198-200 & 206 Plains Road East
City of Burlington Traffic Impact Study

Paradigm Transportation Solutions Limited

2025-10
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ptsl.com

Project Summary

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Client:

Concept Lines Inc.
6-310 Limeridge Road West
Hamilton, ON L9C 2V2

Client Contact:

Alaa Gaber
Director

Consultant Project Team

Stew Elkins, B.E.S
Adam Makarewicz, CET, LET, RSP1
Brian Kim, B.A.Sc.

Paradigm Transportation Solutions Limited

5A-150 Pinebush Road
Cambridge ON N1R 8J8
p: 519.896.3163
905.381.2229
416.479.9684
www.ptsl.com

Professional Engineers Ontario

Licensed Engineering Technologist

Name: A. J. MAKAREWICZ
Number: 100574092
Limitations: Development of traffic impact and transportation planning studies, and reporting recommendations for associated transportation system improvements. **2025-10-31**

Association of Professional Engineers of Ontario

Signing Licensee/Engineer, LET

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Executive Summary

Content

Paradigm Transportation Solutions Limited (Paradigm) was retained to conduct this Transportation Impact Study (TIS) for a proposed mixed-use development at 198-200 and 206 Plains Road East in the City of Burlington.

Official Plan Amendment and Zoning By-law Amendment applications are required to permit the proposed development.

This study determines the impacts of development traffic on the surrounding road network and identifies the recommended improvements, if necessary, to accommodate the site-generated traffic.

Development Concept

The subject property, located at 198-200 and 206 Plains Road East in the City of Burlington, sits on the south side of Plains Road East opposite White Oaks Drive. The owner plans to develop the site with a 6-storey mixed-use building consisting of 66 residential units and approximately 183 m² (1,969.80 sq. ft) of ground-floor commercial space. There are 94 parking spaces to accommodate residential and commercial visitors.

Build-out is anticipated to occur by Year 2030, with timing subject to change and market conditions.

The proposed site driveway connection is a full-move driveway to Plains Road East, situated directly opposite White Oak Drive. The site driveway will provide a garbage loading area, grade-level parking area, and access to the parking garage.

Conclusions

The main findings and conclusions of this study are as follows:

- **Study Area**: The intersections assessed in this study include:
  - Plains Road East and Shadeland Avenue/ Gallagher Road (signalized);
  - Plains Road East and White Oak Drive (unsignalized);
  - Plains Road East and St. Matthews Avenue (signalized);
  - One proposed driveway connection to Plains Road East.

- **Existing Traffic Conditions:** The study area intersections operate at acceptable service levels and within capacity during the weekday AM and PM peak hours.
- **Trip Generation:** The site's vehicular trip is estimated to be approximately 27 - 51 weekday AM/PM peak-hour trips. Considering internal trips, the site is forecast to generate 27 weekday AM and 43 weekday PM peak-hour trips.
- **Background Traffic Conditions:** The study area intersections are forecast to continue operating at acceptable service levels and within capacity during the AM and PM peak hours.
- **Total Traffic Conditions:** With the addition of site-generated traffic, the study area intersections are forecast to operate similarly to background conditions. No new capacity issues are forecast to occur because of site-generated traffic.

  The site driveway connection to Plains Road East is projected to operate at LOS B or better with a v/c ratio of 0.05. The 95th percentile queue length is expected to be less than one vehicle.

  Remedial Measures: From an operational perspective, no major delay or capacity issues are identified. Traffic control signals are not warranted at the intersection of Plains Road East at White Oak Drive and the proposed site driveway.
- **Transportation Demand Management:** The proposed development includes TDM measures such as bicycle parking to encourage cycling and pedestrian facilities to provide accessibility to and from the development.
- **MMLOS Assessment:** The existing study area segments and intersections meet or exceed the level of service targets for transit, trucks, and cars. To address the deficient modes, improved transit facilities, wider sidewalks, enhanced pedestrian measures, and protected cycling facilities should be explored by the City of Burlington.

Recommendations

Based on the findings of this study, the following is recommended:

- The City of Burlington recognizes the conclusions drawn above.
- The City should explore reallocating street space along Plains Road East, Shadeland Avenue, and Gallagher Road to enhance pedestrian and cycling facilities, including wider sidewalks, increased pedestrian buffer, more frequent pedestrian crossings, and protected cycling lanes, to meet MMLOS targets.

- The site's TDM program should be implemented and monitored over time to help manage its transportation and parking impacts

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1 Introduction

Paradigm Transportation Solutions Limited (Paradigm) to conduct this Transportation Impact Study (TIS) for a proposed residential development of 198-200 and 206 Plains Road East in the City of Burlington. **Figure 1.1** illustrates the site location.

Official Plan Amendment and Zoning By-law Amendment applications are required to permit the proposed development.

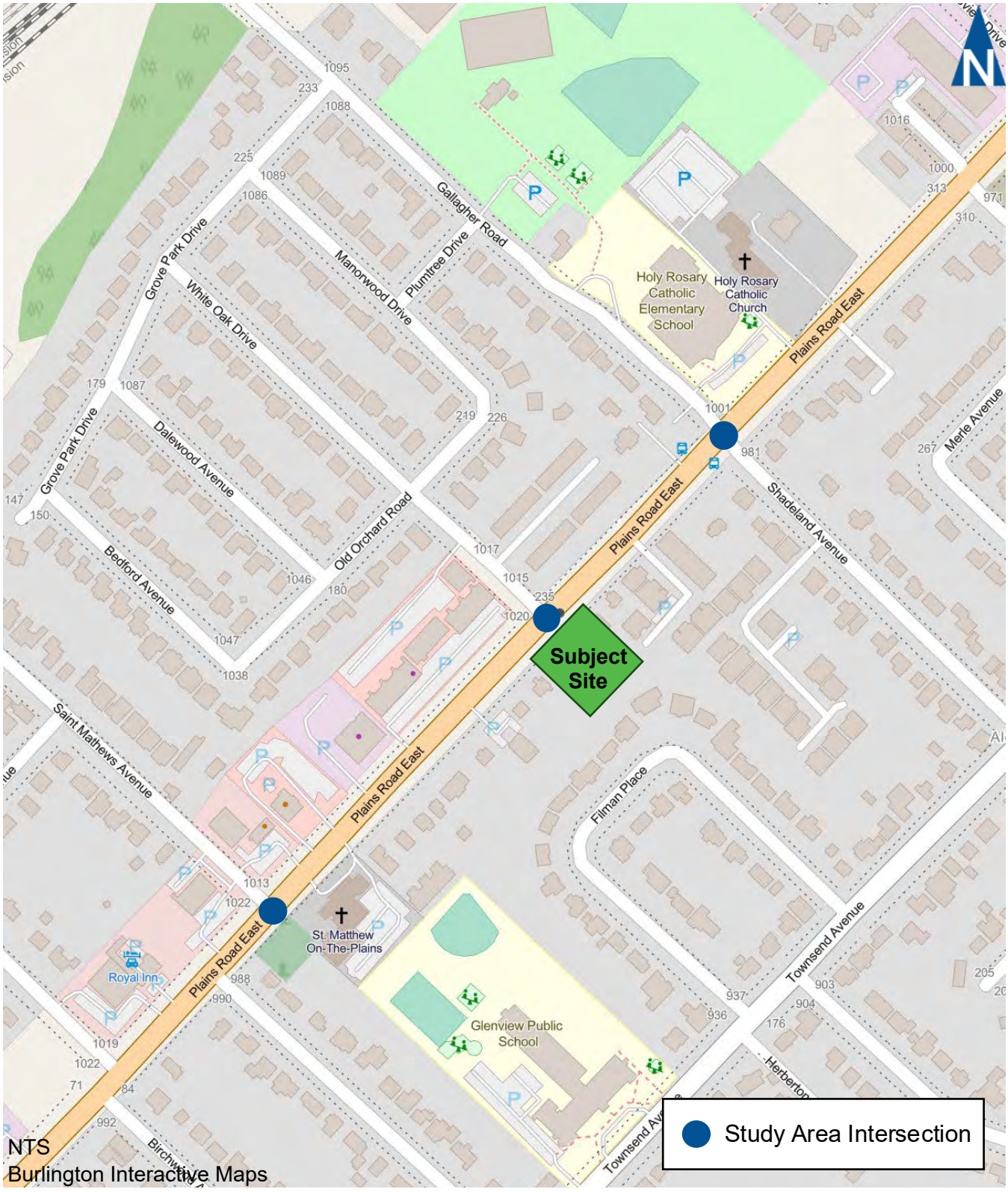
The scope of the study includes:

- Assessment of the current traffic conditions within the study area;
- Estimates of background traffic growth;
- Estimates of additional traffic generated by the subject site;
- Analyses of the impact of the future traffic on the surrounding road network;
- Recommendations necessary to mitigate this future traffic in a satisfactory manner;
- A multimodal level of service (MMLOS) assessment; and
- A transportation demand management (TDM) assessment.

A pre-study consultation was conducted with the City of Burlington in January 2025. The material for this consultation is contained in **Appendix A**.

The intersections assessed in this study include:

- Plains Road East and Shadeland Avenue/ Gallagher Road (signalized);
- Plains Road East and White Oak Drive (unsignalized);
- Plains Road East and St. Matthews Avenue (signalized);
- One proposed driveway connection to Plains Road East.



Subject Site Location

198-200 and 206 Plains Road East , Burlington
240575

Figure 1.1

2 Existing Conditions

The section of the report provides an overview of the existing conditions of the roadways in the study area and other features of the transportation network, including transit and active transportation infrastructure.

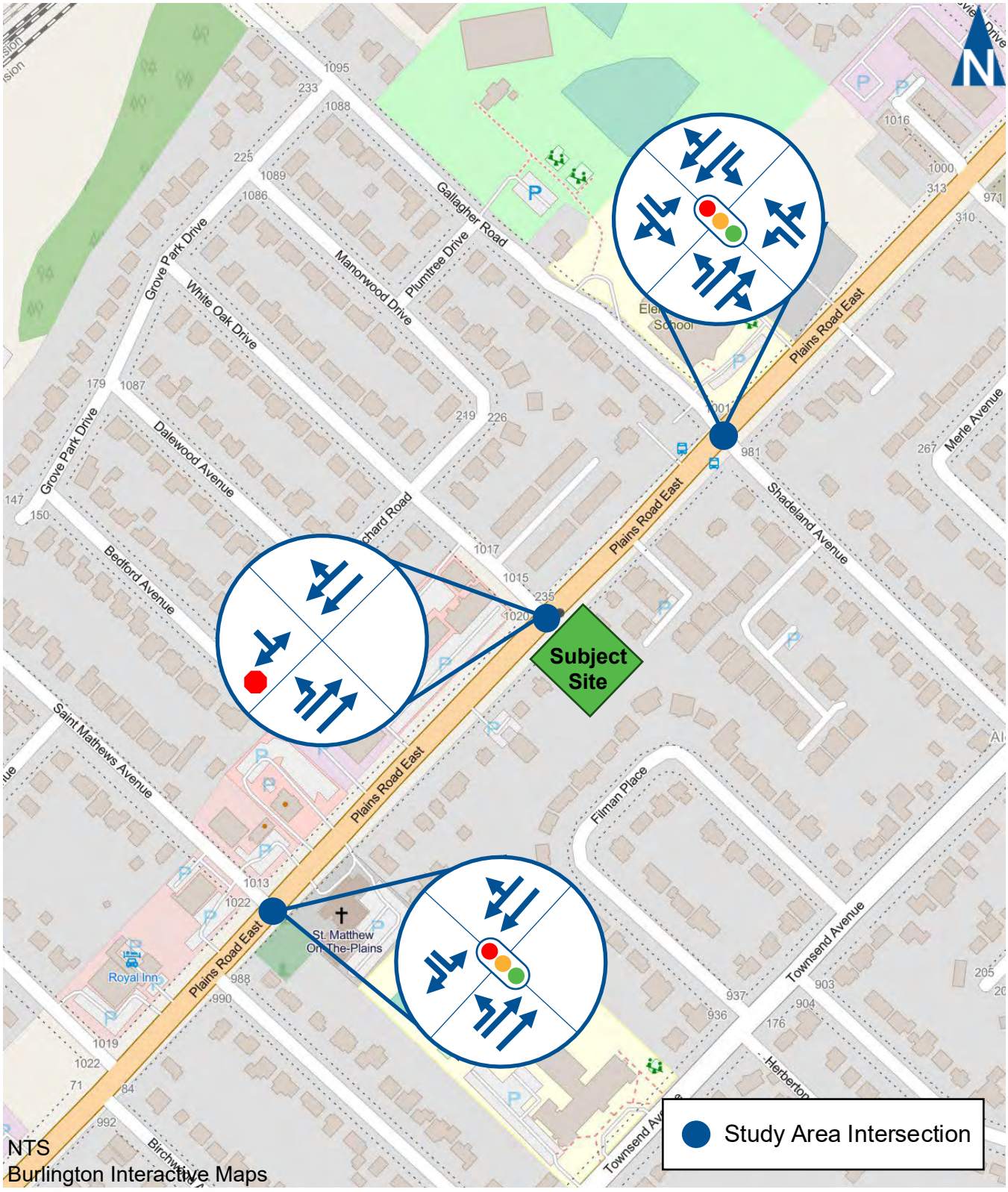
2.1 Road Network

The roadways of interest within the study area include:

- **Plains Road East**, an east-west five-lane multi-purpose arterial[1] roadway with a centre Two-Way Left-Turn Lane (TWLTL). This roadway has a posted speed limit of 60 km/h, which is reduced to 40 km/h east of White Oak Drive when flashing signage is used. Sidewalks are present on both sides of the roadway within the study area. On-street bicycle lanes are present on both side of the roadway, east of Shadeland Avenue.
- **Shadeland Avenue/ Gallagher Road**, a north-south two-lane neighbourhood connector with a posted speed limit of 40 km/h. The roadway is identified as Gallagher Road, north of Plains Road East, and Shadeland Avenue to the south. Sidewalks are present on the east side of the roadway. There are no dedicated cycling facilities along this roadway within the study area. The intersection with Plains Road East is signalized and operate with auxiliary turn lanes.
- **White Oak Drive**, a north-south two-lane local roadway with a posted speed limit of 40 km/h. There are no dedicated cycling or pedestrian facilities along this roadway within the study area.
- **St. Matthews Avenue,** an east-west two-lane local roadway with a posted speed limit of 40 km/h. There are no pedestrian facilities on either side of the roadway. The roadway is identified as a shared use lane through the use of sharrow pavement markings. The intersection with Plains Road East is signalized and operate with auxiliary turn lanes.

Figure 2.1 illustrates the existing lane configuration and traffic control at the study area intersections.

[1] The City of Burlington Official Plan, Schedule O-1: Classification of Transportation Facilities Urban Area, November 2020



Existing Lane Configuration and Traffic Control

198-200 and 206 Plains Road East, Burlington
240575

Figure 2.1

2.2 Cycling Network

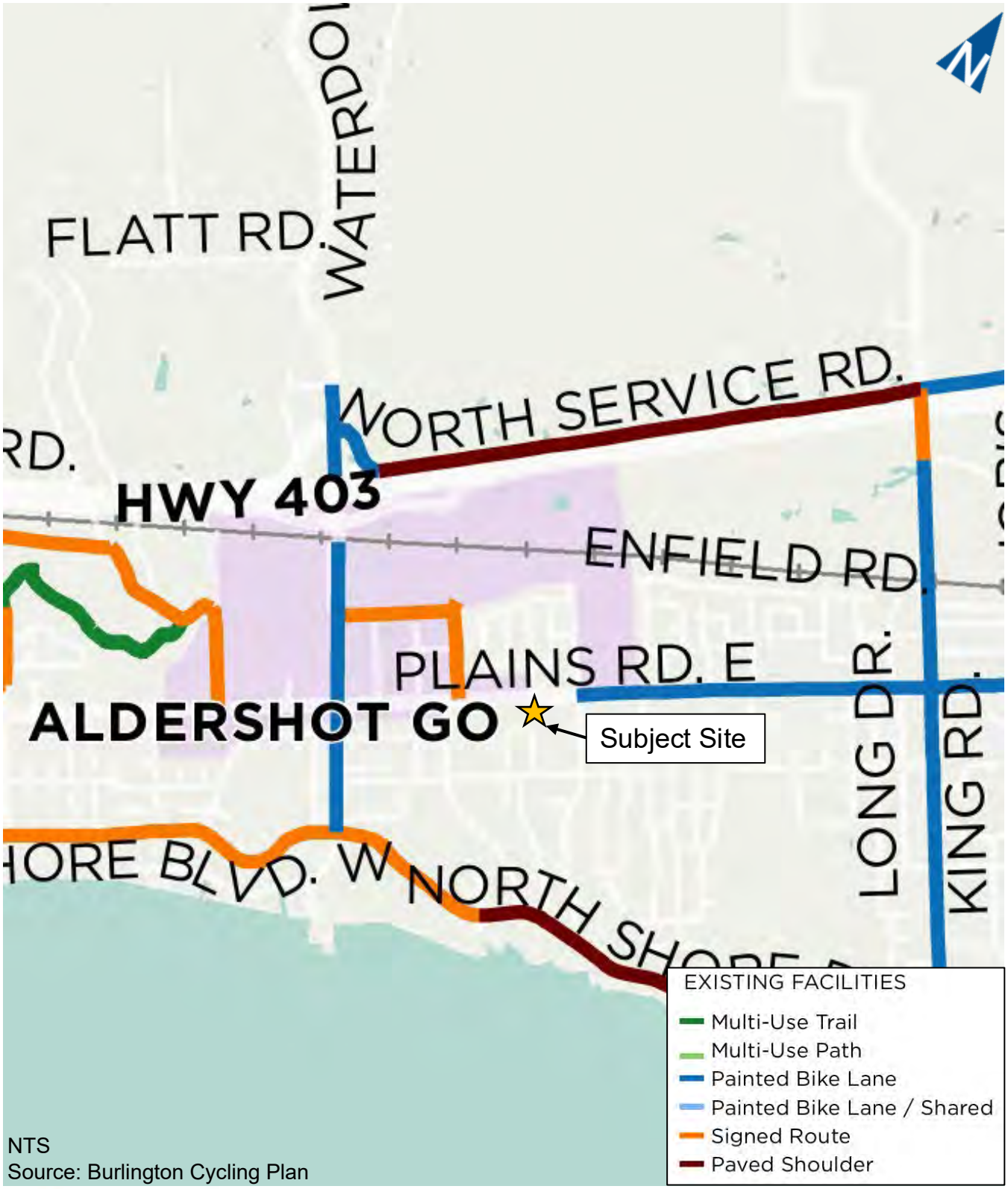
Cycling infrastructure typically consists of on-street and off-street facilities. On-street facilities comprise cycling lanes, signed cycling routes, and paved shoulders. Off-street facilities are in the form of multi-use or informal trails.

The City of Burlington's bicycle network provides a variety of cycling facilities within the study area. **Figure 2.2 - 2.3** illustrates the existing and future cycling network respectively.

Designated on-street bicycle lanes are provided along Plains Road East, east of Shadeland Avenue/Gallagher Road. St. Matthews Avenue is designated as a shared use environment through use of sharrow pavement markings.

The City of Burlington's draft Cycling Plan[2] identifies that additional protected bikeways are proposed along Plains Road East between Waterdown Road to the QEW interchange. Local street bikeways are also planned along St. Matthew's Avenue, Shadeland Avenue, and Gallagher Road. The protected bikeway along Plains Road is designated as a short-term priority, while local street bikeways on Shadeland Avenue and Gallagher Road are medium-term priorities.

[2] City of Burlington Cycling Plan – Draft 08/01/2019. Map 5 – Proposed Network. Map 7 – Proposed Project Priority



NTS
Source: Burlington Cycling Plan

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Existing Cycling Network

198-200 and 206 Plains Road East , Burlington
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Figure 2.2



NTS
Source: Burlington Cycling Plan

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Future Cycling Network

198-200 and 206 Plains Road East , Burlington
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Figure 2.3

2.3 Transit Service

2.3.1 Burlington Transit

Transit service in the area is provided by Burlington Transit, Hamilton Street Railway (HSR), GO Transit and Via Rail and is centralized around the Aldershot GO Station. The GO Station offers both GO Transit Bus and GO Transit Train service and functions as a turnaround point for several Burlington Transit and HSR transit routes.

Figure 2.4 illustrates the existing transit network relative to the subject site's location. The following route provides direct connections to the site:

- **Burlington Transit Route 1 (Plains-Fairview)** provides service between the Appleby GO station and the City of Hamilton (King & James). Weekday headways range from 15-30 minutes depending on time of day. Weekend headways are in the order of 30-minutes.
- **HSR Route 18 (Waterdown)** provides service between the Aldershot GO Station and the Waterdown Walmart Station. Weekday headways range from 25-30 minutes depending on the time of day. Weekend headways vary between 30-40 minutes.

The bus stops serving these routes are conveniently located near the site access intersections, making it easily accessible for development residents. Stops for route 1 can be found along Plains Road East, less than 90 m (1-minute walk) west of White Oak Drive, measured centreline to centreline. Stops serving this route as well as HSR route 18 are also provided at the intersection of Shadeland Avenue/Gallagher Road at Plains Road East.

The City of Burlington aims to provide Frequent Transit Corridors, which are defined as “a priority component of the city-wide public transit network. The long-term frequent transit corridors consist of the following two components”[3]:

- “Frequent Transit Corridors have existing and/or planned land uses, and street design conditions to enable a frequent service;” and
- “Candidate Frequent Transit Corridors have some of the existing and/or planned land uses and street design conditions which may enable a frequent service in the future.”

[3] City of Burlington, *Official Plan: Chapter 13 – Definitions,* (Burlington: City of Burlington, 2020).

Plains Road East is identified as a Frequent Transit Corridor[4] within the study area.

2.3.2 GO Transit

The Aldershot GO Station is located approximately 540 m north-west of the subject site. The walking distance to the Aldershot GO Station south parking lot is about 800 m (11-minute walk) with sidewalks provided along Plains Road East, St. Matthews Avenue, and Masonry Court. As this GO line provides bus and/or train service to major cities including Downtown Toronto, it is a significant transportation link for residents and commuters in the region.

2.4 Traffic Volumes

Paradigm collected Turning Movement Counts (TMC) data at the study area intersections in January 2025. **Appendix B** contains the existing count data.

Figure 2.5 illustrates the existing peak-hour traffic volumes.

[4] City of Burlington, *Official Plan: Schedule B-2 Growth Framework and Long Term Frequent Transit Corridors,* (Burlington: City of Burlington, 2020).

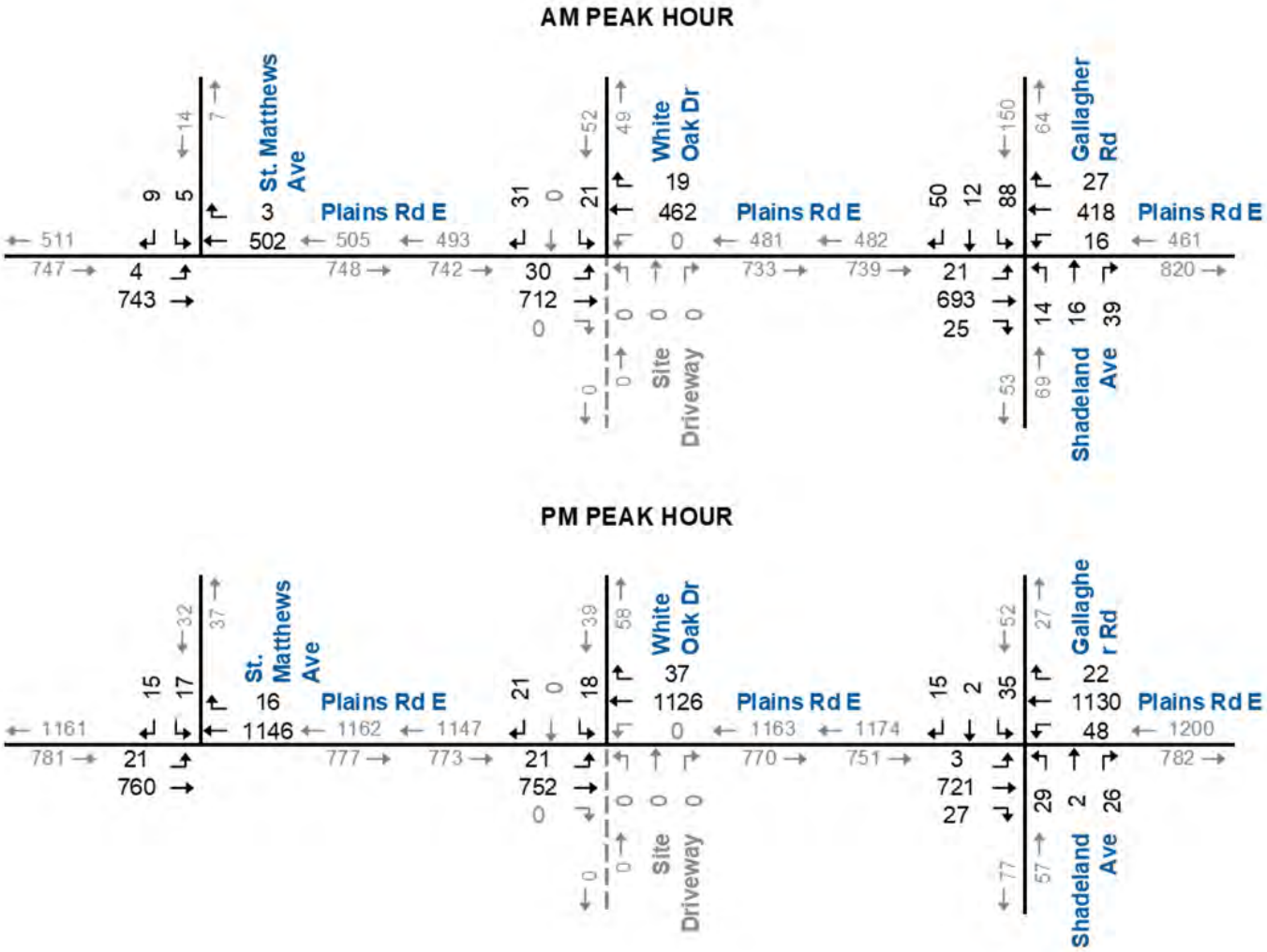


Source: Burlington Transit 2024 Route Map & HSR System Map

Existing Transit Network

198-200 and 206 Plains Road East , Burlington
240575

Figure 2.4



Existing Year Traffic Volumes

198-200 and 206 Plains Road East, Burlington
240575

Figure 2.5

2.5 Traffic Operations

Intersection level of service (LOS) is a recognized method of quantifying the efficiency of traffic flow at intersections. It is based on the delay experienced by individual vehicles executing the various movements. The delay is related to the number of vehicles desiring to make a movement, compared to the estimated capacity for that movement. The capacity is based on several criteria related to the opposing traffic flows. The highest possible rating is LOS A, under which the average total delay is equal or less than 10.0 seconds per vehicle. When the average delay exceeds 80 seconds at signalized intersections (50 seconds at unsignalized), the movement is considered to have a LOS F and remedial measures are usually implemented if they are feasible.

