with Dixie Road where the intersection layout is updated as per the Dixie Road Widening Municipal Class EA (2011) study.
- **Bicycle Level of Service** will likely improve along segments with the consideration of the MUP on both sides of the corridor, however, BLOS will likely remain low at intersections without the installation of crossrides and left turn boxes. The installation of crossrides and turn boxes would help increase BLOS scores at intersections and should be considered further at the design stage.
- **Transit Level of Service** along road segments will likely remain unchanged since buses will still operate in mixed traffic conditions without on-street parking and limited intersecting driveways.
- **Truck Level of Service** will likely remain unchanged along road segments due to lane widths at or in excess of 3.5 metres.
- **Vehicle Level of Service** will likely improve at some intersections due to the reduction of v/c ratios resulting from the Dixie Road Widening Municipal Class EA (2011) intersection layout update at the intersection with Dixie Road and the optimized signal timing splits with critical movements.

It is unlikely further changes on the Williams Parkway corridor will significantly alter future MMLOS scores for various modes since the overall geometry, traffic volumes, and operating speeds are not expected to change at this time. However, the installation of crossrides and two-stage bike boxes for cyclists at intersections within the corridor would help improve BLOS at intersections. Options for bicycle improvements will be investigated during the design stage.

Due to the unchanged or increased number of travel lanes crossed at signalized intersections (such as Dixie Road intersection), pedestrian scores have remained at a PLOS "F". Additionally, the lack of dedicated turn facilities for cyclists at intersections within the corridor's current design results in the BLOS 'F'.

TLOS and ALOS targets are not met at select intersections due to anticipated signal delay times. The suggested LOS target for TrkLOS is not met at the Williams Parkway/MacKay Street intersection due to the limited number of receiving lanes for the eastbound right turn movement in addition to the small turning radius.

4 Cross-section Design Options

As part of this study, the pedestrian and cycling facilities improvements are recommended considering the connectivity to the active transportation networks proposed in the Peel Region Active Transportation Plan and the City of Brampton Bicycle Facilities Implementation Plan. Accordingly, several potential cross-section options are developed for reference at high level, and these options will be investigated further in the next phase of the study. It is important to note that measurements of the roadway in the following cross sections are up to the edge of pavement unless otherwise specified.

4.1 Existing Cross-Section

The existing conditions through the Williams Parkway corridor are presented in **Figure 12** to **Figure 15**.

FIGURE 12 - EXISTING CROSS-SECTION, EAST OF DIXIE RD

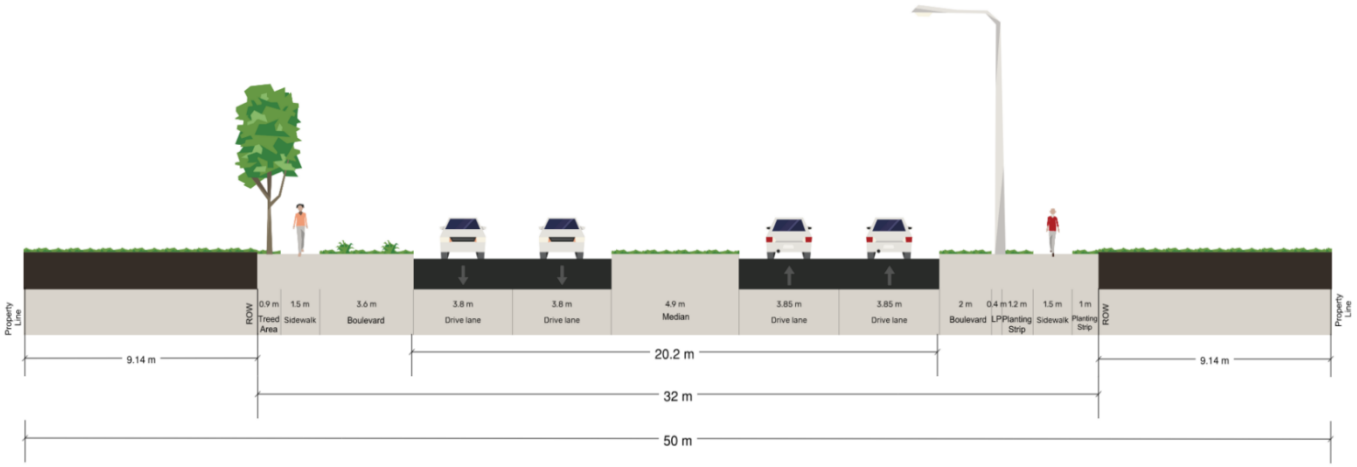


FIGURE 13 - EXISTING CROSS-SECTION, WEST OF BRAMALEA RD

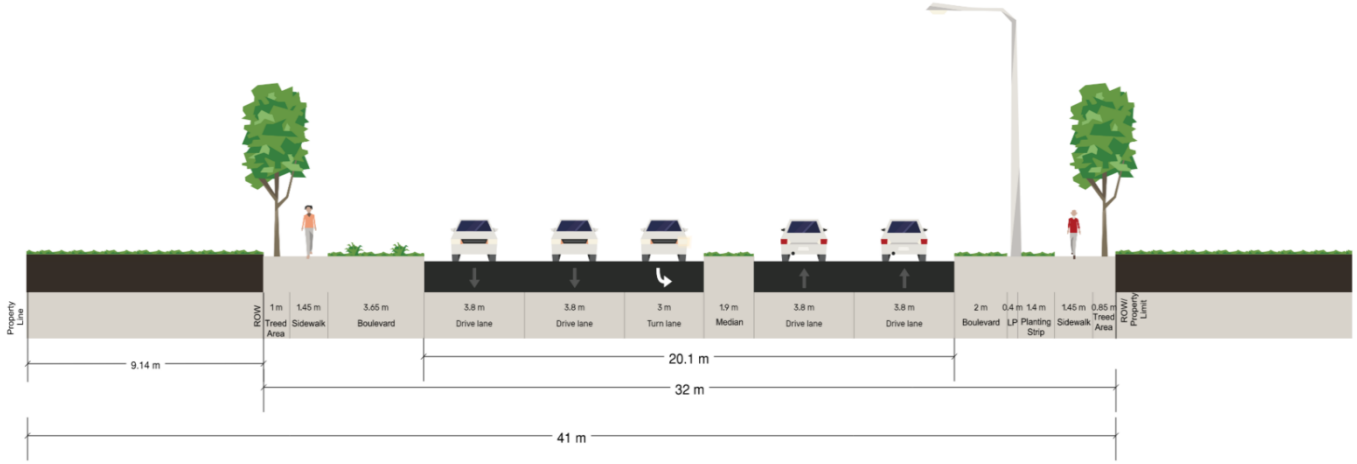


FIGURE 14 - EXISTING CROSS-SECTION, WEST OF GRENOBLE BLVD

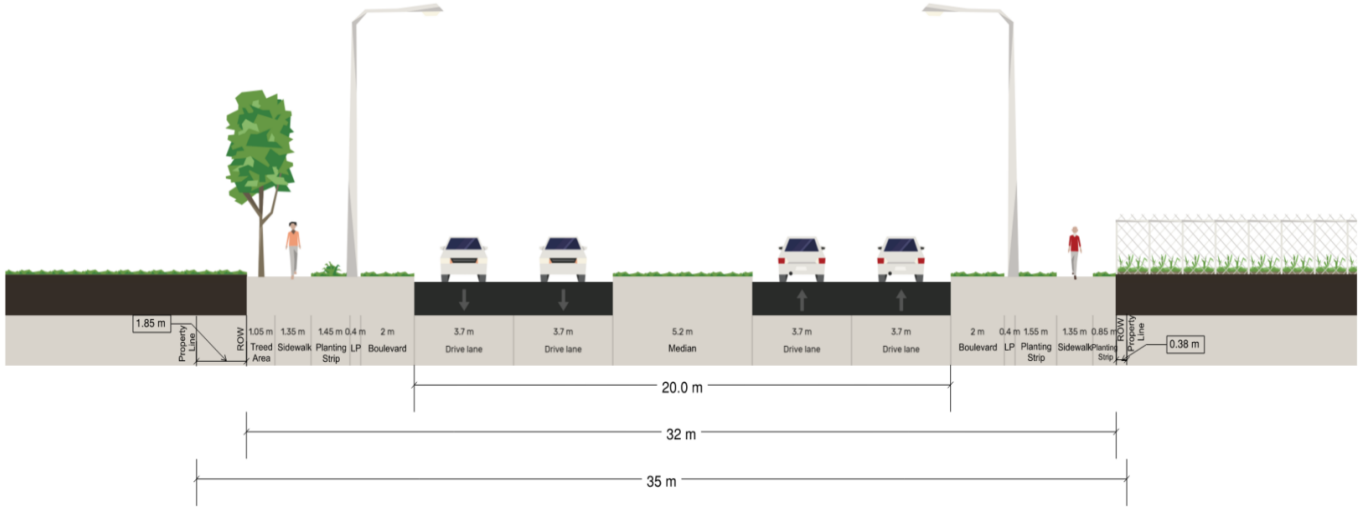
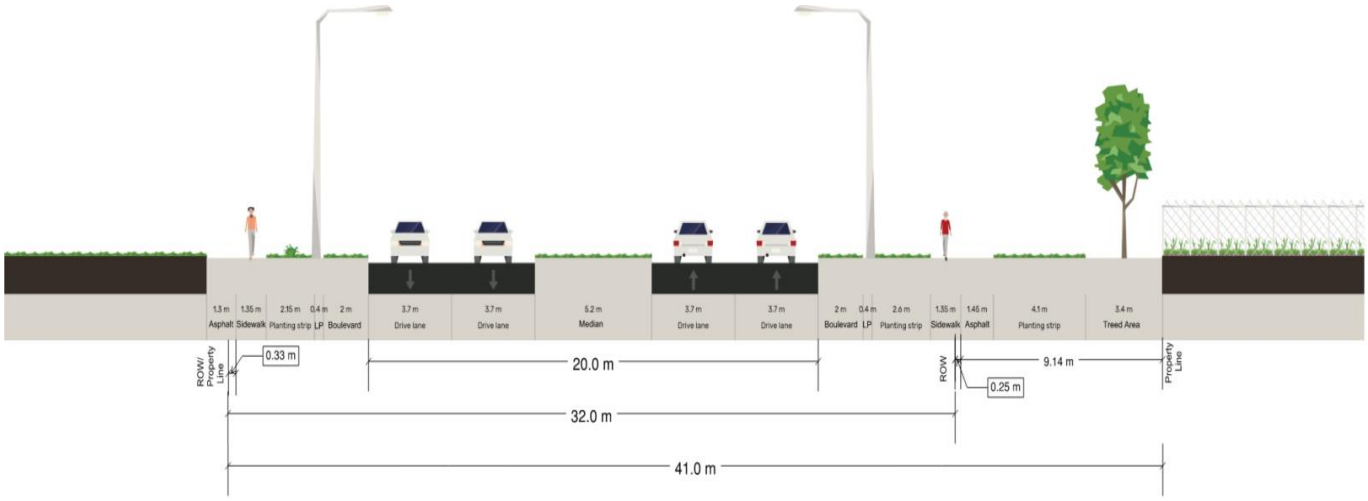


FIGURE 15 - EXISTING CROSS-SECTION, WEST OF TORBRAM RD



4.2 Proposed Cross-Section

Cross-Section options presented in this section are expected to meet the pedestrian and cycling facility space requirements to achieve the target of the active transportation network plan as proposed by the Peel Region Active Transportation Plan and the City of Brampton Bicycle Facilities Implementation Plan.

FIGURE 16 - PROPOSED CROSS-SECTION OPTION 1

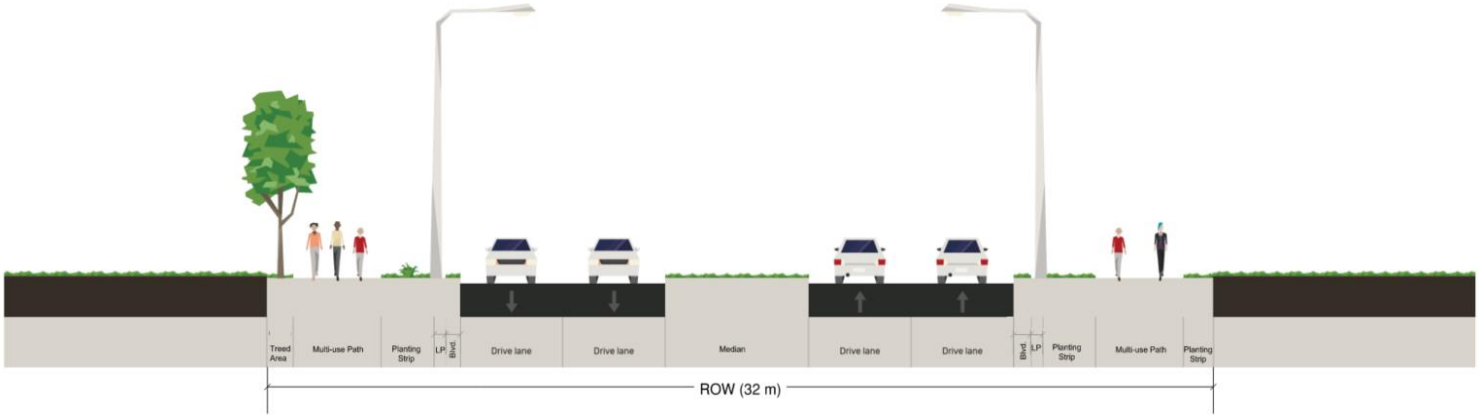


FIGURE 17 - PROPOSED CROSS-SECTION OPTION 2

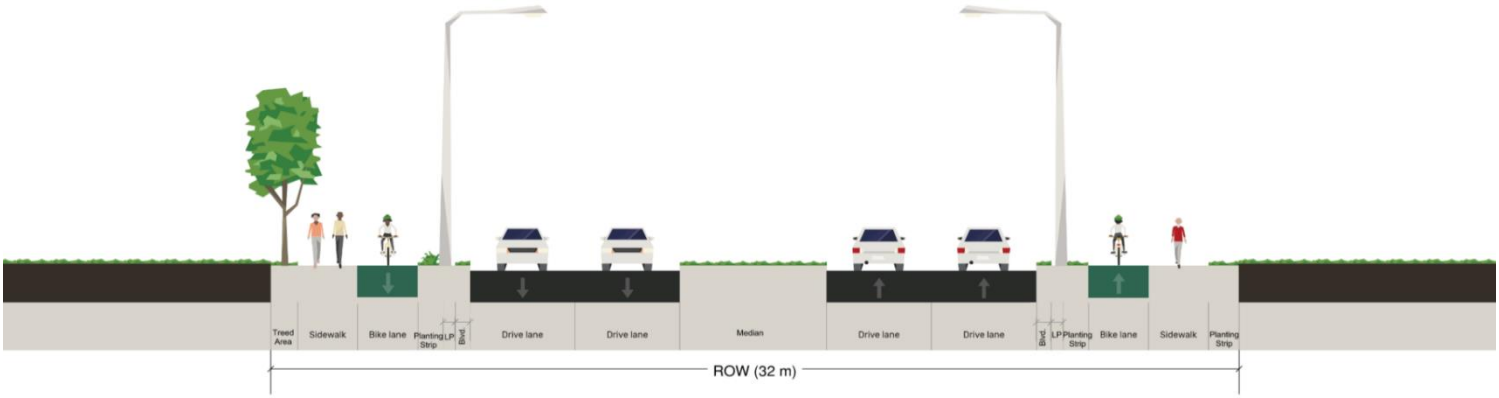


FIGURE 18 - PROPOSED CROSS-SECTION OPTION 3

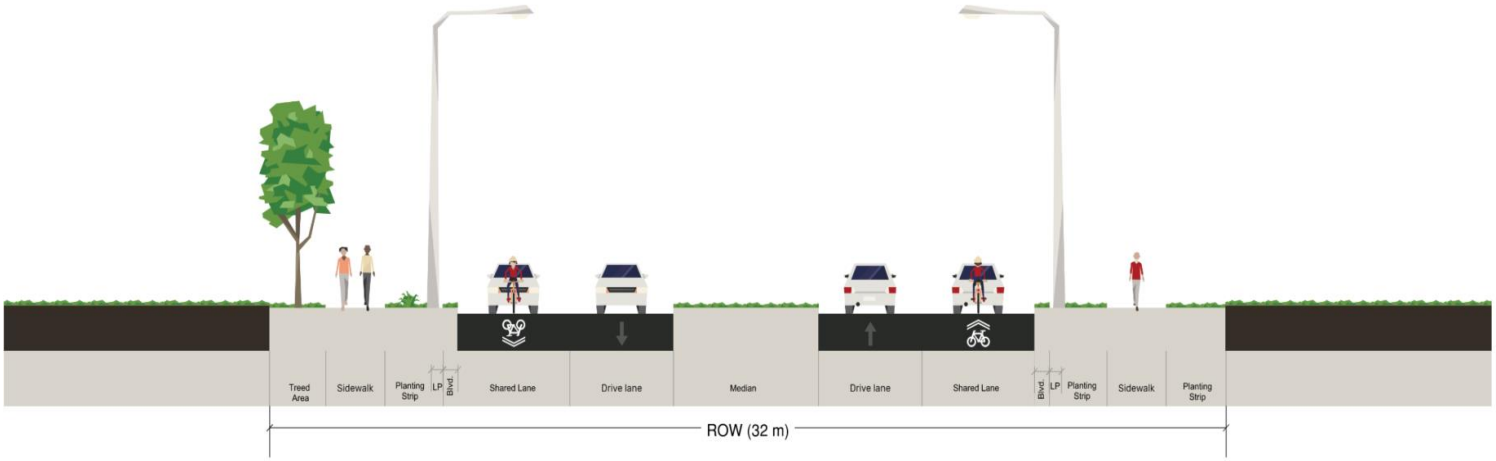


FIGURE 19 - PROPOSED CROSS-SECTION OPTION 4

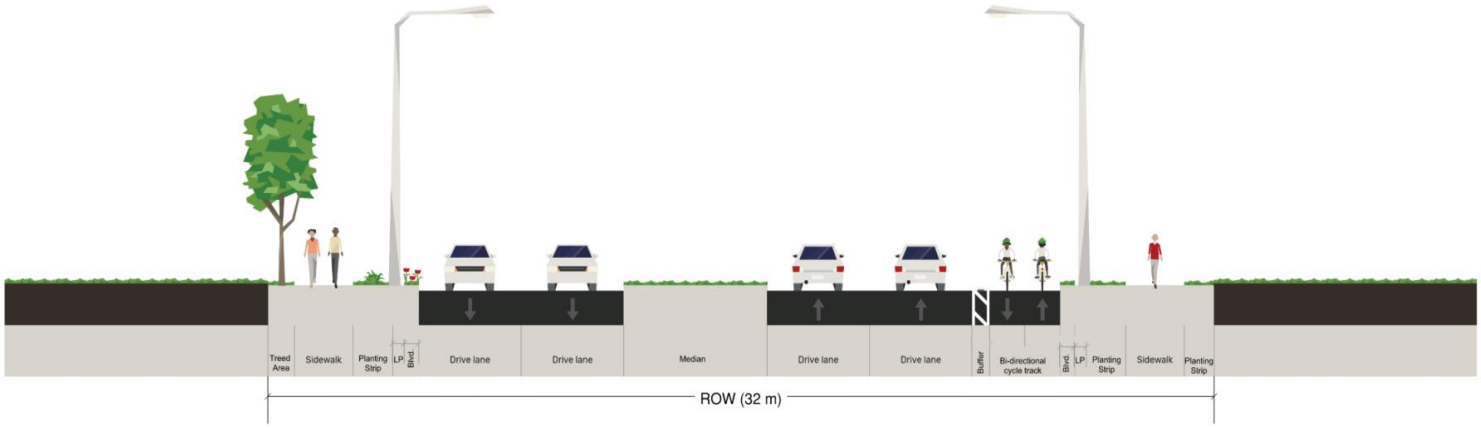
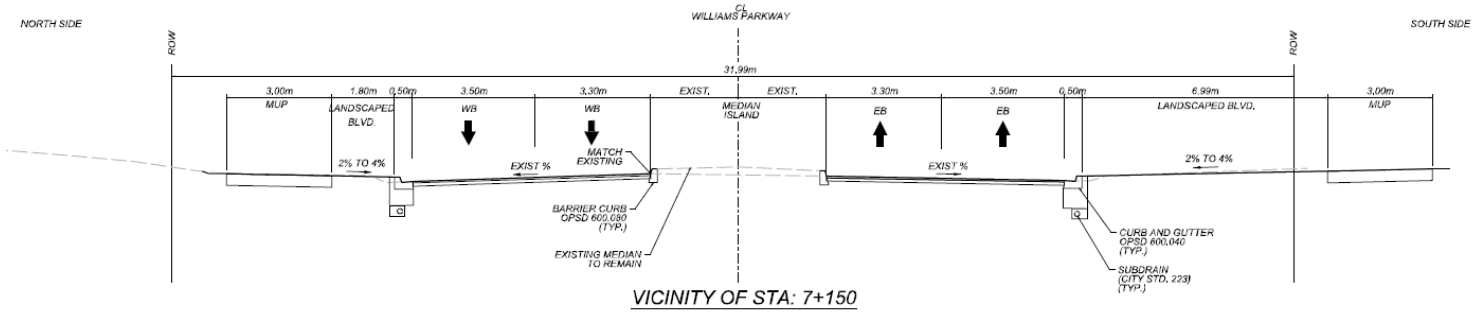


FIGURE 20 - PROPOSED CROSS-SECTION, WEST OF DIXIE



The right-of-way of the proposed cross sections will be maintained as per the existing conditions throughout the Williams Parkway corridor. The four options presented in **Figure 16** to **Figure 20** include a multi-use-path, dedicated cycling lane, shared street, and an on street bi-directional cycling facility, respectively. The proposed cross section west of Dixie in **Figure 20** illustrates the 30% design condition while the Region's detailed design for the intersection is currently being developed. Analysis methodology for the preferred scenario will consider factors such as safety, constructability, preservation of green spaces, and costs, which will be discussed in the next phase of the study.

5 Conclusions & Recommendations

This report summarized the work completed as part of the traffic impact analysis in support of the Williams Parkway MCEA. The following are the key findings and recommendations resulting from the study.

- Overall intersection operations are expected to operate at LOS “D” or better by 2031.
- Some individual movements would operate at LOS “E”, however, the v/c ratios for these movements are less than 1.0.
- Traffic signals are not warranted for any of the unsignalized intersections within the study corridor,
- Based on the 95th % queue length results, intersections where turning lane storage length is proposed to be extended are identified, per **Table 25**.
- It is recommended that the City consider increasing the v/c ratio threshold of 0.85 to 0.95 in the future to promote the use of sustainable transportation modes including active transportation, transit and carpooling.
- Improvements to the intersections on Dixie Road from the Dixie Road Widening Municipal Class EA (2011) are to be incorporated.
- It is recommended to implement advanced left turn phase for the eastbound approach at intersections on Torbram Road. The improvement is to be incorporated to the traffic signal cycle without any physical mitigation.
- The most common type of vehicle collision within the corridor were rear-ends, predominantly as a result of the car following too closely to the one ahead and not leaving enough gap to allow for a safe stop. The second most common type of vehicle collision was from a turning movement, particularly at the intersections with Bramalea Road, Grenoble Blvd, and Torbram Road.
- For the future MMLOS conditions, the following has been noted:
  - PLOS and BLOS are likely to improve along road segments with the inclusion of the proposed MUP on both sides of the Williams Parkway corridor.
  - PLOS at intersections is likely to remain the same as the existing conditions except for the intersection at Dixie Road, where PLOS would improve as a result of intersection layout updates.
  - BLOS is likely to remain low at intersections without the installation of crossrides and left turn boxes.
  - TLOS and TrkLOS will likely remain unchanged.
  - Vehicle LOS will likely improve at some intersections considering the layout updates at the intersection on Dixie Road and optimized signal timing splits at intersections along the study corridor.

APPENDIX A

CITY OF OTTAWA'S MMLOS METHODOLOGY

PARSONS

Exhibit 4 – PLOS Segment Evaluation Table

Sidewalk Width (m)	Boulevard Width (m)	Motor Vehicle Traffic Volume (AADT)	Presence of On-street Parking	Segment PLOS			
				Operating Speed (km/h)			
				≤30	>30 or 50	>50 or 60	>60 [1]
2.0 or more	> 2	≤ 3000	N/A	A	A	A	B
		> 3000	Yes	A	B	B	N/A
			No	A	B	C	D
	0.5 to 2	≤ 3000	N/A	A	A	A	B
		> 3000	Yes	A	B	C	N/A
			No	A	C	D	E
	0	≤ 3000	NA	A	B	C	D
		> 3000	Yes	B	B	D	N/A
			No	B	C	E	F
1.8	> 2	≤ 3000	N/A	A	A	A	B
		> 3000	Yes	A	B	C	N/A
			No	A	C	D	E
	0.5 to 2	≤ 3000	N/A	A	B	B	D
		> 3000	Yes	A	C	C	N/A
			No	B	C	E	E
	0	≤ 3000	N/A	A	B	C	D
		> 3000	Yes	B	C	D	N/A
			No	C	D	F	F
1.5	> 2	≤ 3000	N/A	C	C	C	C
		> 3000	Yes	C	C	D	N/A
			No	C	D	E	E
	0.5 to 2	≤ 3000	N/A	C	C	C	D
		> 3000	Yes	C	C	D	N/A
			No	D	E	E	E
	0	N/A		D	E	F [2]	F [2]
<1.5	N/A			F [3]	F [3]	F [3]	F [3]
No sidewalk	N/A			C [4]	F [3]	F [3]	F [3]

Notes:
1. On-street parking not provided on roadways with posted speed of 70 km/h or more
2. Sidewalk must be 1.8 m wide if no separation is provided (curb-face sidewalk) where speeds are high
3. Sidewalk must be 1.5 m wide to meet Provincial accessiblity standards
4. Ottawa Pedestrian Plan, 2014: “all new and reconstructed urban local roads where pedestrian facilities are required in accordance with these policies but no dedicated pedestrian facility is provided, require that roads be designed for a speed of 30 km/h or lower (pending development of a new 30 km/h roadway design standard).” Where a roadway is specifically designed as 'shared space', with appropriate design controls and features, it can achieve LOS A.
5. Where a multi-use path is provided in lieu of sidewalks, the MUP can be evaluated using the same methodology.

Exhibit 5 – PETSI Point Tables

Replaced through Addendum (see next page).

Exhibit 6 – PETSI Evaluation Table

Pedestrian Exposure to Traffic LOS	
Points threshold	LOS
≥90	A
≥75	B
≥60	C
≥45	D
≥30	E
<30	F

Exhibit 7 – Pedestrian Delay Evaluation Table

Average Pedestrian Crossing Delay Component	
$\text{Delay} = 0.5 \times \frac{(\text{Cycle Length} - \text{Pedestrian Effective Walk Time})^2}{\text{Cycle Length}}$	
< 10 s per intersection leg	LOS A
≥10 to 20 sec	LOS B
>20 to 30 sec	LOS C
>30 to 40 sec	LOS D
>40 to 60 sec	LOS E
> 60 sec	LOS F

Exhibit 5 – PETSI Point Tables (revised February 2017)

5.1 Crossing Distance & Conditions		
Total travel lanes crossed	**No median**	**With Median (>2.4m)**
2	120	120
3	105	105
4	88	90
5	72	75
6	55	60
7	39	45
8	23	30
9	6	15
10	-10	0

5.2 Signal Phasing & Timing Features	
Left turn conflict ("Left_turns")	**Points**
Permissive	-8
Protected/permissive	-8
Protected	0
No left turn/prohibited	0
Right turn conflict ("Right_turns")	**Points**
Permissive or yield control	-5
Protected/permissive	-5
Protected	0
No right turn	0
Right turns on red ("RTOR")	**Points**
RTOR allowed	-3
RTOR prohibited	0
Leading ped interval? ("LPI")	**Points**
No	-2
Yes	0

5.3a Corner Radius	
Corner radius	**Points**
Greater than 25m	-9
> 15m to 25m	-8
> 10m to 15m	-6
> 5m to 10m	-5
>3m to 5m	-4
Less than/equal to 3m	-3
No right turn	0
5.3b Right Turn Channel	
Right turn channel	**Points**
Conventional right turn channel with receiving lane(1)	-3
Conventional right turn channel without receiving lane(1)	0
Right turn “smart channel” (1)	2
No right turn channel	-4
No right turn	0

5.4 Crosswalk Treatment	
Crosswalk treatment (“Crosswalk”)	**Points**
Standard transverse markings	-7
Textured/coloured pavement	-4
Zebra stripe hi-visibility markings	-4
Raised crosswalk	0

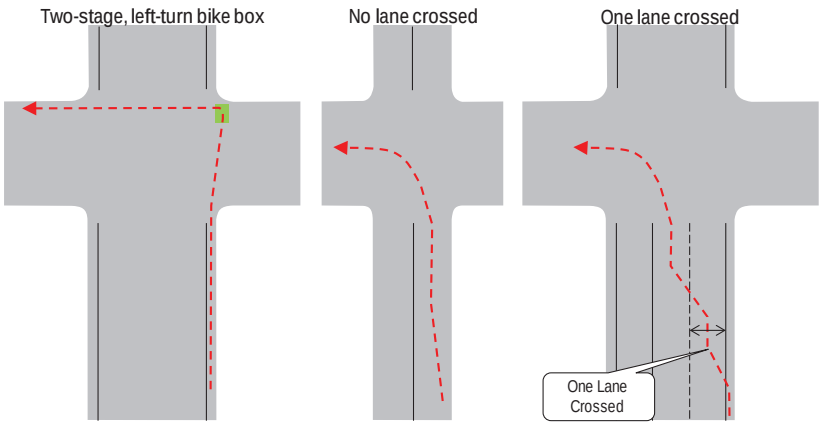
Exhibit 11 – BLOS Segment Evaluation Table

Type of Bikeway		LOS
Physically Separated Bikeway (cycle tracks, protected bike lanes and multi-use paths). Physical separation refers to, but is not limited to, curbs, raised medians, bollards and parking lanes (adjacent to the bike lane along the travelled way i.e. not curbside).		A
Bike Lanes Not Adjacent Parking Lane - Select Worst Scoring Criteria		
No. of Travel Lanes	1 travel lane in each direction	A
	2 travel lanes in each direction separated by a raised median	B
	2 travel lanes in each direction without a separating median	C
	More than 2 travel lanes in each direction	D
Bike Lane Width	≥ 1.8 m wide bike lane (includes marked buffer and paved gutter width)	A
	≥1.5 m to <1.8 m wide bike lane (includes marked buffer and paved gutter width)	B
	≥1.2 m to <1.5 m wide bike lane (includes marked buffer and paved gutter width)	C
Operating Speed	≤ 50 km/h operating speed	A
	60 km/h operating speed	C
	≥ 70 km/h operating speed	E
Bike lane blockage (commercial areas)	Rare	A
	Frequent	C
Bike Lanes Adjacent to curbside Parking Lane - Select Worst Scoring Criteria		
No. of Travel Lanes	1 travel lane in each direction	A
	2 or more travel lanes in each direction	C
Bike Lane and Parking Lane Width	4.5 m wide bike lane plus parking lane (includes marked buffer and paved gutter width)	A
	4.25 m wide bike lane plus parking lane (includes marked buffer and paved gutter width)	B
	≤ 4.0 m wide bike lane plus parking lane (includes marked buffer and paved gutter width)	C
Operating Speed	≤ 40 km/h operating speed	A
	50 km/h operating speed	B
	60 km/h operating speed	D
	≥ 70 km/h operating speed	F
Bike lane blockage (commercial areas)	Rare	A
	Frequent	C
Mixed Traffic		
No. of Travel Lanes and Operating Speed	2 travel lanes; ≤ 40 km/h; no marked centerline or classified as residential	A
	2 to 3 travel lanes; ≤ 40 km/h	B
	2 travel lanes; 50 km/h; no marked centerline or classified as residential	B
	2 to 3 travel lanes; 50 km/h	D
	4 to 5 travel lanes; ≤ 40 km/h	D
	4 to 5 travel lanes; ≥ 50 km/h	E
	6 or more travel lanes; ≤ 40 km/h	E
	≥ 60 km/h	F
Unsignalized Crossing along Route: no median refuge		
No. of Travel Lanes on Side Street and Operating Speed	3 or less lanes being crossed; ≤ 40 km/h	A
	4 to 5 lanes being crossed; ≤ 40 km/h	B
	3 or less lanes being crossed; 50 km/h	B
	4 to 5 lanes being crossed; 50 km/h	C
	3 or less lanes being crossed; 60 km/h	C
	4 to 5 lanes being crossed; 60 km/h	D
	6 or more lanes being crossed; ≤ 40 km/h	E
	3 or less lanes being crossed; ≥ 65 km/h	E
	6 or more lanes being crossed; ≥ 50 km/h	F
	4 to 5 lanes being crossed; ≥ 65 km/h	F
Unsignalized Crossing along Route: with median refuge (≥ 1.8 m wide)		
No. of Travel Lanes on Side Street and Operating Speed	5 or less lanes being crossed; ≤ 40 km/h	A
	3 or less lanes being crossed; 50 km/h	A
	6 or more lanes being crossed; ≤ 40 km/h	B
	4 to 5 lanes being crossed; 50 km/h	B
	3 or less lanes being crossed; 60 km/h	B
	6 or more lanes being crossed; 50 km/h	C
	4 to 5 lanes being crossed; 60 km/h	C
	3 or less lanes being crossed; ≥ 65 km/h	D
	6 or more lanes being crossed; 60 km/h	E
	4 to 5 lanes being crossed; ≥ 65 km/h	E
	6 or more lanes being crossed; ≥ 65 km/h	F

Exhibit 12 – BLOS Signalized Intersection Evaluation Table

Bikeway and Intersection Type		LOS
Bike Lanes or higher order facility on a Signalized Intersection Approach		
Right-turn Lane and Turning Speed of Motorists	No impact on LTS (as long as cycling facility remains to the right of any turn lane - otherwise see pocket bike lanes below)	
Cyclist Making a Left-turn and Operating Speed of Motorists (refer to figure)	Two-stage, left-turn bike box; ≤ 50 km/h	A
	No lane crossed, ≤ 50 km/h	B
	1 lane crossed, ≤ 40 km/h	B
	No lane crossed, ≥ 60 km/h	C
	1 lane crossed, 50 km/h	C
	2 or more lanes crossed, ≤ 40 km/h	D
	1 lane crossed, ≥ 60 km/h	E
	2 or more lanes crossed, ≥ 50 km/h	F
	All other single left-turn lane configurations	F
	Dual left-turn lanes (shared or exclusive)	F
Pocket Bike Lanes on a Signalized Intersection Approach		
Right-turn Lane and Turning Speed of Motorists	Right-turn lane introduced to the right of the bike lane and ≤ 50 m long, turning speed ≤ 25 km/h (based on curb radii and angle of intersection)	B
	Right-turn lane introduced to the right of the bike lane and > 50 m long, turning speed ≤ 30 km/h (based on curb radii and angle of intersection)	D
	Bike lane shifts to the left of the right-turn lane, turning speed ≤ 25 km/h (based on curb radii and angle of intersection)	D
	Right-turn lane with any other configurations	F
	Dual right-turn lanes (shared or exclusive)	F
Cyclist Making a Left-turn and Operating Speed of Motorists (refer to figure)	Two-stage, left-turn bike box; ≤ 50 km/h	A
	No lane crossed, ≤ 50 km/h	B
	1 lane crossed, ≤ 40 km/h	B
	No lane crossed, ≥ 60 km/h	C
	1 lane crossed, 50 km/h	C
	2 or more lanes crossed, ≤ 40 km/h	D
	1 lane crossed, ≥ 60 km/h	E
	2 or more lanes crossed, ≥ 50 km/h	F
	All other single left-turn lane configurations	F
	Dual left-turn lanes (shared or exclusive)	F
Mixed Traffic on a Signalized Intersection Approach		
Right-turn Lane and Turning Speed of Motorists	Right-turn lane 25 to 50 m long, turning speed ≤ 25 km/h (based on curb radii and angle of intersection)	D
	Right-turn lane 25 to 50 m long, turning speed > 25 km/h (based on curb radii and angle of intersection)	E
	Right-turn lane longer than 50 m	F
	Dual right-turn lanes (shared or exclusive)	F
Cyclist Making a Left-turn and Operating Speed of Motorists (refer to figure)	Two-stage, left-turn bike box; ≤ 50 km/h	A
	No lane crossed, ≤ 50 km/h	B
	1 lane crossed, ≤ 40 km/h	B
	No lane crossed, ≥ 60 km/h	D
	1 lane crossed, 50 km/h	D
	2 or more lanes crossed, ≤ 40 km/h	D
	1 lane crossed, ≥ 60 km/h	F
	2 or more lanes crossed, ≥ 50 km/h	F
	All other single left-turn lane configurations	F
	Dual left-turn lanes (shared or exclusive)	F

Left-turn Configurations



Notes:
1. Pocket bike lanes are defined as bike lanes that develop near intersections between vehicular right turn lanes on the right side and vehicular through or left lanes on the left side. All other configurations of bike lanes or separated facility that remain against the edge of the curb/parking lane and require right turning vehicles to yield to through cyclists will not impact the level of traffic stress (i.e. are considered to be LOS A).

Exhibit 14 – TLOS Evaluation Methodology

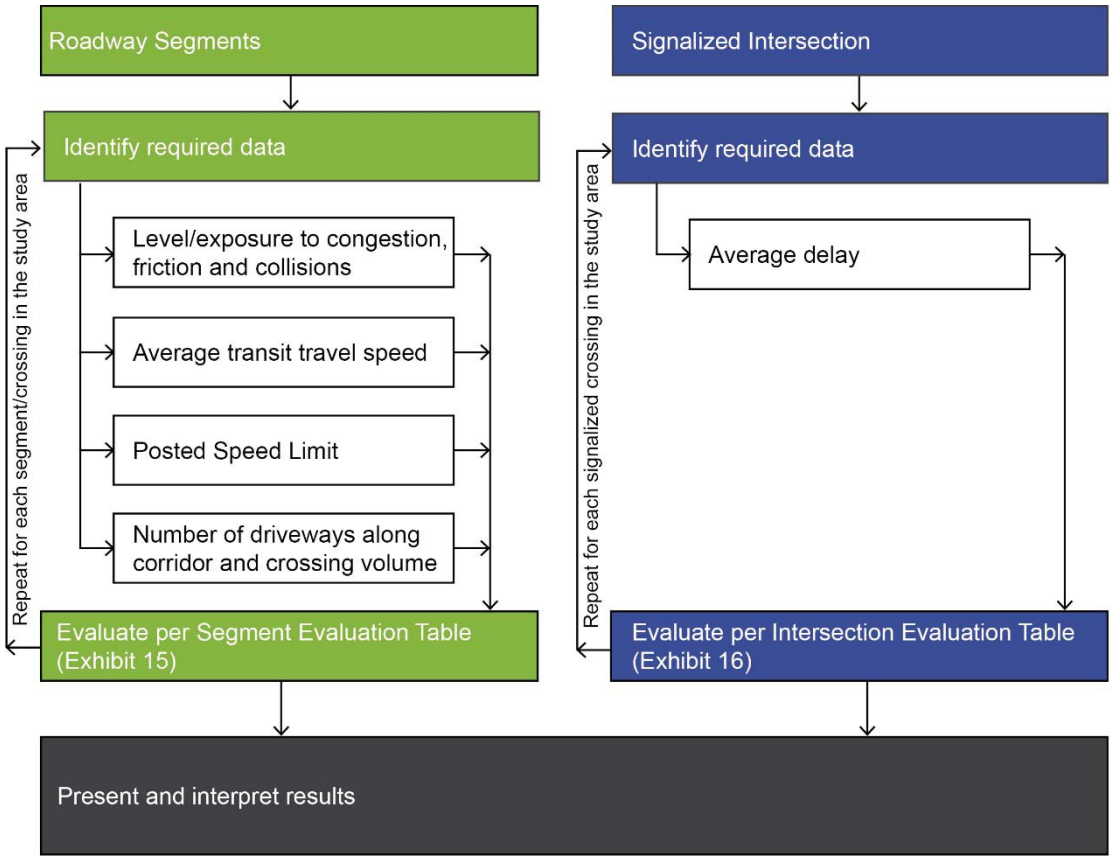


Exhibit 15 - TLOS Segment Evaluation Table

Facility Type		Level/exposure to congestion delay, friction and incidents			Quantitative Measurement	LOS
		Congestion	Friction	Incident Potential		
Segregated ROW		No	No	No	N/A	A
Bus lane	No/limited parking/driveway friction	No	Low	Low	$C_f \leq 60$	B
	Frequent parking/driveway friction	No	Medium	Medium	$C_f > 60$	C
Mixed Traffic	Limited parking/driveway friction	Yes	Low	Medium	$Vt/Vp \geq 0.8$	D
	Moderate parking/driveway friction	Yes	Medium	Medium	$Vt/Vp \leq 0.6$	E
	Frequent parking/driveway friction	Yes	High	High	$Vt/Vp < 0.4$	F

Notes:

Cf, Conflict Factor = = (Number of driveways x crossing volume) / 1 km

Vt/Vp is the ratio of average transit travel speed to posted speed limit

Exhibit 16 – TLOS Signalized Intersection Evaluation Table replaced through Addendum (see next page).

- If the average length of curb edge occupied with parking stalls (or bulb-outs) during the period being evaluated is greater than 50 percent of the sidewalk length from intersection to intersection, then on-street parking should be considered to be present;
- If parking is restricted to certain days or times of day (e.g. off-peak parking only or weekend parking only) then BLOS should be calculated based on whatever on-street parking occurs for the time period being evaluated; and,
- If the parking lane is rarely used and otherwise functions as a vehicle travel lane (e.g. parking is permitted in the curb lanes on a four-lane road but observed parking occupancy is 10 percent or less) then on-street parking should be considered to be absent.

4. Transit Level of Service (TLOS)

4.1 For Segment TLOS, the "average transit travel speed" can be estimated by dividing the length of the corridor by the time it takes for the transit vehicle to travel through the corridor, including any intersection delay and stopping/ dwell time.

4.2 Exhibit 16 – TLOS Signalized Intersection Evaluation Table is replaced with the revised version below which includes "Typical Locations" for LOS 'C' and 'D' and examples of "short", "medium" and "long" cycle lengths.

Delay	Typical Location	LOS
0	Grade Separation	A
≤10 sec	High Level TSP	B
≤20 sec	TSP & short (e.g. <60 sec) to medium (e.g. 60-90 sec) cycle length	C
≤30 sec		D
≤40 sec	TSP & long cycle length (e.g. >90 sec)	E
>40 sec	No TSP & long cycle length (e.g. >90 sec)	F

5. Truck Level of Service (TkLOS)

5.1 For the "curb lane width" in Exhibit 20 – TkLOS Segment Evaluation Table, if trucks typically operate in a non-curb lane (e.g. if the curb lane is a reserved bus lane) then the width of that non-curb lane should be used.

5.2 The "curb lane width" in Exhibit 20 – TkLOS Segment Evaluation Table refers to the typical distance from the curb face to the lane edge line, or in the case of a non-curb lane the distance between lane lines.

Exhibit 19 – TkLOS Evaluation Methodology

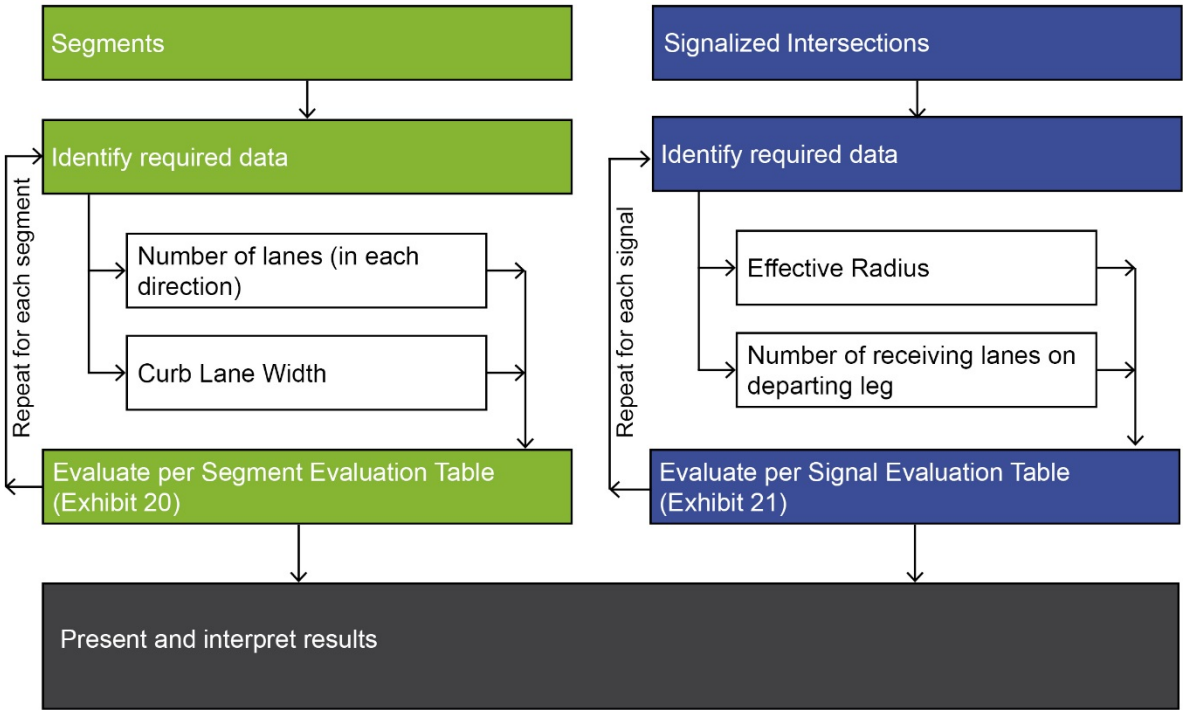


Exhibit 20 – TkLOS Segment Evaluation Table

Curb Lane Width (m)	Only two travel lanes (one in each direction)	More than two travel lanes
>3.7	B	A
≤3.5	C	A
≤3.3	D	C
≤3.2	E	D
≤3	F	E

Exhibit 21 – TkLOS Signalized Intersection Evaluation Table

Effective Corner Radius	One receiving lane on departure from intersection	More than one receiving lane on departure from intersection
< 10m	F	D
10 to 15m	E	B
> 15m	C	A

6 Vehicular Level of Service (LOS)

The following details outlining the evaluation of Vehicular Level of Service are extracted from the 2009 Transportation Impact Assessment Guidelines. As the TIA update is carried out, these parameters may be updated.

6.1 Intersection Capacity Analysis

An evaluation is required of any critical intersection within the study area that will potentially be affected by site generated traffic volumes during any or all of the relevant time periods and scenarios. Summaries are to be provided in tabular format clearly identifying intersection performance under existing and future traffic conditions. Where development is anticipated to proceed in phases or stages, projected performance for all intersections must be documented for the end of each phase.

Detailed output from analysis software is to be provided in an appendix to the report and copies of the electronic files should be provided on CD. Appendix B outlines parameters to be used in operational analysis of signalized intersections.

All volume to capacity (V/C) calculations relating to future conditions should be determined using signal timing optimized for the volume conditions being studied. The V/C ratio for an intersection is defined as the sum of equivalent volumes for all critical movements divided by the sum of capacities for all critical movements assuming that the V/C ratios for critical movements can be equalized. In cases where minimum pedestrian phase times prevent equalizing the level of service for critical movements, then the V/C ratio for the most heavily saturated critical movement should be considered as the V/C ratio for the intersection. Adjustment for the impact of pedestrian activated control is permitted provided detailed supporting analysis including projected pedestrian volumes is provided and discussed in advance with traffic engineering staff.

In the case of planning level or functional design projects, practitioners should undertake a two and a half hour peak period observation of volumes (typically 6:30 – 9:00 AM) to verify that the traffic volumes through the intersections reflect existing demands and to identify unusual operating conditions. For operational studies, peak hour observations are acceptable. Timing of observations and conditions observed should be documented in writing in the report.

LEVEL OF SERVICE	VOLUME TO CAPACITY RATIO
A	0 to 0.60
B	0.61 to 0.70
C	0.71 to 0.80
D	0.81 to 0.90
E	0.91 to 1.00
F	> 1.00

Intersection evaluations should identify:

- Signalized Intersections – V/C ratios for the overall intersection, as defined above, and individual movements; and
- Unsignalized Intersections - Level of service (LOS) where the LOS is between A and E; V/C where capacity is based on gap analysis if intersection LOS is F.

Existing signal timing information such as phasing, pedestrian minimums and clearance intervals must be used as a base to analyze the existing capacity of signalized intersections. This signal timing data should be obtained from the City of Ottawa Traffic Operations Division. Operational design of the signals analyzed should be in accordance with City of Ottawa signal operation practices.

In cases where roadways have closely spaced signals and especially when there are heavy turning movements, the analysis should confirm that storage limitations will not prevent signalized intersections from operating at the predicted V/C ratio.

The City of Ottawa prefers that analysis be completed using the Highway Capacity Software (HCS version 4d or later), or Synchro (version 5 or later). Should a consultant wish to utilize a software package other than those listed above, prior approval must be obtained from the City's Traffic Operations Division.

Section not applicable.

Exhibit 22 – Minimum Desirable MMLOS Targets by Official Plan Policy/Designation & Road Class

OP Designation / Policy Area	Road Class	PLOS	Bicycle - BLOS				Transit - TLOS [3]			Truck - TrLOS		Auto - LOS [4]
			Cross-town Bikeway	Spine Route	Local Route	Elsewhere	Rapid Transit Corridor	TP - Continuous Lanes	TP - Isolated Measures	Truck Route	Other	
Land-Use Designation												
Central Area	Arterial	A	A	C	B	D	A	C	D	D	E	E
	Collector	A	A	B	B	D	A	C	D	D	No target	E
	Local	A	A	B	B	D	A	C	D	E	No target	E
Developing Community	Arterial	C	B	C	B	D	B	C	D	D	No target	D
	Collector	C	B	C	B	D	B	C	D	D	No target	D
	Local	C	B	C	B	D	B	C	D	N/A	No target	D
Employment Area	Arterial	C	B	C	C	E	B	C	D	B	D	D
	Collector	C	B	C	C	E	B	C	D	B	D	D
	Local	C	B	D	C	No target	B	C	D	D	E	D
Entreprise Area	Arterial	C	B	C	B	D	B	C	D	B	E	D
	Collector	C	B	C	B	D	B	C	D	B	E	D
	Local	C	B	C	B	No target	B	C	D	D	No target	D
General Rural Area	Arterial	No target	N/A	D	D	No target	N/A	N/A	N/A	C	E	D
	Collector	No target	N/A	D	D	No target	N/A	N/A	N/A	C	No target	D
	Local	No target	N/A	D	D	No target	N/A	N/A	N/A	No target	No target	D
General Urban Area	Arterial	C	B	C	B	D	B	C	D	D	E	D
	Collector	C	B	C	B	D	B	C	D	D	No target	D
	Local	C	B	C	B	D	B	C	D	N/A	No target	D
Mixed Use Centre	Arterial	C	A	C	B	D	B	C	D	D	E	D
	Collector	C	A	B	B	D	B	C	D	D	No target	D
	Local	C	A	B	B	D	B	C	D	N/A	No target	D
Village	Arterial	C	B	C	B	D	N/A	N/A	N/A	D	No target	D
	Collector	C	B	C	B	D	N/A	N/A	N/A	D	No target	D
	Local	C	B		B	D	N/A	N/A	N/A	N/A	No target	D
Traditional Main Street	Arterial	B	A	C	C	D	B	C	D	D	E	D
	Collector	B	A	C	C	D	B	C	D	D	No target	D
Arterial Main Street	Arterial	C	B	C	D	D	B	C	D	D	E	D
All Other Designations	Arterial	D	B	C	C	D	B	C	D	D	No target	D
	Collector	D	B	C	C	D	B	C	D	D	No target	D
	Local	D	B	C	C	D	B	C	D	N/A	No target	D
Policy Area [2]												
Within 600m of a rapid transit station	Arterial	A	A	C	B	D	A	C	D	D	E	E
	Collector	A	A	B	B	D	A	C	D	D	No target	E
	Local	A	A	B	B	D	A	C	D	N/A	No target	E
Within 300m of a school	Arterial	A	A	C	B	D	A	C	D	D	E	E
	Collector	A	A	B	B	D	A	C	D	D	No target	E
	Local	A	A	B	B	D	A	C	D	N/A	No target	E

1. This table indicates the minimum desirable target. Efforts should be made to exceed these minimum targets whenever possible, without negatively impacting the ability to achieve the minimum targets for other modes .
2. Where a policy area applies to a project or area, the modal targets should reflect the policy area targets regardless of the land use designation.
3. Transit targets are intended to be applied only for streets with a proposed or existing transit route.
4. Auto LOS is based on the two and a half hour peak period.
5. Minimum guidelines as dictated by City policy must be maintained, regardless of MMLOS targets.

N/A - Not applicable

APPENDIX B

EXISTING (2022) TMCs, SIGNAL TIMING PLANS AND TURNING MOVEMENT DIAGRAMS

PARSONS

Existing (2022) TMC's

Williams Pkwy @ Dixie Rd

Morning Peak Diagram

Specified Period
From: 7:00:00
To: 9:00:00

One Hour Peak
From: 7:45:00
To: 8:45:00

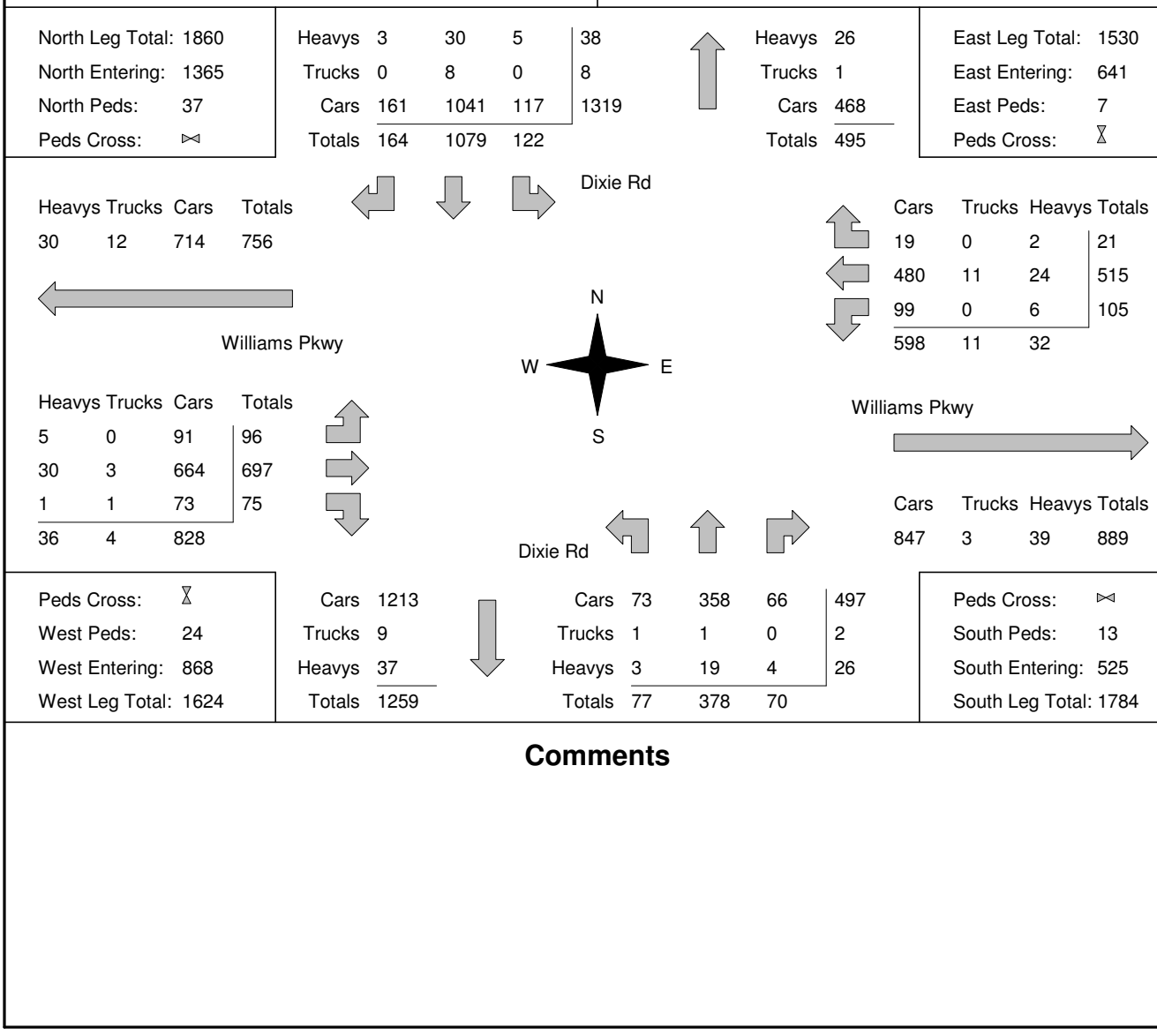
Municipality: Brampton
Site #: 0000000002
Intersection: Dixie Rd & Williams Pkwy
TFR File #: 2
Count date: 15-Jun-2022

Weather conditions:
Cloudy/Dry

Person(s) who counted:
Cam

**** Signalized Intersection ****

Major Road: Dixie Rd runs N/S



Comments

Williams Pkwy @ Dixie Rd

Mid-day Peak Diagram

Specified Period
From: 11:00:00
To: 14:00:00

One Hour Peak
From: 13:00:00
To: 14:00:00

Municipality: Brampton
Site #: 0000000002
Intersection: Dixie Rd & Williams Pkwy
TFR File #: 2
Count date: 15-Jun-2022

Weather conditions:
Cloudy/Dry

Person(s) who counted:
Cam

**** Signalized Intersection ****

Major Road: Dixie Rd runs N/S

North Leg Total:	1226			
North Entering:	618			
North Peds:	6			
Peds Cross:	⋈			
Heavys	3	8	0	11
Trucks	0	10	1	11
Cars	85	478	33	596
Totals	88	496	34	
Heavys	14			
Trucks	5			
Cars	589			
Totals	608			
East Leg Total:	1009			
East Entering:	483			
East Peds:	8			
Peds Cross:	⧖			

Dixie Rd

Heavys	Trucks	Cars	Totals
12	7	559	578

Williams Pkwy

Heavys	Trucks	Cars	Totals
1	1	87	89
8	9	435	452
0	0	35	35
9	10	557	

Cars	Trucks	Heavys	Totals
17	0	0	17
399	6	8	413
52	1	0	53
468	7	8	

N
W E
S

Williams Pkwy

Cars	Trucks	Heavys	Totals
506	11	9	526

Dixie Rd

Peds Cross:	⧖			
West Peds:	12			
West Entering:	576			
West Leg Total:	1154			
Cars	565			
Trucks	11			
Heavys	8			
Totals	584			
Cars	75	485	38	598
Trucks	1	4	1	6
Heavys	1	13	1	15
Totals	77	502	40	
Peds Cross:	⋈			
South Peds:	4			
South Entering:	619			
South Leg Total:	1203			

Comments

Williams Pkwy @ Dixie Rd

Afternoon Peak Diagram

Specified Period
From: 15:00:00
To: 18:00:00

One Hour Peak
From: 15:30:00
To: 16:30:00

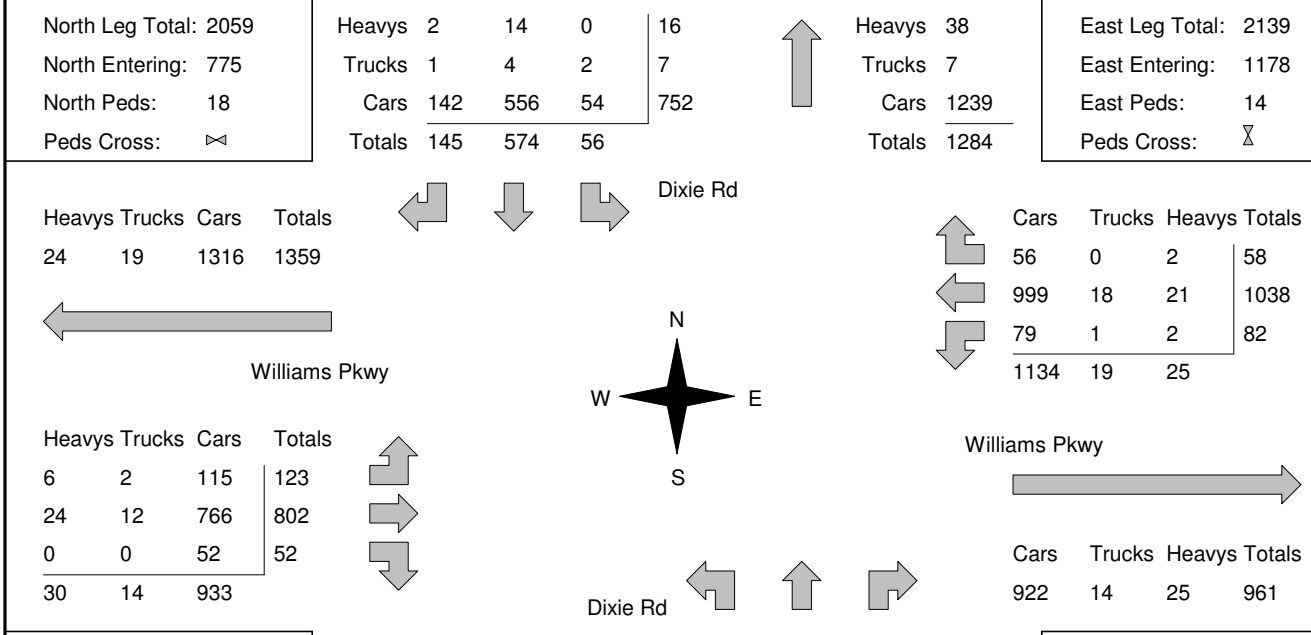
Municipality: Brampton
Site #: 0000000002
Intersection: Dixie Rd & Williams Pkwy
TFR File #: 2
Count date: 15-Jun-2022

Weather conditions:
Cloudy/Dry

Person(s) who counted:
Cam

**** Signalized Intersection ****

Major Road: Dixie Rd runs N/S



Comments

Williams Pkwy @ Dixie Rd

Total Count Diagram

Municipality: Brampton
Site #: 0000000002
Intersection: Dixie Rd & Williams Pkwy
TFR File #: 2
Count date: 15-Jun-2022

Weather conditions:
Cloudy/Dry

Person(s) who counted:
Cam

**** Signalized Intersection ****

Major Road: Dixie Rd runs N/S

North Leg Total:	13391			
North Entering:	6916			
North Peds:	116			
Peds Cross:	⋈			
Heavys	16	120	8	144
Trucks	11	54	6	71
Cars	983	5286	432	6701
Totals	1010	5460	446	
Heavys	151			
Trucks	48			
Cars	6276			
Totals	6475			
East Leg Total:	11315			
East Entering:	5776			
East Peds:	72			
Peds Cross:	⧖			

Dixie Rd

Heavys	Trucks	Cars	Totals
125	91	6665	6881

Williams Pkwy

Cars	Trucks	Heavys	Totals
242	5	5	252
4813	74	97	4984
526	3	11	540
5581	82	113	

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Heavys	Trucks	Cars	Totals
20	8	778	806
117	49	4430	4596
5	3	357	365
142	60	5565	

Williams Pkwy

Cars	Trucks	Heavys	Totals
5344	61	134	5539

Dixie Rd

Peds Cross:	⧖			
West Peds:	110			
West Entering:	5767			
West Leg Total:	12648			
Cars	6169			
Trucks	60			
Heavys	136			
Totals	6365			
Cars	869	5256	482	6607
Trucks	6	35	6	47
Heavys	12	126	9	147
Totals	887	5417	497	
Peds Cross:	⋈			
South Peds:	96			
South Entering:	6801			
South Leg Total:	13166			

Comments

Williams Pkwy @ Dixie Rd

Bikes

Date: June 15, 2022

	North Approach			East Approach			South Approach			West Approach		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
7:15												
7:30												
7:45												
8:00								1				
8:15	1											
8:30								1				
8:45												
9:00												
11:15								1				
11:30												
11:45								1				
12:00												
12:15								1				
12:30		1						1				
12:45		1										
13:00												
13:15								1				
13:30												
13:45												
14:00							1					
15:15								1				
15:30												
15:45												
16:00												
16:15												
16:30		1										
16:45												
17:00											1	
17:15		1										
17:30		1										
17:45												
18:00		1										

Williams Pkwy @ Mansfield St West

Morning Peak Diagram

Specified Period
From: 7:00:00
To: 9:00:00

One Hour Peak
From: 7:45:00
To: 8:45:00

Municipality: Brampton
Site #: 0000000003
Intersection: Williams Pkwy & Mansfield St
TFR File #: 3
Count date: 15-Jun-2022

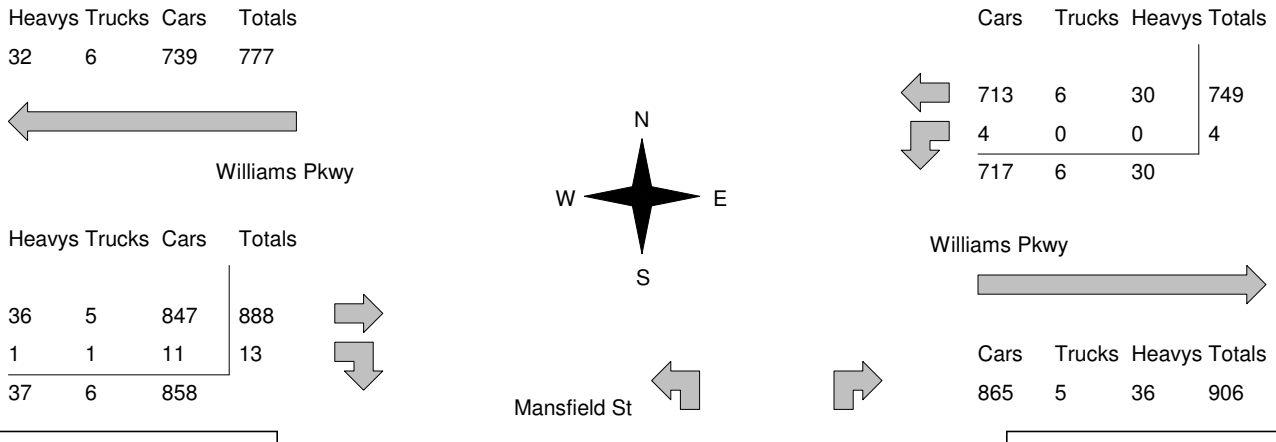
Weather conditions:
Cloudy/Dry

Person(s) who counted:
Cam

**** Non-Signalized Intersection ****

Major Road: Williams Pkwy runs W/E

East Leg Total: 1659
East Entering: 753
East Peds: 2
Peds Cross: ⧖



Peds Cross: ⧖
West Peds: 2
West Entering: 901
West Leg Total: 1678

Cars 15
Trucks 1
Heavys 1
Totals 17

Cars 26 18 44
Trucks 0 0 0
Heavys 2 0 2
Totals 28 18

Peds Cross: ⋈
South Peds: 20
South Entering: 46
South Leg Total: 63

Comments

Williams Pkwy @ Mansfield St West

Mid-day Peak Diagram

Specified Period	One Hour Peak
From: 11:00:00	**From:** 13:00:00
To: 14:00:00	**To:** 14:00:00

Municipality: Brampton
Site #: 0000000003
Intersection: Williams Pkwy & Mansfield St
TFR File #: 3
Count date: 15-Jun-2022

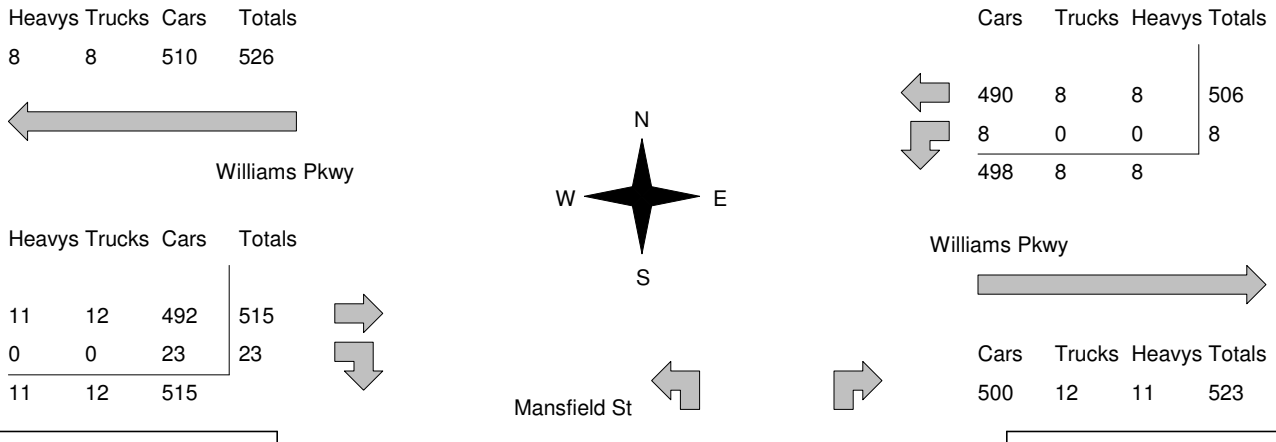
Weather conditions:
Cloudy/Dry

Person(s) who counted:
Cam

**** Non-Signalized Intersection ****

Major Road: Williams Pkwy runs W/E

East Leg Total: 1037
East Entering: 514
East Peds: 0
Peds Cross:



Peds Cross:
West Peds: 0
West Entering: 538
West Leg Total: 1064

Cars 31
Trucks 0
Heavys 0
Totals 31

Cars 20 8 28
Trucks 0 0 0
Heavys 0 0 0
Totals 20 8

Peds Cross:
South Peds: 1
South Entering: 28
South Leg Total: 59

Comments

Williams Pkwy @ Mansfield St West

Afternoon Peak Diagram

Specified Period
From: 15:00:00
To: 18:00:00

One Hour Peak
From: 15:30:00
To: 16:30:00

Municipality: Brampton
Site #: 0000000003
Intersection: Williams Pkwy & Mansfield St
TFR File #: 3
Count date: 15-Jun-2022

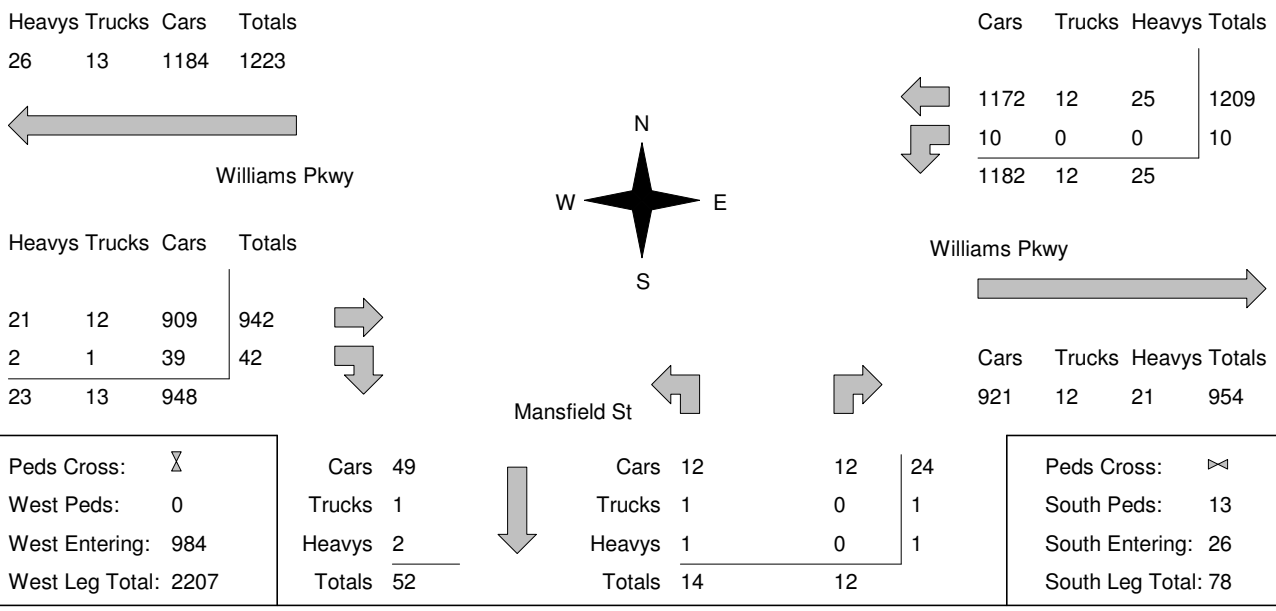
Weather conditions:
Cloudy/Dry

Person(s) who counted:
Cam

**** Non-Signalized Intersection ****

Major Road: Williams Pkwy runs W/E

East Leg Total: 2173
East Entering: 1219
East Peds: 1
Peds Cross:



Peds Cross:
West Peds: 0
West Entering: 984
West Leg Total: 2207

Cars 49
Trucks 1
Heavys 2
Totals 52

Cars 12 12 24
Trucks 1 0 1
Heavys 1 0 1
Totals 14 12

Peds Cross:
South Peds: 13
South Entering: 26
South Leg Total: 78

Comments

Williams Pkwy @ Mansfield St West

Total Count Diagram

Municipality: Brampton
Site #: 0000000003
Intersection: Williams Pkwy & Mansfield St
TFR File #: 3
Count date: 15-Jun-2022

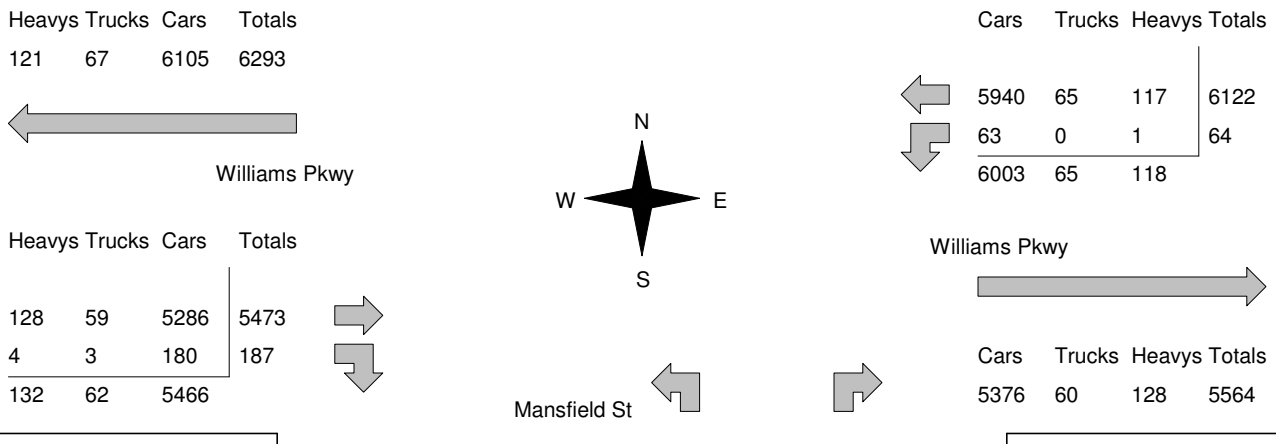
Weather conditions:
Cloudy/Dry

Person(s) who counted:
Cam

**** Non-Signalized Intersection ****

Major Road: Williams Pkwy runs W/E

East Leg Total: 11750
East Entering: 6186
East Peds: 4
Peds Cross: ⧖



Peds Cross: ⧖
West Peds: 3
West Entering: 5660
West Leg Total: 11953

Cars 243
Trucks 3
Heavys 5
Totals 251

Cars 165 90 255
Trucks 2 1 3
Heavys 4 0 4
Totals 171 91

Peds Cross: ⋈
South Peds: 79
South Entering: 262
South Leg Total: 513

Comments

Williams Pkwy @ Mansfield St (West Int)

Bikes

Date: June 15, 2022

	North Approach			East Approach			South Approach			West Approach		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
7:15												
7:30												
7:45											1	
8:00					1							
8:15											2	
8:30												
8:45					1							
9:00												
11:15												
11:30												
11:45												
12:00												
12:15												
12:30					1							
12:45												
13:00												
13:15									1			
13:30												
13:45												
14:00												
15:15												
15:30												
15:45												
16:00												
16:15												
16:30												
16:45												
17:00											5	
17:15									1			
17:30												
17:45												
18:00											1	

Williams Pkwy @ Mansfield St East

Morning Peak Diagram

Specified Period
From: 7:00:00
To: 9:00:00

One Hour Peak
From: 7:45:00
To: 8:45:00

Municipality: Brampton
Site #: 0000000004
Intersection: Williams Pkwy & Mansfield St
TFR File #: 4
Count date: 15-Jun-2022

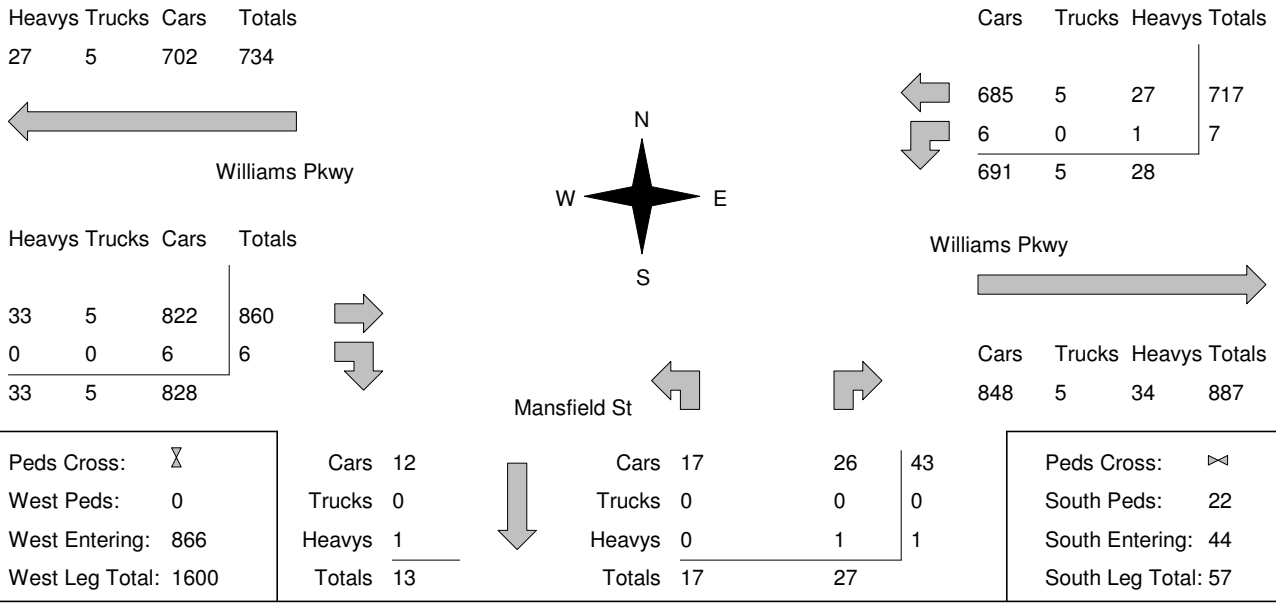
Weather conditions:
Cloudy/Dry

Person(s) who counted:
Cam

**** Non-Signalized Intersection ****

Major Road: Williams Pkwy runs W/E

East Leg Total: 1611
East Entering: 724
East Peds: 2
Peds Cross: ⧖



Peds Cross: ⧖
West Peds: 0
West Entering: 866
West Leg Total: 1600

Peds Cross: ⋈
South Peds: 22
South Entering: 44
South Leg Total: 57

Comments

Williams Pkwy @ Mansfield St East

Mid-day Peak Diagram

Specified Period
From: 11:00:00
To: 14:00:00

One Hour Peak
From: 13:00:00
To: 14:00:00

Municipality: Brampton
Site #: 0000000004
Intersection: Williams Pkwy & Mansfield St
TFR File #: 4
Count date: 15-Jun-2022

Weather conditions:
Cloudy/Dry

Person(s) who counted:
Cam

**** Non-Signalized Intersection ****

Major Road: Williams Pkwy runs W/E

East Leg Total: 1018
East Entering: 497
East Peds: 1
Peds Cross:

Heavys	Trucks	Cars	Totals
10	10	481	501

Williams Pkwy

Heavys	Trucks	Cars	Totals
10	12	488	510
0	0	10	10
10	12	498	

	Cars	Trucks	Heavys	Totals
	467	10	10	487
	9	0	1	10
	476	10	11	

Williams Pkwy

Cars	Trucks	Heavys	Totals
499	12	10	521

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Mansfield St

Peds Cross:
West Peds: 0
West Entering: 520
West Leg Total: 1021

Cars	19
Trucks	0
Heavys	1
Totals	20

Cars	14	11	25
Trucks	0	0	0
Heavys	0	0	0
Totals	14	11	

Peds Cross:
South Peds: 1
South Entering: 25
South Leg Total: 45

Comments

Williams Pkwy @ Mansfield St East

Afternoon Peak Diagram

Specified Period
From: 15:00:00
To: 18:00:00

One Hour Peak
From: 15:15:00
To: 16:15:00

Municipality: Brampton
Site #: 0000000004
Intersection: Williams Pkwy & Mansfield St
TFR File #: 4
Count date: 15-Jun-2022

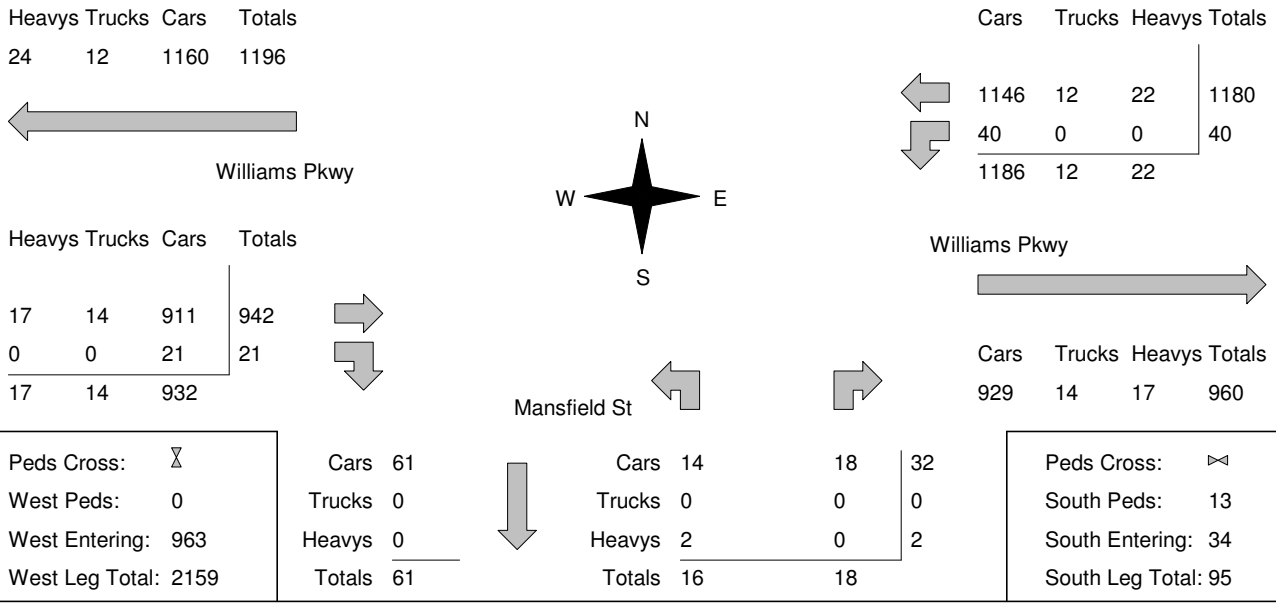
Weather conditions:
Cloudy/Dry

Person(s) who counted:
Cam

**** Non-Signalized Intersection ****

Major Road: Williams Pkwy runs W/E

East Leg Total: 2180
East Entering: 1220
East Peds: 6
Peds Cross:



Peds Cross:
West Peds: 0
West Entering: 963
West Leg Total: 2159

Cars 61
Trucks 0
Heavys 0
Totals 61

Cars 14 18 32
Trucks 0 0 0
Heavys 2 0 2
Totals 16 18

Peds Cross:
South Peds: 13
South Entering: 34
South Leg Total: 95

Comments

Williams Pkwy @ Mansfield St East

Total Count Diagram

Municipality: Brampton
Site #: 0000000004
Intersection: Williams Pkwy & Mansfield St
TFR File #: 4
Count date: 15-Jun-2022

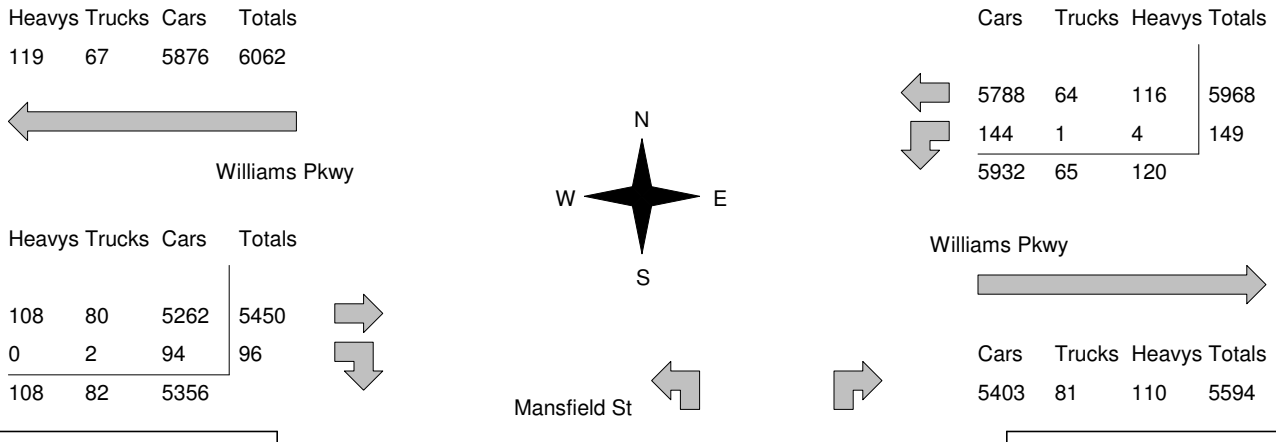
Weather conditions:
Cloudy/Dry

Person(s) who counted:
Cam

**** Non-Signalized Intersection ****

Major Road: Williams Pkwy runs W/E

East Leg Total: 11711
East Entering: 6117
East Peds: 16
Peds Cross: ⧖



Peds Cross: ⧖
West Peds: 2
West Entering: 5546
West Leg Total: 11608

Cars 238
Trucks 3
Heavys 4
Totals 245

Cars 88 141 229
Trucks 3 1 4
Heavys 3 2 5
Totals 94 144

Peds Cross: ⋈
South Peds: 73
South Entering: 238
South Leg Total: 483

Comments

Williams Pkwy @ Mansfield St (East Int)

Bikes

Date: June 15, 2022

	North Approach			East Approach			South Approach			West Approach		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
7:15												
7:30												
7:45											1	
8:00					1						2	
8:15					1						1	
8:30							1				1	
8:45												
9:00												
11:15												
11:30												
11:45												
12:00												
12:15												
12:30					1							
12:45												
13:00												
13:15											1	
13:30												
13:45												
14:00												
15:15											1	
15:30												
15:45												
16:00												
16:15												
16:30												
16:45												
17:00											2	
17:15									1			
17:30												
17:45					1							
18:00											1	

Williams Pkwy @ Mackay St S

Morning Peak Diagram

Specified Period
From: 7:00:00
To: 9:00:00

One Hour Peak
From: 7:45:00
To: 8:45:00

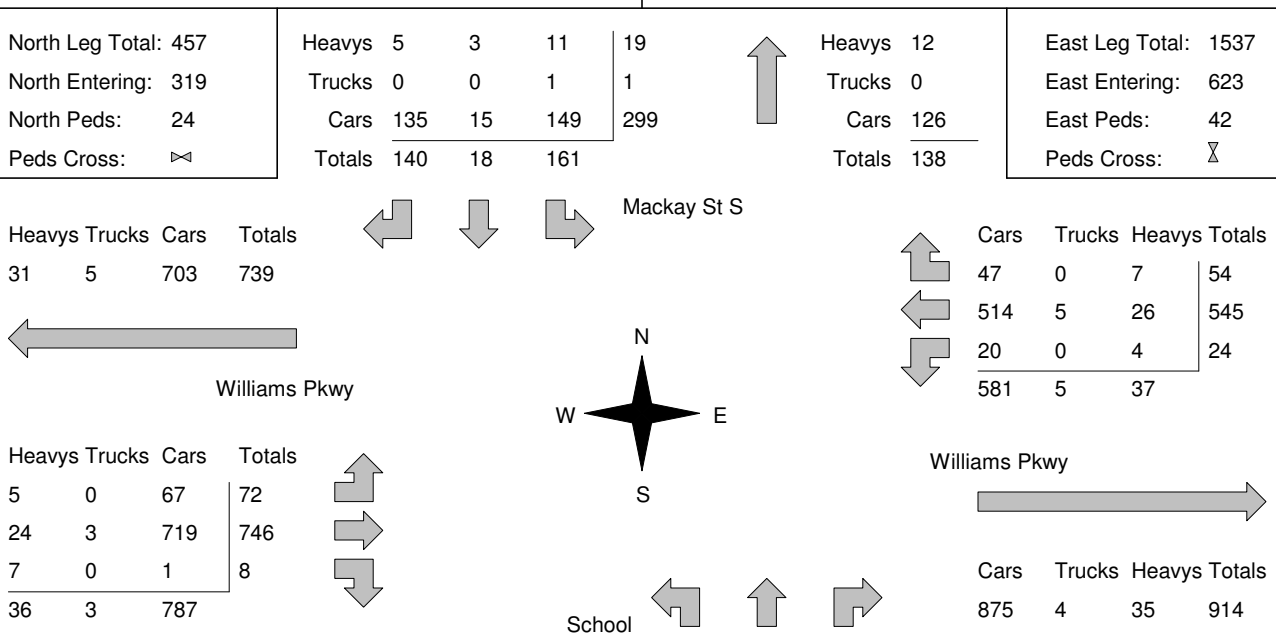
Municipality: Brampton
Site #: 0000000005
Intersection: Williams Pkwy & Mackay St S
TFR File #: 5
Count date: 15-Jun-2022

Weather conditions:
Cloudy/Dry

Person(s) who counted:
Cam

**** Signalized Intersection ****

Major Road: Williams Pkwy runs W/E



Comments

Williams Pkwy @ Mackay St S

Mid-day Peak Diagram

Specified Period
From: 11:00:00
To: 14:00:00

One Hour Peak
From: 13:00:00
To: 14:00:00

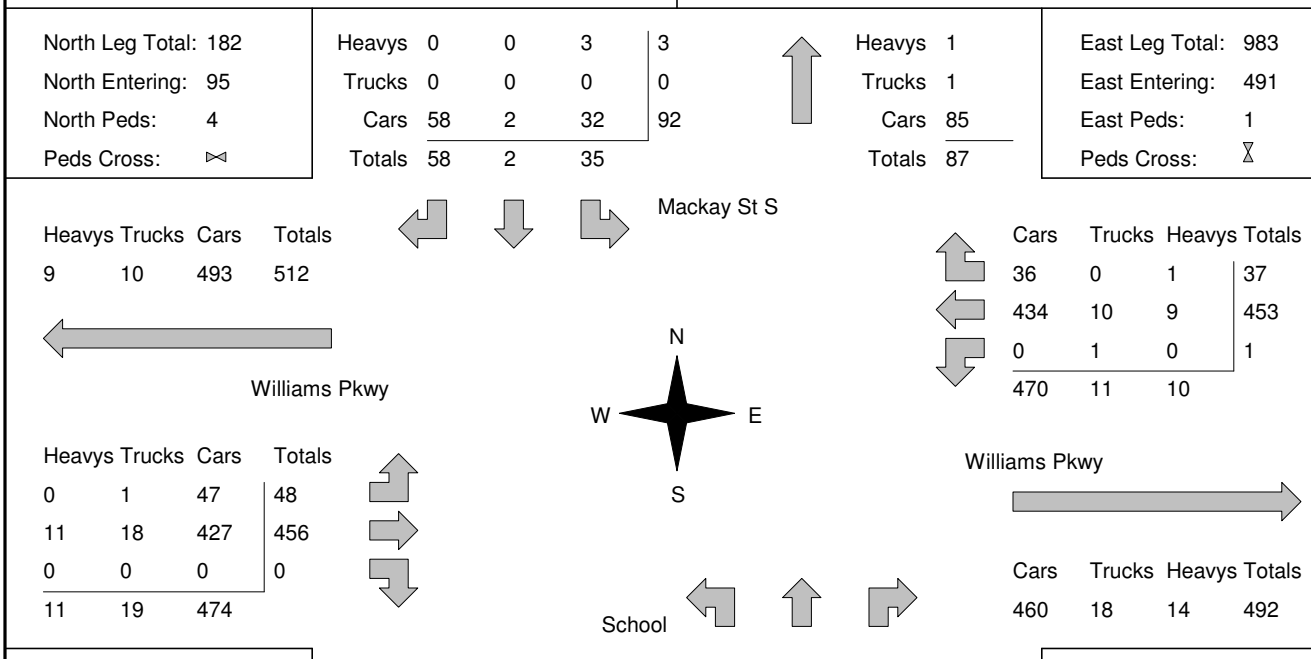
Municipality: Brampton
Site #: 0000000005
Intersection: Williams Pkwy & Mackay St S
TFR File #: 5
Count date: 15-Jun-2022

Weather conditions:
Cloudy/Dry

Person(s) who counted:
Cam

**** Signalized Intersection ****

Major Road: Williams Pkwy runs W/E



Comments

Williams Pkwy @ Mackay St S

Afternoon Peak Diagram

Specified Period
From: 15:00:00
To: 18:00:00

One Hour Peak
From: 15:30:00
To: 16:30:00

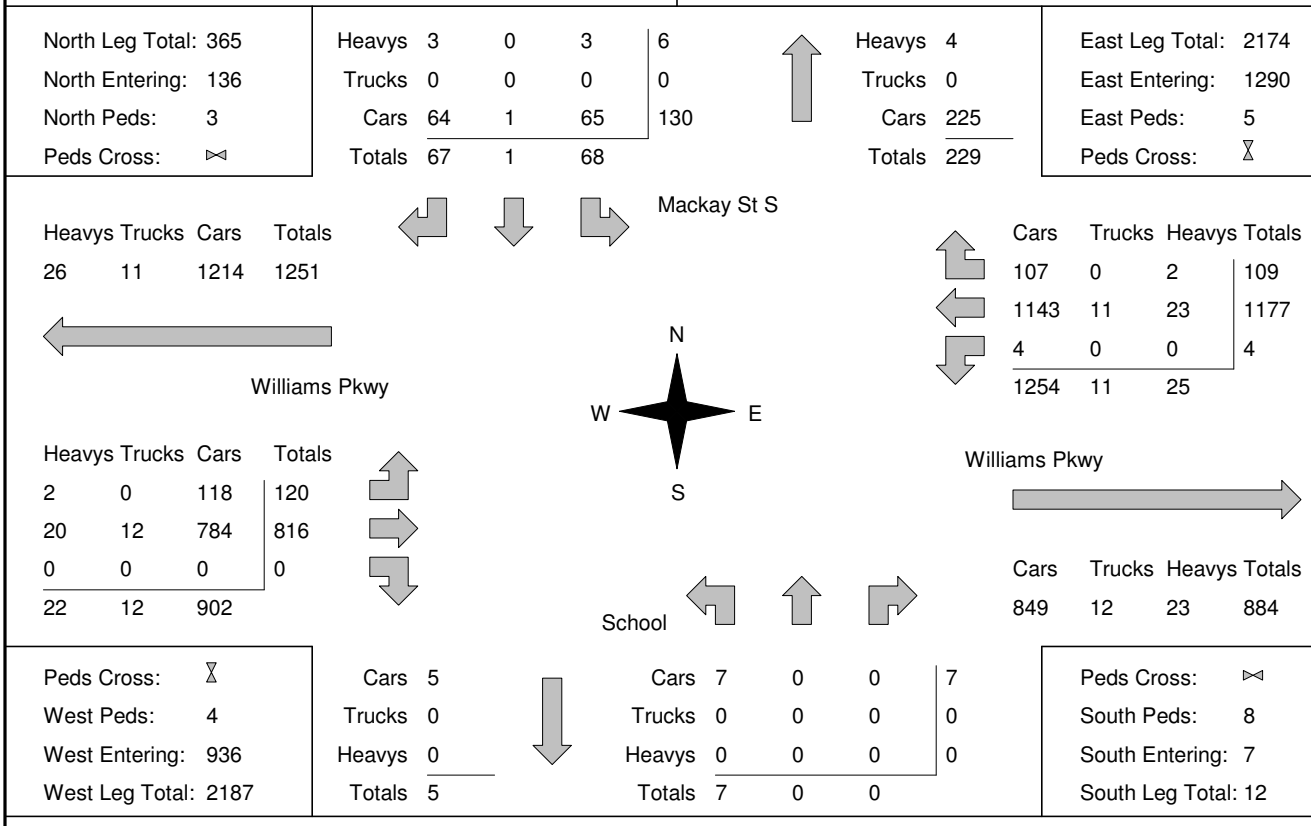
Municipality: Brampton
Site #: 0000000005
Intersection: Williams Pkwy & Mackay St S
TFR File #: 5
Count date: 15-Jun-2022

Weather conditions:
Cloudy/Dry

Person(s) who counted:
Cam

**** Signalized Intersection ****

Major Road: Williams Pkwy runs W/E



Comments

Williams Pkwy @ Mackay St S

Total Count Diagram

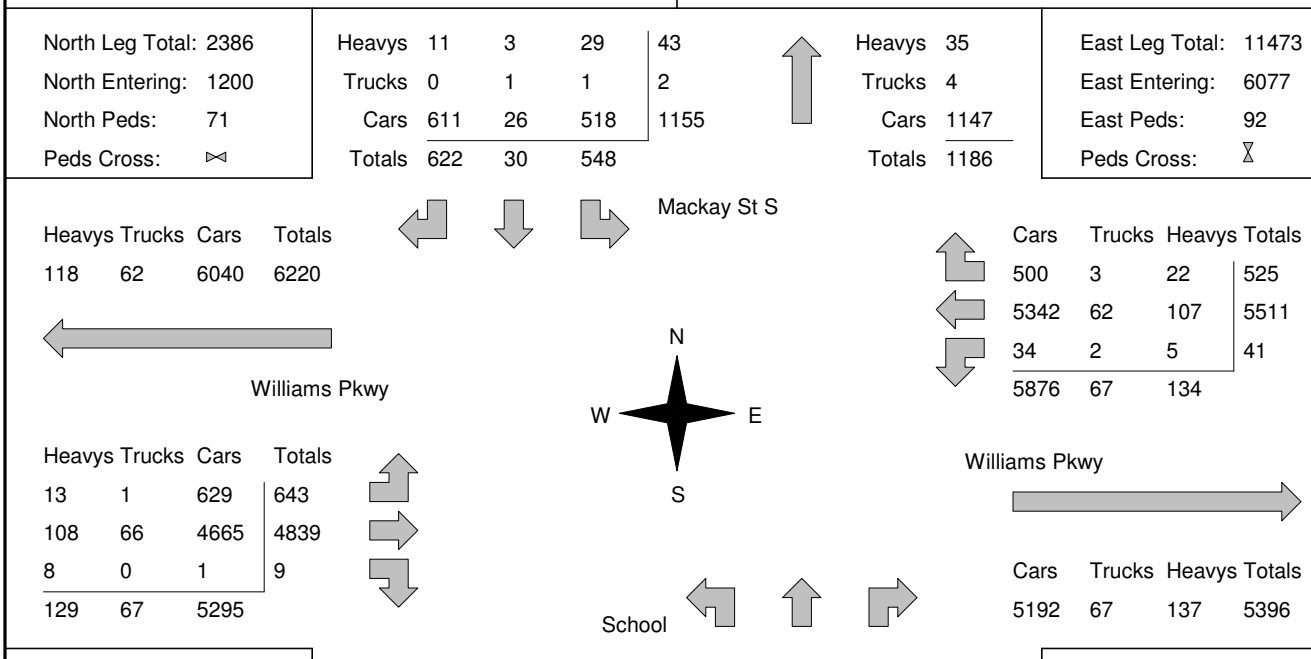
Municipality: Brampton
Site #: 0000000005
Intersection: Williams Pkwy & Mackay St S
TFR File #: 5
Count date: 15-Jun-2022

Weather conditions:
Cloudy/Dry

Person(s) who counted:
Cam

**** Signalized Intersection ****

Major Road: Williams Pkwy runs W/E



Comments

Williams Pkwy @ Mackay St S

Bikes

Date: June 15, 2022

	North Approach			East Approach			South Approach			West Approach		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
7:15												
7:30												
7:45											1	
8:00	1										1	
8:15											1	
8:30			1								1	
8:45											1	
9:00												
11:15												
11:30												
11:45												
12:00												
12:15												
12:30												
12:45												
13:00												
13:15	1											
13:30												
13:45												
14:00												
15:15	1		1									
15:30												
15:45			1									
16:00												
16:15												
16:30												
16:45			1									
17:00	1											
17:15			1								1	
17:30												
17:45					2							
18:00												

Williams Pkwy @ Bramalea Rd

Morning Peak Diagram

Specified Period
From: 7:00:00
To: 9:00:00

One Hour Peak
From: 7:45:00
To: 8:45:00

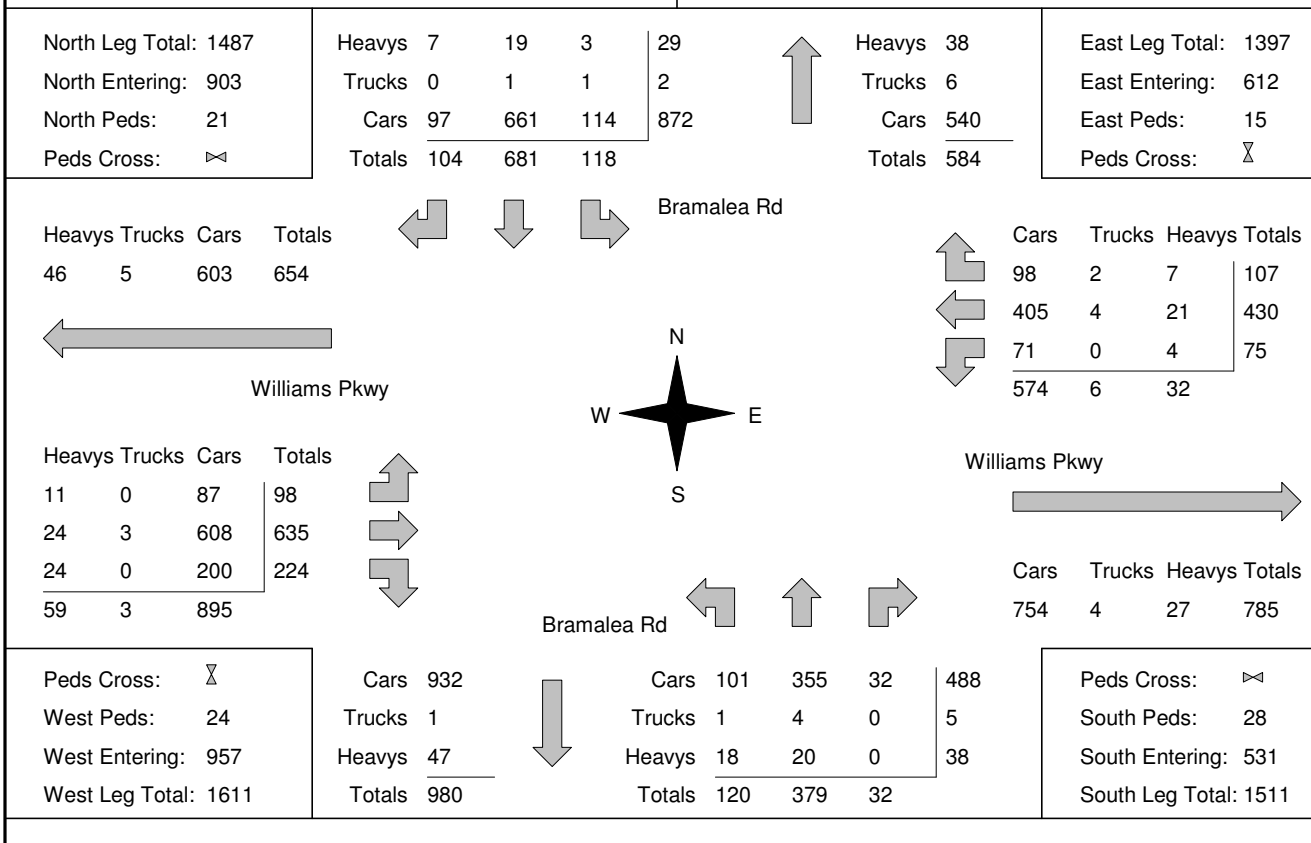
Municipality: Brampton
Site #: 0000000006
Intersection: Bramalea Rd & Williams Pkwy
TFR File #: 6
Count date: 15-Jun-2022

Weather conditions:
Cloudy/Dry

Person(s) who counted:
Cam

**** Signalized Intersection ****

Major Road: Bramalea Rd runs N/S



Comments

Williams Pkwy @ Bramalea Rd

Mid-day Peak Diagram

Specified Period
From: 11:00:00
To: 14:00:00

One Hour Peak
From: 13:00:00
To: 14:00:00

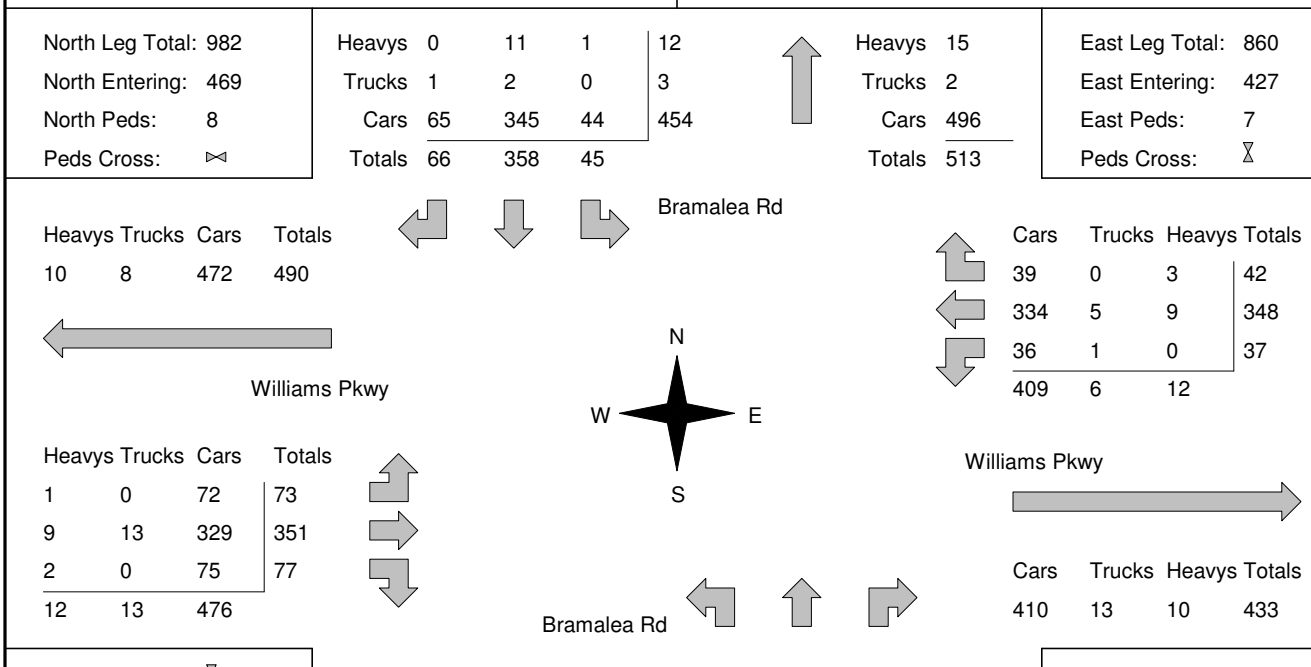
Municipality: Brampton
Site #: 0000000006
Intersection: Bramalea Rd & Williams Pkwy
TFR File #: 6
Count date: 15-Jun-2022

Weather conditions:
Cloudy/Dry

Person(s) who counted:
Cam

**** Signalized Intersection ****

Major Road: Bramalea Rd runs N/S



Comments

Williams Pkwy @ Bramalea Rd

Afternoon Peak Diagram

Specified Period
From: 15:00:00
To: 18:00:00

One Hour Peak
From: 16:45:00
To: 17:45:00

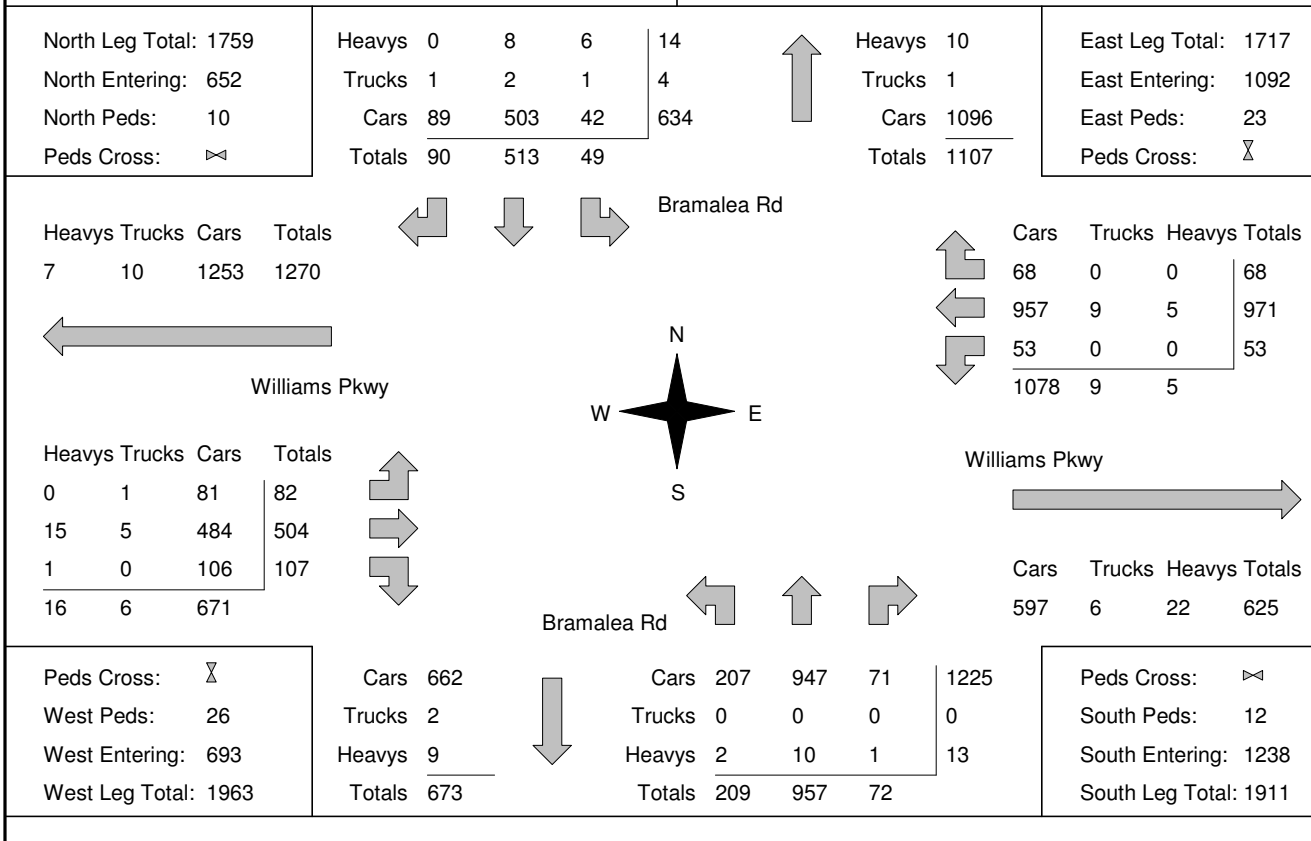
Municipality: Brampton
Site #: 0000000006
Intersection: Bramalea Rd & Williams Pkwy
TFR File #: 6
Count date: 15-Jun-2022

Weather conditions:
Cloudy/Dry

Person(s) who counted:
Cam

**** Signalized Intersection ****

Major Road: Bramalea Rd runs N/S



Comments

Williams Pkwy @ Bramalea Rd

Total Count Diagram

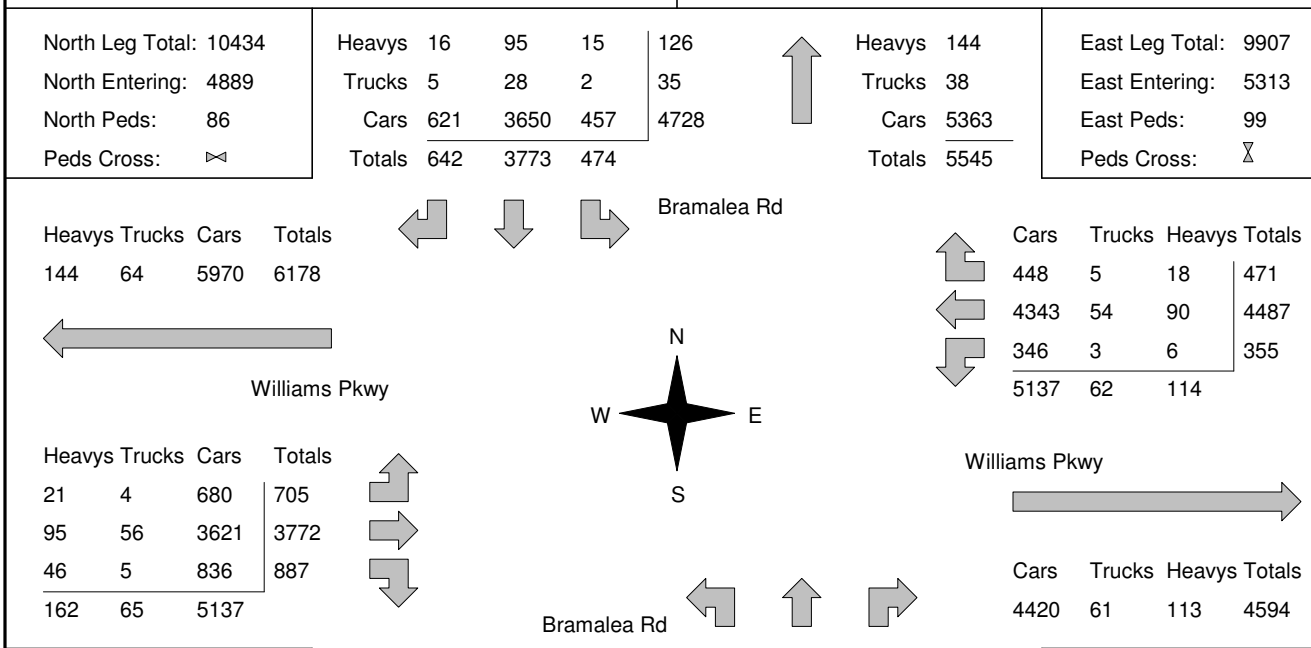
Municipality: Brampton
Site #: 0000000006
Intersection: Bramalea Rd & Williams Pkwy
TFR File #: 6
Count date: 15-Jun-2022

Weather conditions:
Cloudy/Dry

Person(s) who counted:
Cam

**** Signalized Intersection ****

Major Road: Bramalea Rd runs N/S



Comments

Williams Pkwy @ Bramalea Rd

Bikes

Date: June 15, 2022

	North Approach			East Approach			South Approach			West Approach		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
7:15		1			1							
7:30		1										
7:45								1				
8:00								1				
8:15												
8:30												
8:45												
9:00												
11:15												
11:30					1							
11:45								1				
12:00												
12:15												
12:30												
12:45												
13:00												
13:15												
13:30		1										
13:45												
14:00		2	1									
15:15												
15:30					1							
15:45												
16:00					1			1				
16:15												
16:30												
16:45												
17:00												
17:15								1			1	
17:30												
17:45								2			1	
18:00		1		1								

Williams Pkwy @ Glenridge Rd

Morning Peak Diagram

Specified Period
From: 7:00:00
To: 9:00:00

One Hour Peak
From: 7:30:00
To: 8:30:00

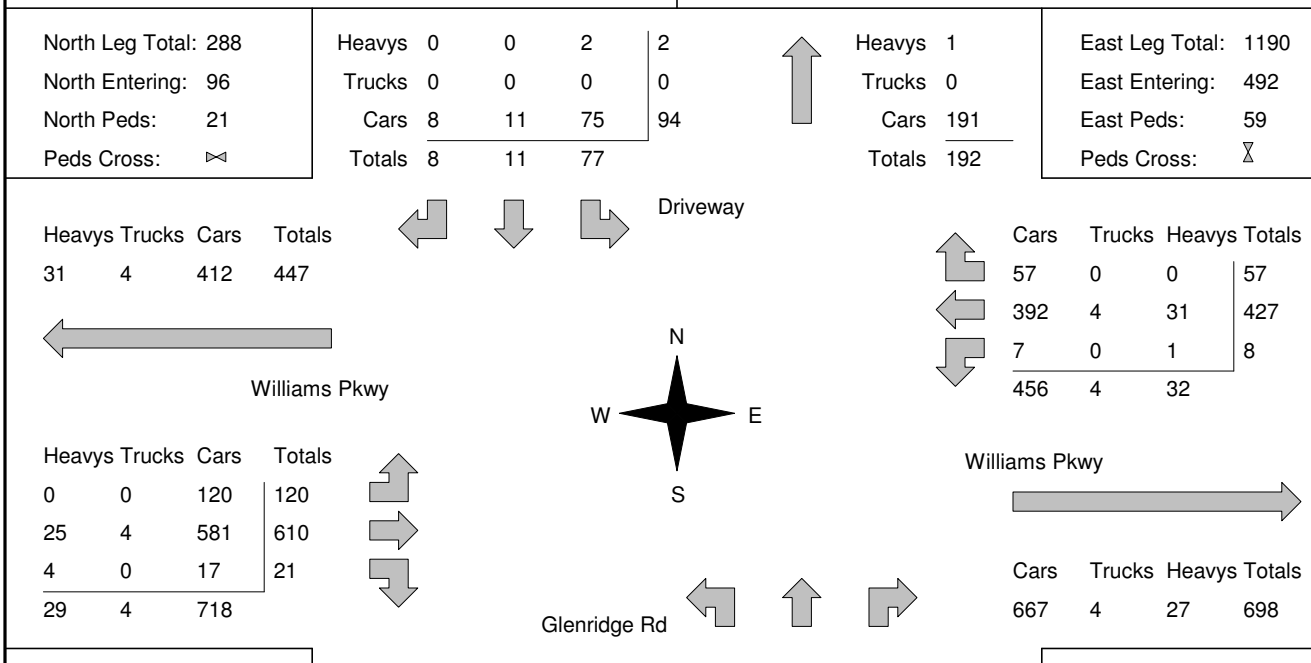
Municipality: Brampton
Site #: 0000000007
Intersection: Williams Pkwy & Glenridge Rd
TFR File #: 7
Count date: 15-Jun-2022

Weather conditions:
Cloudy/Dry

Person(s) who counted:
Cam

**** Signalized Intersection ****

Major Road: Williams Pkwy runs W/E



Comments

Williams Pkwy @ Glenridge Rd

Mid-day Peak Diagram

Specified Period
From: 11:00:00
To: 14:00:00

One Hour Peak
From: 13:00:00
To: 14:00:00

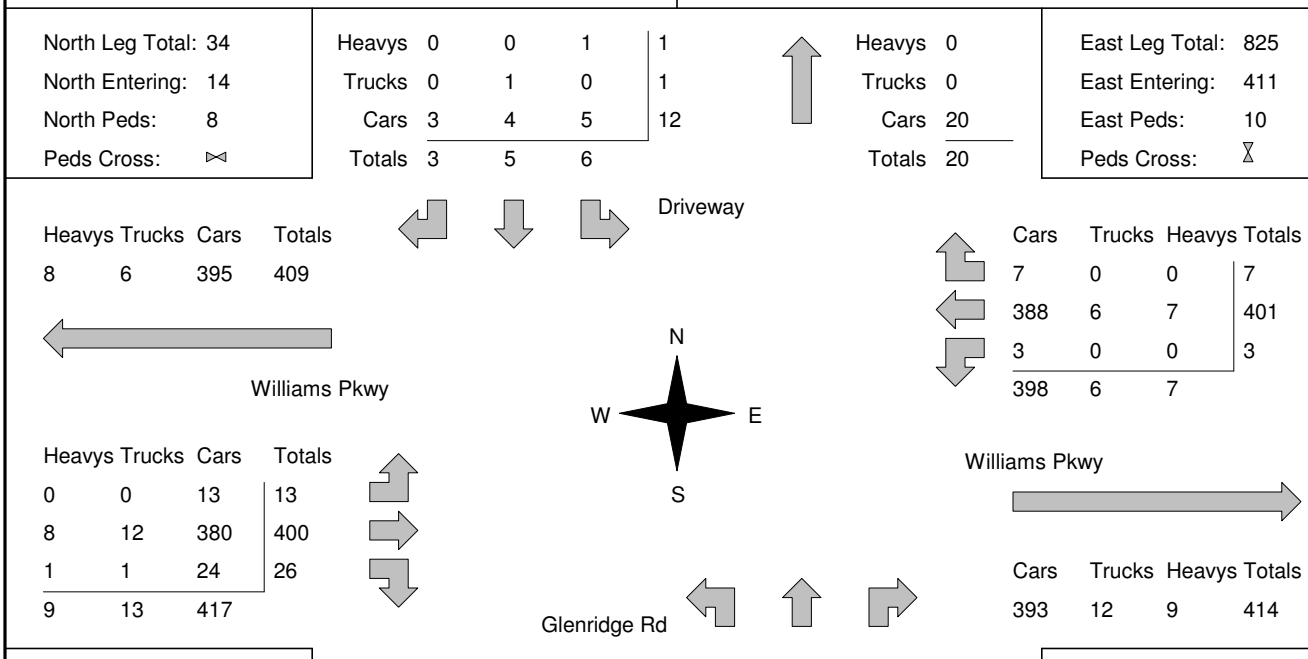
Municipality: Brampton
Site #: 0000000007
Intersection: Williams Pkwy & Glenridge Rd
TFR File #: 7
Count date: 15-Jun-2022

Weather conditions:
Cloudy/Dry

Person(s) who counted:
Cam

**** Signalized Intersection ****

Major Road: Williams Pkwy runs W/E



Comments

Williams Pkwy @ Glenridge Rd

Afternoon Peak Diagram

Specified Period
From: 15:00:00
To: 18:00:00

One Hour Peak
From: 15:30:00
To: 16:30:00

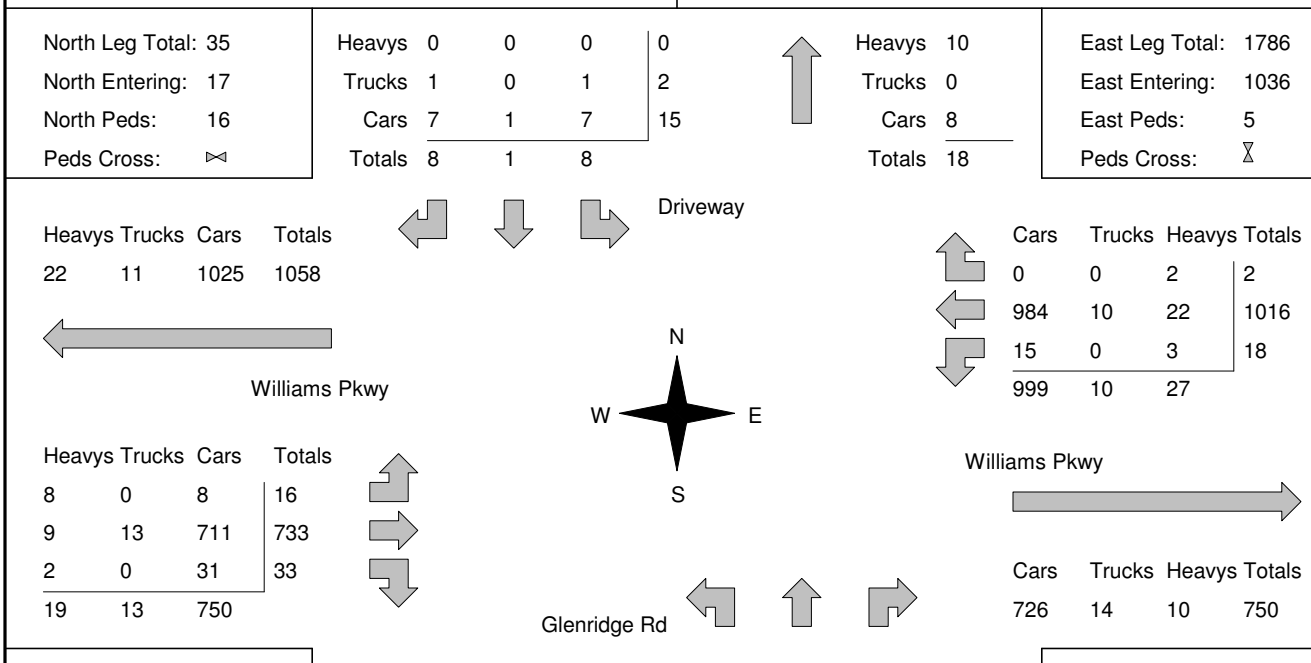
Municipality: Brampton
Site #: 0000000007
Intersection: Williams Pkwy & Glenridge Rd
TFR File #: 7
Count date: 15-Jun-2022

Weather conditions:
Cloudy/Dry

Person(s) who counted:
Cam

**** Signalized Intersection ****

Major Road: Williams Pkwy runs W/E



Comments

Williams Pkwy @ Glenridge Rd

Total Count Diagram

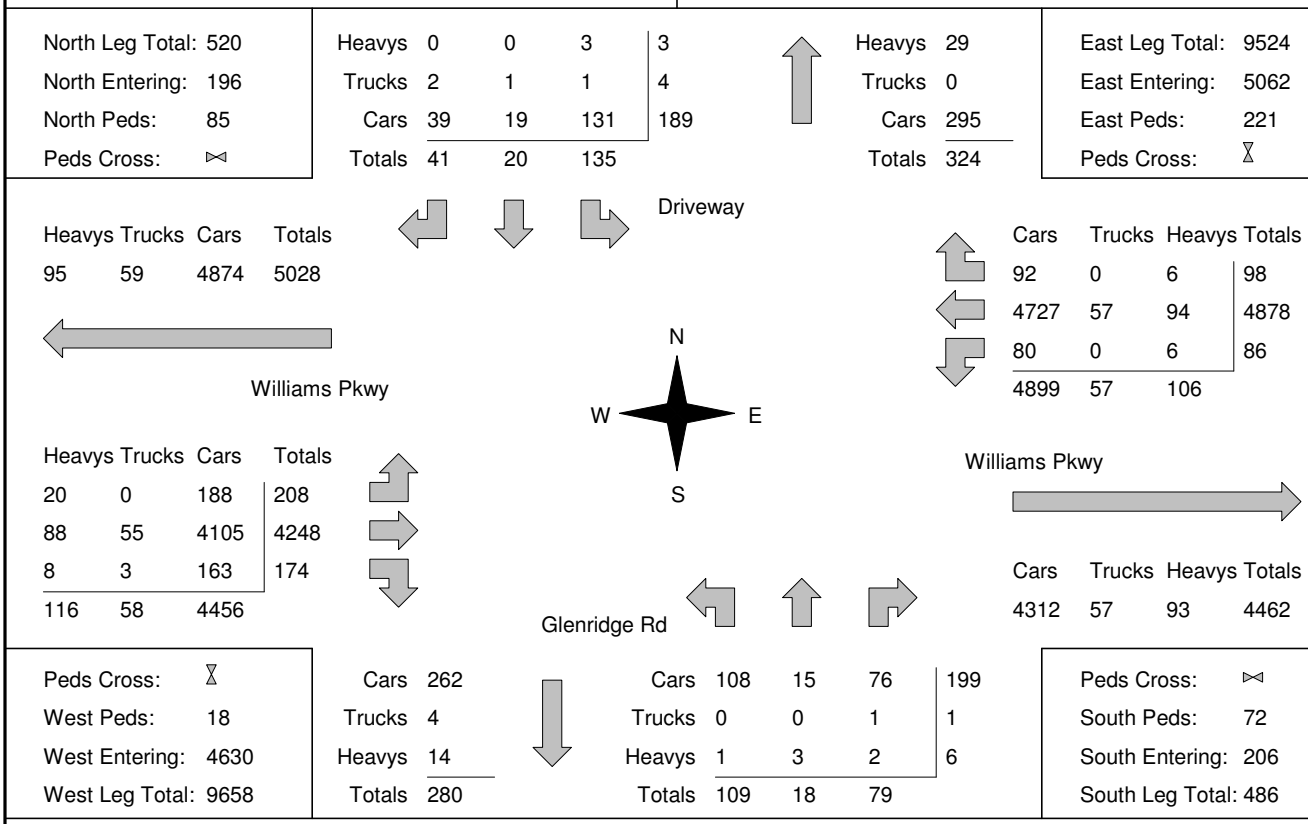
Municipality: Brampton
Site #: 0000000007
Intersection: Williams Pkwy & Glenridge Rd
TFR File #: 7
Count date: 15-Jun-2022

Weather conditions:
Cloudy/Dry

Person(s) who counted:
Cam

**** Signalized Intersection ****

Major Road: Williams Pkwy runs W/E



Comments

Williams Pkwy @ Glenridge Rd

Bikes

Date: June 15, 2022

	North Approach			East Approach			South Approach			West Approach		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
7:15							1				2	
7:30											1	
7:45												
8:00											1	
8:15												
8:30												
8:45												
9:00												
11:15												
11:30												
11:45												
12:00												
12:15												
12:30												
12:45												
13:00												
13:15												
13:30												
13:45												
14:00												
15:15												1
15:30												
15:45												
16:00												
16:15												
16:30												
16:45												
17:00											1	1
17:15		1		2								
17:30												
17:45												
18:00							1					

Williams Pkwy @ Grenoble Blvd

Morning Peak Diagram

Specified Period
From: 7:00:00
To: 9:00:00

One Hour Peak
From: 7:30:00
To: 8:30:00

Municipality: Brampton
Site #: 0000000008
Intersection: Williams Pkwy & Grenoble Blvd
TFR File #: 8
Count date: 15-Jun-2022

Weather conditions:
Cloudy/Dry

Person(s) who counted:
Cam

**** Signalized Intersection ****

Major Road: Williams Pkwy runs W/E

North Leg Total:	371			
North Entering:	274			
North Peds:	18			
Peds Cross:	⋈			
Heavys	7	1	1	9
Trucks	0	0	0	0
Cars	159	46	60	265
Totals	166	47	61	
Heavys	3			
Trucks	1			
Cars	93			
Totals	97			
East Leg Total:	1190			
East Entering:	465			
East Peds:	15			
Peds Cross:	⧖			

Jordan Blvd

Heavys	Trucks	Cars	Totals
31	5	594	630

Cars	Trucks	Heavys	Totals
21	0	0	21
397	5	21	423
19	0	2	21
437	5	23	

Williams Pkwy

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Heavys	Trucks	Cars	Totals
2	0	26	28
24	5	596	625
1	0	41	42
27	5	663	

Williams Pkwy

Cars	Trucks	Heavys	Totals
692	5	28	725

Grenoble Blvd

Peds Cross:	⧖			
West Peds:	15			
West Entering:	695			
West Leg Total:	1325			
Cars	106			
Trucks	0			
Heavys	4			
Totals	110			
Cars	38	46	36	120
Trucks	0	1	0	1
Heavys	3	1	3	7
Totals	41	48	39	
Peds Cross:	⋈			
South Peds:	7			
South Entering:	128			
South Leg Total:	238			

Comments

Williams Pkwy @ Grenoble Blvd

Mid-day Peak Diagram

Specified Period
From: 11:00:00
To: 14:00:00

One Hour Peak
From: 13:00:00
To: 14:00:00

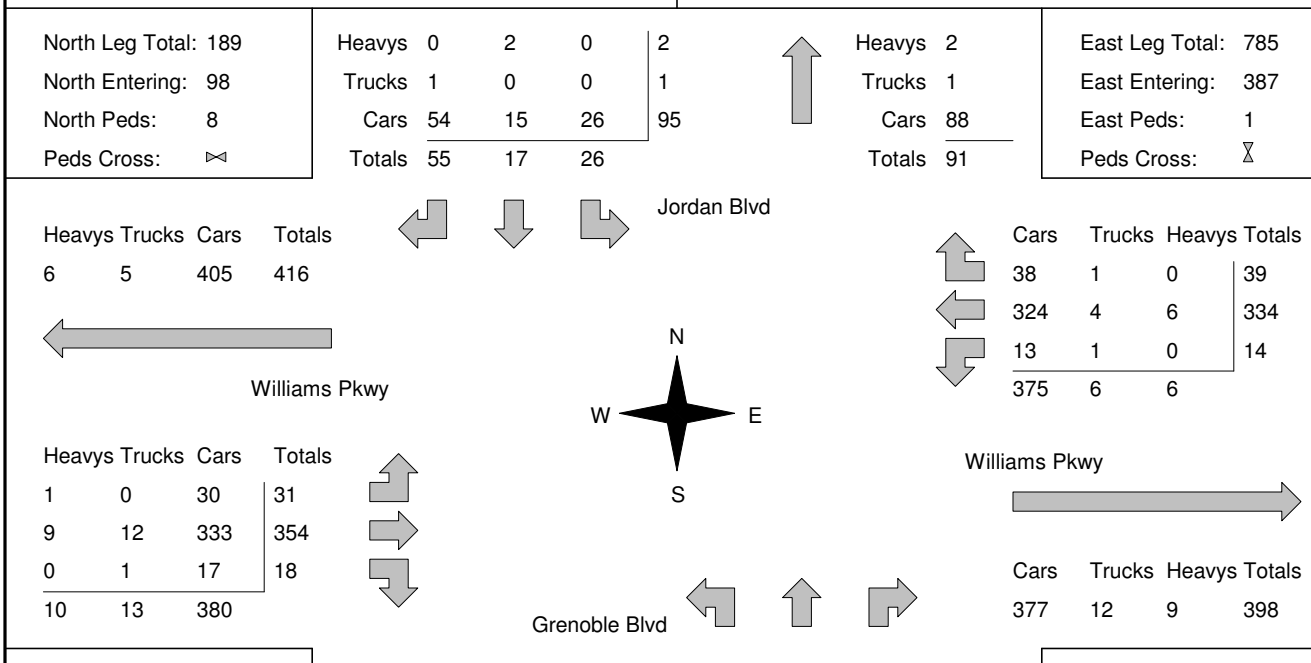
Municipality: Brampton
Site #: 0000000008
Intersection: Williams Pkwy & Grenoble Blvd
TFR File #: 8
Count date: 15-Jun-2022

Weather conditions:
Cloudy/Dry

Person(s) who counted:
Cam

**** Signalized Intersection ****

Major Road: Williams Pkwy runs W/E



Comments

Williams Pkwy @ Grenoble Blvd

Afternoon Peak Diagram

Specified Period
From: 15:00:00
To: 18:00:00

One Hour Peak
From: 15:30:00
To: 16:30:00

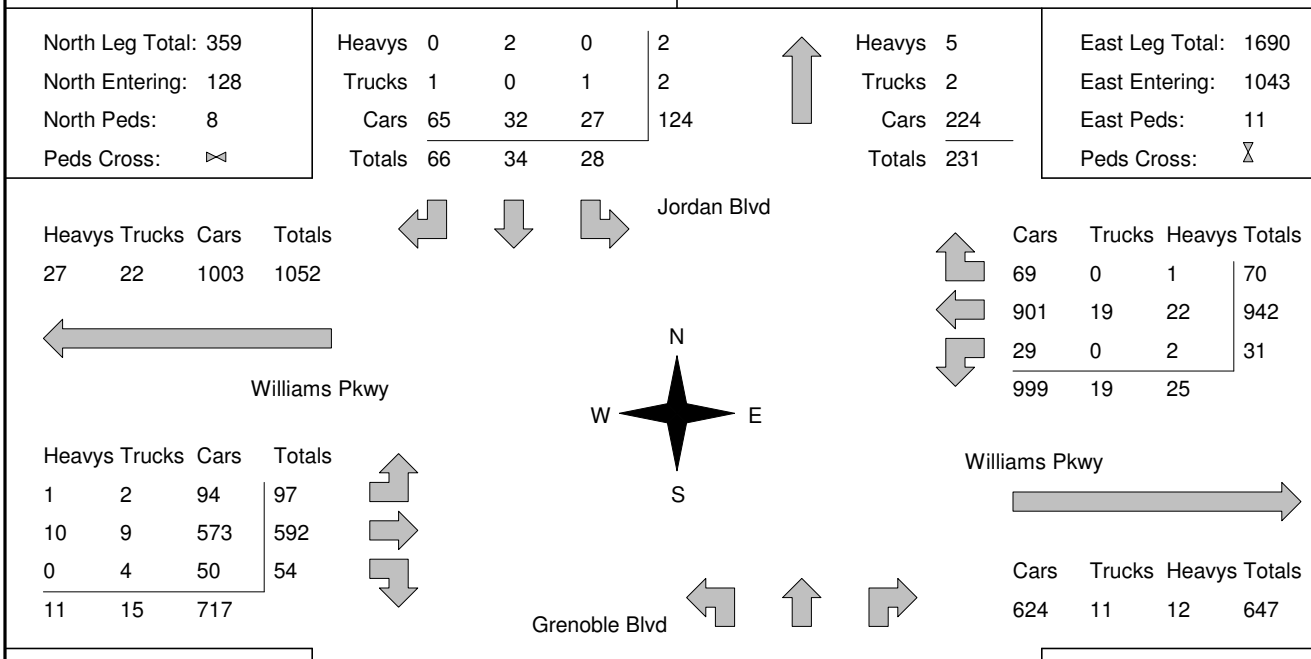
Municipality: Brampton
Site #: 0000000008
Intersection: Williams Pkwy & Grenoble Blvd
TFR File #: 8
Count date: 15-Jun-2022

Weather conditions:
Cloudy/Dry

Person(s) who counted:
Cam

**** Signalized Intersection ****

Major Road: Williams Pkwy runs W/E



Comments

Williams Pkwy @ Grenoble Blvd

Total Count Diagram

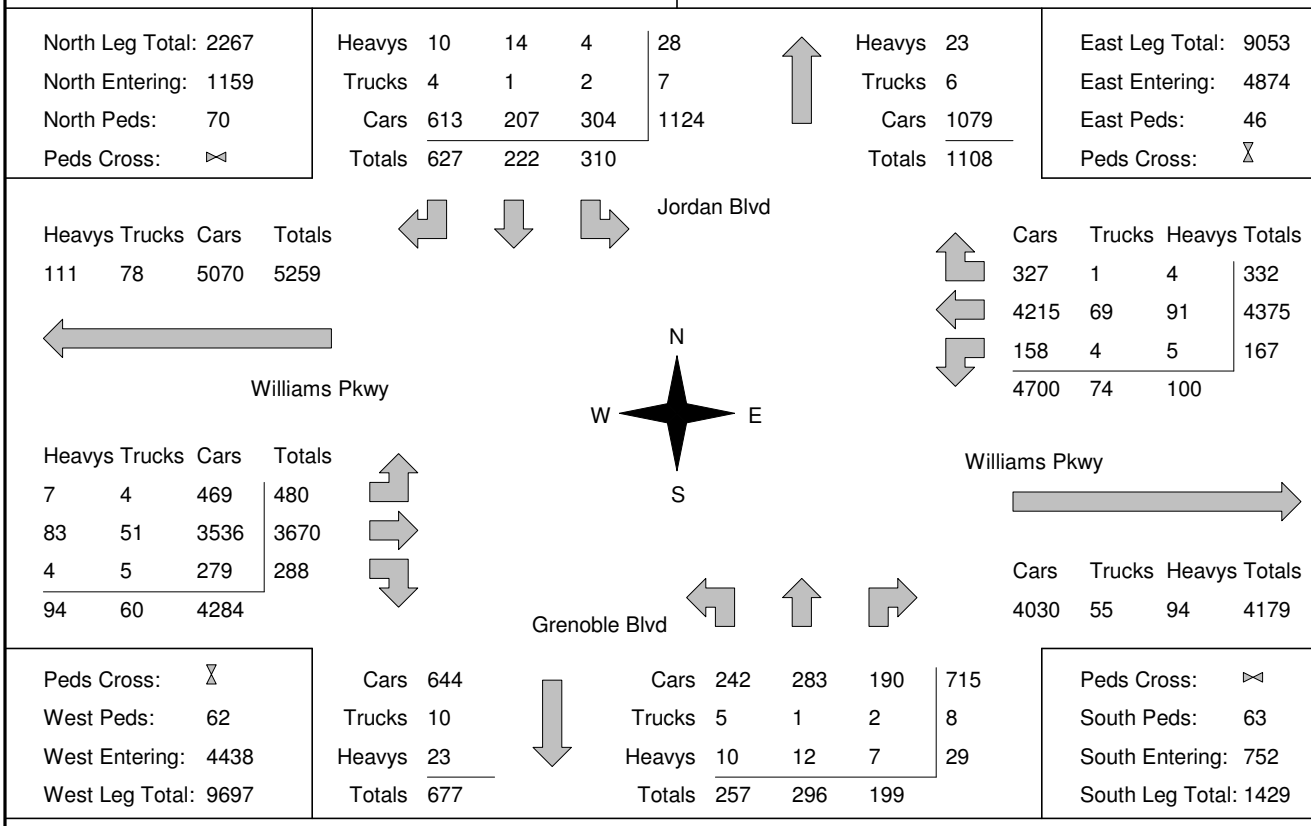
Municipality: Brampton
Site #: 0000000008
Intersection: Williams Pkwy & Grenoble Blvd
TFR File #: 8
Count date: 15-Jun-2022

Weather conditions:
Cloudy/Dry

Person(s) who counted:
Cam

**** Signalized Intersection ****

Major Road: Williams Pkwy runs W/E



Comments

Williams Pkwy @ Grenoble Blvd/Jordan Blvd

Bikes

Date: June 15, 2022

	North Approach			East Approach			South Approach			West Approach		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
7:15												
7:30		1	1				1					
7:45												
8:00		4			1							
8:15												
8:30		1										
8:45												
9:00												
11:15									1			
11:30												
11:45												
12:00							1					
12:15												1
12:30		1						1				
12:45												
13:00												
13:15												
13:30												
13:45												
14:00												
15:15		2										
15:30	1					1						
15:45												
16:00			1									
16:15												
16:30									1			
16:45								1				
17:00		1										
17:15										1		
17:30								1				
17:45								1				
18:00					2							

Williams Pkwy @ Graymar Rd

Morning Peak Diagram

Specified Period
From: 7:00:00
To: 9:00:00

One Hour Peak
From: 7:45:00
To: 8:45:00

Municipality: Brampton
Site #: 0000000009
Intersection: Williams Pkwy & Graymar Rd
TFR File #: 9
Count date: 15-Jun-2022

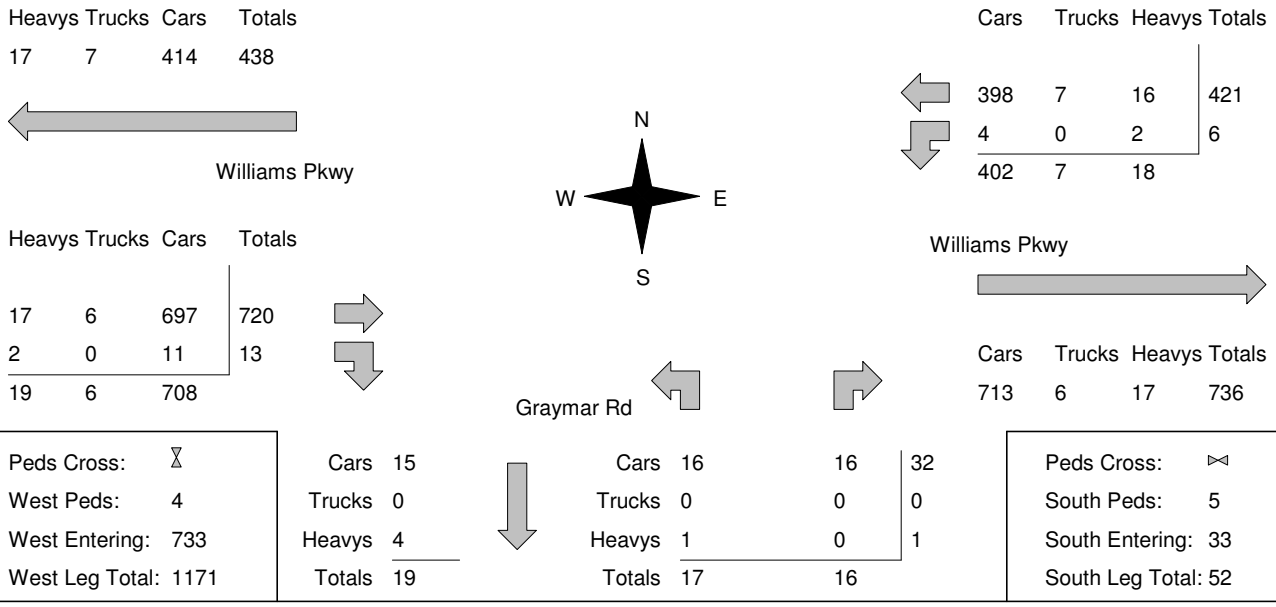
Weather conditions:
Cloudy/Dry

Person(s) who counted:
Cam

**** Non-Signalized Intersection ****

Major Road: Williams Pkwy runs W/E

East Leg Total: 1163
East Entering: 427
East Peds: 6
Peds Cross:



Peds Cross:
West Peds: 4
West Entering: 733
West Leg Total: 1171

Cars 15
Trucks 0
Heavys 4
Totals 19

Cars 16 16 32
Trucks 0 0 0
Heavys 1 0 1
Totals 17 16

Peds Cross:
South Peds: 5
South Entering: 33
South Leg Total: 52

Comments

Williams Pkwy @ Graymar Rd

Mid-day Peak Diagram

Specified Period
From: 11:00:00
To: 14:00:00

One Hour Peak
From: 13:00:00
To: 14:00:00

Municipality: Brampton
Site #: 0000000009
Intersection: Williams Pkwy & Graymar Rd
TFR File #: 9
Count date: 15-Jun-2022

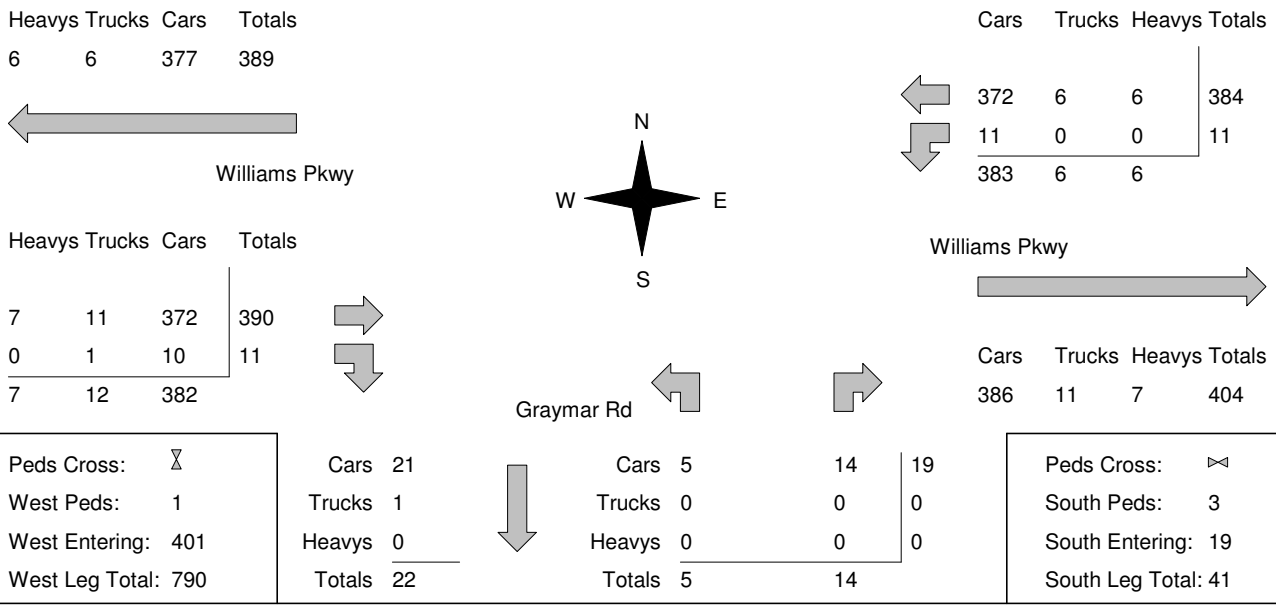
Weather conditions:
Cloudy/Dry

Person(s) who counted:
Cam

**** Non-Signalized Intersection ****

Major Road: Williams Pkwy runs W/E

East Leg Total: 799
East Entering: 395
East Peds: 5
Peds Cross: ⧖



Peds Cross: ⧖
West Peds: 1
West Entering: 401
West Leg Total: 790

Peds Cross: ⋈
South Peds: 3
South Entering: 19
South Leg Total: 41

Comments

Williams Pkwy @ Graymar Rd

Afternoon Peak Diagram

Specified Period
From: 15:00:00
To: 18:00:00

One Hour Peak
From: 15:30:00
To: 16:30:00

Municipality: Brampton
Site #: 0000000009
Intersection: Williams Pkwy & Graymar Rd
TFR File #: 9
Count date: 15-Jun-2022

Weather conditions:
Cloudy/Dry

Person(s) who counted:
Cam

**** Non-Signalized Intersection ****

Major Road: Williams Pkwy runs W/E

East Leg Total: 1717
East Entering: 1057
East Peds: 12
Peds Cross:

	Heavys	Trucks	Cars	Totals
	26	7	1016	1049

Williams Pkwy

	Heavys	Trucks	Cars	Totals
	12	10	618	640
	1	0	14	15
	13	10	632	

	Cars	Trucks	Heavys	Totals
	1006	7	26	1039
	16	1	1	18
	1022	8	27	

Williams Pkwy

	Cars	Trucks	Heavys	Totals
	637	11	12	660

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Graymar Rd

Peds Cross:
West Peds: 2
West Entering: 655
West Leg Total: 1704

Cars	30
Trucks	1
Heavys	2
Totals	33

Cars	10	19	29
Trucks	0	1	1
Heavys	0	0	0
Totals	10	20	

Peds Cross:
South Peds: 15
South Entering: 30
South Leg Total: 63

Comments

Williams Pkwy @ Graymar Rd

Total Count Diagram

Municipality: Brampton
Site #: 0000000009
Intersection: Williams Pkwy & Graymar Rd
TFR File #: 9
Count date: 15-Jun-2022

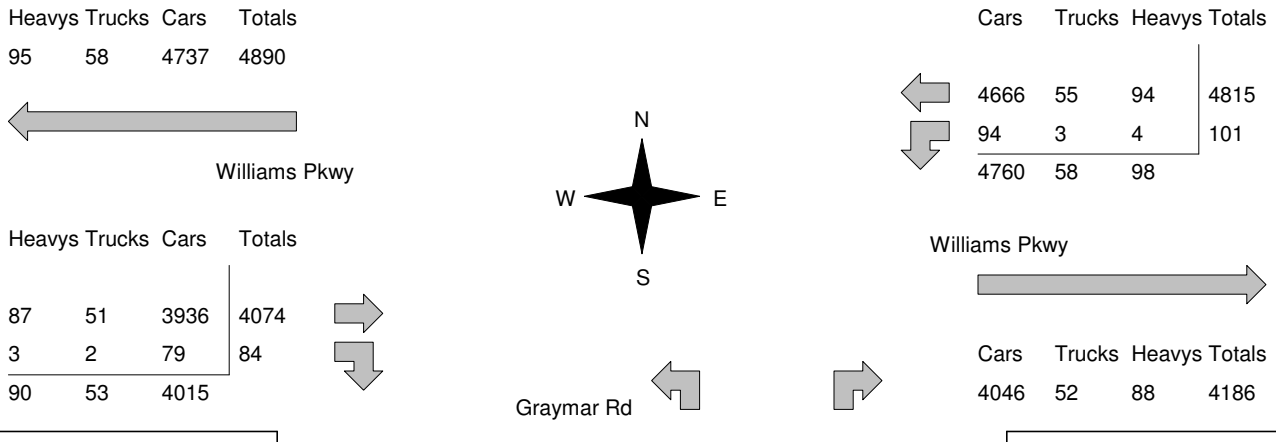
Weather conditions:
Cloudy/Dry

Person(s) who counted:
Cam

**** Non-Signalized Intersection ****

Major Road: Williams Pkwy runs W/E

East Leg Total: 9102
East Entering: 4916
East Peds: 41
Peds Cross: ⧖



Peds Cross: ⧖
West Peds: 15
West Entering: 4158
West Leg Total: 9048

Cars 173
Trucks 5
Heavys 7
Totals 185

Cars 71 110 181
Trucks 3 1 4
Heavys 1 1 2
Totals 75 112

Peds Cross: ⋈
South Peds: 80
South Entering: 187
South Leg Total: 372

Comments

Williams Pkwy @ Graymar Rd

Bikes

Date: June 15, 2022

	North Approach			East Approach			South Approach			West Approach		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
7:15											2	
7:30											1	
7:45												
8:00												
8:15												
8:30												
8:45					1						1	
9:00												
11:15											1	
11:30												
11:45												
12:00					1							
12:15												
12:30												
12:45												
13:00												
13:15					1							
13:30												
13:45												
14:00												
15:15					2							
15:30												
15:45												
16:00												
16:15					2							
16:30											1	
16:45												
17:00												
17:15												
17:30				1								
17:45												
18:00					2							

Williams Pkwy @ Torbram Rd

Morning Peak Diagram

Specified Period
From: 7:00:00
To: 9:00:00

One Hour Peak
From: 7:45:00
To: 8:45:00

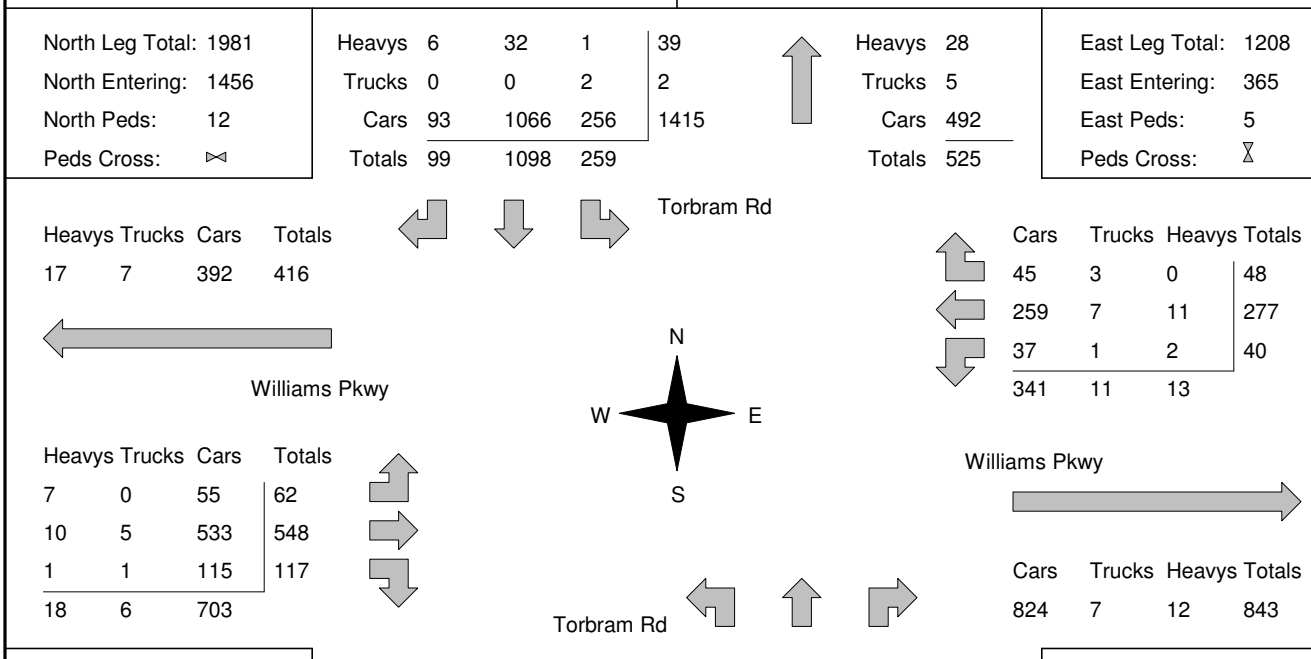
Municipality: Brampton
Site #: 0000000010
Intersection: Torbram Rd & Williams Pkwy
TFR File #: 10
Count date: 15-Jun-2022

Weather conditions:
Cloudy/Dry

Person(s) who counted:
Cam

**** Signalized Intersection ****

Major Road: Torbram Rd runs N/S



Comments

Williams Pkwy @ Torbram Rd

Mid-day Peak Diagram

Specified Period
From: 11:00:00
To: 14:00:00

One Hour Peak
From: 13:00:00
To: 14:00:00

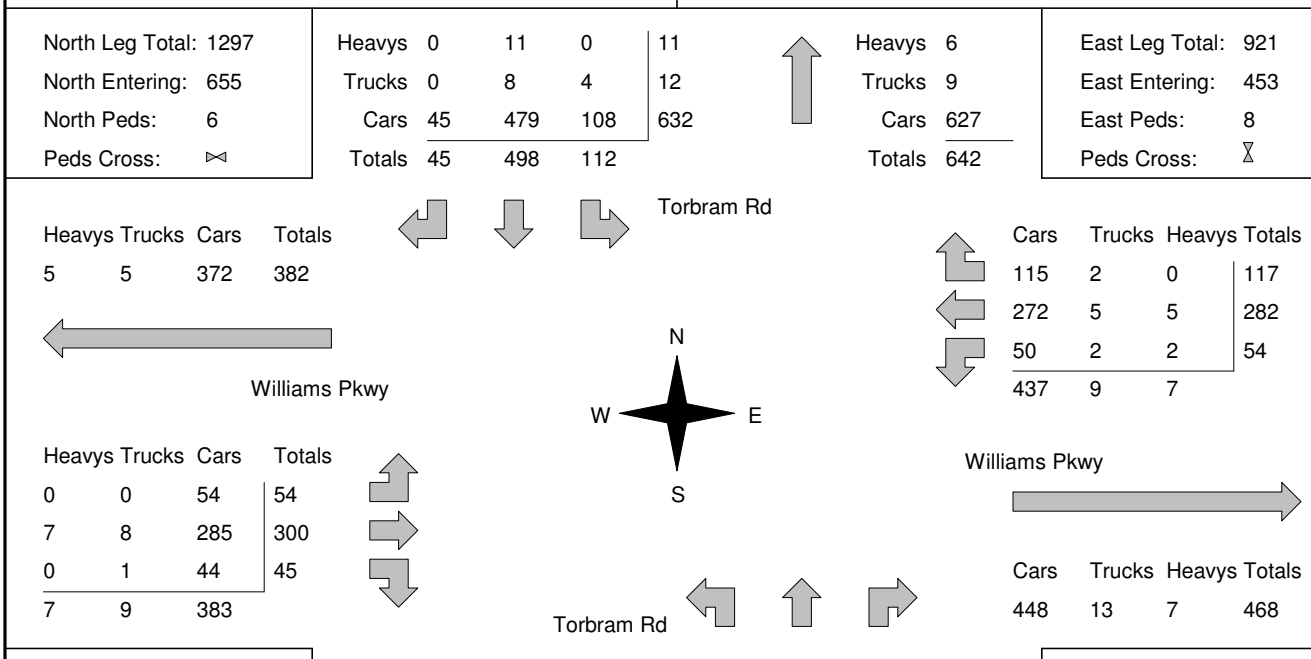
Municipality: Brampton
Site #: 0000000010
Intersection: Torbram Rd & Williams Pkwy
TFR File #: 10
Count date: 15-Jun-2022