The operations of the study area intersections were evaluated under existing traffic volumes using Synchro 11 and HCM 2000 procedures. The intersection analysis considered the following measures of performance:

- The LOS for each turning movement. LOS is based on the average control delay per vehicle;
- The volume to capacity ratio (v/c) for each intersection; and
- 95th percentile queue length (m) using Synchro.

Under The Halton Region's TIS Guidelines[5], the following criteria indicate critical conditions and signify that mitigation measures may need to be considered:

- At signalized intersections,
  - Movements increased to v/c 0.85 or above; and
  - Movements increased to v/c 0.95 or above for exclusive turning movements.
- At unsignalized intersections,
  - LOS, based on average delay per vehicle, on individual movements is expected to operate at a LOS "D" or worse.
- At all intersections,
  - An exclusive turning movement in which the 95th percentile queue will exceed the available storage space.

[5] Halton Region, *Transportation Impact Study Guidelines,* January 2015

Table 2.1 summarizes the existing level of service conditions. The study area intersections are currently operating with acceptable levels of service, and all movements are within capacity during the weekday AM and PM peak hours. The signalized intersections operate at LOS D or better, with v/c ratios below 0.55, while the unsignalized intersection achieves LOS B or better, with v/c ratios below 0.50 during the weekday peak hours.

Appendix C contains the detailed Synchro reports.

TABLE 2.1: EXISTING INTERSECTION OPERATIONS

Analysis Period	Intersection	Control Type	MOE	Direction/Movement/Approach																Overall
				Eastbound				Westbound				Northbound				Southbound				
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
AM Peak Hour	Plains Road East & St. Matthew's Avenue	TCS	LOS	A	A		A		A	>	A					D		D	D	A
			Delay	1	1		1		1	>	1					53		52	52	2
			V/C	0.01	0.25				0.17	>						0.09		0.01		0.25
			Q	1	19				11	>						5		5		
			Stor.	15	-				-	>						-		-		
			Avail.	14	-				-	>						-		-		
	Plains Road East & White Oak Drive	TWSC	LOS	A	A		A		A	>	A					B		>	B	
			Delay	8	0		0		0	>	0					11		>	11	
			V/C	0.03	0.22				0.19	>						0.09		>		
			Q	1	0				0	>						2		>		
			Stor.	35	-				-	>						-		>		
			Avail.	34	-				-	>						-		>		
	Shadeland Avenue/Gallagher Road & Plains Road East	TCS	LOS	A	A	>	A	A	A	>	A	C	C	>	C	C	C	>	C	B
			Delay	6	9	>	9	8	9	>	9	31	31	>	31	35	31	>	33	13
			V/C	0.05	0.37	>		0.06	0.23	>		0.05	0.07	>		0.29	0.07	>		0.34
			Q	5	50	>		4	29	>		8	12	>		31	12	>		
			Stor.	45	-	>		30	-	>		15	-	>		35	-	>		
			Avail.	40	-	>		26	-	>		7	-	>		4	-	>		
PM Peak Hour	Plains Road East & St. Matthew's Avenue	TCS	LOS	A	A		A		A	>	A					D		D	D	A
			Delay	2	2		2		4	>	4					52		50	51	4
			V/C	0.06	0.25				0.39	>						0.22		0.01		0.38
			Q	2	19				100	>						10		6		
			Stor.	15	-				-	>						-		-		
			Avail.	13	-				-	>						-		-		
	Plains Road East & White Oak Drive	TWSC	LOS	B	A		A		A	>	A					B		>	B	
			Delay	10	0		0		0	>	0					14		>	14	
			V/C	0.03	0.23				0.46	>						0.09		>		
			Q	1	0				0	>						2		>		
			Stor.	35	-				-	>						-		>		
			Avail.	34	-				-	>						-		>		
	Shadeland Avenue/Gallagher Road & Plains Road East	TCS	LOS	B	B	>	B	A	B	>	B	C	C	>	C	C	C	>	C	B
			Delay	11	12	>	12	9	12	>	12	31	30	>	31	32	30	>	31	13
			V/C	0.02	0.34	>		0.13	0.52	>		0.08	0.02	>		0.10	0.01	>		0.40
			Q	1	60	>		9	82	>		12	7	>		14	6	>		
			Stor.	45	-	>		30	-	>		15	-	>		35	-	>		
			Avail.	44	-	>		21	-	>		3	-	>		21	-	>		

MOE - Measure of Effectiveness
LOS - Level of Service
Delay - Average Delay per Vehicle in Seconds
V/C - Volume to Capacity Ratio
Q - 95th Percentile Queue Length (m)
Stor. - Existing Storage (m)
Avail. - Available Storage (m)
TCS - Traffic Control Signal
TWSC - Two-Way Stop Control
< / > - Shared with through movement

3 Development Concept

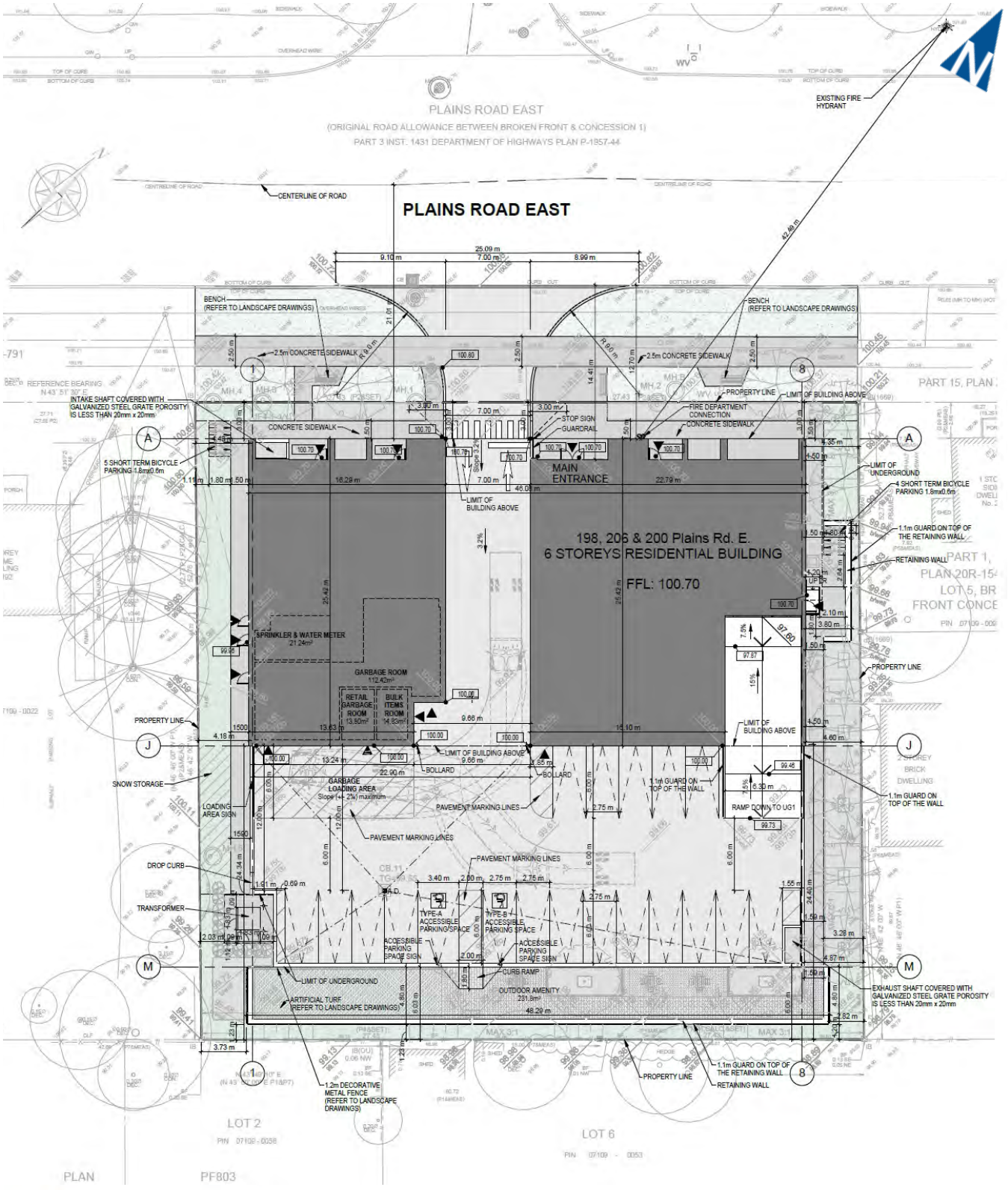
3.1 Development Description

The subject property, located at 198-200 and 206 Plains Road East in the City of Burlington, sits on the south side of Plains Road East and opposite to White Oaks Drive. The owner plans to develop the site with a 6-storey mixed-use building, consisting of 66 residential units and approximately 183 m² (1,969.80 sq. ft.) of ground floor commercial space. There are 94 parking spaces to accommodate for residential and commercial visitors.

Build-out is anticipated to occur by Year 2030, with timing subject to change and market conditions.

The proposed site driveway connection is proposed as a full-move driveway to Plains Road East, situated directly opposite to White Oak Drive. The site driveway will provide a garbage loading area, grade-level parking area, as well as access to the parking garage.

Figure 3.1 illustrates the site concept plan.



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Site Concept Plan

198-200 and 206 Plains Road East, Burlington
240575

Figure 3.1

3.2 Trip Generation

The Institute of Transportation Engineers (ITE) Trip Generation manual[6] provides rates and equations to estimate the peak-hour traffic volumes generated by the proposed development. The following land-use codes were used to estimate the weekday AM and PM peak-hour traffic volumes that the development will generate:

- Multifamily Housing (Mid-Rise) (LUC 221); and
- Strip Retail Plaza (<40k) (LUC 822).

3.2.1 Internal Capture

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

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

The ITE Trip Generation Handbook has been utilized to account for internal trips within the development. By way of example, some portion of the traffic destined to and from the retail uses located within the Site will likely originate from the on-site residential units, requiring only a walking trip. The detailed calculations are provided in **Appendix D**.

ITE data suggests an internal capture rate of 0-16% for the peak hours.

3.2.2 Net Trip Generation Estimates

Table 3.1 summarizes the projected trip generation associated with the build-out of the development. As noted earlier, these estimates were based on the standardized ITE rates with internal credits.

The site's trip generation is estimated to be approximately 27 weekday AM and 51 weekday PM peak-hour trips. With the consideration of internal trips, the site is forecast to generate 27 weekday AM and 43 weekday PM peak-hour trips.

[6] Institute of Transportation Engineers, *Trip Generation Manual,* 11th ed., (Washington DC: ITE, 2021).

TABLE 3.1: TRIP GENERATION

ITE Land Use Code / Number of Units	Trips	AM Peak Hour				PM Peak Hour			
		Rate	In	Out	Sum	Rate	In	Out	Sum
221 - Multifamily Housing (Mid-Rise) - 66 Units	Total	--	4	13	17	--	16	10	26
	Internal	0%	0	0	**0**	15%	3	1	**4**
	New	**100%**	**4**	**13**	**17**	**85%**	**13**	**9**	**22**
822 - Strip Retail Plaza (<40k) - 1,970 sq.ft	Total	--	6	4	10	--	12	13	25
	Internal	0%	0	0	**0**	16%	1	3	**4**
	New	**100%**	**6**	**4**	**10**	**84%**	**11**	**10**	**21**
Total	**Total**	--	**10**	**17**	**27**	--	**28**	**23**	**51**
	Internal	0%	**0**	**0**	**0**	16%	**4**	**4**	**8**
	New	**100%**	**10**	**17**	**27**	**84%**	**24**	**19**	**43**

Equations
LUC 221 Eqn Per Unit AM T = 0.44(X) – 11.61 | PM T = 0.39(X) + 0.34
LUC 822 Eqn Per Unit AM Ln(T) = 0.66 Ln(X) + 1.84 | PM Ln(T) = 0.71 Ln(X) + 2.72

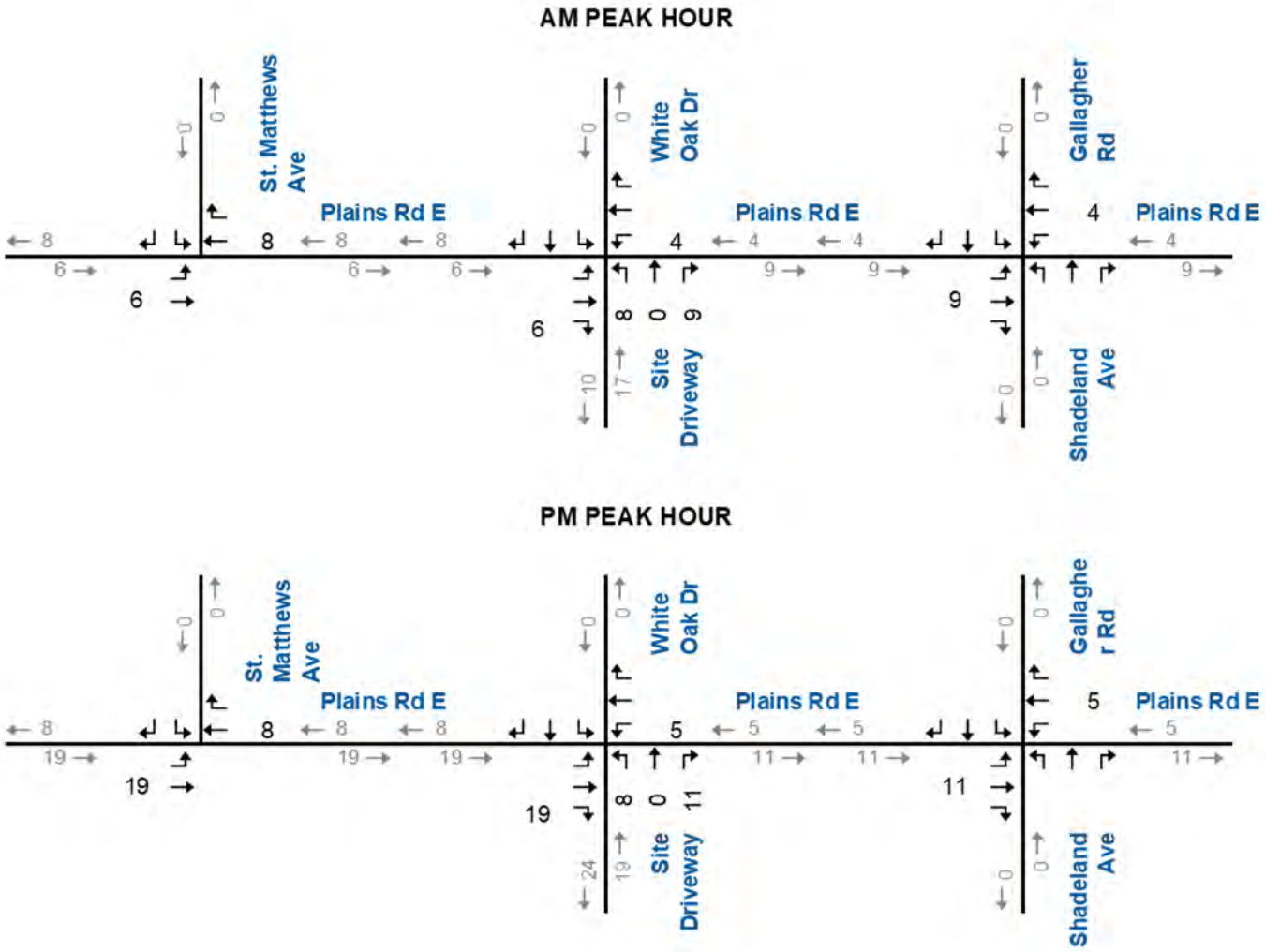
3.2.3 Trip Distribution and Assignment

The directional distribution of traffic approaching and departing the development is a function of several variables: population densities, existing travel patterns, and the efficiency of the roadways leading to the Site. The estimated distribution is based on the Transportation Tomorrow Survey[7] (TTS) review with the zone containing the subject site (5008). The TTS data can be found in **Appendix E**. **Table 3.2** summarizes the estimated trip distribution.
Figure 3.2 illustrates the net site-generated traffic estimates

TABLE 3.2: TRIP DISTRIBUTION

Origin/Destination	AM		PM	
	In	Out	In	Out
East via Plains Road East	40%	50%	20%	60%
West via Plains Road East	60%	50%	80%	40%
Total	**100%**	**100%**	**100%**	**100%**

[7] Transportation Tomorrow Survey, Data Management Group, 2022



Forecast Site Generated Traffic

198-200 and 206 Plains Road East, Burlington
240575

Figure 3.2

3.3 Driveway Review

The proposed driveway connection to Plains Road East has been assessed to determine whether the location may affect design issues and/or safety-related concerns and whether an alternative location should be considered from a design perspective. The critical design issues concerning the driveway location are discussed in the sections below.

3.3.1 Driveway Design Review

Driveways play a crucial role in ensuring the efficient operation of the road network and providing safe, orderly access to development. Driveway designs vary depending on the land use to accommodate the primary vehicles it serves. According to the Transportation Association of Canada (TAC) Geometric Design Guide[8], a two-way driveway for residential land uses requires a width between 2.0 and 7.3 m. As the driveway has a proposed width of approximately 7.0 m, it satisfies the required standards to accommodate vehicle access to the site.

The TAC design guide specifies a minimum driveway curb radius of 3.0 m for residential land uses. The site concept plan indicates an approximate curb radius of 9.0 m for the driveway, supporting efficient vehicle entry and exit without obstructions.

3.3.2 Sight Distance

The proposed driveway connection to Plains Road East were assessed to ensure they provide sufficient sightlines, ensuring safe and efficient traffic flow. A design speed of 10 km/h over the posted and/or assumed speed is typically utilized for two-lane roadways to calculate the required stopping sight distance (SSD) for traffic approaching the proposed driveways and intersection sight distance (ISD) for traffic exiting the proposed driveway. As such, a design speed of 70 km/h was utilized for this study.

SSD is the distance required for a vehicle approaching an intersection from either direction to perceive, react and come to a complete stop to avoid colliding with an object on the road; in this respect, SSD can be considered the minimum visibility criterion for the safe operation of an unsignalized intersection.

ISD is based on the time required for perception, reaction, and completion of the desired turning maneuver (typically, a left-turn) once the driver on a minor street approach (or driveway) decides to execute

[8] Geometric Design Guide for Canadian Roads, Transportation Association of Canada, 2017

the maneuver. The calculation for the critical ISD includes the time to (1) turn left and clear the near half of the intersection without conflicting with the vehicles approaching from the left; and (2) upon turning left, accelerate to the operating speed on the roadway without causing approaching vehicles on the main road to unduly reduce their speed. In this context, ISD can be considered the desirable visibility criterion for the operation of an unsignalized intersection.

Based on the guidelines, for a design speed of 70 km/h, a SSD of 105 m and a ISD of 150 m is required.

The section of Plains Road East is relatively straight and flat, resulting in no sight distance issues related to road geometry. The sight distance in both directions exceeds 150 meters, satisfying the requirements outlined in the TAC design guide. As a result, the available sightlines should be sufficient to support safe operations.

4 Future Conditions

The assessment of future conditions in this section includes the following components:

- Background traffic forecast;
- Total traffic forecast;
- Level of service analysis for background traffic (pre-development); and
- Level of service analysis for total traffic (post-development).

One horizon year has been assessed in this study; five-years from the date of the study (Year 2030).

4.1 Forecast Traffic Volumes

Future traffic volumes near the subject site are estimated to consist of:

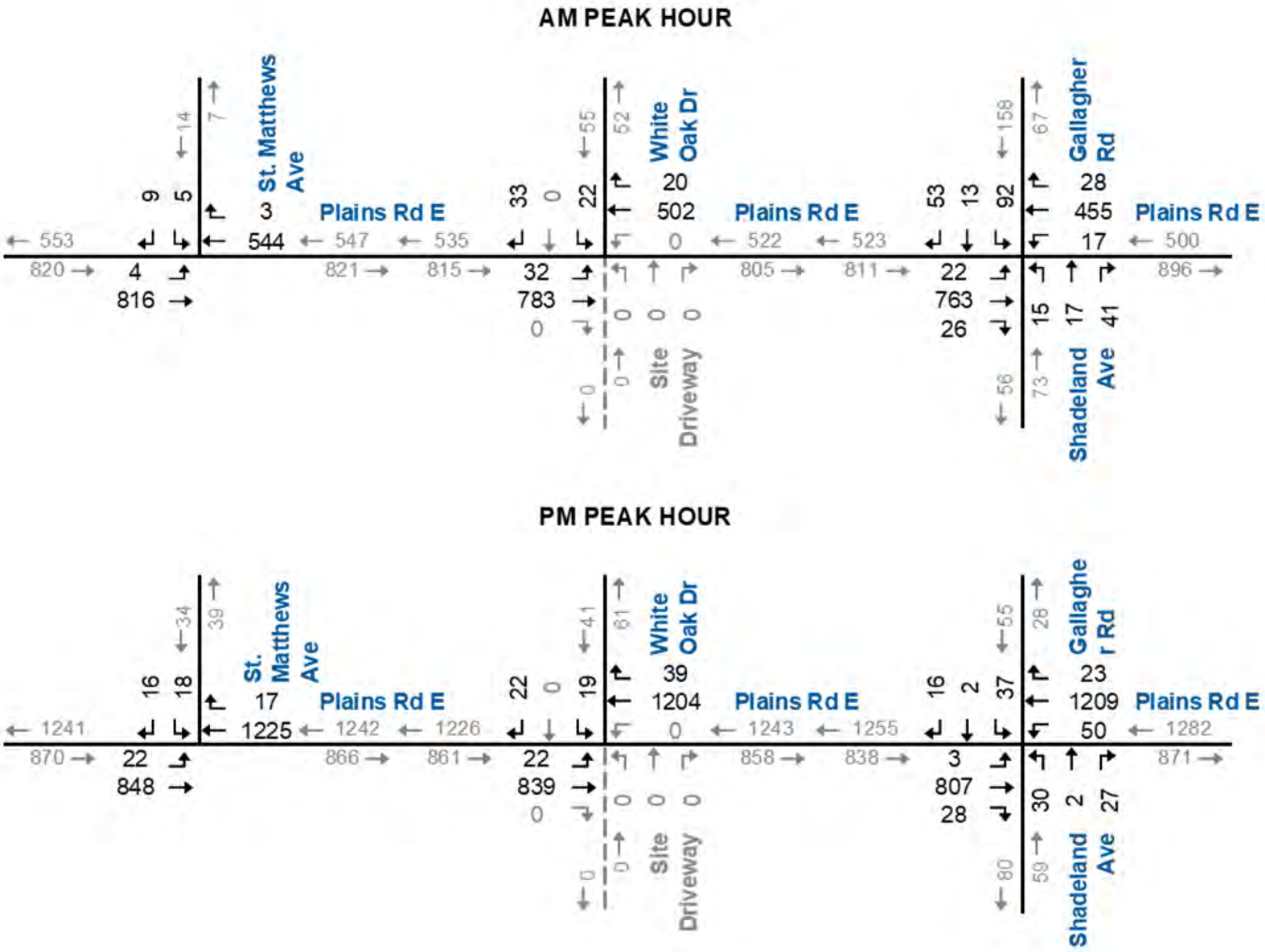
- Generalized background traffic growth of 1% per annum, as identified during pre-study consultation;
- Traffic generated by the following background development:
  - **92 Plains Road East**[9] - 11-storey mixed-use building with 255 residential units and 1,273 m^2 (13,702 sq. ft.) of ground floor commercial space.
- The projected background development traffic volumes have been incorporated into the 2030 future horizon analysis.
- Traffic generated by the subject site.