Weather conditions:
Cloudy/Dry

Person(s) who counted:
Cam

**** Signalized Intersection ****

Major Road: Torbram Rd runs N/S



Comments

Williams Pkwy @ Torbram Rd

Afternoon Peak Diagram

Specified Period
From: 15:00:00
To: 18:00:00

One Hour Peak
From: 15:00:00
To: 16:00:00

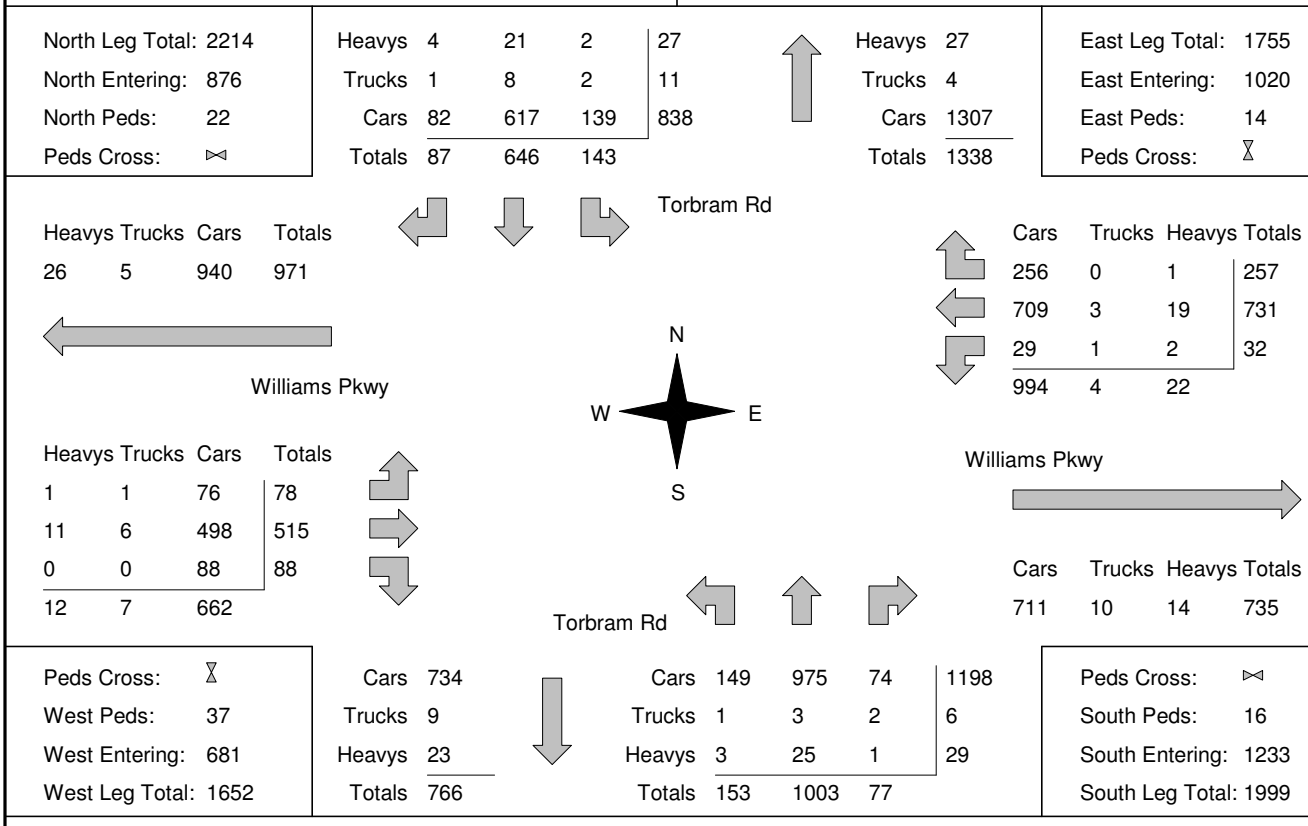
Municipality: Brampton
Site #: 0000000010
Intersection: Torbram Rd & Williams Pkwy
TFR File #: 10
Count date: 15-Jun-2022

Weather conditions:
Cloudy/Dry

Person(s) who counted:
Cam

**** Signalized Intersection ****

Major Road: Torbram Rd runs N/S



Comments

Williams Pkwy @ Torbram Rd

Total Count Diagram

Municipality: Brampton
Site #: 0000000010
Intersection: Torbram Rd & Williams Pkwy
TFR File #: 10
Count date: 15-Jun-2022

Weather conditions:
Cloudy/Dry

Person(s) who counted:
Cam

**** Signalized Intersection ****

Major Road: Torbram Rd runs N/S

North Leg Total:	13812			
North Entering:	6941			
North Peds:	126			
Peds Cross:	⋈			
Heavys	20	114	7	141
Trucks	6	40	23	69
Cars	549	5005	1177	6731
Totals	575	5159	1207	
Heavys	127			
Trucks	51			
Cars	6693			
Totals	6871			
East Leg Total:	9806			
East Entering:	5100			
East Peds:	85			
Peds Cross:	⧖			

Torbram Rd

Heavys	Trucks	Cars	Totals
99	51	4731	4881

Cars	Trucks	Heavys	Totals
1142	10	5	1157
3498	42	73	3613
313	9	8	330
4953	61	86	

Williams Pkwy

N
W E
S

Heavys	Trucks	Cars	Totals
12	3	464	479
64	44	2968	3076
10	3	566	579
86	50	3998	

Williams Pkwy

Cars	Trucks	Heavys	Totals
4551	73	82	4706

Torbram Rd

Peds Cross:	⧖			
West Peds:	200			
West Entering:	4134			
West Leg Total:	9015			
Cars	5884			
Trucks	52			
Heavys	132			
Totals	6068			
Cars	684	5087	406	6177
Trucks	3	38	6	47
Heavys	6	110	11	127
Totals	693	5235	423	
Peds Cross:	⋈			
South Peds:	128			
South Entering:	6351			
South Leg Total:	12419			

Comments

Williams Pkwy @ Torbram Rd

Bikes

Date: June 15, 2022

	North Approach			East Approach			South Approach			West Approach		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
7:15												1
7:30		1									1	
7:45			1			1						
8:00		3										
8:15												
8:30		1										
8:45						1					1	
9:00												
11:15												
11:30												
11:45												
12:00												
12:15			1									
12:30												
12:45		1										
13:00												
13:15												
13:30												
13:45												
14:00												
15:15					1							
15:30												
15:45		1					1	1				
16:00												
16:15												
16:30												
16:45		1										
17:00								2				
17:15												
17:30												
17:45												
18:00					2							

Signal Timing Plans

BRAMPTON
Flower City
brampton.ca

Planning and
Infrastructure Services
Maintenance and Operations

June 17, 2022

Attention:
Subject: **Request for Signal Timings**

As per your request, the traffic signal timing for the requested intersection is as follows:

Dixie Road at Williams Parkway

				PHASE DIRECTION									
Day Plan	*Hour*	*Minute*	*Pattern*	*1 NBLT - Dixie Road*	*2 Dixie Road - SB*	*3 EBLT - Williams Parkway*	*4 Williams Parkway WB*	*6 Dixie Road - NB*	*7 WBLT - Williams Parkway*	*8 Williams Parkway - EB*	*Cycle Length*	*Offset*
1 -	0	0	Free	10	22	10	35	22	10	35	91.8	0
1 -	11	0	2 - OFF	10	50	10	50	60	10	50	120	9
1 -	18	0	Free	10	22	10	35	22	10	35	91.8	0
2 -	0	0	Free	10	22	10	35	22	10	35	91.8	0
2 -	6	0	1 - AM	10	75	10	65	85	10	65	160	138
2 -	9	0	2 - OFF	10	50	10	50	60	10	50	120	9
2 -	14	0	3 - PM	15	64	14	67	79	14	67	160	58
2 -	19	0	2 - OFF	10	50	10	50	60	10	50	120	9
2 -	22	0	Free	10	22	10	35	22	10	35	91.8	0
3 -	0	0	Free	10	22	10	35	22	10	35	91.8	0
3 -	9	0	2 - OFF	10	50	10	50	60	10	50	120	9
3 -	19	0	Free	10	22	10	35	22	10	35	91.8	0

	PHASE			
	2	*4*	*6*	*8*
Walk	12	12	12	12
Clearance	18	25	18	25
Yellow Change	4	4	4	4
Red Clearance	2	2.3	2	2.3

Yours truly,

June 17, 2022

Attention:
Subject: **Request for Signal Timings**

As per your request, the traffic signal timing for the requested intersection is as follows:

Williams Parkway at MacKay Street

				PHASE DIRECTION			
				2	4		
Day Plan	Hour	Minute	Pattern	Williams Parkway	MacKay Street	Cycle Length	Offset
1 - Sunday	0	0	Free	21	15	42	0
1 - Sunday	8	0	2 - OFF	82	38	120	119
1 - Sunday	20	0	Free	21	15	42	0
2 - Weekday	0	0	Free	21	15	42	0
2 - Weekday	6	0	1 - AM	100	60	160	137
2 - Weekday	9	0	2 - OFF	82	38	120	119
2 - Weekday	15	0	3 - PM	115	45	160	43
2 - Weekday	19	0	2 - OFF	82	38	120	119
2 - Weekday	22	0	Free	21	15	42	0
3 - Saturday	0	0	Free	21	15	42	0
3 - Saturday	8	0	2 - OFF	82	38	120	119
3 - Saturday	20	0	Free	21	15	42	0

	PHASE	
	2	4
Walk	12	12
Clearance	15	19
Yellow Change	4	4
Red Clearance	2	2

Yours truly,

June 17, 2022

Attention:
Subject: **Request for Signal Timings**

As per your request, the traffic signal timing for the requested intersection is as follows:

Bramalea Road at Williams Parkway

				PHASE DIRECTION									
Day Plan	*Hour*	*Minute*	*Pattern*	*1 SBLT*	*2 NB Bramalea Rd*	*3 EBLT*	*4 WB Williams Pkwy*	*5 NBLT*	*6 SB Bramalea Rd*	*7 WBLT*	*8 EB Williams Pkwy*	*Cycle Length*	*Offset*
1 - Sunday	0	0	Free	10	21	10	19	10	21	10	19	79	0
1 - Sunday	8	0	2 - OFF	10	48	10	52	10	48	10	52	120	4
1 - Sunday	20	0	Free	10	21	10	19	10	21	10	19	79	0
2 - Weekdays	0	0	Free	10	21	10	19	10	21	10	19	79	0
2 - Weekdays	6	0	1 - AM	10	68	10	72	10	68	10	72	160	83
2 - Weekdays	9	0	2 - OFF	10	48	10	52	10	48	10	52	120	4
2 - Weekdays	14	0	2 - OFF	10	48	10	52	10	48	10	52	120	4
2 - Weekdays	15	0	3 - PM	10	70	10	70	10	70	10	70	160	119
2 - Weekdays	19	0	2 - OFF	10	48	10	52	10	48	10	52	120	4
2 - Weekdays	22	0	Free	10	21	10	19	10	21	10	19	79	0
2 - Weekdays	23	0	5 - Max2	0	0	0	0	0	0	0	0	0	0
3 - Saturday	0	0	Free	10	21	10	19	10	21	10	19	79	0
3 - Saturday	8	0	2 - OFF	10	48	10	52	10	48	10	52	120	4
3 - Saturday	20	0	Free	10	21	10	19	10	21	10	19	79	0
3 - Saturday	23	0	5 - Max2	0	0	0	0	0	0	0	0	0	0

	PHASE			
	2	*4*	*6*	*8*
Walk	8	8	8	8
Clearance	19	21	19	21
Yellow Change	4	5	4	5
Red Clearance	2	2	2	2

Yours truly,

June 17, 2022

Attention:
Subject: **Request for Signal Timings**

As per your request, the traffic signal timing for the requested intersection is as follows:

Williams Parkway at Glenridge Road / Chinguacousy SS Entrance

				PHASE DIRECTION					
Day Plan	*Hour*	*Minute*	*Pattern*	*2 Williams Parkway - EB*	*4 Glenridge Road - NB*	*6 Williams Parkway - WB*	*8 Chinguacousy Secondary School Entrance - SB*	*Cycle Length*	*Offset*
1 -	0	0	Free	35	18	35	18	77	0
1 -	8	0	2 - OFF	83	37	83	37	120	57
1 -	20	0	Free	35	18	35	18	77	0
2 -	0	0	Free	35	18	35	18	77	0
2 -	6	0	1 - AM	110	50	110	50	160	140
2 -	9	0	2 - OFF	83	37	83	37	120	57
2 -	15	0	3 - PM	120	40	120	40	160	16
2 -	19	0	2 - OFF	83	37	83	37	120	57
2 -	22	0	Free	35	18	35	18	77	0
3 -	0	0	Free	35	18	35	18	77	0
3 -	8	0	2 - OFF	83	37	83	37	120	57
3 -	20	0	Free	35	18	35	18	77	0

	PHASE			
	2	*4*	*6*	*8*
Walk	12	12	12	12
Clearance	6	18	6	18
Yellow Change	4	4	4	4
Red Clearance	2	2	2	2

June 17, 2022

Attention:
Subject: **Request for Signal Timings**

As per your request, the traffic signal timing for the requested intersection is as follows:

Williams Parkway at Grenoble Boulevard / Jordon Boulevard

				PHASE DIRECTION					
Day Plan	*Hour*	*Minute*	*Pattern*	*2 Williams Parkway - EB*	*4 Grenoble Boulevard - NB*	*6 Williams Parkway - WB*	*8 Jordan Boulevard - SB*	*Cycle Length*	*Offset*
1 -	0	0	Free	22	19	22	19	65	0
1 -	8	0	2 - OFF	77	43	77	43	120	17
1 -	20	0	Free	22	19	22	19	65	0
2 -	0	0	Free	22	19	22	19	65	0
2 -	6	0	1 - AM	110	50	110	50	160	52
2 -	9	0	2 - OFF	77	43	77	43	120	17
2 -	15	0	3 - PM	117	43	117	43	160	98
2 -	19	0	2 - OFF	77	43	77	43	120	17
2 -	22	0	Free	22	19	22	19	65	0
3 -	0	0	Free	22	19	22	19	65	0
3 -	8	0	2 - OFF	77	43	77	43	120	17
3 -	20	0	Free	22	19	22	19	65	0

	PHASE			
	2	*4*	*6*	*8*
Walk	12	12	12	12
Clearance	21	24	21	24
Yellow Change	4	4	4	4
Red Clearance	2	2	2	2

Yours truly,

BRAMPTON
Flower City
brampton.ca

Planning and
Infrastructure Services
Maintenance and Operations

June 17, 2022

Attention:
Subject: **Request for Signal Timings**

As per your request, the traffic signal timing for the requested intersection is as follows:

Torbram Road at Williams Parkway

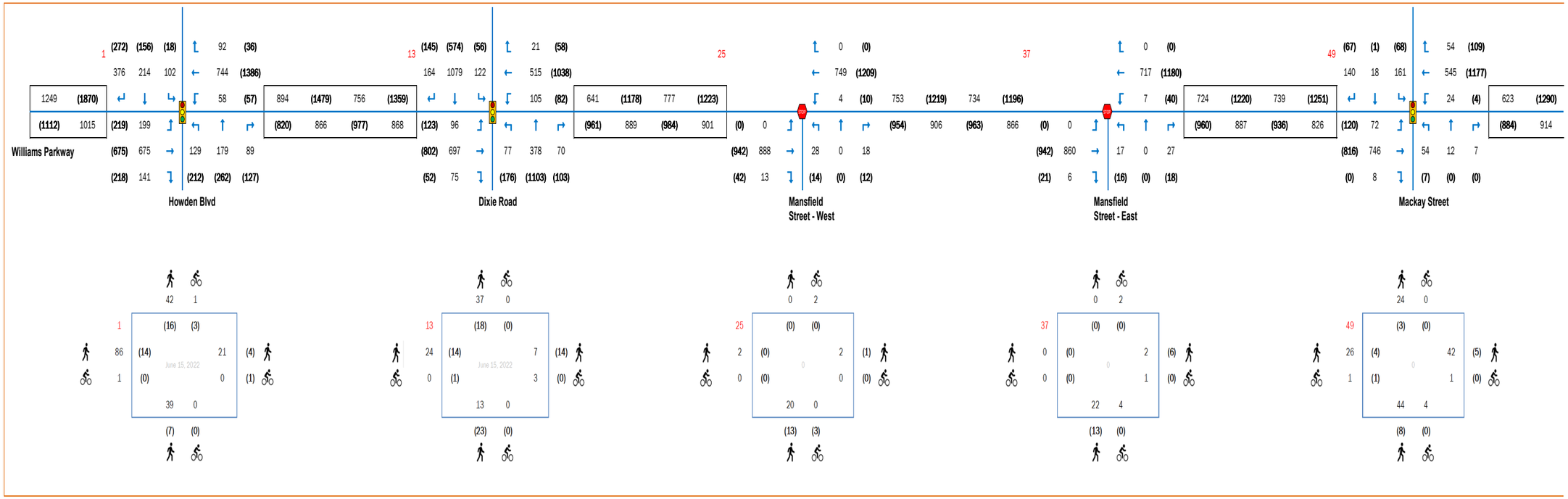
				PHASE DIRECTION							
Day Plan	*Hour*	*Minute*	*Pattern*	*1 SBLT - Torbram Road*	*2 Torbram Road - NB*	*4 Williams Parkway - WB*	*6 Torbram Road - SB*	*7 WBLT - Williams Parkway*	*8 Williams Parkway - EB*	*Cycle Length*	*Offset*
1 -	0	0	Free	17	25	30	25	10	30	89.5	0
1 -	9	0	2 - OFF	15	49	56	64	10	46	120	38
1 -	19	0	Free	17	25	30	25	10	30	89.5	0
1 -	22	0	6 - Max3	20	44	56	64	10	46	120	38
1 -	23	0	Free	17	25	30	25	10	30	89.5	0
2 -	0	0	Free	17	25	30	25	10	30	89.5	0
2 -	6	0	5 - Max2	20	70	70	90	10	60	160	145
2 -	7	0	1 - AM	10	80	70	90	10	60	160	145
2 -	9	30	2 - OFF	15	49	56	64	10	46	120	38
2 -	14	0	6 - Max3	20	44	56	64	10	46	120	38
2 -	15	0	3 - PM	13	70	77	83	10	67	160	18
2 -	19	0	2 - OFF	15	49	56	64	10	46	120	38
2 -	22	0	6 - Max3	20	44	56	64	10	46	120	38
2 -	23	0	Free	17	25	30	25	10	30	89.5	0
3 -	0	0	Free	17	25	30	25	10	30	89.5	0
3 -	5	30	5 - Max2	20	70	70	90	10	60	160	145
3 -	7	0	1 - AM	10	80	70	90	10	60	160	145
3 -	9	30	2 - OFF	15	49	56	64	10	46	120	38
3 -	14	0	6 - Max3	20	44	56	64	10	46	120	38
3 -	16	0	3 - PM	13	70	77	83	10	67	160	18
3 -	20	0	Free	17	25	30	25	10	30	89.5	0
3 -	22	0	6 - Max3	20	44	56	64	10	46	120	38
3 -	23	0	Free	17	25	30	25	10	30	89.5	0

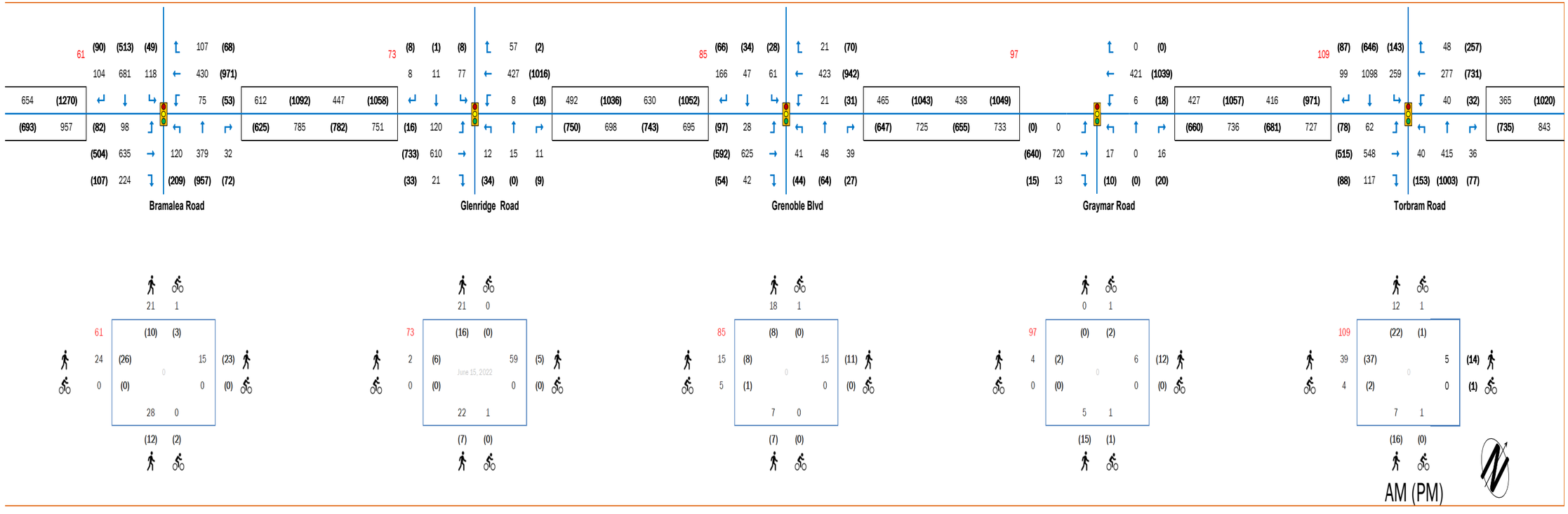
	PHASE			
	2	*4*	*6*	*8*
Walk	12	12	12	12
Clearance	21	19	21	19
Yellow Change	4	4	4	4
Red Clearance	2	2	2	2

Yours truly,

Turning Movement Diagram

Existing Counts





APPENDIX C

SYNCHRO REPORTS
EXISTING (2021) CONDITIONS

PARSONS

Existing Analysis Results – AM Peak

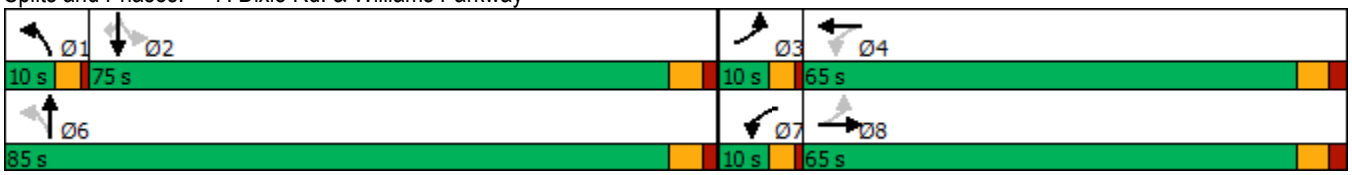
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	96	697	75	105	515	21	77	378	70	122	1079	164
Future Volume (vph)	96	697	75	105	515	21	77	378	70	122	1079	164
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	42.0		0.0	67.0		0.0	88.0		0.0	55.0		25.0
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (m)	51.0			17.5			76.0			62.0		
Satd. Flow (prot)	1738	3421	0	1722	3379	0	1738	3378	0	1755	3510	1601
Flt Permitted	0.291			0.135			0.115			0.475		
Satd. Flow (perm)	523	3421	0	244	3379	0	210	3378	0	872	3510	1521
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		8			3			19				77
Link Speed (k/h)		48			60			50			50	
Link Distance (m)		118.5			270.7			250.0			175.5	
Travel Time (s)		8.9			16.2			18.0			12.6	
Confl. Peds. (#/hr)	37		13	13		37	24		7	7		24
Confl. Bikes (#/hr)									3			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	5%	5%	3%	6%	7%	10%	5%	5%	6%	4%	4%	2%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	104	840	0	114	583	0	84	487	0	133	1173	178
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		Perm	NA	Perm
Protected Phases	3	8		7	4		1	6			2	
Permitted Phases	8			4			6			2		2
Detector Phase	3	8		7	4		1	6		2	2	2
Switch Phase												
Minimum Initial (s)	5.0	8.0		5.0	8.0		5.0	8.0		8.0	8.0	8.0
Minimum Split (s)	10.0	43.3		10.0	43.3		10.0	36.0		36.0	36.0	36.0
Total Split (s)	10.0	65.0		10.0	65.0		10.0	85.0		75.0	75.0	75.0
Total Split (%)	6.3%	40.6%		6.3%	40.6%		6.3%	53.1%		46.9%	46.9%	46.9%
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		4.0	4.0	4.0
All-Red Time (s)	1.0	2.3		1.0	2.3		1.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	4.0	6.3		4.0	6.3		4.0	6.0		6.0	6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead			Lag	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		None	Max		Max	Max	Max
Act Effct Green (s)	53.0	44.7		53.0	44.7		81.2	79.2		69.2	69.2	69.2
Actuated g/C Ratio	0.36	0.31		0.36	0.31		0.56	0.54		0.47	0.47	0.47
v/c Ratio	0.44	0.80		0.77	0.56		0.47	0.27		0.32	0.71	0.23
Control Delay	35.2	52.3		63.6	44.3		25.7	18.5		28.5	34.5	14.6
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	35.2	52.3		63.6	44.3		25.7	18.5		28.5	34.5	14.6
LOS	D	D		E	D		C	B		C	C	B
Approach Delay		50.4			47.4			19.6			31.6	
Approach LOS		D			D			B			C	
Queue Length 50th (m)	19.4	116.7		21.4	74.2		11.0	37.0		23.6	139.4	16.3
Queue Length 95th (m)	32.2	140.0		#42.2	92.3		22.9	56.6		45.9	190.7	36.4
Internal Link Dist (m)		94.5			246.7			226.0			151.5	

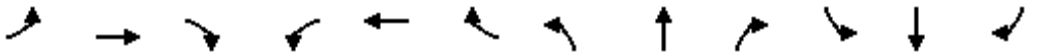
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (m)	42.0			67.0			88.0			55.0		25.0
Base Capacity (vph)	239	1381		149	1361		179	1837		412	1659	759
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.44	0.61		0.77	0.43		0.47	0.27		0.32	0.71	0.23

Intersection Summary			
Area Type:	Other		
Cycle Length: 160			
Actuated Cycle Length: 146.3			
Natural Cycle: 100			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.80			
Intersection Signal Delay: 37.5		Intersection LOS: D	
Intersection Capacity Utilization 82.6%		ICU Level of Service E	
Analysis Period (min) 15			

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

Splits and Phases: 7: Dixie Rd. & Williams Parkway





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	96	697	75	105	515	21	77	378	70	122	1079	164
Future Volume (vph)	96	697	75	105	515	21	77	378	70	122	1079	164
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.3		4.0	6.3		4.0	6.0		6.0	6.0	6.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	0.95
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		0.99	1.00	1.00
Frt	1.00	0.99		1.00	0.99		1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1731	3423		1721	3380		1738	3378		1746	3510	1527
Flt Permitted	0.29	1.00		0.13	1.00		0.12	1.00		0.47	1.00	1.00
Satd. Flow (perm)	531	3423		244	3380		211	3378		872	3510	1527
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	104	758	82	114	560	23	84	411	76	133	1173	178
RTOR Reduction (vph)	0	6	0	0	2	0	0	9	0	0	0	41
Lane Group Flow (vph)	104	834	0	114	581	0	84	478	0	133	1173	137
Confl. Peds. (#/hr)	37		13	13		37	24		7	7		24
Confl. Bikes (#/hr)									3			
Heavy Vehicles (%)	5%	5%	3%	6%	7%	10%	5%	5%	6%	4%	4%	2%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		Perm	NA	Perm
Protected Phases	3	8		7	4		1	6			2	
Permitted Phases	8			4			6			2		2
Actuated Green, G (s)	50.7	44.7		50.7	44.7		79.2	79.2		69.2	69.2	69.2
Effective Green, g (s)	50.7	44.7		50.7	44.7		79.2	79.2		69.2	69.2	69.2
Actuated g/C Ratio	0.35	0.31		0.35	0.31		0.54	0.54		0.47	0.47	0.47
Clearance Time (s)	4.0	6.3		4.0	6.3		4.0	6.0		6.0	6.0	6.0
Vehicle Extension (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Lane Grp Cap (vph)	233	1046		145	1033		176	1829		412	1661	722
v/s Ratio Prot	0.02	c0.24		c0.03	0.17		c0.02	0.14			c0.33	
v/s Ratio Perm	0.14			0.24			0.24			0.15		0.09
v/c Ratio	0.45	0.80		0.79	0.56		0.48	0.26		0.32	0.71	0.19
Uniform Delay, d1	34.2	46.6		38.9	42.5		22.3	17.9		23.9	30.5	22.3
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	2.8	5.0		27.1	1.2		4.2	0.3		2.1	2.6	0.6
Delay (s)	37.0	51.6		66.0	43.7		26.5	18.2		26.0	33.0	22.9
Level of Service	D	D		E	D		C	B		C	C	C
Approach Delay (s)		50.0			47.4			19.5			31.2	
Approach LOS		D			D			B			C	

Intersection Summary			
HCM 2000 Control Delay	37.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	146.2	Sum of lost time (s)	20.3
Intersection Capacity Utilization	82.6%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	888	13	4	749	28	18
Future Volume (vph)	888	13	4	749	28	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)		0.0	50.0		0.0	0.0
Storage Lanes		0	1		1	0
Taper Length (m)			30.0		2.5	
Satd. Flow (prot)	3465	0	1825	3476	1694	0
Flt Permitted			0.950		0.971	
Satd. Flow (perm)	3465	0	1825	3476	1694	0
Link Speed (k/h)	60			60	50	
Link Distance (m)	270.7			273.9	143.1	
Travel Time (s)	16.2			16.4	10.3	
Confl. Peds. (#/hr)		20	20		2	2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	5%	15%	0%	5%	7%	0%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	979	0	4	814	50	0
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 35.6%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	888	13	4	749	28	18
Future Volume (Veh/h)	888	13	4	749	28	18
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	965	14	4	814	30	20
Pedestrians	2			2	20	
Lane Width (m)	3.7			3.7	3.7	
Walking Speed (m/s)	1.2			1.2	1.2	
Percent Blockage	0			0	2	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)	271					
pX, platoon unblocked			0.79		0.79	0.79
vC, conflicting volume			999		1409	512
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			459		979	0
tC, single (s)			4.1		6.9	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.6	3.3
p0 queue free %			100		84	98
cM capacity (veh/h)			861		183	843

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1
Volume Total	643	336	4	407	407	50
Volume Left	0	0	4	0	0	30
Volume Right	0	14	0	0	0	20
cSH	1700	1700	861	1700	1700	267
Volume to Capacity	0.38	0.20	0.00	0.24	0.24	0.19
Queue Length 95th (m)	0.0	0.0	0.1	0.0	0.0	5.1
Control Delay (s)	0.0	0.0	9.2	0.0	0.0	21.6
Lane LOS			A			C
Approach Delay (s)	0.0		0.0			21.6
Approach LOS						C

Intersection Summary			
Average Delay	0.6		
Intersection Capacity Utilization	35.6%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	860	6	7	717	17	27
Future Volume (vph)	860	6	7	717	17	27
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)		0.0	50.0		0.0	0.0
Storage Lanes		0	1		1	0
Taper Length (m)			40.0		2.5	
Satd. Flow (prot)	3507	0	1601	3510	1687	0
Flt Permitted			0.950		0.981	
Satd. Flow (perm)	3507	0	1601	3510	1687	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	273.9			382.9	71.0	
Travel Time (s)	19.7			27.6	5.1	
Confl. Peds. (#/hr)		22	22			2
Confl. Bikes (#/hr)		4				1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	0%	14%	4%	0%	4%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	942	0	8	779	47	0
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 34.6%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	860	6	7	717	17	27
Future Volume (Veh/h)	860	6	7	717	17	27
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	935	7	8	779	18	29
Pedestrians				2	22	
Lane Width (m)				3.7	3.7	
Walking Speed (m/s)				1.2	1.2	
Percent Blockage				0	2	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)				383		
pX, platoon unblocked					0.98	
vC, conflicting volume			964		1366	495
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			964		1334	495
tC, single (s)			4.4		6.8	7.0
tC, 2 stage (s)						
tF (s)			2.3		3.5	3.3
p0 queue free %			99		87	94
cM capacity (veh/h)			629		140	504

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1
Volume Total	623	319	8	390	390	47
Volume Left	0	0	8	0	0	18
Volume Right	0	7	0	0	0	29
cSH	1700	1700	629	1700	1700	253
Volume to Capacity	0.37	0.19	0.01	0.23	0.23	0.19
Queue Length 95th (m)	0.0	0.0	0.3	0.0	0.0	5.1
Control Delay (s)	0.0	0.0	10.8	0.0	0.0	22.4
Lane LOS			B			C
Approach Delay (s)	0.0		0.1			22.4
Approach LOS						C

Intersection Summary				
Average Delay	0.6			
Intersection Capacity Utilization	34.6%	ICU Level of Service		A
Analysis Period (min)	15			

15: Williams Parkway & Mackay St.

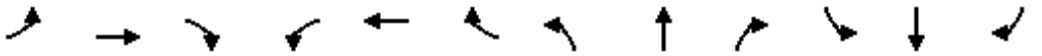
Timing Plan: AM

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	72	746	8	24	545	54	54	12	7	161	18	140
Future Volume (vph)	72	746	8	24	545	54	54	12	7	161	18	140
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	50.0		0.0	30.0		0.0	0.0		0.0	40.0		0.0
Storage Lanes	1		0	1		0	0		0	1		0
Taper Length (m)	30.0			25.0			2.5			30.0		
Satd. Flow (prot)	1706	3466	0	1560	3348	0	0	1812	0	1706	1506	0
Flt Permitted	0.389			0.319				0.536		0.715		
Satd. Flow (perm)	682	3466	0	508	3348	0	0	986	0	1212	1506	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1			11			4			152	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		382.9			440.2			46.0			136.3	
Travel Time (s)		27.6			31.7			3.3			9.8	
Confl. Peds. (#/hr)	24		44	44		24	26		42	42		26
Confl. Bikes (#/hr)			4						1			1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	7%	4%	88%	17%	6%	13%	0%	0%	0%	7%	17%	4%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	78	820	0	26	651	0	0	80	0	175	172	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			2			4			4	
Permitted Phases	2			2			4			4		
Detector Phase	2	2		2	2		4	4		4	4	
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		8.0	8.0		8.0	8.0	
Minimum Split (s)	33.0	33.0		33.0	33.0		37.0	37.0		37.0	37.0	
Total Split (s)	100.0	100.0		100.0	100.0		60.0	60.0		60.0	60.0	
Total Split (%)	62.5%	62.5%		62.5%	62.5%		37.5%	37.5%		37.5%	37.5%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0			6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	C-Max	C-Max		C-Max	C-Max		None	None		None	None	
Act Effct Green (s)	116.0	116.0		116.0	116.0			32.0		32.0	32.0	
Actuated g/C Ratio	0.72	0.72		0.72	0.72			0.20		0.20	0.20	
v/c Ratio	0.16	0.33		0.07	0.27			0.40		0.72	0.41	
Control Delay	9.1	9.0		8.8	8.4			56.7		75.8	12.6	
Queue Delay	0.0	0.0		0.0	0.0			0.0		0.0	0.0	
Total Delay	9.1	9.0		8.8	8.4			56.7		75.8	12.6	
LOS	A	A		A	A			E		E	B	
Approach Delay		9.0			8.4			56.7			44.5	
Approach LOS		A			A			E			D	
Queue Length 50th (m)	6.9	44.2		2.1	32.6			21.4		53.1	5.3	
Queue Length 95th (m)	16.8	69.3		6.8	52.5			35.7		74.2	24.4	
Internal Link Dist (m)		358.9			416.2			22.0			112.3	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (m)	50.0			30.0						40.0		
Base Capacity (vph)	494	2512		368	2430			335		409	608	
Starvation Cap Reductn	0	0		0	0			0		0	0	
Spillback Cap Reductn	0	0		0	0			0		0	0	
Storage Cap Reductn	0	0		0	0			0		0	0	
Reduced v/c Ratio	0.16	0.33		0.07	0.27			0.24		0.43	0.28	

Intersection Summary			
Area Type:	Other		
Cycle Length: 160			
Actuated Cycle Length: 160			
Offset: 137 (86%), Referenced to phase 2:EBWB, Start of Green			
Natural Cycle: 70			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.72			
Intersection Signal Delay: 16.9		Intersection LOS: B	
Intersection Capacity Utilization 90.2%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 15: Williams Parkway & Mackay St.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	72	746	8	24	545	54	54	12	7	161	18	140
Future Volume (vph)	72	746	8	24	545	54	54	12	7	161	18	140
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0			6.0		6.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	0.99			0.99		1.00	0.95	
Flpb, ped/bikes	0.97	1.00		0.96	1.00			0.98		0.95	1.00	
Frt	1.00	1.00		1.00	0.99			0.99		1.00	0.87	
Flt Protected	0.95	1.00		0.95	1.00			0.96		0.95	1.00	
Satd. Flow (prot)	1661	3467		1504	3349			1776		1613	1506	
Flt Permitted	0.39	1.00		0.32	1.00			0.54		0.72	1.00	
Satd. Flow (perm)	680	3467		506	3349			988		1215	1506	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	78	811	9	26	592	59	59	13	8	175	20	152
RTOR Reduction (vph)	0	0	0	0	3	0	0	3	0	0	122	0
Lane Group Flow (vph)	78	820	0	26	648	0	0	77	0	175	50	0
Confl. Peds. (#/hr)	24		44	44		24	26		42	42		26
Confl. Bikes (#/hr)			4						1			1
Heavy Vehicles (%)	7%	4%	88%	17%	6%	13%	0%	0%	0%	7%	17%	4%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			2			4			4	
Permitted Phases	2			2			4			4		
Actuated Green, G (s)	116.0	116.0		116.0	116.0			32.0		32.0	32.0	
Effective Green, g (s)	116.0	116.0		116.0	116.0			32.0		32.0	32.0	
Actuated g/C Ratio	0.72	0.72		0.72	0.72			0.20		0.20	0.20	
Clearance Time (s)	6.0	6.0		6.0	6.0			6.0		6.0	6.0	
Vehicle Extension (s)	5.0	5.0		5.0	5.0			5.0		5.0	5.0	
Lane Grp Cap (vph)	493	2513		366	2428			197		243	301	
v/s Ratio Prot		c0.24			0.19						0.03	
v/s Ratio Perm	0.11			0.05				0.08		c0.14		
v/c Ratio	0.16	0.33		0.07	0.27			0.39		0.72	0.17	
Uniform Delay, d1	6.8	7.9		6.4	7.5			55.5		59.8	53.0	
Progression Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	0.7	0.3		0.4	0.3			2.7		12.2	0.6	
Delay (s)	7.5	8.3		6.8	7.8			58.2		72.0	53.5	
Level of Service	A	A		A	A			E		E	D	
Approach Delay (s)		8.2			7.7			58.2			62.8	
Approach LOS		A			A			E			E	

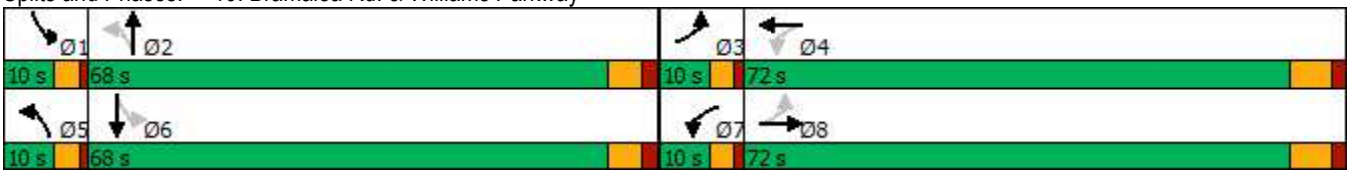
Intersection Summary			
HCM 2000 Control Delay	19.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	90.2%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

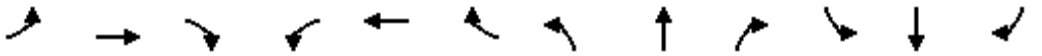
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	98	635	224	75	430	107	120	379	32	118	681	104
Future Volume (vph)	98	635	224	75	430	107	120	379	32	118	681	104
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	45.0		0.0	20.0		0.0	40.0		0.0	55.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	30.0			30.0			90.0			75.0		
Satd. Flow (prot)	1644	3265	0	1738	3297	0	1573	3407	0	1772	3431	0
Flt Permitted	0.323			0.129			0.217			0.442		
Satd. Flow (perm)	552	3265	0	235	3297	0	357	3407	0	814	3431	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		37			23			6			12	
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		440.2			303.2			368.3			146.0	
Travel Time (s)		31.7			21.8			22.1			8.8	
Confl. Peds. (#/hr)	21		28	28		21	24		15	15		24
Confl. Bikes (#/hr)						1						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	11%	4%	11%	5%	6%	8%	16%	6%	0%	3%	3%	7%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	107	933	0	82	583	0	130	447	0	128	853	0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8			4			2			6		
Detector Phase	3	8		7	4		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	8.0		5.0	8.0		5.0	8.0		5.0	8.0	
Minimum Split (s)	10.0	36.0		10.0	36.0		10.0	33.0		10.0	34.0	
Total Split (s)	10.0	72.0		10.0	72.0		10.0	68.0		10.0	68.0	
Total Split (%)	6.3%	45.0%		6.3%	45.0%		6.3%	42.5%		6.3%	42.5%	
Yellow Time (s)	3.0	5.0		3.0	5.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	1.0	2.0		1.0	2.0		1.0	2.0		1.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.0	7.0		4.0	7.0		4.0	6.0		4.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		None	Max		None	Max	
Act Effct Green (s)	58.6	49.6		58.6	49.6		70.2	62.2		70.2	62.2	
Actuated g/C Ratio	0.40	0.34		0.40	0.34		0.48	0.43		0.48	0.43	
v/c Ratio	0.40	0.82		0.52	0.51		0.58	0.30		0.29	0.58	
Control Delay	29.8	48.0		36.4	37.6		34.9	28.6		23.0	33.9	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	29.8	48.0		36.4	37.6		34.9	28.6		23.0	33.9	
LOS	C	D		D	D		C	C		C	C	
Approach Delay		46.1			37.4			30.0			32.5	
Approach LOS		D			D			C			C	
Queue Length 50th (m)	18.4	123.7		13.8	67.1		19.2	42.7		18.6	94.3	
Queue Length 95th (m)	30.2	148.4		24.0	84.0		37.4	65.5		36.4	135.2	
Internal Link Dist (m)		416.2			279.2			344.3			122.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (m)	45.0			20.0			40.0			55.0		
Base Capacity (vph)	268	1489		157	1496		223	1466		434	1480	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.40	0.63		0.52	0.39		0.58	0.30		0.29	0.58	

Intersection Summary			
Area Type:	Other		
Cycle Length: 160			
Actuated Cycle Length: 144.9			
Natural Cycle: 90			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.82			
Intersection Signal Delay: 37.4		Intersection LOS: D	
Intersection Capacity Utilization 76.2%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 19: Bramalea Rd. & Williams Parkway





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	98	635	224	75	430	107	120	379	32	118	681	104
Future Volume (vph)	98	635	224	75	430	107	120	379	32	118	681	104
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	7.0		4.0	7.0		4.0	6.0		4.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.96		1.00	0.97		1.00	0.99		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1639	3269		1737	3299		1571	3409		1764	3433	
Flt Permitted	0.32	1.00		0.13	1.00		0.22	1.00		0.44	1.00	
Satd. Flow (perm)	557	3269		236	3299		359	3409		821	3433	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	107	690	243	82	467	116	130	412	35	128	740	113
RTOR Reduction (vph)	0	24	0	0	15	0	0	3	0	0	7	0
Lane Group Flow (vph)	107	909	0	82	568	0	130	444	0	128	846	0
Confl. Peds. (#/hr)	21		28	28		21	24		15	15		24
Confl. Bikes (#/hr)						1						
Heavy Vehicles (%)	11%	4%	11%	5%	6%	8%	16%	6%	0%	3%	3%	7%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	55.6	49.6		55.6	49.6		68.2	62.2		68.2	62.2	
Effective Green, g (s)	55.6	49.6		55.6	49.6		68.2	62.2		68.2	62.2	
Actuated g/C Ratio	0.38	0.34		0.38	0.34		0.47	0.43		0.47	0.43	
Clearance Time (s)	4.0	7.0		4.0	7.0		4.0	6.0		4.0	6.0	
Vehicle Extension (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	258	1119		152	1130		219	1464		425	1474	
v/s Ratio Prot	0.02	c0.28		c0.02	0.17		c0.02	0.13		0.01	0.25	
v/s Ratio Perm	0.14			0.18			c0.25			0.13		
v/c Ratio	0.41	0.81		0.54	0.50		0.59	0.30		0.30	0.57	
Uniform Delay, d1	30.4	43.4		32.2	37.8		26.2	27.1		22.0	31.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.3	5.2		6.6	0.7		6.4	0.5		0.8	1.6	
Delay (s)	32.6	48.5		38.8	38.5		32.6	27.6		22.8	32.9	
Level of Service	C	D		D	D		C	C		C	C	
Approach Delay (s)		46.9			38.6			28.7			31.6	
Approach LOS		D			D			C			C	

Intersection Summary			
HCM 2000 Control Delay	37.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	144.8	Sum of lost time (s)	21.0
Intersection Capacity Utilization	76.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

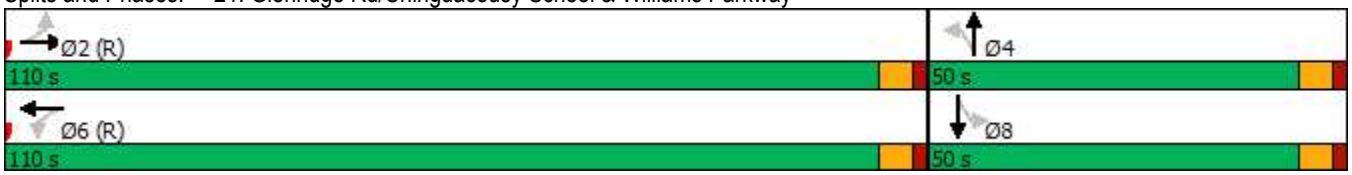
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	120	610	21	8	427	57	12	15	11	77	11	8
Future Volume (vph)	120	610	21	8	427	57	12	15	11	77	11	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	30.0		0.0	25.0		0.0	0.0		0.0	30.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	30.0			20.0			2.5			2.5		
Satd. Flow (prot)	1825	3430	0	1615	3304	0	0	1712	0	0	1781	0
Flt Permitted	0.455			0.381				0.905			0.775	
Satd. Flow (perm)	839	3430	0	629	3304	0	0	1574	0	0	1332	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		4			19			12			3	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		303.2			336.9			195.5			69.4	
Travel Time (s)		21.8			24.3			14.1			5.0	
Confl. Peds. (#/hr)	21		22	22		21	2		59	59		2
Confl. Bikes (#/hr)			1									
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	5%	19%	13%	8%	0%	0%	7%	0%	3%	0%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	130	686	0	9	526	0	0	41	0	0	105	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Detector Phase	2	2		6	6		4	4		8	8	
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		8.0	8.0		8.0	8.0	
Minimum Split (s)	29.0	29.0		29.0	29.0		36.0	36.0		36.0	36.0	
Total Split (s)	110.0	110.0		110.0	110.0		50.0	50.0		50.0	50.0	
Total Split (%)	68.8%	68.8%		68.8%	68.8%		31.3%	31.3%		31.3%	31.3%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0			6.0			6.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	C-Max	C-Max		C-Max	C-Max		None	None		None	None	
Act Effct Green (s)	124.2	124.2		124.2	124.2			23.8			23.8	
Actuated g/C Ratio	0.78	0.78		0.78	0.78			0.15			0.15	
v/c Ratio	0.20	0.26		0.02	0.20			0.17			0.52	
Control Delay	6.5	5.8		4.8	4.4			43.4			68.8	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	6.5	5.8		4.8	4.4			43.4			68.8	
LOS	A	A		A	A			D			E	
Approach Delay		5.9			4.4			43.4			68.8	
Approach LOS		A			A			D			E	
Queue Length 50th (m)	11.7	34.0		0.5	19.8			7.7			29.0	
Queue Length 95th (m)	19.6	41.6		m1.7	23.0			19.2			49.1	
Internal Link Dist (m)		279.2			312.9			171.5			45.4	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (m)	30.0			25.0								
Base Capacity (vph)	650	2662		487	2568			441			368	
Starvation Cap Reductn	0	0		0	0			0			0	
Spillback Cap Reductn	0	0		0	0			0			0	
Storage Cap Reductn	0	0		0	0			0			0	
Reduced v/c Ratio	0.20	0.26		0.02	0.20			0.09			0.29	

Intersection Summary			
Area Type:	Other		
Cycle Length: 160			
Actuated Cycle Length: 160			
Offset: 140 (88%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green			
Natural Cycle: 65			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.52			
Intersection Signal Delay: 10.8		Intersection LOS: B	
Intersection Capacity Utilization 61.7%		ICU Level of Service B	
Analysis Period (min) 15			

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

Splits and Phases: 21: Glenridge Rd/Chinguacousy School & Williams Parkway

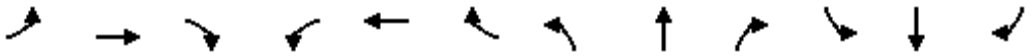


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	120	610	21	8	427	57	12	15	11	77	11	8
Future Volume (vph)	120	610	21	8	427	57	12	15	11	77	11	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0			6.0			6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frpb, ped/bikes	1.00	1.00		1.00	0.99			0.97			1.00	
Flpb, ped/bikes	0.96	1.00		0.97	1.00			1.00			0.93	
Frt	1.00	0.99		1.00	0.98			0.96			0.99	
Flt Protected	0.95	1.00		0.95	1.00			0.98			0.96	
Satd. Flow (prot)	1744	3430		1559	3305			1713			1655	
Flt Permitted	0.46	1.00		0.38	1.00			0.90			0.78	
Satd. Flow (perm)	835	3430		626	3305			1574			1335	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	130	663	23	9	464	62	13	16	12	84	12	9
RTOR Reduction (vph)	0	1	0	0	4	0	0	10	0	0	3	0
Lane Group Flow (vph)	130	685	0	9	522	0	0	31	0	0	102	0
Confl. Peds. (#/hr)	21		22	22		21	2		59	59		2
Confl. Bikes (#/hr)			1									
Heavy Vehicles (%)	0%	5%	19%	13%	8%	0%	0%	7%	0%	3%	0%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	124.2	124.2		124.2	124.2			23.8			23.8	
Effective Green, g (s)	124.2	124.2		124.2	124.2			23.8			23.8	
Actuated g/C Ratio	0.78	0.78		0.78	0.78			0.15			0.15	
Clearance Time (s)	6.0	6.0		6.0	6.0			6.0			6.0	
Vehicle Extension (s)	5.0	5.0		5.0	5.0			5.0			5.0	
Lane Grp Cap (vph)	648	2662		485	2565			234			198	
v/s Ratio Prot		c0.20			0.16							
v/s Ratio Perm	0.16			0.01				0.02			c0.08	
v/c Ratio	0.20	0.26		0.02	0.20			0.13			0.52	
Uniform Delay, d1	4.7	5.0		4.1	4.8			59.1			62.8	
Progression Factor	1.00	1.00		0.85	0.81			1.00			1.00	
Incremental Delay, d2	0.7	0.2		0.1	0.2			0.5			4.5	
Delay (s)	5.4	5.2		3.5	4.0			59.7			67.3	
Level of Service	A	A		A	A			E			E	
Approach Delay (s)		5.3			4.0			59.7			67.3	
Approach LOS		A			A			E			E	

Intersection Summary			
HCM 2000 Control Delay	10.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.30		
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	61.7%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

20: Grenoble Blvd/Jordan Blvd & Williams Parkway

Timing Plan: AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	28	625	42	21	423	21	41	48	39	61	47	166
Future Volume (vph)	28	625	42	21	423	21	41	48	39	61	47	166
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	30.0		0.0	30.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	30.0			30.0			2.5			2.5		
Satd. Flow (prot)	1706	3443	0	1659	3422	0	0	3200	0	0	3111	0
Flt Permitted	0.476			0.363				0.659			0.838	
Satd. Flow (perm)	844	3443	0	632	3422	0	0	2134	0	0	2626	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		9			6			42			180	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		336.9			330.2			104.7			103.8	
Travel Time (s)		24.3			23.8			7.5			7.5	
Confl. Peds. (#/hr)	18		7	7		18	15		15	15		15
Confl. Bikes (#/hr)						1						5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	7%	5%	2%	10%	6%	0%	7%	4%	8%	2%	2%	4%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	30	725	0	23	483	0	0	139	0	0	297	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Detector Phase	2	2		6	6		4	4		8	8	
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		8.0	8.0		8.0	8.0	
Minimum Split (s)	39.0	39.0		39.0	39.0		42.0	42.0		42.0	42.0	
Total Split (s)	110.0	110.0		110.0	110.0		50.0	50.0		50.0	50.0	
Total Split (%)	68.8%	68.8%		68.8%	68.8%		31.3%	31.3%		31.3%	31.3%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0			6.0			6.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	C-Max	C-Max		C-Max	C-Max		None	None		None	None	
Act Effct Green (s)	122.1	122.1		122.1	122.1			25.9			25.9	
Actuated g/C Ratio	0.76	0.76		0.76	0.76			0.16			0.16	
v/c Ratio	0.05	0.28		0.05	0.18			0.37			0.52	
Control Delay	11.7	10.8		7.3	6.5			41.2			24.8	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	11.7	10.8		7.3	6.5			41.2			24.8	
LOS	B	B		A	A			D			C	
Approach Delay		10.8			6.5			41.2			24.8	
Approach LOS		B			A			D			C	
Queue Length 50th (m)	3.5	52.3		2.1	25.8			13.3			16.0	
Queue Length 95th (m)	8.7	68.5		5.3	32.8			23.7			30.6	
Internal Link Dist (m)		312.9			306.2			80.7			79.8	

20: Grenoble Blvd/Jordan Blvd & Williams Parkway

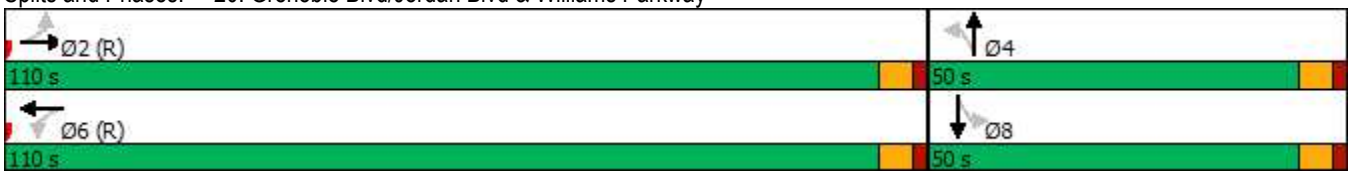
Timing Plan: AM

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (m)	30.0			30.0								
Base Capacity (vph)	644	2630		482	2613			617			852	
Starvation Cap Reductn	0	0		0	0			0			0	
Spillback Cap Reductn	0	0		0	0			0			0	
Storage Cap Reductn	0	0		0	0			0			0	
Reduced v/c Ratio	0.05	0.28		0.05	0.18			0.23			0.35	

Intersection Summary

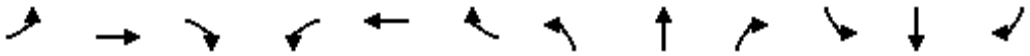
Area Type:	Other		
Cycle Length: 160			
Actuated Cycle Length: 160			
Offset: 52 (33%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green			
Natural Cycle: 85			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.52			
Intersection Signal Delay: 14.5		Intersection LOS: B	
Intersection Capacity Utilization 74.2%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 20: Grenoble Blvd/Jordan Blvd & Williams Parkway



20: Grenoble Blvd/Jordan Blvd & Williams Parkway

Timing Plan: AM



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	28	625	42	21	423	21	41	48	39	61	47	166
Future Volume (vph)	28	625	42	21	423	21	41	48	39	61	47	166
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0			6.0			6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			0.95			0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			0.99			0.98	
Flpb, ped/bikes	0.99	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	0.99		1.00	0.99			0.95			0.91	
Flt Protected	0.95	1.00		0.95	1.00			0.98			0.99	
Satd. Flow (prot)	1683	3445		1653	3422			3186			3095	
Flt Permitted	0.48	1.00		0.36	1.00			0.66			0.84	
Satd. Flow (perm)	842	3445		632	3422			2135			2622	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	30	679	46	23	460	23	45	52	42	66	51	180
RTOR Reduction (vph)	0	2	0	0	1	0	0	35	0	0	151	0
Lane Group Flow (vph)	30	723	0	23	482	0	0	104	0	0	146	0
Confl. Peds. (#/hr)	18		7	7		18	15		15	15		15
Confl. Bikes (#/hr)						1						5
Heavy Vehicles (%)	7%	5%	2%	10%	6%	0%	7%	4%	8%	2%	2%	4%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	122.1	122.1		122.1	122.1			25.9			25.9	
Effective Green, g (s)	122.1	122.1		122.1	122.1			25.9			25.9	
Actuated g/C Ratio	0.76	0.76		0.76	0.76			0.16			0.16	
Clearance Time (s)	6.0	6.0		6.0	6.0			6.0			6.0	
Vehicle Extension (s)	5.0	5.0		5.0	5.0			5.0			5.0	
Lane Grp Cap (vph)	642	2628		482	2611			345			424	
v/s Ratio Prot		c0.21			0.14							
v/s Ratio Perm	0.04			0.04				0.05			c0.06	
v/c Ratio	0.05	0.28		0.05	0.18			0.30			0.34	
Uniform Delay, d1	4.7	5.7		4.7	5.2			59.1			59.5	
Progression Factor	1.64	1.54		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.1	0.3		0.2	0.2			1.0			1.0	
Delay (s)	7.8	9.0		4.8	5.4			60.1			60.5	
Level of Service	A	A		A	A			E			E	
Approach Delay (s)		9.0			5.4			60.1			60.5	
Approach LOS		A			A			E			E	

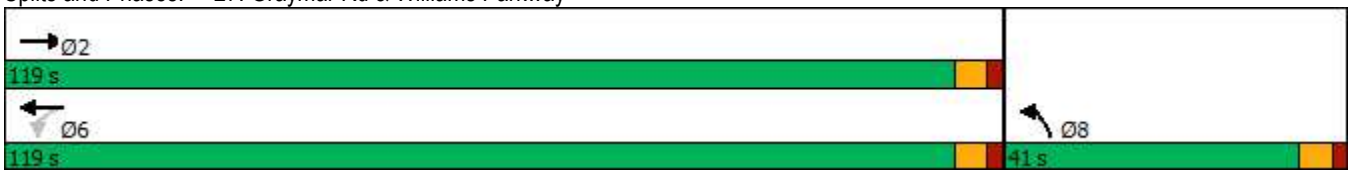
Intersection Summary			
HCM 2000 Control Delay	21.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.29		
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	74.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	720	13	6	421	17	16
Future Volume (vph)	720	13	6	421	17	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)		0.0	30.0		0.0	0.0
Storage Lanes		0	1		1	0
Taper Length (m)			30.0		2.5	
Satd. Flow (prot)	3524	0	1372	3476	1679	0
Flt Permitted			0.348		0.975	
Satd. Flow (perm)	3524	0	501	3476	1672	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	3				17	
Link Speed (k/h)	60			60	50	
Link Distance (m)	330.2			415.5	211.3	
Travel Time (s)	19.8			24.9	15.2	
Confl. Peds. (#/hr)		5	5		4	6
Confl. Bikes (#/hr)		1				
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	15%	33%	5%	6%	0%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	797	0	7	458	35	0
Turn Type	NA		Perm	NA	Prot	
Protected Phases	2			6	8	
Permitted Phases			6			
Detector Phase	2		6	6	8	
Switch Phase						
Minimum Initial (s)	8.0		8.0	8.0	8.0	
Minimum Split (s)	33.0		33.0	33.0	33.0	
Total Split (s)	119.0		119.0	119.0	41.0	
Total Split (%)	74.4%		74.4%	74.4%	25.6%	
Yellow Time (s)	4.0		4.0	4.0	4.0	
All-Red Time (s)	2.0		2.0	2.0	2.0	
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	
Total Lost Time (s)	6.0		6.0	6.0	6.0	
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	Max		Max	Max	None	
Act Effct Green (s)	115.2		115.2	115.2	12.0	
Actuated g/C Ratio	0.85		0.85	0.85	0.09	
v/c Ratio	0.26		0.02	0.15	0.21	
Control Delay	3.2		3.7	2.8	37.5	
Queue Delay	0.0		0.0	0.0	0.0	
Total Delay	3.2		3.7	2.8	37.5	
LOS	A		A	A	D	
Approach Delay	3.2			2.8	37.5	
Approach LOS	A			A	D	
Queue Length 50th (m)	16.8		0.2	8.6	4.6	
Queue Length 95th (m)	45.5		1.8	24.7	14.8	
Internal Link Dist (m)	306.2			391.5	187.3	

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Turn Bay Length (m)			30.0			
Base Capacity (vph)	3013		428	2971	450	
Starvation Cap Reductn	0		0	0	0	
Spillback Cap Reductn	0		0	0	0	
Storage Cap Reductn	0		0	0	0	
Reduced v/c Ratio	0.26		0.02	0.15	0.08	

Intersection Summary			
Area Type:	Other		
Cycle Length: 160			
Actuated Cycle Length: 134.8			
Natural Cycle: 70			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.26			
Intersection Signal Delay: 4.0		Intersection LOS: A	
Intersection Capacity Utilization 42.0%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 27: Graymar Rd & Williams Parkway



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	720	13	6	421	17	16
Future Volume (vph)	720	13	6	421	17	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0		6.0	6.0	6.0	
Lane Util. Factor	0.95		1.00	0.95	1.00	
Frpb, ped/bikes	1.00		1.00	1.00	0.99	
Flpb, ped/bikes	1.00		1.00	1.00	1.00	
Frt	1.00		1.00	1.00	0.93	
Flt Protected	1.00		0.95	1.00	0.97	
Satd. Flow (prot)	3525		1367	3476	1681	
Flt Permitted	1.00		0.35	1.00	0.97	
Satd. Flow (perm)	3525		501	3476	1681	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	783	14	7	458	18	17
RTOR Reduction (vph)	0	0	0	0	16	0
Lane Group Flow (vph)	797	0	7	458	19	0
Confl. Peds. (#/hr)		5	5		4	6
Confl. Bikes (#/hr)		1				
Heavy Vehicles (%)	3%	15%	33%	5%	6%	0%
Turn Type	NA		Perm	NA	Prot	
Protected Phases	2			6	8	
Permitted Phases			6			
Actuated Green, G (s)	113.9		113.9	113.9	10.2	
Effective Green, g (s)	113.9		113.9	113.9	10.2	
Actuated g/C Ratio	0.84		0.84	0.84	0.07	
Clearance Time (s)	6.0		6.0	6.0	6.0	
Vehicle Extension (s)	5.0		5.0	5.0	5.0	
Lane Grp Cap (vph)	2950		419	2909	125	
v/s Ratio Prot	c0.23			0.13	c0.01	
v/s Ratio Perm			0.01			
v/c Ratio	0.27		0.02	0.16	0.15	
Uniform Delay, d1	2.3		1.8	2.1	58.9	
Progression Factor	1.00		1.00	1.00	1.00	
Incremental Delay, d2	0.2		0.1	0.1	1.2	
Delay (s)	2.6		1.9	2.2	60.1	
Level of Service	A		A	A	E	
Approach Delay (s)	2.6			2.2	60.1	
Approach LOS	A			A	E	

Intersection Summary			
HCM 2000 Control Delay	4.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.26		
Actuated Cycle Length (s)	136.1	Sum of lost time (s)	12.0
Intersection Capacity Utilization	42.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

26: Torbram Rd./Torbram Rd & Williams Parkway

Timing Plan: AM

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	62	548	117	40	277	48	40	415	36	259	1098	99
Future Volume (vph)	62	548	117	40	277	48	40	415	36	259	1098	99
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	30.0		30.0	45.0		0.0	40.0		40.0	60.0		0.0
Storage Lanes	1		1	1		1	1		1	1		0
Taper Length (m)	30.0			45.0			25.0			55.0		
Satd. Flow (prot)	1644	3544	1601	1690	3444	1541	1825	3444	1585	1807	3473	0
Flt Permitted	0.568			0.191			0.165			0.444		
Satd. Flow (perm)	971	3544	1564	339	3444	1493	315	3444	1564	842	3473	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			75			52			116		9	
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		415.5			219.7			183.1			148.5	
Travel Time (s)		24.9			13.2			11.0			8.9	
Confl. Peds. (#/hr)	12		7	7		12	39		5	5		39
Confl. Bikes (#/hr)			1			1						4
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	11%	3%	2%	8%	6%	6%	0%	6%	3%	1%	3%	6%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	67	596	127	43	301	52	43	451	39	282	1301	0
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	Perm	NA	Free	pm+pt	NA	
Protected Phases		8		7	4			2		1	6	
Permitted Phases	8		8	4		4	2		Free	6		
Detector Phase	8	8	8	7	4	4	2	2		1	6	
Switch Phase												
Minimum Initial (s)	8.0	8.0	8.0	5.0	8.0	8.0	8.0	8.0		5.0	8.0	
Minimum Split (s)	37.0	37.0	37.0	10.0	37.0	37.0	39.0	39.0		10.0	39.0	
Total Split (s)	60.0	60.0	60.0	10.0	70.0	70.0	80.0	80.0		10.0	90.0	
Total Split (%)	37.5%	37.5%	37.5%	6.3%	43.8%	43.8%	50.0%	50.0%		6.3%	56.3%	
Yellow Time (s)	4.0	4.0	4.0	3.0	4.0	4.0	4.0	4.0		3.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	1.0	2.0	2.0	2.0	2.0		1.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0	4.0	6.0	6.0	6.0	6.0		4.0	6.0	
Lead/Lag	Lag	Lag	Lag	Lead			Lag	Lag		Lead		
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None	None	Max	Max		None	Max	
Act Effct Green (s)	32.6	32.6	32.6	42.4	40.4	40.4	74.4	74.4	136.9	86.5	84.5	
Actuated g/C Ratio	0.24	0.24	0.24	0.31	0.30	0.30	0.54	0.54	1.00	0.63	0.62	
v/c Ratio	0.29	0.71	0.30	0.26	0.30	0.11	0.25	0.24	0.02	0.49	0.61	
Control Delay	46.4	52.7	20.3	35.9	37.3	8.7	24.6	18.1	0.0	16.9	18.8	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	46.4	52.7	20.3	35.9	37.3	8.7	24.6	18.1	0.0	16.9	18.8	
LOS	D	D	C	D	D	A	C	B	A	B	B	
Approach Delay		47.0			33.4			17.3			18.4	
Approach LOS		D			C			B			B	
Queue Length 50th (m)	15.2	79.6	11.4	8.2	32.9	0.0	6.1	33.6	0.0	32.7	111.0	
Queue Length 95th (m)	28.9	99.5	28.1	16.9	45.0	9.2	17.1	50.8	0.0	56.5	157.1	
Internal Link Dist (m)		391.5			195.7			159.1			124.5	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (m)	30.0		30.0	45.0			40.0		40.0	60.0		
Base Capacity (vph)	384	1405	665	164	1619	729	171	1872	1564	574	2146	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.17	0.42	0.19	0.26	0.19	0.07	0.25	0.24	0.02	0.49	0.61	

Intersection Summary

Area Type: Other
Cycle Length: 160
Actuated Cycle Length: 136.9
Natural Cycle: 100
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.71
Intersection Signal Delay: 26.9 Intersection LOS: C
Intersection Capacity Utilization 80.8% ICU Level of Service D
Analysis Period (min) 15

Splits and Phases: 26: Torbram Rd./Torbram Rd & Williams Parkway

26: Torbram Rd./Torbram Rd & Williams Parkway

Timing Plan: AM

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	62	548	117	40	277	48	40	415	36	259	1098	99
Future Volume (vph)	62	548	117	40	277	48	40	415	36	259	1098	99
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	4.0	6.0	6.0	6.0	6.0	4.0	4.0	6.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.97	1.00	1.00	0.99	1.00	0.99	
Flpb, ped/bikes	0.99	1.00	1.00	1.00	1.00	1.00	0.99	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	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1627	3544	1566	1689	3444	1497	1814	3444	1564	1805	3473	
Flt Permitted	0.57	1.00	1.00	0.19	1.00	1.00	0.16	1.00	1.00	0.44	1.00	
Satd. Flow (perm)	973	3544	1566	340	3444	1497	314	3444	1564	843	3473	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	67	596	127	43	301	52	43	451	39	282	1193	108
RTOR Reduction (vph)	0	0	57	0	0	36	0	0	0	0	3	0
Lane Group Flow (vph)	67	596	70	43	301	16	43	451	39	282	1298	0
Confl. Peds. (#/hr)	12		7	7		12	39		5	5		39
Confl. Bikes (#/hr)			1			1						4
Heavy Vehicles (%)	11%	3%	2%	8%	6%	6%	0%	6%	3%	1%	3%	6%
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	Perm	NA	Free	pm+pt	NA	
Protected Phases		8		7	4			2		1	6	
Permitted Phases	8		8	4		4	2		Free	6		
Actuated Green, G (s)	32.6	32.6	32.6	41.2	41.2	41.2	74.5	74.5	137.7	84.5	84.5	
Effective Green, g (s)	32.6	32.6	32.6	41.2	41.2	41.2	74.5	74.5	137.7	84.5	84.5	
Actuated g/C Ratio	0.24	0.24	0.24	0.30	0.30	0.30	0.54	0.54	1.00	0.61	0.61	
Clearance Time (s)	6.0	6.0	6.0	4.0	6.0	6.0	6.0	6.0		4.0	6.0	
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	230	839	370	146	1030	447	169	1863	1564	559	2131	
v/s Ratio Prot		c0.17		0.01	c0.09			0.13		0.02	c0.37	
v/s Ratio Perm	0.07		0.04	0.08		0.01	0.14		0.02	0.29		
v/c Ratio	0.29	0.71	0.19	0.29	0.29	0.03	0.25	0.24	0.02	0.50	0.61	
Uniform Delay, d1	43.1	48.2	42.0	36.3	37.1	34.2	16.8	16.7	0.0	14.5	16.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.5	3.5	0.5	2.4	0.3	0.1	3.6	0.3	0.0	1.5	1.3	
Delay (s)	44.6	51.8	42.5	38.6	37.4	34.2	20.4	17.0	0.0	16.0	17.7	
Level of Service	D	D	D	D	D	C	C	B	A	B	B	
Approach Delay (s)		49.7			37.1			16.0			17.4	
Approach LOS		D			D			B			B	

Intersection Summary			
HCM 2000 Control Delay	27.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	137.7	Sum of lost time (s)	20.0
Intersection Capacity Utilization	80.8%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Existing Analysis Results – PM Peak

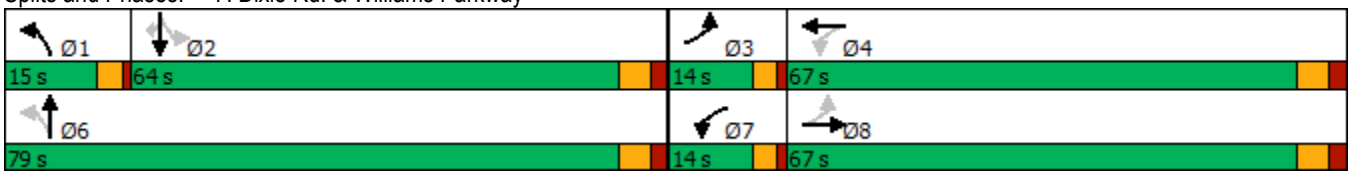
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	123	802	52	82	1038	58	176	1103	103	56	574	145
Future Volume (vph)	123	802	52	82	1038	58	176	1103	103	56	574	145
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	42.0		0.0	67.0		0.0	88.0		0.0	55.0		25.0
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (m)	51.0			17.5			76.0			62.0		
Satd. Flow (prot)	1706	3478	0	1755	3477	0	1807	3493	0	1755	3544	1601
Flt Permitted	0.067			0.150			0.278			0.093		
Satd. Flow (perm)	120	3478	0	276	3477	0	526	3493	0	172	3544	1546
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5			4			8				77
Link Speed (k/h)		48			60			50			50	
Link Distance (m)		118.5			270.7			250.0			175.5	
Travel Time (s)		8.9			16.2			18.0			12.6	
Confl. Peds. (#/hr)	18		23	23		18	14		14	14		14
Confl. Bikes (#/hr)												1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	7%	4%	0%	4%	4%	3%	1%	3%	1%	4%	3%	2%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	134	929	0	89	1191	0	191	1311	0	61	624	158
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		Perm	NA	Perm
Protected Phases	3	8		7	4		1	6			2	
Permitted Phases	8			4			6			2		2
Detector Phase	3	8		7	4		1	6		2	2	2
Switch Phase												
Minimum Initial (s)	5.0	8.0		5.0	8.0		5.0	8.0		8.0	8.0	8.0
Minimum Split (s)	10.0	43.3		10.0	43.3		10.0	36.0		36.0	36.0	36.0
Total Split (s)	14.0	67.0		14.0	67.0		15.0	79.0		64.0	64.0	64.0
Total Split (%)	8.8%	41.9%		8.8%	41.9%		9.4%	49.4%		40.0%	40.0%	40.0%
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		4.0	4.0	4.0
All-Red Time (s)	1.0	2.3		1.0	2.3		1.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	4.0	6.3		4.0	6.3		4.0	6.0		6.0	6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead			Lag	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		None	Max		Max	Max	Max
Act Effct Green (s)	71.8	59.5		71.4	59.3		75.0	73.0		58.0	58.0	58.0
Actuated g/C Ratio	0.45	0.38		0.45	0.37		0.47	0.46		0.37	0.37	0.37
v/c Ratio	0.87	0.71		0.41	0.92		0.57	0.81		0.97	0.48	0.26
Control Delay	80.2	45.6		28.8	58.7		32.4	41.9		157.5	40.5	19.0
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	80.2	45.6		28.8	58.7		32.4	41.9		157.5	40.5	19.0
LOS	F	D		C	E		C	D		F	D	B
Approach Delay		49.9			56.6			40.7			44.9	
Approach LOS		D			E			D			D	
Queue Length 50th (m)	26.9	130.5		15.3	187.1		35.6	187.7		19.2	80.7	17.3
Queue Length 95th (m)	#66.9	155.1		26.1	218.3		52.7	218.0		#51.9	99.3	35.3
Internal Link Dist (m)		94.5			246.7			226.0			151.5	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (m)	42.0			67.0			88.0			55.0		25.0
Base Capacity (vph)	154	1334		217	1333		337	1613		63	1296	614
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.87	0.70		0.41	0.89		0.57	0.81		0.97	0.48	0.26

Intersection Summary

Area Type: Other
Cycle Length: 160
Actuated Cycle Length: 158.6
Natural Cycle: 100
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.97
Intersection Signal Delay: 47.9 Intersection LOS: D
Intersection Capacity Utilization 96.7% ICU Level of Service F
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 7: Dixie Rd. & Williams Parkway



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	123	802	52	82	1038	58	176	1103	103	56	574	145
Future Volume (vph)	123	802	52	82	1038	58	176	1103	103	56	574	145
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.3		4.0	6.3		4.0	6.0		6.0	6.0	6.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.99		1.00	0.99		1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1706	3477		1754	3477		1804	3494		1755	3544	1546
Flt Permitted	0.07	1.00		0.15	1.00		0.28	1.00		0.09	1.00	1.00
Satd. Flow (perm)	121	3477		276	3477		529	3494		172	3544	1546
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	134	872	57	89	1128	63	191	1199	112	61	624	158
RTOR Reduction (vph)	0	3	0	0	3	0	0	4	0	0	0	49
Lane Group Flow (vph)	134	926	0	89	1188	0	191	1307	0	61	624	109
Confl. Peds. (#/hr)	18		23	23		18	14		14	14		14
Confl. Bikes (#/hr)												1
Heavy Vehicles (%)	7%	4%	0%	4%	4%	3%	1%	3%	1%	4%	3%	2%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		Perm	NA	Perm
Protected Phases	3	8		7	4		1	6			2	
Permitted Phases	8			4			6			2		2
Actuated Green, G (s)	69.5	59.5		69.1	59.3		73.0	73.0		58.0	58.0	58.0
Effective Green, g (s)	69.5	59.5		69.1	59.3		73.0	73.0		58.0	58.0	58.0
Actuated g/C Ratio	0.44	0.38		0.44	0.37		0.46	0.46		0.37	0.37	0.37
Clearance Time (s)	4.0	6.3		4.0	6.3		4.0	6.0		6.0	6.0	6.0
Vehicle Extension (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Lane Grp Cap (vph)	152	1304		211	1300		331	1608		62	1296	565
v/s Ratio Prot	c0.06	0.27		0.03	c0.34		0.04	c0.37			0.18	
v/s Ratio Perm	0.33			0.16			0.23			c0.35		0.07
v/c Ratio	0.88	0.71		0.42	0.91		0.58	0.81		0.98	0.48	0.19
Uniform Delay, d1	39.8	42.2		30.1	47.2		27.6	36.9		49.8	38.7	34.3
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	42.8	2.3		2.8	10.5		3.9	4.6		109.8	1.3	0.8
Delay (s)	82.6	44.5		32.9	57.8		31.4	41.5		159.6	40.0	35.1
Level of Service	F	D		C	E		C	D		F	D	D
Approach Delay (s)		49.3			56.0			40.2			47.7	
Approach LOS		D			E			D			D	

Intersection Summary			
HCM 2000 Control Delay	48.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	158.6	Sum of lost time (s)	20.3
Intersection Capacity Utilization	96.7%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	942	42	10	1209	14	12
Future Volume (vph)	942	42	10	1209	14	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)		0.0	50.0		0.0	0.0
Storage Lanes		0	1		1	0
Taper Length (m)			30.0		2.5	
Satd. Flow (prot)	3484	0	1825	3544	1631	0
Flt Permitted			0.950		0.974	
Satd. Flow (perm)	3484	0	1825	3544	1631	0
Link Speed (k/h)	60			60	50	
Link Distance (m)	270.7			273.9	143.1	
Travel Time (s)	16.2			16.4	10.3	
Confl. Peds. (#/hr)		13	13			1
Confl. Bikes (#/hr)		3				
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	7%	0%	3%	14%	0%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1070	0	11	1314	28	0
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	43.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	942	42	10	1209	14	12
Future Volume (Veh/h)	942	42	10	1209	14	12
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1024	46	11	1314	15	13
Pedestrians				1	13	
Lane Width (m)				3.7	3.7	
Walking Speed (m/s)				1.2	1.2	
Percent Blockage				0	1	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)	271					
pX, platoon unblocked			0.78		0.78	0.78
vC, conflicting volume			1083		1739	549
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			536		1379	0
tC, single (s)			4.1		7.1	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.6	3.3
p0 queue free %			99		84	98
cM capacity (veh/h)			802		92	839

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1
Volume Total	683	387	11	657	657	28
Volume Left	0	0	11	0	0	15
Volume Right	0	46	0	0	0	13
cSH	1700	1700	802	1700	1700	157
Volume to Capacity	0.40	0.23	0.01	0.39	0.39	0.18
Queue Length 95th (m)	0.0	0.0	0.3	0.0	0.0	4.8
Control Delay (s)	0.0	0.0	9.6	0.0	0.0	32.8
Lane LOS			A			D
Approach Delay (s)	0.0		0.1			32.8
Approach LOS						D

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	43.7%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	942	21	40	1180	16	18
Future Volume (vph)	942	21	40	1180	16	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)		0.0	50.0		0.0	0.0
Storage Lanes		0	1		1	0
Taper Length (m)			40.0		2.5	
Satd. Flow (prot)	3535	0	1825	3544	1644	0
Flt Permitted			0.950		0.978	
Satd. Flow (perm)	3535	0	1825	3544	1644	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	273.9			382.9	71.0	
Travel Time (s)	19.7			27.6	5.1	
Confl. Peds. (#/hr)		13	13			6
Confl. Bikes (#/hr)		4				1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	0%	0%	3%	13%	0%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1047	0	43	1283	37	0
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 45.1%		ICU Level of Service A	
Analysis Period (min) 15			

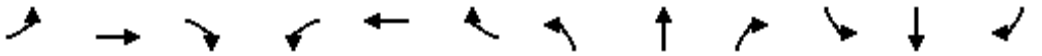
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	942	21	40	1180	16	18
Future Volume (Veh/h)	942	21	40	1180	16	18
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1024	23	43	1283	17	20
Pedestrians				6	13	
Lane Width (m)				3.7	3.7	
Walking Speed (m/s)				1.2	1.2	
Percent Blockage				1	1	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)				383		
pX, platoon unblocked					0.90	
vC, conflicting volume			1060		1776	542
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			1060		1633	542
tC, single (s)			4.1		7.1	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.6	3.3
p0 queue free %			93		75	96
cM capacity (veh/h)			657		68	482

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1
Volume Total	683	364	43	642	642	37
Volume Left	0	0	43	0	0	17
Volume Right	0	23	0	0	0	20
cSH	1700	1700	657	1700	1700	127
Volume to Capacity	0.40	0.21	0.07	0.38	0.38	0.29
Queue Length 95th (m)	0.0	0.0	1.6	0.0	0.0	8.5
Control Delay (s)	0.0	0.0	10.9	0.0	0.0	44.6
Lane LOS			B			E
Approach Delay (s)	0.0		0.4			44.6
Approach LOS						E

Intersection Summary			
Average Delay	0.9		
Intersection Capacity Utilization	45.1%	ICU Level of Service	A
Analysis Period (min)	15		

15: Williams Parkway & Mackay St.

Timing Plan: PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	120	816	0	4	1177	109	7	0	0	68	1	67
Future Volume (vph)	120	816	0	4	1177	109	7	0	0	68	1	67
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	50.0		0.0	30.0		0.0	0.0		0.0	40.0		0.0
Storage Lanes	1		0	1		0	0		0	1		0
Taper Length (m)	30.0			25.0			2.5			30.0		
Satd. Flow (prot)	1789	3510	0	1825	3492	0	0	1825	0	1755	1545	0
Flt Permitted	0.171			0.310				0.705		0.752		
Satd. Flow (perm)	322	3510	0	592	3492	0	0	1347	0	1378	1545	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					13						73	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		382.9			440.2			46.0			136.3	
Travel Time (s)		27.6			31.7			3.3			9.8	
Confl. Peds. (#/hr)	3		8	8		3	4		5	5		4
Confl. Bikes (#/hr)												1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	4%	0%	0%	3%	2%	0%	0%	0%	4%	0%	4%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	130	887	0	4	1397	0	0	8	0	74	74	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			2			4			4	
Permitted Phases	2			2			4			4		
Detector Phase	2	2		2	2		4	4		4	4	
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		8.0	8.0		8.0	8.0	
Minimum Split (s)	33.0	33.0		33.0	33.0		37.0	37.0		37.0	37.0	
Total Split (s)	115.0	115.0		115.0	115.0		45.0	45.0		45.0	45.0	
Total Split (%)	71.9%	71.9%		71.9%	71.9%		28.1%	28.1%		28.1%	28.1%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0			6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	C-Max	C-Max		C-Max	C-Max		None	None		None	None	
Act Effct Green (s)	130.3	130.3		130.3	130.3			17.7		17.7	17.7	
Actuated g/C Ratio	0.81	0.81		0.81	0.81			0.11		0.11	0.11	
v/c Ratio	0.50	0.31		0.01	0.49			0.05		0.49	0.31	
Control Delay	14.0	4.6		4.5	5.9			59.1		75.5	15.1	
Queue Delay	0.0	0.0		0.0	0.0			0.0		0.0	0.0	
Total Delay	14.0	4.6		4.5	5.9			59.1		75.5	15.1	
LOS	B	A		A	A			E		E	B	
Approach Delay		5.8			5.9			59.1			45.3	
Approach LOS		A			A			E			D	
Queue Length 50th (m)	10.1	28.8		0.2	55.8			2.4		22.8	0.3	
Queue Length 95th (m)	39.7	58.0		1.5	109.5			7.2		36.3	14.5	
Internal Link Dist (m)		358.9			416.2			22.0			112.3	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (m)	50.0			30.0						40.0		
Base Capacity (vph)	262	2858		481	2846			328		335	431	
Starvation Cap Reductn	0	0		0	0			0		0	0	
Spillback Cap Reductn	0	0		0	0			0		0	0	
Storage Cap Reductn	0	0		0	0			0		0	0	
Reduced v/c Ratio	0.50	0.31		0.01	0.49			0.02		0.22	0.17	

Intersection Summary			
Area Type:	Other		
Cycle Length: 160			
Actuated Cycle Length: 160			
Offset: 43 (27%), Referenced to phase 2:EBWB, Start of Green			
Natural Cycle: 100			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.50			
Intersection Signal Delay: 8.3		Intersection LOS: A	
Intersection Capacity Utilization 67.3%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 15: Williams Parkway & Mackay St.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	120	816	0	4	1177	109	7	0	0	68	1	67
Future Volume (vph)	120	816	0	4	1177	109	7	0	0	68	1	67
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0			6.0		6.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			1.00		1.00	0.98	
Flpb, ped/bikes	1.00	1.00		0.99	1.00			0.99		0.99	1.00	
Frt	1.00	1.00		1.00	0.99			1.00		1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00			0.95		0.95	1.00	
Satd. Flow (prot)	1788	3510		1813	3493			1815		1741	1544	
Flt Permitted	0.17	1.00		0.31	1.00			0.70		0.75	1.00	
Satd. Flow (perm)	322	3510		591	3493			1346		1379	1544	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	130	887	0	4	1279	118	8	0	0	74	1	73
RTOR Reduction (vph)	0	0	0	0	2	0	0	0	0	0	65	0
Lane Group Flow (vph)	130	887	0	4	1395	0	0	8	0	74	9	0
Confl. Peds. (#/hr)	3		8	8		3	4		5	5		4
Confl. Bikes (#/hr)												1
Heavy Vehicles (%)	2%	4%	0%	0%	3%	2%	0%	0%	0%	4%	0%	4%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			2			4			4	
Permitted Phases	2			2			4			4		
Actuated Green, G (s)	130.3	130.3		130.3	130.3			17.7		17.7	17.7	
Effective Green, g (s)	130.3	130.3		130.3	130.3			17.7		17.7	17.7	
Actuated g/C Ratio	0.81	0.81		0.81	0.81			0.11		0.11	0.11	
Clearance Time (s)	6.0	6.0		6.0	6.0			6.0		6.0	6.0	
Vehicle Extension (s)	5.0	5.0		5.0	5.0			5.0		5.0	5.0	
Lane Grp Cap (vph)	262	2858		481	2844			148		152	170	
v/s Ratio Prot		0.25			0.40						0.01	
v/s Ratio Perm	c0.40			0.01				0.01		c0.05		
v/c Ratio	0.50	0.31		0.01	0.49			0.05		0.49	0.05	
Uniform Delay, d1	4.6	3.7		2.8	4.6			63.7		66.9	63.7	
Progression Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	6.6	0.3		0.0	0.6			0.3		5.1	0.3	
Delay (s)	11.2	4.0		2.8	5.2			64.0		71.9	63.9	
Level of Service	B	A		A	A			E		E	E	
Approach Delay (s)		4.9			5.2			64.0			67.9	
Approach LOS		A			A			E			E	

Intersection Summary			
HCM 2000 Control Delay	8.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	67.3%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

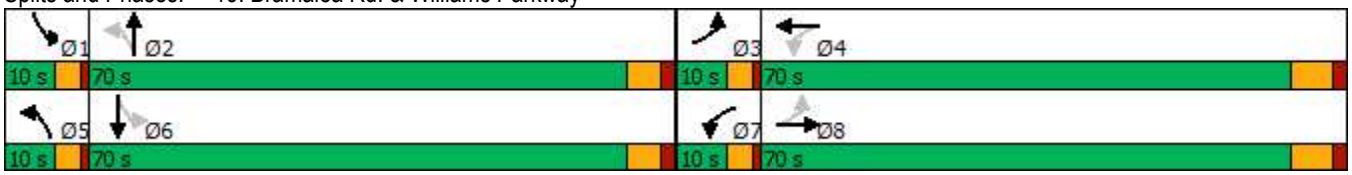
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	82	504	107	53	971	68	209	957	72	49	513	90
Future Volume (vph)	82	504	107	53	971	68	209	957	72	49	513	90
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	45.0		0.0	20.0		0.0	40.0		0.0	55.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	30.0			30.0			90.0			75.0		
Satd. Flow (prot)	1807	3416	0	1825	3573	0	1807	3565	0	1601	3475	0
Flt Permitted	0.071			0.296			0.300			0.113		
Satd. Flow (perm)	135	3416	0	565	3573	0	563	3565	0	190	3475	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		18			5			6			15	
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		440.2			303.2			368.3			146.0	
Travel Time (s)		31.7			21.8			22.1			8.8	
Confl. Peds. (#/hr)	10		12	12		10	26		23	23		26
Confl. Bikes (#/hr)			2			3						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	4%	1%	0%	1%	0%	1%	1%	1%	14%	2%	1%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	89	664	0	58	1129	0	227	1118	0	53	656	0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8			4			2			6		
Detector Phase	3	8		7	4		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	8.0		5.0	8.0		5.0	8.0		5.0	8.0	
Minimum Split (s)	10.0	36.0		10.0	36.0		10.0	33.0		10.0	34.0	
Total Split (s)	10.0	70.0		10.0	70.0		10.0	70.0		10.0	70.0	
Total Split (%)	6.3%	43.8%		6.3%	43.8%		6.3%	43.8%		6.3%	43.8%	
Yellow Time (s)	3.0	5.0		3.0	5.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	1.0	2.0		1.0	2.0		1.0	2.0		1.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.0	7.0		4.0	7.0		4.0	6.0		4.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		None	Max		None	Max	
Act Effct Green (s)	67.0	59.3		66.2	57.1		73.0	66.3		72.1	64.1	
Actuated g/C Ratio	0.43	0.38		0.43	0.37		0.47	0.43		0.47	0.42	
v/c Ratio	0.72	0.50		0.20	0.85		0.72	0.73		0.37	0.45	
Control Delay	56.7	36.9		24.9	51.5		43.8	41.3		29.5	33.6	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	56.7	36.9		24.9	51.5		43.8	41.3		29.5	33.6	
LOS	E	D		C	D		D	D		C	C	
Approach Delay		39.3			50.2			41.7			33.3	
Approach LOS		D			D			D			C	
Queue Length 50th (m)	15.4	80.9		9.9	166.2		41.2	156.9		8.7	76.4	
Queue Length 95th (m)	#37.6	99.4		18.4	194.1		#66.1	189.4		17.4	96.8	
Internal Link Dist (m)		416.2			279.2			344.3			122.0	

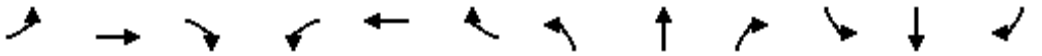
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (m)	45.0			20.0			40.0			55.0		
Base Capacity (vph)	123	1407		291	1463		315	1534		143	1452	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.72	0.47		0.20	0.77		0.72	0.73		0.37	0.45	

Intersection Summary			
Area Type:	Other		
Cycle Length: 160			
Actuated Cycle Length: 154.3			
Natural Cycle: 90			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.85			
Intersection Signal Delay: 42.3		Intersection LOS: D	
Intersection Capacity Utilization 85.2%		ICU Level of Service E	
Analysis Period (min) 15			

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

Splits and Phases: 19: Bramalea Rd. & Williams Parkway





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	82	504	107	53	971	68	209	957	72	49	513	90
Future Volume (vph)	82	504	107	53	971	68	209	957	72	49	513	90
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	7.0		4.0	7.0		4.0	6.0		4.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	0.99		1.00	0.99		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1807	3416		1822	3574		1801	3563		1601	3474	
Flt Permitted	0.07	1.00		0.30	1.00		0.30	1.00		0.11	1.00	
Satd. Flow (perm)	135	3416		568	3574		569	3563		190	3474	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	89	548	116	58	1055	74	227	1040	78	53	558	98
RTOR Reduction (vph)	0	11	0	0	3	0	0	3	0	0	9	0
Lane Group Flow (vph)	89	653	0	58	1126	0	227	1115	0	53	647	0
Confl. Peds. (#/hr)	10		12	12		10	26		23	23		26
Confl. Bikes (#/hr)			2			3						
Heavy Vehicles (%)	1%	4%	1%	0%	1%	0%	1%	1%	1%	14%	2%	1%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	65.3	59.3		62.7	58.0		72.3	66.3		69.7	65.0	
Effective Green, g (s)	65.3	59.3		62.7	58.0		72.3	66.3		69.7	65.0	
Actuated g/C Ratio	0.42	0.38		0.40	0.37		0.46	0.42		0.45	0.42	
Clearance Time (s)	4.0	7.0		4.0	7.0		4.0	6.0		4.0	6.0	
Vehicle Extension (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	120	1298		266	1328		311	1514		127	1447	
v/s Ratio Prot	c0.03	0.19		0.01	c0.32		c0.03	c0.31		0.01	0.19	
v/s Ratio Perm	0.28			0.08			0.31			0.17		
v/c Ratio	0.74	0.50		0.22	0.85		0.73	0.74		0.42	0.45	
Uniform Delay, d1	34.9	37.1		29.6	45.0		35.1	37.5		29.5	32.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	25.4	0.6		0.9	5.8		10.1	3.2		4.6	1.0	
Delay (s)	60.3	37.7		30.5	50.7		45.2	40.8		34.1	33.6	
Level of Service	E	D		C	D		D	D		C	C	
Approach Delay (s)		40.4			49.7			41.5			33.7	
Approach LOS		D			D			D			C	

Intersection Summary			
HCM 2000 Control Delay	42.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	156.0	Sum of lost time (s)	21.0
Intersection Capacity Utilization	85.2%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

21: Glenridge Rd/Chinguacousy School & Williams Parkway

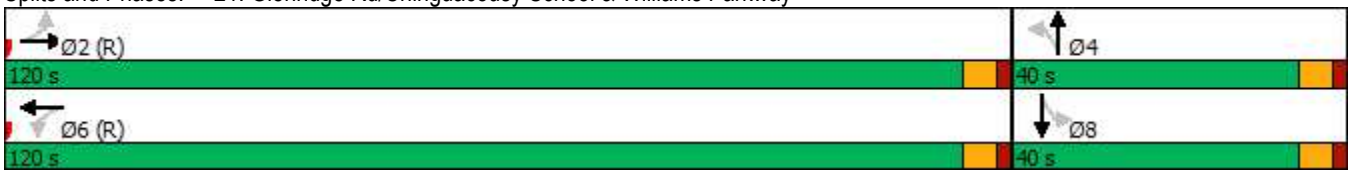
Timing Plan: PM

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	16	733	33	18	1016	2	34	0	9	8	1	8
Future Volume (vph)	16	733	33	18	1016	2	34	0	9	8	1	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	30.0		0.0	25.0		0.0	0.0		0.0	30.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	30.0			20.0			2.5			2.5		
Satd. Flow (prot)	1217	3510	0	1560	3537	0	0	1746	0	0	1548	0
Flt Permitted	0.239			0.327				0.760			0.880	
Satd. Flow (perm)	303	3510	0	533	3537	0	0	1369	0	0	1390	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		7						20			9	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		303.2			336.9			195.5			69.4	
Travel Time (s)		21.8			24.3			14.1			5.0	
Confl. Peds. (#/hr)	16		7	7		16	6		5	5		6
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	50%	3%	6%	17%	3%	100%	0%	0%	11%	13%	0%	13%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	17	833	0	20	1106	0	0	47	0	0	19	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Detector Phase	2	2		6	6		4	4		8	8	
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		8.0	8.0		8.0	8.0	
Minimum Split (s)	29.0	29.0		29.0	29.0		36.0	36.0		36.0	36.0	
Total Split (s)	120.0	120.0		120.0	120.0		40.0	40.0		40.0	40.0	
Total Split (%)	75.0%	75.0%		75.0%	75.0%		25.0%	25.0%		25.0%	25.0%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0			6.0			6.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	C-Max	C-Max		C-Max	C-Max		None	None		None	None	
Act Effct Green (s)	130.7	130.7		130.7	130.7			21.3			21.3	
Actuated g/C Ratio	0.82	0.82		0.82	0.82			0.13			0.13	
v/c Ratio	0.07	0.29		0.05	0.38			0.24			0.10	
Control Delay	6.3	5.4		8.4	8.3			38.6			36.6	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	6.3	5.4		8.4	8.3			38.6			36.6	
LOS	A	A		A	A			D			D	
Approach Delay		5.5			8.3			38.6			36.6	
Approach LOS		A			A			D			D	
Queue Length 50th (m)	1.4	43.3		1.5	58.5			7.2			2.7	
Queue Length 95th (m)	3.9	51.8		7.3	126.1			19.4			10.5	
Internal Link Dist (m)		279.2			312.9			171.5			45.4	
Turn Bay Length (m)	30.0			25.0								

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Base Capacity (vph)	247	2868		435	2888			306			302	
Starvation Cap Reductn	0	0		0	0			0			0	
Spillback Cap Reductn	0	0		0	0			0			0	
Storage Cap Reductn	0	0		0	0			0			0	
Reduced v/c Ratio	0.07	0.29		0.05	0.38			0.15			0.06	

Intersection Summary			
Area Type:	Other		
Cycle Length: 160			
Actuated Cycle Length: 160			
Offset: 16 (10%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green			
Natural Cycle: 65			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.38			
Intersection Signal Delay: 8.1		Intersection LOS: A	
Intersection Capacity Utilization 48.1%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 21: Glenridge Rd/Chinguacousy School & Williams Parkway



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	16	733	33	18	1016	2	34	0	9	8	1	8
Future Volume (vph)	16	733	33	18	1016	2	34	0	9	8	1	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0			6.0			6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			0.99	
Flpb, ped/bikes	0.99	1.00		0.99	1.00			0.99			1.00	
Frt	1.00	0.99		1.00	1.00			0.97			0.94	
Flt Protected	0.95	1.00		0.95	1.00			0.96			0.98	
Satd. Flow (prot)	1203	3509		1546	3536			1734			1543	
Flt Permitted	0.24	1.00		0.33	1.00			0.76			0.88	
Satd. Flow (perm)	303	3509		532	3536			1370			1390	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	17	797	36	20	1104	2	37	0	10	9	1	9
RTOR Reduction (vph)	0	1	0	0	0	0	0	18	0	0	8	0
Lane Group Flow (vph)	17	832	0	20	1106	0	0	29	0	0	11	0
Confl. Peds. (#/hr)	16		7	7		16	6		5	5		6
Heavy Vehicles (%)	50%	3%	6%	17%	3%	100%	0%	0%	11%	13%	0%	13%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	128.3	128.3		128.3	128.3			19.7			19.7	
Effective Green, g (s)	128.3	128.3		128.3	128.3			19.7			19.7	
Actuated g/C Ratio	0.80	0.80		0.80	0.80			0.12			0.12	
Clearance Time (s)	6.0	6.0		6.0	6.0			6.0			6.0	
Vehicle Extension (s)	5.0	5.0		5.0	5.0			5.0			5.0	
Lane Grp Cap (vph)	242	2813		426	2835			168			171	
v/s Ratio Prot		0.24			c0.31							
v/s Ratio Perm	0.06			0.04				c0.02			0.01	
v/c Ratio	0.07	0.30		0.05	0.39			0.18			0.06	
Uniform Delay, d1	3.3	4.1		3.3	4.6			62.9			62.0	
Progression Factor	1.00	1.00		1.50	1.36			1.00			1.00	
Incremental Delay, d2	0.6	0.3		0.2	0.4			1.0			0.3	
Delay (s)	3.9	4.4		5.1	6.6			63.9			62.3	
Level of Service	A	A		A	A			E			E	
Approach Delay (s)		4.4			6.6			63.9			62.3	
Approach LOS		A			A			E			E	

Intersection Summary			
HCM 2000 Control Delay	7.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.36		
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	48.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

20: Grenoble Blvd/Jordan Blvd & Williams Parkway

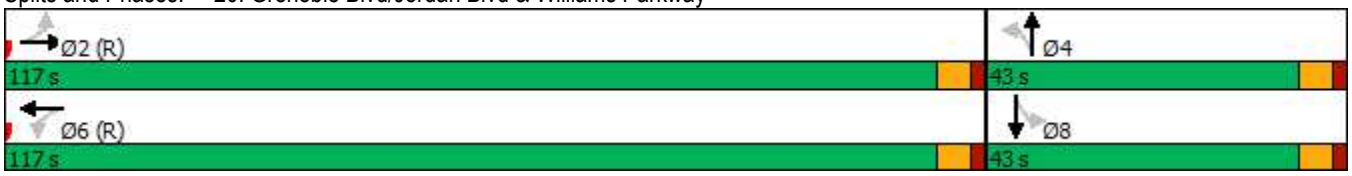
Timing Plan: PM

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	97	592	54	31	942	70	44	64	27	28	34	66
Future Volume (vph)	97	592	54	31	942	70	44	64	27	28	34	66
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	30.0		0.0	30.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	30.0			30.0			2.5			2.5		
Satd. Flow (prot)	1772	3480	0	1722	3476	0	0	3157	0	0	3177	0
Flt Permitted	0.242			0.379				0.805			0.843	
Satd. Flow (perm)	451	3480	0	685	3476	0	0	2575	0	0	2701	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		14			11			18			72	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		336.9			330.2			104.7			103.8	
Travel Time (s)		24.3			23.8			7.5			7.5	
Confl. Peds. (#/hr)	8		7	7		8	8		11	11		8
Confl. Bikes (#/hr)												1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	7%	6%	4%	1%	16%	5%	11%	4%	6%	2%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	105	702	0	34	1100	0	0	147	0	0	139	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Detector Phase	2	2		6	6		4	4		8	8	
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		8.0	8.0		8.0	8.0	
Minimum Split (s)	39.0	39.0		39.0	39.0		42.0	42.0		42.0	42.0	
Total Split (s)	117.0	117.0		117.0	117.0		43.0	43.0		43.0	43.0	
Total Split (%)	73.1%	73.1%		73.1%	73.1%		26.9%	26.9%		26.9%	26.9%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0			6.0			6.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	C-Max	C-Max		C-Max	C-Max		None	None		None	None	
Act Effct Green (s)	129.4	129.4		129.4	129.4			18.6			18.6	
Actuated g/C Ratio	0.81	0.81		0.81	0.81			0.12			0.12	
v/c Ratio	0.29	0.25		0.06	0.39			0.47			0.37	
Control Delay	11.3	5.7		5.0	5.5			60.8			32.2	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	11.3	5.7		5.0	5.5			60.8			32.2	
LOS	B	A		A	A			E			C	
Approach Delay		6.4			5.5			60.8			32.2	
Approach LOS		A			A			E			C	
Queue Length 50th (m)	6.3	20.6		1.6	37.6			20.9			10.5	
Queue Length 95th (m)	33.1	59.5		7.0	87.2			28.5			18.7	
Internal Link Dist (m)		312.9			306.2			80.7			79.8	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (m)	30.0			30.0								
Base Capacity (vph)	364	2818		554	2814			609			679	
Starvation Cap Reductn	0	0		0	0			0			0	
Spillback Cap Reductn	0	0		0	0			0			0	
Storage Cap Reductn	0	0		0	0			0			0	
Reduced v/c Ratio	0.29	0.25		0.06	0.39			0.24			0.20	

Intersection Summary			
Area Type:	Other		
Cycle Length: 160			
Actuated Cycle Length: 160			
Offset: 98 (61%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green			
Natural Cycle: 85			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.47			
Intersection Signal Delay: 11.1		Intersection LOS: B	
Intersection Capacity Utilization 65.5%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 20: Grenoble Blvd/Jordan Blvd & Williams Parkway



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	97	592	54	31	942	70	44	64	27	28	34	66
Future Volume (vph)	97	592	54	31	942	70	44	64	27	28	34	66
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0			6.0			6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			0.95			0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			0.99			0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	0.99		1.00	0.99			0.97			0.92	
Flt Protected	0.95	1.00		0.95	1.00			0.98			0.99	
Satd. Flow (prot)	1768	3481		1715	3475			3149			3169	
Flt Permitted	0.24	1.00		0.38	1.00			0.80			0.84	
Satd. Flow (perm)	451	3481		684	3475			2575			2700	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	105	643	59	34	1024	76	48	70	29	30	37	72
RTOR Reduction (vph)	0	3	0	0	2	0	0	16	0	0	64	0
Lane Group Flow (vph)	105	699	0	34	1098	0	0	131	0	0	75	0
Confl. Peds. (#/hr)	8		7	7		8	8		11	11		8
Confl. Bikes (#/hr)												1
Heavy Vehicles (%)	3%	3%	7%	6%	4%	1%	16%	5%	11%	4%	6%	2%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	129.4	129.4		129.4	129.4			18.6			18.6	
Effective Green, g (s)	129.4	129.4		129.4	129.4			18.6			18.6	
Actuated g/C Ratio	0.81	0.81		0.81	0.81			0.12			0.12	
Clearance Time (s)	6.0	6.0		6.0	6.0			6.0			6.0	
Vehicle Extension (s)	5.0	5.0		5.0	5.0			5.0			5.0	
Lane Grp Cap (vph)	364	2815		553	2810			299			313	
v/s Ratio Prot		0.20			c0.32							
v/s Ratio Perm	0.23			0.05				c0.05			0.03	
v/c Ratio	0.29	0.25		0.06	0.39			0.44			0.24	
Uniform Delay, d1	3.8	3.7		3.1	4.3			65.8			64.3	
Progression Factor	1.64	1.27		1.00	1.00			1.00			1.00	
Incremental Delay, d2	1.9	0.2		0.2	0.4			2.1			0.8	
Delay (s)	8.2	4.8		3.3	4.7			68.0			65.1	
Level of Service	A	A		A	A			E			E	
Approach Delay (s)		5.3			4.6			68.0			65.1	
Approach LOS		A			A			E			E	

Intersection Summary			
HCM 2000 Control Delay	12.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	65.5%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	640	15	18	1039	10	20
Future Volume (vph)	640	15	18	1039	10	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)		0.0	30.0		0.0	0.0
Storage Lanes		0	1		1	0
Taper Length (m)			30.0		2.5	
Satd. Flow (prot)	3525	0	1644	3544	1628	0
Flt Permitted			0.379		0.984	
Satd. Flow (perm)	3525	0	646	3544	1626	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	4				22	
Link Speed (k/h)	60			60	50	
Link Distance (m)	330.2			415.5	211.3	
Travel Time (s)	19.8			24.9	15.2	
Confl. Peds. (#/hr)		15	15		2	12
Confl. Bikes (#/hr)		1				
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	7%	11%	3%	0%	5%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	712	0	20	1129	33	0
Turn Type	NA		Perm	NA	Prot	
Protected Phases	2			6	8	
Permitted Phases			6			
Detector Phase	2		6	6	8	
Switch Phase						
Minimum Initial (s)	4.0		4.0	4.0	4.0	
Minimum Split (s)	33.0		33.0	33.0	33.0	
Total Split (s)	126.0		126.0	126.0	34.0	
Total Split (%)	78.8%		78.8%	78.8%	21.3%	
Yellow Time (s)	4.0		4.0	4.0	4.0	
All-Red Time (s)	2.0		2.0	2.0	2.0	
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	
Total Lost Time (s)	6.0		6.0	6.0	6.0	
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	Max		Max	Max	None	
Act Effct Green (s)	122.3		122.3	122.3	14.8	
Actuated g/C Ratio	0.84		0.84	0.84	0.10	
v/c Ratio	0.24		0.04	0.38	0.18	
Control Delay	3.8		4.3	4.5	30.2	
Queue Delay	0.0		0.0	0.0	0.0	
Total Delay	3.8		4.3	4.5	30.2	
LOS	A		A	A	C	
Approach Delay	3.8			4.5	30.2	
Approach LOS	A			A	C	
Queue Length 50th (m)	14.2		0.6	26.5	3.0	
Queue Length 95th (m)	39.5		3.8	71.2	13.2	
Internal Link Dist (m)	306.2			391.5	187.3	

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Turn Bay Length (m)			30.0			
Base Capacity (vph)	2978		545	2994	334	
Starvation Cap Reductn	0		0	0	0	
Spillback Cap Reductn	0		0	0	0	
Storage Cap Reductn	0		0	0	0	
Reduced v/c Ratio	0.24		0.04	0.38	0.10	

Intersection Summary			
Area Type:	Other		
Cycle Length: 160			
Actuated Cycle Length: 144.8			
Natural Cycle: 70			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.38			
Intersection Signal Delay: 4.7		Intersection LOS: A	
Intersection Capacity Utilization 48.4%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 27: Graymar Rd & Williams Parkway

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	640	15	18	1039	10	20
Future Volume (vph)	640	15	18	1039	10	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0		6.0	6.0	6.0	
Lane Util. Factor	0.95		1.00	0.95	1.00	
Frpb, ped/bikes	1.00		1.00	1.00	0.98	
Flpb, ped/bikes	1.00		0.99	1.00	1.00	
Frt	1.00		1.00	1.00	0.91	
Flt Protected	1.00		0.95	1.00	0.98	
Satd. Flow (prot)	3524		1620	3544	1630	
Flt Permitted	1.00		0.38	1.00	0.98	
Satd. Flow (perm)	3524		646	3544	1630	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	696	16	20	1129	11	22
RTOR Reduction (vph)	1	0	0	0	20	0
Lane Group Flow (vph)	711	0	20	1129	13	0
Confl. Peds. (#/hr)		15	15		2	12
Confl. Bikes (#/hr)		1				
Heavy Vehicles (%)	3%	7%	11%	3%	0%	5%
Turn Type	NA		Perm	NA	Prot	
Protected Phases	2			6	8	
Permitted Phases			6			
Actuated Green, G (s)	120.9		120.9	120.9	13.1	
Effective Green, g (s)	120.9		120.9	120.9	13.1	
Actuated g/C Ratio	0.83		0.83	0.83	0.09	
Clearance Time (s)	6.0		6.0	6.0	6.0	
Vehicle Extension (s)	5.0		5.0	5.0	5.0	
Lane Grp Cap (vph)	2918		534	2934	146	
v/s Ratio Prot	0.20			c0.32	c0.01	
v/s Ratio Perm			0.03			
v/c Ratio	0.24		0.04	0.38	0.09	
Uniform Delay, d1	2.7		2.2	3.2	61.0	
Progression Factor	1.00		1.00	1.00	1.00	
Incremental Delay, d2	0.2		0.1	0.4	0.6	
Delay (s)	2.9		2.4	3.5	61.5	
Level of Service	A		A	A	E	
Approach Delay (s)	2.9			3.5	61.5	
Approach LOS	A			A	E	

Intersection Summary			
HCM 2000 Control Delay	4.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.36		
Actuated Cycle Length (s)	146.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	48.4%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

26: Torbram Rd./Torbram Rd & Williams Parkway

Timing Plan: PM

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	78	515	88	32	731	257	153	1003	77	143	646	87
Future Volume (vph)	78	515	88	32	731	257	153	1003	77	143	646	87
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	30.0		30.0	45.0		0.0	40.0		40.0	60.0		0.0
Storage Lanes	1		1	1		1	1		1	1		0
Taper Length (m)	30.0			45.0			25.0			55.0		
Satd. Flow (prot)	1772	3544	1633	1674	3544	1633	1772	3544	1570	1772	3412	0
Flt Permitted	0.218			0.256			0.350			0.147		
Satd. Flow (perm)	403	3544	1574	448	3544	1558	642	3544	1544	274	3412	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			75			156			116		13	
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		415.5			219.7			183.1			148.5	
Travel Time (s)		24.9			13.2			11.0			8.9	
Confl. Peds. (#/hr)	22		16	16		22	37		14	14		37
Confl. Bikes (#/hr)						1			1			2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	0%	9%	3%	0%	3%	3%	4%	3%	4%	6%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	85	560	96	35	795	279	166	1090	84	155	797	0
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	Perm	NA	Free	pm+pt	NA	
Protected Phases		8		7	4			2		1	6	
Permitted Phases	8		8	4		4	2		Free	6		
Detector Phase	8	8	8	7	4	4	2	2		1	6	
Switch Phase												
Minimum Initial (s)	8.0	8.0	8.0	5.0	8.0	8.0	8.0	8.0		5.0	8.0	
Minimum Split (s)	37.0	37.0	37.0	10.0	37.0	37.0	39.0	39.0		10.0	39.0	
Total Split (s)	67.0	67.0	67.0	10.0	77.0	77.0	70.0	70.0		13.0	83.0	
Total Split (%)	41.9%	41.9%	41.9%	6.3%	48.1%	48.1%	43.8%	43.8%		8.1%	51.9%	
Yellow Time (s)	4.0	4.0	4.0	3.0	4.0	4.0	4.0	4.0		3.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	1.0	2.0	2.0	2.0	2.0		1.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0	4.0	6.0	6.0	6.0	6.0		4.0	6.0	
Lead/Lag	Lag	Lag	Lag	Lead			Lag	Lag		Lead		
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None	None	Max	Max		None	Max	
Act Effct Green (s)	36.3	36.3	36.3	44.0	42.0	42.0	64.4	64.4	131.5	79.4	77.4	
Actuated g/C Ratio	0.28	0.28	0.28	0.33	0.32	0.32	0.49	0.49	1.00	0.60	0.59	
v/c Ratio	0.77	0.57	0.20	0.17	0.70	0.46	0.53	0.63	0.05	0.58	0.40	
Control Delay	85.9	43.7	12.6	30.1	42.4	16.8	33.5	28.2	0.1	22.5	16.2	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	85.9	43.7	12.6	30.1	42.4	16.8	33.5	28.2	0.1	22.5	16.2	
LOS	F	D	B	C	D	B	C	C	A	C	B	
Approach Delay		44.5			35.6			27.1			17.2	
Approach LOS		D			D			C			B	
Queue Length 50th (m)	21.2	68.7	4.2	6.1	94.5	23.9	28.4	104.9	0.0	16.1	53.3	
Queue Length 95th (m)	#47.0	86.4	17.2	13.4	114.8	47.4	64.5	161.9	0.0	35.2	90.1	
Internal Link Dist (m)		391.5			195.7			159.1			124.5	

26: Torbram Rd./Torbram Rd & Williams Parkway

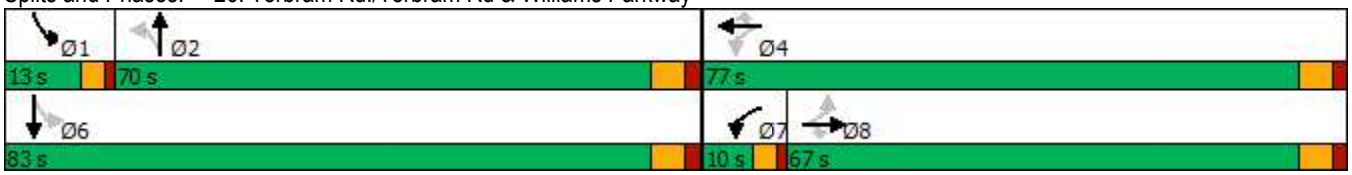
Timing Plan: PM

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (m)	30.0		30.0	45.0			40.0		40.0	60.0		
Base Capacity (vph)	187	1653	774	206	1924	917	314	1734	1544	268	2014	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.45	0.34	0.12	0.17	0.41	0.30	0.53	0.63	0.05	0.58	0.40	

Intersection Summary

Area Type: Other
Cycle Length: 160
Actuated Cycle Length: 131.5
Natural Cycle: 100
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.77
Intersection Signal Delay: 30.2 Intersection LOS: C
Intersection Capacity Utilization 85.8% ICU Level of Service E
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 26: Torbram Rd./Torbram Rd & Williams Parkway



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	78	515	88	32	731	257	153	1003	77	143	646	87
Future Volume (vph)	78	515	88	32	731	257	153	1003	77	143	646	87
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	4.0	6.0	6.0	6.0	6.0	4.0	4.0	6.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.97	1.00	1.00	0.96	1.00	1.00	0.98	1.00	0.99	
Flpb, ped/bikes	0.99	1.00	1.00	1.00	1.00	1.00	0.99	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	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1759	3544	1580	1672	3544	1567	1746	3544	1544	1772	3416	
Flt Permitted	0.22	1.00	1.00	0.26	1.00	1.00	0.35	1.00	1.00	0.15	1.00	
Satd. Flow (perm)	404	3544	1580	450	3544	1567	644	3544	1544	274	3416	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	85	560	96	35	795	279	166	1090	84	155	702	95
RTOR Reduction (vph)	0	0	55	0	0	105	0	0	0	0	5	0
Lane Group Flow (vph)	85	560	41	35	795	174	166	1090	84	155	792	0
Confl. Peds. (#/hr)	22		16	16		22	37		14	14		37
Confl. Bikes (#/hr)						1			1			2
Heavy Vehicles (%)	3%	3%	0%	9%	3%	0%	3%	3%	4%	3%	4%	6%
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	Perm	NA	Free	pm+pt	NA	
Protected Phases		8		7	4			2		1	6	
Permitted Phases	8		8	4		4	2		Free	6		
Actuated Green, G (s)	36.2	36.2	36.2	43.6	43.6	43.6	64.4	64.4	133.0	77.4	77.4	
Effective Green, g (s)	36.2	36.2	36.2	43.6	43.6	43.6	64.4	64.4	133.0	77.4	77.4	
Actuated g/C Ratio	0.27	0.27	0.27	0.33	0.33	0.33	0.48	0.48	1.00	0.58	0.58	
Clearance Time (s)	6.0	6.0	6.0	4.0	6.0	6.0	6.0	6.0		4.0	6.0	
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	109	964	430	178	1161	513	311	1716	1544	260	1987	
v/s Ratio Prot		0.16		0.01	c0.22			c0.31		c0.04	0.23	
v/s Ratio Perm	c0.21		0.03	0.06		0.11	0.26		0.05	0.31		
v/c Ratio	0.78	0.58	0.10	0.20	0.68	0.34	0.53	0.64	0.05	0.60	0.40	
Uniform Delay, d1	44.7	41.8	36.2	31.8	38.7	33.8	23.9	25.5	0.0	17.7	15.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	32.9	1.4	0.2	1.1	2.2	0.8	6.4	1.8	0.1	5.5	0.6	
Delay (s)	77.6	43.2	36.4	33.0	40.9	34.6	30.3	27.4	0.1	23.2	15.7	
Level of Service	E	D	D	C	D	C	C	C	A	C	B	
Approach Delay (s)		46.3			39.1			26.0			16.9	
Approach LOS		D			D			C			B	

Intersection Summary			
HCM 2000 Control Delay	31.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	133.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	85.8%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

APPENDIX D

MMLOS CALCULATION SHEETS

PARSONS

MMLOS – Existing Conditions

.evel of Service - Intersections Form

Consultant	**Parsons Inc.**	**Project**	**478286**
Scenario	**liams Parkway - Existing Conditions**	**Date**	**Jan-23**
Comments	**Dixie Road to Bramalea Road**		
	AM PEAK (Ped Delay LOS/Transit LOS/Auto LOS)		**Table 01**

INTERSECTIONS		**Williams Pkwy & Dixie Rd.**				**Williams Pkwy & Mackay St.**				**Williams Pkwy & Bramalea Rd.**			
	Crossing Side	**NORTH**	**SOUTH**	**EAST**	**WEST**	**NORTH**	**SOUTH**	**EAST**	**WEST**	**NORTH**	**SOUTH**	**EAST**	**WEST**
Pedestrian	Lanes	6	5	5	5	3	0 - 2	5	5	5	5	5	5
	Median	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m
	Conflicting Left Turns	Permissive	Protected/ Permissive	Protected/ Permissive	Protected/ Permissive	Permissive	Permissive	Permissive	Permissive	Protected/ Permissive	Protected/ Permissive	Protected/ Permissive	Protected/ Permissive
	Conflicting Right Turns	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control
	Right Turns on Red (RToR) ?	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed
	Ped Signal Leading Interval?	No	No	No	No	No	No	No	No	No	No	No	No
	Right Turn Channel	No Channel	No Channel	No Channel	No Channel	No Channel	No Channel	No Channel	No Channel	No Channel	No Channel	No Channel	No Channel
	Corner Radius	15-25m	15-25m	10-15m	15-25m	10-15m	5-10m	10-15m	5-10m	15-25m	15-25m	15-25m	15-25m
	Crosswalk Type	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings
	PETSI Score	**21**	**38**	**40**	**38**	**73**	**89**	**40**	**41**	**38**	**38**	**38**	**38**
	Ped. Exposure to Traffic LoS	**F**	**E**	**E**	**E**	**C**	**B**	**E**	**E**	**E**	**E**	**E**	**E**
	Cycle Length	160	160	160	160	160	160	160	160	160	160	160	160
	Effective Walk Time	51	61	33	33	35	35	79	79	43	43	44	44
	Average Pedestrian Delay	**37**	**31**	**50**	**50**	**49**	**49**	**21**	**21**	**43**	**43**	**42**	**42**
	Pedestrian Delay LoS	**D**	**D**	**E**	**E**	**E**	**E**	**C**	**C**	**E**	**E**	**E**	**E**
	Level of Service	**F**	**E**	**E**	**E**	**E**	**E**	**E**	**E**	**E**	**E**	**E**	**E**
		F				**E**				**E**			
	Approach From	**NORTH**	**SOUTH**	**EAST**	**WEST**	**NORTH**	**SOUTH**	**EAST**	**WEST**	**NORTH**	**SOUTH**	**EAST**	**WEST**
Bicycle	Bicycle Lane Arrangement on Approach	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic
	Right Turn Lane Configuration	≤ 50 m	> 50 m	> 50 m	≤ 50 m	> 50 m	≤ 50 m	> 50 m	> 50 m	> 50 m	> 50 m	> 50 m	> 50 m
	Right Turning Speed	≤ 25 km/h	≤ 25 km/h	≤ 25 km/h	≤ 25 km/h	≤ 25 km/h	≤ 25 km/h	≤ 25 km/h	≤ 25 km/h	≤ 25 km/h	≤ 25 km/h	≤ 25 km/h	≤ 25 km/h
	Cyclist relative to RT motorists	**D**	**F**	**F**	**D**	**F**	**D**	**F**	**F**	**F**	**F**	**F**	**F**
	Separated or Mixed Traffic	**Mixed Traffic**	**Mixed Traffic**	**Mixed Traffic**	**Mixed Traffic**	**Mixed Traffic**	**Mixed Traffic**	**Mixed Traffic**	**Mixed Traffic**	**Mixed Traffic**	**Mixed Traffic**	**Mixed Traffic**	**Mixed Traffic**
	Left Turn Approach	≥ 2 lanes crossed	≥ 2 lanes crossed	≥ 2 lanes crossed	≥ 2 lanes crossed	One lane crossed	No lane crossed	≥ 2 lanes crossed	≥ 2 lanes crossed	≥ 2 lanes crossed	≥ 2 lanes crossed	≥ 2 lanes crossed	≥ 2 lanes crossed
	Operating Speed	≥ 60 km/h	≥ 60 km/h	≥ 60 km/h	≥ 60 km/h	> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h	≤ 40 km/h	≤ 40 km/h
	Left Turning Cyclist	**F**	**F**	**F**	**F**	**D**	**B**	**E**	**E**	**E**	**E**	**D**	**D**
	Level of Service	**F**	**F**	**F**	**F**	**F**	**D**	**F**	**F**	**F**	**F**	**F**	**F**
		F				**F**				**F**			
Transit	Average Signal Delay	> 40 sec	> 40 sec	> 40 sec	> 40 sec	> 40 sec	> 40 sec	> 40 sec	> 40 sec	> 40 sec	> 40 sec	> 40 sec	> 40 sec
	Level of Service	**F**	**F**	**F**	**F**	**F**	**F**	**F**	**F**	**F**	**F**	**F**	**F**
		F				**F**				**F**			
Truck	Effective Corner Radius	> 15 m	> 15 m	10 - 15 m	> 15 m	10 - 15 m	< 10 m	10 - 15 m	< 10 m	> 15 m	> 15 m	> 15 m	> 15 m
	Number of Receiving Lanes on Departure from Intersection	≥ 2	≥ 2	≥ 2	≥ 2	≥ 2	≥ 2	≥ 2	1	≥ 2	≥ 2	≥ 2	≥ 2
	Level of Service	**A**	**A**	**B**	**A**	**B**	**D**	**B**	**F**	**A**	**A**	**A**	**A**
		B				**F**				**A**			
Auto	Volume to Capacity Ratio	0.71 - 0.80				0.0 - 0.60				0.61 - 0.70			
	Level of Service	**C**				**A**				**B**			

Multi-Modal Level of Service - Intersections Form

Consultant	**Parsons Inc.**	**Project**	**478286**
Scenario	**Williams Parkway - Existing Conditions**	**Date**	**Jan-23**
Comments	**Glenridge Road to Torbram Road**		
	AM PEAK (Ped Delay LOS/Transit LOS/Auto LOS)		**Table 02**

INTERSECTIONS		**Williams Pkwy & Glenridge Rd.**				**Williams Pkwy & Grenoble Blvd.**				**Williams Pkwy & Graymar Rd.**			
	Crossing Side	**NORTH**	**SOUTH**	**EAST**	**WEST**	**NORTH**	**SOUTH**	**EAST**	**WEST**	**NORTH**	**SOUTH**	**EAST**	**WEST**
Pedestrian	Lanes	0 - 2	0 - 2	5	5	4	4	5	5		0 - 2	5	4
	Median	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m		No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m
	Conflicting Left Turns	Permissive	Permissive	Permissive	Permissive	Permissive	Permissive	Permissive	Permissive		Protected	Permissive	No left turn / Prohib.
	Conflicting Right Turns	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control		Permissive or yield control	No right turn	Permissive or yield control
	Right Turns on Red (RToR) ?	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed		RTOR allowed	RTOR allowed	RTOR allowed
	Ped Signal Leading Interval?	No	No	No	No	No	No	No	No		No	No	No
	Right Turn Channel	No Channel	No Channel	No Channel	No Channel	No Channel	No Channel	No Channel	No Channel		No Channel	No Channel	No Channel
	Corner Radius	10-15m	10-15m	10-15m	10-15m	10-15m	10-15m	10-15m	10-15m		10-15m	0-3m	10-15m
	Crosswalk Type	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings		Zebra stripe hi-vis markings	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings
	PETSI Score	**88**	**88**	**40**	**40**	**56**	**56**	**40**	**40**		**96**	**48**	**64**
	Ped. Exposure to Traffic LoS	**B**	**B**	**E**	**E**	**D**	**D**	**E**	**E**	**-**	**A**	**D**	**C**
	Cycle Length	160	160	160	160	160	160	160	160		160	160	160
	Effective Walk Time	26	26	98	98	20	20	83	83		20	98	98
	Average Pedestrian Delay	**56**	**56**	**12**	**12**	**61**	**61**	**19**	**19**		**61**	**12**	**12**
	Pedestrian Delay LoS	**E**	**E**	**B**	**B**	**F**	**F**	**B**	**B**	**-**	**F**	**B**	**B**
	Level of Service	**E**	**E**	**E**	**E**	**F**	**F**	**E**	**E**	**-**	**F**	**D**	**C**
		E				**F**				**F**			
Approach From		**NORTH**	**SOUTH**	**EAST**	**WEST**	**NORTH**	**SOUTH**	**EAST**	**WEST**	**NORTH**	**SOUTH**	**EAST**	**WEST**
Bicycle	Bicycle Lane Arrangement on Approach	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic		Mixed Traffic	Mixed Traffic	Mixed Traffic
	Right Turn Lane Configuration	≤ 50 m	> 50 m	> 50 m	> 50 m	> 50 m	≤ 50 m	> 50 m	> 50 m		≤ 50 m	≤ 50 m	≤ 50 m
	Right Turning Speed	≤ 25 km/h	≤ 25 km/h	≤ 25 km/h	≤ 25 km/h	≤ 25 km/h	≤ 25 km/h	≤ 25 km/h	≤ 25 km/h		≤ 25 km/h	≤ 25 km/h	≤ 25 km/h
	Cyclist relative to RT motorists	**D**	**F**	**F**	**F**	**F**	**D**	**F**	**F**	**-**	**D**	**D**	**D**
	Separated or Mixed Traffic	**Mixed Traffic**	**Mixed Traffic**	**Mixed Traffic**	**Mixed Traffic**	**Mixed Traffic**	**Mixed Traffic**	**Mixed Traffic**	**Mixed Traffic**	**-**	**Mixed Traffic**	**Mixed Traffic**	**Mixed Traffic**
	Left Turn Approach	One lane crossed	One lane crossed	≥ 2 lanes crossed	≥ 2 lanes crossed	One lane crossed	One lane crossed	≥ 2 lanes crossed	≥ 2 lanes crossed		No lane crossed	One lane crossed	No lane crossed
	Operating Speed	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h		≥ 60 km/h	≥ 60 km/h	≥ 60 km/h
	Left Turning Cyclist	**B**	**B**	**D**	**D**	**B**	**B**	**E**	**E**	**-**	**C**	**F**	**C**
	Level of Service	**D**	**F**	**F**	**F**	**F**	**D**	**F**	**F**	**-**	**D**	**F**	**D**
		F				**F**				**F**			
Transit	Average Signal Delay	> 40 sec	> 40 sec	> 40 sec	> 40 sec	> 40 sec	> 40 sec	> 40 sec	> 40 sec		> 40 sec	> 40 sec	> 40 sec
	Level of Service	**F**	**F**	**F**	**F**	**F**	**F**	**F**	**F**	**-**	**F**	**F**	**F**
		F				**F**				**F**			
Truck	Effective Corner Radius	10 - 15 m	10 - 15 m	10 - 15 m	10 - 15 m	10 - 15 m	10 - 15 m	10 - 15 m	10 - 15 m		10 - 15 m	< 10 m	10 - 15 m
	Number of Receiving Lanes on Departure from Intersection	≥ 2	≥ 2	1	1	≥ 2	≥ 2	≥ 2	≥ 2		≥ 2		1
	Level of Service	**B**	**B**	**E**	**E**	**B**	**B**	**B**	**B**	**-**	**B**	**-**	**E**
		E				**B**				**E**			
Auto	Volume to Capacity Ratio	0.0 - 0.60				0.0 - 0.60				0.0 - 0.60			
	Level of Service	**A**				**A**				**A**			

Multi-Modal Level of Service - Intersections Form

Consultant	**Parsons Inc.**	**Project**	**478286**
Scenario	**Williams Parkway - Existing Conditions**	**Date**	**Jan-23**
Comments	**Torbram Road**		
	AM PEAK (Ped Delay LOS/Transit LOS/Auto LOS)		**Table 03**

	INTERSECTIONS	**Williams Pkwy & Torbram Rd.**												
	Crossing Side	**NORTH**	**SOUTH**	**EAST**	**WEST**	**NORTH**	**SOUTH**	**EAST**	**WEST**	**NORTH**	**SOUTH**	**EAST**	**WEST**
Pedestrian	Lanes	5	6	7	6								
	Median	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m								
	Conflicting Left Turns	Protected/ Permissive	Permissive	Protected/ Permissive	Permissive								
	Conflicting Right Turns	Permissive or yield control	Protected	Permissive or yield control	Permissive or yield control								
	Right Turns on Red (RToR) ?	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed								
	Ped Signal Leading Interval?	No	No	No	No								
	Right Turn Channel	No Channel	Conventional with Receiving Lane	No Channel	No Channel								
	Corner Radius	15-25m	15-25m	15-25m	15-25m								
	Crosswalk Type	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings								
	PETSI Score	**38**	**27**	**5**	**21**								
	Ped. Exposure to Traffic LoS	**E**	**F**	**F**	**F**	-	-	-	-	-	-	-	-
	Cycle Length	160	160	160	160								
	Effective Walk Time	63	53	45	35								
	Average Pedestrian Delay	**29**	**36**	**41**	**49**								
	Pedestrian Delay LoS	**C**	**D**	**E**	**E**	-	-	-	-	-	-	-	-
	Level of Service	**E**	**F**	**F**	**F**	-	-	-	-	-	-	-	-
		F				-				-			
	Approach From	**NORTH**	**SOUTH**	**EAST**	**WEST**	**NORTH**	**SOUTH**	**EAST**	**WEST**	**NORTH**	**SOUTH**	**EAST**	**WEST**
Bicycle	Bicycle Lane Arrangement on Approach	Mixed Traffic	Mixed Traffic	Mixed Traffic	Curb Bike Lane, Cycletrack or MUP								
	Right Turn Lane Configuration	> 50 m	≤ 50 m	> 50 m	Not Applicable								
	Right Turning Speed	≤ 25 km/h	≤ 25 km/h	≤ 25 km/h	≤ 25 km/h								
	Cyclist relative to RT motorists	**F**	**D**	**F**	**Not Applicable**	-	-	-	-	-	-	-	-
	Separated or Mixed Traffic	**Mixed Traffic**	**Mixed Traffic**	**Mixed Traffic**	**Separated**	-	-	-	-	-	-	-	-
	Left Turn Approach	One lane crossed	≥ 2 lanes crossed	≥ 2 lanes crossed	Other LT config								
	Operating Speed	≥ 60 km/h	≥ 60 km/h	≥ 60 km/h	≥ 60 km/h								
	Left Turning Cyclist	**F**	**F**	**F**	**F**	-	-	-	-	-	-	-	-
	Level of Service	**F**	**F**	**F**	**F**	-	-	-	-	-	-	-	-
		F				-				-			
Transit	Average Signal Delay	> 40 sec	> 40 sec	> 40 sec	> 40 sec								
	Level of Service	**F**	**F**	**F**	**F**	-	-	-	-	-	-	-	-
		F				-				-			
Truck	Effective Corner Radius	> 15 m	> 15 m	> 15 m	> 15 m								
	Number of Receiving Lanes on Departure from Intersection	≥ 2	≥ 2	≥ 2	≥ 2								
	Level of Service	**A**	**A**	**A**	**A**	-	-	-	-	-	-	-	-
		A				-				-			
Auto	Volume to Capacity Ratio	0.61 - 0.70											
	Level of Service	**B**				-				-			

Multi-Modal Level of Service - Intersections Form

Consultant	**Parsons Inc.**	**Project**	**478286**
Scenario	**Williams Parkway - Existing Conditions**	**Date**	**Jan-23**
Comments	**Dixie Road to Bramalea Road**		
	PM PEAK (Ped Delay LOS/Transit LOS/Auto LOS)		**Table 01**

INTERSECTIONS		**Williams Pkwy & Dixie Rd.**				**Williams Pkwy & Mackay St.**				**Williams Pkwy & Bramalea Rd.**			
	Crossing Side	**NORTH**	**SOUTH**	**EAST**	**WEST**	**NORTH**	**SOUTH**	**EAST**	**WEST**	**NORTH**	**SOUTH**	**EAST**	**WEST**
Pedestrian	Lanes	6	5	5	5	3	0 - 2	5	5	5	5	5	5
	Median	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m
	Conflicting Left Turns	Permissive	Protected/ Permissive	Protected/ Permissive	Protected/ Permissive	Permissive	Permissive	Permissive	Permissive	Protected/ Permissive	Protected/ Permissive	Protected/ Permissive	Protected/ Permissive
	Conflicting Right Turns	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control
	Right Turns on Red (RToR) ?	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed
	Ped Signal Leading Interval?	No	No	No	No	No	No	No	No	No	No	No	No
	Right Turn Channel	No Channel	No Channel	No Channel	No Channel	No Channel	No Channel	No Channel	No Channel	No Channel	No Channel	No Channel	No Channel
	Corner Radius	15-25m	15-25m	10-15m	15-25m	10-15m	5-10m	10-15m	5-10m	15-25m	15-25m	15-25m	15-25m
	Crosswalk Type	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings
	PETSI Score	**21**	**38**	**40**	**38**	**73**	**89**	**40**	**41**	**38**	**38**	**38**	**38**
	Ped. Exposure to Traffic LoS	**F**	**E**	**E**	**E**	**C**	**B**	**E**	**E**	**E**	**E**	**E**	**E**
	Cycle Length	160	160	160	160	160	160	160	160	160	160	160	160
	Effective Walk Time	40	55	35	35	20	20	94	94	45	45	42	42
	Average Pedestrian Delay	**45**	**34**	**49**	**49**	**61**	**61**	**14**	**14**	**41**	**41**	**44**	**44**
	Pedestrian Delay LoS	**E**	**D**	**E**	**E**	**F**	**F**	**B**	**B**	**E**	**E**	**E**	**E**
	Level of Service	**F**	**E**	**E**	**E**	**F**	**F**	**E**	**E**	**E**	**E**	**E**	**E**
		F				**F**				**E**			
	Approach From	**NORTH**	**SOUTH**	**EAST**	**WEST**	**NORTH**	**SOUTH**	**EAST**	**WEST**	**NORTH**	**SOUTH**	**EAST**	**WEST**
Bicycle	Bicycle Lane Arrangement on Approach	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic
	Right Turn Lane Configuration	≤ 50 m	> 50 m	> 50 m	≤ 50 m	> 50 m	≤ 50 m	> 50 m	> 50 m	> 50 m	> 50 m	> 50 m	> 50 m
	Right Turning Speed	≤ 25 km/h	≤ 25 km/h	≤ 25 km/h	≤ 25 km/h	≤ 25 km/h	≤ 25 km/h	≤ 25 km/h	≤ 25 km/h	≤ 25 km/h	≤ 25 km/h	≤ 25 km/h	≤ 25 km/h
	Cyclist relative to RT motorists	**D**	**F**	**F**	**D**	**F**	**D**	**F**	**F**	**F**	**F**	**F**	**F**
	Separated or Mixed Traffic	**Mixed Traffic**	**Mixed Traffic**	**Mixed Traffic**	**Mixed Traffic**	**Mixed Traffic**	**Mixed Traffic**	**Mixed Traffic**	**Mixed Traffic**	**Mixed Traffic**	**Mixed Traffic**	**Mixed Traffic**	**Mixed Traffic**
	Left Turn Approach	≥ 2 lanes crossed	≥ 2 lanes crossed	≥ 2 lanes crossed	≥ 2 lanes crossed	One lane crossed	No lane crossed	≥ 2 lanes crossed	≥ 2 lanes crossed	≥ 2 lanes crossed	≥ 2 lanes crossed	≥ 2 lanes crossed	≥ 2 lanes crossed
	Operating Speed	≥ 60 km/h	≥ 60 km/h	≥ 60 km/h	≥ 60 km/h	> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h	≤ 40 km/h	≤ 40 km/h
	Left Turning Cyclist	**F**	**F**	**F**	**F**	**D**	**B**	**E**	**E**	**E**	**E**	**D**	**D**
	Level of Service	**F**	**F**	**F**	**F**	**F**	**D**	**F**	**F**	**F**	**F**	**F**	**F**
		F				**F**				**F**			
Transit	Average Signal Delay	> 40 sec	> 40 sec	> 40 sec	> 40 sec	> 40 sec	> 40 sec	> 40 sec	> 40 sec	> 40 sec	> 40 sec	> 40 sec	> 40 sec
	Level of Service	**F**	**F**	**F**	**F**	**F**	**F**	**F**	**F**	**F**	**F**	**F**	**F**
		F				**F**				**F**			
Truck	Effective Corner Radius	> 15 m	> 15 m	10 - 15 m	> 15 m	10 - 15 m	< 10 m	10 - 15 m	< 10 m	> 15 m	> 15 m	> 15 m	> 15 m
	Number of Receiving Lanes on Departure from Intersection	≥ 2	≥ 2	≥ 2	≥ 2	≥ 2	≥ 2	≥ 2	1	≥ 2	≥ 2	≥ 2	≥ 2
	Level of Service	**A**	**A**	**B**	**A**	**B**	**D**	**B**	**F**	**A**	**A**	**A**	**A**
		B				**F**				**A**			
Auto	Volume to Capacity Ratio	0.91 - 1.00				0.0 - 0.60				0.71 - 0.80			
	Level of Service	**E**				**A**				**C**			

Multi-Modal Level of Service - Intersections Form

Consultant	**Parsons Inc.**	**Project**	**478286**
Scenario	**Williams Parkway - Existing Conditions**	**Date**	**Jan-23**
Comments	**Glenridge Road to Torbram Road**		
	PM PEAK (Ped Delay LOS/Transit LOS/Auto LOS)		**Table 02**

INTERSECTIONS		**Williams Pkwy & Glenridge Rd.**				**Williams Pkwy & Grenoble Blvd.**				**Williams Pkwy & Graymar Rd.**			
	Crossing Side	**NORTH**	**SOUTH**	**EAST**	**WEST**	**NORTH**	**SOUTH**	**EAST**	**WEST**	**NORTH**	**SOUTH**	**EAST**	**WEST**
Pedestrian	Lanes	0 - 2	0 - 2	5	5	4	4	5	5		0 - 2	5	4
	Median	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m		No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m
	Conflicting Left Turns	Permissive	Permissive	Permissive	Permissive	Permissive	Permissive	Permissive	Permissive		Protected	Permissive	No left turn / Prohib.
	Conflicting Right Turns	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control		Permissive or yield control	No right turn	Permissive or yield control
	Right Turns on Red (RToR) ?	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed		RTOR allowed	RTOR allowed	RTOR allowed
	Ped Signal Leading Interval?	No	No	No	No	No	No	No	No		No	No	No
	Right Turn Channel	No Channel	No Channel	No Channel	No Channel	No Channel	No Channel	No Channel	No Channel		No Channel	No Channel	No Channel
	Corner Radius	10-15m	10-15m	10-15m	10-15m	10-15m	10-15m	10-15m	10-15m		10-15m	0-3m	10-15m
	Crosswalk Type	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings		Zebra stripe hi-vis markings	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings
	PETSI Score	**88**	**88**	**40**	**40**	**56**	**56**	**40**	**40**		**96**	**48**	**64**
	Ped. Exposure to Traffic LoS	**B**	**B**	**E**	**E**	**D**	**D**	**E**	**E**	**-**	**A**	**D**	**C**
	Cycle Length	160	160	160	160	160	160	160	160		160	160	160
	Effective Walk Time	16	16	108	108	13	13	90	90		13	105	105
	Average Pedestrian Delay	**65**	**65**	**8**	**8**	**68**	**68**	**15**	**15**		**68**	**9**	**9**
	Pedestrian Delay LoS	**F**	**F**	**A**	**A**	**F**	**F**	**B**	**B**	**-**	**F**	**A**	**A**
	Level of Service	**F**	**F**	**E**	**E**	**F**	**F**	**E**	**E**	**-**	**F**	**D**	**C**
		F				**F**				**F**			
	Approach From	**NORTH**	**SOUTH**	**EAST**	**WEST**	**NORTH**	**SOUTH**	**EAST**	**WEST**	**NORTH**	**SOUTH**	**EAST**	**WEST**
Bicycle	Bicycle Lane Arrangement on Approach	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic		Mixed Traffic	Mixed Traffic	Mixed Traffic
	Right Turn Lane Configuration	≤ 50 m	> 50 m	> 50 m	> 50 m	> 50 m	≤ 50 m	> 50 m	> 50 m		≤ 50 m	≤ 50 m	≤ 50 m
	Right Turning Speed	≤ 25 km/h	≤ 25 km/h	≤ 25 km/h	≤ 25 km/h	≤ 25 km/h	≤ 25 km/h	≤ 25 km/h	≤ 25 km/h		≤ 25 km/h	≤ 25 km/h	≤ 25 km/h
	Cyclist relative to RT motorists	**D**	**F**	**F**	**F**	**F**	**D**	**F**	**F**	**-**	**D**	**D**	**D**
	Separated or Mixed Traffic	**Mixed Traffic**	**Mixed Traffic**	**Mixed Traffic**	**Mixed Traffic**	**Mixed Traffic**	**Mixed Traffic**	**Mixed Traffic**	**Mixed Traffic**	**-**	**Mixed Traffic**	**Mixed Traffic**	**Mixed Traffic**
	Left Turn Approach	One lane crossed	One lane crossed	≥ 2 lanes crossed	≥ 2 lanes crossed	One lane crossed	One lane crossed	≥ 2 lanes crossed	≥ 2 lanes crossed		No lane crossed	One lane crossed	No lane crossed
	Operating Speed	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h		≥ 60 km/h	≥ 60 km/h	≥ 60 km/h
	Left Turning Cyclist	**B**	**B**	**D**	**D**	**B**	**B**	**E**	**E**	**-**	**C**	**F**	**C**
	Level of Service	**D**	**F**	**F**	**F**	**F**	**D**	**F**	**F**	**-**	**D**	**F**	**D**
		F				**F**				**F**			
Transit	Average Signal Delay	> 40 sec	> 40 sec	> 40 sec	> 40 sec	> 40 sec	> 40 sec	> 40 sec	> 40 sec		> 40 sec	> 40 sec	> 40 sec
	Level of Service	**F**	**F**	**F**	**F**	**F**	**F**	**F**	**F**	**-**	**F**	**F**	**F**
		F				**F**				**F**			
Truck	Effective Corner Radius	10 - 15 m	10 - 15 m	10 - 15 m	10 - 15 m	10 - 15 m	10 - 15 m	10 - 15 m	10 - 15 m		10 - 15 m	< 10 m	10 - 15 m
	Number of Receiving Lanes on Departure from Intersection	≥ 2	≥ 2	1	1	≥ 2	≥ 2	≥ 2	≥ 2		≥ 2		1
	Level of Service	**B**	**B**	**E**	**E**	**B**	**B**	**B**	**B**	**-**	**B**	**-**	**E**
		E				**B**				**E**			
Auto	Volume to Capacity Ratio	0.0 - 0.60				0.0 - 0.60				0.0 - 0.60			
	Level of Service	**A**				**A**				**A**			

Multi-Modal Level of Service - Intersections Form

Consultant	**Parsons Inc.**	**Project**	**478286**
Scenario	**Williams Parkway - Existing Conditions**	**Date**	**Jan-23**
Comments	**Torbram Road**		
	PM PEAK (Ped Delay LOS/Transit LOS/Auto LOS)		**Table 03**

	INTERSECTIONS	**Williams Pkwy & Torbram Rd.**												
	Crossing Side	**NORTH**	**SOUTH**	**EAST**	**WEST**	**NORTH**	**SOUTH**	**EAST**	**WEST**	**NORTH**	**SOUTH**	**EAST**	**WEST**
Pedestrian	Lanes	5	6	7	6								
	Median	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m								
	Conflicting Left Turns	Protected/ Permissive	Permissive	Protected/ Permissive	Permissive								
	Conflicting Right Turns	Permissive or yield control	Protected	Permissive or yield control	Permissive or yield control								
	Right Turns on Red (RToR) ?	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed								
	Ped Signal Leading Interval?	No	No	No	No								
	Right Turn Channel	No Channel	Conventional with Receiving Lane	No Channel	No Channel								
	Corner Radius	15-25m	15-25m	15-25m	15-25m								
	Crosswalk Type	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings								
	PETSI Score	**38**	**27**	**5**	**21**								
	Ped. Exposure to Traffic LoS	**E**	**F**	**F**	**F**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
	Cycle Length	160	160	160	160								
	Effective Walk Time	63	53	45	35								
	Average Pedestrian Delay	**29**	**36**	**41**	**49**								
	Pedestrian Delay LoS	**C**	**D**	**E**	**E**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
	Level of Service	**E**	**F**	**F**	**F**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
		F				**-**				**-**			
	Approach From	**NORTH**	**SOUTH**	**EAST**	**WEST**	**NORTH**	**SOUTH**	**EAST**	**WEST**	**NORTH**	**SOUTH**	**EAST**	**WEST**
Bicycle	Bicycle Lane Arrangement on Approach	Mixed Traffic	Mixed Traffic	Mixed Traffic	Curb Bike Lane, Cycletrack or MUP								
	Right Turn Lane Configuration	> 50 m	≤ 50 m	> 50 m	Not Applicable								
	Right Turning Speed	≤ 25 km/h	≤ 25 km/h	≤ 25 km/h	≤ 25 km/h								
	Cyclist relative to RT motorists	**F**	**D**	**F**	**Not Applicable**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
	Separated or Mixed Traffic	**Mixed Traffic**	**Mixed Traffic**	**Mixed Traffic**	**Separated**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
	Left Turn Approach	One lane crossed	≥ 2 lanes crossed	≥ 2 lanes crossed	≥ 2 lanes crossed								
	Operating Speed	≥ 60 km/h	≥ 60 km/h	≥ 60 km/h	≥ 60 km/h								
	Left Turning Cyclist	**F**	**F**	**F**	**F**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
	Level of Service	**F**	**F**	**F**	**F**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
		F				**-**				**-**			
Transit	Average Signal Delay	> 40 sec	> 40 sec	> 40 sec	> 40 sec								
	Level of Service	**F**	**F**	**F**	**F**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
		F				**-**				**-**			
Truck	Effective Corner Radius	> 15 m	> 15 m	> 15 m	> 15 m								
	Number of Receiving Lanes on Departure from Intersection	≥ 2	≥ 2	≥ 2	≥ 2								
	Level of Service	**A**	**A**	**A**	**A**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
		A				**-**				**-**			
Auto	Volume to Capacity Ratio	0.61 - 0.70											
	Level of Service	**B**				**-**				**-**			

Multi-Modal Level of Service - Segments Form

Consultant	**Parsons Inc.**	**Project**	**478286**
Scenario	**Williams Parkway - Existing Conditions**	**Date**	**Jan-23**
Comments	**North Park Drive to Torbram Road**		
	AM/PM PEAK - Eastbound		

SEGMENTS		Street A	Section 1 Dixie Rd. to Mackay St	Section 2 Mackay St. to Bramalea Rd.	Section 3 Bramalea Rd. to Glenridge Rd.	Section 4 Glenridge Rd. to Grennoble Blvd.	Section 5 Grenoble Blvd to Graymar Rd.	Section 6 Graymar Rd. to Torbram Rd.
Pedestrian	Sidewalk Width Boulevard Width	**F**	1.5 m > 2 m	1.5 m > 2 m	< 1.5 m n/a	< 1.5 m n/a	< 1.5 m n/a	< 1.5 m n/a
	Avg Daily Curb Lane Traffic Volume		> 3000	> 3000	> 3000	> 3000	> 3000	> 3000
	Operating Speed On-Street Parking		> 50 to 60 km/h no	> 30 to 50 km/h no	> 30 to 50 km/h no	> 30 to 50 km/h no	> 30 to 50 km/h no	> 50 to 60 km/h no
	Exposure to Traffic PLoS		**E**	**D**	**F**	**F**	**F**	**F**
	Effective Sidewalk Width		1.5 m	1.5 m	1.2 m	1.2 m	1.2 m	1.2 m
	Pedestrian Volume		250 ped/hr	250 ped/hr	250 ped/hr	250 ped/hr	250 ped/hr	250 ped/hr
	Crowding PLoS		**B**	**B**	**B**	**B**	**B**	**B**
	Level of Service		**E**	**D**	**F**	**F**	**F**	**F**
Bicycle	Type of Cycling Facility	**E**	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Physically Separated
	Number of Travel Lanes		2-3 lanes total	2-3 lanes total	2-3 lanes total	2-3 lanes total	2-3 lanes total	~~2-3 lanes total~~
	Operating Speed		≥ 50 to 60 km/h	≥ 50 to 60 km/h	>40 to <50 km/h	>40 to <50 km/h	>40 to <50 km/h	~~≥ 50 to 60 km/h~~
	# of Lanes & Operating Speed LoS		**E**	**E**	**D**	**D**	**D**	**A**
	Bike Lane (+ Parking Lane) Width							
	Bike Lane Width LoS		-	-	-	-	-	-
	Bike Lane Blockages							
	Blockage LoS		-	-	-	-	-	-
	Median Refuge Width (no median = < 1.8 m)		< 1.8 m refuge	< 1.8 m refuge	< 1.8 m refuge	< 1.8 m refuge	< 1.8 m refuge	~~< 1.8 m refuge~~
	No. of Lanes at Unsignalized Crossing		≤ 3 lanes	≤ 3 lanes	≤ 3 lanes	≤ 3 lanes	≤ 3 lanes	~~≤ 3 lanes~~
	Sidestreet Operating Speed		>40 to 50 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	~~>50 to 60 km/h~~
	Unsignalized Crossing - Lowest LoS		**B**	**A**	**A**	**A**	**A**	**A**
	Level of Service		**E**	**E**	**D**	**D**	**D**	**A**
Transit	Facility Type	**D**	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic
	Friction or Ratio Transit:Posted Speed		Vt/Vp ≥ 0.8	Vt/Vp ≥ 0.8	Vt/Vp ≥ 0.8	Vt/Vp ≥ 0.8	Vt/Vp ≥ 0.8	Vt/Vp ≥ 0.8
	Level of Service		**D**	**D**	**D**	**D**	**D**	**D**
Truck	Truck Lane Width	**A**	> 3.7 m	> 3.7 m	> 3.7 m	> 3.7 m	> 3.7 m	> 3.7 m
	Travel Lanes per Direction		> 1	> 1	> 1	> 1	> 1	> 1
	Level of Service		**A**	**A**	**A**	**A**	**A**	**A**
Auto	**Level of Service**	**Not Applicable**						

Multi-Modal Level of Service - Segments Form

Consultant	**Parsons Inc.**	**Project**	**478286**
Scenario	**Williams Parkway - Existing Conditions**	**Date**	**Jan-23**
Comments	**Dixie Road to Torbram Road**		
	AM/PM PEAK - Westbound		

	SEGMENTS	Street A	Section 1 Dixie Rd. to Mackay St.	Section 2 Mackay St. to Bramalea Rd.	Section 3 Bramalea Rd. to Glenridge Rd.	Section 4 Glenridge Rd. to Grennoble Blvd.	Section 5 Grenoble Blvd to Graymar Rd.	Section 6 Graymar Rd. to Torbram Rd.
Pedestrian	Sidewalk Width Boulevard Width		1.5 m > 2 m	1.5 m > 2 m	< 1.5 m n/a	< 1.5 m n/a	< 1.5 m n/a	< 1.5 m n/a
	Avg Daily Curb Lane Traffic Volume		> 3000	> 3000	> 3000	> 3000	> 3000	> 3000
	Operating Speed On-Street Parking		> 50 to 60 km/h no	> 30 to 50 km/h no	> 30 to 50 km/h no	> 30 to 50 km/h no	> 30 to 50 km/h no	> 50 to 60 km/h no
	Exposure to Traffic PLoS	**F**	**E**	**D**	**F**	**F**	**F**	**F**
	Effective Sidewalk Width		1.5 m	1.5 m	1.2 m	1.2 m	1.2 m	1.2 m
	Pedestrian Volume		250 ped/hr	250 ped/hr	250 ped/hr	250 ped/hr	250 ped/hr	250 ped/hr
	Crowding PLoS		**B**	**B**	**B**	**B**	**B**	**B**
	Level of Service		**E**	**D**	**F**	**F**	**F**	**F**
Bicycle	Type of Cycling Facility		Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Physically Separated
	Number of Travel Lanes		2-3 lanes total	2-3 lanes total	2-3 lanes total	2-3 lanes total	2-3 lanes total	~~2-3 lanes total~~
	Operating Speed		≥ 50 to 60 km/h	≥ 50 to 60 km/h	>40 to <50 km/h	>40 to <50 km/h	>40 to <50 km/h	~~≥ 50 to 60 km/h~~
	# of Lanes & Operating Speed LoS		**E**	**E**	**D**	**D**	**D**	**A**
	Bike Lane (+ Parking Lane) Width							
	Bike Lane Width LoS		-	-	-	-	-	-
	Bike Lane Blockages							
	Blockage LoS		-	-	-	-	-	-
	Median Refuge Width (no median = < 1.8 m)		< 1.8 m refuge	< 1.8 m refuge	< 1.8 m refuge	< 1.8 m refuge	< 1.8 m refuge	~~< 1.8 m refuge~~
	No. of Lanes at Unsignalized Crossing		≤ 3 lanes	≤ 3 lanes	≤ 3 lanes	≤ 3 lanes	≤ 3 lanes	~~≤ 3 lanes~~
	Sidestreet Operating Speed		≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	~~>50 to 60 km/h~~
	Unsignalized Crossing - Lowest LoS	**E**	**A**	**A**	**A**	**A**	**A**	**A**
	Level of Service		**E**	**E**	**D**	**D**	**D**	**A**
Transit	Facility Type		Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic
	Friction or Ratio Transit:Posted Speed	**D**	Vt/Vp ≥ 0.8	Vt/Vp ≥ 0.8	Vt/Vp ≥ 0.8	Vt/Vp ≥ 0.8	Vt/Vp ≥ 0.8	Vt/Vp ≥ 0.8
	Level of Service		**D**	**D**	**D**	**D**	**D**	**D**
Truck	Truck Lane Width		> 3.7 m	> 3.7 m	> 3.7 m	> 3.7 m	> 3.7 m	> 3.7 m
	Travel Lanes per Direction	**A**	> 1	> 1	> 1	> 1	> 1	> 1
	Level of Service		**A**	**A**	**A**	**A**	**A**	**A**
Auto	**Level of Service**	**Not Applicable**						

MMLOS – Future Conditions (2031)

With Improvement

Multi-Modal Level of Service - Intersections Form

Consultant	**Parsons Inc.**	**Project**	**478286**
Scenario	**Williams Parkway - Future Conditions**	**Date**	**Jan-23**
Comments	**Dixie Road to Bramalea Road- With Improvements**		
	AM PEAK (Ped Delay LOS/Transit LOS/Auto LOS)		**Table 01**

	INTERSECTIONS	**Williams Pkwy & Dixie Rd.**				**Williams Pkwy & Mackay St.**				**Williams Pkwy & Bramalea Rd.**			
	Crossing Side	**NORTH**	**SOUTH**	**EAST**	**WEST**	**NORTH**	**SOUTH**	**EAST**	**WEST**	**NORTH**	**SOUTH**	**EAST**	**WEST**
Pedestrian	Lanes	8	8	6	6	3	0 - 2	5	5	5	5	5	5
	Median	Median > 2.4 m	Median > 2.4 m	Median > 2.4 m	Median > 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m
	Conflicting Left Turns	Permissive	Protected/ Permissive	Protected/ Permissive	Protected/ Permissive	Permissive	Permissive	Permissive	Permissive	Protected/ Permissive	Protected/ Permissive	Protected/ Permissive	Protected/ Permissive
	Conflicting Right Turns	Protected/ Permissive	Protected/ Permissive	Protected/ Permissive	Protected/ Permissive	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control
	Right Turns on Red (RToR) ?	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed
	Ped Signal Leading Interval?	No	No	No	No	No	No	No	No	No	No	No	No
	Right Turn Channel	Conv'tl without Receiving Lane	Conv'tl without Receiving Lane	Conv'tl without Receiving Lane	Conv'tl without Receiving Lane	No Channel	No Channel	No Channel	No Channel	No Channel	No Channel	No Channel	No Channel
	Corner Radius	>25m	>25m	>25m	>25m	10-15m	5-10m	10-15m	5-10m	15-25m	15-25m	15-25m	15-25m
	Crosswalk Type	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings
	PETSI Score	**-1**	**-1**	**29**	**29**	**73**	**89**	**40**	**41**	**38**	**38**	**38**	**38**
	Ped. Exposure to Traffic LoS	**F**	**F**	**F**	**F**	**C**	**B**	**E**	**E**	**E**	**E**	**E**	**E**
	Cycle Length	160	160	160	160	160	160	160	160	160	160	160	160
	Effective Walk Time	40	55	34	31	43	43	71	71	35	43	36	37
	Average Pedestrian Delay	**45**	**34**	**50**	**52**	**43**	**43**	**25**	**25**	**49**	**43**	**48**	**47**
	Pedestrian Delay LoS	**E**	**D**	**E**	**E**	**E**	**E**	**C**	**C**	**E**	**E**	**E**	**E**
	Level of Service	**F**	**F**	**F**	**F**	**E**	**E**	**E**	**E**	**E**	**E**	**E**	**E**
		F				**E**				**E**			
	Approach From	**NORTH**	**SOUTH**	**EAST**	**WEST**	**NORTH**	**SOUTH**	**EAST**	**WEST**	**NORTH**	**SOUTH**	**EAST**	**WEST**
Bicycle	Bicycle Lane Arrangement on Approach	Mixed Traffic	Mixed Traffic	Curb Bike Lane, Cycletrack or MUP	Curb Bike Lane, Cycletrack or MUP	Mixed Traffic	Mixed Traffic	Curb Bike Lane, Cycletrack or MUP	Curb Bike Lane, Cycletrack or MUP	Mixed Traffic	Mixed Traffic	Curb Bike Lane, Cycletrack or MUP	Curb Bike Lane, Cycletrack or MUP
	Right Turn Lane Configuration	> 50 m	> 50 m			> 50 m	≤ 50 m			> 50 m	> 50 m		
	Right Turning Speed	≤ 25 km/h	≤ 25 km/h			≤ 25 km/h	≤ 25 km/h			≤ 25 km/h	≤ 25 km/h		
	Cyclist relative to RT motorists	**F**	**F**	**Not Applicable**	**Not Applicable**	**F**	**D**	**Not Applicable**	**Not Applicable**	**F**	**F**	**Not Applicable**	**Not Applicable**
	Separated or Mixed Traffic	**Mixed Traffic**	**Mixed Traffic**	**Separated**	**Separated**	**Mixed Traffic**	**Mixed Traffic**	**Separated**	**Separated**	**Mixed Traffic**	**Mixed Traffic**	**Separated**	**Separated**
	Left Turn Approach	≥ 2 lanes crossed	≥ 2 lanes crossed	Other LT config	Other LT config	One lane crossed	No lane crossed	Other LT config	Other LT config	≥ 2 lanes crossed	≥ 2 lanes crossed	Other LT config	Other LT config
	Operating Speed	≥ 60 km/h	≥ 60 km/h	≥ 60 km/h	≥ 60 km/h	> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h	≤ 40 km/h	≤ 40 km/h
	Left Turning Cyclist	**F**	**F**	**F**	**F**	**D**	**B**	**F**	**F**	**E**	**E**	**F**	**F**
	Level of Service	**F**	**F**	**F**	**F**	**F**	**D**	**F**	**F**	**F**	**F**	**F**	**F**
		F				**F**				**F**			
Transit	Average Signal Delay	> 40 sec	> 40 sec	> 40 sec	> 40 sec	> 40 sec	> 40 sec	> 40 sec	> 40 sec	> 40 sec	> 40 sec	> 40 sec	> 40 sec
	Level of Service	**F**	**F**	**F**	**F**	**F**	**F**	**F**	**F**	**F**	**F**	**F**	**F**
		F				**F**				**F**			
Truck	Effective Corner Radius	> 15 m	> 15 m	> 15 m	> 15 m	10 - 15 m	< 10 m	10 - 15 m	< 10 m	> 15 m	> 15 m	> 15 m	> 15 m
	Number of Receiving Lanes on Departure from Intersection	≥ 2	≥ 2	≥ 2	≥ 2	≥ 2	≥ 2	≥ 2	1	≥ 2	≥ 2	≥ 2	≥ 2
	Level of Service	**A**	**A**	**A**	**A**	**B**	**D**	**B**	**F**	**A**	**A**	**A**	**A**
		A				**F**				**A**			
Auto	Volume to Capacity Ratio	0.61 - 0.70				0.0 - 0.60				0.71 - 0.80			
	Level of Service	**B**				**A**				**C**			

Multi-Modal Level of Service - Intersections Form

Consultant	**Parsons Inc.**	**Project**	**478286**
Scenario	**Williams Parkway - Future Conditions**	**Date**	**Jan-23**
Comments	**Glenridge Road to Graymar Road - With Improvements**		
	AM PEAK (Ped Delay LOS/Transit LOS/Auto LOS)		**Table 02**