Appendix F contains the individual trip assignments for the background development included in this study.

The future traffic volumes are illustrated in the following figures:

- **Figure 4.1** illustrates the 2030 horizon background traffic volumes.
- **Figure 4.2** illustrates the 2030 horizon total traffic volumes.

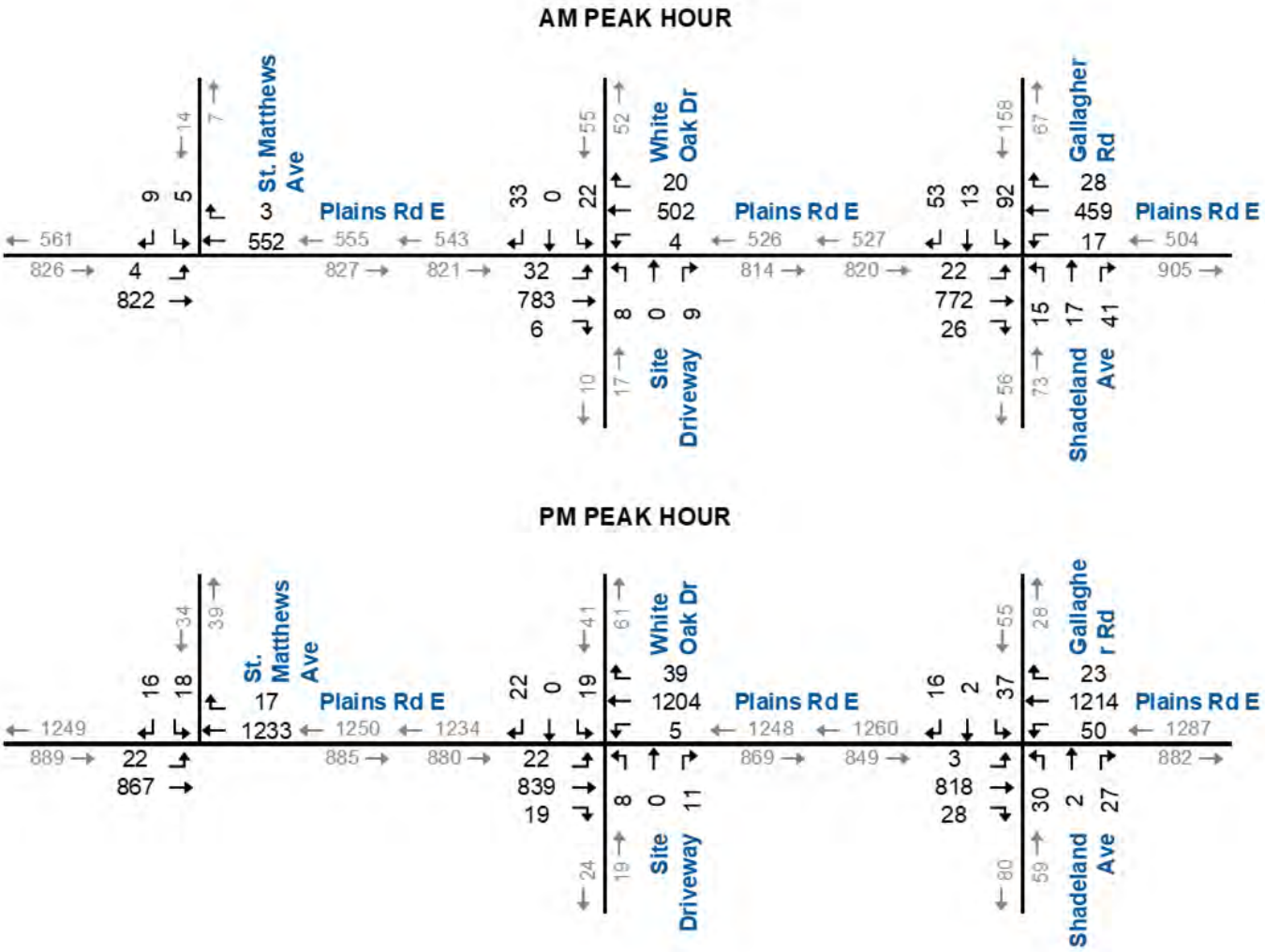
[9] WSP. *92 Plains Road East Traffic Impact Statement and Parking Assessment,* October 2017



Background Traffic 2030 Horizon

198-200 and 206 Plains Road East, Burlington
240575

Figure 4.1



Total Traffic 2030 Horizon

198-200 and 206 Plains Road East, Burlington
240575

Figure 4.2

4.2 Five-Year Horizon

The study area intersection operational analysis follows the same methodology used for existing conditions. No changes to the existing lane configurations or traffic control are assumed.

4.2.1 Background Traffic Operations

Table 4.1 summarizes the Five-Year horizon background traffic level of service conditions.

The study area intersections are forecast to continue to operate with acceptable levels of service and all movements to be within capacity during the AM and PM peak hours. All projected vehicular queues would be contained within their available storage provisions and would not block or impede adjacent travel lanes. No critical movements are identified.

Appendix G contains the detailed Synchro 12 reports.

TABLE 4.1: FIVE YEAR HORIZON – BACKGROUND TRAFFIC OPERATIONS

Analysis Period	Intersection	Control Type	MOE	Direction/Movement/Approach																
				Eastbound				Westbound				Northbound				Southbound				Overall
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
AM Peak Hour	Plains Road East & St. Matthew's Avenue	TCS	LOS	A	A		A		A	>	A					D		D	D	A
			Delay	1	2		2		1	>	1					53		52	52	2
			V/C	0.01	0.28				0.18	>						0.09		0.01		0.27
			Q	1	21				12	>						5		5		
			Stor.	15	-				-	>						-		-		
			Avail.	14	-				-	>						-		-		
	Plains Road East & White Oak Drive	TWSC	LOS	A	A		A		A	>	A					B		>	B	
			Delay	8	0		0		0	>	0					11		>	11	
			V/C	0.03	0.24				0.21	>						0.09		>		
			Q	1	0				0	>						2		>		
			Stor.	35	-				-	>						-		>		
			Avail.	34	-				-	>						-		>		
	Shadeland Avenue/Gallagher Road & Plains Road East	TCS	LOS	A	A	>	A	A	A	>	A	C	C	>	C	D	C	>	C	B
			Delay	6	10	>	10	8	9	>	9	31	31	>	31	35	31	>	34	13
			V/C	0.06	0.40	>		0.07	0.25	>		0.05	0.07	>		0.31	0.07	>		0.37
			Q	5	56	>		4	32	>		8	13	>		33	13	>		
			Stor.	45	-	>		30	-	>		15	-	>		35	-	>		
			Avail.	40	-	>		26	-	>		7	-	>		2	-	>		
PM Peak Hour	Plains Road East & St. Matthew's Avenue	TCS	LOS	A	A		A		A	>	A					D		D	D	A
			Delay	2	2		2		4	>	4					52		50	51	4
			V/C	0.06	0.28				0.41	>						0.22		0.01		0.40
			Q	2	22				111	>						11		7		
			Stor.	15	-				-	>						-		-		
			Avail.	13	-				-	>						-		-		
	Plains Road East & White Oak Drive	TWSC	LOS	B	A		A		A	>	A					B		>	B	
			Delay	11	0		0		0	>	0					14		>	14	
			V/C	0.04	0.25				0.49	>						0.10		>		
			Q	1	0				0	>						2		>		
			Stor.	35	-				-	>						-		>		
			Avail.	34	-				-	>						-		>		
	Shadeland Avenue/Gallagher Road & Plains Road East	TCS	LOS	B	B	>	B	A	B	>	B	C	C	>	C	C	C	>	C	B
			Delay	12	13	>	13	9	12	>	12	31	30	>	31	32	30	>	31	14
			V/C	0.02	0.37	>		0.15	0.55	>		0.08	0.02	>		0.11	0.01	>		0.42
			Q	1	71	>		10	91	>		13	8	>		15	6	>		
			Stor.	45	-	>		30	-	>		15	-	>		35	-	>		
			Avail.	44	-	>		20	-	>		2	-	>		20	-	>		

MOE - Measure of Effectiveness
LOS - Level of Service
Delay - Average Delay per Vehicle in Seconds
V/C - Volume to Capacity Ratio
Q - 95th Percentile Queue Length (m)
Stor. - Existing Storage (m)
Avail. - Available Storage (m)
TCS - Traffic Control Signal
TWSC - Two-Way Stop Control
< / > - Shared with through movement

4.2.2 Total Traffic Operations

Table 4.2 summarizes the 5-year horizon total traffic level of service conditions.

With the addition of site-generated vehicular traffic, the study area intersections are forecast to continue operating at acceptable levels of service and with movements within capacity. All projected vehicular queues would be contained within their available storage provisions and would not block or impede adjacent travel lanes. No critical movements are identified.

The site connection approach to Plains Road East is forecast to operate with acceptable levels of service. Delays on the approach is forecast to be LOS B with v/c ratio of 0.05 during the weekday peak hours. The 95th percentile queue length is expected to be less than one vehicle.

Appendix H contains the detailed Synchro 12 reports.

TABLE 4.2: FIVE YEAR HORIZON – TOTAL TRAFFIC OPERATIONS

Analysis Period	Intersection	Control Type	MOE	Direction/Movement/Approach																
				Eastbound				Westbound				Northbound				Southbound				Overall
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
AM Peak Hour	Plains Road East & St. Matthew's Avenue	TCS	LOS	A	A		A		A	>	A					D		D	D	A
			Delay	1	2		2		1	>	1					53		52	52	2
			V/C	0.01	0.28				0.19	>						0.09		0.01		0.27
			Q	1	21				12	>						5		5		
			Stor.	15	-				-	>						-		-		
			Avail.	14	-				-	>						-		-		
	Site Driveway/White Oak Drive & Plains Road East	TWSC	LOS	A	A	>	A	A	A	>	A	<	B	>	B	<	B	>	B	
			Delay	8	0	>	0	10	0	>	0	<	15	>	15	<	12	>	12	
			V/C	0.03	0.32	>		0.00	0.21	>		<	0.05	>		<	0.10	>		
			Q	1	0	>		0	0	>		<	1	>		<	2	>		
			Stor.	35	-	>		15	-	>		<	-	>		<	-	>		
			Avail.	34	-	>		15	-	>		<	-	>		<	-	>		
	Shadeland Avenue/Gallagher Road & Plains Road East	TCS	LOS	A	A	>	A	A	A	>	A	C	C	>	C	D	C	>	C	B
			Delay	6	10	>	10	8	9	>	9	31	31	>	31	35	31	>	34	13
			V/C	0.06	0.41	>		0.07	0.25	>		0.05	0.07	>		0.31	0.07	>		0.38
			Q	5	56	>		4	32	>		8	13	>		33	13	>		
			Stor.	45	-	>		30	-	>		15	-	>		35	-	>		
			Avail.	40	-	>		26	-	>		7	-	>		2	-	>		
PM Peak Hour	Plains Road East & St. Matthew's Avenue	TCS	LOS	A	A		A		A	>	A					D		D	D	A
			Delay	2	2		2		4	>	4					52		50	51	4
			V/C	0.06	0.29				0.42	>						0.22		0.01		0.41
			Q	2	22				112	>						11		7		
			Stor.	15	-				-	>						-		-		
			Avail.	13	-				-	>						-		-		
	Site Driveway/White Oak Drive & Plains Road East	TWSC	LOS	B	A	>	A	A	A	>	A	<	B	>	B	<	C	>	C	
			Delay	11	0	>	0	10	0	>	0	<	14	>	14	<	16	>	16	
			V/C	0.04	0.34	>		0.01	0.49	>		<	0.05	>		<	0.11	>		
			Q	1	0	>		0	0	>		<	1	>		<	3	>		
			Stor.	35	-	>		15	-	>		<	-	>		<	-	>		
			Avail.	34	-	>		15	-	>		<	-	>		<	-	>		
	Shadeland Avenue/Gallagher Road & Plains Road East	TCS	LOS	B	B	>	B	A	B	>	B	C	C	>	C	C	C	>	C	B
			Delay	12	13	>	13	9	12	>	12	31	30	>	31	32	30	>	31	14
			V/C	0.02	0.38	>		0.16	0.55	>		0.08	0.02	>		0.11	0.01	>		0.42
			Q	1	72	>		10	92	>		13	8	>		15	6	>		
			Stor.	45	-	>		30	-	>		15	-	>		35	-	>		
			Avail.	44	-	>		20	-	>		2	-	>		20	-	>		

MOE - Measure of Effectiveness
LOS - Level of Service
Delay - Average Delay per Vehicle in Seconds
V/C - Volume to Capacity Ratio
Q - 95th Percentile Queue Length (m)
Stor. - Existing Storage (m)
Avail. - Available Storage (m)
TCS - Traffic Control Signal
TWSC - Two-Way Stop Control
< / > - Shared with through movement

5 Remedial Measures

The following section discusses the potential remedial measures that could be considered better to accommodate the forecast traffic volumes in the study area.

5.1 Assessment of Impacts

The operational analysis contained in **Section 4** (existing, background traffic and total traffic conditions) suggests that the study area intersections will operate with acceptable delays, even with the background growth, background development traffic, and traffic generated from full-build out of the development.

5.2 Traffic Control Signal

The White Oak Drive at Plains Road East and the proposed site driveway intersection were assessed using the Ontario Traffic Manual[10] signal warrant procedures. To warrant the consideration for the installation of traffic signal control with forecast traffic volumes (average hourly volumes), at least one warrant must be fulfilled by 120% for an existing intersection or 150% for a proposed new intersection. **Appendix I** contains the warrant analysis.

Based on the warrant analysis, traffic signals are not warranted. The existing form of stop control continues to be appropriate.

5.3 Multi-Modal Level of Service

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

Multi-modal Level of Service (MMLOS) extends this concept to incorporate the experience of modes beyond car drivers. It converts a variety of factors into a scale from A to F for each mode; A indicates the best experience for users of that mode, and F denotes the worst

[10] Ministry of Transportation Ontario, *Ontario Traffic Manual Book 12 Traffic Signals, Justification 7*. Ontario, March 2012.

experience. As the output is a *set* of indicators, it reveals where changes have different (or opposite) effects on each mode.

This study has used the MMLOS guidelines created by the Ontario Traffic Council (OTC).[11] These were developed after reviewing national and international best practices in MMLOS analysis. **Table 5.1** outlines the street type classification assumed for the study area roadways.

TABLE 5.1: MMLOS STREET TYPE CLASSIFICATION

Roadway	Classification	MMLOS Applicable Classification
Plains Road East	Urban Main Street	Urban Main Street
Shadeland Avenue/ Gallagher Road	Neighbourhood Main Street	Neighbourhood Main Street

5.4 Level of Service Targets

Based on the street type, the MMLOS guidelines provide base LOS targets, ultimately identifying which modes should be prioritized. **Table 5.2** summarizes the base and adjusted LOS target (used in the analysis), as directed by the City of Burlington. The LOS for each user is based on the following criteria:

- Pedestrian LOS criteria include facility width, buffer width and maximum distance between controlled crossings.
- Cycling LOS criteria include facility width, buffer width and conflicts with other modes (in-lane conflicts and crossing point conflicts).
- Transit LOS criteria include the facility type, passenger amenities, and pedestrian level of service. The level of service for trucks is based on the width of the curb lane and the level of service for the car.
- Car LOS criteria relate to the mid-block v/c ratio and curb lane conflicts.

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

TABLE 5.2: MMLOS TARGETS

Street Classification	Pedestrian	Bikes	Transit	Trucks	Cars
Urban Main Street	C	C	D	D	D
Adjusted Urban Main Street	B	B	C	D	E
Neighbourhood Main Street	C	C	D	D	D
Adjusted Neighbourhood Main Street	B	B	D	D	D

5.5 MMLOS Segment Analysis

Table 5.3 summarizes the MMLOS analysis for the roadways. The existing and future conditions for the segment's lengths are assumed to be the same.

Pedestrian MMLOS along Plains Road East, Shadeland Avenue, and Gallagher Road is assessed to be in the D and E range, below the target of LOS B. Pedestrian MMLOS can be improved by widening the pedestrian facility width, increasing pedestrian buffer width, or by adding additional controlled crossings to reduce the maximum distance between crossings.

Cycling MMLOS along Plains Road East, Shadeland Avenue, and Gallagher Road is not applicable as no dedicated cycling facilities are present along the assessed roadway segments. The City of Burlington Cycling Master Plan proposes a protected bikeway along Plains Road East and local street bikeways along Shadeland Avenue and Gallagher Road, which can be expected to improve the cycling MMLOS in the future. Once these facilities are implemented, the cycling MMLOS can be further improved by increasing the bicycle facility and buffer widths.

Transit MMLOS along Plains Road East is assessed to be in the C range, satisfying the target grade of LOS D. Along Shadeland Avenue and Gallagher Road, it was assessed to be in the F range, missing the target grade of D. As transit service is not provided along Shadeland Avenue and Gallagher Road, a low MMLOS grade along these roadways are expected.

Truck MMLOS along Plains Road East and Gallagher Road is in the D range, meeting the target grade. Shadeland Avenue is assessed to be in the C range, exceeding the target grade.

Car MMLOS along Plains Road East, Shadeland Avenue, and Gallagher Road is in the C range, meeting and exceeding the target grade.

Appendix J contains the detailed MMLOS assessment.

TABLE 5.3: MMLOS SEGMENT ANALYSIS

Segment	Pedestrian	Bikes	Transit	Trucks	Cars
Plains Road East	D	N/A	C	D	C
Shadeland Avenue	E	N/A	F	C	C
Gallagher Road	E	N/A	F	D	C

6 Transportation Demand Management

Based on best practices and policy objectives, there is merit for a further reduction through a Transportation Demand Management (TDM) program.

A TDM plan aims to reduce the development's overall traffic and parking impacts by implementing strategies to affect the demand side of the transportation equation. TDM strategies include incentives and disincentives that increase people's likelihood of changing travel behaviour. Strategies include financial incentives, time incentives, new or enhanced commuter services, information dissemination, and alternative marketing services. Such methods include providing information on modes accessible to the site, bike parking, and the proper amount of parking.

The TDM plan has been formulated to extend reasonable and practical strategies that encourage residents and visitors to take alternative modes of transportation. The strategies identified are expected to improve transportation access and connectivity for the proposed development.

6.1 Potential TDM Measures

The development will implement the proposed strategies identified herein to reduce the number of auto-trips made to/from the Development:

6.1.1 Transportation Information

Knowing which modes are available and accessible is a significant part of mode choice. As a resident welcome packet component, information on transportation options and links to the appropriate website should be conveyed to all prospective residents.

Available information should include schedules for local and regional transit services, bicycle and trail networks and the location of retail and recreational establishments.

6.1.2 Cycling

By providing additional opportunities and safeguards for residents that choose to travel to/from the development through cycling, sustainable transportation and a reduction in automobile trips and parking requirements are expected to occur.

the City of Burlington City-Wide Parking Standards Review [12] provides guidelines regarding the amount of bicycle parking that should be provided. Based on the Parking Standard Review requirements:

- Residential:
  - Bicycle parking shall be provided at a rate of 0.5 long-term spaces per unit; and
  - 0.05 short-term bicycle parking spaces per unit.
- Retail:
  - 2 long term spaces + 1 space per 1,000 m^2 GFA.
  - 3 short term spaces + 1 space per 1,000 m2 GFA.

Table 6.1 summarizes the required bicycle parking supply outlined by the Parking Standards Review. Based on the rates, the site should provide at least 35 long-term bicycle parking spaces and 6 short-term bicycle parking spaces to support a reduced parking supply. The site statistics indicate a provision of 36 long-term and 9 short-term bicycle parking spaces, exceeding the requirements set by the Parking Standards Review.

[12] IBI Group, *Burlington City-Wide Parking Standards Review*, (Burlington: IBI Group, 2017), 116.

TABLE 6.1: REQUIRED BICYCLE PARKING SUPPLY

Land Use	Parking Type	Minimum Parking Rate	Parking Spaces Required	Parking Spaces Provided
Residential mixed-use building (66 units)	Short Term	0.05 spaces per dwelling unit	3	4
	Long Term	0.5 spaces per dwelling unit	33	34
Retail (183 m^2)	Short Term	3 spaces + 1 space / 1,000 m^2 GFA	3	5
	Long Term	2 spaces + 1 space / 1,000 m^2 GFA	2	2
Total	**Short Term**		**6**	**9**
	Long Term		**35**	**36**

6.1.3 Walking

Similar to cycling, providing a safe and attractive environment for residents walking to/from the development will contribute to sustainable transportation.

The site plan indicates that a concrete walkway at least 1.50 m in width will be provided adjacent to the building's frontage, connecting to the site's outdoor amenities and the existing sidewalk along Plains Road East, offering access to nearby roads.

The proposed development generally satisfies the City's TDM policy for walking.

6.1.4 Parking

A parking management plan recognizes the need to provide adequate parking but values strategies that result in more efficient use of parking resources and reduce the amount of parking needed at a particular location.

Rather than establish generous parking requirements to satisfy the maximum potential demand that may occur, parking management allows contingency-based planning, which means that various solutions are identified which can be deployed if needed.

The single most significant contributor to the ubiquitous use of the SOV is the oversupply of inexpensive parking. By limiting parking supply, the developer provides a key ingredient in managing parking demand at the site. Reducing parking supply to match but not exceed the expected demand can positively influence the selection of alternative travel modes.

As the development promotes using other modes of transportation through limited on-site parking to meet the projected demand, the development plays a significant role in setting an example for residents and visitors to consider non-automotive travel.

6.1.5 Unbundled Parking

Implementing a paid parking operation is one of the most effective TDM strategies for encouraging alternative travel habits. Occupants are not forced to pay for parking they do not need; consumers can adjust their parking supply to reflect their needs. To further encourage apartment building residents to utilize sustainable travel modes, parking is recommended to be unbundled from the cost of the units.

This is an essential factor as residents are notified at the project's onset that parking is proposed to be provided as an additional cost instead of the price to rent a unit. If residents are significantly considering changing their travel behaviour, the cost of renting a parking space could contribute to this change.

7 Conclusions and Recommendations

7.1 Conclusions

The main findings and conclusions of this study are as follows:

- **Study Area**: The intersections assessed in this study include:
  - Plains Road East and Shadeland Avenue/ Gallagher Road (signalized);
  - Plains Road East and White Oak Drive (unsignalized);
  - Plains Road East and St. Matthews Avenue (signalized);
  - One proposed driveway connection to Plains Road East.
- **Existing Traffic Conditions:** The study area intersections operate at acceptable service levels and within capacity during the weekday AM and PM peak hours.
- **Trip Generation:** The site's vehicular trip is estimated to be approximately 27 - 51 weekday AM/PM peak-hour trips. Considering internal trips, the site is forecast to generate 27 weekday AM and 43 weekday PM peak-hour trips.
- **Background Traffic Conditions:** The study area intersections are forecast to continue operating at acceptable service levels and within capacity during the AM and PM peak hours.
- **Total Traffic Conditions:** With the addition of site-generated traffic, the study area intersections are forecast to operate similarly to background conditions. No new capacity issues are forecast to occur because of site-generated traffic.

  The site driveway connection to Plains Road East is projected to operate at LOS B or better with a v/c ratio of 0.05. The 95th percentile queue length is expected to be less than one vehicle.

  Remedial Measures: From an operational perspective, no major delay or capacity issues are identified. Traffic control signals are not warranted at the intersection of Plains Road East at White Oak Drive and the proposed site driveway.
- **Transportation Demand Management:** The proposed development includes TDM measures such as bicycle parking to encourage cycling and pedestrian facilities to provide accessibility to and from the development.
- **MMLOS Assessment:** The existing study area segments and intersections meet or exceed the level of service targets for transit, trucks, and cars. To address the deficient modes,

improved transit facilities, wider sidewalks, enhanced pedestrian measures, and protected cycling facilities should be explored by the City of Burlington.

7.2 Recommendations

Based on the findings of this study, the following is recommended:

- The City of Burlington recognizes the conclusions drawn above.
- The City should explore reallocating street space along Plains Road East, Shadeland Avenue, and Gallagher Road to enhance pedestrian and cycling facilities, including wider sidewalks, increased pedestrian buffer, more frequent pedestrian crossings, and protected cycling lanes, to meet MMLOS targets.
- The site's TDM program should be implemented and monitored over time to help manage its transportation and parking impacts.

Appendix A

Terms of Reference

Outlook

Re: 240575: 198-200 & 206 Plains Rd E, Burlington - Transportation Impact Study - Terms of Reference

---

From Brian Kim <bkim@ptsl.com>
Date Mon 2025-02-10 5:32 PM
To Adiga, Smeeta <Smeeta.Adiga@burlington.ca>
Cc Lucas, Sandra <Sandra.Lucas@burlington.ca>

Hi Smeeta,

Thank you for your comments. We'll ensure that they get addressed in our TIS for this development.

Thank you!

Brian Kim
Transportation Consultant

paradigm TRANSPORTATION SOLUTIONS LIMITED

Great Place To Work. Certified NOV 2023 - NOV 2024 CANADA

5A-150 Pinebush Road, Cambridge ON, N1R 8J8
p: 905.381.2229 x301
e: bkim@ptsl.com
w: www.ptsl.com

Paradigm operates on a four-day workweek. Our offices are closed on Fridays.

From: Adiga, Smeeta <Smeeta.Adiga@burlington.ca>
Sent: February 7, 2025 11:11 AM
To: Brian Kim <bkim@ptsl.com>
Cc: Lucas, Sandra <Sandra.Lucas@burlington.ca>
Subject: RE: 240575: 198-200 & 206 Plains Rd E, Burlington - Transportation Impact Study - Terms of Reference

Good morning Brian,

Thank you for providing the Terms of Reference (TOR) for the proposed development at 198-200 & 206 Plains Rd E. Transportation Planning have reviewed it and provided our feedback in **green below**.

As part of the TIS, an MMLOS analysis will also be required, as outlined below.

Please let us know if you have any questions or concerns.

Thanks,

Smeeta Adiga (she/her)
Transportation Planning Technologist
Transportation Services Department

P. 905 335 7600, ext 7691
smeeta.adiga@burlington.ca

426 Brant Street P.O. Box 5013, Burlington, Ontario, L7R 3Z6

City of Burlington | [www.burlington.ca]www.burlington.ca



Our working hours may be different. You are not obligated to reply outside of your typical working hours.

From: Brian Kim <bkim@ptsl.com>
Sent: Thursday, January 23, 2025 10:51 AM
To: Mailbox, Transportation Planning <devapptransportationplanning@burlington.ca>; Ayesha.Khan@halton.ca
Subject: 240575: 198-200 & 206 Plains Rd E, Burlington - Transportation Impact Study - Terms of Reference

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Hi all,

Paradigm Transportations Solutions Limited has been retained to conduct a Transportation Impact Study for a proposed development of 198-200 & 206 Plains Rd E in the City of Burlington. The subject site is on the south side of Plains Road East and opposite to White Oaks Drive. The applicant proposes a 6-storey mixed-use building, including approximately 183 square metres of commercial space and 66 residential units with a total of 94 parking spaces. A preliminary concept plan is attached.

We'd like to prepare our report based on the following scope, subject to your comments:

Proposed Terms of Reference

Study Area Intersections

- Plains Road East at White Oak Drive (unsignalized)
- Plains Road East at St. Matthews Avenue (signalized)
- Plains Road East at Gallagher Road/ Shadeland Avenue (Signalized)
- One site driveway

  Accepted

Existing Data

- TMCs to be collected by Paradigm.

  Please contact the Traffic Operations Supervisor, Josip Kafadar, at Josip.kafadar@burlington.ca for any recent traffic data on city roads. If the data is not available from the city, it is recommended that a traffic consultant conduct an eight-hours weekday count at the relevant intersections.

Horizon Years

- 2025 Base Year
- Five years from date of the study (2030)

  Accepted

Analysis Periods

- Weekday AM peak hour
- Weekday PM peak hour

Accepted

Analysis

- Synchro 12
- HCM 2000
- SimTraffic Queueing (five 60-min iterations)

Accepted

Intersection Analysis:

- A detailed evaluation of intersections in the study area is required, focusing on parameters such as queue lengths, v/c ratios, level of service, and delay times to predict the development's impact on intersection performance. The queuing assessment, including levels of service and queuing distances, shall be based on micro-simulations using Sim-Traffic, as mentioned above.

Background Traffic

- Generalized growth rate 1% per annum

Accepted

- **Please identify any adjacent development applications to include in the traffic forecast.**
- It is recommended to include the 84, 92, 104 Plains Rd E development, although the site is not within the proposed study boundary but is very close to it. The proposal includes 255 residential units with ground floor commercial.

Details can found in:
https://burlington.maps.arcgis.com/home/webmap/viewer.html?webmap=64655c40535f478b8d3adbbbecdb683e

Site Traffic Estimates

- ITE Trip Generation Data ~~11th Edition~~ on-line edition
- No modal split reductions

Accepted

Site Traffic Distribution

- Existing travel patterns/TTS data

Accepted

MMOLS Analysis:

- Since the location is within an Enhanced Pedestrian Realm, a Multimodal Level of service (MMLOS) analysis is required. The analysis must assess the benefits of the "Complete Streets" design option on Plains Road East. Additionally, the MMLOS analysis shall identify areas where the transportation system needs improvement, prioritize investments in transportation infrastructure and inform transportation planning and policy decisions.

LOS Target

Street Name	Street Type	LOS Per Mode Type				
		Pedestrian	Bikes	Transit	Trucks	Cars
Plains Road East	Urban Main Street	C	C	D	D	D
	Adjusted Targets	B	B	C	D	E
Gallagher Road / Shadeland Avenue	Neighbourhood Main Street	C	C	D	D	D
	Adjusted Targets	B	B	D	D	D

Transportation Demand Management (TDM) recommendations:

- When providing TDM considerations, it is essential to focus on strategies that reduce single-occupancy vehicle trips and promote alternative transportation modes such as active and sustainable transportation and parking and vehicle use management.

Report

- We will document the study methodologies, findings, and conclusions in a report with appendices containing the detailed analysis results and any data collected.

Please let us know if you have any comments on the proposed study.

Thank you,

Brian Kim
Transportation Consultant

5A-150 Pinebush Road, Cambridge ON, N1R 8J8
p: 905.381.2229 x301
e: bkim@ptsl.com
w: www.ptsl.com

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Outlook

RE: 240575: 198-200 & 206 Plains Rd E, Burlington - Transportation Impact Study - Terms of Reference

From Scattolon, Walter <Walter.Scattolon@halton.ca>
Date Fri 2025-01-24 2:13 PM
To Brian Kim <bkim@ptsl.com>; devapptransportationplanning@burlington.ca <devapptransportationplanning@burlington.ca>
Cc McNeish, Amanda <Amanda.McNeish@halton.ca>; Pettenuzzo, Nicole <Nicole.Pettenuzzo@halton.ca>

Hello Brian,

Thank you for reaching out. As this development location does not fall within close proximity to any Regional roadways or intersections, Halton Region will not be providing any review or comments of the provided TIS Terms of Reference for **198-200 & 206 Plains Rd E, Burlington .**

Location:
https://www.google.ca/maps/place/206+Plains+Rd+E,+Burlington,+ON+L7T+2C3/@43.3171394,-79.8684354,7493m/data=!3m1!1e3!4m6!3m5!1s0x882c9dc5e82088df:0x97e9d294b12bf502!8m2!3d43.3116695!4d-79.8457146!16s%2Fg%2F11c5kfrk84?entry=ttu&g_ep=EgoyMDI1MDEyMS4wIKXMDSoASAFQAw%3D%3D

We trust that you will follow any input the City of Burlington will provide for their Local roadway network impacts.

Thank you,

Walter Scattolon – Halton Region – Development Services – Transportation Development Review

Walter Scattolon, BASc (Eng.), PMP
Project Manager I – Transportation Development Review
Development Services
Public Works
Halton Region
905-825-6000, ext. 2687 | 1-866-442-5866

Halton Region logo Twitter logo F ace Li nke You Tube

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From: Brian Kim <bkim@ptsl.com>
Sent: Thursday, January 23, 2025 10:51 AM
To: devapptransportationplanning@burlington.ca; Khan, Ayesha <Ayesha.Khan@halton.ca>
Subject: 240575: 198-200 & 206 Plains Rd E, Burlington - Transportation Impact Study - Terms of Reference

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- Weekday AM peak hour
- Weekday PM peak hour

Analysis

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Background Traffic

- Generalized growth rate 1% per annum
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Site Traffic Estimates

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Site Traffic Distribution

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Report

- We will document the study methodologies, findings, and conclusions in a report with appendices containing the detailed analysis results and any data collected.

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Thank you,

Brian Kim
Transportation Consultant

5A-150 Pinebush Road, Cambridge ON, N1R 8J8
p: 905.381.2229 x301
e: bkim@ptsl.com
w: www.ptsl.com

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Appendix B

Existing Traffic Data



Plains Rd E @ Gallagher Rd/Shadeland Ave

Morning Peak Diagram

Specified Period
From: 7:00:00
To: 10:00:00

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

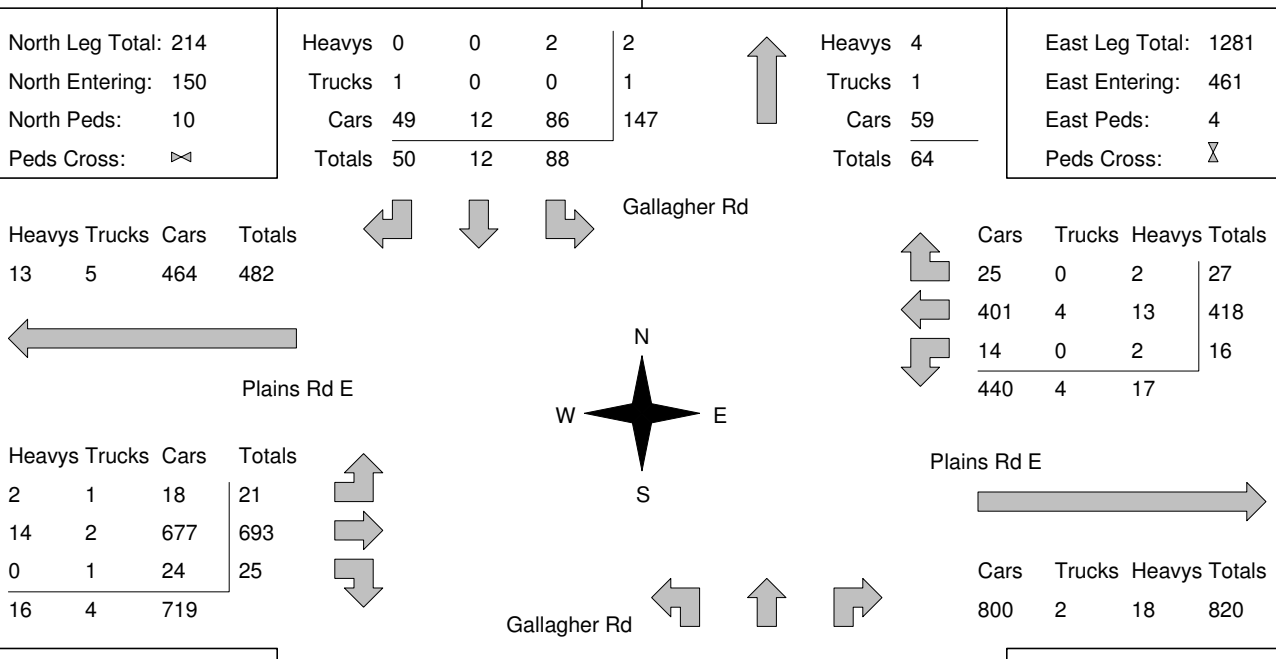
Municipality: Burlington
Site #: 0000000003
Intersection: Plains Rd E & Gallagher Rd
TFR File #: 3
Count date: 30-Jan-2025

Weather conditions:
Cloudy/Dry

Person(s) who counted:
Pyramid Traffic Inc

**** Signalized Intersection ****

Major Road: Plains Rd E runs W/E



Comments

Plains Rd E @ Gallagher Rd/Shadeland Ave

Mid-day Peak Diagram

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

One Hour Peak
From: 12:30:00
To: 13:30:00

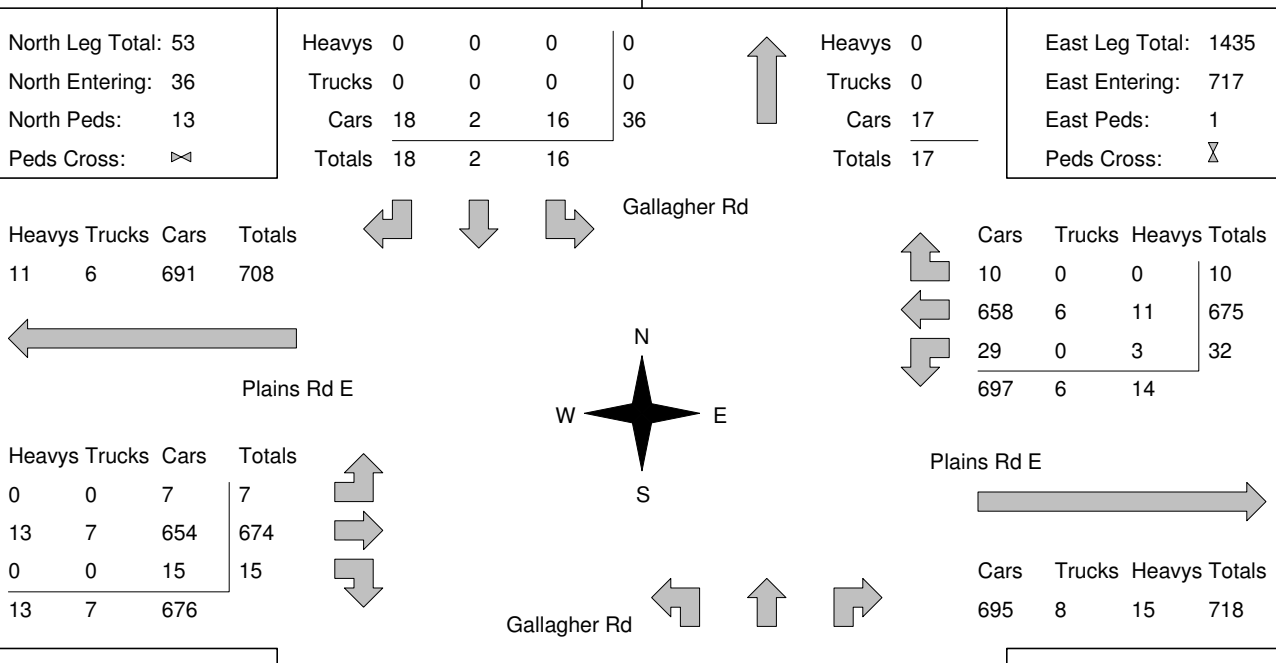
Municipality: Burlington
Site #: 0000000003
Intersection: Plains Rd E & Gallagher Rd
TFR File #: 3
Count date: 30-Jan-2025

Weather conditions:
Cloudy/Dry

Person(s) who counted:
Pyramid Traffic Inc

**** Signalized Intersection ****

Major Road: Plains Rd E runs W/E



Comments

Plains Rd E @ Gallagher Rd/Shadeland Ave

Afternoon Peak Diagram

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

One Hour Peak
From: 16:30:00
To: 17:30:00

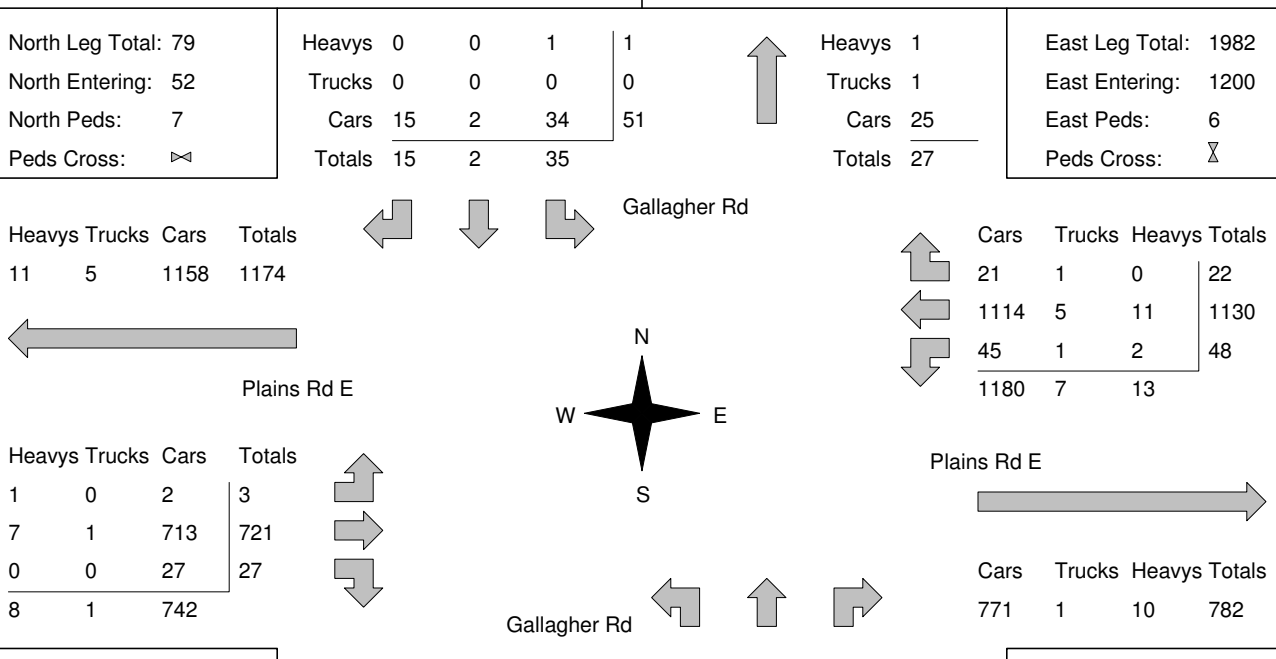
Municipality: Burlington
Site #: 0000000003
Intersection: Plains Rd E & Gallagher Rd
TFR File #: 3
Count date: 30-Jan-2025

Weather conditions:
Cloudy/Dry

Person(s) who counted:
Pyramid Traffic Inc

**** Signalized Intersection ****

Major Road: Plains Rd E runs W/E



Comments

Plains Rd E @ Gallagher Rd/Shadeland Ave

Total Count Diagram

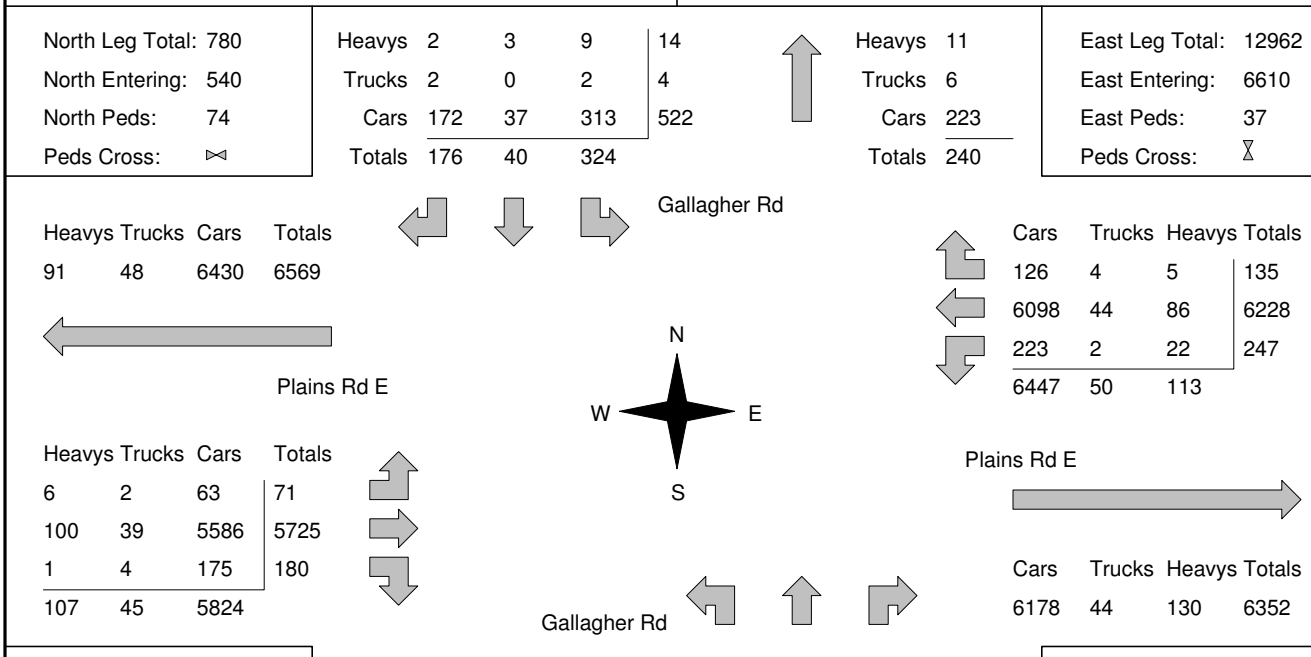
Municipality: Burlington
Site #: 0000000003
Intersection: Plains Rd E & Gallagher Rd
TFR File #: 3
Count date: 30-Jan-2025

Weather conditions:
Cloudy/Dry

Person(s) who counted:
Pyramid Traffic Inc

**** Signalized Intersection ****

Major Road: Plains Rd E runs W/E



Comments

Plains Rd E @ St Matthews Ave

Morning Peak Diagram

Specified Period
From: 7:00:00
To: 10:00:00

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

Municipality: Burlington
Site #: 0000000001
Intersection: Plains Rd E & St Matthews Ave
TFR File #: 1
Count date: 30-Jan-2025

Weather conditions:
Cloudy/Dry

Person(s) who counted:
Pyramid Traffic Inc

**** Signalized Intersection ****

Major Road: Plains Rd E runs W/E

North Leg Total: 21
North Entering: 14
North Peds: 4
Peds Cross: ⋈

Heavys	0	0	0
Trucks	0	0	0
Cars	9	5	14
Totals	9	5	

Heavys	1
Trucks	0
Cars	6
Totals	7

East Leg Total: 1253
East Entering: 505
East Peds: 1
Peds Cross: ⧖

St Matthews Ave

Heavys	Trucks	Cars	Totals
15	8	488	511

Cars	Trucks	Heavys	Totals
3	0	0	3
479	8	15	502
482	8	15	

Plains Rd E

N
W E
S

Heavys	Trucks	Cars	Totals
1	0	3	4
14	6	723	743
15	6	726	

Plains Rd E

Cars	Trucks	Heavys	Totals
728	6	14	748

Peds Cross: ⧖
West Peds: 1
West Entering: 747
West Leg Total: 1258

Comments

Plains Rd E @ St Matthews Ave

Mid-day Peak Diagram

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

One Hour Peak
From: 12:30:00
To: 13:30:00

Municipality: Burlington
Site #: 0000000001
Intersection: Plains Rd E & St Matthews Ave
TFR File #: 1
Count date: 30-Jan-2025

Weather conditions:
Cloudy/Dry

Person(s) who counted:
Pyramid Traffic Inc

**** Signalized Intersection ****

Major Road: Plains Rd E runs W/E

North Leg Total: 56
North Entering: 34
North Peds: 16
Peds Cross: ⋈

Heavys	0	0	0
Trucks	1	0	1
Cars	16	17	33
Totals	17	17	

Heavys	0
Trucks	1
Cars	21
Totals	22

East Leg Total: 1458
East Entering: 726
East Peds: 5
Peds Cross: ⧖

St Matthews Ave

Heavys	Trucks	Cars	Totals
11	8	714	733

Plains Rd E

Heavys	Trucks	Cars	Totals
0	1	11	12
12	7	696	715
12	8	707	

Cars	Trucks	Heavys	Totals
10	0	0	10
698	7	11	716
708	7	11	

N
W E
S

Plains Rd E

Cars	Trucks	Heavys	Totals
713	7	12	732

Peds Cross: ⧖
West Peds: 0
West Entering: 727
West Leg Total: 1460

Comments

Plains Rd E @ St Matthews Ave

Afternoon Peak Diagram

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

One Hour Peak
From: 16:30:00
To: 17:30:00

Municipality: Burlington
Site #: 0000000001
Intersection: Plains Rd E & St Matthews Ave
TFR File #: 1
Count date: 30-Jan-2025

Weather conditions:
Cloudy/Dry

Person(s) who counted:
Pyramid Traffic Inc

**** Signalized Intersection ****

Major Road: Plains Rd E runs W/E

North Leg Total: 69
North Entering: 32
North Peds: 6
Peds Cross: ⋈

Heavys	0	0	0
Trucks	1	0	1
Cars	14	17	31
Totals	15	17	

Heavys	0
Trucks	0
Cars	37
Totals	37

East Leg Total: 1939
East Entering: 1162
East Peds: 2
Peds Cross: ⧖

St Matthews Ave

Heavys	Trucks	Cars	Totals
10	6	1145	1161

Cars	Trucks	Heavys	Totals
16	0	0	16
1131	5	10	1146
1147	5	10	

Plains Rd E

N
W E
S

Heavys	Trucks	Cars	Totals
0	0	21	21
8	3	749	760
8	3	770	

Plains Rd E

Cars	Trucks	Heavys	Totals
766	3	8	777

Peds Cross: ⧖
West Peds: 6
West Entering: 781
West Leg Total: 1942

Comments

Plains Rd E @ St Matthews Ave

Total Count Diagram

Municipality: Burlington
Site #: 0000000001
Intersection: Plains Rd E & St Matthews Ave
TFR File #: 1
Count date: 30-Jan-2025