INTERSECTIONS		**Williams Pkwy & Glenridge Rd.**				**Williams Pkwy & Grenoble Blvd.**				**Williams Pkwy & Graymar Rd.**			
	Crossing Side	**NORTH**	**SOUTH**	**EAST**	**WEST**	**NORTH**	**SOUTH**	**EAST**	**WEST**	**NORTH**	**SOUTH**	**EAST**	**WEST**
Pedestrian	Lanes	0 - 2	0 - 2	5	5	4	4	5	5		0 - 2	5	4
	Median	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m		No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m
	Conflicting Left Turns	Permissive	Permissive	Permissive	Permissive	Permissive	Permissive	Permissive	Permissive		Protected	Permissive	No left turn / Prohib.
	Conflicting Right Turns	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control		Permissive or yield control	No right turn	Permissive or yield control
	Right Turns on Red (RToR) ?	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed		RTOR allowed	RTOR allowed	RTOR allowed
	Ped Signal Leading Interval?	No	No	No	No	No	No	No	No		No	No	No
	Right Turn Channel	No Channel	No Channel	No Channel	No Channel	No Channel	No Channel	No Channel	No Channel		No Channel	No Channel	No Channel
	Corner Radius	10-15m	10-15m	10-15m	10-15m	10-15m	10-15m	10-15m	10-15m		10-15m	0-3m	10-15m
	Crosswalk Type	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings		Zebra stripe hi-vis markings	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings
	PETSI Score	**88**	**88**	**40**	**40**	**56**	**56**	**40**	**40**		**96**	**48**	**64**
	Ped. Exposure to Traffic LoS	**B**	**B**	**E**	**E**	**D**	**D**	**E**	**E**	**-**	**A**	**D**	**C**
	Cycle Length	160	160	160	160	160	160	160	160		160	160	160
	Effective Walk Time	26	26	98	98	20	20	83	83		21	97	97
	Average Pedestrian Delay	**56**	**56**	**12**	**12**	**61**	**61**	**19**	**19**		**60**	**12**	**12**
	Pedestrian Delay LoS	**E**	**E**	**B**	**B**	**F**	**F**	**B**	**B**	**-**	**F**	**B**	**B**
	Level of Service	**E**	**E**	**E**	**E**	**F**	**F**	**E**	**E**	**-**	**F**	**D**	**C**
		E				**F**				**F**			
	Approach From	**NORTH**	**SOUTH**	**EAST**	**WEST**	**NORTH**	**SOUTH**	**EAST**	**WEST**	**NORTH**	**SOUTH**	**EAST**	**WEST**
Bicycle	Bicycle Lane Arrangement on Approach	Mixed Traffic	Mixed Traffic	Curb Bike Lane, Cycletrack or MUP	Curb Bike Lane, Cycletrack or MUP	Mixed Traffic	Mixed Traffic	Curb Bike Lane, Cycletrack or MUP	Curb Bike Lane, Cycletrack or MUP		Mixed Traffic	Curb Bike Lane, Cycletrack or MUP	Curb Bike Lane, Cycletrack or MUP
	Right Turn Lane Configuration	≤ 50 m	> 50 m			> 50 m	≤ 50 m				≤ 50 m		
	Right Turning Speed	≤ 25 km/h	≤ 25 km/h			≤ 25 km/h	≤ 25 km/h				≤ 25 km/h		
	Cyclist relative to RT motorists	**D**	**F**	**Not Applicable**	**Not Applicable**	**F**	**D**	**Not Applicable**	**Not Applicable**	**-**	**D**	**Not Applicable**	**Not Applicable**
	Separated or Mixed Traffic	**Mixed Traffic**	**Mixed Traffic**	**Separated**	**Separated**	**Mixed Traffic**	**Mixed Traffic**	**Separated**	**Separated**	**-**	**Mixed Traffic**	**Separated**	**Separated**
	Left Turn Approach	One lane crossed	One lane crossed	Other LT config	Other LT config	One lane crossed	One lane crossed	Other LT config	Other LT config		No lane crossed	Other LT config	Other LT config
	Operating Speed	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h		≥ 60 km/h	≥ 60 km/h	≥ 60 km/h
	Left Turning Cyclist	**B**	**B**	**F**	**F**	**B**	**B**	**F**	**F**	**-**	**C**	**F**	**F**
	Level of Service	**D**	**F**	**F**	**F**	**F**	**D**	**F**	**F**	**-**	**D**	**F**	**F**
		F				**F**				**F**			
Transit	Average Signal Delay	> 40 sec	> 40 sec	> 40 sec	> 40 sec	> 40 sec	> 40 sec	> 40 sec	> 40 sec		> 40 sec	> 40 sec	> 40 sec
	Level of Service	**F**	**F**	**F**	**F**	**F**	**F**	**F**	**F**	**-**	**F**	**F**	**F**
		F				**F**				**F**			
Truck	Effective Corner Radius	10 - 15 m	10 - 15 m	10 - 15 m	10 - 15 m	10 - 15 m	10 - 15 m	10 - 15 m	10 - 15 m		10 - 15 m	< 10 m	10 - 15 m
	Number of Receiving Lanes on Departure from Intersection	≥ 2	≥ 2	1	1	≥ 2	≥ 2	≥ 2	≥ 2		≥ 2		1
	Level of Service	**B**	**B**	**E**	**E**	**B**	**B**	**B**	**B**	**-**	**B**	**-**	**E**
		E				**B**				**E**			
Auto	Volume to Capacity Ratio	0.0 - 0.60				0.0 - 0.60				0.0 - 0.60			
	Level of Service	**A**				**A**				**A**			

Multi-Modal Level of Service - Intersections Form

Consultant	**Parsons Inc.**	**Project**	**478286**
Scenario	**Williams Parkway - Future Conditions**	**Date**	**Jan-23**
Comments	**Torbram Road - With Improvements**		
	AM PEAK (Ped Delay LOS/Transit LOS/Auto LOS)		**Table 03**

	INTERSECTIONS	**Williams Pkwy & Torbram Rd.**												
	Crossing Side	**NORTH**	**SOUTH**	**EAST**	**WEST**	**NORTH**	**SOUTH**	**EAST**	**WEST**	**NORTH**	**SOUTH**	**EAST**	**WEST**
Pedestrian	Lanes	5	6	7	6								
	Median	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m								
	Conflicting Left Turns	Protected/ Permissive	Permissive	Protected/ Permissive	Permissive								
	Conflicting Right Turns	Permissive or yield control	Protected	Permissive or yield control	Permissive or yield control								
	Right Turns on Red (RToR) ?	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed								
	Ped Signal Leading Interval?	No	No	No	No								
	Right Turn Channel	No Channel	Conventional with Receiving Lane	No Channel	No Channel								
	Corner Radius	15-25m	15-25m	15-25m	15-25m								
	Crosswalk Type	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings								
	PETSI Score	**38**	**27**	**5**	**21**								
	Ped. Exposure to Traffic LoS	**E**	**F**	**F**	**F**	-	-	-	-	-	-	-	-
	Cycle Length	160	160	160	160								
	Effective Walk Time	64	36	34	34								
	Average Pedestrian Delay	**29**	**48**	**50**	**50**								
	Pedestrian Delay LoS	**C**	**E**	**E**	**E**	-	-	-	-	-	-	-	-
	Level of Service	**E**	**F**	**F**	**F**	-	-	-	-	-	-	-	-
		F				-				-			
	Approach From	**NORTH**	**SOUTH**	**EAST**	**WEST**	**NORTH**	**SOUTH**	**EAST**	**WEST**	**NORTH**	**SOUTH**	**EAST**	**WEST**
Bicycle	Bicycle Lane Arrangement on Approach	Mixed Traffic	Mixed Traffic	Curb Bike Lane, Cycletrack or MUP	Curb Bike Lane, Cycletrack or MUP								
	Right Turn Lane Configuration	> 50 m	≤ 50 m										
	Right Turning Speed	≤ 25 km/h	≤ 25 km/h										
	Cyclist relative to RT motorists	**F**	**D**	**Not Applicable**	**Not Applicable**	-	-	-	-	-	-	-	-
	Separated or Mixed Traffic	**Mixed Traffic**	**Mixed Traffic**	**Separated**	**Separated**	-	-	-	-	-	-	-	-
	Left Turn Approach	One lane crossed	≥ 2 lanes crossed	Other LT config	Other LT config								
	Operating Speed	≥ 60 km/h	≥ 60 km/h	≥ 60 km/h	≥ 60 km/h								
	Left Turning Cyclist	**F**	**F**	**F**	**F**	-	-	-	-	-	-	-	-
	Level of Service	**F**	**F**	**F**	**F**	-	-	-	-	-	-	-	-
		F				-				-			
Transit	Average Signal Delay	> 40 sec	> 40 sec	> 40 sec	> 40 sec								
	Level of Service	**F**	**F**	**F**	**F**	-	-	-	-	-	-	-	-
		F				-				-			
Truck	Effective Corner Radius	> 15 m	> 15 m	> 15 m	> 15 m								
	Number of Receiving Lanes on Departure from Intersection	≥ 2	≥ 2	≥ 2	≥ 2								
	Level of Service	**A**	**A**	**A**	**A**	-	-	-	-	-	-	-	-
		A				-				-			
Auto	Volume to Capacity Ratio	0.61 - 0.70											
	Level of Service	**B**				-				-			

Multi-Modal Level of Service - Intersections Form

Consultant	**Parsons Inc.**	**Project**	**478286**
Scenario	**Williams Parkway - Future Conditions**	**Date**	**Jan-23**
Comments	**Dixie Road to Bramalea Road - With Improvements**		
	PM PEAK (Ped Delay LOS/Transit LOS/Auto LOS)		**Table 01**

INTERSECTIONS		**Williams Pkwy & Dixie Rd.**				**Williams Pkwy & Mackay St.**				**Williams Pkwy & Bramalea Rd.**			
	Crossing Side	**NORTH**	**SOUTH**	**EAST**	**WEST**	**NORTH**	**SOUTH**	**EAST**	**WEST**	**NORTH**	**SOUTH**	**EAST**	**WEST**
Pedestrian	Lanes	8	8	6	6	3	0 - 2	5	5	5	5	5	5
	Median	Median > 2.4 m	Median > 2.4 m	Median > 2.4 m	Median > 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m
	Conflicting Left Turns	Permissive	Protected/ Permissive	Protected/ Permissive	Protected/ Permissive	Permissive	Permissive	Permissive	Permissive	Protected/ Permissive	Protected/ Permissive	Protected/ Permissive	Protected/ Permissive
	Conflicting Right Turns	Protected/ Permissive	Protected/ Permissive	Protected/ Permissive	Protected/ Permissive	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control
	Right Turns on Red (RToR) ?	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed
	Ped Signal Leading Interval?	No	No	No	No	No	No	No	No	No	No	No	No
	Right Turn Channel	Conv'tl without Receiving Lane	Conv'tl without Receiving Lane	Conv'tl without Receiving Lane	Conv'tl without Receiving Lane	No Channel	No Channel	No Channel	No Channel	No Channel	No Channel	No Channel	No Channel
	Corner Radius	>25m	>25m	>25m	>25m	10-15m	5-10m	10-15m	10-15m	15-25m	15-25m	15-25m	15-25m
	Crosswalk Type	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings
	PETSI Score	**-1**	**-1**	**29**	**29**	**73**	**89**	**40**	**40**	**38**	**38**	**38**	**38**
	Ped. Exposure to Traffic LoS	**F**	**F**	**F**	**F**	**C**	**B**	**E**	**E**	**E**	**E**	**E**	**E**
	Cycle Length	160	160	160	160	160	160	160	160	160	160	160	160
	Effective Walk Time	40	52	37	39	20	20	94	94	24	43	40	44
	Average Pedestrian Delay	**45**	**36**	**47**	**46**	**61**	**61**	**14**	**14**	**58**	**43**	**45**	**42**
	Pedestrian Delay LoS	**E**	**D**	**E**	**E**	**F**	**F**	**B**	**B**	**E**	**E**	**E**	**E**
	Level of Service	**F**	**F**	**F**	**F**	**F**	**F**	**E**	**E**	**E**	**E**	**E**	**E**
		F				**F**				**E**			
	Approach From	**NORTH**	**SOUTH**	**EAST**	**WEST**	**NORTH**	**SOUTH**	**EAST**	**WEST**	**NORTH**	**SOUTH**	**EAST**	**WEST**
Bicycle	Bicycle Lane Arrangement on Approach	Mixed Traffic	Mixed Traffic	Curb Bike Lane, Cycletrack or MUP	Curb Bike Lane, Cycletrack or MUP	Mixed Traffic	Mixed Traffic	Curb Bike Lane, Cycletrack or MUP	Curb Bike Lane, Cycletrack or MUP	Mixed Traffic	Mixed Traffic	Curb Bike Lane, Cycletrack or MUP	Curb Bike Lane, Cycletrack or MUP
	Right Turn Lane Configuration	> 50 m	> 50 m			> 50 m	≤ 50 m			> 50 m	> 50 m		
	Right Turning Speed	≤ 25 km/h	≤ 25 km/h			≤ 25 km/h	≤ 25 km/h			≤ 25 km/h	≤ 25 km/h		
	Cyclist relative to RT motorists	**F**	**F**	**Not Applicable**	**Not Applicable**	**F**	**D**	**Not Applicable**	**Not Applicable**	**F**	**F**	**Not Applicable**	**Not Applicable**
	Separated or Mixed Traffic	**Mixed Traffic**	**Mixed Traffic**	**Separated**	**Separated**	**Mixed Traffic**	**Mixed Traffic**	**Separated**	**Separated**	**Mixed Traffic**	**Mixed Traffic**	**Separated**	**Separated**
	Left Turn Approach	Other LT config	Other LT config	Other LT config	Other LT config	One lane crossed	No lane crossed	Other LT config	Other LT config	≥ 2 lanes crossed	≥ 2 lanes crossed	Other LT config	Other LT config
	Operating Speed	≥ 60 km/h	≥ 60 km/h	≥ 60 km/h	≥ 60 km/h	> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h	≤ 40 km/h	≤ 40 km/h
	Left Turning Cyclist	**F**	**F**	**F**	**F**	**D**	**B**	**F**	**F**	**E**	**E**	**F**	**F**
	Level of Service	**F**	**F**	**F**	**F**	**F**	**D**	**F**	**F**	**F**	**F**	**F**	**F**
		F				**F**				**F**			
Transit	Average Signal Delay	> 40 sec	> 40 sec	> 40 sec	> 40 sec	> 40 sec	> 40 sec	> 40 sec	> 40 sec	> 40 sec	> 40 sec	> 40 sec	> 40 sec
	Level of Service	**F**	**F**	**F**	**F**	**F**	**F**	**F**	**F**	**F**	**F**	**F**	**F**
		F				**F**				**F**			
Truck	Effective Corner Radius	> 15 m	> 15 m	> 15 m	> 15 m	10 - 15 m	< 10 m	10 - 15 m	< 10 m	> 15 m	> 15 m	> 15 m	> 15 m
	Number of Receiving Lanes on Departure from Intersection	≥ 2	≥ 2	≥ 2	≥ 2	≥ 2	≥ 2	≥ 2	1	≥ 2	≥ 2	≥ 2	≥ 2
	Level of Service	**A**	**A**	**A**	**A**	**B**	**D**	**B**	**F**	**A**	**A**	**A**	**A**
		A				**F**				**A**			
Auto	Volume to Capacity Ratio	0.71 - 0.80				0.0 - 0.60				0.81 - 0.90			
	Level of Service	**C**				**A**				**D**			

Multi-Modal Level of Service - Intersections Form

Consultant	**Parsons Inc.**	**Project**	**478286**
Scenario	**Williams Parkway - Future Conditions**	**Date**	**Jan-23**
Comments	**Glenridge Road to Graymar Road - With Improvements**		
	PM PEAK (Ped Delay LOS/Transit LOS/Auto LOS)		**Table 02**

INTERSECTIONS		**Williams Pkwy & Glenridge Rd.**				**Williams Pkwy & Grenoble Blvd.**				**Williams Pkwy & Graymar Rd.**			
	Crossing Side	**NORTH**	**SOUTH**	**EAST**	**WEST**	**NORTH**	**SOUTH**	**EAST**	**WEST**	**NORTH**	**SOUTH**	**EAST**	**WEST**
Pedestrian	Lanes	0 - 2	0 - 2	5	5	4	4	5	5		0 - 2	5	4
	Median	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m		No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m
	Conflicting Left Turns	Permissive	Permissive	Permissive	Permissive	Permissive	Permissive	Permissive	Permissive		Protected	Permissive	No left turn / Prohib.
	Conflicting Right Turns	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control		Permissive or yield control	No right turn	Permissive or yield control
	Right Turns on Red (RToR) ?	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed		RTOR allowed	RTOR allowed	RTOR allowed
	Ped Signal Leading Interval?	No	No	No	No	No	No	No	No		No	No	No
	Right Turn Channel	No Channel	No Channel	No Channel	No Channel	No Channel	No Channel	No Channel	No Channel		No Channel	No Channel	No Channel
	Corner Radius	10-15m	10-15m	10-15m	10-15m	10-15m	10-15m	10-15m	10-15m		10-15m	0-3m	10-15m
	Crosswalk Type	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings		Zebra stripe hi-vis markings	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings
	PETSI Score	**88**	**88**	**40**	**40**	**56**	**56**	**40**	**40**		**96**	**48**	**64**
	Ped. Exposure to Traffic LoS	**B**	**B**	**E**	**E**	**D**	**D**	**E**	**E**	**-**	**A**	**D**	**C**
	Cycle Length	160	160	160	160	160	160	160	160		160	160	160
	Effective Walk Time	16	16	108	108	13	13	90	90		15	103	103
	Average Pedestrian Delay	**65**	**65**	**8**	**8**	**68**	**68**	**15**	**15**		**66**	**10**	**10**
	Pedestrian Delay LoS	**F**	**F**	**A**	**A**	**F**	**F**	**B**	**B**	**-**	**F**	**B**	**B**
	Level of Service	**F**	**F**	**E**	**E**	**F**	**F**	**E**	**E**	**-**	**F**	**D**	**C**
		F				**F**				**F**			
	Approach From	**NORTH**	**SOUTH**	**EAST**	**WEST**	**NORTH**	**SOUTH**	**EAST**	**WEST**	**NORTH**	**SOUTH**	**EAST**	**WEST**
Bicycle	Bicycle Lane Arrangement on Approach	Mixed Traffic	Mixed Traffic	Curb Bike Lane, Cycletrack or MUP	Curb Bike Lane, Cycletrack or MUP	Mixed Traffic	Mixed Traffic	Curb Bike Lane, Cycletrack or MUP	Curb Bike Lane, Cycletrack or MUP		Mixed Traffic	Curb Bike Lane, Cycletrack or MUP	Curb Bike Lane, Cycletrack or MUP
	Right Turn Lane Configuration	≤ 50 m	> 50 m			> 50 m	≤ 50 m				≤ 50 m		
	Right Turning Speed	≤ 25 km/h	≤ 25 km/h			≤ 25 km/h	≤ 25 km/h				≤ 25 km/h		
	Cyclist relative to RT motorists	**D**	**F**	**Not Applicable**	**Not Applicable**	**F**	**D**	**Not Applicable**	**Not Applicable**	**-**	**D**	**Not Applicable**	**Not Applicable**
	Separated or Mixed Traffic	**Mixed Traffic**	**Mixed Traffic**	**Separated**	**Separated**	**Mixed Traffic**	**Mixed Traffic**	**Separated**	**Separated**	**-**	**Mixed Traffic**	**Separated**	**Separated**
	Left Turn Approach	One lane crossed	One lane crossed	Other LT config	Other LT config	One lane crossed	One lane crossed	Other LT config	Other LT config		No lane crossed	Other LT config	Other LT config
	Operating Speed	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h		≥ 60 km/h	≥ 60 km/h	≥ 60 km/h
	Left Turning Cyclist	**B**	**B**	**F**	**F**	**B**	**B**	**F**	**F**	**-**	**C**	**F**	**F**
	Level of Service	**D**	**F**	**F**	**F**	**F**	**D**	**F**	**F**	**-**	**D**	**F**	**F**
		F				**F**				**F**			
Transit	Average Signal Delay	> 40 sec	> 40 sec	> 40 sec	> 40 sec	> 40 sec	> 40 sec	> 40 sec	> 40 sec		> 40 sec	> 40 sec	> 40 sec
	Level of Service	**F**	**F**	**F**	**F**	**F**	**F**	**F**	**F**	**-**	**F**	**F**	**F**
		F				**F**				**F**			
Truck	Effective Corner Radius	10 - 15 m	10 - 15 m	10 - 15 m	10 - 15 m	10 - 15 m	10 - 15 m	10 - 15 m	10 - 15 m		10 - 15 m	< 10 m	10 - 15 m
	Number of Receiving Lanes on Departure from Intersection	≥ 2	≥ 2	1	1	≥ 2	≥ 2	≥ 2	≥ 2		≥ 2		1
	Level of Service	**B**	**B**	**E**	**E**	**B**	**B**	**B**	**B**	**-**	**B**	**-**	**E**
		E				**B**				**E**			
Auto	Volume to Capacity Ratio	0.0 - 0.60				0.0 - 0.60				0.0 - 0.60			
	Level of Service	**A**				**A**				**A**			

Multi-Modal Level of Service - Intersections Form

Consultant	**Parsons Inc.**	**Project**	**478286**
Scenario	**Williams Parkway - Future Conditions**	**Date**	**Jan-23**
Comments	**Torbram Road - With Improvements**		
	AM PEAK (Ped Delay LOS/Transit LOS/Auto LOS)		**Table 03**

	INTERSECTIONS	**Williams Pkwy & Torbram Rd.**												
	Crossing Side	**NORTH**	**SOUTH**	**EAST**	**WEST**	**NORTH**	**SOUTH**	**EAST**	**WEST**	**NORTH**	**SOUTH**	**EAST**	**WEST**
Pedestrian	Lanes	5	6	7	6								
	Median	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m								
	Conflicting Left Turns	Protected/ Permissive	Permissive	Protected/ Permissive	Permissive								
	Conflicting Right Turns	Permissive or yield control	Protected	Permissive or yield control	Permissive or yield control								
	Right Turns on Red (RToR) ?	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed								
	Ped Signal Leading Interval?	No	No	No	No								
	Right Turn Channel	No Channel	Conventional with Receiving Lane	No Channel	No Channel								
	Corner Radius	15-25m	15-25m	15-25m	15-25m								
	Crosswalk Type	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings								
	PETSI Score	**38**	**27**	**5**	**21**								
	Ped. Exposure to Traffic LoS	**E**	**F**	**F**	**F**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
	Cycle Length	160	160	160	160								
	Effective Walk Time	68	53	28	30								
	Average Pedestrian Delay	**26**	**36**	**54**	**53**								
	Pedestrian Delay LoS	**C**	**D**	**E**	**E**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
	Level of Service	**E**	**F**	**F**	**F**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
		F				**-**				**-**			
	Approach From	**NORTH**	**SOUTH**	**EAST**	**WEST**	**NORTH**	**SOUTH**	**EAST**	**WEST**	**NORTH**	**SOUTH**	**EAST**	**WEST**
Bicycle	Bicycle Lane Arrangement on Approach	Mixed Traffic	Mixed Traffic	Curb Bike Lane, Cycletrack or MUP	Curb Bike Lane, Cycletrack or MUP								
	Right Turn Lane Configuration	> 50 m	≤ 50 m										
	Right Turning Speed	≤ 25 km/h	≤ 25 km/h										
	Cyclist relative to RT motorists	**F**	**D**	**Not Applicable**	**Not Applicable**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
	Separated or Mixed Traffic	**Mixed Traffic**	**Mixed Traffic**	**Separated**	**Separated**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
	Left Turn Approach	One lane crossed	≥ 2 lanes crossed	Other LT config	Other LT config								
	Operating Speed	≥ 60 km/h	≥ 60 km/h	≥ 60 km/h	≥ 60 km/h								
	Left Turning Cyclist	**F**	**F**	**F**	**F**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
	Level of Service	**F**	**F**	**F**	**F**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
		F				**-**				**-**			
Transit	Average Signal Delay	> 40 sec	> 40 sec	> 40 sec	> 40 sec								
	Level of Service	**F**	**F**	**F**	**F**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
		F				**-**				**-**			
Truck	Effective Corner Radius	> 15 m	> 15 m	> 15 m	> 15 m								
	Number of Receiving Lanes on Departure from Intersection	≥ 2	≥ 2	≥ 2	≥ 2								
	Level of Service	**A**	**A**	**A**	**A**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
		A				**-**				**-**			
Auto	Volume to Capacity Ratio	0.71 - 0.80											
	Level of Service	**C**				**-**				**-**			

Multi-Modal Level of Service - Segments Form

Consultant	**Parsons Inc.**	**Project**	**478286**
Scenario	**Williams Parkway - Future Conditions**	**Date**	**Jan-23**
Comments	**Dixie Road to Torbram Road - With Improvements**		
	AM/PM PEAK - Eastbound		

SEGMENTS		Street A	Section 1 Dixie Rd. to Mackay St	Section 2 Mackay St. to Bramalea Rd.	Section 3 Bramalea Rd. to Glenridge Rd.	Section 4 Glenridge Rd. to Grennoble Blvd.	Section 5 Grenoble Blvd to Graymar Rd.	Section 6 Graymar Rd. to Torbram Rd.
Pedestrian	Sidewalk Width Boulevard Width	**E**	1.5 m > 2 m	1.5 m > 2 m	1.5 m > 2 m	1.5 m > 2 m	1.5 m > 2 m	1.5 m > 2 m
	Avg Daily Curb Lane Traffic Volume		> 3000	> 3000	> 3000	> 3000	> 3000	> 3000
	Operating Speed On-Street Parking		> 50 to 60 km/h no	> 30 to 50 km/h no	> 30 to 50 km/h no	> 30 to 50 km/h no	> 30 to 50 km/h no	> 50 to 60 km/h no
	Exposure to Traffic PLoS		**E**	**D**	**D**	**D**	**D**	**E**
	Effective Sidewalk Width		1.5 m	1.5 m	1.2 m	1.2 m	1.2 m	1.2 m
	Pedestrian Volume		250 ped/hr	250 ped/hr	250 ped/hr	250 ped/hr	250 ped/hr	250 ped/hr
	Crowding PLoS		**B**	**B**	**B**	**B**	**B**	**B**
	Level of Service		**E**	**D**	**D**	**D**	**D**	**E**
Bicycle	Type of Cycling Facility	**A**	Physically Separated	Physically Separated	Physically Separated	Physically Separated	Physically Separated	Physically Separated
	Number of Travel Lanes		~~2-3 lanes total~~	~~2-3 lanes total~~	~~2-3 lanes total~~	~~2-3 lanes total~~	~~2-3 lanes total~~	~~2-3 lanes total~~
	Operating Speed		~~≥ 50 to 60 km/h~~	~~≥ 50 to 60 km/h~~	~~>40 to <50 km/h~~	~~>40 to <50 km/h~~	~~>40 to <50 km/h~~	~~≥ 50 to 60 km/h~~
	# of Lanes & Operating Speed LoS		~~**A**~~	~~**A**~~	~~**A**~~	~~**A**~~	~~**A**~~	~~**A**~~
	Bike Lane (+ Parking Lane) Width							
	Bike Lane Width LoS		-	-	-	-	-	-
	Bike Lane Blockages							
	Blockage LoS		-	-	-	-	-	-
	Median Refuge Width (no median = < 1.8 m)		~~< 1.8 m refuge~~	~~< 1.8 m refuge~~	~~< 1.8 m refuge~~	~~< 1.8 m refuge~~	~~< 1.8 m refuge~~	~~< 1.8 m refuge~~
	No. of Lanes at Unsignalized Crossing		~~≤ 3 lanes~~	~~≤ 3 lanes~~	~~≤ 3 lanes~~	~~≤ 3 lanes~~	~~≤ 3 lanes~~	~~≤ 3 lanes~~
	Sidestreet Operating Speed		~~>40 to 50 km/h~~	~~≤ 40 km/h~~	~~≤ 40 km/h~~	~~≤ 40 km/h~~	~~≤ 40 km/h~~	~~>50 to 60 km/h~~
	Unsignalized Crossing - Lowest LoS		~~**A**~~	~~**A**~~	~~**A**~~	~~**A**~~	~~**A**~~	~~**A**~~
	Level of Service		**A**	**A**	**A**	**A**	**A**	**A**
Transit	Facility Type	**D**	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic
	Friction or Ratio Transit:Posted Speed		Vt/Vp ≥ 0.8	Vt/Vp ≥ 0.8	Vt/Vp ≥ 0.8	Vt/Vp ≥ 0.8	Vt/Vp ≥ 0.8	Vt/Vp ≥ 0.8
	Level of Service		**D**	**D**	**D**	**D**	**D**	**D**
Truck	Truck Lane Width	**A**	> 3.7 m	> 3.7 m	> 3.7 m	> 3.7 m	> 3.7 m	> 3.7 m
	Travel Lanes per Direction		> 1	> 1	> 1	> 1	> 1	> 1
	Level of Service		**A**	**A**	**A**	**A**	**A**	**A**
Auto	**Level of Service**	**Not Applicable**						

Multi-Modal Level of Service - Segments Form

Consultant	**Parsons Inc.**	**Project**	**478286**
Scenario	**Williams Parkway - Future Conditions**	**Date**	**Jan-23**
Comments	**Dixie Road to Torbram Road - With Improvements**		
	AM/PM PEAK - Westbound		

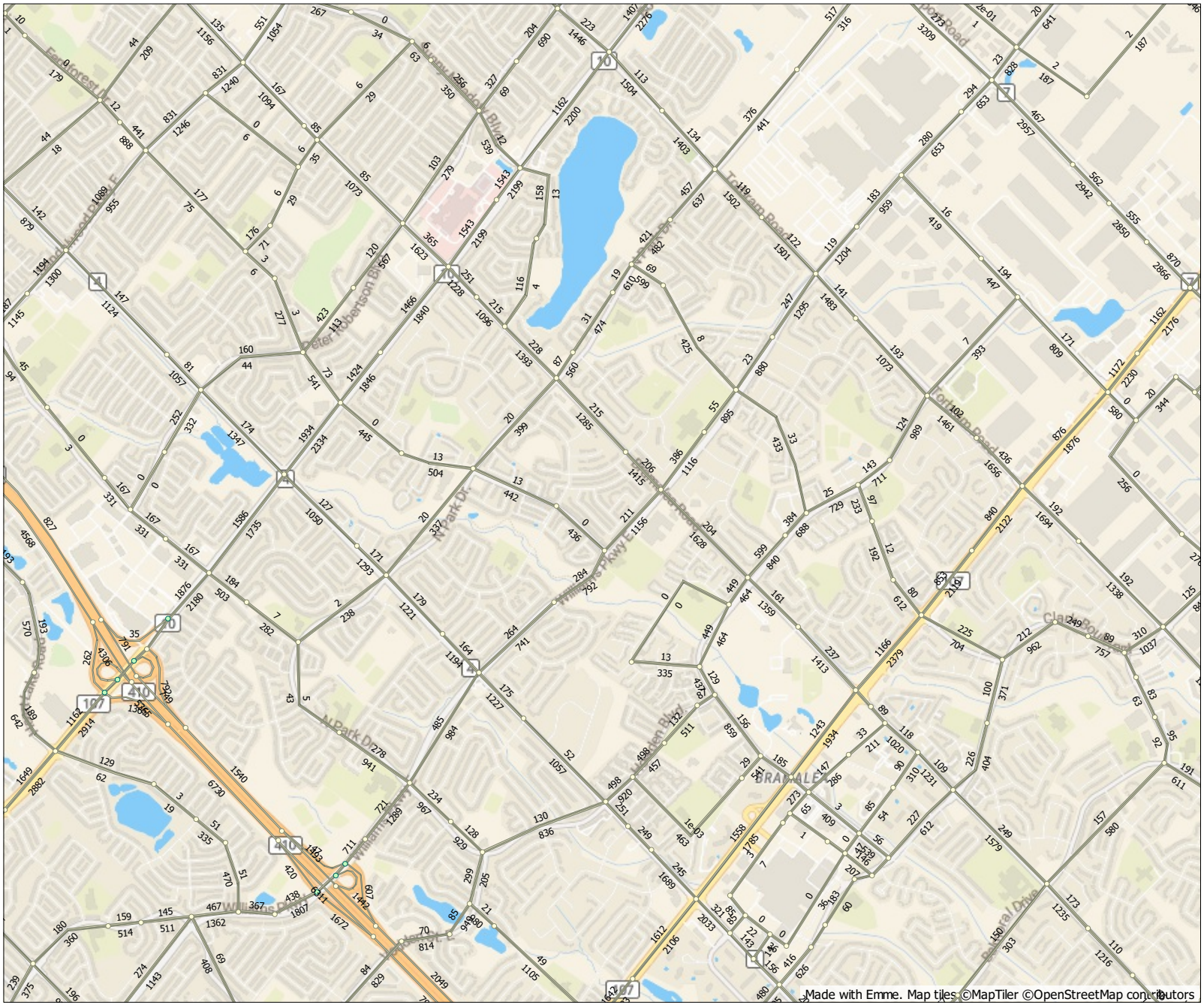
SEGMENTS		Street A	Section 1 Dixie Rd. to Mackay St.	Section 2 Mackay St. to Bramalea Rd.	Section 3 Bramalea Rd. to Glenridge Rd.	Section 4 Glenridge Rd. to Grennoble Blvd.	Section 5 Grenoble Blvd to Graymar Rd.	Section 6 Graymar Rd. to Torbram Rd.
Pedestrian	Sidewalk Width Boulevard Width	**E**	1.5 m > 2 m	1.5 m > 2 m	1.5 m > 2 m	1.5 m > 2 m	1.5 m > 2 m	1.5 m > 2 m
	Avg Daily Curb Lane Traffic Volume		> 3000	> 3000	> 3000	> 3000	> 3000	> 3000
	Operating Speed On-Street Parking		> 50 to 60 km/h no	> 30 to 50 km/h no	> 30 to 50 km/h no	> 30 to 50 km/h no	> 30 to 50 km/h no	> 50 to 60 km/h no
	Exposure to Traffic PLoS		**E**	**D**	**D**	**D**	**D**	**E**
	Effective Sidewalk Width		1.5 m	1.5 m	1.2 m	1.2 m	1.2 m	1.2 m
	Pedestrian Volume		250 ped/hr	250 ped/hr	250 ped/hr	250 ped/hr	250 ped/hr	250 ped/hr
	Crowding PLoS		**B**	**B**	**B**	**B**	**B**	**B**
	Level of Service		**E**	**D**	**D**	**D**	**D**	**E**
Bicycle	Type of Cycling Facility	**A**	Physically Separated	Physically Separated	Physically Separated	Physically Separated	Physically Separated	Physically Separated
	Number of Travel Lanes		~~2-3 lanes total~~	~~2-3 lanes total~~	~~2-3 lanes total~~	~~2-3 lanes total~~	~~2-3 lanes total~~	~~2-3 lanes total~~
	Operating Speed		~~≥ 50 to 60 km/h~~	~~≥ 50 to 60 km/h~~	~~>40 to <50 km/h~~	~~>40 to <50 km/h~~	~~>40 to <50 km/h~~	~~≥ 50 to 60 km/h~~
	# of Lanes & Operating Speed LoS		~~**A**~~	~~**A**~~	~~**A**~~	~~**A**~~	~~**A**~~	~~**A**~~
	Bike Lane (+ Parking Lane) Width							
	Bike Lane Width LoS		-	-	-	-	-	-
	Bike Lane Blockages							
	Blockage LoS		-	-	-	-	-	-
	Median Refuge Width (no median = < 1.8 m)		~~< 1.8 m refuge~~	~~< 1.8 m refuge~~	~~< 1.8 m refuge~~	~~< 1.8 m refuge~~	~~< 1.8 m refuge~~	~~< 1.8 m refuge~~
	No. of Lanes at Unsignalized Crossing		~~≤ 3 lanes~~	~~≤ 3 lanes~~	~~≤ 3 lanes~~	~~≤ 3 lanes~~	~~≤ 3 lanes~~	~~≤ 3 lanes~~
	Sidestreet Operating Speed		~~≤ 40 km/h~~	~~≤ 40 km/h~~	~~≤ 40 km/h~~	~~≤ 40 km/h~~	~~≤ 40 km/h~~	~~>50 to 60 km/h~~
	Unsignalized Crossing - Lowest LoS		~~**A**~~	~~**A**~~	~~**A**~~	~~**A**~~	~~**A**~~	~~**A**~~
	Level of Service		**A**	**A**	**A**	**A**	**A**	**A**
Transit	Facility Type	**D**	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic
	Friction or Ratio Transit:Posted Speed		Vt/Vp ≥ 0.8	Vt/Vp ≥ 0.8	Vt/Vp ≥ 0.8	Vt/Vp ≥ 0.8	Vt/Vp ≥ 0.8	Vt/Vp ≥ 0.8
	Level of Service		**D**	**D**	**D**	**D**	**D**	**D**
Truck	Truck Lane Width	**A**	> 3.7 m	> 3.7 m	> 3.7 m	> 3.7 m	> 3.7 m	> 3.7 m
	Travel Lanes per Direction		> 1	> 1	> 1	> 1	> 1	> 1
	Level of Service		**A**	**A**	**A**	**A**	**A**	**A**
Auto	**Level of Service**	**Not Applicable**						

APPENDIX E

REGION'S EMME MODEL OUTPUTS

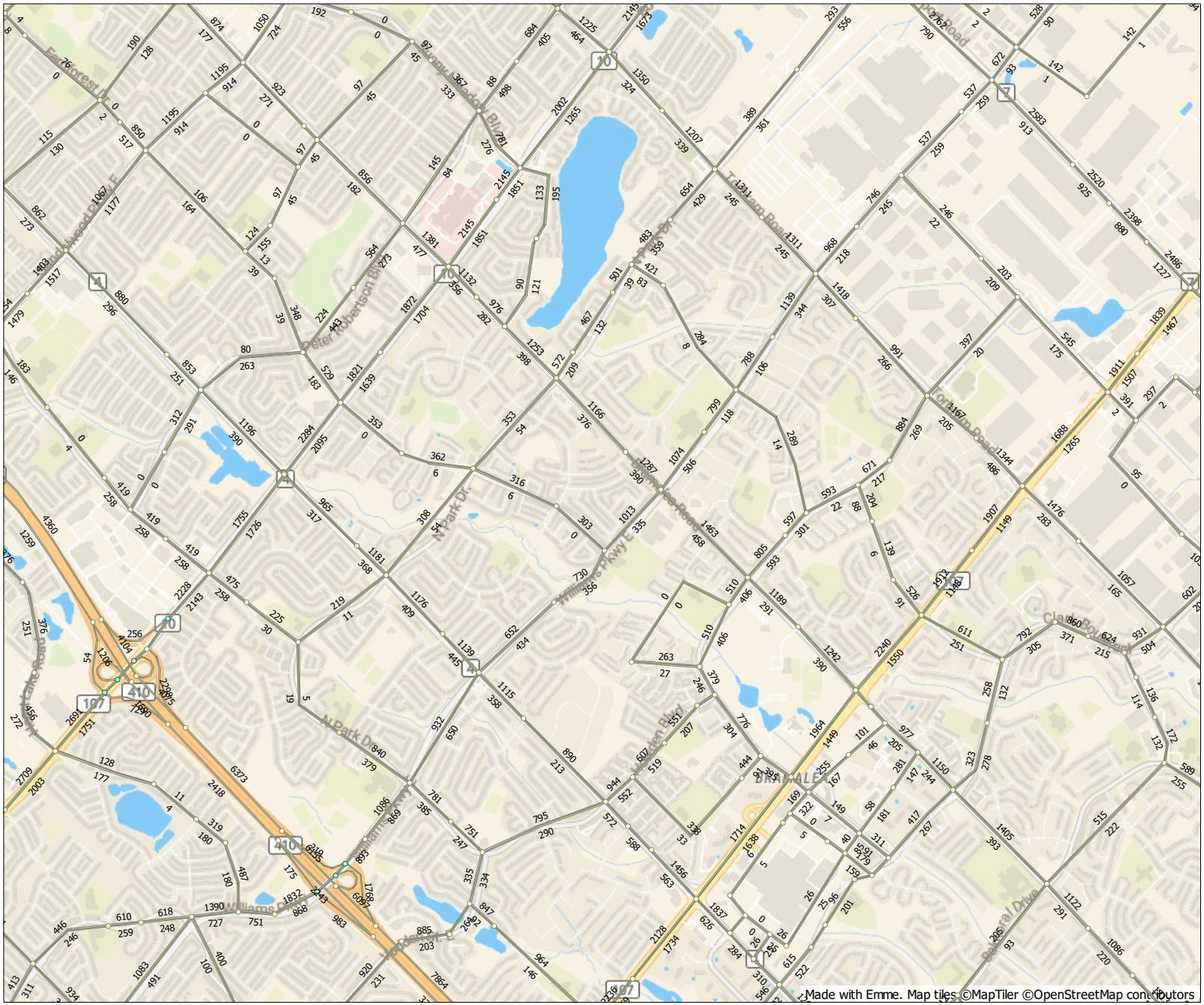
PARSONS

2011 Peak Hour Auto Volumes



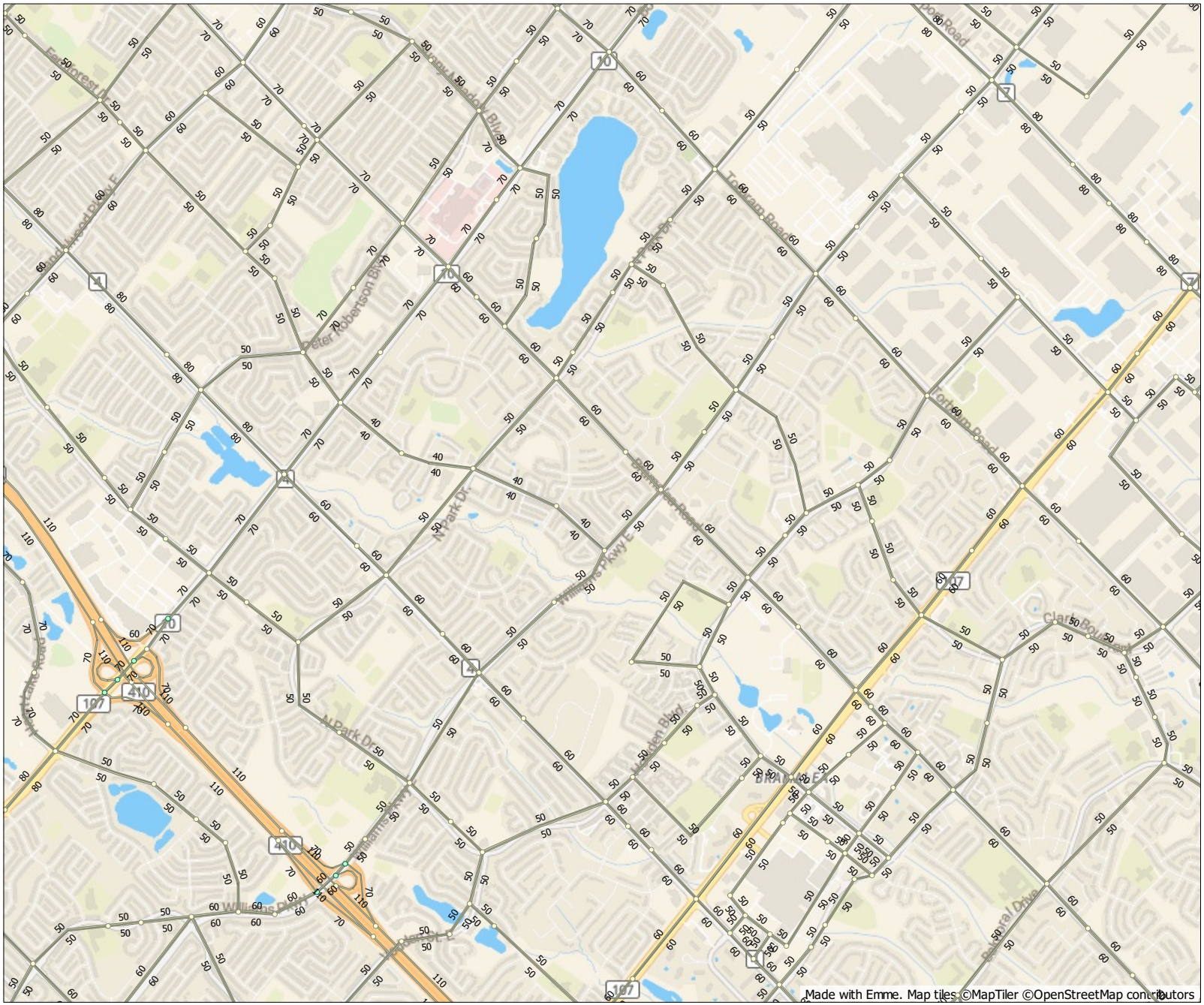
2011 (G:/TranModel/2011_Base/Database/emmebank)
Scenario 311: copy of scenario 211_AM_Ken whillans with Church Revised
2022-05-25 11:38 (lwu@COB10W-MJ03YM3B)

2011 Peak Hour Auto Volumes



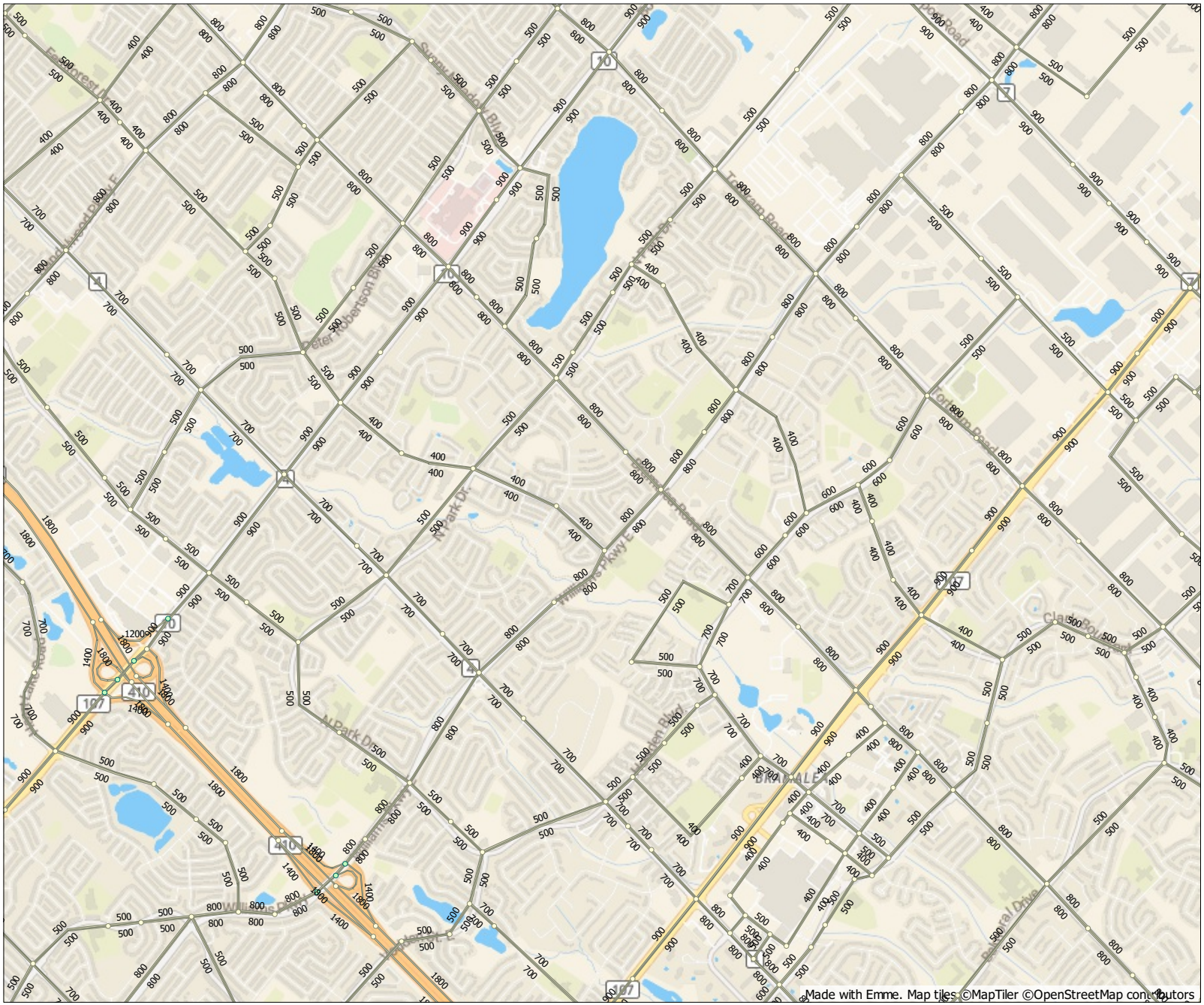
2011 (G:/TranModel/2011_Base/Database/emmebank)
Scenario 331: copy of scenario 231_PM_Ken whillans with Church Revised
2022-05-25 11:38 (lwu@COB10W-MJ03YM3B)

2011 Network



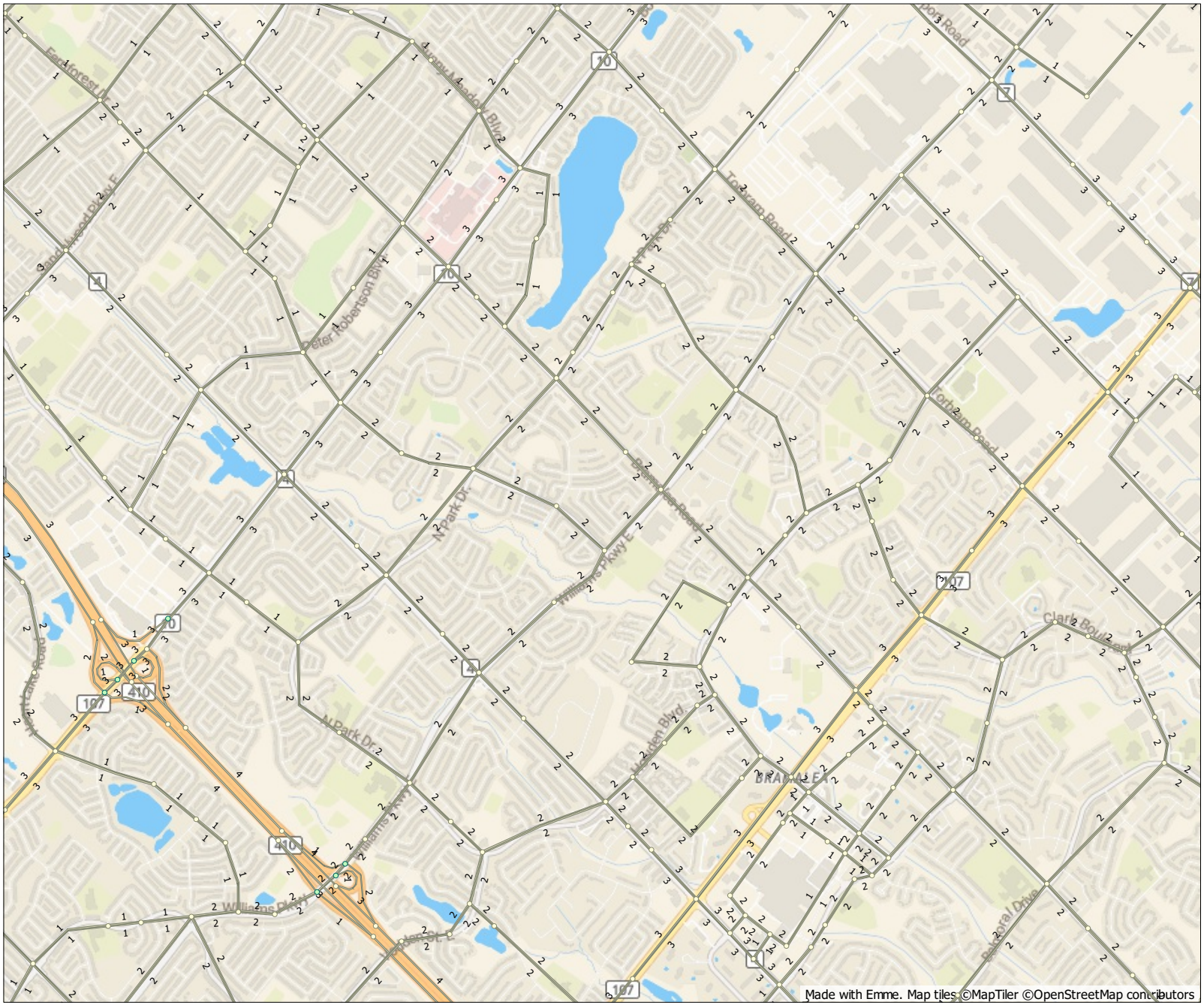
2011 (G:/TranModel/2011_Base/Database/emmebank)
Scenario 311: copy of scenario 211_AM_Ken whillans with Church Revised
2022-05-25 11:37 (lwu@COB10W-MJ03YM3B)

2011 Network



2011 (G:/TranModel/2011_Base/Database/emmebank)
Scenario 311: copy of scenario 211_AM_Ken whillans with Church Revised
2022-05-25 11:37 (lwu@COB10W-MJ03YM3B)

2011 Network

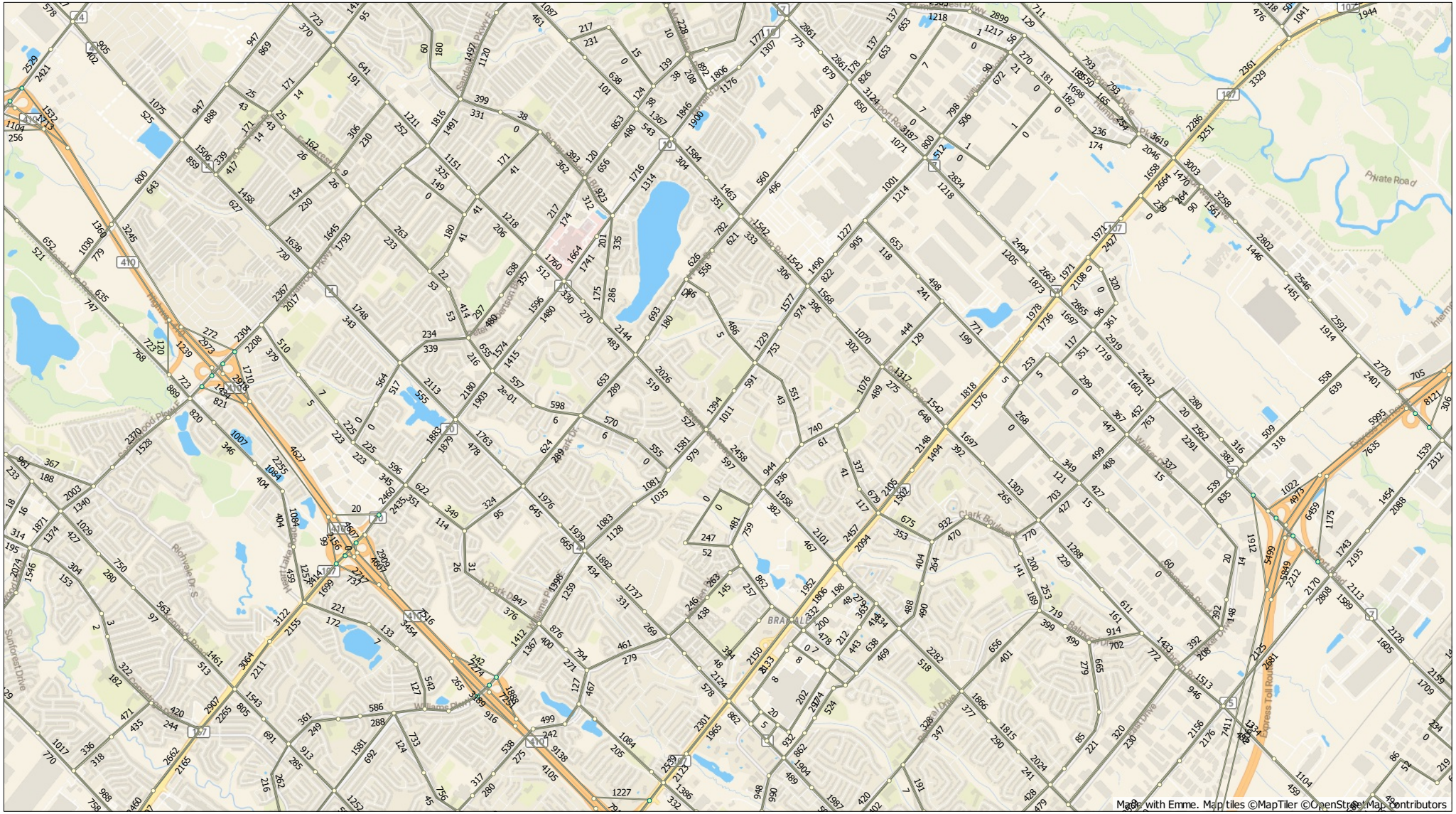


2011 (G:/TranModel/2011_Base/Database/emmebank)
Scenario 311: copy of scenario 211_AM_Ken whillans with Church Revised
2022-05-25 11:36 (lwu@COB10W-MJ03YM3B)

Peak Hour Auto Volumes

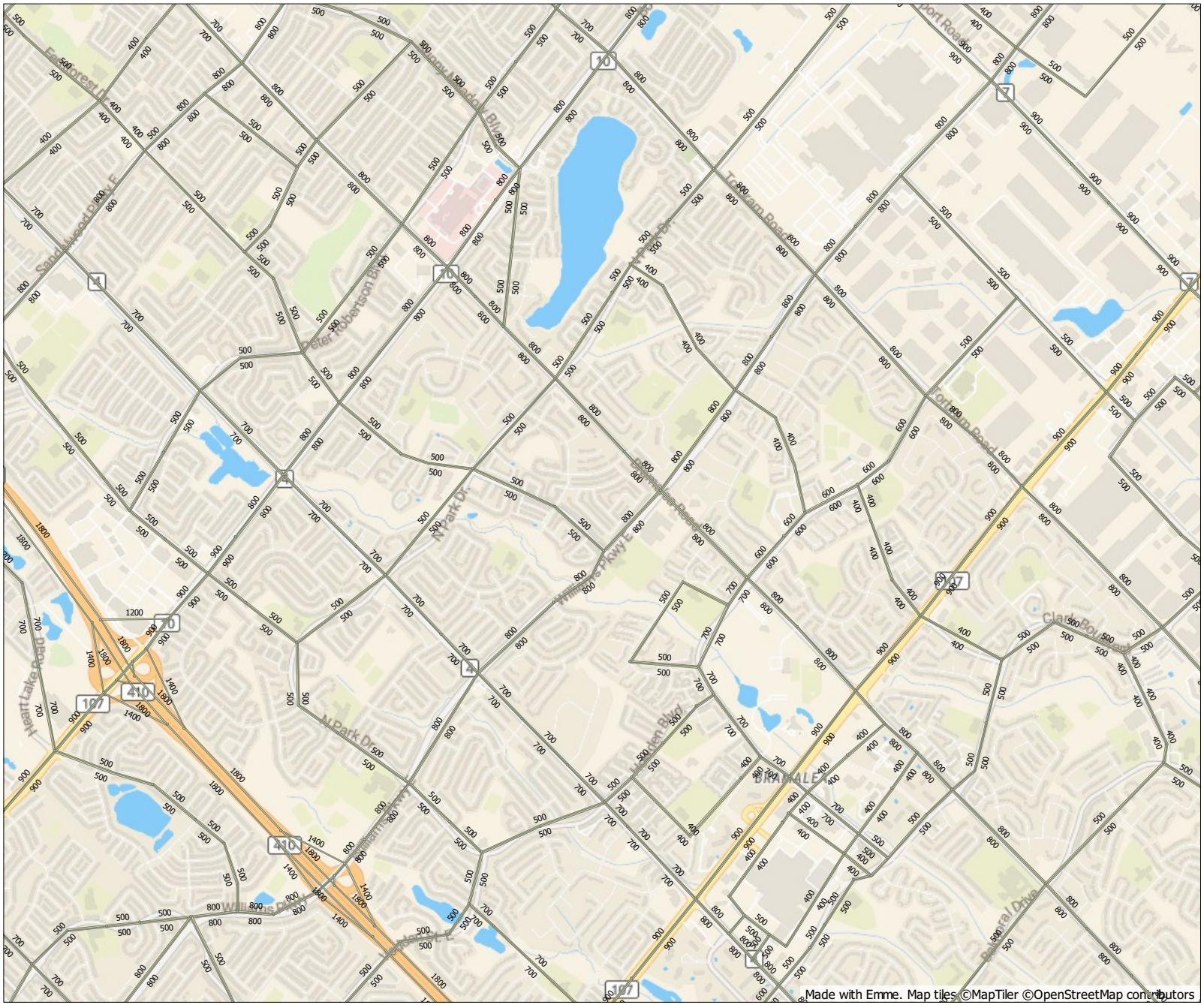
2031 with campus (G:/TranModel/2031_with_campus Base/Database/emmebank)
Scenario 1211: AM_KenWhillians with Church and Torbram Revised
2022-08-19 13:27 (lwu@COB10W-M003YM3B)

Peak Hour Auto Volumes



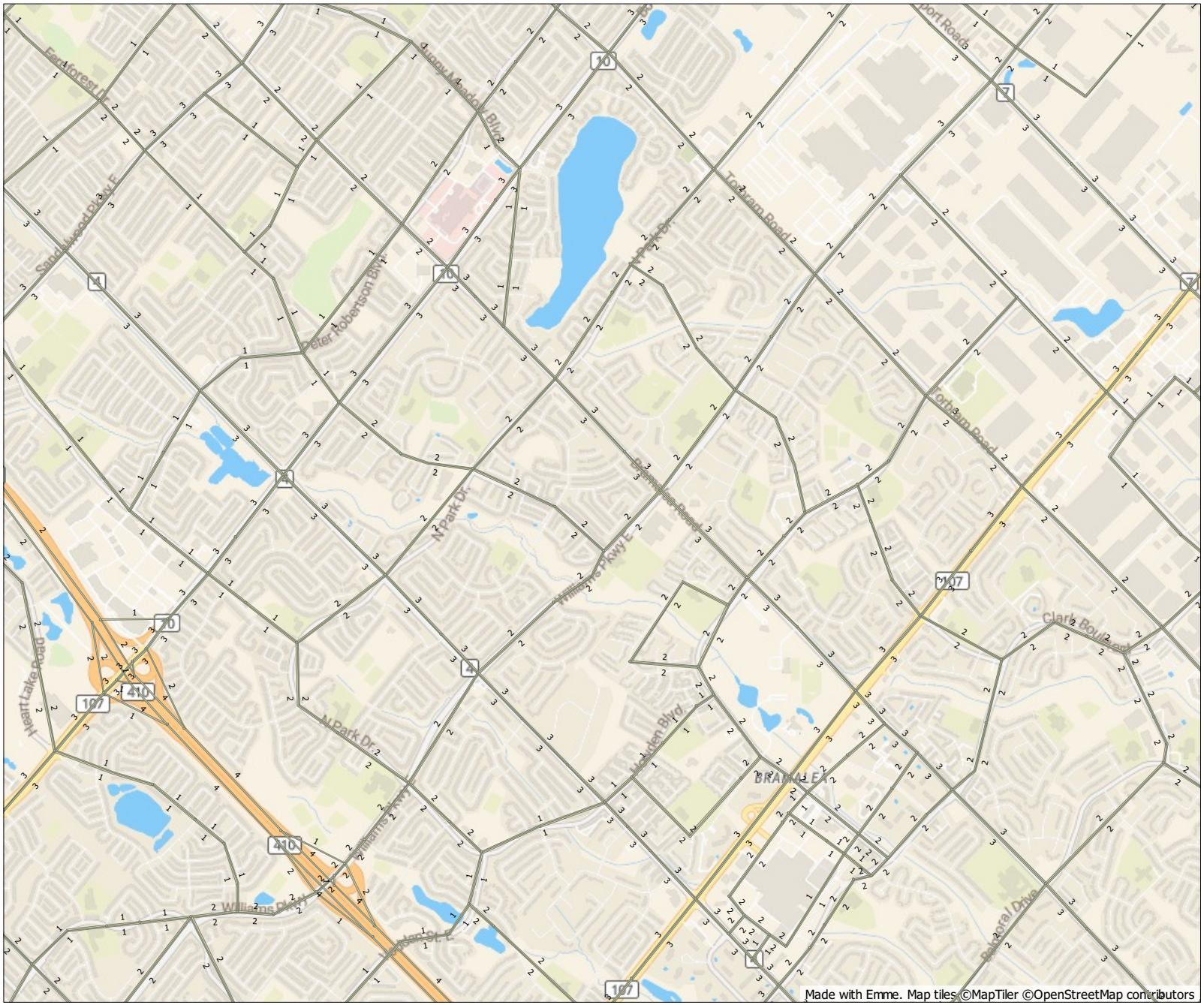
2031 with campus (G:/TranModel/2031_with_campus Base/Database/emmebank)
Scenario 1231: PM_KenWhillians with Church and Torbram Revised
2022-08-19 15:38 (lwu@COB10W-M003YM3B)

2031 Network



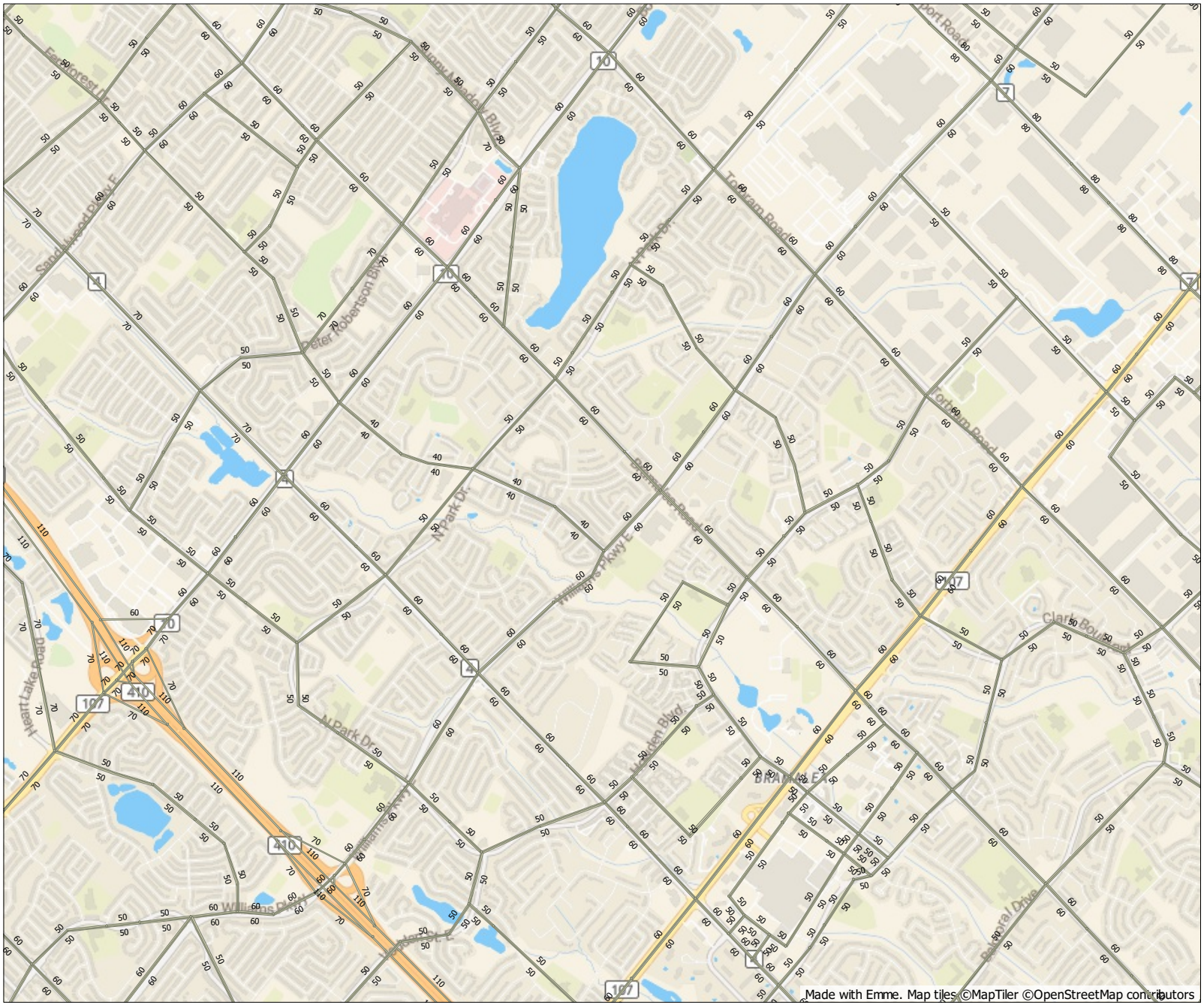
2031 with campus (G:/TranModel/2031_with_campus Base/Database/emmebank)
Scenario 1211: AM_KenWhillians with Church and Torbram Revised
2022-05-25 13:59 (lwu@COB10W-MJ03YM3B)

2031 Network



2031 with campus (G:/TranModel/2031_with_campus Base/Database/emmebank)
Scenario 1211: AM_KenWhillians with Church and Torbram Revised
2022-05-25 13:57 (lwu@COB10W-MJ03YM3B)

2031 Network

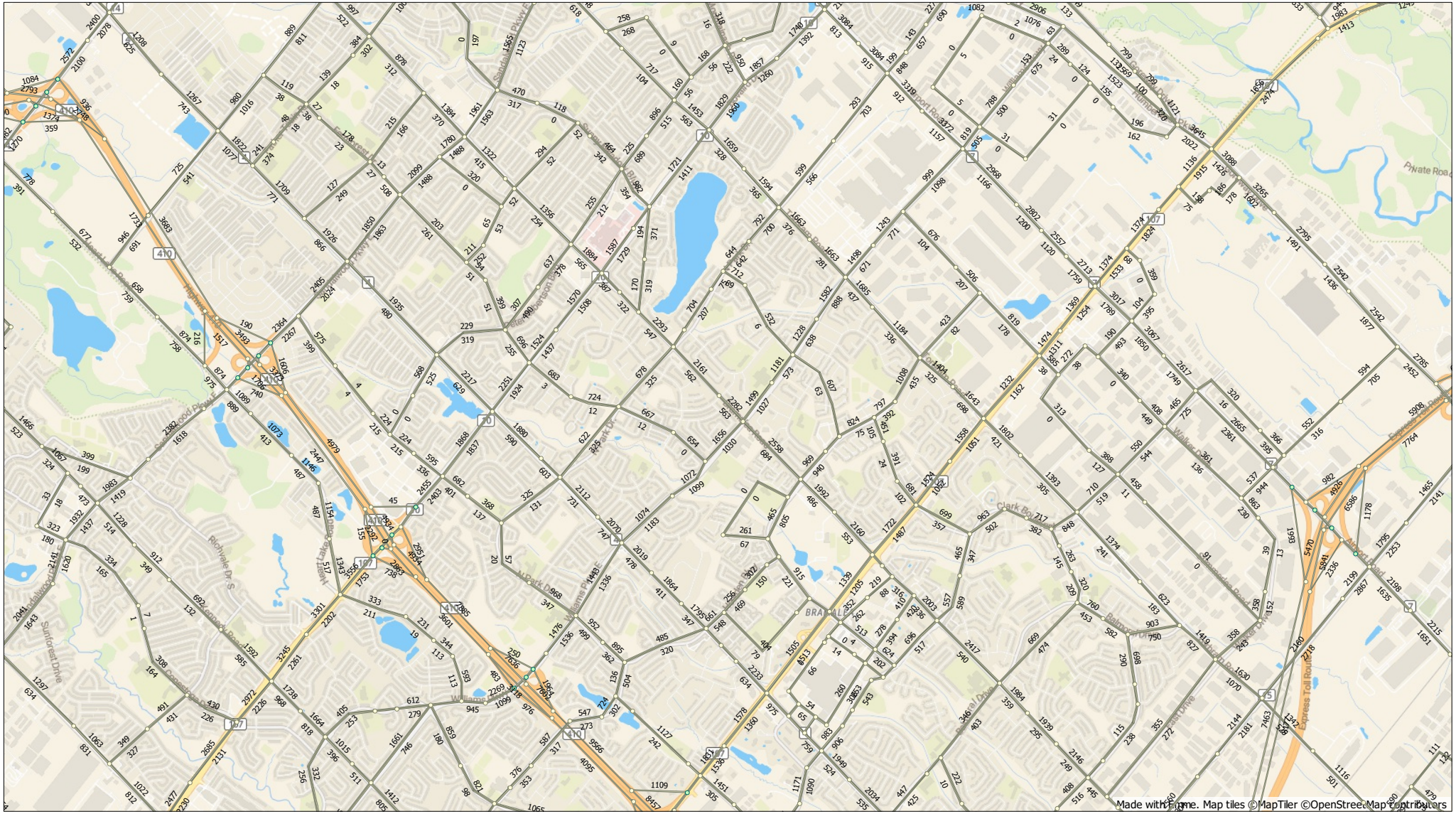


2031 with campus (G:/TranModel/2031_with_campus Base/Database/emmebank)
Scenario 1211: AM_KenWhillians with Church and Torbram Revised
2022-05-25 13:58 (lwu@COB10W-MJ03YM3B)

Peak Hour Auto Volume

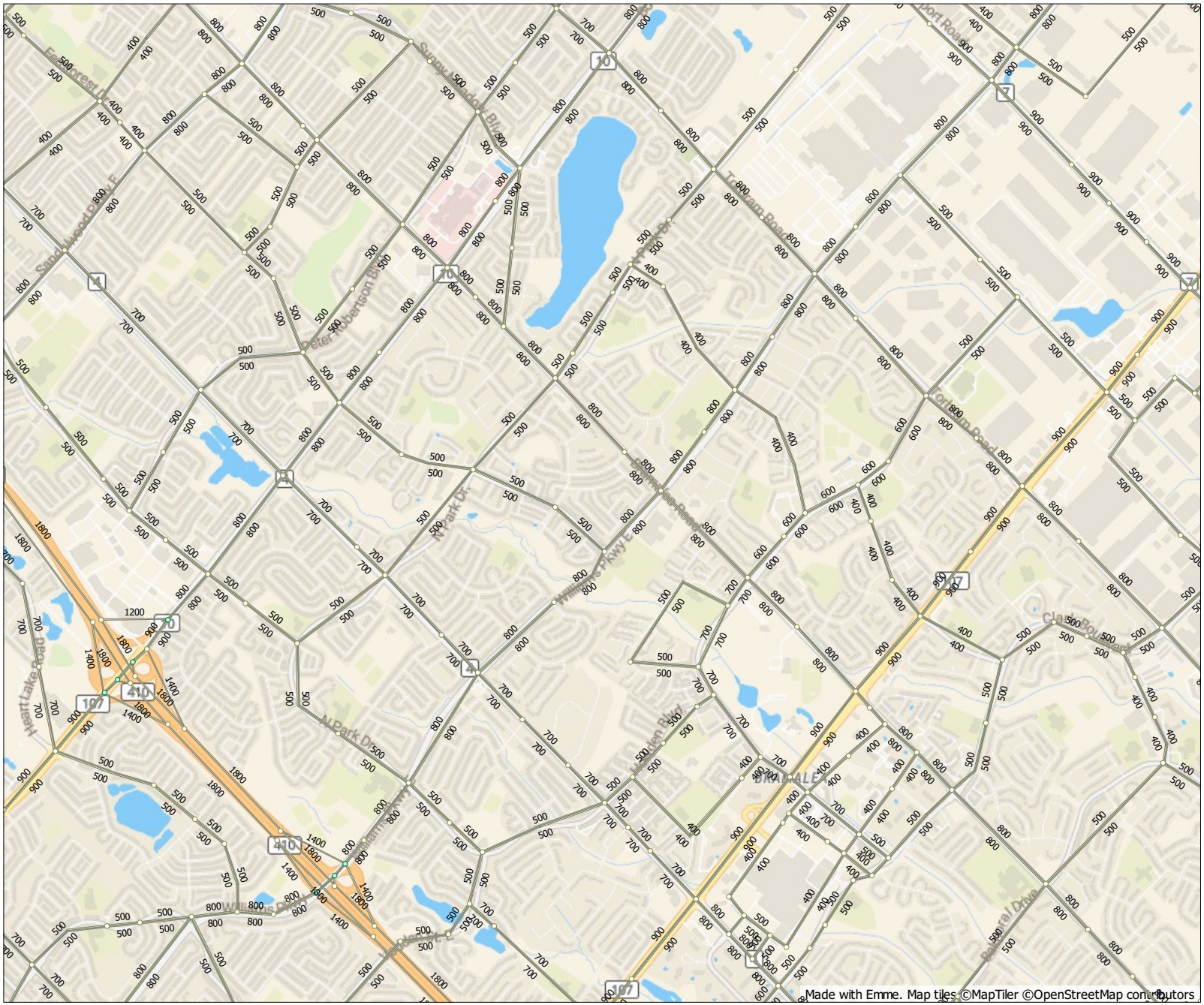
2041_WITH CAMPUS (G:/TranModel/2041_GTAW1_P890240E324840/Database/emmebank)
Scenario 111: copy of scenario 11_Tobram 4 lanes
2022-08-19 12:48 (lwu@COB10W-MJ03YM3B)

Peak Hour Auto Volume



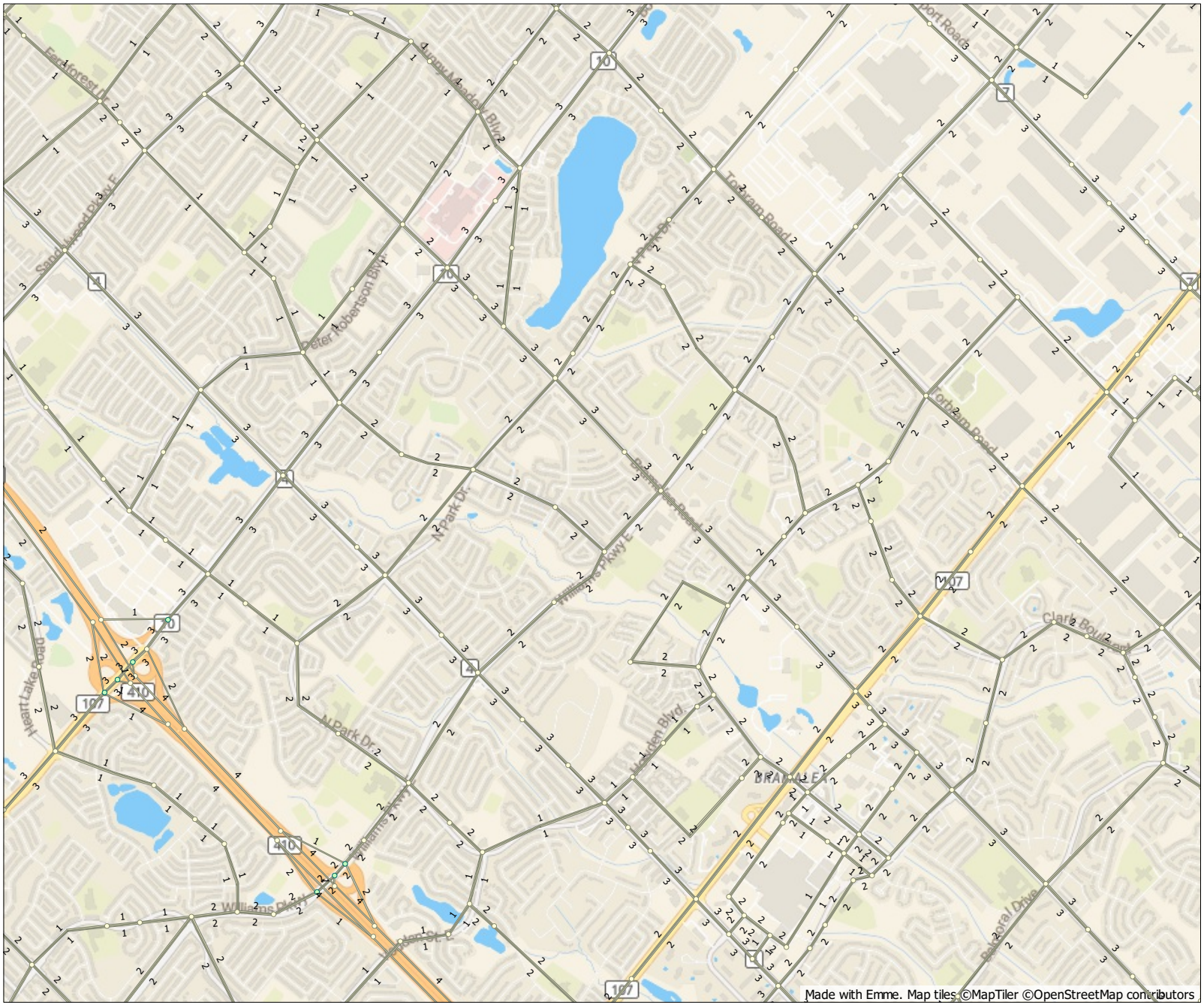
2041_WITH CAMPUS (G:/TranModel/2041_GTAW1_P890240E324840/Database/emmebank)
Scenario 131: copy of scenario 31_Tobram 4 lanes
2022-08-19 12:49 (lwu@COB10W-MJ03YM3B)