Weather conditions:
Cloudy/Dry

Person(s) who counted:
Pyramid Traffic Inc

**** Signalized Intersection ****

Major Road: Plains Rd E runs W/E

North Leg Total:	374		
North Entering:	203		
North Peds:	50		
Peds Cross:	⋈		
Heavys	0	0	0
Trucks	2	1	3
Cars	108	92	200
Totals	110	93	
Heavys	2		
Trucks	3		
Cars	166		
Totals	171		
East Leg Total:	12687		
East Entering:	6576		
East Peds:	61		
Peds Cross:	⧖		

St Matthews Ave

Heavys	Trucks	Cars	Totals
93	52	6452	6597

Cars	Trucks	Heavys	Totals
89	0	0	89
6344	50	93	6487
6433	50	93	

Plains Rd E

N
W E
S

Heavys	Trucks	Cars	Totals
2	3	77	82
99	49	5870	6018
101	52	5947	

Plains Rd E

Cars	Trucks	Heavys	Totals
5962	50	99	6111

Peds Cross:	⧖
West Peds:	29
West Entering:	6100
West Leg Total:	12697

Comments

Plains Rd E @ White Oak Dr

Morning Peak Diagram

Specified Period
From: 7:00:00
To: 10:00:00

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

Municipality: Burlington
Site #: 0000000002
Intersection: Plains Rd E & White Oak Dr
TFR File #: 2
Count date: 30-Jan-2025

Weather conditions:
Cloudy/Dry

Person(s) who counted:
Pyramid Traffic Inc

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

Major Road: Plains Rd E runs W/E

North Leg Total: 101
North Entering: 52
North Peds: 4
Peds Cross: ⋈

Heavys	2	0	2
Trucks	1	0	1
Cars	28	21	49
Totals	31	21	

Heavys	0
Trucks	1
Cars	48
Totals	49

East Leg Total: 1214
East Entering: 481
East Peds: 0
Peds Cross: ⧖

White Oak Dr

Heavys	Trucks	Cars	Totals
15	6	472	493

Cars	Trucks	Heavys	Totals
19	0	0	19
444	5	13	462
463	5	13	

Plains Rd E

N
W E
S

Heavys	Trucks	Cars	Totals
0	1	29	30
16	4	692	712
16	5	721	

Plains Rd E

Cars	Trucks	Heavys	Totals
713	4	16	733

Peds Cross: ⧖
West Peds: 2
West Entering: 742
West Leg Total: 1235

Comments

Plains Rd E @ White Oak Dr

Mid-day Peak Diagram

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

One Hour Peak
From: 12:30:00
To: 13:30:00

Municipality: Burlington
Site #: 0000000002
Intersection: Plains Rd E & White Oak Dr
TFR File #: 2
Count date: 30-Jan-2025

Weather conditions:
Cloudy/Dry

Person(s) who counted:
Pyramid Traffic Inc

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

Major Road: Plains Rd E runs W/E

North Leg Total: 90
North Entering: 42
North Peds: 13
Peds Cross: ⋈

Heavys	0	0	0
Trucks	0	0	0
Cars	19	23	42
Totals	19	23	

Heavys	0
Trucks	0
Cars	48
Totals	48

East Leg Total: 1421
East Entering: 709
East Peds: 0
Peds Cross: ⧖

White Oak Dr

Heavys	Trucks	Cars	Totals
10	7	686	703

Cars	Trucks	Heavys	Totals
25	0	0	25
667	7	10	684
692	7	10	

Plains Rd E

N
W E
S

Heavys	Trucks	Cars	Totals
0	0	23	23
11	8	670	689
11	8	693	

Plains Rd E

Cars	Trucks	Heavys	Totals
693	8	11	712

Peds Cross: ⧖
West Peds: 1
West Entering: 712
West Leg Total: 1415

Comments

Plains Rd E @ White Oak Dr

Afternoon Peak Diagram

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

One Hour Peak
From: 16:30:00
To: 17:30:00

Municipality: Burlington
Site #: 0000000002
Intersection: Plains Rd E & White Oak Dr
TFR File #: 2
Count date: 30-Jan-2025

Weather conditions:
Cloudy/Dry

Person(s) who counted:
Pyramid Traffic Inc

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

Major Road: Plains Rd E runs W/E

North Leg Total: 97
North Entering: 39
North Peds: 5
Peds Cross: ⋈

Heavys	0	0	0
Trucks	1	0	1
Cars	20	18	38
Totals	21	18	

Heavys	0
Trucks	1
Cars	57
Totals	58

East Leg Total: 1933
East Entering: 1163
East Peds: 0
Peds Cross: ⧖

White Oak Dr

Heavys	Trucks	Cars	Totals
10	6	1131	1147

Cars	Trucks	Heavys	Totals
36	1	0	37
1111	5	10	1126
1147	6	10	

Plains Rd E

N
W E
S

Heavys	Trucks	Cars	Totals
0	0	21	21
9	3	740	752
9	3	761	

Plains Rd E

Cars	Trucks	Heavys	Totals
758	3	9	770

Peds Cross: ⧖
West Peds: 0
West Entering: 773
West Leg Total: 1920

Comments

Plains Rd E @ White Oak Dr

Total Count Diagram

Municipality: Burlington
Site #: 0000000002
Intersection: Plains Rd E & White Oak Dr
TFR File #: 2
Count date: 30-Jan-2025

Weather conditions:
Cloudy/Dry

Person(s) who counted:
Pyramid Traffic Inc

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

Major Road: Plains Rd E runs W/E

North Leg Total: 819
North Entering: 390
North Peds: 63
Peds Cross: ⋈

Heavys	2	0	2
Trucks	3	2	5
Cars	190	193	383
Totals	195	195	

Heavys	3
Trucks	7
Cars	419
Totals	429

East Leg Total: 12568
East Entering: 6530
East Peds: 0
Peds Cross: ⧖

White Oak Dr

Heavys	Trucks	Cars	Totals
93	42	6342	6477

Plains Rd E

Heavys	Trucks	Cars	Totals
2	1	178	181
100	46	5697	5843
102	47	5875	

Cars	Trucks	Heavys	Totals
241	6	1	248
6152	39	91	6282
6393	45	92	

Plains Rd E

Cars	Trucks	Heavys	Totals
5890	48	100	6038

N
W E
S

Peds Cross: ⧖
West Peds: 4
West Entering: 6024
West Leg Total: 12501

Comments

Intersection Name:	TS ID:	Line No:	Model:	IP address:	Controller Make:
Plains Road @ Shadeland	115	4	EOS	172.24.17.2	Econolite

Type of Operation: 8 Phase Semi-Actuated

No	Date			Description	Prepared by:
	Y	M	D		
5	2024	12	17	New TSP Plan	SE

*-Start from Main Menu

PHASE DESCRIPTION

Ph1		Ph5	
Ph2	EB - Plains Road	Ph6	WB - Plains Road
Ph3		Ph7	
Ph4	NB - Shadeland Avenue	Ph8	SB - Shadeland Avenue

CONFIGURATION (PHASE SEQ): PHASE IN USE/EXCLUSIVE PED (MM) *- 1 - 6

Phase:	1	2	3	4	5	6	7	8
Phase in Use		X		X		X		X
Exclusive PED								

CONTROLLER TIMING DATA - VEHICLE TIMING * - 2 - 1

Timing Plan: 1	Phase: 1	2	3	4	5	6	7	8
Minimum Green		8		8		8		8
Walk		28		12		28		12
Ped. Clearance		7		16		7		16
Pedestrian Carry Over								
Vehicle Extension		3		5		3		5
MAX 1		35		25		35		25
MAX 2		35		25		35		25
Yellow Change		3.7		3		3.7		3
Red Clearance		1.8		3.6		1.8		3.6
Phase Minimum:	**0**	**40.5**	**0**	**34.6**	**0**	**40.5**	**0**	**34.6**

PHASE DATA - VEHICLE AND PEDESTRIAN RECALLS * - 2 - 1-6

Phase:	1	2	3	4	5	6	7	8
Lock Detector								
Vehicle Recall								
Pedestrian Recall		X				X		
MAX Recall		X				X		
Min Recall								

SCP STRATEGY PLAN * - 4 -3

PLAN 1

TIME TO LIVE	130 SECONDS								
SCP PHASE	1	2	3	4	5	6	7	8	
ENABLE	NO	YES	NO	NO	NO	NO	NO	NO	

PLAN 2

TIME TO LIVE									
SCP PHASE	1	2	3	4	5	6	7	8	
ENABLE									

PLAN 3

TIME TO LIVE									
SCP PHASE	1	2	3	4	5	6	7	8	
ENABLE									

PLAN 4

TIME TO LIVE	130 SECONDS								
SCP PHASE	1	2	3	4	5	6	7	8	
ENABLE									

SCP SPLIT PATTERN * 4 -4 ,

Cycle Length	Plan		Phases							
			1	2	3	4	5	6	7	8
110	1	Max Reduction		11		11		11		11
		Max Extension		11		0		11		0
90	2	Max Reduction		9		9		9		9
		Max Extension		9		0		9		0
110	3	Max Reduction		11		11		11		11
		Max Extension		11		0		11		0
90	4	Max Reduction		9		9		9		9
		Max Extension		9		0		9		0
110	5	Max Reduction		11		11		11		11
		Max Extension		11		0		11		0
0	10	Max Reduction		0				0		0
		Max Extension		20		0		20		0

EVENT PLAN * - 5 -2,

Event Plan	Cycle Length	Offset (sec)	Phases (sec)							
			1	2	3	4	5	6	7	8
1	110	52		75		35		75		35
2	90	43		55		35		55		35
3	110	40		75		35		75		35
4	90	41		55		35		55		35
5	110	52		58		52		58		52

10	0	0		0		0		0		0

DAY PLAN *** - 5 - 3, -5 - 4**

Day Plan	Event Plan	Time Period
1	4	06:00
1	1	07:00
1	5	08:15
1	1	08:45
1	2	09:00
1	5	14:45
1	3	15:30
1	4	19:00
1	10	22:00
2	4	08:00
2	3	10:30
2	4	17:00
2	10	21:00
3	4	09:30
3	2	12:00
3	4	17:00
3	10	21:00

Dayplan

1	Weekday
2	Saturday
3	Sunday & Holiday

Special Programming:

TIME BASE DATA - TIME OF YEAR EVENTS *** - 5 - 5**

Events	Exception Day		MON/ MON	DOW/ DOW	WOM/ Year	Day Plan
New Year's Day	1	Fixed	1	1	0	3
Family Day	2	Float	2	2	3	3
Good Friday	3	Float	4	18	1	3
Victoria Day	4	Float	5	2	3	3
Canada Day	5	Fixed	7	1	0	3
Civic Day	6	Float	8	2	1	3
Labour Day	7	Float	9	2	1	3
Thanksgiving	8	Float	10	2	2	3
Christmas Day	9	Fixed	12	25	0	3

Intersection Name:	TS ID:	Line No:	Model:	IP address:	Controller Make:
Fairview Street @ St. Mathews	116	4	EOS	172.24.16.2	Econolite

Type of Operation:	8 Phase Semi-Actuated

*-Start from Main Menu

No	Date			Description	Prepared by
	Y	M	D		
7	2024	12	17	New TSP Plan	MA

PHASE DESCRIPTION

Ph1		Ph5	
Ph2	EB - Plains Road	Ph6	WB - Plains Road
Ph3		Ph7	
Ph4		Ph8	SB - St.Mathews Avenue

CONFIGURATION (PHASE SEQ): PHASE IN USE/EXCLUSIVE PED *- 1 -6

Phase:	1	2	3	4	5	6	7	8
Phase in Use		X				X		X
Exclusive PED								

CONTROLLER TIMING DATA - VEHICLE TIMING * - 2 - 1

Timing Plan: 1

	Phase: 1	2	3	4	5	6	7	8
Minimum Green		8				8		8
Walk		30				30		8
Ped. Clearance		8				8		13
Delayed Green								5
Vehicle Extension		3				3		3
MAX 1		40				40		30
MAX 2		40				40		30
Yellow Change		3.7				3.7		3
Red Clearance		1.7				1.7		3
Phase Minimum:	**0**	**43.4**	**0**	**0**	**0**	**43.4**	**0**	**27**

PHASE DATA - VEHICLE AND PEDESTRIAN RECALLS * - 2 -1-6

Phase:	1	2	3	4	5	6	7	8
Lock Detector								
Vehicle Recall								
Pedestrian Recall		X				X		

MAX Recall		X				X			
Min Recall									

SCP STRATEGY PLAN * - 4 -3

PLAN 1

TIME TO LIVE				130 SECONDS							
SCP PHASE				1	2	3	4	5	6	7	8
ENABLE				NO	YES	NO	NO	NO	YES	NO	NO

PLAN 2

TIME TO LIVE											
SCP PHASE				1	2	3	4	5	6	7	8
ENABLE											

PLAN 3

TIME TO LIVE											
SCP PHASE				1	2	3	4	5	6	7	8
ENABLE											

PLAN 4

TIME TO LIVE				130 SECONDS							
SCP PHASE				1	2	3	4	5	6	7	8
ENABLE											

SCP SPLIT PATTERN * 4 -4 ,

Cycle Length	Plan		Phases							
			1	2	3	4	5	6	7	8
110	1	Max Reduction		11				11		11
		Max Extension		11				11		0
90	2	Max Reduction		9				9		9
		Max Extension		9				9		0
110	3	Max Reduction		11				11		11
		Max Extension		11				11		0
90	4	Max Reduction		9				9		9
		Max Extension		9				9		0
0	10	Max Reduction		0				0		0
		Max Extension		20				20		0

EVENT PLAN * - 5 -2,

Event plan	Cycle length	Offset	Phases (sec)

			1	2	3	4	5	6	7	8
1	110	0		80				80		30
2	90	4		60				60		30
3	110	94		80				80		30
4	90	7		60				60		30
10	0	0		0				0		0

DAY PLAN *** - 5 - 3, -5 - 4**

Day Plan	Event Plan	Time Period
1	4	06:00
1	1	07:00
1	2	09:00
1	3	15:30
1	4	19:00
1	10	22:00
2	10	08:00
3	10	08:00

Dayplan	
1	Weekday
2	Saturday
3	Sunday & Holiday

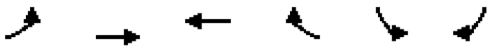
Special Programming:

TIME BASE DATA - TIME OF YEAR EVENTS *** - 5 - 5**

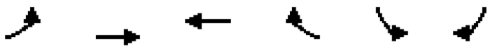
Events	Exception Day		MON/ MON	DOW/ DOW	WOM/ Year	Day Plan
New Year's Day	1	Fixed	1	1	0	3
Family Day	2	Float	2	2	3	3
Good Friday	3	Fixed	4	18	0	3
Victoria Day	4	Float	5	2	3	3
Canada Day	5	Fixed	7	1	0	3
Civic Day	6	Float	8	2	1	3
Labour Day	7	Float	9	2	1	3
Thanksgiving	8	Float	10	2	2	3
Christmas Day	9	Fixed	12	25	0	3

Appendix C

Base Year Traffic Operation Reports



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	4	743	502	3	5	9
Future Volume (vph)	4	743	502	3	5	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	15.0			0.0	0.0	0.0
Storage Lanes	1			0	1	1
Taper Length (m)	7.6				7.6	
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	1.00
Ped Bike Factor	1.00		1.00		1.00	0.99
Frt			0.999			0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1460	3544	3574	0	1825	1633
Flt Permitted	0.457				0.950	
Satd. Flow (perm)	700	3544	3574	0	1822	1611
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)			1			9
Link Speed (k/h)		60	60		40	
Link Distance (m)		166.7	285.8		199.5	
Travel Time (s)		10.0	17.1		18.0	
Confl. Peds. (#/hr)	4			4	1	1
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	25%	3%	2%	5%	0%	0%
Adj. Flow (vph)	4	774	523	3	5	9
Shared Lane Traffic (%)						
Lane Group Flow (vph)	4	774	526	0	5	9
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.7	3.7		3.7	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.9	4.9		4.9	
Two way Left Turn Lane		Yes	Yes			
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24			14	24	14
Number of Detectors	1	2	2		1	1
Detector Template	Left	Thru	Thru		Left	Right
Leading Detector (m)	6.1	30.5	30.5		6.1	6.1
Trailing Detector (m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Size(m)	6.1	1.8	1.8		6.1	6.1
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0		0.0	0.0
Detector 2 Position(m)		28.7	28.7			
Detector 2 Size(m)		1.8	1.8			
Detector 2 Type		Cl+Ex	Cl+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			

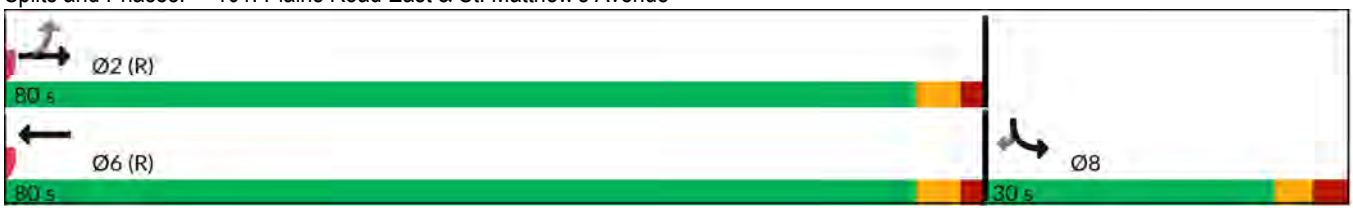


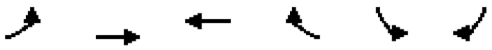
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Turn Type	Perm	NA	NA		Prot	Perm
Protected Phases		2	6		8	
Permitted Phases	2					8
Detector Phase	2	2	6		8	8
Switch Phase						
Minimum Initial (s)	8.0	8.0	8.0		8.0	8.0
Minimum Split (s)	45.5	45.5	45.5		27.0	27.0
Total Split (s)	80.0	80.0	80.0		30.0	30.0
Total Split (%)	72.7%	72.7%	72.7%		27.3%	27.3%
Maximum Green (s)	74.6	74.6	74.6		24.0	24.0
Yellow Time (s)	3.7	3.7	3.7		3.0	3.0
All-Red Time (s)	1.7	1.7	1.7		3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	5.4	5.4	5.4		6.0	6.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	C-Max	C-Max	C-Max		None	None
Walk Time (s)	30.0	30.0	30.0		8.0	8.0
Flash Don't Walk (s)	8.0	8.0	8.0		13.0	13.0
Pedestrian Calls (#/hr)	0	0	0		0	0
Act Effct Green (s)	102.2	102.2	102.2		8.0	8.0
Actuated g/C Ratio	0.93	0.93	0.93		0.07	0.07
v/c Ratio	0.01	0.23	0.16		0.04	0.07
Control Delay (s/veh)	1.5	1.3	1.0		48.2	26.7
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay (s/veh)	1.5	1.3	1.0		48.2	26.7
LOS	A	A	A		D	C
Approach Delay (s/veh)		1.3	1.0		34.4	
Approach LOS		A	A		C	
Queue Length 50th (m)	0.0	0.0	0.0		1.0	0.0
Queue Length 95th (m)	0.6	18.8	11.1		4.7	5.0
Internal Link Dist (m)		142.7	261.8		175.5	
Turn Bay Length (m)	15.0					
Base Capacity (vph)	650	3294	3322		398	358
Starvation Cap Reductn	0	0	0		0	0
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.01	0.23	0.16		0.01	0.03

Intersection Summary	
Area Type:	Other
Cycle Length: 110	
Actuated Cycle Length: 110	
Offset: 22.5 (20%), Referenced to phase 2:EBTL and 6:WBT, Start of Green	
Natural Cycle: 75	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.23	
Intersection Signal Delay (s/veh): 1.5	Intersection LOS: A

Intersection Capacity Utilization 48.2% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 101: Plains Road East & St. Matthew's Avenue

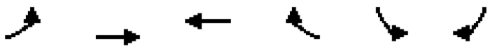




Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	4	743	502	3	5	9
Future Volume (vph)	4	743	502	3	5	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.4	5.4	5.4		6.0	6.0
Lane Util. Factor	1.00	0.95	0.95		1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00		1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	1.00		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1456	3544	3574		1825	1611
Flt Permitted	0.46	1.00	1.00		0.95	1.00
Satd. Flow (perm)	700	3544	3574		1825	1611
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	4	774	523	3	5	9
RTOR Reduction (vph)	0	0	0	0	0	9
Lane Group Flow (vph)	4	774	526	0	5	0
Confl. Peds. (#/hr)	4			4	1	1
Heavy Vehicles (%)	25%	3%	2%	5%	0%	0%
Turn Type	Perm	NA	NA		Prot	Perm
Protected Phases		2	6		8	
Permitted Phases	2					8
Actuated Green, G (s)	95.4	95.4	95.4		3.2	3.2
Effective Green, g (s)	95.4	95.4	95.4		3.2	3.2
Actuated g/C Ratio	0.87	0.87	0.87		0.03	0.03
Clearance Time (s)	5.4	5.4	5.4		6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	607	3073	3099		53	46
v/s Ratio Prot		c0.22	0.15		c0.00	
v/s Ratio Perm	0.01					0.00
v/c Ratio	0.01	0.25	0.17		0.09	0.01
Uniform Delay, d1	1.0	1.2	1.1		52.0	51.9
Progression Factor	1.00	1.00	0.91		1.00	1.00
Incremental Delay, d2	0.0	0.2	0.1		0.8	0.0
Delay (s)	1.0	1.4	1.2		52.8	51.9
Level of Service	A	A	A		D	D
Approach Delay (s/veh)		1.4	1.2		52.2	
Approach LOS		A	A		D	

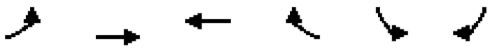
Intersection Summary			
HCM 2000 Control Delay (s/veh)	1.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.25		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	11.4
Intersection Capacity Utilization	48.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	30	712	462	19	21	31
Future Volume (vph)	30	712	462	19	21	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	35.0			0.0	0.0	0.0
Storage Lanes	1			0	1	0
Taper Length (m)	7.6				7.6	
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	1.00
Ped Bike Factor						
Frt			0.994		0.919	
Flt Protected	0.950				0.980	
Satd. Flow (prot)	1772	3544	3494	0	1632	0
Flt Permitted	0.950				0.980	
Satd. Flow (perm)	1772	3544	3494	0	1632	0
Link Speed (k/h)		60	60		40	
Link Distance (m)		285.8	182.7		131.2	
Travel Time (s)		17.1	11.0		11.8	
Confl. Peds. (#/hr)	4			4		2
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	3%	3%	4%	0%	0%	10%
Adj. Flow (vph)	32	749	486	20	22	33
Shared Lane Traffic (%)						
Lane Group Flow (vph)	32	749	506	0	55	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.7	3.7		3.7	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.9	4.9		4.9	
Two way Left Turn Lane		Yes	Yes			
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24			14	24	14
Sign Control		Free	Free		Stop	

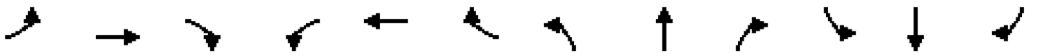
Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 30.7%		ICU Level of Service A	
Analysis Period (min) 15			



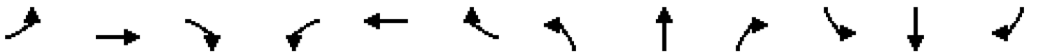
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	30	712	462	19	21	31
Future Volume (Veh/h)	30	712	462	19	21	31
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	32	749	486	20	22	33
Pedestrians		2			4	
Lane Width (m)		3.7			3.7	
Walking Speed (m/s)		1.1			1.1	
Percent Blockage		0			0	
Right turn flare (veh)						
Median type		TWLTL	TWLTL			
Median storage veh)		2	2			
Upstream signal (m)		286	183			
pX, platoon unblocked	0.96				0.96	0.96
vC, conflicting volume	510				939	259
vC1, stage 1 conf vol					500	
vC2, stage 2 conf vol					439	
vCu, unblocked vol	406				852	145
tC, single (s)	4.2				6.8	7.1
tC, 2 stage (s)					5.8	
tF (s)	2.2				3.5	3.4
p0 queue free %	97				96	96
cM capacity (veh/h)	1092				492	813

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	32	375	375	324	182	55
Volume Left	32	0	0	0	0	22
Volume Right	0	0	0	0	20	33
cSH	1092	1700	1700	1700	1700	644
Volume to Capacity	0.03	0.22	0.22	0.19	0.11	0.09
Queue Length 95th (m)	0.7	0.0	0.0	0.0	0.0	2.1
Control Delay (s/veh)	8.4	0.0	0.0	0.0	0.0	11.1
Lane LOS	A					B
Approach Delay (s/veh)	0.3			0.0		11.1
Approach LOS						B

Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	30.7%	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)	21	693	25	16	418	27	14	16	39	88	12	50
Future Volume (vph)	21	693	25	16	418	27	14	16	39	88	12	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	45.0		0.0	30.0		0.0	15.0		0.0	35.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.6			7.6			7.6			7.6		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	1.00		1.00	1.00		1.00	0.99		1.00	0.99	
Frt		0.995			0.991			0.893			0.880	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1601	3555	0	1615	3465	0	1825	1695	0	1789	1646	0
Flt Permitted	0.453			0.304			0.711			0.716		
Satd. Flow (perm)	758	3555	0	516	3465	0	1364	1695	0	1343	1646	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		6			12			45			57	
Link Speed (k/h)		60			60			40			40	
Link Distance (m)		182.7			307.2			153.2			143.4	
Travel Time (s)		11.0			18.4			13.8			12.9	
Confl. Peds. (#/hr)	10		3	3		10	1		4	4		1
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	14%	2%	4%	13%	4%	7%	0%	0%	0%	2%	0%	2%
Adj. Flow (vph)	24	797	29	18	480	31	16	18	45	101	14	57
Shared Lane Traffic (%)												
Lane Group Flow (vph)	24	826	0	18	511	0	16	63	0	101	71	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane		Yes			Yes							
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	2	2		6	6		8	8		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)	40.5	40.5		40.5	40.5		34.6	34.6		34.6	34.6	
Total Split (s)	75.0	75.0		75.0	75.0		35.0	35.0		35.0	35.0	
Total Split (%)	68.2%	68.2%		68.2%	68.2%		31.8%	31.8%		31.8%	31.8%	
Maximum Green (s)	69.5	69.5		69.5	69.5		28.4	28.4		28.4	28.4	
Yellow Time (s)	3.7	3.7		3.7	3.7		3.0	3.0		3.0	3.0	
All-Red Time (s)	1.8	1.8		1.8	1.8		3.6	3.6		3.6	3.6	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.5	5.5		5.5	5.5		6.6	6.6		6.6	6.6	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		5.0	5.0		5.0	5.0	
Recall Mode	C-Max	C-Max		C-Max	C-Max		Max	Max		Max	Max	
Walk Time (s)	28.0	28.0		28.0	28.0		12.0	12.0		12.0	12.0	
Flash Don't Walk (s)	7.0	7.0		7.0	7.0		16.0	16.0		16.0	16.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	69.5	69.5		69.5	69.5		28.4	28.4		28.4	28.4	
Actuated g/C Ratio	0.63	0.63		0.63	0.63		0.26	0.26		0.26	0.26	
v/c Ratio	0.05	0.37		0.06	0.23		0.05	0.13		0.29	0.15	
Control Delay (s/veh)	6.7	9.2		8.3	8.8		31.2	14.1		35.6	12.1	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay (s/veh)	6.7	9.2		8.3	8.8		31.2	14.1		35.6	12.1	
LOS	A	A		A	A		C	B		D	B	
Approach Delay (s/veh)		9.2			8.8			17.6			25.9	
Approach LOS		A			A			B			C	
Queue Length 50th (m)	1.8	40.8		1.4	22.3		2.6	2.9		17.4	2.3	
Queue Length 95th (m)	4.8	49.5		4.1	28.8		7.8	12.5		31.3	12.4	
Internal Link Dist (m)		158.7			283.2			129.2			119.4	
Turn Bay Length (m)	45.0			30.0			15.0			35.0		
Base Capacity (vph)	478	2248		326	2193		352	471		346	467	
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	0.05	0.37		0.06	0.23		0.05	0.13		0.29	0.15	

Intersection Summary	
Area Type:	Other
Cycle Length: 110	
Actuated Cycle Length: 110	
Offset: 52 (47%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green	
Natural Cycle: 80	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.37	
Intersection Signal Delay (s/veh): 11.2	Intersection LOS: B

Intersection Capacity Utilization 62.6% ICU Level of Service B
Analysis Period (min) 15

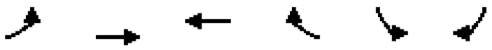
Splits and Phases: 103: Shadeland Avenue/Gallagher Road & Plains Road East



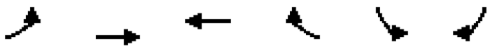
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	21	693	25	16	418	27	14	16	39	88	12	50
Future Volume (vph)	21	693	25	16	418	27	14	16	39	88	12	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5		5.5	5.5		6.6	6.6		6.6	6.6	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	0.99	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.99		1.00	0.89		1.00	0.88	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1589	3554		1613	3464		1823	1695		1782	1645	
Flt Permitted	0.45	1.00		0.30	1.00		0.71	1.00		0.72	1.00	
Satd. Flow (perm)	757	3554		517	3464		1364	1695		1343	1645	
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	24	797	29	18	480	31	16	18	45	101	14	57
RTOR Reduction (vph)	0	2	0	0	4	0	0	33	0	0	42	0
Lane Group Flow (vph)	24	824	0	18	507	0	16	30	0	101	29	0
Confl. Peds. (#/hr)	10		3	3		10	1		4	4		1
Heavy Vehicles (%)	14%	2%	4%	13%	4%	7%	0%	0%	0%	2%	0%	2%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	69.5	69.5		69.5	69.5		28.4	28.4		28.4	28.4	
Effective Green, g (s)	69.5	69.5		69.5	69.5		28.4	28.4		28.4	28.4	
Actuated g/C Ratio	0.63	0.63		0.63	0.63		0.26	0.26		0.26	0.26	
Clearance Time (s)	5.5	5.5		5.5	5.5		6.6	6.6		6.6	6.6	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	478	2245		326	2188		352	437		346	424	
v/s Ratio Prot		c0.23			0.15			0.02			0.02	
v/s Ratio Perm	0.03			0.03			0.01			c0.08		
v/c Ratio	0.05	0.37		0.06	0.23		0.05	0.07		0.29	0.07	
Uniform Delay, d1	7.7	9.7		7.7	8.7		30.6	30.8		32.7	30.8	
Progression Factor	0.82	0.90		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	0.5		0.3	0.2		0.2	0.3		2.1	0.3	
Delay (s)	6.5	9.2		8.0	9.0		30.9	31.1		34.9	31.1	
Level of Service	A	A		A	A		C	C		C	C	
Approach Delay (s/veh)		9.1			8.9			31.1			33.3	
Approach LOS		A			A			C			C	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	12.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.34		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	12.1
Intersection Capacity Utilization	62.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	21	760	1146	16	17	15
Future Volume (vph)	21	760	1146	16	17	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	15.0			0.0	0.0	0.0
Storage Lanes	1			0	1	1
Taper Length (m)	7.6				7.6	
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	1.00
Ped Bike Factor	1.00		1.00		1.00	0.98
Frt			0.998			0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1825	3614	3606	0	1825	1526
Flt Permitted	0.230				0.950	
Satd. Flow (perm)	441	3614	3606	0	1819	1494
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)			3			15
Link Speed (k/h)		60	60		40	
Link Distance (m)		166.7	285.8		199.5	
Travel Time (s)		10.0	17.1		18.0	
Confl. Peds. (#/hr)	6			6	2	6
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	0%	1%	1%	0%	0%	7%
Adj. Flow (vph)	21	776	1169	16	17	15
Shared Lane Traffic (%)						
Lane Group Flow (vph)	21	776	1185	0	17	15
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.7	3.7		3.7	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.9	4.9		4.9	
Two way Left Turn Lane		Yes	Yes			
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24			14	24	14
Number of Detectors	1	2	2		1	1
Detector Template	Left	Thru	Thru		Left	Right
Leading Detector (m)	6.1	30.5	30.5		6.1	6.1
Trailing Detector (m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Size(m)	6.1	1.8	1.8		6.1	6.1
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0		0.0	0.0
Detector 2 Position(m)		28.7	28.7			
Detector 2 Size(m)		1.8	1.8			
Detector 2 Type		Cl+Ex	Cl+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			

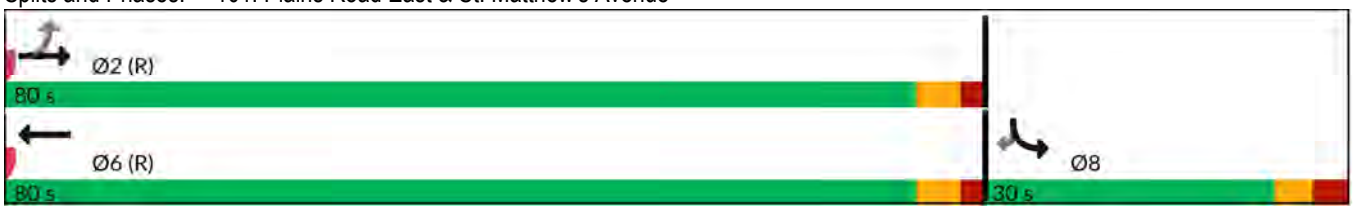


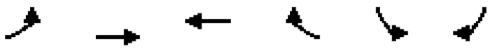
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Turn Type	Perm	NA	NA		Prot	Perm
Protected Phases		2	6		8	
Permitted Phases	2					8
Detector Phase	2	2	6		8	8
Switch Phase						
Minimum Initial (s)	8.0	8.0	8.0		8.0	8.0
Minimum Split (s)	45.5	45.5	45.5		27.0	27.0
Total Split (s)	80.0	80.0	80.0		30.0	30.0
Total Split (%)	72.7%	72.7%	72.7%		27.3%	27.3%
Maximum Green (s)	74.6	74.6	74.6		24.0	24.0
Yellow Time (s)	3.7	3.7	3.7		3.0	3.0
All-Red Time (s)	1.7	1.7	1.7		3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	5.4	5.4	5.4		6.0	6.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	C-Max	C-Max	C-Max		None	None
Walk Time (s)	30.0	30.0	30.0		8.0	8.0
Flash Don't Walk (s)	8.0	8.0	8.0		13.0	13.0
Pedestrian Calls (#/hr)	0	0	0		0	0
Act Effct Green (s)	98.3	98.3	98.3		8.0	8.0
Actuated g/C Ratio	0.89	0.89	0.89		0.07	0.07
v/c Ratio	0.05	0.24	0.37		0.13	0.12
Control Delay (s/veh)	2.0	1.7	4.2		50.1	23.8
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay (s/veh)	2.0	1.7	4.2		50.1	23.8
LOS	A	A	A		D	C
Approach Delay (s/veh)		1.7	4.2		37.8	
Approach LOS		A	A		D	
Queue Length 50th (m)	0.6	14.7	81.7		3.5	0.0
Queue Length 95th (m)	1.9	19.0	100.5		10.4	6.4
Internal Link Dist (m)		142.7	261.8		175.5	
Turn Bay Length (m)	15.0					
Base Capacity (vph)	394	3230	3223		398	337
Starvation Cap Reductn	0	0	0		0	0
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.05	0.24	0.37		0.04	0.04

Intersection Summary	
Area Type:	Other
Cycle Length: 110	
Actuated Cycle Length: 110	
Offset: 94 (85%), Referenced to phase 2:EBTL and 6:WBT, Start of Green	
Natural Cycle: 75	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.37	
Intersection Signal Delay (s/veh): 3.7	Intersection LOS: A

Intersection Capacity Utilization 50.3% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 101: Plains Road East & St. Matthew's Avenue

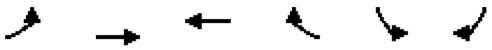




Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	21	760	1146	16	17	15
Future Volume (vph)	21	760	1146	16	17	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.4	5.4	5.4		6.0	6.0
Lane Util. Factor	1.00	0.95	0.95		1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00		1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	1.00		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1822	3614	3606		1825	1494
Flt Permitted	0.23	1.00	1.00		0.95	1.00
Satd. Flow (perm)	441	3614	3606		1825	1494
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	21	776	1169	16	17	15
RTOR Reduction (vph)	0	0	0	0	0	14
Lane Group Flow (vph)	21	776	1185	0	17	1
Confl. Peds. (#/hr)	6			6	2	6
Heavy Vehicles (%)	0%	1%	1%	0%	0%	7%
Turn Type	Perm	NA	NA		Prot	Perm
Protected Phases		2	6		8	
Permitted Phases	2					8
Actuated Green, G (s)	93.8	93.8	93.8		4.8	4.8
Effective Green, g (s)	93.8	93.8	93.8		4.8	4.8
Actuated g/C Ratio	0.85	0.85	0.85		0.04	0.04
Clearance Time (s)	5.4	5.4	5.4		6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	376	3081	3074		79	65
v/s Ratio Prot		0.21	c0.33		c0.01	
v/s Ratio Perm	0.05					0.00
v/c Ratio	0.06	0.25	0.39		0.22	0.01
Uniform Delay, d1	1.3	1.5	1.8		50.8	50.3
Progression Factor	1.00	1.00	2.18		1.00	1.00
Incremental Delay, d2	0.3	0.2	0.3		1.4	0.1
Delay (s)	1.5	1.7	4.2		52.2	50.4
Level of Service	A	A	A		D	D
Approach Delay (s/veh)		1.7	4.2		51.3	
Approach LOS		A	A		D	

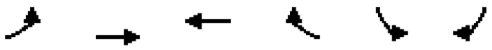
Intersection Summary			
HCM 2000 Control Delay (s/veh)	4.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.38		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	11.4
Intersection Capacity Utilization	50.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	21	752	1126	37	18	21
Future Volume (vph)	21	752	1126	37	18	21
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	35.0			0.0	0.0	0.0
Storage Lanes	1			0	1	0
Taper Length (m)	7.6				7.6	
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	1.00
Ped Bike Factor						
Frt			0.995		0.928	
Flt Protected	0.950				0.977	
Satd. Flow (prot)	1825	3579	3594	0	1696	0
Flt Permitted	0.950				0.977	
Satd. Flow (perm)	1825	3579	3594	0	1696	0
Link Speed (k/h)		60	60		40	
Link Distance (m)		285.8	182.7		131.2	
Travel Time (s)		17.1	11.0		11.8	
Confl. Peds. (#/hr)	5			5		
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	0%	2%	1%	3%	0%	5%
Adj. Flow (vph)	22	775	1161	38	19	22
Shared Lane Traffic (%)						
Lane Group Flow (vph)	22	775	1199	0	41	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.7	3.7		3.7	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.9	4.9		4.9	
Two way Left Turn Lane		Yes	Yes			
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24			14	24	14
Sign Control		Free	Free		Stop	

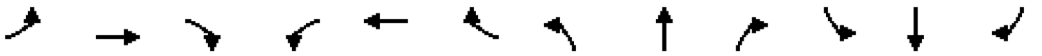
Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 42.3%		ICU Level of Service A	
Analysis Period (min) 15			



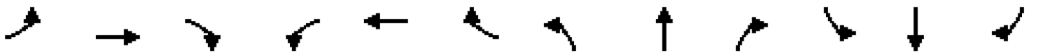
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	21	752	1126	37	18	21
Future Volume (Veh/h)	21	752	1126	37	18	21
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	22	775	1161	38	19	22
Pedestrians					5	
Lane Width (m)					3.7	
Walking Speed (m/s)					1.1	
Percent Blockage					0	
Right turn flare (veh)						
Median type		TWLTL	TWLTL			
Median storage veh)		2	2			
Upstream signal (m)		286	183			
pX, platoon unblocked	0.82				0.82	0.82
vC, conflicting volume	1204				1617	605
vC1, stage 1 conf vol					1185	
vC2, stage 2 conf vol					432	
vCu, unblocked vol	798				1279	63
tC, single (s)	4.1				6.8	7.0
tC, 2 stage (s)					5.8	
tF (s)	2.2				3.5	3.4
p0 queue free %	97				94	97
cM capacity (veh/h)	676				308	794

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	22	388	388	774	425	41
Volume Left	22	0	0	0	0	19
Volume Right	0	0	0	0	38	22
cSH	676	1700	1700	1700	1700	459
Volume to Capacity	0.03	0.23	0.23	0.46	0.25	0.09
Queue Length 95th (m)	0.8	0.0	0.0	0.0	0.0	2.2
Control Delay (s/veh)	10.5	0.0	0.0	0.0	0.0	13.6
Lane LOS	B					B
Approach Delay (s/veh)	0.3			0.0		13.6
Approach LOS						B

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	42.3%	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)	3	721	27	48	1130	22	29	2	26	35	2	15
Future Volume (vph)	3	721	27	48	1130	22	29	2	26	35	2	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	45.0		0.0	30.0		0.0	15.0		0.0	35.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.6			7.6			7.6			7.6		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00	1.00		1.00	1.00			0.98		0.99		
Frt		0.995			0.997			0.860			0.868	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1372	3593	0	1722	3598	0	1825	1623	0	1772	1668	0
Flt Permitted	0.186			0.330			0.746			0.738		
Satd. Flow (perm)	268	3593	0	595	3598	0	1433	1623	0	1367	1668	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		7			3			27			15	
Link Speed (k/h)		60			60			40			40	
Link Distance (m)		182.7			307.2			153.2			143.4	
Travel Time (s)		11.0			18.4			13.8			12.9	
Confl. Peds. (#/hr)	7		10	10		7			6	6		
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	33%	1%	0%	6%	1%	5%	0%	0%	0%	3%	0%	0%
Adj. Flow (vph)	3	736	28	49	1153	22	30	2	27	36	2	15
Shared Lane Traffic (%)												
Lane Group Flow (vph)	3	764	0	49	1175	0	30	29	0	36	17	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane		Yes			Yes							
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	2	2		6	6		8	8		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)	40.5	40.5		40.5	40.5		34.6	34.6		34.6	34.6	
Total Split (s)	75.0	75.0		75.0	75.0		35.0	35.0		35.0	35.0	
Total Split (%)	68.2%	68.2%		68.2%	68.2%		31.8%	31.8%		31.8%	31.8%	
Maximum Green (s)	69.5	69.5		69.5	69.5		28.4	28.4		28.4	28.4	
Yellow Time (s)	3.7	3.7		3.7	3.7		3.0	3.0		3.0	3.0	
All-Red Time (s)	1.8	1.8		1.8	1.8		3.6	3.6		3.6	3.6	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.5	5.5		5.5	5.5		6.6	6.6		6.6	6.6	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		5.0	5.0		5.0	5.0	
Recall Mode	C-Max	C-Max		C-Max	C-Max		Max	Max		Max	Max	
Walk Time (s)	28.0	28.0		28.0	28.0		12.0	12.0		12.0	12.0	
Flash Don't Walk (s)	7.0	7.0		7.0	7.0		16.0	16.0		16.0	16.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	69.5	69.5		69.5	69.5		28.4	28.4		28.4	28.4	
Actuated g/C Ratio	0.63	0.63		0.63	0.63		0.26	0.26		0.26	0.26	
v/c Ratio	0.02	0.34		0.13	0.52		0.08	0.07		0.10	0.04	
Control Delay (s/veh)	11.3	12.4		9.2	12.0		31.8	12.5		32.2	15.2	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay (s/veh)	11.3	12.4		9.2	12.0		31.8	12.5		32.2	15.2	
LOS	B	B		A	B		C	B		C	B	
Approach Delay (s/veh)		12.4			11.9			22.3			26.7	
Approach LOS		B			B			C			C	
Queue Length 50th (m)	0.3	42.9		3.9	66.6		4.9	0.3		5.9	0.3	
Queue Length 95th (m)	m1.1	60.0		9.2	82.4		12.5	7.4		14.1	5.7	
Internal Link Dist (m)		158.7			283.2			129.2			119.4	
Turn Bay Length (m)	45.0			30.0			15.0			35.0		
Base Capacity (vph)	169	2272		375	2274		369	439		352	441	
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	0.02	0.34		0.13	0.52		0.08	0.07		0.10	0.04	

Intersection Summary	
Area Type:	Other
Cycle Length: 110	
Actuated Cycle Length: 110	
Offset: 40 (36%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green	
Natural Cycle: 80	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.52	
Intersection Signal Delay (s/veh): 12.8	Intersection LOS: B

Intersection Capacity Utilization 73.3%	ICU Level of Service D
Analysis Period (min) 15	
m Volume for 95th percentile queue is metered by upstream signal.	

Splits and Phases: 103: Shadeland Avenue/Gallagher Road & Plains Road East



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	721	27	48	1130	22	29	2	26	35	2	15
Future Volume (vph)	3	721	27	48	1130	22	29	2	26	35	2	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5		5.5	5.5		6.6	6.6		6.6	6.6	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.98		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		0.99	1.00	
Frt	1.00	0.99		1.00	1.00		1.00	0.86		1.00	0.87	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1370	3591		1713	3599		1825	1624		1760	1667	
Flt Permitted	0.19	1.00		0.33	1.00		0.75	1.00		0.74	1.00	
Satd. Flow (perm)	269	3591		595	3599		1434	1624		1368	1667	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	3	736	28	49	1153	22	30	2	27	36	2	15
RTOR Reduction (vph)	0	3	0	0	1	0	0	20	0	0	11	0
Lane Group Flow (vph)	3	761	0	49	1174	0	30	9	0	36	6	0
Confl. Peds. (#/hr)	7		10	10		7			6	6		
Heavy Vehicles (%)	33%	1%	0%	6%	1%	5%	0%	0%	0%	3%	0%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	69.5	69.5		69.5	69.5		28.4	28.4		28.4	28.4	
Effective Green, g (s)	69.5	69.5		69.5	69.5		28.4	28.4		28.4	28.4	
Actuated g/C Ratio	0.63	0.63		0.63	0.63		0.26	0.26		0.26	0.26	
Clearance Time (s)	5.5	5.5		5.5	5.5		6.6	6.6		6.6	6.6	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	169	2268		375	2273		370	419		353	430	
v/s Ratio Prot		0.21			c0.33			0.01			0.00	
v/s Ratio Perm	0.01			0.08			0.02			c0.03		
v/c Ratio	0.02	0.34		0.13	0.52		0.08	0.02		0.10	0.01	
Uniform Delay, d1	7.5	9.5		8.1	11.1		30.9	30.4		31.1	30.4	
Progression Factor	1.45	1.27		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	0.4		0.7	0.8		0.4	0.1		0.6	0.1	
Delay (s)	11.1	12.4		8.8	11.9		31.3	30.5		31.7	30.4	
Level of Service	B	B		A	B		C	C		C	C	
Approach Delay (s/veh)		12.4			11.8			30.9			31.3	
Approach LOS		B			B			C			C	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	13.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	12.1
Intersection Capacity Utilization	73.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Appendix D

ITE Internal Capture

Project Name:	(240575) 198-200 & 206 Plains Road East
Analysis Period:	**AM Street Peak Hour**

Table 7-A: Conversion of Vehicle-Trip Ends to Person-Trip Ends

Land Use	Table 7-A (D): Entering Trips			Table 7-A (O): Exiting Trips		
	Veh. Occ.	Vehicle-Trips	Person-Trips*	Veh. Occ.	Vehicle-Trips	Person-Trips*
Office	1.00	0	0	1.00	0	0
Retail	1.00	6	6	1.00	4	4
Restaurant	1.00	0	0	1.00	0	0
Cinema/Entertainment	1.00	0	0	1.00	0	0
Residential	1.00	4	4	1.00	13	13
Hotel	1.00	0	0	1.00	0	0

Table 8-A (O): Internal Person-Trip Origin-Destination Matrix (Computed at Origin)

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

Table 8-A (D): Internal Person-Trip Origin-Destination Matrix (Computed at Destination)

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

Table 9-A (D): Internal and External Trips Summary (Entering Trips)

Destination Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles[1]	Transit[2]	Non-Motorized[2]
Office	0	0	0	0	0	0
Retail	0	6	6	6	0	0
Restaurant	0	0	0	0	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	0	4	4	4	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses[3]	0	0	0	0	0	0

Table 9-A (O): Internal and External Trips Summary (Exiting Trips)

Origin Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles[1]	Transit[2]	Non-Motorized[2]
Office	0	0	0	0	0	0
Retail	0	4	4	4	0	0
Restaurant	0	0	0	0	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	0	13	13	13	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses[3]	0	0	0	0	0	0

[1]Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-A

[2]Person-Trips

[3]Total estimate for all other land uses at mixed-use development site-not subject to internal trip capture computations in this estimator

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

Project Name:	(240575) 198-200 & 206 Plains Road East
Analysis Period:	**PM Street Peak Hour**

Table 7-P: Conversion of Vehicle-Trip Ends to Person-Trip Ends

Land Use	Table 7-P (D): Entering Trips			Table 7-P (O): Exiting Trips		
	Veh. Occ.	Vehicle-Trips	Person-Trips*	Veh. Occ.	Vehicle-Trips	Person-Trips*
Office	1.00	0	0	1.00	0	0
Retail	1.00	12	12	1.00	13	13
Restaurant	1.00	0	0	1.00	0	0
Cinema/Entertainment	1.00	0	0	1.00	0	0
Residential	1.00	16	16	1.00	10	10
Hotel	1.00	0	0	1.00	0	0

Table 8-P (O): Internal Person-Trip Origin-Destination Matrix (Computed at Origin)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		0	0	0	0	0
Retail	0		4	1	3	1
Restaurant	0	0		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	0	4	2	0		0
Hotel	0	0	0	0	0	

Table 8-P (D): Internal Person-Trip Origin-Destination Matrix (Computed at Destination)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		1	0	0	1	0
Retail	0		0	0	7	0
Restaurant	0	6		0	3	0
Cinema/Entertainment	0	0	0		1	0
Residential	0	1	0	0		0
Hotel	0	0	0	0	0	

Table 9-P (D): Internal and External Trips Summary (Entering Trips)

Destination Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles[1]	Transit[2]	Non-Motorized[2]
Office	0	0	0	0	0	0
Retail	1	11	12	11	0	0
Restaurant	0	0	0	0	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	3	13	16	13	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses[3]	0	0	0	0	0	0

Table 9-P (O): Internal and External Trips Summary (Exiting Trips)

Origin Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles[1]	Transit[2]	Non-Motorized[2]
Office	0	0	0	0	0	0
Retail	3	10	13	10	0	0
Restaurant	0	0	0	0	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	1	9	10	9	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses[3]	0	0	0	0	0	0

[1]Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-P

[2]Person-Trips

[3]Total estimate for all other land uses at mixed-use development site-not subject to internal trip capture computations in this estimator

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

Appendix E

TTS Data

AM

Cross Tabulation Query Form - Trip - 2022

Row: 2022 TTS zone of origin - tts22_orig
Column: 2022 TTS zone of destination - tts22_dest

Filters:
(2022 TTS zone of origin - tts22_orig In 5008
or
2022 TTS zone of destination - tts22_dest In 5008)
and
Start time of trip - start_time In 700-900

Trip 2022
ROW : tts22_orig
COLUMN : tts22_dest

tts22_orig	tts22_dest	total
5002	5008	38
5006	5008	16
5007	5008	21
5008	1078	4
5008	4511	8
5008	4679	4
5008	5016	16
5008	5041	9
5008	5199	50
5008	5460	126
5008	6125	14
5008	6150	99
5016	5008	16
5108	5008	13
5176	5008	31
5199	5008	50
23049	5008	11

PM

Cross Tabulation Query Form - Trip - 2022

Row: 2022 TTS zone of origin - tts22_orig
Column: 2022 TTS zone of destination - tts22_dest

Filters:
(2022 TTS zone of origin - tts22_orig In 5008
or
2022 TTS zone of destination - tts22_dest In 5008)
and
Start time of trip - start_time In 1500-1800

Trip 2022
ROW : tts22_orig
COLUMN : tts22_dest

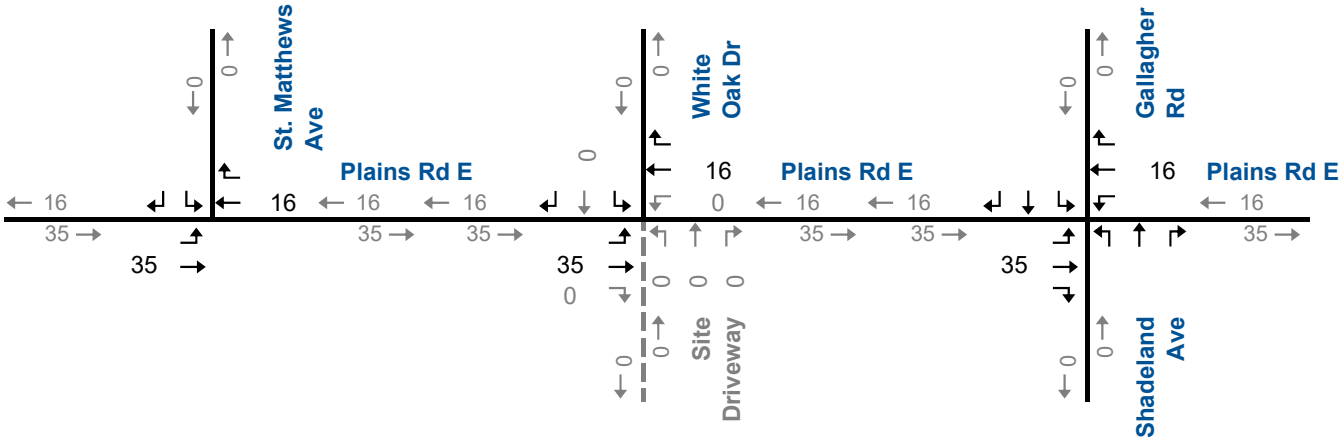
tts22_orig	tts22_dest	total
1078	5008	4
1363	5008	4
4657	5008	71
5008	4639	6
5008	5001	126
5008	5050	9
5008	5123	71
5008	5134	18
5008	5154	32
5008	5251	9
5008	5253	27
5008	6241	8
5017	5008	349
5036	5008	4
5095	5008	24
5123	5008	35
5134	5008	18
5253	5008	27
6125	5008	14
6150	5008	99
6241	5008	23

Appendix F

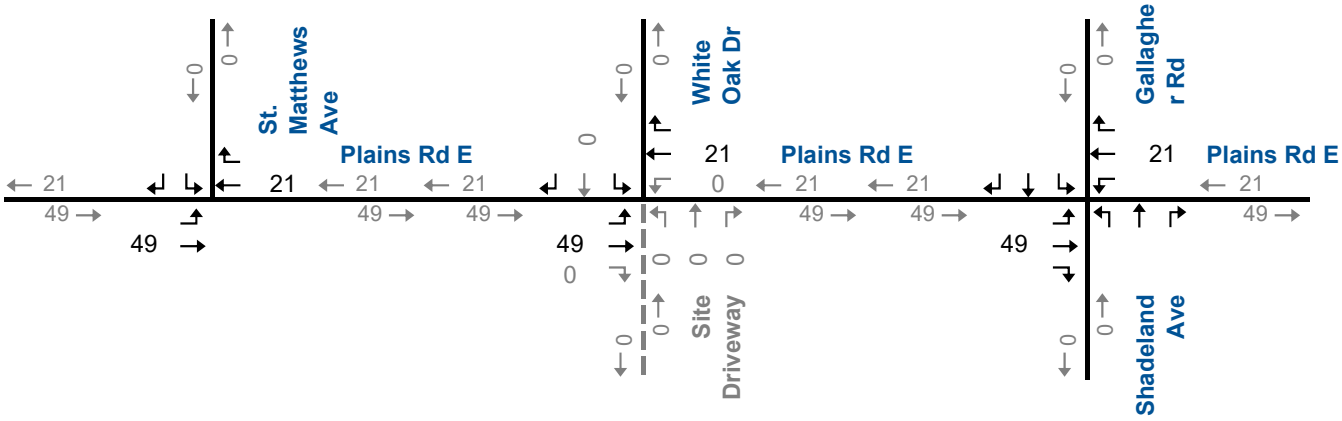
Adjacent Development Traffic Forecasts



AM PEAK HOUR



PM PEAK HOUR



84, 92, 104 Plains Road East Traffic Forecast

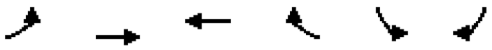
198-200 and 206 Plains Road East, Burlington
240575

Appendix F

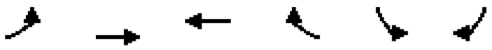
Appendix G

Background Traffic Operation Reports





Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	4	816	544	3	5	9
Future Volume (vph)	4	816	544	3	5	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	15.0			0.0	0.0	0.0
Storage Lanes	1			0	1	1
Taper Length (m)	7.6				7.6	
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	1.00
Ped Bike Factor	1.00		1.00		1.00	0.99
Frt			0.999			0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1460	3544	3574	0	1825	1633
Flt Permitted	0.438				0.950	
Satd. Flow (perm)	671	3544	3574	0	1822	1611
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)			1			9
Link Speed (k/h)		60	60		40	
Link Distance (m)		166.7	285.8		199.5	
Travel Time (s)		10.0	17.1		18.0	
Confl. Peds. (#/hr)	4			4	1	1
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	25%	3%	2%	5%	0%	0%
Adj. Flow (vph)	4	850	567	3	5	9
Shared Lane Traffic (%)						
Lane Group Flow (vph)	4	850	570	0	5	9
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.7	3.7		3.7	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.9	4.9		4.9	
Two way Left Turn Lane		Yes	Yes			
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24			14	24	14
Number of Detectors	1	2	2		1	1
Detector Template	Left	Thru	Thru		Left	Right
Leading Detector (m)	6.1	30.5	30.5		6.1	6.1
Trailing Detector (m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Size(m)	6.1	1.8	1.8		6.1	6.1
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0		0.0	0.0
Detector 2 Position(m)		28.7	28.7			
Detector 2 Size(m)		1.8	1.8			
Detector 2 Type		Cl+Ex	Cl+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			

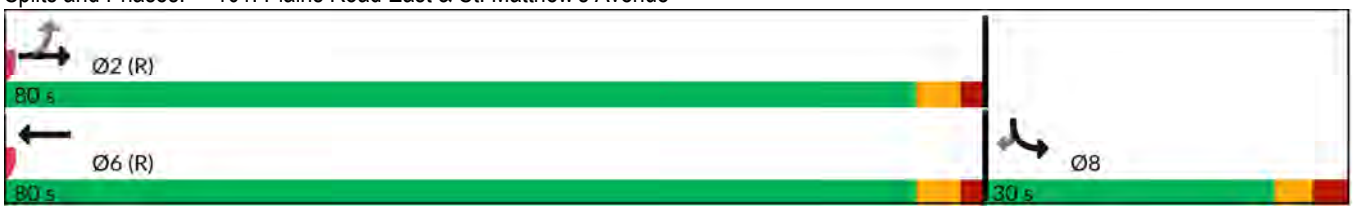


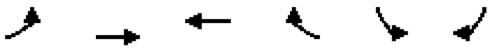
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Turn Type	Perm	NA	NA		Prot	Perm
Protected Phases		2	6		8	
Permitted Phases	2					8
Detector Phase	2	2	6		8	8
Switch Phase						
Minimum Initial (s)	8.0	8.0	8.0		8.0	8.0
Minimum Split (s)	45.5	45.5	45.5		27.0	27.0
Total Split (s)	80.0	80.0	80.0		30.0	30.0
Total Split (%)	72.7%	72.7%	72.7%		27.3%	27.3%
Maximum Green (s)	74.6	74.6	74.6		24.0	24.0
Yellow Time (s)	3.7	3.7	3.7		3.0	3.0
All-Red Time (s)	1.7	1.7	1.7		3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	5.4	5.4	5.4		6.0	6.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	C-Max	C-Max	C-Max		None	None
Walk Time (s)	30.0	30.0	30.0		8.0	8.0
Flash Don't Walk (s)	8.0	8.0	8.0		13.0	13.0
Pedestrian Calls (#/hr)	0	0	0		0	0
Act Effct Green (s)	102.2	102.2	102.2		8.0	8.0
Actuated g/C Ratio	0.93	0.93	0.93		0.07	0.07
v/c Ratio	0.01	0.26	0.17		0.04	0.07
Control Delay (s/veh)	1.5	1.3	1.1		48.2	26.7
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay (s/veh)	1.5	1.3	1.1		48.2	26.7
LOS	A	A	A		D	C
Approach Delay (s/veh)		1.3	1.1		34.4	
Approach LOS		A	A		C	
Queue Length 50th (m)	0.0	0.0	0.0		1.0	0.0
Queue Length 95th (m)	0.6	21.1	12.0		4.7	5.0
Internal Link Dist (m)		142.7	261.8		175.5	
Turn Bay Length (m)	15.0					
Base Capacity (vph)	623	3294	3322		398	358
Starvation Cap Reductn	0	0	0		0	0
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.01	0.26	0.17		0.01	0.03

Intersection Summary	
Area Type:	Other
Cycle Length: 110	
Actuated Cycle Length: 110	
Offset: 22.5 (20%), Referenced to phase 2:EBTL and 6:WBT, Start of Green	
Natural Cycle: 75	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.26	
Intersection Signal Delay (s/veh): 1.5	Intersection LOS: A

Intersection Capacity Utilization 48.2% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 101: Plains Road East & St. Matthew's Avenue

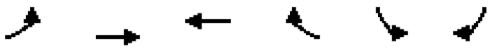




Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	4	816	544	3	5	9
Future Volume (vph)	4	816	544	3	5	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.4	5.4	5.4		6.0	6.0
Lane Util. Factor	1.00	0.95	0.95		1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00		1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	1.00		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1456	3544	3575		1825	1611
Flt Permitted	0.44	1.00	1.00		0.95	1.00
Satd. Flow (perm)	671	3544	3575		1825	1611
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	4	850	567	3	5	9
RTOR Reduction (vph)	0	0	0	0	0	9
Lane Group Flow (vph)	4	850	570	0	5	0
Confl. Peds. (#/hr)	4			4	1	1
Heavy Vehicles (%)	25%	3%	2%	5%	0%	0%
Turn Type	Perm	NA	NA		Prot	Perm
Protected Phases		2	6		8	
Permitted Phases	2					8
Actuated Green, G (s)	95.4	95.4	95.4		3.2	3.2
Effective Green, g (s)	95.4	95.4	95.4		3.2	3.2
Actuated g/C Ratio	0.87	0.87	0.87		0.03	0.03
Clearance Time (s)	5.4	5.4	5.4		6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	581	3073	3100		53	46
v/s Ratio Prot		c0.24	0.16		c0.00	
v/s Ratio Perm	0.01					0.00
v/c Ratio	0.01	0.28	0.18		0.09	0.01
Uniform Delay, d1	1.0	1.3	1.2		52.0	51.9
Progression Factor	1.00	1.00	0.91		1.00	1.00
Incremental Delay, d2	0.0	0.2	0.1		0.8	0.0
Delay (s)	1.0	1.5	1.2		52.8	51.9
Level of Service	A	A	A		D	D
Approach Delay (s/veh)		1.5	1.2		52.2	
Approach LOS		A	A		D	

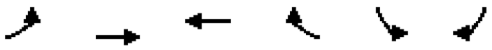
Intersection Summary			
HCM 2000 Control Delay (s/veh)	1.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.27		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	11.4
Intersection Capacity Utilization	48.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	32	783	502	20	22	33
Future Volume (vph)	32	783	502	20	22	33
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	35.0			0.0	0.0	0.0
Storage Lanes	1			0	1	0
Taper Length (m)	7.6				7.6	
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	1.00
Ped Bike Factor						
Frt			0.994		0.919	
Flt Protected	0.950				0.981	
Satd. Flow (prot)	1772	3544	3494	0	1633	0
Flt Permitted	0.950				0.981	
Satd. Flow (perm)	1772	3544	3494	0	1633	0
Link Speed (k/h)		60	60		40	
Link Distance (m)		285.8	182.7		131.2	
Travel Time (s)		17.1	11.0		11.8	
Confl. Peds. (#/hr)	4			4		2
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	3%	3%	4%	0%	0%	10%
Adj. Flow (vph)	34	824	528	21	23	35
Shared Lane Traffic (%)						
Lane Group Flow (vph)	34	824	549	0	58	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.7	3.7		3.7	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.9	4.9		4.9	
Two way Left Turn Lane		Yes	Yes			
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24			14	24	14
Sign Control		Free	Free		Stop	

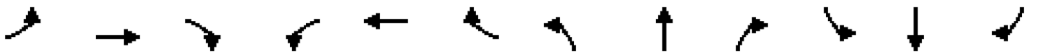
Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 32.3%		ICU Level of Service A	
Analysis Period (min) 15			



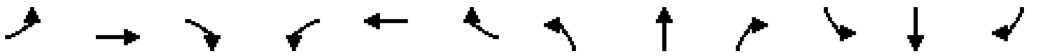
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	32	783	502	20	22	33
Future Volume (Veh/h)	32	783	502	20	22	33
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	34	824	528	21	23	35
Pedestrians		2			4	
Lane Width (m)		3.7			3.7	
Walking Speed (m/s)		1.1			1.1	
Percent Blockage		0			0	
Right turn flare (veh)						
Median type		TWLTL	TWLTL			
Median storage veh)		2	2			
Upstream signal (m)		286	183			
pX, platoon unblocked	0.95				0.95	0.95
vC, conflicting volume	553				1023	281
vC1, stage 1 conf vol					543	
vC2, stage 2 conf vol					480	
vCu, unblocked vol	430				905	144
tC, single (s)	4.2				6.8	7.1
tC, 2 stage (s)					5.8	
tF (s)	2.2				3.5	3.4
p0 queue free %	97				95	96
cM capacity (veh/h)	1061				469	807

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	34	412	412	352	197	58
Volume Left	34	0	0	0	0	23
Volume Right	0	0	0	0	21	35
cSH	1061	1700	1700	1700	1700	628
Volume to Capacity	0.03	0.24	0.24	0.21	0.12	0.09
Queue Length 95th (m)	0.8	0.0	0.0	0.0	0.0	2.3
Control Delay (s/veh)	8.5	0.0	0.0	0.0	0.0	11.3
Lane LOS	A					B
Approach Delay (s/veh)	0.3			0.0		11.3
Approach LOS						B

Intersection Summary			
Average Delay	0.6		
Intersection Capacity Utilization	32.3%	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)	22	763	26	17	455	28	15	17	41	92	13	53
Future Volume (vph)	22	763	26	17	455	28	15	17	41	92	13	53
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	45.0		0.0	30.0		0.0	15.0		0.0	35.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.6			7.6			7.6			7.6		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	1.00		1.00	1.00		1.00	0.99		1.00	0.99	
Frt		0.995			0.991			0.895			0.880	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1601	3555	0	1615	3465	0	1825	1699	0	1789	1646	0
Flt Permitted	0.429			0.273			0.708			0.713		
Satd. Flow (perm)	718	3555	0	464	3465	0	1359	1699	0	1337	1646	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		6			11			47			61	
Link Speed (k/h)		60			60			40			40	
Link Distance (m)		182.7			307.2			153.2			143.4	
Travel Time (s)		11.0			18.4			13.8			12.9	
Confl. Peds. (#/hr)	10		3	3		10	1		4	4		1
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	14%	2%	4%	13%	4%	7%	0%	0%	0%	2%	0%	2%
Adj. Flow (vph)	25	877	30	20	523	32	17	20	47	106	15	61
Shared Lane Traffic (%)												
Lane Group Flow (vph)	25	907	0	20	555	0	17	67	0	106	76	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane		Yes			Yes							
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	2	2		6	6		8	8		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)	40.5	40.5		40.5	40.5		34.6	34.6		34.6	34.6	
Total Split (s)	75.0	75.0		75.0	75.0		35.0	35.0		35.0	35.0	
Total Split (%)	68.2%	68.2%		68.2%	68.2%		31.8%	31.8%		31.8%	31.8%	
Maximum Green (s)	69.5	69.5		69.5	69.5		28.4	28.4		28.4	28.4	
Yellow Time (s)	3.7	3.7		3.7	3.7		3.0	3.0		3.0	3.0	
All-Red Time (s)	1.8	1.8		1.8	1.8		3.6	3.6		3.6	3.6	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.5	5.5		5.5	5.5		6.6	6.6		6.6	6.6	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		5.0	5.0		5.0	5.0	
Recall Mode	C-Max	C-Max		C-Max	C-Max		Max	Max		Max	Max	
Walk Time (s)	28.0	28.0		28.0	28.0		12.0	12.0		12.0	12.0	
Flash Don't Walk (s)	7.0	7.0		7.0	7.0		16.0	16.0		16.0	16.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	69.5	69.5		69.5	69.5		28.4	28.4		28.4	28.4	
Actuated g/C Ratio	0.63	0.63		0.63	0.63		0.26	0.26		0.26	0.26	
v/c Ratio	0.06	0.40		0.07	0.25		0.05	0.14		0.31	0.16	
Control Delay (s/veh)	6.7	9.6		8.6	9.0		31.3	14.2		35.9	11.9	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay (s/veh)	6.7	9.6		8.6	9.0		31.3	14.2		35.9	11.9	
LOS	A	A		A	A		C	B		D	B	
Approach Delay (s/veh)		9.5			9.0			17.7			25.9	
Approach LOS		A			A			B			C	
Queue Length 50th (m)	1.9	46.3		1.5	24.7		2.8	3.2		18.4	2.4	
Queue Length 95th (m)	5.0	55.6		4.5	31.6		8.1	13.1		32.6	12.7	
Internal Link Dist (m)		158.7			283.2			129.2			119.4	
Turn Bay Length (m)	45.0			30.0			15.0			35.0		
Base Capacity (vph)	453	2248		293	2193		350	473		345	470	
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	0.06	0.40		0.07	0.25		0.05	0.14		0.31	0.16	

Intersection Summary	
Area Type:	Other
Cycle Length: 110	
Actuated Cycle Length: 110	
Offset: 52 (47%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green	
Natural Cycle: 80	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.40	
Intersection Signal Delay (s/veh): 11.4	Intersection LOS: B

Intersection Capacity Utilization 62.6%
ICU Level of Service B
Analysis Period (min) 15

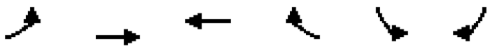
Splits and Phases: 103: Shadeland Avenue/Gallagher Road & Plains Road East



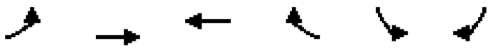
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	22	763	26	17	455	28	15	17	41	92	13	53
Future Volume (vph)	22	763	26	17	455	28	15	17	41	92	13	53
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5		5.5	5.5		6.6	6.6		6.6	6.6	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	0.99	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00		1.00	0.99		1.00	0.89		1.00	0.88	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1590	3556		1613	3467		1823	1699		1782	1646	
Flt Permitted	0.43	1.00		0.27	1.00		0.71	1.00		0.71	1.00	
Satd. Flow (perm)	718	3556		464	3467		1358	1699		1338	1646	
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	25	877	30	20	523	32	17	20	47	106	15	61
RTOR Reduction (vph)	0	2	0	0	4	0	0	35	0	0	45	0
Lane Group Flow (vph)	25	905	0	20	551	0	17	32	0	106	31	0
Confl. Peds. (#/hr)	10		3	3		10	1		4	4		1
Heavy Vehicles (%)	14%	2%	4%	13%	4%	7%	0%	0%	0%	2%	0%	2%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	69.5	69.5		69.5	69.5		28.4	28.4		28.4	28.4	
Effective Green, g (s)	69.5	69.5		69.5	69.5		28.4	28.4		28.4	28.4	
Actuated g/C Ratio	0.63	0.63		0.63	0.63		0.26	0.26		0.26	0.26	
Clearance Time (s)	5.5	5.5		5.5	5.5		6.6	6.6		6.6	6.6	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	453	2246		293	2190		350	438		345	424	
v/s Ratio Prot		c0.25			0.16			0.02			0.02	
v/s Ratio Perm	0.03			0.04			0.01			c0.08		
v/c Ratio	0.06	0.40		0.07	0.25		0.05	0.07		0.31	0.07	
Uniform Delay, d1	7.7	10.0		7.8	8.9		30.7	30.9		32.9	30.8	
Progression Factor	0.81	0.90		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	0.5		0.4	0.3		0.3	0.3		2.3	0.3	
Delay (s)	6.5	9.6		8.2	9.1		30.9	31.2		35.2	31.2	
Level of Service	A	A		A	A		C	C		D	C	
Approach Delay (s/veh)		9.5			9.1			31.1			33.5	
Approach LOS		A			A			C			C	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	12.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.37		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	12.1
Intersection Capacity Utilization	62.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	22	848	1225	17	18	16
Future Volume (vph)	22	848	1225	17	18	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	15.0			0.0	0.0	0.0
Storage Lanes	1			0	1	1
Taper Length (m)	7.6				7.6	
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	1.00
Ped Bike Factor	1.00		1.00		1.00	0.98
Frt			0.998			0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1825	3614	3606	0	1825	1526
Flt Permitted	0.210				0.950	
Satd. Flow (perm)	403	3614	3606	0	1819	1494
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)			3			16
Link Speed (k/h)		60	60		40	
Link Distance (m)		166.7	285.8		199.5	
Travel Time (s)		10.0	17.1		18.0	
Confl. Peds. (#/hr)	6			6	2	6
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	0%	1%	1%	0%	0%	7%
Adj. Flow (vph)	22	865	1250	17	18	16
Shared Lane Traffic (%)						
Lane Group Flow (vph)	22	865	1267	0	18	16
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.7	3.7		3.7	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.9	4.9		4.9	
Two way Left Turn Lane		Yes	Yes			
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24			14	24	14
Number of Detectors	1	2	2		1	1
Detector Template	Left	Thru	Thru		Left	Right
Leading Detector (m)	6.1	30.5	30.5		6.1	6.1
Trailing Detector (m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Size(m)	6.1	1.8	1.8		6.1	6.1
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0		0.0	0.0
Detector 2 Position(m)		28.7	28.7			
Detector 2 Size(m)		1.8	1.8			
Detector 2 Type		Cl+Ex	Cl+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			