2041 Network



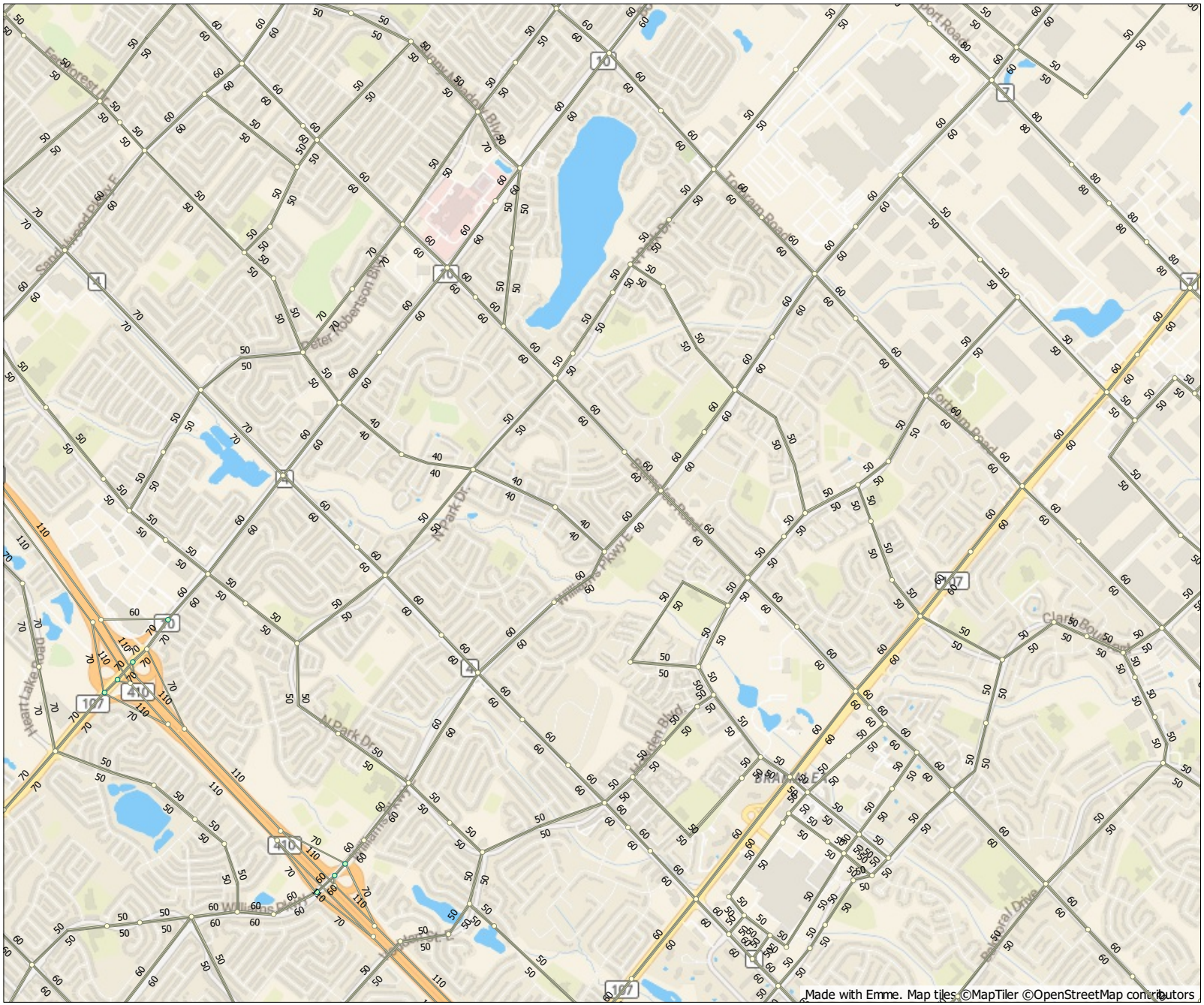
2041_WITH CAMPUS (G:/TranModel/2041_GTAW1_P890240E324840/Database/emmebank)
Scenario 111: copy of scenario 11_Tobram 4 lanes
2022-05-25 11:49 (lwu@COB10W-MJ03YM3B)

2041 Network



2041_WITH CAMPUS (G:/TranModel/2041_GTAW1_P890240E324840/Database/emmebank)
Scenario 111: copy of scenario 11_Tobram 4 lanes
2022-05-25 11:48 (lwu@COB10W-MJ03YM3B)

2041 Network



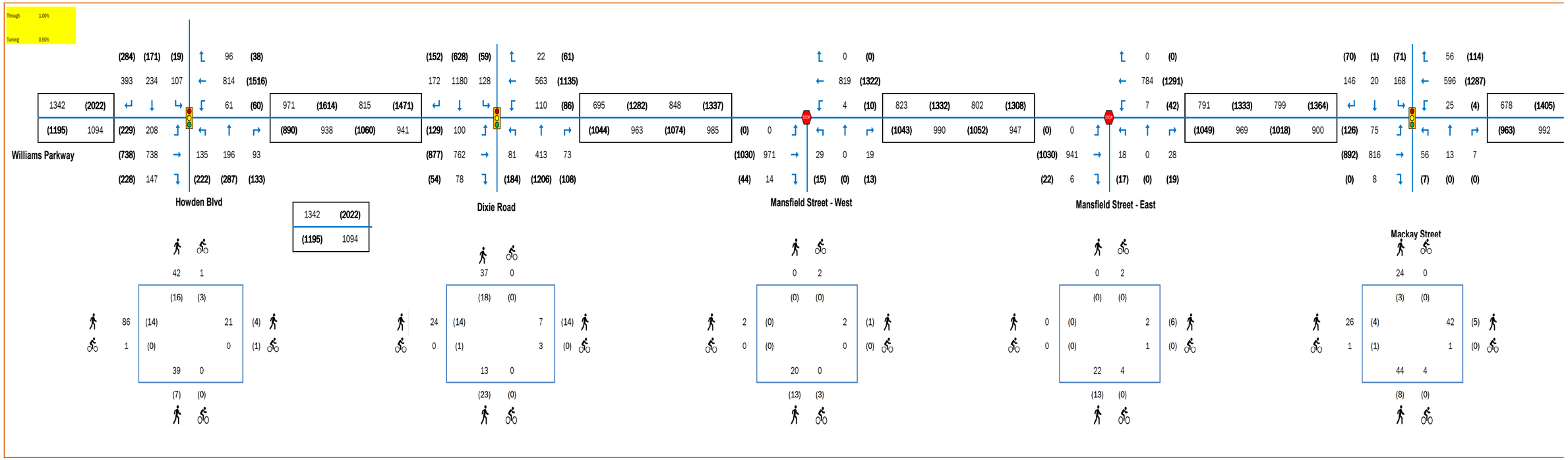
2041_WITH CAMPUS (G:/TranModel/2041_GTAW1_P890240E324840/Database/emmebank)
Scenario 111: copy of scenario 11_Tobram 4 lanes
2022-05-25 11:49 (lwu@COB10W-MJ03YM3B)

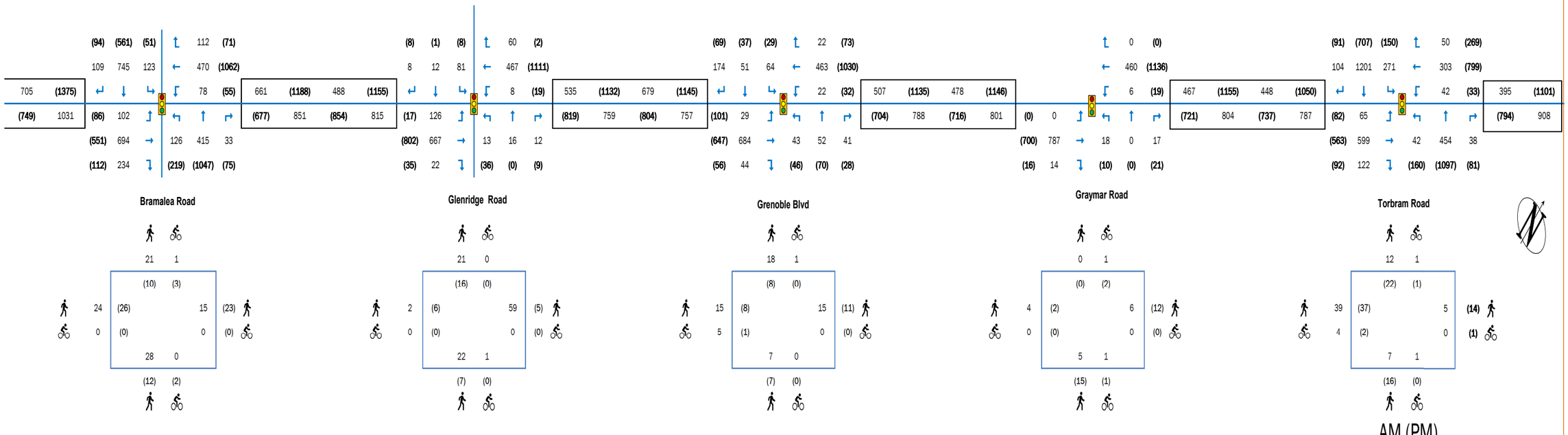
APPENDIX F

2031 TRAFFIC FORECASTS

PARSONS

Future Counts (2031)





APPENDIX G

SYNCHRO REPORTS, FUTURE 2031 CONDITIONS

PARSONS

Future Analysis Results (2031) - AM

Without Improvement

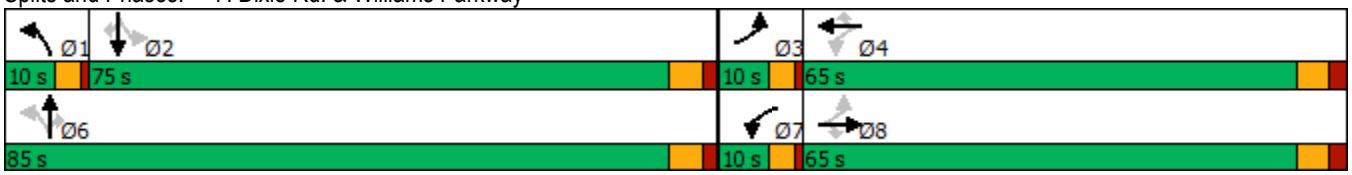
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	100	762	78	110	563	22	81	413	73	128	1180	172
Future Volume (vph)	100	762	78	110	563	22	81	413	73	128	1180	172
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	92.0		92.0	90.0		90.0	66.0		67.0	127.0		58.0
Storage Lanes	1		1	1		1	1		1	1		1
Taper Length (m)	51.0			55.0			100.0			62.0		
Satd. Flow (prot)	1738	3476	1585	1722	3411	1484	1738	4995	1541	1755	5043	1601
Flt Permitted	0.278			0.147			0.145			0.490		
Satd. Flow (perm)	500	3476	1540	265	3411	1397	265	4995	1503	900	5043	1521
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			82			75			77			136
Link Speed (k/h)		48			60			50			50	
Link Distance (m)		222.3			270.7			250.0			175.5	
Travel Time (s)		16.7			16.2			18.0			12.6	
Confl. Peds. (#/hr)	37		13	13		37	24		7	7		24
Confl. Bikes (#/hr)									3			
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	5%	5%	3%	6%	7%	10%	5%	5%	6%	4%	4%	2%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	105	802	82	116	593	23	85	435	77	135	1242	181
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases	3	8		7	4		1	6			2	
Permitted Phases	8		8	4		4	6		6	2		2
Detector Phase	3	8	8	7	4	4	1	6	6	2	2	2
Switch Phase												
Minimum Initial (s)	5.0	8.0	8.0	5.0	8.0	8.0	5.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	10.0	43.3	43.3	10.0	43.3	43.3	10.0	36.0	36.0	36.0	36.0	36.0
Total Split (s)	10.0	65.0	65.0	10.0	65.0	65.0	10.0	85.0	85.0	75.0	75.0	75.0
Total Split (%)	6.3%	40.6%	40.6%	6.3%	40.6%	40.6%	6.3%	53.1%	53.1%	46.9%	46.9%	46.9%
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	2.3	2.3	1.0	2.3	2.3	1.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.3	6.3	4.0	6.3	6.3	4.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead			Lag	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None	None	None	Max	Max	Max	Max	Max
Act Effct Green (s)	51.1	42.8	42.8	51.1	42.8	42.8	81.3	79.2	79.2	69.2	69.2	69.2
Actuated g/C Ratio	0.35	0.30	0.30	0.35	0.30	0.30	0.56	0.55	0.55	0.48	0.48	0.48
v/c Ratio	0.46	0.78	0.16	0.75	0.59	0.05	0.40	0.16	0.09	0.31	0.51	0.23
Control Delay	36.6	52.0	7.4	61.5	45.4	0.2	22.0	17.1	4.0	27.3	27.7	7.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	36.6	52.0	7.4	61.5	45.4	0.2	22.0	17.1	4.0	27.3	27.7	7.7
LOS	D	D	A	E	D	A	C	B	A	C	C	A
Approach Delay		46.7			46.6			16.1			25.4	
Approach LOS		D			D			B			C	
Queue Length 50th (m)	19.6	110.3	0.0	21.8	76.0	0.0	10.7	21.6	0.0	23.1	87.8	6.8
Queue Length 95th (m)	32.4	133.1	11.9	#41.6	94.4	0.0	22.6	33.3	8.4	45.2	117.9	23.1
Internal Link Dist (m)		198.3			246.7			226.0			151.5	

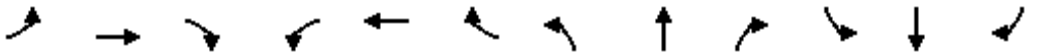
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (m)	92.0		92.0	90.0		90.0	66.0		67.0	127.0		58.0
Base Capacity (vph)	228	1417	676	154	1390	614	210	2741	859	431	2417	799
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.46	0.57	0.12	0.75	0.43	0.04	0.40	0.16	0.09	0.31	0.51	0.23

Intersection Summary

Area Type: Other
Cycle Length: 160
Actuated Cycle Length: 144.4
Natural Cycle: 100
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.78
Intersection Signal Delay: 33.4 — Intersection LOS: C
Intersection Capacity Utilization 82.6% — ICU Level of Service E
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 7: Dixie Rd. & Williams Parkway





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	100	762	78	110	563	22	81	413	73	128	1180	172
Future Volume (vph)	100	762	78	110	563	22	81	413	73	128	1180	172
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.3	6.3	4.0	6.3	6.3	4.0	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes	1.00	1.00	0.97	1.00	1.00	0.95	1.00	1.00	0.98	1.00	1.00	0.95
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	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)	1732	3476	1543	1721	3411	1404	1737	4995	1505	1745	5043	1527
Flt Permitted	0.28	1.00	1.00	0.15	1.00	1.00	0.14	1.00	1.00	0.49	1.00	1.00
Satd. Flow (perm)	507	3476	1543	266	3411	1404	265	4995	1505	900	5043	1527
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	105	802	82	116	593	23	85	435	77	135	1242	181
RTOR Reduction (vph)	0	0	58	0	0	16	0	0	35	0	0	71
Lane Group Flow (vph)	105	802	24	116	593	7	85	435	42	135	1242	110
Confl. Peds. (#/hr)	37		13	13		37	24		7	7		24
Confl. Bikes (#/hr)									3			
Heavy Vehicles (%)	5%	5%	3%	6%	7%	10%	5%	5%	6%	4%	4%	2%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases	3	8		7	4		1	6			2	
Permitted Phases	8		8	4		4	6		6	2		2
Actuated Green, G (s)	48.8	42.8	42.8	48.8	42.8	42.8	79.2	79.2	79.2	69.2	69.2	69.2
Effective Green, g (s)	48.8	42.8	42.8	48.8	42.8	42.8	79.2	79.2	79.2	69.2	69.2	69.2
Actuated g/C Ratio	0.34	0.30	0.30	0.34	0.30	0.30	0.55	0.55	0.55	0.48	0.48	0.48
Clearance Time (s)	4.0	6.3	6.3	4.0	6.3	6.3	4.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Grp Cap (vph)	222	1030	457	150	1011	416	206	2741	826	431	2418	732
v/s Ratio Prot	0.02	c0.23		c0.03	0.17		c0.02	0.09			c0.25	
v/s Ratio Perm	0.14		0.02	0.23		0.00	0.21		0.03	0.15		0.07
v/c Ratio	0.47	0.78	0.05	0.77	0.59	0.02	0.41	0.16	0.05	0.31	0.51	0.15
Uniform Delay, d1	34.8	46.4	36.3	39.2	43.2	35.9	17.9	16.1	15.1	23.0	25.9	21.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.3	4.4	0.1	24.7	1.4	0.0	2.8	0.1	0.1	1.9	0.8	0.4
Delay (s)	38.1	50.8	36.4	63.9	44.6	35.9	20.7	16.2	15.2	24.9	26.7	21.5
Level of Service	D	D	D	E	D	D	C	B	B	C	C	C
Approach Delay (s)		48.3			47.4			16.7			25.9	
Approach LOS		D			D			B			C	

Intersection Summary			
HCM 2000 Control Delay	34.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	144.3	Sum of lost time (s)	20.3
Intersection Capacity Utilization	82.6%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	971	14	4	819	29	19
Future Volume (vph)	971	14	4	819	29	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)		0.0	50.0		0.0	0.0
Storage Lanes		0	1		1	0
Taper Length (m)			30.0		2.5	
Satd. Flow (prot)	3465	0	1825	3476	1694	0
Flt Permitted			0.950		0.971	
Satd. Flow (perm)	3465	0	1825	3476	1694	0
Link Speed (k/h)	60			60	50	
Link Distance (m)	270.7			273.9	143.1	
Travel Time (s)	16.2			16.4	10.3	
Confl. Peds. (#/hr)		20	20		2	2
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	5%	15%	0%	5%	7%	0%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1037	0	4	862	51	0
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 38.0%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	971	14	4	819	29	19
Future Volume (Veh/h)	971	14	4	819	29	19
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	1022	15	4	862	31	20
Pedestrians	2			2	20	
Lane Width (m)	3.7			3.7	3.7	
Walking Speed (m/s)	1.2			1.2	1.2	
Percent Blockage	0			0	2	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)	271					
pX, platoon unblocked			0.79		0.79	0.79
vC, conflicting volume			1057		1490	540
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			543		1091	0
tC, single (s)			4.1		6.9	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.6	3.3
p0 queue free %			100		80	98
cM capacity (veh/h)			805		155	847

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1
Volume Total	681	356	4	431	431	51
Volume Left	0	0	4	0	0	31
Volume Right	0	15	0	0	0	20
cSH	1700	1700	805	1700	1700	229
Volume to Capacity	0.40	0.21	0.00	0.25	0.25	0.22
Queue Length 95th (m)	0.0	0.0	0.1	0.0	0.0	6.3
Control Delay (s)	0.0	0.0	9.5	0.0	0.0	25.2
Lane LOS			A			D
Approach Delay (s)	0.0		0.0			25.2
Approach LOS						D

Intersection Summary				
Average Delay	0.7			
Intersection Capacity Utilization	38.0%	ICU Level of Service		A
Analysis Period (min)	15			

8: Mansfield St. E & Williams Parkway
Timing Plan: AM

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	941	6	7	784	18	28
Future Volume (vph)	941	6	7	784	18	28
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)		0.0	50.0		0.0	0.0
Storage Lanes		0	1		1	0
Taper Length (m)			40.0		2.5	
Satd. Flow (prot)	3507	0	1601	3510	1689	0
Flt Permitted			0.950		0.981	
Satd. Flow (perm)	3507	0	1601	3510	1689	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	273.9			382.9	71.0	
Travel Time (s)	19.7			27.6	5.1	
Confl. Peds. (#/hr)		22	22			2
Confl. Bikes (#/hr)		4				1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	4%	0%	14%	4%	0%	4%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	997	0	7	825	48	0
Sign Control	Free			Free	Stop	

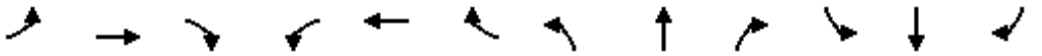
Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 36.9%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	941	6	7	784	18	28
Future Volume (Veh/h)	941	6	7	784	18	28
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	991	6	7	825	19	29
Pedestrians				2	22	
Lane Width (m)				3.7	3.7	
Walking Speed (m/s)				1.2	1.2	
Percent Blockage				0	2	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)				383		
pX, platoon unblocked					0.97	
vC, conflicting volume			1019		1442	522
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			1019		1396	522
tC, single (s)			4.4		6.8	7.0
tC, 2 stage (s)						
tF (s)			2.3		3.5	3.3
p0 queue free %			99		85	94
cM capacity (veh/h)			597		127	484

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1
Volume Total	661	336	7	412	412	48
Volume Left	0	0	7	0	0	19
Volume Right	0	6	0	0	0	29
cSH	1700	1700	597	1700	1700	229
Volume to Capacity	0.39	0.20	0.01	0.24	0.24	0.21
Queue Length 95th (m)	0.0	0.0	0.3	0.0	0.0	5.9
Control Delay (s)	0.0	0.0	11.1	0.0	0.0	24.9
Lane LOS			B			C
Approach Delay (s)	0.0		0.1			24.9
Approach LOS						C

Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	36.9%	ICU Level of Service	A
Analysis Period (min)	15		

15: Williams Parkway & Mackay St.
Timing Plan: AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	75	816	8	25	596	56	56	13	7	168	20	146
Future Volume (vph)	75	816	8	25	596	56	56	13	7	168	20	146
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	50.0		0.0	30.0		0.0	0.0		0.0	40.0		0.0
Storage Lanes	1		0	1		0	0		0	1		0
Taper Length (m)	30.0			25.0			2.5			30.0		
Satd. Flow (prot)	1706	3475	0	1560	3353	0	0	1818	0	1706	1507	0
Flt Permitted	0.374			0.302				0.532		0.715		
Satd. Flow (perm)	657	3475	0	482	3353	0	0	982	0	1212	1507	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1			11			3			154	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		382.9			440.2			46.0			136.3	
Travel Time (s)		27.6			31.7			3.3			9.8	
Confl. Peds. (#/hr)	24		44	44		24	26		42	42		26
Confl. Bikes (#/hr)			4						1			1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	7%	4%	88%	17%	6%	13%	0%	0%	0%	7%	17%	4%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	79	867	0	26	686	0	0	80	0	177	175	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			2			4			4	
Permitted Phases	2			2			4			4		
Detector Phase	2	2		2	2		4	4		4	4	
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		8.0	8.0		8.0	8.0	
Minimum Split (s)	33.0	33.0		33.0	33.0		37.0	37.0		37.0	37.0	
Total Split (s)	100.0	100.0		100.0	100.0		60.0	60.0		60.0	60.0	
Total Split (%)	62.5%	62.5%		62.5%	62.5%		37.5%	37.5%		37.5%	37.5%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0			6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	C-Max	C-Max		C-Max	C-Max		None	None		None	None	
Act Effct Green (s)	115.8	115.8		115.8	115.8			32.2		32.2	32.2	
Actuated g/C Ratio	0.72	0.72		0.72	0.72			0.20		0.20	0.20	
v/c Ratio	0.17	0.34		0.07	0.28			0.40		0.73	0.41	
Control Delay	9.3	9.3		8.9	8.6			57.4		76.0	12.6	
Queue Delay	0.0	0.0		0.0	0.0			0.0		0.0	0.0	
Total Delay	9.3	9.3		8.9	8.6			57.4		76.0	12.6	
LOS	A	A		A	A			E		E	B	
Approach Delay		9.3			8.6			57.4			44.5	
Approach LOS		A			A			E			D	
Queue Length 50th (m)	7.0	47.4		2.2	34.7			21.8		53.8	5.6	
Queue Length 95th (m)	17.2	74.7		7.0	56.2			35.9		75.0	24.7	
Internal Link Dist (m)		358.9			416.2			22.0			112.3	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (m)	50.0			30.0						40.0		
Base Capacity (vph)	475	2515		348	2430			333		409	610	
Starvation Cap Reductn	0	0		0	0			0		0	0	
Spillback Cap Reductn	0	0		0	0			0		0	0	
Storage Cap Reductn	0	0		0	0			0		0	0	
Reduced v/c Ratio	0.17	0.34		0.07	0.28			0.24		0.43	0.29	

Intersection Summary			
Area Type:	Other		
Cycle Length: 160			
Actuated Cycle Length: 160			
Offset: 137 (86%), Referenced to phase 2:EBWB, Start of Green			
Natural Cycle: 70			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.73			
Intersection Signal Delay: 16.8		Intersection LOS: B	
Intersection Capacity Utilization 90.7%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 15: Williams Parkway & Mackay St.

15: Williams Parkway & Mackay St.
Timing Plan: AM

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	75	816	8	25	596	56	56	13	7	168	20	146
Future Volume (vph)	75	816	8	25	596	56	56	13	7	168	20	146
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0			6.0		6.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	0.99			0.99		1.00	0.95	
Flpb, ped/bikes	0.98	1.00		0.97	1.00			0.98		0.95	1.00	
Frt	1.00	1.00		1.00	0.99			0.99		1.00	0.87	
Flt Protected	0.95	1.00		0.95	1.00			0.96		0.95	1.00	
Satd. Flow (prot)	1663	3474		1509	3354			1782		1613	1507	
Flt Permitted	0.37	1.00		0.30	1.00			0.53		0.72	1.00	
Satd. Flow (perm)	654	3474		479	3354			983		1215	1507	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	79	859	8	26	627	59	59	14	7	177	21	154
RTOR Reduction (vph)	0	0	0	0	3	0	0	2	0	0	123	0
Lane Group Flow (vph)	79	867	0	26	683	0	0	78	0	177	52	0
Confl. Peds. (#/hr)	24		44	44		24	26		42	42		26
Confl. Bikes (#/hr)			4						1			1
Heavy Vehicles (%)	7%	4%	88%	17%	6%	13%	0%	0%	0%	7%	17%	4%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			2			4			4	
Permitted Phases	2			2			4			4		
Actuated Green, G (s)	115.8	115.8		115.8	115.8			32.2		32.2	32.2	
Effective Green, g (s)	115.8	115.8		115.8	115.8			32.2		32.2	32.2	
Actuated g/C Ratio	0.72	0.72		0.72	0.72			0.20		0.20	0.20	
Clearance Time (s)	6.0	6.0		6.0	6.0			6.0		6.0	6.0	
Vehicle Extension (s)	5.0	5.0		5.0	5.0			5.0		5.0	5.0	
Lane Grp Cap (vph)	473	2514		346	2427			197		244	303	
v/s Ratio Prot		c0.25			0.20						0.03	
v/s Ratio Perm	0.12			0.05				0.08		c0.15		
v/c Ratio	0.17	0.34		0.08	0.28			0.39		0.73	0.17	
Uniform Delay, d1	6.9	8.1		6.5	7.7			55.4		59.8	52.9	
Progression Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	0.8	0.4		0.4	0.3			2.7		12.4	0.6	
Delay (s)	7.7	8.5		6.9	8.0			58.1		72.2	53.4	
Level of Service	A	A		A	A			E		E	D	
Approach Delay (s)		8.4			7.9			58.1			62.9	
Approach LOS		A			A			E			E	

Intersection Summary			
HCM 2000 Control Delay	19.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	90.7%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

19: Bramalea Rd. & Williams Parkway
Timing Plan: AM

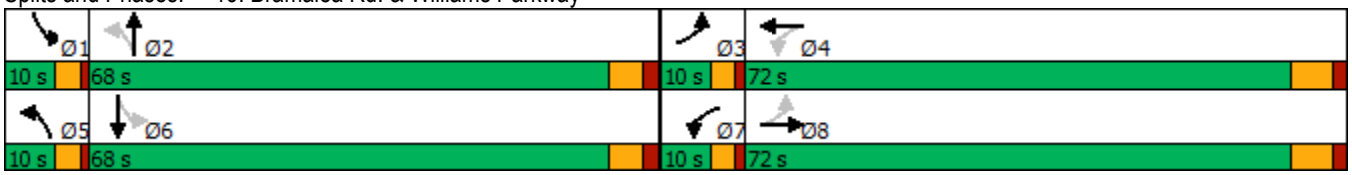
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	102	694	234	78	470	112	126	415	33	123	745	109
Future Volume (vph)	102	694	234	78	470	112	126	415	33	123	745	109
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	45.0		0.0	20.0		0.0	40.0		0.0	55.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	30.0			30.0			90.0			75.0		
Satd. Flow (prot)	1644	3272	0	1738	3302	0	1573	3410	0	1772	3435	0
Flt Permitted	0.309			0.119			0.193			0.422		
Satd. Flow (perm)	529	3272	0	218	3302	0	320	3410	0	778	3435	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		35			22			6			12	
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		440.2			303.2			368.3			146.0	
Travel Time (s)		31.7			21.8			22.1			8.8	
Confl. Peds. (#/hr)	21		28	28		21	24		15	15		24
Confl. Bikes (#/hr)						1						
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	11%	4%	11%	5%	6%	8%	16%	6%	0%	3%	3%	7%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	107	977	0	82	613	0	133	472	0	129	899	0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8			4			2			6		
Detector Phase	3	8		7	4		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	8.0		5.0	8.0		5.0	8.0		5.0	8.0	
Minimum Split (s)	10.0	36.0		10.0	36.0		10.0	33.0		10.0	34.0	
Total Split (s)	10.0	72.0		10.0	72.0		10.0	68.0		10.0	68.0	
Total Split (%)	6.3%	45.0%		6.3%	45.0%		6.3%	42.5%		6.3%	42.5%	
Yellow Time (s)	3.0	5.0		3.0	5.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	1.0	2.0		1.0	2.0		1.0	2.0		1.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.0	7.0		4.0	7.0		4.0	6.0		4.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		None	Max		None	Max	
Act Effct Green (s)	61.2	52.2		61.2	52.2		70.2	62.2		70.2	62.2	
Actuated g/C Ratio	0.41	0.35		0.41	0.35		0.48	0.42		0.48	0.42	
v/c Ratio	0.41	0.83		0.54	0.52		0.66	0.33		0.31	0.62	
Control Delay	29.6	48.4		37.2	37.5		41.7	30.2		24.5	36.3	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	29.6	48.4		37.2	37.5		41.7	30.2		24.5	36.3	
LOS	C	D		D	D		D	C		C	D	
Approach Delay		46.5			37.5			32.7			34.8	
Approach LOS		D			D			C			C	
Queue Length 50th (m)	18.4	132.4		13.8	71.6		20.7	47.7		19.8	106.1	
Queue Length 95th (m)	30.2	158.1		24.0	88.8		#44.0	70.3		37.3	146.5	
Internal Link Dist (m)		416.2			279.2			344.3			122.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (m)	45.0			20.0			40.0			55.0		
Base Capacity (vph)	264	1466		152	1472		203	1441		410	1455	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.41	0.67		0.54	0.42		0.66	0.33		0.31	0.62	

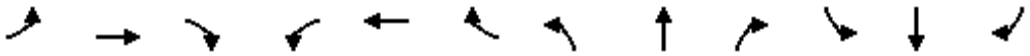
Intersection Summary			
Area Type:	Other		
Cycle Length: 160			
Actuated Cycle Length: 147.5			
Natural Cycle: 90			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.83			
Intersection Signal Delay: 38.7		Intersection LOS: D	
Intersection Capacity Utilization 80.5%		ICU Level of Service D	
Analysis Period (min) 15			

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

Splits and Phases: 19: Bramalea Rd. & Williams Parkway



19: Bramalea Rd. & Williams Parkway
Timing Plan: AM

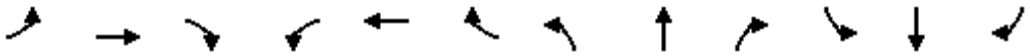


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	102	694	234	78	470	112	126	415	33	123	745	109
Future Volume (vph)	102	694	234	78	470	112	126	415	33	123	745	109
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	7.0		4.0	7.0		4.0	6.0		4.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.96		1.00	0.97		1.00	0.99		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1640	3276		1738	3304		1572	3410		1764	3436	
Flt Permitted	0.31	1.00		0.12	1.00		0.19	1.00		0.42	1.00	
Satd. Flow (perm)	533	3276		217	3304		319	3410		784	3436	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	107	731	246	82	495	118	133	437	35	129	784	115
RTOR Reduction (vph)	0	23	0	0	14	0	0	3	0	0	7	0
Lane Group Flow (vph)	107	954	0	82	599	0	133	469	0	129	892	0
Confl. Peds. (#/hr)	21		28	28		21	24		15	15		24
Confl. Bikes (#/hr)						1						
Heavy Vehicles (%)	11%	4%	11%	5%	6%	8%	16%	6%	0%	3%	3%	7%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	58.2	52.2		58.2	52.2		68.2	62.2		68.2	62.2	
Effective Green, g (s)	58.2	52.2		58.2	52.2		68.2	62.2		68.2	62.2	
Actuated g/C Ratio	0.39	0.35		0.39	0.35		0.46	0.42		0.46	0.42	
Clearance Time (s)	4.0	7.0		4.0	7.0		4.0	6.0		4.0	6.0	
Vehicle Extension (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	255	1160		147	1170		198	1438		402	1449	
v/s Ratio Prot	0.02	c0.29		c0.02	0.18		c0.03	0.14		0.01	0.26	
v/s Ratio Perm	0.15			0.20			c0.28			0.14		
v/c Ratio	0.42	0.82		0.56	0.51		0.67	0.33		0.32	0.62	
Uniform Delay, d1	30.0	43.4		32.2	37.5		29.3	28.5		23.4	33.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.3	5.4		7.6	0.8		11.1	0.6		1.0	2.0	
Delay (s)	32.3	48.8		39.8	38.3		40.4	29.2		24.4	35.2	
Level of Service	C	D		D	D		D	C		C	D	
Approach Delay (s)		47.2			38.5			31.6			33.9	
Approach LOS		D			D			C			C	

Intersection Summary			
HCM 2000 Control Delay	38.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	147.4	Sum of lost time (s)	21.0
Intersection Capacity Utilization	80.5%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

21: Glenridge Rd/Chinguacousy School & Williams Parkway

Timing Plan: AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	126	667	22	8	467	60	13	16	12	81	12	8
Future Volume (vph)	126	667	22	8	467	60	13	16	12	81	12	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	30.0		0.0	25.0		0.0	0.0		0.0	30.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	30.0			20.0			2.5			2.5		
Satd. Flow (prot)	1825	3432	0	1615	3308	0	0	1712	0	0	1783	0
Flt Permitted	0.441			0.365				0.905			0.774	
Satd. Flow (perm)	817	3432	0	604	3308	0	0	1574	0	0	1334	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		4			18			13			3	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		303.2			336.9			195.5			69.4	
Travel Time (s)		21.8			24.3			14.1			5.0	
Confl. Peds. (#/hr)	21		22	22		21	2		59	59		2
Confl. Bikes (#/hr)			1									
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	0%	5%	19%	13%	8%	0%	0%	7%	0%	3%	0%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	133	725	0	8	555	0	0	44	0	0	106	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Detector Phase	2	2		6	6		4	4		8	8	
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		8.0	8.0		8.0	8.0	
Minimum Split (s)	29.0	29.0		29.0	29.0		36.0	36.0		36.0	36.0	
Total Split (s)	110.0	110.0		110.0	110.0		50.0	50.0		50.0	50.0	
Total Split (%)	68.8%	68.8%		68.8%	68.8%		31.3%	31.3%		31.3%	31.3%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0			6.0			6.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	C-Max	C-Max		C-Max	C-Max		None	None		None	None	
Act Effct Green (s)	124.1	124.1		124.1	124.1			23.9			23.9	
Actuated g/C Ratio	0.78	0.78		0.78	0.78			0.15			0.15	
v/c Ratio	0.21	0.27		0.02	0.22			0.18			0.53	
Control Delay	6.6	5.9		4.8	4.4			43.0			68.9	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	6.6	5.9		4.8	4.4			43.0			68.9	
LOS	A	A		A	A			D			E	
Approach Delay		6.0			4.4			43.0			68.9	
Approach LOS		A			A			D			E	
Queue Length 50th (m)	12.1	36.5		0.5	21.2			8.3			29.3	
Queue Length 95th (m)	20.3	44.4		m1.7	24.7			20.1			49.1	
Internal Link Dist (m)		279.2			312.9			171.5			45.4	

21: Glenridge Rd/Chinguacousy School & Williams Parkway

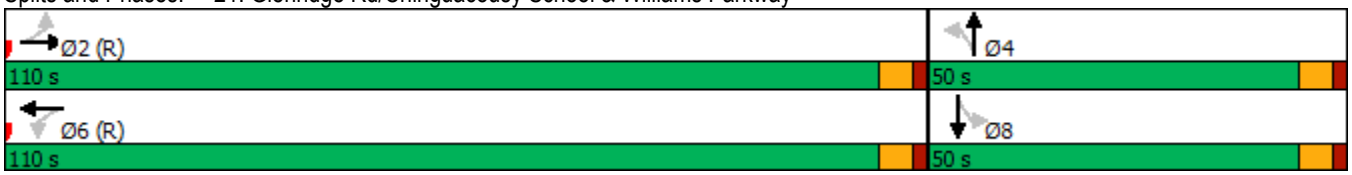
Timing Plan: AM

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (m)	30.0			25.0								
Base Capacity (vph)	633	2663		468	2570			442			369	
Starvation Cap Reductn	0	0		0	0			0			0	
Spillback Cap Reductn	0	0		0	0			0			0	
Storage Cap Reductn	0	0		0	0			0			0	
Reduced v/c Ratio	0.21	0.27		0.02	0.22			0.10			0.29	

Intersection Summary

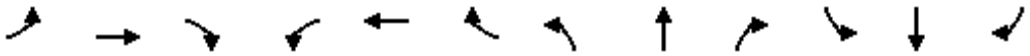
Area Type: Other
Cycle Length: 160
Actuated Cycle Length: 160
Offset: 140 (88%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 65
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.53
Intersection Signal Delay: 10.7 Intersection LOS: B
Intersection Capacity Utilization 63.3% ICU Level of Service B
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 21: Glenridge Rd/Chinguacousy School & Williams Parkway



21: Glenridge Rd/Chinguacousy School & Williams Parkway

Timing Plan: AM



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	126	667	22	8	467	60	13	16	12	81	12	8
Future Volume (vph)	126	667	22	8	467	60	13	16	12	81	12	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0			6.0			6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frpb, ped/bikes	1.00	1.00		1.00	0.99			0.97			1.00	
Flpb, ped/bikes	0.96	1.00		0.97	1.00			1.00			0.93	
Frt	1.00	1.00		1.00	0.98			0.96			0.99	
Flt Protected	0.95	1.00		0.95	1.00			0.98			0.96	
Satd. Flow (prot)	1748	3432		1563	3308			1712			1658	
Flt Permitted	0.44	1.00		0.37	1.00			0.90			0.77	
Satd. Flow (perm)	811	3432		601	3308			1573			1334	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	133	702	23	8	492	63	14	17	13	85	13	8
RTOR Reduction (vph)	0	1	0	0	4	0	0	11	0	0	3	0
Lane Group Flow (vph)	133	724	0	8	551	0	0	33	0	0	103	0
Confl. Peds. (#/hr)	21		22	22		21	2		59	59		2
Confl. Bikes (#/hr)			1									
Heavy Vehicles (%)	0%	5%	19%	13%	8%	0%	0%	7%	0%	3%	0%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	124.1	124.1		124.1	124.1			23.9			23.9	
Effective Green, g (s)	124.1	124.1		124.1	124.1			23.9			23.9	
Actuated g/C Ratio	0.78	0.78		0.78	0.78			0.15			0.15	
Clearance Time (s)	6.0	6.0		6.0	6.0			6.0			6.0	
Vehicle Extension (s)	5.0	5.0		5.0	5.0			5.0			5.0	
Lane Grp Cap (vph)	629	2661		466	2565			234			199	
v/s Ratio Prot		c0.21			0.17							
v/s Ratio Perm	0.16			0.01				0.02			c0.08	
v/c Ratio	0.21	0.27		0.02	0.21			0.14			0.52	
Uniform Delay, d1	4.8	5.1		4.1	4.8			59.1			62.8	
Progression Factor	1.00	1.00		0.83	0.81			1.00			1.00	
Incremental Delay, d2	0.8	0.3		0.1	0.2			0.6			4.5	
Delay (s)	5.6	5.4		3.5	4.1			59.7			67.3	
Level of Service	A	A		A	A			E			E	
Approach Delay (s)		5.4			4.1			59.7			67.3	
Approach LOS		A			A			E			E	

Intersection Summary			
HCM 2000 Control Delay	10.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.31		
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	63.3%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

20: Grenoble Blvd/Jordan Blvd & Williams Parkway

Timing Plan: AM

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	29	684	44	22	463	22	43	52	41	64	51	174
Future Volume (vph)	29	684	44	22	463	22	43	52	41	64	51	174
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	30.0		0.0	30.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	30.0			30.0			2.5			2.5		
Satd. Flow (prot)	1706	3446	0	1659	3422	0	0	3204	0	0	3115	0
Flt Permitted	0.462			0.347				0.657			0.837	
Satd. Flow (perm)	820	3446	0	604	3422	0	0	2129	0	0	2627	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		8			6			42			183	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		336.9			330.2			104.7			103.8	
Travel Time (s)		24.3			23.8			7.5			7.5	
Confl. Peds. (#/hr)	18		7	7		18	15		15	15		15
Confl. Bikes (#/hr)						1						5
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	7%	5%	2%	10%	6%	0%	7%	4%	8%	2%	2%	4%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	31	766	0	23	510	0	0	143	0	0	304	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Detector Phase	2	2		6	6		4	4		8	8	
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		8.0	8.0		8.0	8.0	
Minimum Split (s)	39.0	39.0		39.0	39.0		42.0	42.0		42.0	42.0	
Total Split (s)	110.0	110.0		110.0	110.0		50.0	50.0		50.0	50.0	
Total Split (%)	68.8%	68.8%		68.8%	68.8%		31.3%	31.3%		31.3%	31.3%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0			6.0			6.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	C-Max	C-Max		C-Max	C-Max		None	None		None	None	
Act Effct Green (s)	122.0	122.0		122.0	122.0			26.0			26.0	
Actuated g/C Ratio	0.76	0.76		0.76	0.76			0.16			0.16	
v/c Ratio	0.05	0.29		0.05	0.20			0.38			0.53	
Control Delay	12.0	11.3		7.4	6.6			41.9			25.2	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	12.0	11.3		7.4	6.6			41.9			25.2	
LOS	B	B		A	A			D			C	
Approach Delay		11.3			6.6			41.9			25.2	
Approach LOS		B			A			D			C	
Queue Length 50th (m)	3.7	57.8		2.1	27.6			13.8			16.6	
Queue Length 95th (m)	9.0	75.0		5.3	34.7			24.4			31.4	
Internal Link Dist (m)		312.9			306.2			80.7			79.8	

20: Grenoble Blvd/Jordan Blvd & Williams Parkway

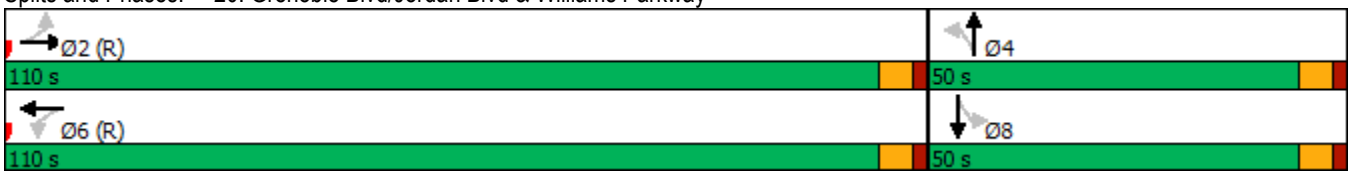
Timing Plan: AM

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (m)	30.0			30.0								
Base Capacity (vph)	625	2630		460	2611			615			855	
Starvation Cap Reductn	0	0		0	0			0			0	
Spillback Cap Reductn	0	0		0	0			0			0	
Storage Cap Reductn	0	0		0	0			0			0	
Reduced v/c Ratio	0.05	0.29		0.05	0.20			0.23			0.36	

Intersection Summary

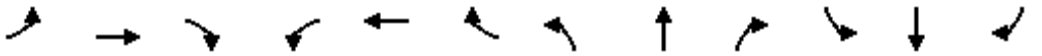
Area Type:	Other		
Cycle Length: 160			
Actuated Cycle Length: 160			
Offset: 52 (33%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green			
Natural Cycle: 85			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.53			
Intersection Signal Delay: 14.7		Intersection LOS: B	
Intersection Capacity Utilization 75.9%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 20: Grenoble Blvd/Jordan Blvd & Williams Parkway



20: Grenoble Blvd/Jordan Blvd & Williams Parkway

Timing Plan: AM



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	29	684	44	22	463	22	43	52	41	64	51	174
Future Volume (vph)	29	684	44	22	463	22	43	52	41	64	51	174
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0			6.0			6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			0.95			0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			0.99			0.98	
Flpb, ped/bikes	0.99	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	0.99		1.00	0.99			0.95			0.91	
Flt Protected	0.95	1.00		0.95	1.00			0.98			0.99	
Satd. Flow (prot)	1684	3446		1654	3423			3190			3098	
Flt Permitted	0.46	1.00		0.35	1.00			0.66			0.84	
Satd. Flow (perm)	818	3446		603	3423			2129			2623	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	31	720	46	23	487	23	45	55	43	67	54	183
RTOR Reduction (vph)	0	2	0	0	1	0	0	35	0	0	153	0
Lane Group Flow (vph)	31	764	0	23	509	0	0	108	0	0	151	0
Confl. Peds. (#/hr)	18		7	7		18	15		15	15		15
Confl. Bikes (#/hr)						1						5
Heavy Vehicles (%)	7%	5%	2%	10%	6%	0%	7%	4%	8%	2%	2%	4%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	122.0	122.0		122.0	122.0			26.0			26.0	
Effective Green, g (s)	122.0	122.0		122.0	122.0			26.0			26.0	
Actuated g/C Ratio	0.76	0.76		0.76	0.76			0.16			0.16	
Clearance Time (s)	6.0	6.0		6.0	6.0			6.0			6.0	
Vehicle Extension (s)	5.0	5.0		5.0	5.0			5.0			5.0	
Lane Grp Cap (vph)	623	2627		459	2610			345			426	
v/s Ratio Prot		c0.22			0.15							
v/s Ratio Perm	0.04			0.04				0.05			c0.06	
v/c Ratio	0.05	0.29		0.05	0.19			0.31			0.35	
Uniform Delay, d1	4.7	5.8		4.7	5.3			59.1			59.5	
Progression Factor	1.68	1.59		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.1	0.3		0.2	0.2			1.1			1.1	
Delay (s)	8.0	9.5		4.9	5.5			60.2			60.6	
Level of Service	A	A		A	A			E			E	
Approach Delay (s)		9.4			5.4			60.2			60.6	
Approach LOS		A			A			E			E	

Intersection Summary			
HCM 2000 Control Delay	21.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.30		
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	75.9%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	787	14	6	460	18	17
Future Volume (vph)	787	14	6	460	18	17
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)		0.0	30.0		0.0	0.0
Storage Lanes		0	1		1	0
Taper Length (m)			30.0		2.5	
Satd. Flow (prot)	3523	0	1372	3476	1673	0
Flt Permitted			0.333		0.975	
Satd. Flow (perm)	3523	0	478	3476	1662	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	3				18	
Link Speed (k/h)	60			60	50	
Link Distance (m)	330.2			415.5	211.3	
Travel Time (s)	19.8			24.9	15.2	
Confl. Peds. (#/hr)		5	5		4	6
Confl. Bikes (#/hr)		1				
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	3%	15%	33%	5%	6%	0%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	843	0	6	484	37	0
Turn Type	NA		Perm	NA	Prot	
Protected Phases	2			6	8	
Permitted Phases			6			
Detector Phase	2		6	6	8	
Switch Phase						
Minimum Initial (s)	8.0		8.0	8.0	8.0	
Minimum Split (s)	33.0		33.0	33.0	33.0	
Total Split (s)	118.0		118.0	118.0	42.0	
Total Split (%)	73.8%		73.8%	73.8%	26.3%	
Yellow Time (s)	4.0		4.0	4.0	4.0	
All-Red Time (s)	2.0		2.0	2.0	2.0	
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	
Total Lost Time (s)	6.0		6.0	6.0	6.0	
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	Max		Max	Max	None	
Act Effct Green (s)	114.0		114.0	114.0	10.1	
Actuated g/C Ratio	0.86		0.86	0.86	0.08	
v/c Ratio	0.28		0.01	0.16	0.26	
Control Delay	2.5		2.5	2.2	39.9	
Queue Delay	0.0		0.0	0.0	0.0	
Total Delay	2.5		2.5	2.2	39.9	
LOS	A		A	A	D	
Approach Delay	2.5			2.2	39.9	
Approach LOS	A			A	D	
Queue Length 50th (m)	18.2		0.2	9.3	4.8	
Queue Length 95th (m)	32.9		1.1	17.7	15.8	
Internal Link Dist (m)	306.2			391.5	187.3	

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Turn Bay Length (m)			30.0			
Base Capacity (vph)	3048		413	3007	471	
Starvation Cap Reductn	0		0	0	0	
Spillback Cap Reductn	0		0	0	0	
Storage Cap Reductn	0		0	0	0	
Reduced v/c Ratio	0.28		0.01	0.16	0.08	

Intersection Summary			
Area Type:	Other		
Cycle Length: 160			
Actuated Cycle Length: 131.8			
Natural Cycle: 70			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.28			
Intersection Signal Delay: 3.4		Intersection LOS: A	
Intersection Capacity Utilization 40.1%		ICU Level of Service A	
Analysis Period (min) 15			

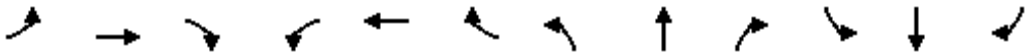
Splits and Phases: 27: Graymar Rd & Williams Parkway

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	787	14	6	460	18	17
Future Volume (vph)	787	14	6	460	18	17
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0		6.0	6.0	6.0	
Lane Util. Factor	0.95		1.00	0.95	1.00	
Frpb, ped/bikes	1.00		1.00	1.00	0.99	
Flpb, ped/bikes	1.00		0.99	1.00	1.00	
Frt	1.00		1.00	1.00	0.93	
Flt Protected	1.00		0.95	1.00	0.97	
Satd. Flow (prot)	3524		1364	3476	1676	
Flt Permitted	1.00		0.33	1.00	0.97	
Satd. Flow (perm)	3524		478	3476	1676	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	828	15	6	484	19	18
RTOR Reduction (vph)	0	0	0	0	17	0
Lane Group Flow (vph)	843	0	6	484	20	0
Confl. Peds. (#/hr)		5	5		4	6
Confl. Bikes (#/hr)		1				
Heavy Vehicles (%)	3%	15%	33%	5%	6%	0%
Turn Type	NA		Perm	NA	Prot	
Protected Phases	2			6	8	
Permitted Phases			6			
Actuated Green, G (s)	112.7		112.7	112.7	8.4	
Effective Green, g (s)	112.7		112.7	112.7	8.4	
Actuated g/C Ratio	0.85		0.85	0.85	0.06	
Clearance Time (s)	6.0		6.0	6.0	6.0	
Vehicle Extension (s)	5.0		5.0	5.0	5.0	
Lane Grp Cap (vph)	2983		404	2943	105	
v/s Ratio Prot	c0.24			0.14	c0.01	
v/s Ratio Perm			0.01			
v/c Ratio	0.28		0.01	0.16	0.19	
Uniform Delay, d1	2.1		1.6	1.8	59.1	
Progression Factor	1.00		1.00	1.00	1.00	
Incremental Delay, d2	0.2		0.1	0.1	1.9	
Delay (s)	2.3		1.7	1.9	61.0	
Level of Service	A		A	A	E	
Approach Delay (s)	2.3			1.9	61.0	
Approach LOS	A			A	E	

Intersection Summary			
HCM 2000 Control Delay	3.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.28		
Actuated Cycle Length (s)	133.1	Sum of lost time (s)	12.0
Intersection Capacity Utilization	40.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

26: Torbram Rd./Torbram Rd & Williams Parkway

Timing Plan: AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	65	599	122	42	303	50	42	454	38	271	1201	104
Future Volume (vph)	65	599	122	42	303	50	42	454	38	271	1201	104
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	30.0		30.0	45.0		0.0	40.0		40.0	60.0		0.0
Storage Lanes	1		1	1		1	1		1	1		0
Taper Length (m)	30.0			45.0			25.0			55.0		
Satd. Flow (prot)	1644	3544	1601	1690	3444	1541	1825	3444	1585	1807	3474	0
Flt Permitted	0.558			0.175			0.143			0.427		
Satd. Flow (perm)	954	3544	1564	310	3444	1493	275	3444	1564	810	3474	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			75			53			116		8	
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		415.5			219.7			183.1			148.5	
Travel Time (s)		24.9			13.2			11.0			8.9	
Confl. Peds. (#/hr)	12		7	7		12	39		5	5		39
Confl. Bikes (#/hr)			1			1						4
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	11%	3%	2%	8%	6%	6%	0%	6%	3%	1%	3%	6%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	68	631	128	44	319	53	44	478	40	285	1373	0
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	Perm	NA	Free	pm+pt	NA	
Protected Phases		8		7	4			2		1	6	
Permitted Phases	8		8	4		4	2		Free	6		
Detector Phase	8	8	8	7	4	4	2	2		1	6	
Switch Phase												
Minimum Initial (s)	8.0	8.0	8.0	5.0	8.0	8.0	8.0	8.0		5.0	8.0	
Minimum Split (s)	37.0	37.0	37.0	10.0	37.0	37.0	39.0	39.0		10.0	39.0	
Total Split (s)	60.0	60.0	60.0	10.0	70.0	70.0	80.0	80.0		10.0	90.0	
Total Split (%)	37.5%	37.5%	37.5%	6.3%	43.8%	43.8%	50.0%	50.0%		6.3%	56.3%	
Yellow Time (s)	4.0	4.0	4.0	3.0	4.0	4.0	4.0	4.0		3.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	1.0	2.0	2.0	2.0	2.0		1.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0	4.0	6.0	6.0	6.0	6.0		4.0	6.0	
Lead/Lag	Lag	Lag	Lag	Lead			Lag	Lag		Lead		
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None	None	Max	Max		None	Max	
Act Effct Green (s)	33.9	33.9	33.9	43.6	41.6	41.6	74.4	74.4	138.2	86.5	84.5	
Actuated g/C Ratio	0.25	0.25	0.25	0.32	0.30	0.30	0.54	0.54	1.00	0.63	0.61	
v/c Ratio	0.29	0.73	0.29	0.28	0.31	0.11	0.30	0.26	0.03	0.52	0.65	
Control Delay	46.0	53.2	20.1	36.1	37.2	8.5	28.0	18.9	0.0	18.2	20.4	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	46.0	53.2	20.1	36.1	37.2	8.5	28.0	18.9	0.0	18.2	20.4	
LOS	D	D	C	D	D	A	C	B	A	B	C	
Approach Delay		47.5			33.4			18.2			20.0	
Approach LOS		D			C			B			C	
Queue Length 50th (m)	15.5	85.3	11.6	8.4	35.1	0.0	6.6	37.0	0.0	34.3	125.2	
Queue Length 95th (m)	29.3	105.7	28.4	17.1	47.4	9.4	18.9	55.5	0.0	59.0	176.7	
Internal Link Dist (m)		391.5			195.7			159.1			124.5	

26: Torbram Rd./Torbram Rd & Williams Parkway

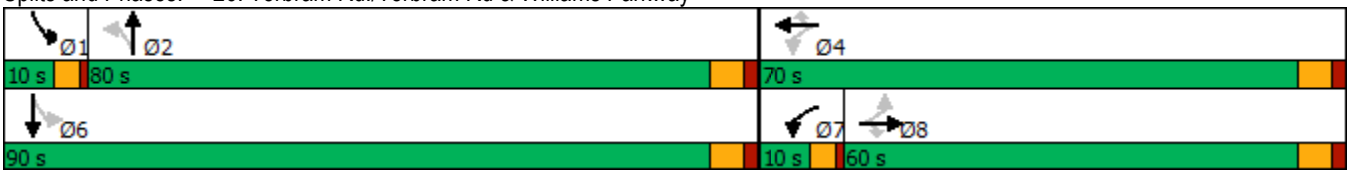
Timing Plan: AM

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (m)	30.0		30.0	45.0			40.0		40.0	60.0		
Base Capacity (vph)	374	1392	660	158	1604	723	148	1855	1564	550	2127	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.18	0.45	0.19	0.28	0.20	0.07	0.30	0.26	0.03	0.52	0.65	

Intersection Summary

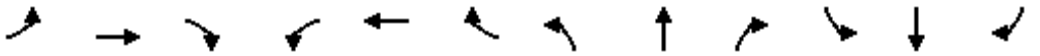
Area Type: Other
Cycle Length: 160
Actuated Cycle Length: 138.2
Natural Cycle: 100
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.73
Intersection Signal Delay: 27.9 Intersection LOS: C
Intersection Capacity Utilization 84.4% ICU Level of Service E
Analysis Period (min) 15

Splits and Phases: 26: Torbram Rd./Torbram Rd & Williams Parkway



26: Torbram Rd./Torbram Rd & Williams Parkway

Timing Plan: AM



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	65	599	122	42	303	50	42	454	38	271	1201	104
Future Volume (vph)	65	599	122	42	303	50	42	454	38	271	1201	104
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	4.0	6.0	6.0	6.0	6.0	4.0	4.0	6.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.97	1.00	1.00	0.99	1.00	1.00	
Flpb, ped/bikes	0.99	1.00	1.00	1.00	1.00	1.00	0.99	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	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1627	3544	1565	1689	3444	1497	1816	3444	1564	1805	3476	
Flt Permitted	0.56	1.00	1.00	0.18	1.00	1.00	0.14	1.00	1.00	0.43	1.00	
Satd. Flow (perm)	956	3544	1565	312	3444	1497	273	3444	1564	811	3476	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	68	631	128	44	319	53	44	478	40	285	1264	109
RTOR Reduction (vph)	0	0	57	0	0	37	0	0	0	0	3	0
Lane Group Flow (vph)	68	631	71	44	319	16	44	478	40	285	1370	0
Confl. Peds. (#/hr)	12		7	7		12	39		5	5		39
Confl. Bikes (#/hr)			1			1						4
Heavy Vehicles (%)	11%	3%	2%	8%	6%	6%	0%	6%	3%	1%	3%	6%
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	Perm	NA	Free	pm+pt	NA	
Protected Phases		8		7	4			2		1	6	
Permitted Phases	8		8	4		4	2		Free	6		
Actuated Green, G (s)	33.9	33.9	33.9	42.6	42.6	42.6	74.5	74.5	139.1	84.5	84.5	
Effective Green, g (s)	33.9	33.9	33.9	42.6	42.6	42.6	74.5	74.5	139.1	84.5	84.5	
Actuated g/C Ratio	0.24	0.24	0.24	0.31	0.31	0.31	0.54	0.54	1.00	0.61	0.61	
Clearance Time (s)	6.0	6.0	6.0	4.0	6.0	6.0	6.0	6.0		4.0	6.0	
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	232	863	381	142	1054	458	146	1844	1564	535	2111	
v/s Ratio Prot		c0.18		0.01	c0.09			0.14		0.02	c0.39	
v/s Ratio Perm	0.07		0.05	0.08		0.01	0.16		0.03	0.30		
v/c Ratio	0.29	0.73	0.19	0.31	0.30	0.04	0.30	0.26	0.03	0.53	0.65	
Uniform Delay, d1	42.8	48.4	41.7	36.2	36.9	33.8	17.9	17.4	0.0	15.6	17.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.5	3.9	0.5	2.6	0.3	0.1	5.2	0.3	0.0	1.9	1.6	
Delay (s)	44.3	52.3	42.2	38.8	37.2	33.9	23.1	17.8	0.0	17.5	19.2	
Level of Service	D	D	D	D	D	C	C	B	A	B	B	
Approach Delay (s)		50.1			37.0			16.9			18.9	
Approach LOS		D			D			B			B	

Intersection Summary			
HCM 2000 Control Delay	28.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	139.1	Sum of lost time (s)	20.0
Intersection Capacity Utilization	84.4%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Future Analysis Results (2031) - PM

Without Improvement

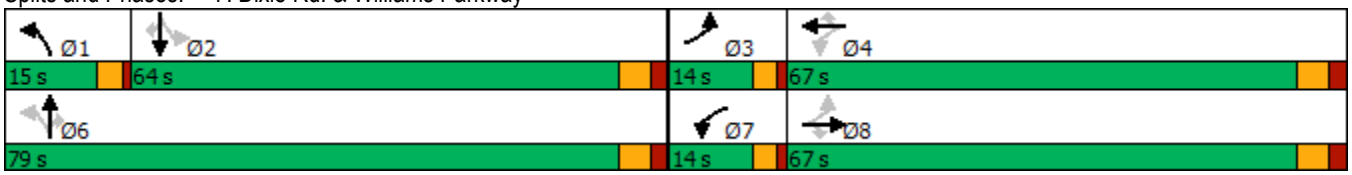
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	129	877	54	86	1135	61	184	1206	108	59	628	152
Future Volume (vph)	129	877	54	86	1135	61	184	1206	108	59	628	152
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	92.0		92.0	90.0		90.0	66.0		67.0	127.0		58.0
Storage Lanes	1		1	1		1	1		1	1		1
Taper Length (m)	51.0			55.0			100.0			62.0		
Satd. Flow (prot)	1706	3510	1633	1755	3510	1585	1807	5092	1617	1755	5092	1601
Flt Permitted	0.067			0.152			0.304			0.176		
Satd. Flow (perm)	120	3510	1566	279	3510	1530	574	5092	1562	324	5092	1546
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			75			75			100			160
Link Speed (k/h)		48			60			50			50	
Link Distance (m)		162.6			270.7			250.0			175.5	
Travel Time (s)		12.2			16.2			18.0			12.6	
Confl. Peds. (#/hr)	18		23	23		18	14		14	14		14
Confl. Bikes (#/hr)												1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	7%	4%	0%	4%	4%	3%	1%	3%	1%	4%	3%	2%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	136	923	57	91	1195	64	194	1269	114	62	661	160
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases	3	8		7	4		1	6			2	
Permitted Phases	8		8	4		4	6		6	2		2
Detector Phase	3	8	8	7	4	4	1	6	6	2	2	2
Switch Phase												
Minimum Initial (s)	5.0	8.0	8.0	5.0	8.0	8.0	5.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	10.0	43.3	43.3	10.0	43.3	43.3	10.0	36.0	36.0	36.0	36.0	36.0
Total Split (s)	14.0	67.0	67.0	14.0	67.0	67.0	15.0	79.0	79.0	64.0	64.0	64.0
Total Split (%)	8.8%	41.9%	41.9%	8.8%	41.9%	41.9%	9.4%	49.4%	49.4%	40.0%	40.0%	40.0%
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	2.3	2.3	1.0	2.3	2.3	1.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.3	6.3	4.0	6.3	6.3	4.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead			Lag	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None	None	None	Max	Max	Max	Max	Max
Act Effct Green (s)	71.7	59.4	59.4	71.3	59.2	59.2	75.0	73.0	73.0	58.0	58.0	58.0
Actuated g/C Ratio	0.45	0.37	0.37	0.45	0.37	0.37	0.47	0.46	0.46	0.37	0.37	0.37
v/c Ratio	0.88	0.70	0.09	0.42	0.91	0.10	0.54	0.54	0.15	0.53	0.35	0.24
Control Delay	82.8	45.5	3.5	29.0	58.4	5.0	31.6	32.0	6.2	59.2	37.5	5.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	82.8	45.5	3.5	29.0	58.4	5.0	31.6	32.0	6.2	59.2	37.5	5.5
LOS	F	D	A	C	E	A	C	C	A	E	D	A
Approach Delay		47.9			53.9			30.1			33.2	
Approach LOS		D			D			C			C	
Queue Length 50th (m)	27.6	129.8	0.0	15.6	187.8	0.0	36.3	105.8	2.4	15.6	56.4	0.0
Queue Length 95th (m)	#68.2	154.1	5.8	26.5	219.0	7.7	53.7	120.0	13.9	34.2	67.9	15.5
Internal Link Dist (m)		138.6			246.7			226.0			151.5	

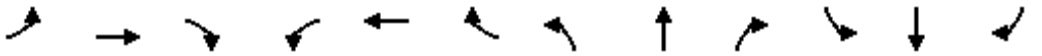
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (m)	92.0		92.0	90.0		90.0	66.0		67.0	127.0		58.0
Base Capacity (vph)	154	1344	646	218	1344	631	356	2345	773	118	1863	667
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.88	0.69	0.09	0.42	0.89	0.10	0.54	0.54	0.15	0.53	0.35	0.24

Intersection Summary

Area Type: Other
Cycle Length: 160
Actuated Cycle Length: 158.5
Natural Cycle: 100
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.91
Intersection Signal Delay: 41.2 — Intersection LOS: D
Intersection Capacity Utilization 90.6% — ICU Level of Service E
Analysis Period (min) 15
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 7: Dixie Rd. & Williams Parkway





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	129	877	54	86	1135	61	184	1206	108	59	628	152
Future Volume (vph)	129	877	54	86	1135	61	184	1206	108	59	628	152
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.3	6.3	4.0	6.3	6.3	4.0	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes	1.00	1.00	0.96	1.00	1.00	0.97	1.00	1.00	0.97	1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	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)	1706	3510	1566	1754	3510	1530	1804	5092	1562	1749	5092	1546
Flt Permitted	0.07	1.00	1.00	0.15	1.00	1.00	0.30	1.00	1.00	0.18	1.00	1.00
Satd. Flow (perm)	121	3510	1566	280	3510	1530	577	5092	1562	324	5092	1546
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	136	923	57	91	1195	64	194	1269	114	62	661	160
RTOR Reduction (vph)	0	0	36	0	0	40	0	0	54	0	0	101
Lane Group Flow (vph)	136	923	21	91	1195	24	194	1269	60	62	661	59
Confl. Peds. (#/hr)	18		23	23		18	14		14	14		14
Confl. Bikes (#/hr)												1
Heavy Vehicles (%)	7%	4%	0%	4%	4%	3%	1%	3%	1%	4%	3%	2%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases	3	8		7	4		1	6			2	
Permitted Phases	8		8	4		4	6		6	2		2
Actuated Green, G (s)	69.4	59.4	59.4	69.0	59.2	59.2	73.0	73.0	73.0	58.0	58.0	58.0
Effective Green, g (s)	69.4	59.4	59.4	69.0	59.2	59.2	73.0	73.0	73.0	58.0	58.0	58.0
Actuated g/C Ratio	0.44	0.37	0.37	0.44	0.37	0.37	0.46	0.46	0.46	0.37	0.37	0.37
Clearance Time (s)	4.0	6.3	6.3	4.0	6.3	6.3	4.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Grp Cap (vph)	152	1315	586	213	1310	571	350	2345	719	118	1863	565
v/s Ratio Prot	c0.06	0.26		0.03	c0.34		0.04	c0.25			0.13	
v/s Ratio Perm	0.33		0.01	0.16		0.02	c0.22		0.04	0.19		0.04
v/c Ratio	0.89	0.70	0.04	0.43	0.91	0.04	0.55	0.54	0.08	0.53	0.35	0.10
Uniform Delay, d1	40.4	42.0	31.4	30.1	47.2	31.6	26.6	30.7	24.0	39.4	36.6	33.1
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	45.6	2.2	0.1	2.9	10.3	0.1	3.2	0.9	0.2	15.7	0.5	0.4
Delay (s)	85.9	44.2	31.5	32.9	57.5	31.7	29.8	31.6	24.2	55.2	37.1	33.5
Level of Service	F	D	C	C	E	C	C	C	C	E	D	C
Approach Delay (s)		48.6			54.6			30.9			37.7	
Approach LOS		D			D			C			D	

Intersection Summary			
HCM 2000 Control Delay	42.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	158.5	Sum of lost time (s)	20.3
Intersection Capacity Utilization	90.6%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1030	44	10	1322	15	13
Future Volume (vph)	1030	44	10	1322	15	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)		0.0	50.0		0.0	0.0
Storage Lanes		0	1		1	0
Taper Length (m)			30.0		2.5	
Satd. Flow (prot)	3485	0	1825	3544	1631	0
Flt Permitted			0.950		0.974	
Satd. Flow (perm)	3485	0	1825	3544	1631	0
Link Speed (k/h)	60			60	50	
Link Distance (m)	270.7			273.9	143.1	
Travel Time (s)	16.2			16.4	10.3	
Confl. Peds. (#/hr)		13	13			1
Confl. Bikes (#/hr)		3				
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	4%	7%	0%	3%	14%	0%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1130	0	11	1392	30	0
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	46.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	1030	44	10	1322	15	13
Future Volume (Veh/h)	1030	44	10	1322	15	13
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	1084	46	11	1392	16	14
Pedestrians				1	13	
Lane Width (m)				3.7	3.7	
Walking Speed (m/s)				1.2	1.2	
Percent Blockage				0	1	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)	271					
pX, platoon unblocked			0.78		0.78	0.78
vC, conflicting volume			1143		1838	579
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			607		1503	0
tC, single (s)			4.1		7.1	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.6	3.3
p0 queue free %			99		79	98
cM capacity (veh/h)			753		76	836

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1
Volume Total	723	407	11	696	696	30
Volume Left	0	0	11	0	0	16
Volume Right	0	46	0	0	0	14
cSH	1700	1700	753	1700	1700	132
Volume to Capacity	0.43	0.24	0.01	0.41	0.41	0.23
Queue Length 95th (m)	0.0	0.0	0.3	0.0	0.0	6.3
Control Delay (s)	0.0	0.0	9.9	0.0	0.0	40.3
Lane LOS			A			E
Approach Delay (s)	0.0		0.1			40.3
Approach LOS						E

Intersection Summary				
Average Delay	0.5			
Intersection Capacity Utilization	46.9%	ICU Level of Service		A
Analysis Period (min)	15			

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1030	22	42	1291	17	19
Future Volume (vph)	1030	22	42	1291	17	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)		0.0	50.0		0.0	0.0
Storage Lanes		0	1		1	0
Taper Length (m)			40.0		2.5	
Satd. Flow (prot)	3535	0	1825	3544	1643	0
Flt Permitted			0.950		0.977	
Satd. Flow (perm)	3535	0	1825	3544	1643	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	273.9			382.9	71.0	
Travel Time (s)	19.7			27.6	5.1	
Confl. Peds. (#/hr)		13	13			6
Confl. Bikes (#/hr)		4				1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	3%	0%	0%	3%	13%	0%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1107	0	44	1359	38	0
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 47.5%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	1030	22	42	1291	17	19
Future Volume (Veh/h)	1030	22	42	1291	17	19
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	1084	23	44	1359	18	20
Pedestrians				6	13	
Lane Width (m)				3.7	3.7	
Walking Speed (m/s)				1.2	1.2	
Percent Blockage				1	1	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)				383		
pX, platoon unblocked					0.88	
vC, conflicting volume			1120		1876	572
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			1120		1719	572
tC, single (s)			4.1		7.1	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.6	3.3
p0 queue free %			93		69	96
cM capacity (veh/h)			624		58	460

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1
Volume Total	723	384	44	680	680	38
Volume Left	0	0	44	0	0	18
Volume Right	0	23	0	0	0	20
cSH	1700	1700	624	1700	1700	107
Volume to Capacity	0.43	0.23	0.07	0.40	0.40	0.35
Queue Length 95th (m)	0.0	0.0	1.7	0.0	0.0	10.8
Control Delay (s)	0.0	0.0	11.2	0.0	0.0	56.0
Lane LOS			B			F
Approach Delay (s)	0.0		0.4			56.0
Approach LOS						F

Intersection Summary			
Average Delay	1.0		
Intersection Capacity Utilization	47.5%	ICU Level of Service	A
Analysis Period (min)	15		

15: Williams Parkway & Mackay St.
Timing Plan: PM

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	126	892	0	4	1287	114	7	0	0	71	1	70
Future Volume (vph)	126	892	0	4	1287	114	7	0	0	71	1	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	50.0		0.0	30.0		0.0	0.0		0.0	40.0		0.0
Storage Lanes	1		0	1		0	0		0	1		0
Taper Length (m)	30.0			25.0			2.5			30.0		
Satd. Flow (prot)	1789	3510	0	1825	3496	0	0	1825	0	1755	1545	0
Flt Permitted	0.155			0.292				0.701		0.753		
Satd. Flow (perm)	292	3510	0	558	3496	0	0	1339	0	1380	1545	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					13						74	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		382.9			440.2			46.0			136.3	
Travel Time (s)		27.6			31.7			3.3			9.8	
Confl. Peds. (#/hr)	3		8	8		3	4		5	5		4
Confl. Bikes (#/hr)												1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	2%	4%	0%	0%	3%	2%	0%	0%	0%	4%	0%	4%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	133	939	0	4	1475	0	0	7	0	75	75	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			2			4			4	
Permitted Phases	2			2			4			4		
Detector Phase	2	2		2	2		4	4		4	4	
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		8.0	8.0		8.0	8.0	
Minimum Split (s)	33.0	33.0		33.0	33.0		37.0	37.0		37.0	37.0	
Total Split (s)	115.0	115.0		115.0	115.0		45.0	45.0		45.0	45.0	
Total Split (%)	71.9%	71.9%		71.9%	71.9%		28.1%	28.1%		28.1%	28.1%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0			6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	C-Max	C-Max		C-Max	C-Max		None	None		None	None	
Act Effct Green (s)	130.2	130.2		130.2	130.2			17.8		17.8	17.8	
Actuated g/C Ratio	0.81	0.81		0.81	0.81			0.11		0.11	0.11	
v/c Ratio	0.56	0.33		0.01	0.52			0.05		0.49	0.32	
Control Delay	18.2	4.7		4.5	6.2			58.7		75.5	15.3	
Queue Delay	0.0	0.0		0.0	0.0			0.0		0.0	0.0	
Total Delay	18.2	4.7		4.5	6.2			58.7		75.5	15.3	
LOS	B	A		A	A			E		E	B	
Approach Delay		6.4			6.2			58.7			45.4	
Approach LOS		A			A			E			D	
Queue Length 50th (m)	11.4	31.3		0.2	61.7			2.1		23.1	0.3	
Queue Length 95th (m)	50.5	62.4		1.5	120.0			6.6		37.0	14.8	
Internal Link Dist (m)		358.9			416.2			22.0			112.3	

15: Williams Parkway & Mackay St.

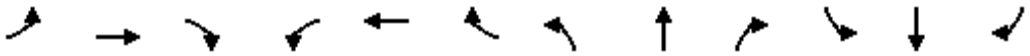
Timing Plan: PM

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (m)	50.0			30.0						40.0		
Base Capacity (vph)	237	2856		454	2848			326		336	432	
Starvation Cap Reductn	0	0		0	0			0		0	0	
Spillback Cap Reductn	0	0		0	0			0		0	0	
Storage Cap Reductn	0	0		0	0			0		0	0	
Reduced v/c Ratio	0.56	0.33		0.01	0.52			0.02		0.22	0.17	

Intersection Summary

Area Type:	Other		
Cycle Length: 160			
Actuated Cycle Length: 160			
Offset: 43 (27%), Referenced to phase 2:EBWB, Start of Green			
Natural Cycle: 110			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.56			
Intersection Signal Delay: 8.6		Intersection LOS: A	
Intersection Capacity Utilization 70.8%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 15: Williams Parkway & Mackay St.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	126	892	0	4	1287	114	7	0	0	71	1	70
Future Volume (vph)	126	892	0	4	1287	114	7	0	0	71	1	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0			6.0		6.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			1.00		1.00	0.98	
Flpb, ped/bikes	1.00	1.00		0.99	1.00			0.99		0.99	1.00	
Frt	1.00	1.00		1.00	0.99			1.00		1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00			0.95		0.95	1.00	
Satd. Flow (prot)	1788	3510		1814	3495			1815		1741	1543	
Flt Permitted	0.16	1.00		0.29	1.00			0.70		0.75	1.00	
Satd. Flow (perm)	292	3510		558	3495			1339		1381	1543	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	133	939	0	4	1355	120	7	0	0	75	1	74
RTOR Reduction (vph)	0	0	0	0	2	0	0	0	0	0	66	0
Lane Group Flow (vph)	133	939	0	4	1473	0	0	7	0	75	9	0
Confl. Peds. (#/hr)	3		8	8		3	4		5	5		4
Confl. Bikes (#/hr)												1
Heavy Vehicles (%)	2%	4%	0%	0%	3%	2%	0%	0%	0%	4%	0%	4%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			2			4			4	
Permitted Phases	2			2			4			4		
Actuated Green, G (s)	130.2	130.2		130.2	130.2			17.8		17.8	17.8	
Effective Green, g (s)	130.2	130.2		130.2	130.2			17.8		17.8	17.8	
Actuated g/C Ratio	0.81	0.81		0.81	0.81			0.11		0.11	0.11	
Clearance Time (s)	6.0	6.0		6.0	6.0			6.0		6.0	6.0	
Vehicle Extension (s)	5.0	5.0		5.0	5.0			5.0		5.0	5.0	
Lane Grp Cap (vph)	237	2856		454	2844			148		153	171	
v/s Ratio Prot		0.27			0.42						0.01	
v/s Ratio Perm	c0.46			0.01				0.01		c0.05		
v/c Ratio	0.56	0.33		0.01	0.52			0.05		0.49	0.05	
Uniform Delay, d1	5.1	3.8		2.8	4.8			63.5		66.8	63.6	
Progression Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	9.3	0.3		0.0	0.7			0.3		5.1	0.3	
Delay (s)	14.4	4.1		2.8	5.5			63.8		71.9	63.8	
Level of Service	B	A		A	A			E		E	E	
Approach Delay (s)		5.4			5.5			63.8			67.9	
Approach LOS		A			A			E			E	

Intersection Summary			
HCM 2000 Control Delay	9.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	70.8%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

19: Bramalea Rd. & Williams Parkway
Timing Plan: PM

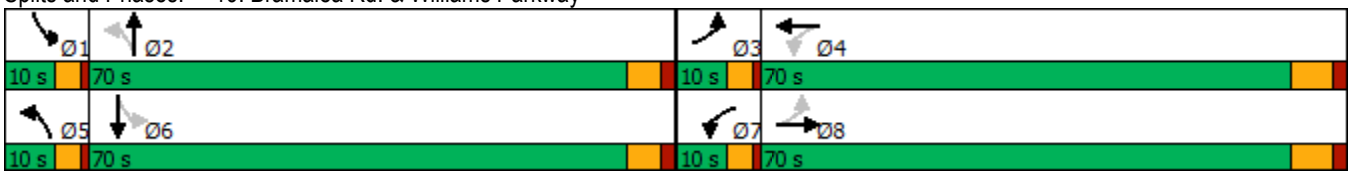
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	86	551	112	55	1062	71	219	1047	75	51	561	94
Future Volume (vph)	86	551	112	55	1062	71	219	1047	75	51	561	94
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	45.0		0.0	20.0		0.0	40.0		0.0	55.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	30.0			30.0			90.0			75.0		
Satd. Flow (prot)	1807	3420	0	1825	3577	0	1807	3565	0	1601	3476	0
Flt Permitted	0.065			0.281			0.278			0.087		
Satd. Flow (perm)	124	3420	0	537	3577	0	523	3565	0	147	3476	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		18			5			5			14	
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		440.2			303.2			368.3			146.0	
Travel Time (s)		31.7			21.8			22.1			8.8	
Confl. Peds. (#/hr)	10		12	12		10	26		23	23		26
Confl. Bikes (#/hr)			2			3						
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	1%	4%	1%	0%	1%	0%	1%	1%	1%	14%	2%	1%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	91	698	0	58	1193	0	231	1181	0	54	690	0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8			4			2			6		
Detector Phase	3	8		7	4		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	8.0		5.0	8.0		5.0	8.0		5.0	8.0	
Minimum Split (s)	10.0	36.0		10.0	36.0		10.0	33.0		10.0	34.0	
Total Split (s)	10.0	70.0		10.0	70.0		10.0	70.0		10.0	70.0	
Total Split (%)	6.3%	43.8%		6.3%	43.8%		6.3%	43.8%		6.3%	43.8%	
Yellow Time (s)	3.0	5.0		3.0	5.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	1.0	2.0		1.0	2.0		1.0	2.0		1.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.0	7.0		4.0	7.0		4.0	6.0		4.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		None	Max		None	Max	
Act Effct Green (s)	69.3	61.6		68.5	59.5		72.9	66.2		72.1	64.1	
Actuated g/C Ratio	0.44	0.39		0.44	0.38		0.47	0.42		0.46	0.41	
v/c Ratio	0.76	0.51		0.20	0.88		0.79	0.78		0.44	0.48	
Control Delay	63.6	37.0		24.8	53.3		51.5	44.5		33.9	35.2	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	63.6	37.0		24.8	53.3		51.5	44.5		33.9	35.2	
LOS	E	D		C	D		D	D		C	D	
Approach Delay		40.1			52.0			45.7			35.1	
Approach LOS		D			D			D			D	
Queue Length 50th (m)	15.8	86.3		9.9	180.2		43.6	175.8		9.2	84.1	
Queue Length 95th (m)	#42.0	105.4		18.4	209.9		#74.8	204.8		17.6	103.0	
Internal Link Dist (m)		416.2			279.2			344.3			122.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (m)	45.0			20.0			40.0			55.0		
Base Capacity (vph)	119	1388		284	1443		292	1510		123	1430	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.76	0.50		0.20	0.83		0.79	0.78		0.44	0.48	

Intersection Summary			
Area Type:	Other		
Cycle Length: 160			
Actuated Cycle Length: 156.6			
Natural Cycle: 90			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.88			
Intersection Signal Delay: 44.6		Intersection LOS: D	
Intersection Capacity Utilization 89.6%		ICU Level of Service E	
Analysis Period (min) 15			

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

Splits and Phases: 19: Bramalea Rd. & Williams Parkway



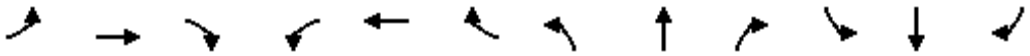
19: Bramalea Rd. & Williams Parkway
Timing Plan: PM

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	86	551	112	55	1062	71	219	1047	75	51	561	94
Future Volume (vph)	86	551	112	55	1062	71	219	1047	75	51	561	94
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	7.0		4.0	7.0		4.0	6.0		4.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	0.99		1.00	0.99		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1807	3419		1823	3575		1802	3565		1601	3478	
Flt Permitted	0.06	1.00		0.28	1.00		0.28	1.00		0.09	1.00	
Satd. Flow (perm)	124	3419		539	3575		528	3565		147	3478	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	91	580	118	58	1118	75	231	1102	79	54	591	99
RTOR Reduction (vph)	0	11	0	0	3	0	0	3	0	0	8	0
Lane Group Flow (vph)	91	687	0	58	1190	0	231	1178	0	54	682	0
Confl. Peds. (#/hr)	10		12	12		10	26		23	23		26
Confl. Bikes (#/hr)			2			3						
Heavy Vehicles (%)	1%	4%	1%	0%	1%	0%	1%	1%	1%	14%	2%	1%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	67.6	61.6		65.0	60.3		72.2	66.2		69.6	64.9	
Effective Green, g (s)	67.6	61.6		65.0	60.3		72.2	66.2		69.6	64.9	
Actuated g/C Ratio	0.43	0.39		0.41	0.38		0.46	0.42		0.44	0.41	
Clearance Time (s)	4.0	7.0		4.0	7.0		4.0	6.0		4.0	6.0	
Vehicle Extension (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	116	1331		259	1362		289	1491		107	1426	
v/s Ratio Prot	c0.03	0.20		0.01	c0.33		c0.03	0.33		0.01	0.20	
v/s Ratio Perm	0.30			0.09			c0.33			0.21		
v/c Ratio	0.78	0.52		0.22	0.87		0.80	0.79		0.50	0.48	
Uniform Delay, d1	35.7	36.9		29.3	45.4		38.3	40.0		31.9	34.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	32.2	0.7		0.9	7.0		16.2	4.3		7.6	1.2	
Delay (s)	67.9	37.6		30.2	52.4		54.5	44.3		39.5	35.4	
Level of Service	E	D		C	D		D	D		D	D	
Approach Delay (s)		41.1			51.4			46.0			35.7	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM 2000 Control Delay	44.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	158.2	Sum of lost time (s)	21.0
Intersection Capacity Utilization	89.6%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

21: Glenridge Rd/Chinguacousy School & Williams Parkway

Timing Plan: PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	17	802	35	19	1111	2	39	0	9	8	1	8
Future Volume (vph)	17	802	35	19	1111	2	39	0	9	8	1	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	30.0		0.0	25.0		0.0	0.0		0.0	30.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	30.0			20.0			2.5			2.5		
Satd. Flow (prot)	1217	3511	0	1560	3538	0	0	1761	0	0	1550	0
Flt Permitted	0.222			0.310				0.753			0.884	
Satd. Flow (perm)	284	3511	0	506	3538	0	0	1369	0	0	1397	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		7						20			8	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		303.2			336.9			195.5			69.4	
Travel Time (s)		21.8			24.3			14.1			5.0	
Confl. Peds. (#/hr)	16		7	7		16	6		5	5		6
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	50%	3%	6%	17%	3%	100%	0%	0%	11%	13%	0%	13%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	18	881	0	20	1171	0	0	50	0	0	17	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Detector Phase	2	2		6	6		4	4		8	8	
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		8.0	8.0		8.0	8.0	
Minimum Split (s)	29.0	29.0		29.0	29.0		36.0	36.0		36.0	36.0	
Total Split (s)	120.0	120.0		120.0	120.0		40.0	40.0		40.0	40.0	
Total Split (%)	75.0%	75.0%		75.0%	75.0%		25.0%	25.0%		25.0%	25.0%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0			6.0			6.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	C-Max	C-Max		C-Max	C-Max		None	None		None	None	
Act Effct Green (s)	130.6	130.6		130.6	130.6			21.4			21.4	
Actuated g/C Ratio	0.82	0.82		0.82	0.82			0.13			0.13	
v/c Ratio	0.08	0.31		0.05	0.41			0.25			0.09	
Control Delay	6.6	5.6		8.6	8.6			39.8			36.8	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	6.6	5.6		8.6	8.6			39.8			36.8	
LOS	A	A		A	A			D			D	
Approach Delay		5.6			8.6			39.8			36.8	
Approach LOS		A			A			D			D	
Queue Length 50th (m)	1.5	46.6		1.5	63.5			8.0			2.4	
Queue Length 95th (m)	4.2	55.6		m7.2	139.0			20.8			9.7	
Internal Link Dist (m)		279.2			312.9			171.5			45.4	
Turn Bay Length (m)	30.0			25.0								

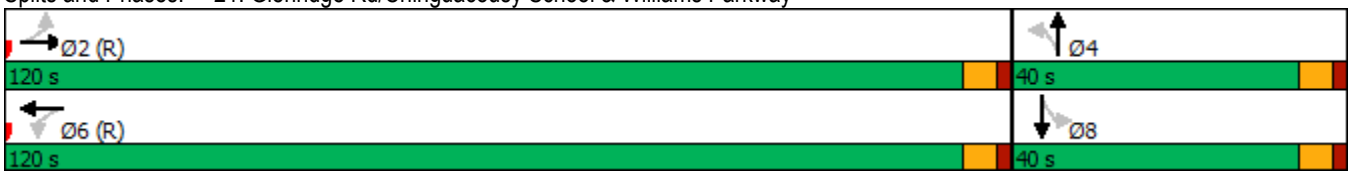
21: Glenridge Rd/Chinguacousy School & Williams Parkway

Timing Plan: PM

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Base Capacity (vph)	232	2868		413	2889			306			303	
Starvation Cap Reductn	0	0		0	0			0			0	
Spillback Cap Reductn	0	0		0	0			0			0	
Storage Cap Reductn	0	0		0	0			0			0	
Reduced v/c Ratio	0.08	0.31		0.05	0.41			0.16			0.06	

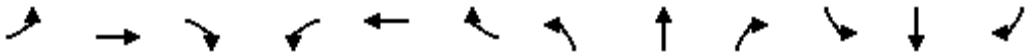
Intersection Summary			
Area Type:	Other		
Cycle Length: 160			
Actuated Cycle Length: 160			
Offset: 16 (10%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green			
Natural Cycle: 65			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.41			
Intersection Signal Delay: 8.3		Intersection LOS: A	
Intersection Capacity Utilization 50.8%		ICU Level of Service A	
Analysis Period (min) 15			
m Volume for 95th percentile queue is metered by upstream signal.			

Splits and Phases: 21: Glenridge Rd/Chinguacousy School & Williams Parkway



21: Glenridge Rd/Chinguacousy School & Williams Parkway

Timing Plan: PM



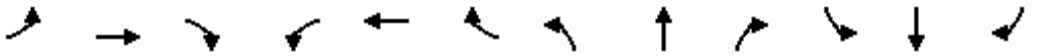
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	17	802	35	19	1111	2	39	0	9	8	1	8
Future Volume (vph)	17	802	35	19	1111	2	39	0	9	8	1	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0			6.0			6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			0.99	
Flpb, ped/bikes	0.99	1.00		0.99	1.00			0.99			1.00	
Frt	1.00	0.99		1.00	1.00			0.98			0.94	
Flt Protected	0.95	1.00		0.95	1.00			0.96			0.98	
Satd. Flow (prot)	1205	3510		1548	3537			1746			1545	
Flt Permitted	0.22	1.00		0.31	1.00			0.75			0.88	
Satd. Flow (perm)	281	3510		505	3537			1368			1397	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	18	844	37	20	1169	2	41	0	9	8	1	8
RTOR Reduction (vph)	0	1	0	0	0	0	0	18	0	0	7	0
Lane Group Flow (vph)	18	880	0	20	1171	0	0	32	0	0	10	0
Confl. Peds. (#/hr)	16		7	7		16	6		5	5		6
Heavy Vehicles (%)	50%	3%	6%	17%	3%	100%	0%	0%	11%	13%	0%	13%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	128.2	128.2		128.2	128.2			19.8			19.8	
Effective Green, g (s)	128.2	128.2		128.2	128.2			19.8			19.8	
Actuated g/C Ratio	0.80	0.80		0.80	0.80			0.12			0.12	
Clearance Time (s)	6.0	6.0		6.0	6.0			6.0			6.0	
Vehicle Extension (s)	5.0	5.0		5.0	5.0			5.0			5.0	
Lane Grp Cap (vph)	225	2812		404	2834			169			172	
v/s Ratio Prot		0.25			c0.33							
v/s Ratio Perm	0.06			0.04				c0.02			0.01	
v/c Ratio	0.08	0.31		0.05	0.41			0.19			0.06	
Uniform Delay, d1	3.4	4.2		3.3	4.7			62.9			61.9	
Progression Factor	1.00	1.00		1.51	1.38			1.00			1.00	
Incremental Delay, d2	0.7	0.3		0.2	0.4			1.2			0.3	
Delay (s)	4.1	4.5		5.2	6.9			64.1			62.2	
Level of Service	A	A		A	A			E			E	
Approach Delay (s)		4.5			6.9			64.1			62.2	
Approach LOS		A			A			E			E	

Intersection Summary			
HCM 2000 Control Delay	7.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.38		
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	50.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

20: Grenoble Blvd/Jordan Blvd & Williams Parkway

Timing Plan: PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	101	647	56	32	1030	73	46	70	28	29	37	69
Future Volume (vph)	101	647	56	32	1030	73	46	70	28	29	37	69
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	30.0		0.0	30.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	30.0			30.0			2.5			2.5		
Satd. Flow (prot)	1772	3484	0	1722	3476	0	0	3165	0	0	3180	0
Flt Permitted	0.225			0.363				0.802			0.834	
Satd. Flow (perm)	419	3484	0	656	3476	0	0	2572	0	0	2675	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		13			11			17			73	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		336.9			330.2			104.7			103.8	
Travel Time (s)		24.3			23.8			7.5			7.5	
Confl. Peds. (#/hr)	8		7	7		8	8		11	11		8
Confl. Bikes (#/hr)												1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	3%	3%	7%	6%	4%	1%	16%	5%	11%	4%	6%	2%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	106	740	0	34	1161	0	0	151	0	0	143	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Detector Phase	2	2		6	6		4	4		8	8	
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		8.0	8.0		8.0	8.0	
Minimum Split (s)	39.0	39.0		39.0	39.0		42.0	42.0		42.0	42.0	
Total Split (s)	117.0	117.0		117.0	117.0		43.0	43.0		43.0	43.0	
Total Split (%)	73.1%	73.1%		73.1%	73.1%		26.9%	26.9%		26.9%	26.9%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0			6.0			6.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	C-Max	C-Max		C-Max	C-Max		None	None		None	None	
Act Effct Green (s)	129.2	129.2		129.2	129.2			18.8			18.8	
Actuated g/C Ratio	0.81	0.81		0.81	0.81			0.12			0.12	
v/c Ratio	0.31	0.26		0.06	0.41			0.48			0.38	
Control Delay	13.3	6.3		5.1	5.7			61.7			32.6	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	13.3	6.3		5.1	5.7			61.7			32.6	
LOS	B	A		A	A			E			C	
Approach Delay		7.2			5.7			61.7			32.6	
Approach LOS		A			A			E			C	
Queue Length 50th (m)	7.5	25.5		1.6	41.3			21.7			11.0	
Queue Length 95th (m)	37.5	66.9		7.1	94.0			29.3			19.2	
Internal Link Dist (m)		312.9			306.2			80.7			79.8	

20: Grenoble Blvd/Jordan Blvd & Williams Parkway

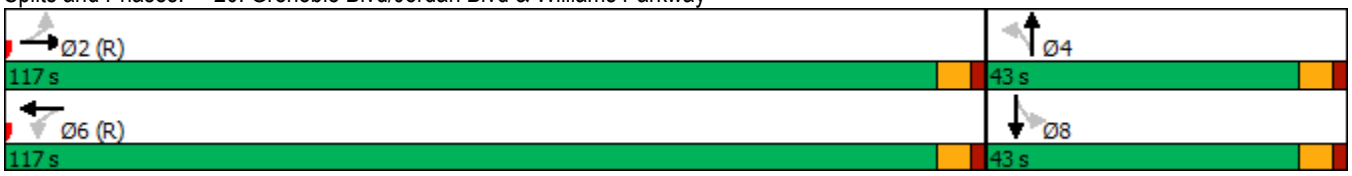
Timing Plan: PM

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (m)	30.0			30.0								
Base Capacity (vph)	338	2816		529	2809			607			674	
Starvation Cap Reductn	0	0		0	0			0			0	
Spillback Cap Reductn	0	0		0	0			0			0	
Storage Cap Reductn	0	0		0	0			0			0	
Reduced v/c Ratio	0.31	0.26		0.06	0.41			0.25			0.21	

Intersection Summary

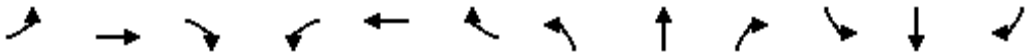
Area Type: Other
Cycle Length: 160
Actuated Cycle Length: 160
Offset: 98 (61%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 85
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.48
Intersection Signal Delay: 11.5 Intersection LOS: B
Intersection Capacity Utilization 68.1% ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 20: Grenoble Blvd/Jordan Blvd & Williams Parkway



20: Grenoble Blvd/Jordan Blvd & Williams Parkway

Timing Plan: PM



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	101	647	56	32	1030	73	46	70	28	29	37	69
Future Volume (vph)	101	647	56	32	1030	73	46	70	28	29	37	69
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0			6.0			6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			0.95			0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			0.99			0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	0.99		1.00	0.99			0.97			0.92	
Flt Protected	0.95	1.00		0.95	1.00			0.98			0.99	
Satd. Flow (prot)	1768	3484		1716	3476			3158			3173	
Flt Permitted	0.23	1.00		0.36	1.00			0.80			0.83	
Satd. Flow (perm)	420	3484		656	3476			2574			2676	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	106	681	59	34	1084	77	48	74	29	31	39	73
RTOR Reduction (vph)	0	3	0	0	2	0	0	15	0	0	64	0
Lane Group Flow (vph)	106	737	0	34	1159	0	0	136	0	0	79	0
Confl. Peds. (#/hr)	8		7	7		8	8		11	11		8
Confl. Bikes (#/hr)												1
Heavy Vehicles (%)	3%	3%	7%	6%	4%	1%	16%	5%	11%	4%	6%	2%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	129.2	129.2		129.2	129.2			18.8			18.8	
Effective Green, g (s)	129.2	129.2		129.2	129.2			18.8			18.8	
Actuated g/C Ratio	0.81	0.81		0.81	0.81			0.12			0.12	
Clearance Time (s)	6.0	6.0		6.0	6.0			6.0			6.0	
Vehicle Extension (s)	5.0	5.0		5.0	5.0			5.0			5.0	
Lane Grp Cap (vph)	339	2813		529	2806			302			314	
v/s Ratio Prot		0.21			c0.33							
v/s Ratio Perm	0.25			0.05				c0.05			0.03	
v/c Ratio	0.31	0.26		0.06	0.41			0.45			0.25	
Uniform Delay, d1	4.0	3.8		3.1	4.4			65.8			64.2	
Progression Factor	1.83	1.38		1.00	1.00			1.00			1.00	
Incremental Delay, d2	2.3	0.2		0.2	0.5			2.2			0.9	
Delay (s)	9.6	5.4		3.4	4.9			68.0			65.1	
Level of Service	A	A		A	A			E			E	
Approach Delay (s)		5.9			4.9			68.0			65.1	
Approach LOS		A			A			E			E	

Intersection Summary			
HCM 2000 Control Delay	13.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	68.1%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	700	16	19	1136	10	21
Future Volume (vph)	700	16	19	1136	10	21
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)		0.0	30.0		0.0	0.0
Storage Lanes		0	1		1	0
Taper Length (m)			30.0		2.5	
Satd. Flow (prot)	3525	0	1644	3544	1628	0
Flt Permitted			0.362		0.984	
Satd. Flow (perm)	3525	0	618	3544	1626	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	4				22	
Link Speed (k/h)	60			60	50	
Link Distance (m)	330.2			415.5	211.3	
Travel Time (s)	19.8			24.9	15.2	
Confl. Peds. (#/hr)		15	15		2	12
Confl. Bikes (#/hr)		1				
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	3%	7%	11%	3%	0%	5%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	754	0	20	1196	33	0
Turn Type	NA		Perm	NA	Prot	
Protected Phases	2			6	8	
Permitted Phases			6			
Detector Phase	2		6	6	8	
Switch Phase						
Minimum Initial (s)	4.0		4.0	4.0	4.0	
Minimum Split (s)	33.0		33.0	33.0	33.0	
Total Split (s)	124.0		124.0	124.0	36.0	
Total Split (%)	77.5%		77.5%	77.5%	22.5%	
Yellow Time (s)	4.0		4.0	4.0	4.0	
All-Red Time (s)	2.0		2.0	2.0	2.0	
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	
Total Lost Time (s)	6.0		6.0	6.0	6.0	
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	Max		Max	Max	None	
Act Effct Green (s)	120.4		120.4	120.4	14.8	
Actuated g/C Ratio	0.84		0.84	0.84	0.10	
v/c Ratio	0.25		0.04	0.40	0.17	
Control Delay	3.9		4.4	4.8	29.7	
Queue Delay	0.0		0.0	0.0	0.0	
Total Delay	3.9		4.4	4.8	29.7	
LOS	A		A	A	C	
Approach Delay	3.9			4.8	29.7	
Approach LOS	A			A	C	
Queue Length 50th (m)	15.3		0.6	28.8	2.9	
Queue Length 95th (m)	42.3		3.8	77.2	13.0	
Internal Link Dist (m)	306.2			391.5	187.3	

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Turn Bay Length (m)			30.0			
Base Capacity (vph)	2971		520	2986	362	
Starvation Cap Reductn	0		0	0	0	
Spillback Cap Reductn	0		0	0	0	
Storage Cap Reductn	0		0	0	0	
Reduced v/c Ratio	0.25		0.04	0.40	0.09	

Intersection Summary			
Area Type:	Other		
Cycle Length: 160			
Actuated Cycle Length: 142.8			
Natural Cycle: 70			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.40			
Intersection Signal Delay: 4.8		Intersection LOS: A	
Intersection Capacity Utilization 51.1%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 27: Graymar Rd & Williams Parkway

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	700	16	19	1136	10	21
Future Volume (vph)	700	16	19	1136	10	21
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0		6.0	6.0	6.0	
Lane Util. Factor	0.95		1.00	0.95	1.00	
Frpb, ped/bikes	1.00		1.00	1.00	0.98	
Flpb, ped/bikes	1.00		0.99	1.00	1.00	
Frt	1.00		1.00	1.00	0.91	
Flt Protected	1.00		0.95	1.00	0.98	
Satd. Flow (prot)	3524		1622	3544	1630	
Flt Permitted	1.00		0.36	1.00	0.98	
Satd. Flow (perm)	3524		618	3544	1630	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	737	17	20	1196	11	22
RTOR Reduction (vph)	1	0	0	0	20	0
Lane Group Flow (vph)	753	0	20	1196	13	0
Confl. Peds. (#/hr)		15	15		2	12
Confl. Bikes (#/hr)		1				
Heavy Vehicles (%)	3%	7%	11%	3%	0%	5%
Turn Type	NA		Perm	NA	Prot	
Protected Phases	2			6	8	
Permitted Phases			6			
Actuated Green, G (s)	119.0		119.0	119.0	13.1	
Effective Green, g (s)	119.0		119.0	119.0	13.1	
Actuated g/C Ratio	0.83		0.83	0.83	0.09	
Clearance Time (s)	6.0		6.0	6.0	6.0	
Vehicle Extension (s)	5.0		5.0	5.0	5.0	
Lane Grp Cap (vph)	2910		510	2926	148	
v/s Ratio Prot	0.21			c0.34	c0.01	
v/s Ratio Perm			0.03			
v/c Ratio	0.26		0.04	0.41	0.09	
Uniform Delay, d1	2.8		2.3	3.3	60.0	
Progression Factor	1.00		1.00	1.00	1.00	
Incremental Delay, d2	0.2		0.1	0.4	0.5	
Delay (s)	3.0		2.4	3.7	60.6	
Level of Service	A		A	A	E	
Approach Delay (s)	3.0			3.7	60.6	
Approach LOS	A			A	E	

Intersection Summary			
HCM 2000 Control Delay	4.4	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.38		
Actuated Cycle Length (s)	144.1	Sum of lost time (s)	12.0
Intersection Capacity Utilization	51.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Williams Parkway EA
Do Nothing Scenario - YR 2031

26: Torbram Rd./Torbram Rd & Williams Parkway
Timing Plan: PM

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	82	563	92	33	799	269	160	1097	81	150	707	91
Future Volume (vph)	82	563	92	33	799	269	160	1097	81	150	707	91
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	30.0		30.0	45.0		0.0	40.0		40.0	60.0		0.0
Storage Lanes	1		1	1		1	1		1	1		0
Taper Length (m)	30.0			45.0			25.0			55.0		
Satd. Flow (prot)	1772	3544	1633	1674	3544	1633	1772	3544	1570	1772	3417	0
Flt Permitted	0.199			0.245			0.336			0.122		
Satd. Flow (perm)	368	3544	1574	429	3544	1558	617	3544	1544	228	3417	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			75			152			116		12	
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		415.5			219.7			183.1			148.5	
Travel Time (s)		24.9			13.2			11.0			8.9	
Confl. Peds. (#/hr)	22		16	16		22	37		14	14		37
Confl. Bikes (#/hr)						1			1			2
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	3%	3%	0%	9%	3%	0%	3%	3%	4%	3%	4%	6%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	86	593	97	35	841	283	168	1155	85	158	840	0
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	Perm	NA	Free	pm+pt	NA	
Protected Phases		8		7	4			2		1	6	
Permitted Phases	8		8	4		4	2		Free	6		
Detector Phase	8	8	8	7	4	4	2	2		1	6	
Switch Phase												
Minimum Initial (s)	8.0	8.0	8.0	5.0	8.0	8.0	8.0	8.0		5.0	8.0	
Minimum Split (s)	37.0	37.0	37.0	10.0	37.0	37.0	39.0	39.0		10.0	39.0	
Total Split (s)	67.0	67.0	67.0	10.0	77.0	77.0	70.0	70.0		13.0	83.0	
Total Split (%)	41.9%	41.9%	41.9%	6.3%	48.1%	48.1%	43.8%	43.8%		8.1%	51.9%	
Yellow Time (s)	4.0	4.0	4.0	3.0	4.0	4.0	4.0	4.0		3.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	1.0	2.0	2.0	2.0	2.0		1.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0	4.0	6.0	6.0	6.0	6.0		4.0	6.0	
Lead/Lag	Lag	Lag	Lag	Lead			Lag	Lag		Lead		
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None	None	Max	Max		None	Max	
Act Effct Green (s)	38.9	38.9	38.9	46.7	44.7	44.7	64.5	64.5	134.3	79.6	77.5	
Actuated g/C Ratio	0.29	0.29	0.29	0.35	0.33	0.33	0.48	0.48	1.00	0.59	0.58	
v/c Ratio	0.81	0.58	0.19	0.17	0.71	0.46	0.57	0.68	0.06	0.66	0.42	
Control Delay	93.7	43.2	12.2	29.4	42.3	17.1	37.6	31.2	0.1	29.6	17.9	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	93.7	43.2	12.2	29.4	42.3	17.1	37.6	31.2	0.1	29.6	17.9	
LOS	F	D	B	C	D	B	D	C	A	C	B	
Approach Delay		44.9			35.8			30.0			19.8	
Approach LOS		D			D			C			B	
Queue Length 50th (m)	22.0	73.5	4.4	6.1	101.6	25.7	29.9	116.4	0.0	16.9	58.7	
Queue Length 95th (m)	#49.7	91.4	17.2	13.2	122.4	48.9	70.8	185.6	0.0	#46.5	103.2	
Internal Link Dist (m)		391.5			195.7			159.1			124.5	

26: Torbram Rd./Torbram Rd & Williams Parkway

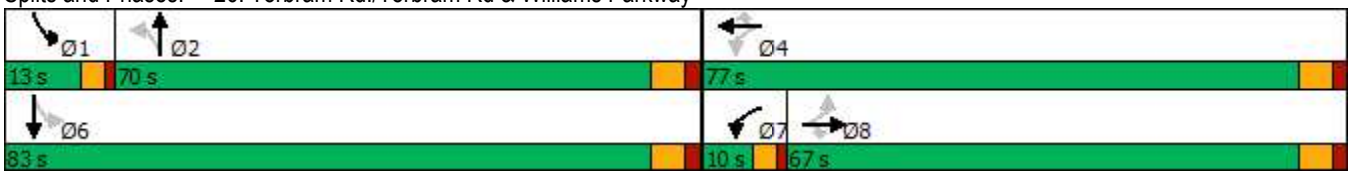
Timing Plan: PM

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (m)	30.0		30.0	45.0			40.0		40.0	60.0		
Base Capacity (vph)	168	1621	760	205	1886	900	295	1700	1544	239	1978	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.51	0.37	0.13	0.17	0.45	0.31	0.57	0.68	0.06	0.66	0.42	

Intersection Summary

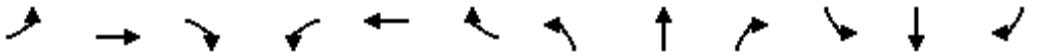
Area Type: Other
Cycle Length: 160
Actuated Cycle Length: 134.3
Natural Cycle: 100
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.81
Intersection Signal Delay: 31.9 Intersection LOS: C
Intersection Capacity Utilization 87.7% ICU Level of Service E
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 26: Torbram Rd./Torbram Rd & Williams Parkway



26: Torbram Rd./Torbram Rd & Williams Parkway

Timing Plan: PM



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	82	563	92	33	799	269	160	1097	81	150	707	91
Future Volume (vph)	82	563	92	33	799	269	160	1097	81	150	707	91
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	4.0	6.0	6.0	6.0	6.0	4.0	4.0	6.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.97	1.00	1.00	0.96	1.00	1.00	0.98	1.00	0.99	
Flpb, ped/bikes	0.99	1.00	1.00	1.00	1.00	1.00	0.99	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	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1760	3544	1580	1672	3544	1566	1747	3544	1544	1772	3419	
Flt Permitted	0.20	1.00	1.00	0.25	1.00	1.00	0.34	1.00	1.00	0.12	1.00	
Satd. Flow (perm)	369	3544	1580	432	3544	1566	617	3544	1544	228	3419	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	86	593	97	35	841	283	168	1155	85	158	744	96
RTOR Reduction (vph)	0	0	54	0	0	100	0	0	0	0	5	0
Lane Group Flow (vph)	86	593	43	35	841	183	168	1155	85	158	835	0
Confl. Peds. (#/hr)	22		16	16		22	37		14	14		37
Confl. Bikes (#/hr)						1			1			2
Heavy Vehicles (%)	3%	3%	0%	9%	3%	0%	3%	3%	4%	3%	4%	6%
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	Perm	NA	Free	pm+pt	NA	
Protected Phases		8		7	4			2		1	6	
Permitted Phases	8		8	4		4	2		Free	6		
Actuated Green, G (s)	38.9	38.9	38.9	46.3	46.3	46.3	64.4	64.4	135.8	77.5	77.5	
Effective Green, g (s)	38.9	38.9	38.9	46.3	46.3	46.3	64.4	64.4	135.8	77.5	77.5	
Actuated g/C Ratio	0.29	0.29	0.29	0.34	0.34	0.34	0.47	0.47	1.00	0.57	0.57	
Clearance Time (s)	6.0	6.0	6.0	4.0	6.0	6.0	6.0	6.0		4.0	6.0	
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	105	1015	452	178	1208	533	292	1680	1544	233	1951	
v/s Ratio Prot		0.17		0.00	c0.24			0.33		c0.05	0.24	
v/s Ratio Perm	c0.23		0.03	0.06		0.12	0.27		0.06	c0.34		
v/c Ratio	0.82	0.58	0.10	0.20	0.70	0.34	0.58	0.69	0.06	0.68	0.43	
Uniform Delay, d1	45.2	41.5	35.6	31.4	38.7	33.4	25.8	27.9	0.0	20.4	16.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	40.9	1.3	0.2	1.1	2.2	0.8	8.0	2.3	0.1	9.8	0.7	
Delay (s)	86.1	42.9	35.7	32.6	40.9	34.2	33.8	30.2	0.1	30.2	17.2	
Level of Service	F	D	D	C	D	C	C	C	A	C	B	
Approach Delay (s)		46.8			39.0			28.8			19.3	
Approach LOS		D			D			C			B	

Intersection Summary			
HCM 2000 Control Delay	32.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	135.8	Sum of lost time (s)	20.0
Intersection Capacity Utilization	87.7%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Future Analysis Results (2031) - AM

With Improvement

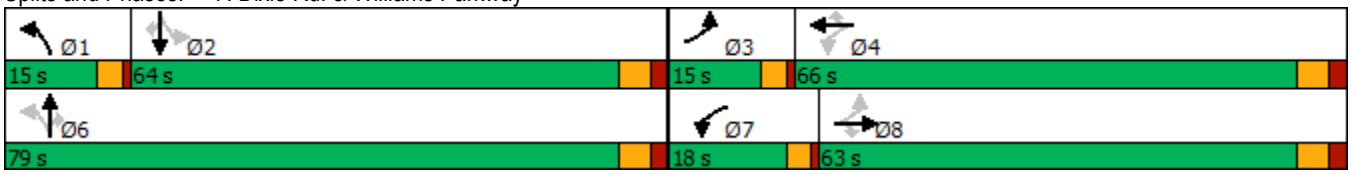
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	100	762	78	110	563	22	81	413	73	128	1180	172
Future Volume (vph)	100	762	78	110	563	22	81	413	73	128	1180	172
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	92.0		92.0	90.0		90.0	66.0		67.0	127.0		58.0
Storage Lanes	1		1	1		1	1		1	1		1
Taper Length (m)	51.0			55.0			100.0			62.0		
Satd. Flow (prot)	1738	3476	1585	1722	3411	1484	1738	4995	1541	1755	5043	1601
Flt Permitted	0.303			0.138			0.122			0.490		
Satd. Flow (perm)	545	3476	1540	249	3411	1397	223	4995	1503	900	5043	1521
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			82			75			77			121
Link Speed (k/h)		48			60			50			50	
Link Distance (m)		199.1			270.7			250.0			175.5	
Travel Time (s)		14.9			16.2			18.0			12.6	
Confl. Peds. (#/hr)	37		13	13		37	24		7	7		24
Confl. Bikes (#/hr)									3			
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	5%	5%	3%	6%	7%	10%	5%	5%	6%	4%	4%	2%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	105	802	82	116	593	23	85	435	77	135	1242	181
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases	3	8		7	4		1	6			2	
Permitted Phases	8		8	4		4	6		6	2		2
Detector Phase	3	8	8	7	4	4	1	6	6	2	2	2
Switch Phase												
Minimum Initial (s)	5.0	8.0	8.0	5.0	8.0	8.0	5.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	10.0	43.3	43.3	10.0	43.3	43.3	10.0	36.0	36.0	36.0	36.0	36.0
Total Split (s)	15.0	63.0	63.0	18.0	66.0	66.0	15.0	79.0	79.0	64.0	64.0	64.0
Total Split (%)	9.4%	39.4%	39.4%	11.3%	41.3%	41.3%	9.4%	49.4%	49.4%	40.0%	40.0%	40.0%
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	2.3	2.3	1.0	2.3	2.3	1.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.3	6.3	4.0	6.3	6.3	4.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead			Lag	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None	None	None	Max	Max	Max	Max	Max
Act Effct Green (s)	56.0	43.0	43.0	60.4	45.2	45.2	75.3	73.3	73.3	59.6	59.6	59.6
Actuated g/C Ratio	0.38	0.30	0.30	0.41	0.31	0.31	0.52	0.50	0.50	0.41	0.41	0.41
v/c Ratio	0.35	0.78	0.16	0.50	0.56	0.05	0.39	0.17	0.10	0.37	0.60	0.26
Control Delay	28.3	52.7	7.5	32.4	43.6	0.2	25.4	21.0	4.9	36.3	36.6	12.2
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	28.3	52.7	7.5	32.4	43.6	0.2	25.4	21.0	4.9	36.3	36.6	12.2
LOS	C	D	A	C	D	A	C	C	A	D	D	B
Approach Delay		46.4			40.5			19.5			33.7	
Approach LOS		D			D			B			C	
Queue Length 50th (m)	18.2	112.6	0.0	20.2	75.2	0.0	12.3	24.7	0.0	27.3	103.8	10.8
Queue Length 95th (m)	30.1	135.6	11.9	32.7	93.2	0.0	25.3	37.2	9.5	52.5	137.4	31.0
Internal Link Dist (m)		175.1			246.7			226.0			151.5	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (m)	92.0		92.0	90.0		90.0	66.0		67.0	127.0		58.0
Base Capacity (vph)	301	1359	652	247	1404	619	230	2514	795	368	2063	694
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.35	0.59	0.13	0.47	0.42	0.04	0.37	0.17	0.10	0.37	0.60	0.26

Intersection Summary

Area Type: Other
Cycle Length: 160
Actuated Cycle Length: 145.6
Natural Cycle: 100
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.78
Intersection Signal Delay: 36.0 — Intersection LOS: D
Intersection Capacity Utilization 82.6% — ICU Level of Service E
Analysis Period (min) 15

Splits and Phases: 7: Dixie Rd. & Williams Parkway



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	100	762	78	110	563	22	81	413	73	128	1180	172
Future Volume (vph)	100	762	78	110	563	22	81	413	73	128	1180	172
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.3	6.3	4.0	6.3	6.3	4.0	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes	1.00	1.00	0.97	1.00	1.00	0.95	1.00	1.00	0.98	1.00	1.00	0.95
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	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)	1731	3476	1543	1721	3411	1403	1738	4995	1505	1745	5043	1527
Flt Permitted	0.30	1.00	1.00	0.14	1.00	1.00	0.12	1.00	1.00	0.49	1.00	1.00
Satd. Flow (perm)	552	3476	1543	250	3411	1403	224	4995	1505	900	5043	1527
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	105	802	82	116	593	23	85	435	77	135	1242	181
RTOR Reduction (vph)	0	0	58	0	0	16	0	0	38	0	0	71
Lane Group Flow (vph)	105	802	24	116	593	7	85	435	39	135	1242	110
Confl. Peds. (#/hr)	37		13	13		37	24		7	7		24
Confl. Bikes (#/hr)									3			
Heavy Vehicles (%)	5%	5%	3%	6%	7%	10%	5%	5%	6%	4%	4%	2%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases	3	8		7	4		1	6			2	
Permitted Phases	8		8	4		4	6		6	2		2
Actuated Green, G (s)	53.7	43.0	43.0	58.1	45.2	45.2	73.3	73.3	73.3	59.6	59.6	59.6
Effective Green, g (s)	53.7	43.0	43.0	58.1	45.2	45.2	73.3	73.3	73.3	59.6	59.6	59.6
Actuated g/C Ratio	0.37	0.30	0.30	0.40	0.31	0.31	0.50	0.50	0.50	0.41	0.41	0.41
Clearance Time (s)	4.0	6.3	6.3	4.0	6.3	6.3	4.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Grp Cap (vph)	290	1027	456	230	1059	435	213	2516	758	368	2065	625
v/s Ratio Prot	0.03	c0.23		c0.04	0.17		c0.03	0.09			c0.25	
v/s Ratio Perm	0.11		0.02	0.16		0.01	0.17		0.03	0.15		0.07
v/c Ratio	0.36	0.78	0.05	0.50	0.56	0.02	0.40	0.17	0.05	0.37	0.60	0.18
Uniform Delay, d1	31.5	46.9	36.7	31.3	41.9	34.7	22.1	19.6	18.4	29.8	33.6	27.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.6	4.5	0.1	3.6	1.1	0.0	2.6	0.1	0.1	2.8	1.3	0.6
Delay (s)	33.1	51.5	36.8	34.9	42.9	34.8	24.6	19.8	18.5	32.6	35.0	27.9
Level of Service	C	D	D	C	D	C	C	B	B	C	C	C
Approach Delay (s)		48.3			41.4			20.3			33.9	
Approach LOS		D			D			C			C	

Intersection Summary			
HCM 2000 Control Delay	36.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	145.5	Sum of lost time (s)	20.3
Intersection Capacity Utilization	82.6%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	971	14	4	819	29	19
Future Volume (vph)	971	14	4	819	29	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)		0.0	50.0		0.0	0.0
Storage Lanes		0	1		1	0
Taper Length (m)			30.0		2.5	
Satd. Flow (prot)	3465	0	1825	3476	1694	0
Flt Permitted			0.950		0.971	
Satd. Flow (perm)	3465	0	1825	3476	1694	0
Link Speed (k/h)	60			60	50	
Link Distance (m)	270.7			273.9	143.1	
Travel Time (s)	16.2			16.4	10.3	
Confl. Peds. (#/hr)		20	20		2	2
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	5%	15%	0%	5%	7%	0%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1037	0	4	862	51	0
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 38.0%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	971	14	4	819	29	19
Future Volume (Veh/h)	971	14	4	819	29	19
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	1022	15	4	862	31	20
Pedestrians	2			2	20	
Lane Width (m)	3.7			3.7	3.7	
Walking Speed (m/s)	1.2			1.2	1.2	
Percent Blockage	0			0	2	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)	271					
pX, platoon unblocked			0.79		0.79	0.79
vC, conflicting volume			1057		1490	540
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			542		1090	0
tC, single (s)			4.1		6.9	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.6	3.3
p0 queue free %			100		80	98
cM capacity (veh/h)			806		156	846

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1
Volume Total	681	356	4	431	431	51
Volume Left	0	0	4	0	0	31
Volume Right	0	15	0	0	0	20
cSH	1700	1700	806	1700	1700	229
Volume to Capacity	0.40	0.21	0.00	0.25	0.25	0.22
Queue Length 95th (m)	0.0	0.0	0.1	0.0	0.0	6.3
Control Delay (s)	0.0	0.0	9.5	0.0	0.0	25.2
Lane LOS			A			D
Approach Delay (s)	0.0		0.0			25.2
Approach LOS						D

Intersection Summary				
Average Delay	0.7			
Intersection Capacity Utilization	38.0%	ICU Level of Service		A
Analysis Period (min)	15			

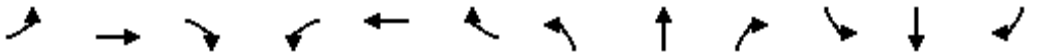
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	941	6	7	784	18	28
Future Volume (vph)	941	6	7	784	18	28
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)		0.0	50.0		0.0	0.0
Storage Lanes		0	1		1	0
Taper Length (m)			40.0		2.5	
Satd. Flow (prot)	3507	0	1601	3510	1689	0
Flt Permitted			0.950		0.981	
Satd. Flow (perm)	3507	0	1601	3510	1689	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	273.9			382.9	71.0	
Travel Time (s)	19.7			27.6	5.1	
Confl. Peds. (#/hr)		22	22			2
Confl. Bikes (#/hr)		4				1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	4%	0%	14%	4%	0%	4%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	997	0	7	825	48	0
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 36.9%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	941	6	7	784	18	28
Future Volume (Veh/h)	941	6	7	784	18	28
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	991	6	7	825	19	29
Pedestrians				2	22	
Lane Width (m)				3.7	3.7	
Walking Speed (m/s)				1.2	1.2	
Percent Blockage				0	2	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)				383		
pX, platoon unblocked					0.97	
vC, conflicting volume			1019		1442	522
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			1019		1395	522
tC, single (s)			4.4		6.8	7.0
tC, 2 stage (s)						
tF (s)			2.3		3.5	3.3
p0 queue free %			99		85	94
cM capacity (veh/h)			597		127	484

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1
Volume Total	661	336	7	412	412	48
Volume Left	0	0	7	0	0	19
Volume Right	0	6	0	0	0	29
cSH	1700	1700	597	1700	1700	229
Volume to Capacity	0.39	0.20	0.01	0.24	0.24	0.21
Queue Length 95th (m)	0.0	0.0	0.3	0.0	0.0	5.9
Control Delay (s)	0.0	0.0	11.1	0.0	0.0	24.9
Lane LOS			B			C
Approach Delay (s)	0.0		0.1			24.9
Approach LOS						C

Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	36.9%	ICU Level of Service	A
Analysis Period (min)	15		



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	75	816	8	25	596	56	56	13	7	168	20	146
Future Volume (vph)	75	816	8	25	596	56	56	13	7	168	20	146
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	50.0		0.0	30.0		0.0	0.0		0.0	40.0		0.0
Storage Lanes	1		0	1		0	0		0	1		0
Taper Length (m)	30.0			25.0			2.5			30.0		
Satd. Flow (prot)	1706	3475	0	1560	3353	0	0	1818	0	1706	1507	0
Flt Permitted	0.374			0.301				0.533		0.715		
Satd. Flow (perm)	657	3475	0	482	3353	0	0	983	0	1211	1507	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1			10			4			154	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		382.9			440.2			46.0			136.3	
Travel Time (s)		27.6			31.7			3.3			9.8	
Confl. Peds. (#/hr)	24		44	44		24	26		42	42		26
Confl. Bikes (#/hr)			4						1			1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	7%	4%	88%	17%	6%	13%	0%	0%	0%	7%	17%	4%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	79	867	0	26	686	0	0	80	0	177	175	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			2			4			4	
Permitted Phases	2			2			4			4		
Detector Phase	2	2		2	2		4	4		4	4	
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		8.0	8.0		8.0	8.0	
Minimum Split (s)	33.0	33.0		33.0	33.0		37.0	37.0		37.0	37.0	
Total Split (s)	92.0	92.0		92.0	92.0		68.0	68.0		68.0	68.0	
Total Split (%)	57.5%	57.5%		57.5%	57.5%		42.5%	42.5%		42.5%	42.5%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0			6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	C-Max	C-Max		C-Max	C-Max		None	None		None	None	
Act Effct Green (s)	115.7	115.7		115.7	115.7			32.3		32.3	32.3	
Actuated g/C Ratio	0.72	0.72		0.72	0.72			0.20		0.20	0.20	
v/c Ratio	0.17	0.35		0.07	0.28			0.40		0.73	0.41	
Control Delay	9.4	9.4		9.0	8.7			56.3		75.5	12.5	
Queue Delay	0.0	0.0		0.0	0.0			0.0		0.0	0.0	
Total Delay	9.4	9.4		9.0	8.7			56.3		75.5	12.5	
LOS	A	A		A	A			E		E	B	
Approach Delay		9.4			8.7			56.3			44.2	
Approach LOS		A			A			E			D	
Queue Length 50th (m)	7.0	47.4		2.2	34.8			21.4		53.8	5.6	
Queue Length 95th (m)	17.4	75.6		7.0	57.1			35.4		74.6	24.5	
Internal Link Dist (m)		358.9			416.2			22.0			112.3	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (m)	50.0			30.0						40.0		
Base Capacity (vph)	475	2512		348	2427			383		469	678	
Starvation Cap Reductn	0	0		0	0			0		0	0	
Spillback Cap Reductn	0	0		0	0			0		0	0	
Storage Cap Reductn	0	0		0	0			0		0	0	
Reduced v/c Ratio	0.17	0.35		0.07	0.28			0.21		0.38	0.26	

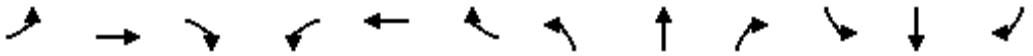
Intersection Summary			
Area Type:	Other		
Cycle Length: 160			
Actuated Cycle Length: 160			
Offset: 137 (86%), Referenced to phase 2:EBWB, Start of Green			
Natural Cycle: 70			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.73			
Intersection Signal Delay: 16.8		Intersection LOS: B	
Intersection Capacity Utilization 90.7%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 15: Williams Parkway & Mackay St.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	75	816	8	25	596	56	56	13	7	168	20	146
Future Volume (vph)	75	816	8	25	596	56	56	13	7	168	20	146
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0			6.0		6.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	0.99			0.99		1.00	0.95	
Flpb, ped/bikes	0.98	1.00		0.97	1.00			0.98		0.95	1.00	
Frt	1.00	1.00		1.00	0.99			0.99		1.00	0.87	
Flt Protected	0.95	1.00		0.95	1.00			0.96		0.95	1.00	
Satd. Flow (prot)	1663	3474		1509	3354			1782		1613	1507	
Flt Permitted	0.37	1.00		0.30	1.00			0.53		0.72	1.00	
Satd. Flow (perm)	654	3474		479	3354			985		1215	1507	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	79	859	8	26	627	59	59	14	7	177	21	154
RTOR Reduction (vph)	0	0	0	0	3	0	0	3	0	0	123	0
Lane Group Flow (vph)	79	867	0	26	683	0	0	77	0	177	52	0
Confl. Peds. (#/hr)	24		44	44		24	26		42	42		26
Confl. Bikes (#/hr)			4						1			1
Heavy Vehicles (%)	7%	4%	88%	17%	6%	13%	0%	0%	0%	7%	17%	4%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			2			4			4	
Permitted Phases	2			2			4			4		
Actuated Green, G (s)	115.7	115.7		115.7	115.7			32.3		32.3	32.3	
Effective Green, g (s)	115.7	115.7		115.7	115.7			32.3		32.3	32.3	
Actuated g/C Ratio	0.72	0.72		0.72	0.72			0.20		0.20	0.20	
Clearance Time (s)	6.0	6.0		6.0	6.0			6.0		6.0	6.0	
Vehicle Extension (s)	5.0	5.0		5.0	5.0			5.0		5.0	5.0	
Lane Grp Cap (vph)	472	2512		346	2425			198		245	304	
v/s Ratio Prot		c0.25			0.20						0.03	
v/s Ratio Perm	0.12			0.05				0.08		c0.15		
v/c Ratio	0.17	0.35		0.08	0.28			0.39		0.72	0.17	
Uniform Delay, d1	7.0	8.2		6.5	7.7			55.3		59.7	52.8	
Progression Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	0.8	0.4		0.4	0.3			2.6		12.2	0.6	
Delay (s)	7.7	8.5		6.9	8.0			57.9		71.9	53.3	
Level of Service	A	A		A	A			E		E	D	
Approach Delay (s)		8.5			8.0			57.9			62.7	
Approach LOS		A			A			E			E	

Intersection Summary			
HCM 2000 Control Delay	19.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	90.7%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

19: Bramalea Rd. & Williams Parkway
Timing Plan: AM

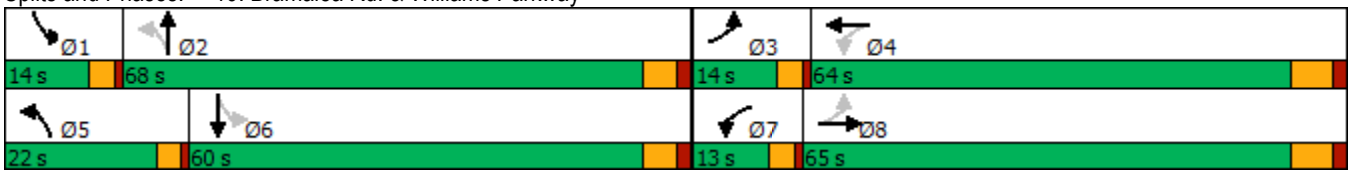


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	102	694	234	78	470	112	126	415	33	123	745	109
Future Volume (vph)	102	694	234	78	470	112	126	415	33	123	745	109
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	45.0		0.0	20.0		0.0	40.0		0.0	55.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	30.0			30.0			90.0			75.0		
Satd. Flow (prot)	1644	3272	0	1738	3302	0	1573	3410	0	1772	3435	0
Flt Permitted	0.288			0.107			0.152			0.442		
Satd. Flow (perm)	493	3272	0	196	3302	0	252	3410	0	813	3435	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		32			20			6			11	
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		440.2			303.2			368.3			146.0	
Travel Time (s)		31.7			21.8			22.1			8.8	
Confl. Peds. (#/hr)	21		28	28		21	24		15	15		24
Confl. Bikes (#/hr)						1						
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	11%	4%	11%	5%	6%	8%	16%	6%	0%	3%	3%	7%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	107	977	0	82	613	0	133	472	0	129	899	0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8			4			2			6		
Detector Phase	3	8		7	4		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	8.0		5.0	8.0		5.0	8.0		5.0	8.0	
Minimum Split (s)	10.0	36.0		10.0	36.0		10.0	33.0		10.0	34.0	
Total Split (s)	14.0	65.0		13.0	64.0		22.0	68.0		14.0	60.0	
Total Split (%)	8.8%	40.6%		8.1%	40.0%		13.8%	42.5%		8.8%	37.5%	
Yellow Time (s)	3.0	5.0		3.0	5.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	1.0	2.0		1.0	2.0		1.0	2.0		1.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.0	7.0		4.0	7.0		4.0	6.0		4.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None		None	None		None	Max		None	Max	
Act Effct Green (s)	65.4	52.4		63.5	51.5		76.7	62.1		69.9	58.1	
Actuated g/C Ratio	0.42	0.34		0.41	0.33		0.50	0.40		0.45	0.38	
v/c Ratio	0.38	0.86		0.48	0.55		0.55	0.34		0.30	0.69	
Control Delay	29.3	54.8		34.6	42.4		30.6	33.2		23.9	44.8	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	29.3	54.8		34.6	42.4		30.6	33.2		23.9	44.8	
LOS	C	D		C	D		C	C		C	D	
Approach Delay		52.3			41.5			32.6			42.2	
Approach LOS		D			D			C			D	
Queue Length 50th (m)	19.3	143.5		14.5	78.3		22.6	53.7		21.6	124.8	
Queue Length 95th (m)	31.8	171.0		25.3	97.1		37.0	70.3		35.4	159.3	
Internal Link Dist (m)		416.2			279.2			344.3			122.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (m)	45.0			20.0			40.0			55.0		
Base Capacity (vph)	283	1251		170	1233		281	1375		431	1299	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.38	0.78		0.48	0.50		0.47	0.34		0.30	0.69	

Intersection Summary			
Area Type:	Other		
Cycle Length: 160			
Actuated Cycle Length: 154.4			
Natural Cycle: 90			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.86			
Intersection Signal Delay: 43.6		Intersection LOS: D	
Intersection Capacity Utilization 80.5%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 19: Bramalea Rd. & Williams Parkway



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	102	694	234	78	470	112	126	415	33	123	745	109
Future Volume (vph)	102	694	234	78	470	112	126	415	33	123	745	109
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	7.0		4.0	7.0		4.0	6.0		4.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		0.99	1.00	
Frt	1.00	0.96		1.00	0.97		1.00	0.99		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1640	3274		1738	3303		1573	3410		1763	3435	
Flt Permitted	0.29	1.00		0.11	1.00		0.15	1.00		0.44	1.00	
Satd. Flow (perm)	497	3274		195	3303		251	3410		820	3435	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	107	731	246	82	495	118	133	437	35	129	784	115
RTOR Reduction (vph)	0	21	0	0	13	0	0	4	0	0	7	0
Lane Group Flow (vph)	107	956	0	82	600	0	133	468	0	129	892	0
Confl. Peds. (#/hr)	21		28	28		21	24		15	15		24
Confl. Bikes (#/hr)						1						
Heavy Vehicles (%)	11%	4%	11%	5%	6%	8%	16%	6%	0%	3%	3%	7%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	62.5	52.5		60.5	51.5		75.9	62.1		67.9	58.1	
Effective Green, g (s)	62.5	52.5		60.5	51.5		75.9	62.1		67.9	58.1	
Actuated g/C Ratio	0.40	0.34		0.39	0.33		0.49	0.40		0.44	0.38	
Clearance Time (s)	4.0	7.0		4.0	7.0		4.0	6.0		4.0	6.0	
Vehicle Extension (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	275	1113		166	1101		241	1371		420	1292	
v/s Ratio Prot	0.03	c0.29		c0.03	0.18		c0.05	0.14		0.02	c0.26	
v/s Ratio Perm	0.13			0.16			0.22			0.12		
v/c Ratio	0.39	0.86		0.49	0.54		0.55	0.34		0.31	0.69	
Uniform Delay, d1	30.3	47.5		34.1	41.9		26.3	32.0		26.2	40.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.9	7.4		4.8	1.0		4.6	0.7		0.9	3.0	
Delay (s)	32.2	54.9		38.8	42.9		30.9	32.7		27.1	43.6	
Level of Service	C	D		D	D		C	C		C	D	
Approach Delay (s)		52.7			42.4			32.3			41.5	
Approach LOS		D			D			C			D	

Intersection Summary			
HCM 2000 Control Delay	43.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	154.4	Sum of lost time (s)	21.0
Intersection Capacity Utilization	80.5%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

21: Glenridge Rd/Chinguacousy School & Williams Parkway

Timing Plan: AM

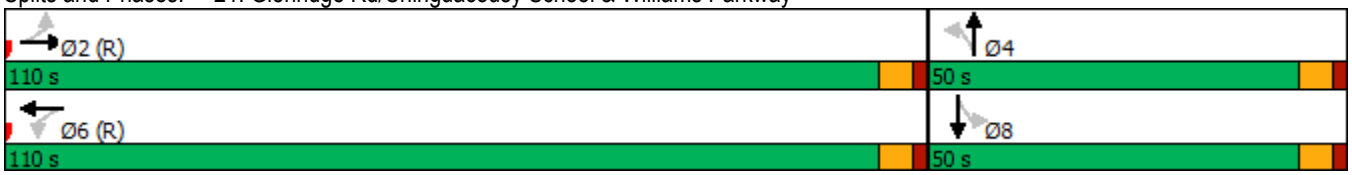
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	126	667	22	8	467	60	13	16	12	81	12	8
Future Volume (vph)	126	667	22	8	467	60	13	16	12	81	12	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	30.0		0.0	25.0		0.0	0.0		0.0	30.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	30.0			20.0			2.5			2.5		
Satd. Flow (prot)	1825	3432	0	1615	3308	0	0	1712	0	0	1783	0
Flt Permitted	0.441			0.365				0.905			0.774	
Satd. Flow (perm)	816	3432	0	604	3308	0	0	1574	0	0	1334	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		4			18			13			3	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		303.2			336.9			195.5			69.4	
Travel Time (s)		21.8			24.3			14.1			5.0	
Confl. Peds. (#/hr)	21		22	22		21	2		59	59		2
Confl. Bikes (#/hr)			1									
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	0%	5%	19%	13%	8%	0%	0%	7%	0%	3%	0%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	133	725	0	8	555	0	0	44	0	0	106	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Detector Phase	2	2		6	6		4	4		8	8	
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		8.0	8.0		8.0	8.0	
Minimum Split (s)	29.0	29.0		29.0	29.0		36.0	36.0		36.0	36.0	
Total Split (s)	110.0	110.0		110.0	110.0		50.0	50.0		50.0	50.0	
Total Split (%)	68.8%	68.8%		68.8%	68.8%		31.3%	31.3%		31.3%	31.3%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0			6.0			6.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	C-Max	C-Max		C-Max	C-Max		None	None		None	None	
Act Effct Green (s)	124.1	124.1		124.1	124.1			23.9			23.9	
Actuated g/C Ratio	0.78	0.78		0.78	0.78			0.15			0.15	
v/c Ratio	0.21	0.27		0.02	0.22			0.18			0.53	
Control Delay	6.7	5.9		4.8	4.4			43.0			68.9	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	6.7	5.9		4.8	4.4			43.0			68.9	
LOS	A	A		A	A			D			E	
Approach Delay		6.0			4.4			43.0			68.9	
Approach LOS		A			A			D			E	
Queue Length 50th (m)	12.1	36.5		0.5	21.2			8.3			29.3	
Queue Length 95th (m)	20.3	44.4		m1.7	24.7			20.1			49.1	
Internal Link Dist (m)		279.2			312.9			171.5			45.4	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (m)	30.0			25.0								
Base Capacity (vph)	632	2663		468	2570			442			369	
Starvation Cap Reductn	0	0		0	0			0			0	
Spillback Cap Reductn	0	0		0	0			0			0	
Storage Cap Reductn	0	0		0	0			0			0	
Reduced v/c Ratio	0.21	0.27		0.02	0.22			0.10			0.29	

Intersection Summary			
Area Type:	Other		
Cycle Length: 160			
Actuated Cycle Length: 160			
Offset: 140 (88%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green			
Natural Cycle: 65			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.53			
Intersection Signal Delay: 10.7		Intersection LOS: B	
Intersection Capacity Utilization 63.3%		ICU Level of Service B	
Analysis Period (min) 15			

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

Splits and Phases: 21: Glenridge Rd/Chinguacousy School & Williams Parkway

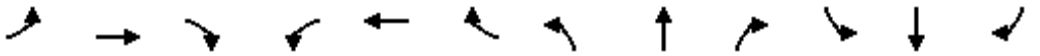


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	126	667	22	8	467	60	13	16	12	81	12	8
Future Volume (vph)	126	667	22	8	467	60	13	16	12	81	12	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0			6.0			6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frpb, ped/bikes	1.00	1.00		1.00	0.99			0.97			1.00	
Flpb, ped/bikes	0.96	1.00		0.97	1.00			1.00			0.93	
Frt	1.00	1.00		1.00	0.98			0.96			0.99	
Flt Protected	0.95	1.00		0.95	1.00			0.98			0.96	
Satd. Flow (prot)	1748	3432		1563	3308			1712			1658	
Flt Permitted	0.44	1.00		0.37	1.00			0.90			0.77	
Satd. Flow (perm)	811	3432		601	3308			1573			1334	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	133	702	23	8	492	63	14	17	13	85	13	8
RTOR Reduction (vph)	0	1	0	0	4	0	0	11	0	0	3	0
Lane Group Flow (vph)	133	724	0	8	551	0	0	33	0	0	103	0
Confl. Peds. (#/hr)	21		22	22		21	2		59	59		2
Confl. Bikes (#/hr)			1									
Heavy Vehicles (%)	0%	5%	19%	13%	8%	0%	0%	7%	0%	3%	0%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	124.1	124.1		124.1	124.1			23.9			23.9	
Effective Green, g (s)	124.1	124.1		124.1	124.1			23.9			23.9	
Actuated g/C Ratio	0.78	0.78		0.78	0.78			0.15			0.15	
Clearance Time (s)	6.0	6.0		6.0	6.0			6.0			6.0	
Vehicle Extension (s)	5.0	5.0		5.0	5.0			5.0			5.0	
Lane Grp Cap (vph)	629	2661		466	2565			234			199	
v/s Ratio Prot		c0.21			0.17							
v/s Ratio Perm	0.16			0.01				0.02			c0.08	
v/c Ratio	0.21	0.27		0.02	0.21			0.14			0.52	
Uniform Delay, d1	4.8	5.1		4.1	4.8			59.1			62.8	
Progression Factor	1.00	1.00		0.83	0.81			1.00			1.00	
Incremental Delay, d2	0.8	0.3		0.1	0.2			0.6			4.5	
Delay (s)	5.6	5.4		3.5	4.1			59.7			67.3	
Level of Service	A	A		A	A			E			E	
Approach Delay (s)		5.4			4.1			59.7			67.3	
Approach LOS		A			A			E			E	

Intersection Summary			
HCM 2000 Control Delay	10.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.31		
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	63.3%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

20: Grenoble Blvd/Jordan Blvd & Williams Parkway

Timing Plan: AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	29	684	44	22	463	22	43	52	41	64	51	174
Future Volume (vph)	29	684	44	22	463	22	43	52	41	64	51	174
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	30.0		0.0	30.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	30.0			30.0			2.5			2.5		
Satd. Flow (prot)	1706	3446	0	1659	3422	0	0	3204	0	0	3115	0
Flt Permitted	0.462			0.347				0.657			0.837	
Satd. Flow (perm)	819	3446	0	604	3422	0	0	2129	0	0	2627	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		8			6			42			183	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		336.9			330.2			104.7			103.8	
Travel Time (s)		24.3			23.8			7.5			7.5	
Confl. Peds. (#/hr)	18		7	7		18	15		15	15		15
Confl. Bikes (#/hr)						1						5
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	7%	5%	2%	10%	6%	0%	7%	4%	8%	2%	2%	4%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	31	766	0	23	510	0	0	143	0	0	304	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Detector Phase	2	2		6	6		4	4		8	8	
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		8.0	8.0		8.0	8.0	
Minimum Split (s)	39.0	39.0		39.0	39.0		42.0	42.0		42.0	42.0	
Total Split (s)	110.0	110.0		110.0	110.0		50.0	50.0		50.0	50.0	
Total Split (%)	68.8%	68.8%		68.8%	68.8%		31.3%	31.3%		31.3%	31.3%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0			6.0			6.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	C-Max	C-Max		C-Max	C-Max		None	None		None	None	
Act Effct Green (s)	122.0	122.0		122.0	122.0			26.0			26.0	
Actuated g/C Ratio	0.76	0.76		0.76	0.76			0.16			0.16	
v/c Ratio	0.05	0.29		0.05	0.20			0.38			0.53	
Control Delay	12.0	11.3		7.4	6.6			41.9			25.2	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	12.0	11.3		7.4	6.6			41.9			25.2	
LOS	B	B		A	A			D			C	
Approach Delay		11.3			6.6			41.9			25.2	
Approach LOS		B			A			D			C	
Queue Length 50th (m)	3.7	57.8		2.1	27.6			13.8			16.6	
Queue Length 95th (m)	9.0	75.0		5.3	34.7			24.4			31.4	
Internal Link Dist (m)		312.9			306.2			80.7			79.8	

20: Grenoble Blvd/Jordan Blvd & Williams Parkway

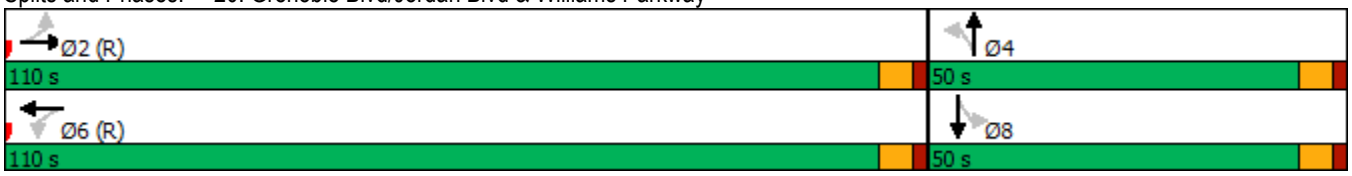
Timing Plan: AM

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (m)	30.0			30.0								
Base Capacity (vph)	624	2630		460	2611			615			855	
Starvation Cap Reductn	0	0		0	0			0			0	
Spillback Cap Reductn	0	0		0	0			0			0	
Storage Cap Reductn	0	0		0	0			0			0	
Reduced v/c Ratio	0.05	0.29		0.05	0.20			0.23			0.36	

Intersection Summary

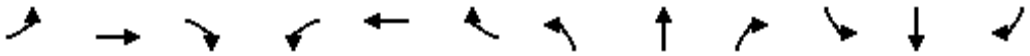
Area Type:	Other		
Cycle Length: 160			
Actuated Cycle Length: 160			
Offset: 52 (33%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green			
Natural Cycle: 85			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.53			
Intersection Signal Delay: 14.7		Intersection LOS: B	
Intersection Capacity Utilization 75.9%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 20: Grenoble Blvd/Jordan Blvd & Williams Parkway



20: Grenoble Blvd/Jordan Blvd & Williams Parkway

Timing Plan: AM



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	29	684	44	22	463	22	43	52	41	64	51	174
Future Volume (vph)	29	684	44	22	463	22	43	52	41	64	51	174
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0			6.0			6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			0.95			0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			0.99			0.98	
Flpb, ped/bikes	0.99	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	0.99		1.00	0.99			0.95			0.91	
Flt Protected	0.95	1.00		0.95	1.00			0.98			0.99	
Satd. Flow (prot)	1684	3446		1654	3423			3190			3098	
Flt Permitted	0.46	1.00		0.35	1.00			0.66			0.84	
Satd. Flow (perm)	818	3446		603	3423			2129			2623	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	31	720	46	23	487	23	45	55	43	67	54	183
RTOR Reduction (vph)	0	2	0	0	1	0	0	35	0	0	153	0
Lane Group Flow (vph)	31	764	0	23	509	0	0	108	0	0	151	0
Confl. Peds. (#/hr)	18		7	7		18	15		15	15		15
Confl. Bikes (#/hr)						1						5
Heavy Vehicles (%)	7%	5%	2%	10%	6%	0%	7%	4%	8%	2%	2%	4%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	122.0	122.0		122.0	122.0			26.0			26.0	
Effective Green, g (s)	122.0	122.0		122.0	122.0			26.0			26.0	
Actuated g/C Ratio	0.76	0.76		0.76	0.76			0.16			0.16	
Clearance Time (s)	6.0	6.0		6.0	6.0			6.0			6.0	
Vehicle Extension (s)	5.0	5.0		5.0	5.0			5.0			5.0	
Lane Grp Cap (vph)	623	2627		459	2610			345			426	
v/s Ratio Prot		c0.22			0.15							
v/s Ratio Perm	0.04			0.04				0.05			c0.06	
v/c Ratio	0.05	0.29		0.05	0.19			0.31			0.35	
Uniform Delay, d1	4.7	5.8		4.7	5.3			59.1			59.5	
Progression Factor	1.68	1.59		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.1	0.3		0.2	0.2			1.1			1.1	
Delay (s)	8.0	9.5		4.9	5.5			60.2			60.6	
Level of Service	A	A		A	A			E			E	
Approach Delay (s)		9.4			5.4			60.2			60.6	
Approach LOS		A			A			E			E	

Intersection Summary			
HCM 2000 Control Delay	21.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.30		
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	75.9%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	787	14	6	460	18	17
Future Volume (vph)	787	14	6	460	18	17
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)		0.0	30.0		0.0	0.0
Storage Lanes		0	1		1	0
Taper Length (m)			30.0		2.5	
Satd. Flow (prot)	3524	0	1372	3476	1679	0
Flt Permitted			0.331		0.975	
Satd. Flow (perm)	3524	0	476	3476	1673	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	3				18	
Link Speed (k/h)	60			60	50	
Link Distance (m)	330.2			415.5	211.3	
Travel Time (s)	19.8			24.9	15.2	
Confl. Peds. (#/hr)		5	5		4	6
Confl. Bikes (#/hr)		1				
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	3%	15%	33%	5%	6%	0%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	843	0	6	484	37	0
Turn Type	NA		Perm	NA	Prot	
Protected Phases	2			6	8	
Permitted Phases			6			
Detector Phase	2		6	6	8	
Switch Phase						
Minimum Initial (s)	4.0		4.0	4.0	4.0	
Minimum Split (s)	33.0		33.0	33.0	33.0	
Total Split (s)	118.0		118.0	118.0	42.0	
Total Split (%)	73.8%		73.8%	73.8%	26.3%	
Yellow Time (s)	4.0		4.0	4.0	4.0	
All-Red Time (s)	2.0		2.0	2.0	2.0	
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	
Total Lost Time (s)	6.0		6.0	6.0	6.0	
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	Max		Max	Max	None	
Act Effct Green (s)	114.4		114.4	114.4	11.9	
Actuated g/C Ratio	0.85		0.85	0.85	0.09	
v/c Ratio	0.28		0.01	0.16	0.22	
Control Delay	3.3		3.7	2.9	37.2	
Queue Delay	0.0		0.0	0.0	0.0	
Total Delay	3.3		3.7	2.9	37.2	
LOS	A		A	A	D	
Approach Delay	3.3			2.9	37.2	
Approach LOS	A			A	D	
Queue Length 50th (m)	18.2		0.2	9.3	4.8	
Queue Length 95th (m)	48.8		1.7	26.3	15.2	
Internal Link Dist (m)	306.2			391.5	187.3	

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Turn Bay Length (m)			30.0			
Base Capacity (vph)	3009		406	2968	466	
Starvation Cap Reductn	0		0	0	0	
Spillback Cap Reductn	0		0	0	0	
Storage Cap Reductn	0		0	0	0	
Reduced v/c Ratio	0.28		0.01	0.16	0.08	

Intersection Summary			
Area Type:	Other		
Cycle Length: 160			
Actuated Cycle Length: 134			
Natural Cycle: 70			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.28			
Intersection Signal Delay: 4.1		Intersection LOS: A	
Intersection Capacity Utilization 39.3%		ICU Level of Service A	
Analysis Period (min) 15			

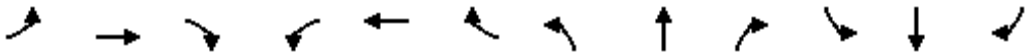
Splits and Phases: 27: Graymar Rd & Williams Parkway

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	787	14	6	460	18	17
Future Volume (vph)	787	14	6	460	18	17
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0		6.0	6.0	6.0	
Lane Util. Factor	0.95		1.00	0.95	1.00	
Frpb, ped/bikes	1.00		1.00	1.00	0.99	
Flpb, ped/bikes	1.00		1.00	1.00	1.00	
Frt	1.00		1.00	1.00	0.93	
Flt Protected	1.00		0.95	1.00	0.97	
Satd. Flow (prot)	3525		1367	3476	1680	
Flt Permitted	1.00		0.33	1.00	0.97	
Satd. Flow (perm)	3525		476	3476	1680	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	828	15	6	484	19	18
RTOR Reduction (vph)	0	0	0	0	17	0
Lane Group Flow (vph)	843	0	6	484	20	0
Confl. Peds. (#/hr)		5	5		4	6
Confl. Bikes (#/hr)		1				
Heavy Vehicles (%)	3%	15%	33%	5%	6%	0%
Turn Type	NA		Perm	NA	Prot	
Protected Phases	2			6	8	
Permitted Phases			6			
Actuated Green, G (s)	113.0		113.0	113.0	10.2	
Effective Green, g (s)	113.0		113.0	113.0	10.2	
Actuated g/C Ratio	0.84		0.84	0.84	0.08	
Clearance Time (s)	6.0		6.0	6.0	6.0	
Vehicle Extension (s)	5.0		5.0	5.0	5.0	
Lane Grp Cap (vph)	2946		397	2905	126	
v/s Ratio Prot	c0.24			0.14	c0.01	
v/s Ratio Perm			0.01			
v/c Ratio	0.29		0.02	0.17	0.16	
Uniform Delay, d1	2.4		1.8	2.1	58.5	
Progression Factor	1.00		1.00	1.00	1.00	
Incremental Delay, d2	0.2		0.1	0.1	1.3	
Delay (s)	2.6		1.9	2.2	59.8	
Level of Service	A		A	A	E	
Approach Delay (s)	2.6			2.2	59.8	
Approach LOS	A			A	E	

Intersection Summary			
HCM 2000 Control Delay	4.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.28		
Actuated Cycle Length (s)	135.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	39.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

26: Torbram Rd./Torbram Rd & Williams Parkway

Timing Plan: AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	65	599	122	42	303	50	42	454	38	271	1201	104
Future Volume (vph)	65	599	122	42	303	50	42	454	38	271	1201	104
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	30.0		30.0	45.0		0.0	40.0		40.0	60.0		0.0
Storage Lanes	1		1	1		1	1		1	1		0
Taper Length (m)	30.0			45.0			25.0			55.0		
Satd. Flow (prot)	1644	3544	1601	1690	3444	1541	1825	3444	1585	1807	3474	0
Flt Permitted	0.477			0.192			0.168			0.408		
Satd. Flow (perm)	817	3544	1564	340	3444	1493	321	3444	1564	774	3474	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			75			75			116		9	
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		415.5			219.7			183.1			148.5	
Travel Time (s)		24.9			13.2			11.0			8.9	
Confl. Peds. (#/hr)	12		7	7		12	39		5	5		39
Confl. Bikes (#/hr)			1			1						4
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	11%	3%	2%	8%	6%	6%	0%	6%	3%	1%	3%	6%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	68	631	128	44	319	53	44	478	40	285	1373	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Free	pm+pt	NA	
Protected Phases	3	8		7	4			2		1	6	
Permitted Phases	8		8	4		4	2		Free	6		
Detector Phase	3	8	8	7	4	4	2	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	8.0	8.0	5.0	8.0	8.0	8.0	8.0		5.0	8.0	
Minimum Split (s)	9.0	37.0	37.0	10.0	37.0	37.0	39.0	39.0		10.0	39.0	
Total Split (s)	10.0	59.0	59.0	10.0	59.0	59.0	63.0	63.0		28.0	91.0	
Total Split (%)	6.3%	36.9%	36.9%	6.3%	36.9%	36.9%	39.4%	39.4%		17.5%	56.9%	
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	4.0	4.0		3.0	4.0	
All-Red Time (s)	1.0	2.0	2.0	1.0	2.0	2.0	2.0	2.0		1.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.0	6.0	6.0	4.0	6.0	6.0	6.0	6.0		4.0	6.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lag	Lag		Lead		
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None	None	Max	Max		None	Max	
Act Effct Green (s)	40.4	33.7	33.7	40.4	33.7	33.7	64.6	64.6	139.0	87.5	85.5	
Actuated g/C Ratio	0.29	0.24	0.24	0.29	0.24	0.24	0.46	0.46	1.00	0.63	0.62	
v/c Ratio	0.25	0.73	0.29	0.28	0.38	0.13	0.30	0.30	0.03	0.47	0.64	
Control Delay	35.6	54.1	20.4	36.7	45.2	4.2	36.3	26.2	0.0	15.5	20.1	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	35.6	54.1	20.4	36.7	45.2	4.2	36.3	26.2	0.0	15.5	20.1	
LOS	D	D	C	D	D	A	D	C	A	B	C	
Approach Delay		47.3			39.1			25.1			19.3	
Approach LOS		D			D			C			B	
Queue Length 50th (m)	13.3	86.1	11.7	8.5	39.4	0.0	7.7	43.7	0.0	34.5	125.6	
Queue Length 95th (m)	24.5	106.7	28.7	17.2	53.2	5.6	22.1	69.2	0.0	58.3	174.5	
Internal Link Dist (m)		391.5			195.7			159.1			124.5	

26: Torbram Rd./Torbram Rd & Williams Parkway

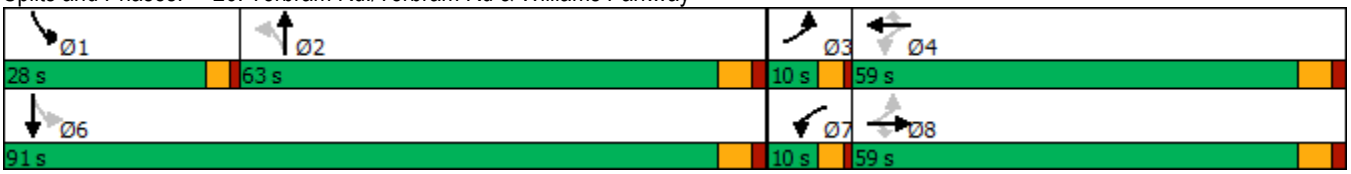
Timing Plan: AM

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (m)	30.0		30.0	45.0			40.0		40.0	60.0		
Base Capacity (vph)	273	1359	645	157	1320	618	149	1600	1564	666	2139	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.25	0.46	0.20	0.28	0.24	0.09	0.30	0.30	0.03	0.43	0.64	

Intersection Summary

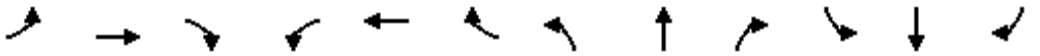
Area Type: Other
Cycle Length: 160
Actuated Cycle Length: 139
Natural Cycle: 100
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.73
Intersection Signal Delay: 29.3 Intersection LOS: C
Intersection Capacity Utilization 84.4% ICU Level of Service E
Analysis Period (min) 15

Splits and Phases: 26: Torbram Rd./Torbram Rd & Williams Parkway



26: Torbram Rd./Torbram Rd & Williams Parkway

Timing Plan: AM



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	65	599	122	42	303	50	42	454	38	271	1201	104
Future Volume (vph)	65	599	122	42	303	50	42	454	38	271	1201	104
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0	6.0	4.0	6.0	6.0	6.0	6.0	4.0	4.0	6.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.97	1.00	1.00	0.99	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	0.99	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	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1637	3544	1565	1689	3444	1496	1814	3444	1564	1805	3476	
Flt Permitted	0.48	1.00	1.00	0.19	1.00	1.00	0.17	1.00	1.00	0.41	1.00	
Satd. Flow (perm)	822	3544	1565	341	3444	1496	320	3444	1564	774	3476	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	68	631	128	44	319	53	44	478	40	285	1264	109
RTOR Reduction (vph)	0	0	57	0	0	40	0	0	0	0	3	0
Lane Group Flow (vph)	68	631	71	44	319	13	44	478	40	285	1370	0
Confl. Peds. (#/hr)	12		7	7		12	39		5	5		39
Confl. Bikes (#/hr)			1			1						4
Heavy Vehicles (%)	11%	3%	2%	8%	6%	6%	0%	6%	3%	1%	3%	6%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Free	pm+pt	NA	
Protected Phases	3	8		7	4			2		1	6	
Permitted Phases	8		8	4		4	2		Free	6		
Actuated Green, G (s)	38.4	33.7	33.7	38.4	33.7	33.7	64.7	64.7	139.9	85.5	85.5	
Effective Green, g (s)	38.4	33.7	33.7	38.4	33.7	33.7	64.7	64.7	139.9	85.5	85.5	
Actuated g/C Ratio	0.27	0.24	0.24	0.27	0.24	0.24	0.46	0.46	1.00	0.61	0.61	
Clearance Time (s)	4.0	6.0	6.0	4.0	6.0	6.0	6.0	6.0		4.0	6.0	
Vehicle Extension (s)	3.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	253	853	376	138	829	360	147	1592	1564	596	2124	
v/s Ratio Prot	0.01	c0.18		c0.01	0.09			0.14		0.06	c0.39	
v/s Ratio Perm	0.06		0.05	0.08		0.01	0.14		0.03	0.23		
v/c Ratio	0.27	0.74	0.19	0.32	0.38	0.04	0.30	0.30	0.03	0.48	0.64	
Uniform Delay, d1	38.5	49.0	42.2	39.0	44.4	40.7	23.5	23.5	0.0	13.1	17.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.6	4.1	0.5	2.8	0.6	0.1	5.1	0.5	0.0	1.3	1.5	
Delay (s)	39.1	53.2	42.7	41.8	45.1	40.7	28.6	24.0	0.0	14.4	19.0	
Level of Service	D	D	D	D	D	D	C	C	A	B	B	
Approach Delay (s)		50.4			44.2			22.6			18.2	
Approach LOS		D			D			C			B	

Intersection Summary			
HCM 2000 Control Delay	29.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	139.9	Sum of lost time (s)	20.0
Intersection Capacity Utilization	84.4%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Future Analysis Results (2031) - PM

With Improvement

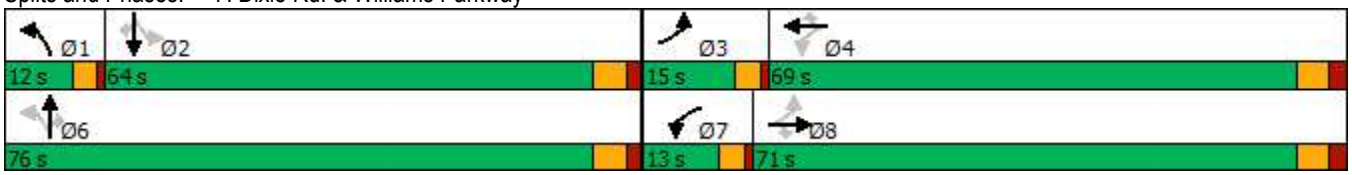
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	129	877	54	86	1135	61	184	1206	108	59	628	152
Future Volume (vph)	129	877	54	86	1135	61	184	1206	108	59	628	152
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	92.0		92.0	90.0		90.0	66.0		67.0	127.0		58.0
Storage Lanes	1		1	1		1	1		1	1		1
Taper Length (m)	51.0			55.0			100.0			62.0		
Satd. Flow (prot)	1706	3510	1633	1755	3510	1585	1807	5092	1617	1755	5092	1601
Flt Permitted	0.064			0.171			0.305			0.163		
Satd. Flow (perm)	115	3510	1566	314	3510	1530	576	5092	1562	300	5092	1546
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			75			75			96			160
Link Speed (k/h)		48			60			50			50	
Link Distance (m)		180.2			270.7			250.0			175.5	
Travel Time (s)		13.5			16.2			18.0			12.6	
Confl. Peds. (#/hr)	18		23	23		18	14		14	14		14
Confl. Bikes (#/hr)												1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	7%	4%	0%	4%	4%	3%	1%	3%	1%	4%	3%	2%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	136	923	57	91	1195	64	194	1269	114	62	661	160
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases	3	8		7	4		1	6			2	
Permitted Phases	8		8	4		4	6		6	2		2
Detector Phase	3	8	8	7	4	4	1	6	6	2	2	2
Switch Phase												
Minimum Initial (s)	5.0	8.0	8.0	5.0	8.0	8.0	5.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	10.0	43.3	43.3	10.0	43.3	43.3	10.0	36.0	36.0	36.0	36.0	36.0
Total Split (s)	15.0	71.0	71.0	13.0	69.0	69.0	12.0	76.0	76.0	64.0	64.0	64.0
Total Split (%)	9.4%	44.4%	44.4%	8.1%	43.1%	43.1%	7.5%	47.5%	47.5%	40.0%	40.0%	40.0%
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	2.3	2.3	1.0	2.3	2.3	1.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.3	6.3	4.0	6.3	6.3	4.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead			Lag	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None	None	None	Max	Max	Max	Max	Max
Act Effct Green (s)	75.4	62.1	62.1	71.4	60.1	60.1	72.1	70.1	70.1	58.0	58.0	58.0
Actuated g/C Ratio	0.48	0.39	0.39	0.45	0.38	0.38	0.46	0.45	0.45	0.37	0.37	0.37
v/c Ratio	0.82	0.67	0.09	0.41	0.89	0.10	0.60	0.56	0.15	0.56	0.35	0.24
Control Delay	69.6	41.9	3.2	27.0	55.1	4.8	36.5	33.8	7.2	63.9	37.1	5.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	69.6	41.9	3.2	27.0	55.1	4.8	36.5	33.8	7.2	63.9	37.1	5.5
LOS	E	D	A	C	E	A	D	C	A	E	D	A
Approach Delay		43.3			50.8			32.3			33.3	
Approach LOS		D			D			C			C	
Queue Length 50th (m)	26.9	124.3	0.0	15.0	183.8	0.0	37.6	109.7	3.2	15.8	56.4	0.0
Queue Length 95th (m)	#64.0	147.4	5.6	25.4	214.3	7.5	55.7	124.5	15.2	#37.3	67.9	15.5
Internal Link Dist (m)		156.2			246.7			226.0			151.5	

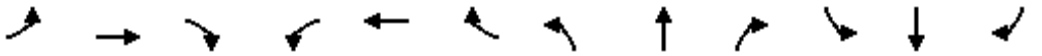
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (m)	92.0		92.0	90.0		90.0	66.0		67.0	127.0		58.0
Base Capacity (vph)	166	1443	687	224	1398	654	325	2264	748	110	1876	670
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.82	0.64	0.08	0.41	0.85	0.10	0.60	0.56	0.15	0.56	0.35	0.24

Intersection Summary			
Area Type:	Other		
Cycle Length: 160			
Actuated Cycle Length: 157.5			
Natural Cycle: 100			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.89			
Intersection Signal Delay: 40.0		Intersection LOS: D	
Intersection Capacity Utilization 90.6%		ICU Level of Service E	
Analysis Period (min) 15			

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

Splits and Phases: 7: Dixie Rd. & Williams Parkway





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	129	877	54	86	1135	61	184	1206	108	59	628	152
Future Volume (vph)	129	877	54	86	1135	61	184	1206	108	59	628	152
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.3	6.3	4.0	6.3	6.3	4.0	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes	1.00	1.00	0.96	1.00	1.00	0.97	1.00	1.00	0.97	1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	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)	1706	3510	1566	1754	3510	1531	1804	5092	1562	1750	5092	1546
Flt Permitted	0.06	1.00	1.00	0.17	1.00	1.00	0.30	1.00	1.00	0.16	1.00	1.00
Satd. Flow (perm)	116	3510	1566	315	3510	1531	579	5092	1562	300	5092	1546
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	136	923	57	91	1195	64	194	1269	114	62	661	160
RTOR Reduction (vph)	0	0	35	0	0	40	0	0	53	0	0	101
Lane Group Flow (vph)	136	923	22	91	1195	24	194	1269	61	62	661	59
Confl. Peds. (#/hr)	18		23	23		18	14		14	14		14
Confl. Bikes (#/hr)												1
Heavy Vehicles (%)	7%	4%	0%	4%	4%	3%	1%	3%	1%	4%	3%	2%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases	3	8		7	4		1	6			2	
Permitted Phases	8		8	4		4	6		6	2		2
Actuated Green, G (s)	73.1	62.1	62.1	69.1	60.1	60.1	70.1	70.1	70.1	58.1	58.1	58.1
Effective Green, g (s)	73.1	62.1	62.1	69.1	60.1	60.1	70.1	70.1	70.1	58.1	58.1	58.1
Actuated g/C Ratio	0.46	0.39	0.39	0.44	0.38	0.38	0.45	0.45	0.45	0.37	0.37	0.37
Clearance Time (s)	4.0	6.3	6.3	4.0	6.3	6.3	4.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Grp Cap (vph)	164	1383	617	220	1339	584	319	2266	695	110	1878	570
v/s Ratio Prot	c0.06	0.26		0.02	c0.34		0.03	c0.25			0.13	
v/s Ratio Perm	0.33		0.01	0.16		0.02	c0.24		0.04	0.21		0.04
v/c Ratio	0.83	0.67	0.04	0.41	0.89	0.04	0.61	0.56	0.09	0.56	0.35	0.10
Uniform Delay, d1	39.9	39.2	29.3	28.9	45.7	30.6	30.7	32.3	25.2	39.6	36.0	32.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	30.6	1.6	0.1	2.6	8.4	0.1	4.8	1.0	0.2	19.2	0.5	0.4
Delay (s)	70.5	40.8	29.4	31.5	54.1	30.7	35.5	33.3	25.5	58.8	36.6	33.0
Level of Service	E	D	C	C	D	C	D	C	C	E	D	C
Approach Delay (s)		43.9			51.5			33.0			37.5	
Approach LOS		D			D			C			D	

Intersection Summary			
HCM 2000 Control Delay	41.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	157.5	Sum of lost time (s)	20.3
Intersection Capacity Utilization	90.6%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1030	44	10	1322	15	13
Future Volume (vph)	1030	44	10	1322	15	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)		0.0	50.0		0.0	0.0
Storage Lanes		0	1		1	0
Taper Length (m)			30.0		2.5	
Satd. Flow (prot)	3485	0	1825	3544	1631	0
Flt Permitted			0.950		0.974	
Satd. Flow (perm)	3485	0	1825	3544	1631	0
Link Speed (k/h)	60			60	50	
Link Distance (m)	270.7			273.9	143.1	
Travel Time (s)	16.2			16.4	10.3	
Confl. Peds. (#/hr)		13	13			1
Confl. Bikes (#/hr)		3				
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	4%	7%	0%	3%	14%	0%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1130	0	11	1392	30	0
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	46.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	1030	44	10	1322	15	13
Future Volume (Veh/h)	1030	44	10	1322	15	13
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	1084	46	11	1392	16	14
Pedestrians				1	13	
Lane Width (m)				3.7	3.7	
Walking Speed (m/s)				1.2	1.2	
Percent Blockage				0	1	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)	271					
pX, platoon unblocked			0.78		0.78	0.78
vC, conflicting volume			1143		1838	579
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			628		1516	0
tC, single (s)			4.1		7.1	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.6	3.3
p0 queue free %			99		79	98
cM capacity (veh/h)			746		75	844

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1
Volume Total	723	407	11	696	696	30
Volume Left	0	0	11	0	0	16
Volume Right	0	46	0	0	0	14
cSH	1700	1700	746	1700	1700	130
Volume to Capacity	0.43	0.24	0.01	0.41	0.41	0.23
Queue Length 95th (m)	0.0	0.0	0.3	0.0	0.0	6.4
Control Delay (s)	0.0	0.0	9.9	0.0	0.0	40.7
Lane LOS			A			E
Approach Delay (s)	0.0		0.1			40.7
Approach LOS						E

Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	46.9%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1030	22	42	1291	17	19
Future Volume (vph)	1030	22	42	1291	17	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)		0.0	50.0		0.0	0.0
Storage Lanes		0	1		1	0
Taper Length (m)			40.0		2.5	
Satd. Flow (prot)	3535	0	1825	3544	1643	0
Flt Permitted			0.950		0.977	
Satd. Flow (perm)	3535	0	1825	3544	1643	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	273.9			382.9	71.0	
Travel Time (s)	19.7			27.6	5.1	
Confl. Peds. (#/hr)		13	13			6
Confl. Bikes (#/hr)		4				1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	3%	0%	0%	3%	13%	0%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1107	0	44	1359	38	0
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 47.5%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	1030	22	42	1291	17	19
Future Volume (Veh/h)	1030	22	42	1291	17	19
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	1084	23	44	1359	18	20
Pedestrians				6	13	
Lane Width (m)				3.7	3.7	
Walking Speed (m/s)				1.2	1.2	
Percent Blockage				1	1	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)				383		
pX, platoon unblocked					0.88	
vC, conflicting volume			1120		1876	572
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			1120		1719	572
tC, single (s)			4.1		7.1	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.6	3.3
p0 queue free %			93		69	96
cM capacity (veh/h)			624		58	460

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1
Volume Total	723	384	44	680	680	38
Volume Left	0	0	44	0	0	18
Volume Right	0	23	0	0	0	20
cSH	1700	1700	624	1700	1700	107
Volume to Capacity	0.43	0.23	0.07	0.40	0.40	0.35
Queue Length 95th (m)	0.0	0.0	1.7	0.0	0.0	10.8
Control Delay (s)	0.0	0.0	11.2	0.0	0.0	56.0
Lane LOS			B			F
Approach Delay (s)	0.0		0.4			56.0
Approach LOS						F

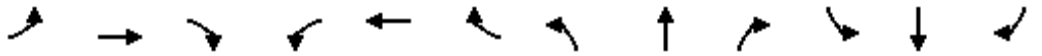
Intersection Summary			
Average Delay	1.0		
Intersection Capacity Utilization	47.5%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	126	892	0	4	1287	114	7	0	0	71	1	70
Future Volume (vph)	126	892	0	4	1287	114	7	0	0	71	1	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	50.0		0.0	30.0		0.0	0.0		0.0	40.0		0.0
Storage Lanes	1		0	1		0	0		0	1		0
Taper Length (m)	30.0			25.0			2.5			30.0		
Satd. Flow (prot)	1789	3510	0	1825	3496	0	0	1825	0	1755	1545	0
Flt Permitted	0.155			0.292				0.701		0.753		
Satd. Flow (perm)	292	3510	0	558	3496	0	0	1339	0	1380	1545	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					13						74	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		382.9			440.2			46.0			136.3	
Travel Time (s)		27.6			31.7			3.3			9.8	
Confl. Peds. (#/hr)	3		8	8		3	4		5	5		4
Confl. Bikes (#/hr)												1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	2%	4%	0%	0%	3%	2%	0%	0%	0%	4%	0%	4%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	133	939	0	4	1475	0	0	7	0	75	75	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			2			4			4	
Permitted Phases	2			2			4			4		
Detector Phase	2	2		2	2		4	4		4	4	
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		8.0	8.0		8.0	8.0	
Minimum Split (s)	33.0	33.0		33.0	33.0		37.0	37.0		37.0	37.0	
Total Split (s)	115.0	115.0		115.0	115.0		45.0	45.0		45.0	45.0	
Total Split (%)	71.9%	71.9%		71.9%	71.9%		28.1%	28.1%		28.1%	28.1%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0			6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	C-Max	C-Max		C-Max	C-Max		None	None		None	None	
Act Effct Green (s)	130.2	130.2		130.2	130.2			17.8		17.8	17.8	
Actuated g/C Ratio	0.81	0.81		0.81	0.81			0.11		0.11	0.11	
v/c Ratio	0.56	0.33		0.01	0.52			0.05		0.49	0.32	
Control Delay	18.2	4.7		4.5	6.2			58.7		75.5	15.3	
Queue Delay	0.0	0.0		0.0	0.0			0.0		0.0	0.0	
Total Delay	18.2	4.7		4.5	6.2			58.7		75.5	15.3	
LOS	B	A		A	A			E		E	B	
Approach Delay		6.4			6.2			58.7			45.4	
Approach LOS		A			A			E			D	
Queue Length 50th (m)	11.4	31.3		0.2	61.7			2.1		23.1	0.3	
Queue Length 95th (m)	50.5	62.4		1.5	120.0			6.6		37.0	14.8	
Internal Link Dist (m)		358.9			416.2			22.0			112.3	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (m)	50.0			30.0						40.0		
Base Capacity (vph)	237	2856		454	2848			326		336	432	
Starvation Cap Reductn	0	0		0	0			0		0	0	
Spillback Cap Reductn	0	0		0	0			0		0	0	
Storage Cap Reductn	0	0		0	0			0		0	0	
Reduced v/c Ratio	0.56	0.33		0.01	0.52			0.02		0.22	0.17	

Intersection Summary			
Area Type:	Other		
Cycle Length: 160			
Actuated Cycle Length: 160			
Offset: 43 (27%), Referenced to phase 2:EBWB, Start of Green			
Natural Cycle: 110			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.56			
Intersection Signal Delay: 8.6		Intersection LOS: A	
Intersection Capacity Utilization 70.8%		ICU Level of Service C	
Analysis Period (min) 15			

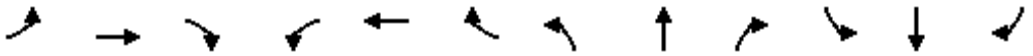
Splits and Phases: 15: Williams Parkway & Mackay St.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	126	892	0	4	1287	114	7	0	0	71	1	70
Future Volume (vph)	126	892	0	4	1287	114	7	0	0	71	1	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0			6.0		6.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			1.00		1.00	0.98	
Flpb, ped/bikes	1.00	1.00		0.99	1.00			0.99		0.99	1.00	
Frt	1.00	1.00		1.00	0.99			1.00		1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00			0.95		0.95	1.00	
Satd. Flow (prot)	1788	3510		1814	3495			1815		1741	1543	
Flt Permitted	0.16	1.00		0.29	1.00			0.70		0.75	1.00	
Satd. Flow (perm)	292	3510		558	3495			1339		1381	1543	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	133	939	0	4	1355	120	7	0	0	75	1	74
RTOR Reduction (vph)	0	0	0	0	2	0	0	0	0	0	66	0
Lane Group Flow (vph)	133	939	0	4	1473	0	0	7	0	75	9	0
Confl. Peds. (#/hr)	3		8	8		3	4		5	5		4
Confl. Bikes (#/hr)												1
Heavy Vehicles (%)	2%	4%	0%	0%	3%	2%	0%	0%	0%	4%	0%	4%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			2			4			4	
Permitted Phases	2			2			4			4		
Actuated Green, G (s)	130.2	130.2		130.2	130.2			17.8		17.8	17.8	
Effective Green, g (s)	130.2	130.2		130.2	130.2			17.8		17.8	17.8	
Actuated g/C Ratio	0.81	0.81		0.81	0.81			0.11		0.11	0.11	
Clearance Time (s)	6.0	6.0		6.0	6.0			6.0		6.0	6.0	
Vehicle Extension (s)	5.0	5.0		5.0	5.0			5.0		5.0	5.0	
Lane Grp Cap (vph)	237	2856		454	2844			148		153	171	
v/s Ratio Prot		0.27			0.42						0.01	
v/s Ratio Perm	c0.46			0.01				0.01		c0.05		
v/c Ratio	0.56	0.33		0.01	0.52			0.05		0.49	0.05	
Uniform Delay, d1	5.1	3.8		2.8	4.8			63.5		66.8	63.6	
Progression Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	9.3	0.3		0.0	0.7			0.3		5.1	0.3	
Delay (s)	14.4	4.1		2.8	5.5			63.8		71.9	63.8	
Level of Service	B	A		A	A			E		E	E	
Approach Delay (s)		5.4			5.5			63.8			67.9	
Approach LOS		A			A			E			E	

Intersection Summary			
HCM 2000 Control Delay	9.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	70.8%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

19: Bramalea Rd. & Williams Parkway
Timing Plan: PM

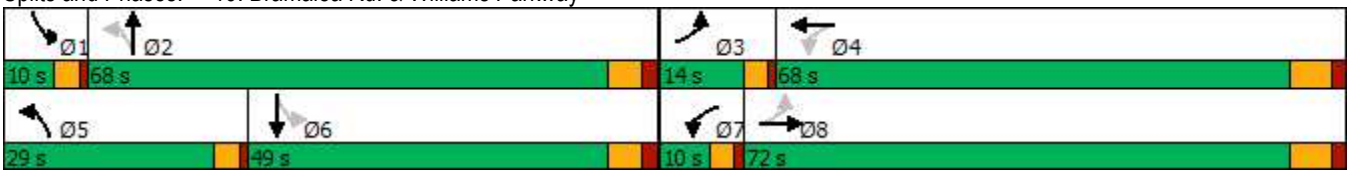


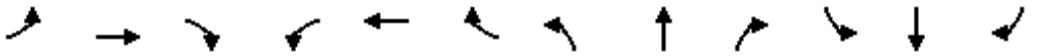
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	86	551	112	55	1062	71	219	1047	75	51	561	94
Future Volume (vph)	86	551	112	55	1062	71	219	1047	75	51	561	94
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	45.0		0.0	20.0		0.0	40.0		0.0	55.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	30.0			30.0			90.0			75.0		
Satd. Flow (prot)	1807	3420	0	1825	3577	0	1807	3565	0	1601	3476	0
Flt Permitted	0.064			0.310			0.199			0.092		
Satd. Flow (perm)	122	3420	0	592	3577	0	379	3565	0	154	3476	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		18			5			5			12	
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		440.2			303.2			368.3			146.0	
Travel Time (s)		31.7			21.8			22.1			8.8	
Confl. Peds. (#/hr)	10		12	12		10	26		23	23		26
Confl. Bikes (#/hr)			2			3						
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	1%	4%	1%	0%	1%	0%	1%	1%	1%	14%	2%	1%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	91	698	0	58	1193	0	231	1181	0	54	690	0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8			4			2			6		
Detector Phase	3	8		7	4		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	8.0		5.0	8.0		5.0	8.0		5.0	8.0	
Minimum Split (s)	10.0	36.0		10.0	36.0		10.0	33.0		10.0	34.0	
Total Split (s)	14.0	72.0		10.0	68.0		29.0	68.0		10.0	49.0	
Total Split (%)	8.8%	45.0%		6.3%	42.5%		18.1%	42.5%		6.3%	30.6%	
Yellow Time (s)	3.0	5.0		3.0	5.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	1.0	2.0		1.0	2.0		1.0	2.0		1.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.0	7.0		4.0	7.0		4.0	6.0		4.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		None	Max		None	Max	
Act Effct Green (s)	74.7	64.0		67.0	57.9		72.0	62.3		55.0	47.0	
Actuated g/C Ratio	0.48	0.41		0.43	0.37		0.47	0.40		0.36	0.30	
v/c Ratio	0.55	0.49		0.19	0.89		0.66	0.82		0.49	0.65	
Control Delay	38.2	34.6		23.5	54.7		35.5	48.1		41.5	50.5	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	38.2	34.6		23.5	54.7		35.5	48.1		41.5	50.5	
LOS	D	C		C	D		D	D		D	D	
Approach Delay		35.0			53.3			46.1			49.9	
Approach LOS		C			D			D			D	
Queue Length 50th (m)	15.4	84.3		9.6	184.1		44.7	179.8		9.4	98.8	
Queue Length 95th (m)	30.3	103.1		17.9	214.4		64.5	209.4		18.0	127.3	
Internal Link Dist (m)		416.2			279.2			344.3			122.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (m)	45.0			20.0			40.0			55.0		
Base Capacity (vph)	167	1453		304	1418		408	1437		110	1063	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.54	0.48		0.19	0.84		0.57	0.82		0.49	0.65	

Intersection Summary			
Area Type:	Other		
Cycle Length: 160			
Actuated Cycle Length: 154.8			
Natural Cycle: 90			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.89			
Intersection Signal Delay: 46.8		Intersection LOS: D	
Intersection Capacity Utilization 89.6%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 19: Bramalea Rd. & Williams Parkway





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	86	551	112	55	1062	71	219	1047	75	51	561	94
Future Volume (vph)	86	551	112	55	1062	71	219	1047	75	51	561	94
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	7.0		4.0	7.0		4.0	6.0		4.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	0.99		1.00	0.99		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1807	3419		1822	3575		1804	3565		1601	3478	
Flt Permitted	0.06	1.00		0.31	1.00		0.20	1.00		0.09	1.00	
Satd. Flow (perm)	121	3419		594	3575		377	3565		155	3478	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	91	580	118	58	1118	75	231	1102	79	54	591	99
RTOR Reduction (vph)	0	11	0	0	3	0	0	3	0	0	8	0
Lane Group Flow (vph)	91	687	0	58	1190	0	231	1178	0	54	682	0
Confl. Peds. (#/hr)	10		12	12		10	26		23	23		26
Confl. Bikes (#/hr)			2			3						
Heavy Vehicles (%)	1%	4%	1%	0%	1%	0%	1%	1%	1%	14%	2%	1%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	72.7	64.0		63.6	58.9		71.0	62.3		52.7	48.0	
Effective Green, g (s)	72.7	64.0		63.6	58.9		71.0	62.3		52.7	48.0	
Actuated g/C Ratio	0.46	0.41		0.41	0.38		0.45	0.40		0.34	0.31	
Clearance Time (s)	4.0	7.0		4.0	7.0		4.0	6.0		4.0	6.0	
Vehicle Extension (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	161	1396		277	1343		343	1417		95	1065	
v/s Ratio Prot	c0.04	0.20		0.01	c0.33		c0.08	c0.33		0.02	0.20	
v/s Ratio Perm	0.23			0.08			0.22			0.17		
v/c Ratio	0.57	0.49		0.21	0.89		0.67	0.83		0.57	0.64	
Uniform Delay, d1	33.0	34.3		29.0	45.8		29.9	42.5		38.9	46.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	7.3	0.6		0.8	7.9		6.7	5.8		12.2	3.0	
Delay (s)	40.3	34.9		29.8	53.7		36.6	48.3		51.1	49.8	
Level of Service	D	C		C	D		D	D		D	D	
Approach Delay (s)		35.5			52.6			46.4			49.9	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM 2000 Control Delay	46.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	156.7	Sum of lost time (s)	21.0
Intersection Capacity Utilization	89.6%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

21: Glenridge Rd/Chinguacousy School & Williams Parkway

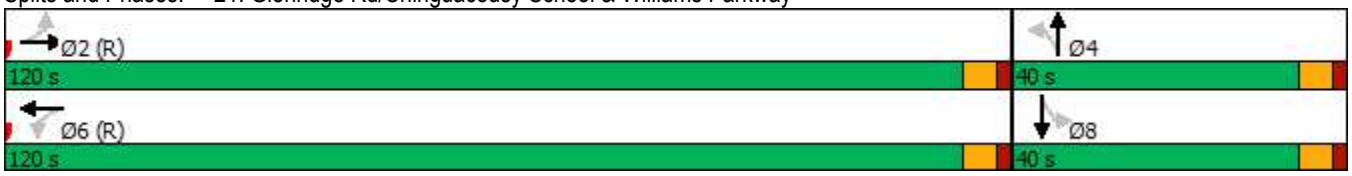
Timing Plan: PM

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	17	802	35	19	1111	2	36	0	9	8	1	8
Future Volume (vph)	17	802	35	19	1111	2	36	0	9	8	1	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	30.0		0.0	25.0		0.0	0.0		0.0	30.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	30.0			20.0			2.5			2.5		
Satd. Flow (prot)	1217	3511	0	1560	3538	0	0	1754	0	0	1550	0
Flt Permitted	0.222			0.310				0.755			0.884	
Satd. Flow (perm)	282	3511	0	506	3538	0	0	1368	0	0	1397	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		7						20			8	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		303.2			336.9			195.5			69.4	
Travel Time (s)		21.8			24.3			14.1			5.0	
Confl. Peds. (#/hr)	16		7	7		16	6		5	5		6
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	50%	3%	6%	17%	3%	100%	0%	0%	11%	13%	0%	13%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	18	881	0	20	1171	0	0	47	0	0	17	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Detector Phase	2	2		6	6		4	4		8	8	
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		8.0	8.0		8.0	8.0	
Minimum Split (s)	29.0	29.0		29.0	29.0		36.0	36.0		36.0	36.0	
Total Split (s)	120.0	120.0		120.0	120.0		40.0	40.0		40.0	40.0	
Total Split (%)	75.0%	75.0%		75.0%	75.0%		25.0%	25.0%		25.0%	25.0%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0			6.0			6.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	C-Max	C-Max		C-Max	C-Max		None	None		None	None	
Act Effct Green (s)	130.7	130.7		130.7	130.7			21.3			21.3	
Actuated g/C Ratio	0.82	0.82		0.82	0.82			0.13			0.13	
v/c Ratio	0.08	0.31		0.05	0.41			0.24			0.09	
Control Delay	6.6	5.6		8.6	8.6			38.6			36.8	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	6.6	5.6		8.6	8.6			38.6			36.8	
LOS	A	A		A	A			D			D	
Approach Delay		5.6			8.6			38.6			36.8	
Approach LOS		A			A			D			D	
Queue Length 50th (m)	1.5	46.6		1.5	63.5			7.2			2.4	
Queue Length 95th (m)	4.2	55.6		m7.2	139.0			19.4			9.7	
Internal Link Dist (m)		279.2			312.9			171.5			45.4	
Turn Bay Length (m)	30.0			25.0								

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Base Capacity (vph)	230	2869		413	2889			306			303	
Starvation Cap Reductn	0	0		0	0			0			0	
Spillback Cap Reductn	0	0		0	0			0			0	
Storage Cap Reductn	0	0		0	0			0			0	
Reduced v/c Ratio	0.08	0.31		0.05	0.41			0.15			0.06	

Intersection Summary			
Area Type:	Other		
Cycle Length: 160			
Actuated Cycle Length: 160			
Offset: 16 (10%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green			
Natural Cycle: 65			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.41			
Intersection Signal Delay: 8.2		Intersection LOS: A	
Intersection Capacity Utilization 50.8%		ICU Level of Service A	
Analysis Period (min) 15			
m Volume for 95th percentile queue is metered by upstream signal.			

Splits and Phases: 21: Glenridge Rd/Chinguacousy School & Williams Parkway



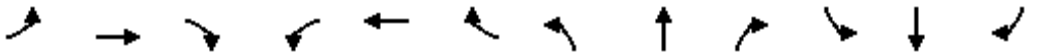
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	17	802	35	19	1111	2	36	0	9	8	1	8
Future Volume (vph)	17	802	35	19	1111	2	36	0	9	8	1	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0			6.0			6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			0.99	
Flpb, ped/bikes	0.99	1.00		0.99	1.00			0.99			1.00	
Frt	1.00	0.99		1.00	1.00			0.97			0.94	
Flt Protected	0.95	1.00		0.95	1.00			0.96			0.98	
Satd. Flow (prot)	1205	3510		1548	3537			1742			1545	
Flt Permitted	0.22	1.00		0.31	1.00			0.76			0.88	
Satd. Flow (perm)	281	3510		505	3537			1369			1399	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	18	844	37	20	1169	2	38	0	9	8	1	8
RTOR Reduction (vph)	0	1	0	0	0	0	0	18	0	0	7	0
Lane Group Flow (vph)	18	880	0	20	1171	0	0	29	0	0	10	0
Confl. Peds. (#/hr)	16		7	7		16	6		5	5		6
Heavy Vehicles (%)	50%	3%	6%	17%	3%	100%	0%	0%	11%	13%	0%	13%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	128.3	128.3		128.3	128.3			19.7			19.7	
Effective Green, g (s)	128.3	128.3		128.3	128.3			19.7			19.7	
Actuated g/C Ratio	0.80	0.80		0.80	0.80			0.12			0.12	
Clearance Time (s)	6.0	6.0		6.0	6.0			6.0			6.0	
Vehicle Extension (s)	5.0	5.0		5.0	5.0			5.0			5.0	
Lane Grp Cap (vph)	225	2814		404	2836			168			172	
v/s Ratio Prot		0.25			c0.33							
v/s Ratio Perm	0.06			0.04				c0.02			0.01	
v/c Ratio	0.08	0.31		0.05	0.41			0.18			0.06	
Uniform Delay, d1	3.4	4.2		3.3	4.7			62.9			62.0	
Progression Factor	1.00	1.00		1.51	1.38			1.00			1.00	
Incremental Delay, d2	0.7	0.3		0.2	0.4			1.0			0.3	
Delay (s)	4.1	4.5		5.1	6.9			63.9			62.3	
Level of Service	A	A		A	A			E			E	
Approach Delay (s)		4.5			6.9			63.9			62.3	
Approach LOS		A			A			E			E	

Intersection Summary			
HCM 2000 Control Delay	7.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.38		
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	50.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

20: Grenoble Blvd/Jordan Blvd & Williams Parkway

Timing Plan: PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	101	647	56	32	1030	73	46	70	28	29	37	69
Future Volume (vph)	101	647	56	32	1030	73	46	70	28	29	37	69
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	30.0		0.0	30.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	30.0			30.0			2.5			2.5		
Satd. Flow (prot)	1772	3484	0	1722	3476	0	0	3165	0	0	3180	0
Flt Permitted	0.225			0.363				0.802			0.834	
Satd. Flow (perm)	419	3484	0	656	3476	0	0	2572	0	0	2675	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		13			11			17			73	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		336.9			330.2			104.7			103.8	
Travel Time (s)		24.3			23.8			7.5			7.5	
Confl. Peds. (#/hr)	8		7	7		8	8		11	11		8
Confl. Bikes (#/hr)												1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	3%	3%	7%	6%	4%	1%	16%	5%	11%	4%	6%	2%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	106	740	0	34	1161	0	0	151	0	0	143	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Detector Phase	2	2		6	6		4	4		8	8	
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		8.0	8.0		8.0	8.0	
Minimum Split (s)	39.0	39.0		39.0	39.0		42.0	42.0		42.0	42.0	
Total Split (s)	117.0	117.0		117.0	117.0		43.0	43.0		43.0	43.0	
Total Split (%)	73.1%	73.1%		73.1%	73.1%		26.9%	26.9%		26.9%	26.9%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0			6.0			6.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	C-Max	C-Max		C-Max	C-Max		None	None		None	None	
Act Effct Green (s)	129.2	129.2		129.2	129.2			18.8			18.8	
Actuated g/C Ratio	0.81	0.81		0.81	0.81			0.12			0.12	
v/c Ratio	0.31	0.26		0.06	0.41			0.48			0.38	
Control Delay	13.3	6.3		5.1	5.7			61.7			32.6	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	13.3	6.3		5.1	5.7			61.7			32.6	
LOS	B	A		A	A			E			C	
Approach Delay		7.2			5.7			61.7			32.6	
Approach LOS		A			A			E			C	
Queue Length 50th (m)	7.5	25.5		1.6	41.3			21.7			11.0	
Queue Length 95th (m)	37.5	66.9		7.1	94.0			29.3			19.2	
Internal Link Dist (m)		312.9			306.2			80.7			79.8	

20: Grenoble Blvd/Jordan Blvd & Williams Parkway

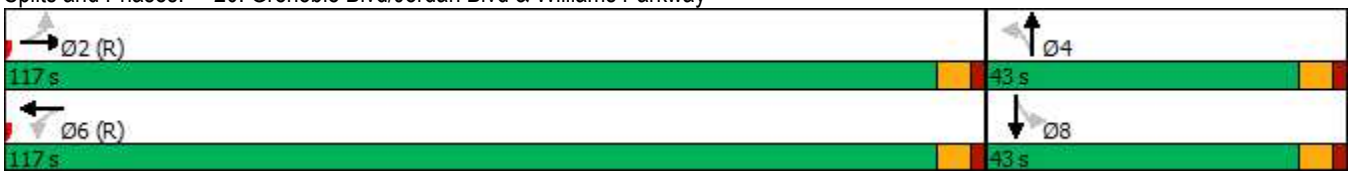
Timing Plan: PM

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (m)	30.0			30.0								
Base Capacity (vph)	338	2816		529	2809			607			674	
Starvation Cap Reductn	0	0		0	0			0			0	
Spillback Cap Reductn	0	0		0	0			0			0	
Storage Cap Reductn	0	0		0	0			0			0	
Reduced v/c Ratio	0.31	0.26		0.06	0.41			0.25			0.21	

Intersection Summary

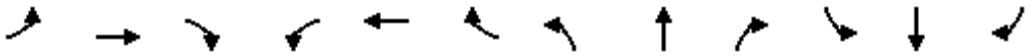
Area Type: Other
Cycle Length: 160
Actuated Cycle Length: 160
Offset: 98 (61%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 85
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.48
Intersection Signal Delay: 11.5 Intersection LOS: B
Intersection Capacity Utilization 68.1% ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 20: Grenoble Blvd/Jordan Blvd & Williams Parkway



20: Grenoble Blvd/Jordan Blvd & Williams Parkway

Timing Plan: PM



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	101	647	56	32	1030	73	46	70	28	29	37	69
Future Volume (vph)	101	647	56	32	1030	73	46	70	28	29	37	69
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0			6.0			6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			0.95			0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			0.99			0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	0.99		1.00	0.99			0.97			0.92	
Flt Protected	0.95	1.00		0.95	1.00			0.98			0.99	
Satd. Flow (prot)	1768	3484		1716	3476			3158			3173	
Flt Permitted	0.23	1.00		0.36	1.00			0.80			0.83	
Satd. Flow (perm)	420	3484		656	3476			2574			2676	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	106	681	59	34	1084	77	48	74	29	31	39	73
RTOR Reduction (vph)	0	3	0	0	2	0	0	15	0	0	64	0
Lane Group Flow (vph)	106	737	0	34	1159	0	0	136	0	0	79	0
Confl. Peds. (#/hr)	8		7	7		8	8		11	11		8
Confl. Bikes (#/hr)												1
Heavy Vehicles (%)	3%	3%	7%	6%	4%	1%	16%	5%	11%	4%	6%	2%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	129.2	129.2		129.2	129.2			18.8			18.8	
Effective Green, g (s)	129.2	129.2		129.2	129.2			18.8			18.8	
Actuated g/C Ratio	0.81	0.81		0.81	0.81			0.12			0.12	
Clearance Time (s)	6.0	6.0		6.0	6.0			6.0			6.0	
Vehicle Extension (s)	5.0	5.0		5.0	5.0			5.0			5.0	
Lane Grp Cap (vph)	339	2813		529	2806			302			314	
v/s Ratio Prot		0.21			c0.33							
v/s Ratio Perm	0.25			0.05				c0.05			0.03	
v/c Ratio	0.31	0.26		0.06	0.41			0.45			0.25	
Uniform Delay, d1	4.0	3.8		3.1	4.4			65.8			64.2	
Progression Factor	1.83	1.38		1.00	1.00			1.00			1.00	
Incremental Delay, d2	2.3	0.2		0.2	0.5			2.2			0.9	
Delay (s)	9.6	5.4		3.4	4.9			68.0			65.1	
Level of Service	A	A		A	A			E			E	
Approach Delay (s)		5.9			4.9			68.0			65.1	
Approach LOS		A			A			E			E	

Intersection Summary			
HCM 2000 Control Delay	13.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	68.1%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	700	16	19	1136	10	21
Future Volume (vph)	700	16	19	1136	10	21
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)		0.0	30.0		0.0	0.0
Storage Lanes		0	1		1	0
Taper Length (m)			30.0		2.5	
Satd. Flow (prot)	3525	0	1644	3544	1628	0
Flt Permitted			0.362		0.984	
Satd. Flow (perm)	3525	0	618	3544	1626	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	4				22	
Link Speed (k/h)	60			60	50	
Link Distance (m)	330.2			415.5	211.3	
Travel Time (s)	19.8			24.9	15.2	
Confl. Peds. (#/hr)		15	15		2	12
Confl. Bikes (#/hr)		1				
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	3%	7%	11%	3%	0%	5%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	754	0	20	1196	33	0
Turn Type	NA		Perm	NA	Prot	
Protected Phases	2			6	8	
Permitted Phases			6			
Detector Phase	2		6	6	8	
Switch Phase						
Minimum Initial (s)	4.0		4.0	4.0	4.0	
Minimum Split (s)	33.0		33.0	33.0	33.0	
Total Split (s)	124.0		124.0	124.0	36.0	
Total Split (%)	77.5%		77.5%	77.5%	22.5%	
Yellow Time (s)	4.0		4.0	4.0	4.0	
All-Red Time (s)	2.0		2.0	2.0	2.0	
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	
Total Lost Time (s)	6.0		6.0	6.0	6.0	
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	Max		Max	Max	None	
Act Effct Green (s)	120.4		120.4	120.4	14.8	
Actuated g/C Ratio	0.84		0.84	0.84	0.10	
v/c Ratio	0.25		0.04	0.40	0.17	
Control Delay	3.9		4.4	4.8	29.7	
Queue Delay	0.0		0.0	0.0	0.0	
Total Delay	3.9		4.4	4.8	29.7	
LOS	A		A	A	C	
Approach Delay	3.9			4.8	29.7	
Approach LOS	A			A	C	
Queue Length 50th (m)	15.3		0.6	28.8	2.9	
Queue Length 95th (m)	42.3		3.8	77.2	13.0	
Internal Link Dist (m)	306.2			391.5	187.3	

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Turn Bay Length (m)			30.0			
Base Capacity (vph)	2971		520	2986	362	
Starvation Cap Reductn	0		0	0	0	
Spillback Cap Reductn	0		0	0	0	
Storage Cap Reductn	0		0	0	0	
Reduced v/c Ratio	0.25		0.04	0.40	0.09	

Intersection Summary			
Area Type:	Other		
Cycle Length: 160			
Actuated Cycle Length: 142.8			
Natural Cycle: 70			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.40			
Intersection Signal Delay: 4.8		Intersection LOS: A	
Intersection Capacity Utilization 51.1%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 27: Graymar Rd & Williams Parkway

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	700	16	19	1136	10	21
Future Volume (vph)	700	16	19	1136	10	21
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0		6.0	6.0	6.0	
Lane Util. Factor	0.95		1.00	0.95	1.00	
Frpb, ped/bikes	1.00		1.00	1.00	0.98	
Flpb, ped/bikes	1.00		0.99	1.00	1.00	
Frt	1.00		1.00	1.00	0.91	
Flt Protected	1.00		0.95	1.00	0.98	
Satd. Flow (prot)	3524		1622	3544	1630	
Flt Permitted	1.00		0.36	1.00	0.98	
Satd. Flow (perm)	3524		618	3544	1630	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	737	17	20	1196	11	22
RTOR Reduction (vph)	1	0	0	0	20	0
Lane Group Flow (vph)	753	0	20	1196	13	0
Confl. Peds. (#/hr)		15	15		2	12
Confl. Bikes (#/hr)		1				
Heavy Vehicles (%)	3%	7%	11%	3%	0%	5%
Turn Type	NA		Perm	NA	Prot	
Protected Phases	2			6	8	
Permitted Phases			6			
Actuated Green, G (s)	119.0		119.0	119.0	13.1	
Effective Green, g (s)	119.0		119.0	119.0	13.1	
Actuated g/C Ratio	0.83		0.83	0.83	0.09	
Clearance Time (s)	6.0		6.0	6.0	6.0	
Vehicle Extension (s)	5.0		5.0	5.0	5.0	
Lane Grp Cap (vph)	2910		510	2926	148	
v/s Ratio Prot	0.21			c0.34	c0.01	
v/s Ratio Perm			0.03			
v/c Ratio	0.26		0.04	0.41	0.09	
Uniform Delay, d1	2.8		2.3	3.3	60.0	
Progression Factor	1.00		1.00	1.00	1.00	
Incremental Delay, d2	0.2		0.1	0.4	0.5	
Delay (s)	3.0		2.4	3.7	60.6	
Level of Service	A		A	A	E	
Approach Delay (s)	3.0			3.7	60.6	
Approach LOS	A			A	E	

Intersection Summary			
HCM 2000 Control Delay	4.4	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.38		
Actuated Cycle Length (s)	144.1	Sum of lost time (s)	12.0
Intersection Capacity Utilization	51.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

26: Torbram Rd./Torbram Rd & Williams Parkway

Timing Plan: PM

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	82	563	92	33	799	269	160	1097	81	150	707	91
Future Volume (vph)	82	563	92	33	799	269	160	1097	81	150	707	91
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	30.0		30.0	45.0		0.0	40.0		40.0	60.0		0.0
Storage Lanes	1		1	1		1	1		1	1		0
Taper Length (m)	30.0			45.0			25.0			55.0		
Satd. Flow (prot)	1772	3544	1633	1674	3544	1633	1772	3544	1570	1772	3417	0
Flt Permitted	0.100			0.296			0.328			0.118		
Satd. Flow (perm)	187	3544	1574	517	3544	1558	602	3544	1544	220	3417	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			75			179			116		14	
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		415.5			219.7			183.1			148.5	
Travel Time (s)		24.9			13.2			11.0			8.9	
Confl. Peds. (#/hr)	22		16	16		22	37		14	14		37
Confl. Bikes (#/hr)						1			1			2
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	3%	3%	0%	9%	3%	0%	3%	3%	4%	3%	4%	6%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	86	593	97	35	841	283	168	1155	85	158	840	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Free	pm+pt	NA	
Protected Phases	3	8		7	4			2		1	6	
Permitted Phases	8		8	4		4	2		Free	6		
Detector Phase	3	8	8	7	4	4	2	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	8.0	8.0	5.0	8.0	8.0	8.0	8.0		5.0	8.0	
Minimum Split (s)	9.0	37.0	37.0	10.0	37.0	37.0	39.0	39.0		10.0	39.0	
Total Split (s)	12.0	55.0	55.0	10.0	53.0	53.0	80.0	80.0		15.0	95.0	
Total Split (%)	7.5%	34.4%	34.4%	6.3%	33.1%	33.1%	50.0%	50.0%		9.4%	59.4%	
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	4.0	4.0		3.0	4.0	
All-Red Time (s)	1.0	2.0	2.0	1.0	2.0	2.0	2.0	2.0		1.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.0	6.0	6.0	4.0	6.0	6.0	6.0	6.0		4.0	6.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lag	Lag		Lead		
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None	None	Max	Max		None	Max	
Act Effct Green (s)	56.7	48.3	48.3	52.4	44.4	44.4	74.3	74.3	157.3	91.1	89.1	
Actuated g/C Ratio	0.36	0.31	0.31	0.33	0.28	0.28	0.47	0.47	1.00	0.58	0.57	
v/c Ratio	0.59	0.54	0.18	0.16	0.84	0.50	0.59	0.69	0.06	0.68	0.43	
Control Delay	49.3	47.9	13.3	33.4	61.8	19.6	41.8	35.6	0.1	31.9	20.4	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	49.3	47.9	13.3	33.4	61.8	19.6	41.8	35.6	0.1	31.9	20.4	
LOS	D	D	B	C	E	B	D	D	A	C	C	
Approach Delay		43.7			50.6			34.2			22.3	
Approach LOS		D			D			C			C	
Queue Length 50th (m)	17.8	83.1	5.0	7.0	131.0	26.0	39.4	152.2	0.0	23.1	79.0	
Queue Length 95th (m)	30.3	102.6	19.2	15.0	156.5	54.6	68.4	177.8	0.0	37.1	94.7	
Internal Link Dist (m)		391.5			195.7			159.1			124.5	

26: Torbram Rd./Torbram Rd & Williams Parkway

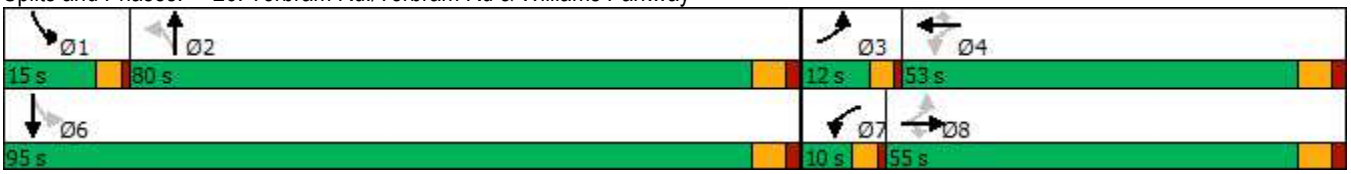
Timing Plan: PM

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (m)	30.0		30.0	45.0			40.0		40.0	60.0		
Base Capacity (vph)	148	1104	542	216	1059	591	284	1675	1544	235	1940	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.58	0.54	0.18	0.16	0.79	0.48	0.59	0.69	0.06	0.67	0.43	

Intersection Summary

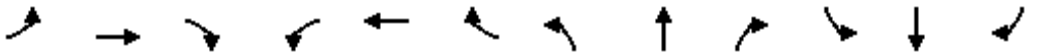
Area Type: Other
Cycle Length: 160
Actuated Cycle Length: 157.3
Natural Cycle: 100
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.84
Intersection Signal Delay: 37.6 Intersection LOS: D
Intersection Capacity Utilization 83.9% ICU Level of Service E
Analysis Period (min) 15

Splits and Phases: 26: Torbram Rd./Torbram Rd & Williams Parkway



26: Torbram Rd./Torbram Rd & Williams Parkway

Timing Plan: PM



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	82	563	92	33	799	269	160	1097	81	150	707	91
Future Volume (vph)	82	563	92	33	799	269	160	1097	81	150	707	91
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0	6.0	4.0	6.0	6.0	6.0	6.0	4.0	4.0	6.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.96	1.00	1.00	0.95	1.00	1.00	0.98	1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	0.98	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	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1772	3544	1574	1671	3544	1558	1743	3544	1544	1772	3416	
Flt Permitted	0.10	1.00	1.00	0.30	1.00	1.00	0.33	1.00	1.00	0.12	1.00	
Satd. Flow (perm)	186	3544	1574	521	3544	1558	602	3544	1544	220	3416	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	86	593	97	35	841	283	168	1155	85	158	744	96
RTOR Reduction (vph)	0	0	52	0	0	128	0	0	0	0	6	0
Lane Group Flow (vph)	86	593	45	35	841	155	168	1155	85	158	834	0
Confl. Peds. (#/hr)	22		16	16		22	37		14	14		37
Confl. Bikes (#/hr)						1			1			2
Heavy Vehicles (%)	3%	3%	0%	9%	3%	0%	3%	3%	4%	3%	4%	6%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Free	pm+pt	NA	
Protected Phases	3	8		7	4			2		1	6	
Permitted Phases	8		8	4		4	2		Free	6		
Actuated Green, G (s)	56.1	48.3	48.3	49.9	45.2	45.2	74.4	74.4	158.1	89.1	89.1	
Effective Green, g (s)	56.1	48.3	48.3	49.9	45.2	45.2	74.4	74.4	158.1	89.1	89.1	
Actuated g/C Ratio	0.35	0.31	0.31	0.32	0.29	0.29	0.47	0.47	1.00	0.56	0.56	
Clearance Time (s)	4.0	6.0	6.0	4.0	6.0	6.0	6.0	6.0		4.0	6.0	
Vehicle Extension (s)	3.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	144	1082	480	198	1013	445	283	1667	1544	229	1925	
v/s Ratio Prot	c0.03	0.17		0.01	c0.24			0.33		c0.05	0.24	
v/s Ratio Perm	0.18		0.03	0.05		0.10	0.28		0.06	c0.34		
v/c Ratio	0.60	0.55	0.09	0.18	0.83	0.35	0.59	0.69	0.06	0.69	0.43	
Uniform Delay, d1	38.8	45.8	39.2	38.5	52.9	44.8	30.7	32.9	0.0	24.5	19.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	6.5	1.0	0.2	0.9	6.5	1.0	8.9	2.4	0.1	10.7	0.7	
Delay (s)	45.3	46.8	39.4	39.4	59.4	45.8	39.6	35.3	0.1	35.2	20.6	
Level of Service	D	D	D	D	E	D	D	D	A	D	C	
Approach Delay (s)		45.7			55.5			33.7			22.9	
Approach LOS		D			E			C			C	

Intersection Summary			
HCM 2000 Control Delay	39.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	158.1	Sum of lost time (s)	20.0
Intersection Capacity Utilization	83.9%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

APPENDIX H

SIGNAL WARRANT ANALYSIS

PARSONS

Warrant Analysis - Justification 7, Projected Volumes

Horizon Year:	2031
Jurisdiction:	COB
Major Street:	Williams Parkway
Minor Street:	Mansfield E
Number of Approach lanes:	2
Tee Intersection:	YES
Flow Conditions:	Free Flow
Both Intersceting Roads Exist	Yes
Volume Expansion	120%

Justification 7 Results

Warrant	100% Satisfied	80% Satisfied	Justification 7 Satisfied
Warrant 1	NO	NO	NO
Warrant 2	NO	NO	

Time Period	Major Street: Williams Parkway						Minor Street: Mansfield E						Peds Crossing Main Road
	Eastbound			Westbound			Northbound			Southbound			
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
AM Peak Hour	0	941	6	7	784	0	18	0	28				0
PM Peak Hour	(0)	(1030)	(22)	(42)	(1291)	(0)	(17)	(0)	(19)				0
Average Houly Volume (AHV)	0	235	2	2	196	0	4	0	7	0	0	0	0

Total Volumes

Warrant	AHV
1A -All Apchs	446
1B - Minor	11
2A - Major	435
2B - Cross	4

Major Approach Heavier Left Turn Volumes - Warrant 2B

Heavier Left Turn Volume (LTV)	2
Opposing Volume (OV)	235
LTV >120	No
Sum of LTV & OV > 720	No
Both Conditions Met	No
Add 50% of LTV to Crossing Volumes	0

Warrant 1 - Minimum Vehicular Volume

	Approach Lanes		1		2 or more		AHV	Compliance
1A	Flow Conditions		Free	Restricted	Free	Restricted		
	All Approaches	Requirement	480	720	600	900		
		Volume Expansion	576	864	720	1080	446	41%

	Approach Lanes		1		2 or more		AHV	Compliance
1B	Flow Conditions		Free	Restricted	Free	Restricted		
	Minor Street	Requirement	180	255	180	255		
		Volume Expansion	216	306	216	306	11	4%

Warrant 2 - Delay to Cross Traffic

	Approach Lanes		1		2 or more		AHV	Compliance
2A	Flow Conditions		Free	Restricted	Free	Restricted		
	Major Street	Requirement	480	720	600	900		
		Volume Expansion	576	864	720	1080	435	40%

	Approach Lanes		1		2 or more		AHV	Compliance
2B	Flow Conditions		Free	Restricted	Free	Restricted		
	Traffic Crossing Major Street	Requirement	50	75	120	170		
		Volume Expansion	60	90	144	204	4	2%

Warrant Analysis - Justification 7, Projected Volumes

Horizon Year:	2031
Jurisdiction:	COB
Major Street:	Williams Parkway
Minor Street:	Mansfield W
Number of Approach lanes:	2
Tee Intersection:	YES
Flow Conditions:	Free Flow
Both Intersceting Roads Exist	Yes
Volume Expansion	120%

Justification 7 Results

Warrant	100% Satisfied	80% Satisfied	Justification 7 Satisfied
Warrant 1	NO	NO	NO
Warrant 2	NO	NO	

Time Period	Major Street						Minor Street						Peds Crossing Main Road
	Williams Parkway						Mansfield W						
	Eastbound			Westbound			Northbound			Southbound			
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
AM Peak Hour	0	971	14	4	819	0	29	0	19				0
PM Peak Hour	(0)	(1030)	(44)	(10)	(1322)	(0)	(15)	(0)	19				0
Average Houly Volume (AHV)	0	243	3	1	205	0	7	0	9	0	0	0	0

Total Volumes

Warrant	AHV
1A -All Apchs	468
1B - Minor	16
2A - Major	452
2B - Cross	7

Major Approach Heavier Left Turn Volumes - Warrant 2B

Heavier Left Turn Volume (LTV)	1
Opposing Volume (OV)	243
LTV >120	No
Sum of LTV & OV > 720	No
Both Conditions Met	No
Add 50% of LTV to Crossing Volumes	0

Warrant 1 - Minimum Vehicular Volume

	Approach Lanes		1		2 or more		AHV	Compliance
1A	Flow Conditions		Free	Restricted	Free	Restricted		
	All Approaches	Requirement	480	720	600	900		
		Volume Expansion	576	864	720	1080	468	43%

	Approach Lanes		1		2 or more		AHV	Compliance
1B	Flow Conditions		Free	Restricted	Free	Restricted		
	Minor Street	Requirement	180	255	180	255		
		Volume Expansion	216	306	216	306	16	5%

Warrant 2 - Delay to Cross Traffic

	Approach Lanes		1		2 or more		AHV	Compliance
2A	Flow Conditions		Free	Restricted	Free	Restricted		
	Major Street	Requirement	480	720	600	900		
		Volume Expansion	576	864	720	1080	452	42%

	Approach Lanes		1		2 or more		AHV	Compliance
2B	Flow Conditions		Free	Restricted	Free	Restricted		
	Traffic Crossing Major Street	Requirement	50	75	120	170		
		Volume Expansion	60	90	144	204	7	3%

APPENDIX I

COLLISION DATA

Collision Data - Intersections

Accident No.	Accident Date	Accident Year	Accident Time	Geo ID	Location	Accident Location	Initial Direction Of Travel One	Initial Direction Of Travel Two	Road 1 Surface Condition	Driver 1 Condition	Driver 2 Condition	Vehicle 1 Manoeuver
170254970	7/10/2017	2017	1:51	4752	TORBRAM RD @ WILLIAMS PKY (4752)	02 - Intersection related	North	None	01 - Dry	99 - Other		14 - Pulling onto shoulder or toward curb
170329365	9/3/2017	2017	6:05	4752	TORBRAM RD @ WILLIAMS PKY (4752)	02 - Intersection related	East	South	02 - Wet	01 - Normal	01 - Normal	01 - Going ahead
170335362	9/7/2017	2017	17:14	1688	BRAMALEA RD @ WILLIAMS PKY (1688)	03 - At intersection	South	North	02 - Wet	01 - Normal	01 - Normal	01 - Going ahead
170342184	9/12/2017	2017	15:41	1688	BRAMALEA RD @ WILLIAMS PKY (1688)	02 - Intersection related	South	South	01 - Dry	01 - Normal	01 - Normal	01 - Going ahead
170346501	9/15/2017	2017	8:00	4752	TORBRAM RD @ WILLIAMS PKY (4752)	03 - At intersection	East	East	01 - Dry	08 - Inattentive	01 - Normal	01 - Going ahead
170405064	10/28/2017	2017	18:20	312	GRENOBLE BLVD/ JORDAN BLVD @ WILLIAMS PKY (312)	03 - At intersection	North	West	01 - Dry	01 - Normal	01 - Normal	01 - Going ahead
170405639	10/29/2017	2017	5:05	1688	BRAMALEA RD @ WILLIAMS PKY (1688)	03 - At intersection	South	None	01 - Dry	08 - Inattentive		01 - Going ahead
170411689	11/2/2017	2017	17:50	4752	TORBRAM RD @ WILLIAMS PKY (4752)	03 - At intersection	South	South	02 - Wet	01 - Normal	01 - Normal	01 - Going ahead
170434995	11/20/2017	2017	15:00	4752	TORBRAM RD @ WILLIAMS PKY (4752)	03 - At intersection	West	West	01 - Dry	08 - Inattentive	01 - Normal	01 - Going ahead
170436509	11/20/2017	2017	15:00	1688	BRAMALEA RD @ WILLIAMS PKY (1688)	03 - At intersection	North	North	01 - Dry	08 - Inattentive	01 - Normal	01 - Going ahead
170437238	11/22/2017	2017	6:43	4752	TORBRAM RD @ WILLIAMS PKY (4752)	03 - At intersection	South	North	01 - Dry	08 - Inattentive	01 - Normal	04 - Turning left
170445106	11/28/2017	2017	6:38	1688	BRAMALEA RD @ WILLIAMS PKY (1688)	03 - At intersection	South	North	02 - Wet	01 - Normal	01 - Normal	04 - Turning left
180002175	1/2/2018	2018	19:31	1688	BRAMALEA RD @ WILLIAMS PKY (1688)	03 - At intersection	North	South	01 - Dry	01 - Normal	01 - Normal	01 - Going ahead
180022033	1/17/2018	2018	9:00	1688	BRAMALEA RD @ WILLIAMS PKY (1688)	03 - At intersection	South	South	01 - Dry	08 - Inattentive	01 - Normal	02 - Slowing or stopping
180025028	1/19/2018	2018	12:55	1688	BRAMALEA RD @ WILLIAMS PKY (1688)	03 - At intersection	South	West	01 - Dry	08 - Inattentive	01 - Normal	01 - Going ahead
180030919	1/24/2018	2018	6:11	4752	TORBRAM RD @ WILLIAMS PKY (4752)	03 - At intersection	South	North	01 - Dry	01 - Normal	01 - Normal	04 - Turning left
180054408	2/10/2018	2018	14:13	1688	BRAMALEA RD @ WILLIAMS PKY (1688)	03 - At intersection	South	North	04 - Slush	01 - Normal	01 - Normal	04 - Turning left
180104971	3/20/2018	2018	14:33	1688	BRAMALEA RD @ WILLIAMS PKY (1688)	02 - Intersection related	South	South	01 - Dry	01 - Normal	01 - Normal	01 - Going ahead
180138982	4/14/2018	2018	16:16	4752	TORBRAM RD @ WILLIAMS PKY (4752)	03 - At intersection	East	East	03 - Loose snow			04 - Turning left
180144656	4/19/2018	2018	6:07	4752	TORBRAM RD @ WILLIAMS PKY (4752)	03 - At intersection	South	North	01 - Dry	01 - Normal	01 - Normal	04 - Turning left
180154742	4/26/2018	2018	15:45	1317	MACKAY ST S @ WILLIAMS PKY (1317)	03 - At intersection	West	East	01 - Dry	01 - Normal	01 - Normal	01 - Going ahead
180167808	5/5/2018	2018	14:44	4752	TORBRAM RD @ WILLIAMS PKY (4752)	03 - At intersection	North	North	01 - Dry	01 - Normal	01 - Normal	07 - Changing lanes
180192476	5/23/2018	2018	19:49	4752	TORBRAM RD @ WILLIAMS PKY (4752)	03 - At intersection	South	East	01 - Dry	08 - Inattentive	01 - Normal	01 - Going ahead
180193192	5/23/2018	2018	15:00	1688	BRAMALEA RD @ WILLIAMS PKY (1688)	02 - Intersection related	East	East	01 - Dry	01 - Normal	01 - Normal	01 - Going ahead
180235783	6/23/2018	2018	1:05	4752	TORBRAM RD @ WILLIAMS PKY (4752)	03 - At intersection	West	North	01 - Dry	01 - Normal	01 - Normal	01 - Going ahead
180258474	7/10/2018	2018	14:40	4752	TORBRAM RD @ WILLIAMS PKY (4752)	02 - Intersection related	North	North	01 - Dry	01 - Normal	01 - Normal	02 - Slowing or stopping
180291048	8/3/2018	2018	14:25	371	GLENRIDGE RD @ WILLIAMS PKY (371)	03 - At intersection	West	West	01 - Dry	01 - Normal	01 - Normal	07 - Changing lanes
180323182	8/27/2018	2018	19:30	4752	TORBRAM RD @ WILLIAMS PKY (4752)	02 - Intersection related	North	South	01 - Dry	99 - Other	01 - Normal	04 - Turning left
180334937	9/5/2018	2018	11:44	4752	TORBRAM RD @ WILLIAMS PKY (4752)	02 - Intersection related	South	East	01 - Dry	01 - Normal	01 - Normal	05 - Turning right
180405756	10/27/2018	2018	9:20	312	GRENOBLE BLVD/ JORDAN BLVD @ WILLIAMS PKY (312)	03 - At intersection	North	South	02 - Wet	01 - Normal	01 - Normal	04 - Turning left
180477313	12/20/2018	2018	15:30	1688	BRAMALEA RD @ WILLIAMS PKY (1688)	03 - At intersection	East	West	01 - Dry	08 - Inattentive	01 - Normal	04 - Turning left
190016775	1/13/2019	2019	21:45	1688	BRAMALEA RD @ WILLIAMS PKY (1688)	03 - At intersection	East	West	01 - Dry	08 - Inattentive	01 - Normal	04 - Turning left
190034664	1/27/2019	2019	2:00	4752	TORBRAM RD @ WILLIAMS PKY (4752)	03 - At intersection	South	None	03 - Loose snow	01 - Normal		05 - Turning right
190036070	1/28/2019	2019	15:01	1688	BRAMALEA RD @ WILLIAMS PKY (1688)	03 - At intersection	North	North	05 - Packed snow	01 - Normal	01 - Normal	01 - Going ahead
190036952	1/29/2019	2019	9:45	4752	TORBRAM RD @ WILLIAMS PKY (4752)	03 - At intersection	South	None	03 - Loose snow	01 - Normal		07 - Changing lanes
190057091	2/13/2019	2019	13:05	4752	TORBRAM RD @ WILLIAMS PKY (4752)	02 - Intersection related	East	East	02 - Wet	01 - Normal	01 - Normal	01 - Going ahead
190057606	2/13/2019	2019	22:53	4752	TORBRAM RD @ WILLIAMS PKY (4752)	03 - At intersection	South	North	03 - Loose snow	01 - Normal	01 - Normal	04 - Turning left
190065711	2/20/2019	2019	7:00	1688	BRAMALEA RD @ WILLIAMS PKY (1688)	03 - At intersection	North	South	01 - Dry	01 - Normal	01 - Normal	04 - Turning left
190077011	2/28/2019	2019	19:32	4752	TORBRAM RD @ WILLIAMS PKY (4752)	03 - At intersection	North	North	01 - Dry	08 - Inattentive	01 - Normal	01 - Going ahead
190129332	4/9/2019	2019	18:20	1317	MACKAY ST S @ WILLIAMS PKY (1317)	02 - Intersection related	South	West	01 - Dry	08 - Inattentive	01 - Normal	05 - Turning right
190133838	4/12/2019	2019	18:25	312	GRENOBLE BLVD/ JORDAN BLVD @ WILLIAMS PKY (312)	03 - At intersection	North	South	01 - Dry	01 - Normal	01 - Normal	07 - Changing lanes
190138630	4/16/2019	2019	16:04	371	GLENRIDGE RD @ WILLIAMS PKY (371)	03 - At intersection	West	West	02 - Wet	08 - Inattentive	01 - Normal	02 - Slowing or stopping
190141614	4/18/2019	2019	13:35	1688	BRAMALEA RD @ WILLIAMS PKY (1688)	03 - At intersection	West	South	01 - Dry	01 - Normal	01 - Normal	04 - Turning left
190162034	5/4/2019	2019	1:00	4752	TORBRAM RD @ WILLIAMS PKY (4752)	03 - At intersection	West	East	01 - Dry	01 - Normal	01 - Normal	04 - Turning left
190167846	5/8/2019	2019	15:00	1688	BRAMALEA RD @ WILLIAMS PKY (1688)	03 - At intersection	North	North	01 - Dry	08 - Inattentive	01 - Normal	01 - Going ahead
190205384	6/5/2019	2019	17:50	1688	BRAMALEA RD @ WILLIAMS PKY (1688)	03 - At intersection	East	West	02 - Wet	01 - Normal	01 - Normal	04 - Turning left
190214970	6/12/2019	2019	19:38	1688	BRAMALEA RD @ WILLIAMS PKY (1688)	03 - At intersection	South	North	01 - Dry	01 - Normal	01 - Normal	01 - Going ahead
190217586	6/14/2019	2019	17:35	4752	TORBRAM RD @ WILLIAMS PKY (4752)	03 - At intersection	West	South	01 - Dry	08 - Inattentive	01 - Normal	01 - Going ahead
190222713	6/18/2019	2019	15:31	1317	MACKAY ST S @ WILLIAMS PKY (1317)	02 - Intersection related	West	None	01 - Dry	01 - Normal		01 - Going ahead
190241890	7/2/2019	2019	16:57	4752	TORBRAM RD @ WILLIAMS PKY (4752)	03 - At intersection	North	North	01 - Dry	08 - Inattentive	01 - Normal	01 - Going ahead
190261832	7/17/2019	2019	7:20	4752	TORBRAM RD @ WILLIAMS PKY (4752)	02 - Intersection related	South	South	02 - Wet	01 - Normal	01 - Normal	99 - Other
190290414	8/8/2019	2019	17:10	1317	MACKAY ST S @ WILLIAMS PKY (1317)	03 - At intersection	East	East	01 - Dry	08 - Inattentive	01 - Normal	07 - Changing lanes
190314772	8/27/2019	2019	18:00	4752	TORBRAM RD @ WILLIAMS PKY (4752)	03 - At intersection	East	West	02 - Wet	01 - Normal	01 - Normal	04 - Turning left
190326137	9/5/2019	2019	15:50	312	GRENOBLE BLVD/ JORDAN BLVD @ WILLIAMS PKY (312)	03 - At intersection	South	None	01 - Dry	08 - Inattentive		04 - Turning left
190352103	9/25/2019	2019	18:30	4752	TORBRAM RD @ WILLIAMS PKY (4752)	03 - At intersection	South	North	01 - Dry	01 - Normal	01 - Normal	01 - Going ahead
190381868	10/18/2019	2019	14:14	1688	BRAMALEA RD @ WILLIAMS PKY (1688)	03 - At intersection	North	West	01 - Dry	01 - Normal	01 - Normal	01 - Going ahead
190387653	10/22/2019	2019	18:15	4752	TORBRAM RD @ WILLIAMS PKY (4752)	03 - At intersection	East	West	01 - Dry	08 - Inattentive	01 - Normal	04 - Turning left
190399436	10/31/2019	2019	20:02	4752	TORBRAM RD @ WILLIAMS PKY (4752)	03 - At intersection	East	South	02 - Wet	08 - Inattentive	01 - Normal	01 - Going ahead
190421548	11/18/2019	2019	16:08	4752	TORBRAM RD @ WILLIAMS PKY (4752)	03 - At intersection	East	East	02 - Wet	08 - Inattentive	01 - Normal	01 - Going ahead
190455685	12/14/2019	2019	20:53	4752	TORBRAM RD @ WILLIAMS PKY (4752)	03 - At intersection	West	West	02 - Wet	08 - Inattentive	01 - Normal	01 - Going ahead
190457798	12/17/2019	2019	16:43	4752	TORBRAM RD @ WILLIAMS PKY (4752)	03 - At intersection	West	South	01 - Dry	01 - Normal	01 - Normal	01 - Going ahead
190461586	12/19/2019	2019	13:00	4752	TORBRAM RD @ WILLIAMS PKY (4752)	03 - At intersection	North	East	03 - Loose snow	01 - Normal	01 - Normal	01 - Going ahead
200014329	1/12/2020	2020	16:24	312	GRENOBLE BLVD/ JORDAN BLVD @ WILLIAMS PKY (312)	03 - At intersection	East	South	06 - Ice	08 - Inattentive	01 - Normal	01 - Going ahead
200022950	1/18/2020	2020	23:15	4752	TORBRAM RD @ WILLIAMS PKY (4752)	03 - At intersection	East	West	03 - Loose snow	08 - Inattentive	01 - Normal	04 - Turning left
200024100	1/20/2020	2020	7:00	1688	BRAMALEA RD @ WILLIAMS PKY (1688)	03 - At intersection	North	South	01 - Dry	01 - Normal	01 - Normal	04 - Turning left
200043527	2/3/2020	2020	14:50	312	GRENOBLE BLVD/ JORDAN BLVD @ WILLIAMS PKY (312)	03 - At intersection	East	South	01 - Dry	08 - Inattentive	08 - Inattentive	01 - Going ahead
200100828	3/18/2020	2020	10:30	4752	TORBRAM RD @ WILLIAMS PKY (4752)	02 - Intersection related	South	South	01 - Dry	01 - Normal	01 - Normal	01 - Going ahead
200181821	6/12/2020	2020	18:15	4752	TORBRAM RD @ WILLIAMS PKY (4752)	03 - At intersection	North	North	01 - Dry	08 - Inattentive	01 - Normal	01 - Going ahead
200200359	6/27/2020	2020	20:58	4493	MANSFIELD ST @ WILLIAMS PKY (2) (4493)	03 - At intersection	East	North	01 - Dry	08 - Inattentive	01 - Normal	07 - Changing lanes
200216936	7/11/2020	2020	3:44	1317	MACKAY ST S @ WILLIAMS PKY (1317)	03 - At intersection	East	None	02 - Wet	01 - Normal		01 - Going ahead
200312650	9/26/2020	2020	16:46	312	GRENOBLE BLVD/ JORDAN BLVD @ WILLIAMS PKY (312)	03 - At intersection	South	East	01 - Dry	08 - Inattentive	01 - Normal	05 - Turning right
200380005	11/20/2020	2020	21:08	4752	TORBRAM RD @ WILLIAMS PKY (4752)	02 - Intersection related	North	North	01 - Dry	01 - Normal	01 - Normal	01 - Going ahead
200386228	11/25/2020	2020	20:55	4752	TORBRAM RD @ WILLIAMS PKY (4752)	03 - At intersection	South	South	02 - Wet	08 - Inattentive	01 - Normal	01 - Going ahead
200418145	12/23/2020	2020	23:20	4752	TORBRAM RD @ WILLIAMS PKY (4752)	02 - Intersection related	South	North	02 - Wet	08 - Inattentive	01 - Normal	04 - Turning left
210003427	1/4/2021	2021	8:06	4752	TORBRAM RD @ WILLIAMS PKY (4752)	03 - At intersection	North	North	06 - Ice	01 - Normal	01 - Normal	01 - Going ahead
210004122	1/4/2021	2021	17:40	1317	MACKAY ST S @ WILLIAMS PKY (1317)	03 - At intersection	South	South	01 - Dry	01 - Normal	01 - Normal	01 - Going ahead
210031837	1/26/2021	2021	14:21	1688	BRAMALEA RD @ WILLIAMS PKY (1688)	03 - At intersection	South	West	03 - Loose snow	01 - Normal	01 - Normal	01 - Going ahead
210042149	2/3/2021	2021	17:14	4752	TORBRAM RD @ WILLIAMS PKY (4752)	03 - At intersection	West	West	01 - Dry	08 - Inattentive	01 - Normal	01 - Going ahead
210089649	3/12/2021	2021	14:30	312	GRENOBLE BLVD/ JORDAN BLVD @ WILLIAMS PKY (312)	03 - At intersection	North	South	01 - Dry	01 - Normal	01 - Normal	04 - Turning left
210099881	3/20/2021	2021	17:50	4752	TORBRAM RD @ WILLIAMS PKY (4752)	03 - At intersection	North	South	01 - Dry	08 - Inattentive	01 - Normal	04 - Turning left
210173722	5/18/2021	2021	20:06	1688	BRAMALEA RD @ WILLIAMS PKY (1688)	03 - At intersection	North	West	01 - Dry	08 - Inattentive	01 - Normal	01 - Going ahead
210185674	5/28/2021	2021	15:04	1688	BRAMALEA RD @ WILLIAMS PKY (1688)	03 - At intersection	East	North	02 - Wet	01 - Normal	01 - Normal	01 - Going ahead
210242444	7/14/2021	2021	10:10	312	GRENOBLE BLVD/ JORDAN BLVD @ WILLIAMS PKY (312)	03 - At intersection	North	South	01 - Dry	08 - Inattentive	01 - Normal	04 - Turning left
210245606	7/17/2021	2021	9:30	4752	TORBRAM RD @ WILLIAMS PKY (4752)	03 - At intersection	South	South	02 - Wet	01 - Normal	01 - Normal	01 - Going ahead

Collision Data - Midblock

Accident No.	Accident Date	Accident Year	Accident Time	Geo ID	Location	Accident Location	Initial Direction Of Travel One	Initial Direction Of Travel Two	Road 1 Surface Condition	Driver 1 Condition	Driver 2 Condition	Vehicle 1 Manoeuver	Vehicle 2 Manoeuver	Impact Location	Environment Condition 1	Light	Classification Of Accident	Initial Impact Type	Apparent Driver 1 Action
170259477	7/13/2017	2017	8:39	205886	WILLIAMS PKY btwn GRAYMAR RD & GRENOBLE BLVD/ JORDAN BLVD (205886)	01 - Non intersection	East	East	01 - Dry	01 - Normal	01 - Normal	01 - Going ahead	01 - Going ahead	02 - Thru lane	01 - Clear	01 - Daylight	03 - P.D. only	03 - Rear end	01 - Driving properly
170343785	9/13/2017	2017	16:25	205891	WILLIAMS PKY btwn MANSFIELD ST & MANSFIELD ST (1) (205891)	01 - Non intersection	East	East	01 - Dry	01 - Normal	01 - Normal	07 - Changing lanes	01 - Going ahead	02 - Thru lane	01 - Clear	01 - Daylight	03 - P.D. only	04 - Sideswipe	12 - Improper lane change
180111571	3/25/2018	2018	14:57	205897	WILLIAMS PKY btwn DIXIE RD & MANSFIELD ST (205897)	01 - Non intersection	West	West	01 - Dry	08 - Inattentive	08 - Inattentive	01 - Going ahead	01 - Going ahead	02 - Thru lane	01 - Clear	01 - Daylight	03 - P.D. only	03 - Rear end	03 - Exceeding speed limit
180267385	7/17/2018	2018	5:23	205889	WILLIAMS PKY btwn GRAYMAR RD & TORBRAM RD (205889)	01 - Non intersection	East	East	01 - Dry	01 - Normal	01 - Normal	07 - Changing lanes	01 - Going ahead	99 - Other	01 - Clear	03 - Dawn	03 - P.D. only	04 - Sideswipe	12 - Improper lane change
180342321	9/10/2018	2018	14:14	205901	WILLIAMS PKY btwn BRAMALEA RD & MACKAY ST S (205901)	01 - Non intersection	West	West	02 - Wet	08 - Inattentive	01 - Normal	01 - Going ahead	01 - Going ahead	02 - Thru lane	02 - Rain	01 - Daylight	03 - P.D. only	03 - Rear end	04 - Speed too fast for condition
180386123	10/12/2018	2018	22:10	205897	WILLIAMS PKY btwn DIXIE RD & MANSFIELD ST (205897)	01 - Non intersection	East	None	01 - Dry	99 - Other		01 - Going ahead		11 - Not on roadway - right side	01 - Clear	07 - Dark	03 - P.D. only	07 - SMV other	10 - Lost control
180473163	12/17/2018	2018	15:30	205901	WILLIAMS PKY btwn BRAMALEA RD & MACKAY ST S (205901)	01 - Non intersection	West	West	01 - Dry	08 - Inattentive	01 - Normal	01 - Going ahead	10 - Stopped	02 - Thru lane	01 - Clear	01 - Daylight	03 - P.D. only	03 - Rear end	01 - Driving properly
190010688	1/9/2019	2019	8:10	205897	WILLIAMS PKY btwn DIXIE RD & MANSFIELD ST (205897)	01 - Non intersection	East	East	01 - Dry	01 - Normal	01 - Normal	01 - Going ahead	01 - Going ahead	02 - Thru lane	01 - Clear	03 - Dawn	03 - P.D. only	03 - Rear end	02 - Following too close
190027388	1/21/2019	2019	19:07	205897	WILLIAMS PKY btwn DIXIE RD & MANSFIELD ST (205897)	01 - Non intersection	West	West	02 - Wet	08 - Inattentive	01 - Normal	07 - Changing lanes	01 - Going ahead	02 - Thru lane	01 - Clear	07 - Dark	02 - Non-fatal injury	04 - Sideswipe	12 - Improper lane change
190060867	2/16/2019	2019	10:30	205901	WILLIAMS PKY btwn BRAMALEA RD & MACKAY ST S (205901)	04 - At/near private drive	East	East	01 - Dry	01 - Normal	01 - Normal	01 - Going ahead	02 - Slowing or stopping	09 - Right shoulder	01 - Clear	01 - Daylight	03 - P.D. only	03 - Rear end	02 - Following too close
190075236	2/23/2019	2019	15:30	205889	WILLIAMS PKY btwn GRAYMAR RD & TORBRAM RD (205889)	01 - Non intersection	East	East	01 - Dry	01 - Normal	01 - Normal	01 - Going ahead	01 - Going ahead	02 - Thru lane	01 - Clear	01 - Daylight	02 - Non-fatal injury	03 - Rear end	02 - Following too close
190112403	3/27/2019	2019	17:00	205897	WILLIAMS PKY btwn DIXIE RD & MANSFIELD ST (205897)	01 - Non intersection	West	West	01 - Dry	01 - Normal	01 - Normal	01 - Going ahead	10 - Stopped	02 - Thru lane	01 - Clear	01 - Daylight	03 - P.D. only	03 - Rear end	02 - Following too close
190179822	5/17/2019	2019	15:40	205886	WILLIAMS PKY btwn GRAYMAR RD & GRENOBLE BLVD/ JORDAN BLVD (205886)	01 - Non intersection	West	West	01 - Dry	01 - Normal	01 - Normal	01 - Going ahead	01 - Going ahead	02 - Thru lane	01 - Clear	01 - Daylight	03 - P.D. only	03 - Rear end	02 - Following too close
190194145	5/28/2019	2019	9:00	205900	WILLIAMS PKY btwn BRAMALEA RD & GLENRIDGE RD (205900)	01 - Non intersection	West	West	02 - Wet	01 - Normal	01 - Normal	01 - Going ahead	01 - Going ahead	02 - Thru lane	02 - Rain	01 - Daylight	03 - P.D. only	03 - Rear end	02 - Following too close
190322814	9/3/2019	2019	8:45	205890	WILLIAMS PKY btwn GLENRIDGE RD & GRENOBLE BLVD/ JORDAN BLVD (205890)	04 - At/near private drive	West	West	01 - Dry	01 - Normal	01 - Normal	01 - Going ahead	02 - Slowing or stopping	04 - Right turn lane	01 - Clear	01 - Daylight	03 - P.D. only	03 - Rear end	02 - Following too close
190458255	12/17/2019	2019	0:30	205886	WILLIAMS PKY btwn GRAYMAR RD & GRENOBLE BLVD/ JORDAN BLVD (205886)	01 - Non intersection	West	West	01 - Dry	01 - Normal	01 - Normal	01 - Going ahead	01 - Going ahead	09 - Right shoulder	01 - Clear	07 - Dark	03 - P.D. only	03 - Rear end	02 - Following too close
200203512	6/30/2020	2020	9:00	205890	WILLIAMS PKY btwn GLENRIDGE RD & GRENOBLE BLVD/ JORDAN BLVD (205890)	01 - Non intersection	East	East	01 - Dry	01 - Normal	01 - Normal	01 - Going ahead	01 - Going ahead	04 - Right turn lane	01 - Clear	01 - Daylight	03 - P.D. only	03 - Rear end	01 - Driving properly
200275866	8/28/2020	2020	8:35	205901	WILLIAMS PKY btwn BRAMALEA RD & MACKAY ST S (205901)	01 - Non intersection	West	West	01 - Dry	01 - Normal	01 - Normal	07 - Changing lanes	01 - Going ahead	07 - Passing lane	01 - Clear	01 - Daylight	03 - P.D. only	04 - Sideswipe	12 - Improper lane change
200309034	9/23/2020	2020	16:00	205889	WILLIAMS PKY btwn GRAYMAR RD & TORBRAM RD (205889)	01 - Non intersection	West	West	01 - Dry	08 - Inattentive	01 - Normal	01 - Going ahead	10 - Stopped	02 - Thru lane	01 - Clear	01 - Daylight	03 - P.D. only	03 - Rear end	02 - Following too close
210053103	2/11/2021	2021	22:00	205902	WILLIAMS PKY btwn MACKAY ST S & MANSFIELD ST (205902)	01 - Non intersection	East	East	01 - Dry	99 - Other	01 - Normal	01 - Going ahead	01 - Going ahead	02 - Thru lane	01 - Clear	08 - Dark, artificial	03 - P.D. only	03 - Rear end	02 - Following too close
210190584	6/1/2021	2021	16:15	205889	WILLIAMS PKY btwn GRAYMAR RD & TORBRAM RD (205889)	01 - Non intersection	East	East	01 - Dry	01 - Normal	01 - Normal	01 - Going ahead	02 - Slowing or stopping	02 - Thru lane	01 - Clear	01 - Daylight	03 - P.D. only	03 - Rear end	02 - Following too close
210219133	6/24/2021	2021	2:10	205897	WILLIAMS PKY btwn DIXIE RD & MANSFIELD ST (205897)	01 - Non intersection	West	West	01 - Dry	01 - Normal	01 - Normal	03 - Overtaking	01 - Going ahead	02 - Thru lane	01 - Clear	07 - Dark	03 - P.D. only	04 - Sideswipe	10 - Lost control