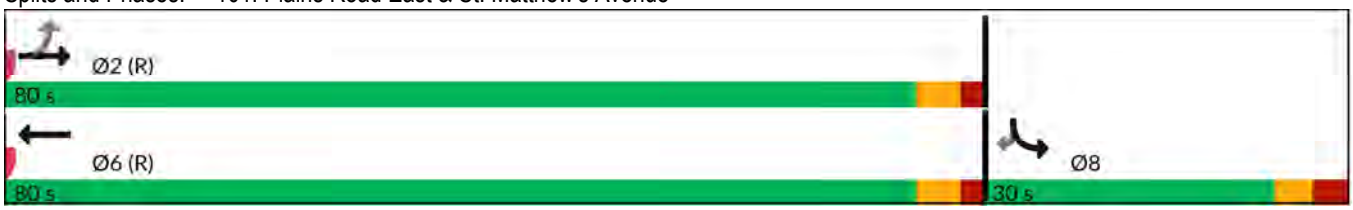


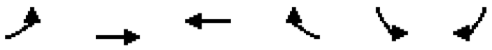
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Turn Type	Perm	NA	NA		Prot	Perm
Protected Phases		2	6		8	
Permitted Phases	2					8
Detector Phase	2	2	6		8	8
Switch Phase						
Minimum Initial (s)	8.0	8.0	8.0		8.0	8.0
Minimum Split (s)	45.5	45.5	45.5		27.0	27.0
Total Split (s)	80.0	80.0	80.0		30.0	30.0
Total Split (%)	72.7%	72.7%	72.7%		27.3%	27.3%
Maximum Green (s)	74.6	74.6	74.6		24.0	24.0
Yellow Time (s)	3.7	3.7	3.7		3.0	3.0
All-Red Time (s)	1.7	1.7	1.7		3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	5.4	5.4	5.4		6.0	6.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	C-Max	C-Max	C-Max		None	None
Walk Time (s)	30.0	30.0	30.0		8.0	8.0
Flash Don't Walk (s)	8.0	8.0	8.0		13.0	13.0
Pedestrian Calls (#/hr)	0	0	0		0	0
Act Effct Green (s)	98.3	98.3	98.3		8.1	8.1
Actuated g/C Ratio	0.89	0.89	0.89		0.07	0.07
v/c Ratio	0.06	0.27	0.39		0.14	0.13
Control Delay (s/veh)	2.1	1.8	4.4		50.2	23.3
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay (s/veh)	2.1	1.8	4.4		50.2	23.3
LOS	A	A	A		D	C
Approach Delay (s/veh)		1.8	4.4		37.5	
Approach LOS		A	A		D	
Queue Length 50th (m)	0.7	16.9	90.6		3.7	0.0
Queue Length 95th (m)	2.0	22.0	111.2		10.8	6.8
Internal Link Dist (m)		142.7	261.8		175.5	
Turn Bay Length (m)	15.0					
Base Capacity (vph)	360	3229	3222		398	338
Starvation Cap Reductn	0	0	0		0	0
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.06	0.27	0.39		0.05	0.05

Intersection Summary	
Area Type:	Other
Cycle Length: 110	
Actuated Cycle Length: 110	
Offset: 94 (85%), Referenced to phase 2:EBTL and 6:WBT, Start of Green	
Natural Cycle: 75	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.39	
Intersection Signal Delay (s/veh): 3.8	Intersection LOS: A

Intersection Capacity Utilization 52.5% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 101: Plains Road East & St. Matthew's Avenue

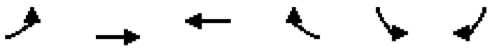




Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	22	848	1225	17	18	16
Future Volume (vph)	22	848	1225	17	18	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.4	5.4	5.4		6.0	6.0
Lane Util. Factor	1.00	0.95	0.95		1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00		1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	1.00		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1822	3614	3606		1825	1494
Flt Permitted	0.21	1.00	1.00		0.95	1.00
Satd. Flow (perm)	402	3614	3606		1825	1494
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	22	865	1250	17	18	16
RTOR Reduction (vph)	0	0	0	0	0	15
Lane Group Flow (vph)	22	865	1267	0	18	1
Confl. Peds. (#/hr)	6			6	2	6
Heavy Vehicles (%)	0%	1%	1%	0%	0%	7%
Turn Type	Perm	NA	NA		Prot	Perm
Protected Phases		2	6		8	
Permitted Phases	2					8
Actuated Green, G (s)	93.7	93.7	93.7		4.9	4.9
Effective Green, g (s)	93.7	93.7	93.7		4.9	4.9
Actuated g/C Ratio	0.85	0.85	0.85		0.04	0.04
Clearance Time (s)	5.4	5.4	5.4		6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	342	3078	3071		81	66
v/s Ratio Prot		0.24	c0.35		c0.01	
v/s Ratio Perm	0.05					0.00
v/c Ratio	0.06	0.28	0.41		0.22	0.01
Uniform Delay, d1	1.3	1.6	1.9		50.7	50.2
Progression Factor	1.00	1.00	2.18		1.00	1.00
Incremental Delay, d2	0.4	0.2	0.4		1.4	0.1
Delay (s)	1.6	1.8	4.4		52.1	50.3
Level of Service	A	A	A		D	D
Approach Delay (s/veh)		1.8	4.4		51.3	
Approach LOS		A	A		D	

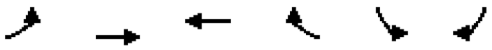
Intersection Summary			
HCM 2000 Control Delay (s/veh)	4.1	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	11.4
Intersection Capacity Utilization	52.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	22	839	1204	39	19	22
Future Volume (vph)	22	839	1204	39	19	22
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	35.0			0.0	0.0	0.0
Storage Lanes	1			0	1	0
Taper Length (m)	7.6				7.6	
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	1.00
Ped Bike Factor						
Frt			0.995		0.928	
Flt Protected	0.950				0.977	
Satd. Flow (prot)	1825	3579	3594	0	1696	0
Flt Permitted	0.950				0.977	
Satd. Flow (perm)	1825	3579	3594	0	1696	0
Link Speed (k/h)		60	60		40	
Link Distance (m)		285.8	182.7		131.2	
Travel Time (s)		17.1	11.0		11.8	
Confl. Peds. (#/hr)	5			5		
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	0%	2%	1%	3%	0%	5%
Adj. Flow (vph)	23	865	1241	40	20	23
Shared Lane Traffic (%)						
Lane Group Flow (vph)	23	865	1281	0	43	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.7	3.7		3.7	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.9	4.9		4.9	
Two way Left Turn Lane		Yes	Yes			
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24			14	24	14
Sign Control		Free	Free		Stop	

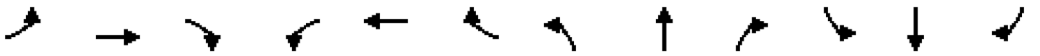
Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 44.5%		ICU Level of Service A	
Analysis Period (min) 15			



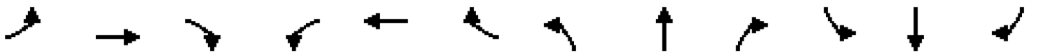
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	22	839	1204	39	19	22
Future Volume (Veh/h)	22	839	1204	39	19	22
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	23	865	1241	40	20	23
Pedestrians					5	
Lane Width (m)					3.7	
Walking Speed (m/s)					1.1	
Percent Blockage					0	
Right turn flare (veh)						
Median type		TWLTL	TWLTL			
Median storage veh)		2	2			
Upstream signal (m)		286	183			
pX, platoon unblocked	0.79				0.80	0.79
vC, conflicting volume	1286				1745	646
vC1, stage 1 conf vol					1266	
vC2, stage 2 conf vol					479	
vCu, unblocked vol	842				1333	36
tC, single (s)	4.1				6.8	7.0
tC, 2 stage (s)					5.8	
tF (s)	2.2				3.5	3.4
p0 queue free %	96				93	97
cM capacity (veh/h)	634				287	805

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	23	433	433	827	454	43
Volume Left	23	0	0	0	0	20
Volume Right	0	0	0	0	40	23
cSH	634	1700	1700	1700	1700	437
Volume to Capacity	0.04	0.25	0.25	0.49	0.27	0.10
Queue Length 95th (m)	0.9	0.0	0.0	0.0	0.0	2.5
Control Delay (s/veh)	10.9	0.0	0.0	0.0	0.0	14.1
Lane LOS	B					B
Approach Delay (s/veh)	0.3			0.0		14.1
Approach LOS						B

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	44.5%	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)	3	807	28	50	1209	23	30	2	27	37	2	16
Future Volume (vph)	3	807	28	50	1209	23	30	2	27	37	2	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	45.0		0.0	30.0		0.0	15.0		0.0	35.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.6			7.6			7.6			7.6		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00	1.00		1.00	1.00			0.98		0.99		
Frt		0.995			0.997			0.860			0.867	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1372	3593	0	1722	3598	0	1825	1623	0	1772	1666	0
Flt Permitted	0.164			0.294			0.746			0.738		
Satd. Flow (perm)	237	3593	0	531	3598	0	1433	1623	0	1367	1666	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		6			3			28			16	
Link Speed (k/h)		60			60			40			40	
Link Distance (m)		182.7			307.2			153.2			143.4	
Travel Time (s)		11.0			18.4			13.8			12.9	
Confl. Peds. (#/hr)	7		10	10		7			6	6		
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	33%	1%	0%	6%	1%	5%	0%	0%	0%	3%	0%	0%
Adj. Flow (vph)	3	823	29	51	1234	23	31	2	28	38	2	16
Shared Lane Traffic (%)												
Lane Group Flow (vph)	3	852	0	51	1257	0	31	30	0	38	18	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane		Yes			Yes							
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	2	2		6	6		8	8		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)	40.5	40.5		40.5	40.5		34.6	34.6		34.6	34.6	
Total Split (s)	75.0	75.0		75.0	75.0		35.0	35.0		35.0	35.0	
Total Split (%)	68.2%	68.2%		68.2%	68.2%		31.8%	31.8%		31.8%	31.8%	
Maximum Green (s)	69.5	69.5		69.5	69.5		28.4	28.4		28.4	28.4	
Yellow Time (s)	3.7	3.7		3.7	3.7		3.0	3.0		3.0	3.0	
All-Red Time (s)	1.8	1.8		1.8	1.8		3.6	3.6		3.6	3.6	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.5	5.5		5.5	5.5		6.6	6.6		6.6	6.6	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		5.0	5.0		5.0	5.0	
Recall Mode	C-Max	C-Max		C-Max	C-Max		Max	Max		Max	Max	
Walk Time (s)	28.0	28.0		28.0	28.0		12.0	12.0		12.0	12.0	
Flash Don't Walk (s)	7.0	7.0		7.0	7.0		16.0	16.0		16.0	16.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	69.5	69.5		69.5	69.5		28.4	28.4		28.4	28.4	
Actuated g/C Ratio	0.63	0.63		0.63	0.63		0.26	0.26		0.26	0.26	
v/c Ratio	0.02	0.38		0.15	0.55		0.08	0.07		0.11	0.04	
Control Delay (s/veh)	12.0	13.4		9.7	12.6		31.9	12.3		32.3	15.1	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay (s/veh)	12.0	13.4		9.7	12.6		31.9	12.3		32.3	15.1	
LOS	B	B		A	B		C	B		C	B	
Approach Delay (s/veh)		13.3			12.5			22.2			26.8	
Approach LOS		B			B			C			C	
Queue Length 50th (m)	0.3	51.5		4.1	73.8		5.1	0.3		6.2	0.3	
Queue Length 95th (m)	m1.1	70.6		9.7	91.1		12.7	7.6		14.7	5.9	
Internal Link Dist (m)		158.7			283.2			129.2			119.4	
Turn Bay Length (m)	45.0			30.0			15.0			35.0		
Base Capacity (vph)	149	2272		335	2274		369	439		352	442	
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	0.02	0.38		0.15	0.55		0.08	0.07		0.11	0.04	

Intersection Summary	
Area Type:	Other
Cycle Length: 110	
Actuated Cycle Length: 110	
Offset: 40 (36%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green	
Natural Cycle: 80	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.55	
Intersection Signal Delay (s/veh): 13.4	Intersection LOS: B

Intersection Capacity Utilization 75.0%	ICU Level of Service D
Analysis Period (min) 15	
m Volume for 95th percentile queue is metered by upstream signal.	

Splits and Phases: 103: Shadeland Avenue/Gallagher Road & Plains Road East



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	807	28	50	1209	23	30	2	27	37	2	16
Future Volume (vph)	3	807	28	50	1209	23	30	2	27	37	2	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5		5.5	5.5		6.6	6.6		6.6	6.6	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.98		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		0.99	1.00	
Frt	1.00	0.99		1.00	1.00		1.00	0.86		1.00	0.87	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1370	3592		1714	3599		1825	1623		1760	1665	
Flt Permitted	0.16	1.00		0.29	1.00		0.75	1.00		0.74	1.00	
Satd. Flow (perm)	237	3592		531	3599		1433	1623		1366	1665	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	3	823	29	51	1234	23	31	2	28	38	2	16
RTOR Reduction (vph)	0	2	0	0	1	0	0	21	0	0	12	0
Lane Group Flow (vph)	3	850	0	51	1256	0	31	9	0	38	6	0
Confl. Peds. (#/hr)	7		10	10		7			6	6		
Heavy Vehicles (%)	33%	1%	0%	6%	1%	5%	0%	0%	0%	3%	0%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	69.5	69.5		69.5	69.5		28.4	28.4		28.4	28.4	
Effective Green, g (s)	69.5	69.5		69.5	69.5		28.4	28.4		28.4	28.4	
Actuated g/C Ratio	0.63	0.63		0.63	0.63		0.26	0.26		0.26	0.26	
Clearance Time (s)	5.5	5.5		5.5	5.5		6.6	6.6		6.6	6.6	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	149	2269		335	2273		369	419		352	429	
v/s Ratio Prot		0.24			c0.35			0.01			0.00	
v/s Ratio Perm	0.01			0.10			0.02			c0.03		
v/c Ratio	0.02	0.37		0.15	0.55		0.08	0.02		0.11	0.01	
Uniform Delay, d1	7.6	9.8		8.2	11.5		30.9	30.4		31.1	30.4	
Progression Factor	1.51	1.32		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	0.5		1.0	1.0		0.4	0.1		0.6	0.1	
Delay (s)	11.7	13.3		9.2	12.4		31.4	30.5		31.8	30.4	
Level of Service	B	B		A	B		C	C		C	C	
Approach Delay (s/veh)		13.3			12.3			31.0			31.3	
Approach LOS		B			B			C			C	

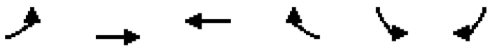
Intersection Summary			
HCM 2000 Control Delay (s/veh)	13.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	12.1
Intersection Capacity Utilization	75.0%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

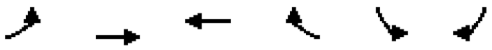
Appendix H

Total Traffic Operation Reports





Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	4	822	552	3	5	9
Future Volume (vph)	4	822	552	3	5	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	15.0			0.0	0.0	0.0
Storage Lanes	1			0	1	1
Taper Length (m)	7.6				7.6	
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	1.00
Ped Bike Factor	1.00		1.00		1.00	0.99
Frt			0.999			0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1460	3544	3574	0	1825	1633
Flt Permitted	0.434				0.950	
Satd. Flow (perm)	665	3544	3574	0	1822	1611
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)			1			9
Link Speed (k/h)		60	60		40	
Link Distance (m)		166.7	285.8		199.5	
Travel Time (s)		10.0	17.1		18.0	
Confl. Peds. (#/hr)	4			4	1	1
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	25%	3%	2%	5%	0%	0%
Adj. Flow (vph)	4	856	575	3	5	9
Shared Lane Traffic (%)						
Lane Group Flow (vph)	4	856	578	0	5	9
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.7	3.7		3.7	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.9	4.9		4.9	
Two way Left Turn Lane		Yes	Yes			
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24			14	24	14
Number of Detectors	1	2	2		1	1
Detector Template	Left	Thru	Thru		Left	Right
Leading Detector (m)	6.1	30.5	30.5		6.1	6.1
Trailing Detector (m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Size(m)	6.1	1.8	1.8		6.1	6.1
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0		0.0	0.0
Detector 2 Position(m)		28.7	28.7			
Detector 2 Size(m)		1.8	1.8			
Detector 2 Type		Cl+Ex	Cl+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			

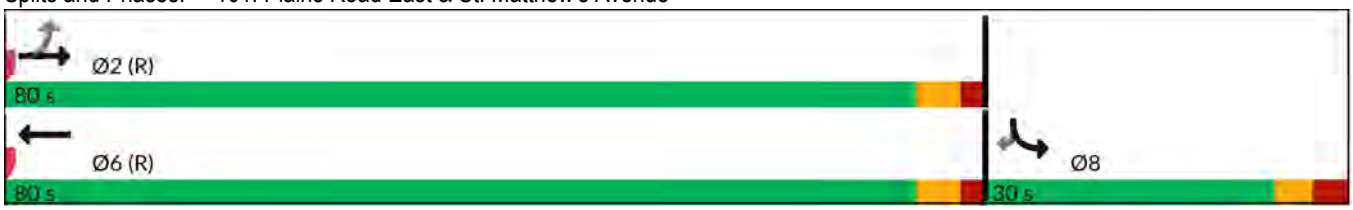


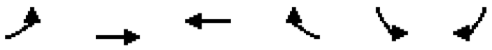
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Turn Type	Perm	NA	NA		Prot	Perm
Protected Phases		2	6		8	
Permitted Phases	2					8
Detector Phase	2	2	6		8	8
Switch Phase						
Minimum Initial (s)	8.0	8.0	8.0		8.0	8.0
Minimum Split (s)	45.5	45.5	45.5		27.0	27.0
Total Split (s)	80.0	80.0	80.0		30.0	30.0
Total Split (%)	72.7%	72.7%	72.7%		27.3%	27.3%
Maximum Green (s)	74.6	74.6	74.6		24.0	24.0
Yellow Time (s)	3.7	3.7	3.7		3.0	3.0
All-Red Time (s)	1.7	1.7	1.7		3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	5.4	5.4	5.4		6.0	6.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	C-Max	C-Max	C-Max		None	None
Walk Time (s)	30.0	30.0	30.0		8.0	8.0
Flash Don't Walk (s)	8.0	8.0	8.0		13.0	13.0
Pedestrian Calls (#/hr)	0	0	0		0	0
Act Effct Green (s)	102.2	102.2	102.2		8.0	8.0
Actuated g/C Ratio	0.93	0.93	0.93		0.07	0.07
v/c Ratio	0.01	0.26	0.17		0.04	0.07
Control Delay (s/veh)	1.5	1.3	1.1		48.2	26.7
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay (s/veh)	1.5	1.3	1.1		48.2	26.7
LOS	A	A	A		D	C
Approach Delay (s/veh)		1.3	1.1		34.4	
Approach LOS		A	A		C	
Queue Length 50th (m)	0.0	0.0	0.0		1.0	0.0
Queue Length 95th (m)	0.6	21.3	12.2		4.7	5.0
Internal Link Dist (m)		142.7	261.8		175.5	
Turn Bay Length (m)	15.0					
Base Capacity (vph)	618	3294	3322		398	358
Starvation Cap Reductn	0	0	0		0	0
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.01	0.26	0.17		0.01	0.03

Intersection Summary	
Area Type:	Other
Cycle Length: 110	
Actuated Cycle Length: 110	
Offset: 22.5 (20%), Referenced to phase 2:EBTL and 6:WBT, Start of Green	
Natural Cycle: 75	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.26	
Intersection Signal Delay (s/veh): 1.5	Intersection LOS: A

Intersection Capacity Utilization 48.2% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 101: Plains Road East & St. Matthew's Avenue





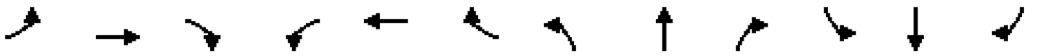
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	4	822	552	3	5	9
Future Volume (vph)	4	822	552	3	5	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.4	5.4	5.4		6.0	6.0
Lane Util. Factor	1.00	0.95	0.95		1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00		1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	1.00		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1456	3544	3575		1825	1611
Flt Permitted	0.43	1.00	1.00		0.95	1.00
Satd. Flow (perm)	666	3544	3575		1825	1611
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	4	856	575	3	5	9
RTOR Reduction (vph)	0	0	0	0	0	9
Lane Group Flow (vph)	4	856	578	0	5	0
Confl. Peds. (#/hr)	4			4	1	1
Heavy Vehicles (%)	25%	3%	2%	5%	0%	0%
Turn Type	Perm	NA	NA		Prot	Perm
Protected Phases		2	6		8	
Permitted Phases	2					8
Actuated Green, G (s)	95.4	95.4	95.4		3.2	3.2
Effective Green, g (s)	95.4	95.4	95.4		3.2	3.2
Actuated g/C Ratio	0.87	0.87	0.87		0.03	0.03
Clearance Time (s)	5.4	5.4	5.4		6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	577	3073	3100		53	46
v/s Ratio Prot		c0.24	0.16		c0.00	
v/s Ratio Perm	0.01					0.00
v/c Ratio	0.01	0.28	0.19		0.09	0.01
Uniform Delay, d1	1.0	1.3	1.2		52.0	51.9
Progression Factor	1.00	1.00	0.91		1.00	1.00
Incremental Delay, d2	0.0	0.2	0.1		0.8	0.0
Delay (s)	1.0	1.5	1.2		52.8	51.9
Level of Service	A	A	A		D	D
Approach Delay (s/veh)		1.5	1.2		52.2	
Approach LOS		A	A		D	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	1.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.27		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	11.4
Intersection Capacity Utilization	48.2%	ICU Level of Service	A
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)	32	783	6	4	502	20	8	0	9	22	0	33
Future Volume (vph)	32	783	6	4	502	20	8	0	9	22	0	33
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	35.0		0.0	15.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	7.6			7.6			2.5			7.6		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.999			0.994			0.929			0.919	
Flt Protected	0.950			0.950				0.977			0.981	
Satd. Flow (prot)	1772	3541	0	1789	3494	0	0	1709	0	0	1633	0
Flt Permitted	0.950			0.950				0.977			0.981	
Satd. Flow (perm)	1772	3541	0	1789	3494	0	0	1709	0	0	1633	0
Link Speed (k/h)		60			60			50			40	
Link Distance (m)		285.8			182.7			115.4			131.2	
Travel Time (s)		17.1			11.0			8.3			11.8	
Confl. Peds. (#/hr)	4					4						2
Peak Hour Factor	0.95	0.95	0.92	0.92	0.95	0.95	0.92	0.92	0.92	0.95	0.92	0.95
Heavy Vehicles (%)	3%	3%	2%	2%	4%	0%	2%	2%	2%	0%	2%	10%
Adj. Flow (vph)	34	824	7	4	528	21	9	0	10	23	0	35
Shared Lane Traffic (%)												
Lane Group Flow (vph)	34	831	0	4	549	0	0	19	0	0	58	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			1.6			4.9	
Two way Left Turn Lane		Yes			Yes							
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control		Free			Free			Stop			Stop	

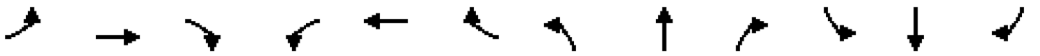
Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 37.9%		ICU Level of Service A	
Analysis Period (min) 15			



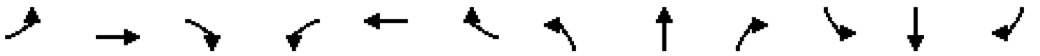
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	32	783	6	4	502	20	8	0	9	22	0	33
Future Volume (Veh/h)	32	783	6	4	502	20	8	0	9	22	0	33
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.92	0.92	0.95	0.95	0.92	0.92	0.92	0.95	0.92	0.95
Hourly flow rate (vph)	34	824	7	4	528	21	9	0	10	23	0	35
Pedestrians		2									4	
Lane Width (m)		3.7									3.7	
Walking Speed (m/s)		1.1									1.1	
Percent Blockage		0									0	
Right turn flare (veh)												
Median type		TWLTL			TWLTL							
Median storage veh)		2			2							
Upstream signal (m)		286			183							
pX, platoon unblocked	0.95			0.99			0.95	0.95	0.99	0.95	0.95	0.95
vC, conflicting volume	553			831			1205	1457	416	1041	1450	281
vC1, stage 1 conf vol							896	896		551	551	
vC2, stage 2 conf vol							309	561		490	899	
vCu, unblocked vol	430			819			1093	1357	401	921	1349	143
tC, single (s)	4.2			4.1			7.5	6.5	6.9	7.5	6.5	7.1
tC, 2 stage (s)							6.5	5.5		6.5	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.4
p0 queue free %	97			100			97	100	98	94	100	96
cM capacity (veh/h)	1061			801			281	305	596	411	306	808

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	34	549	282	4	352	197	19	58
Volume Left	34	0	0	4	0	0	9	23
Volume Right	0	0	7	0	0	21	10	35
cSH	1061	1700	1700	801	1700	1700	389	584
Volume to Capacity	0.03	0.32	0.17	0.00	0.21	0.12	0.05	0.10
Queue Length 95th (m)	0.8	0.0	0.0	0.1	0.0	0.0	1.2	2.5
Control Delay (s/veh)	8.5	0.0	0.0	9.5	0.0	0.0	14.7	11.8
Lane LOS	A			A			B	B
Approach Delay (s/veh)	0.3			0.1			14.7	11.8
Approach LOS							B	B

Intersection Summary				
Average Delay	0.9			
Intersection Capacity Utilization	37.9%	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)	22	772	26	17	459	28	15	17	41	92	13	53
Future Volume (vph)	22	772	26	17	459	28	15	17	41	92	13	53
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	45.0		0.0	30.0		0.0	15.0		0.0	35.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.6			7.6			7.6			7.6		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	1.00		1.00	1.00		1.00	0.99		1.00	0.99	
Frt		0.995			0.991			0.895			0.880	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1601	3555	0	1615	3465	0	1825	1699	0	1789	1646	0
Flt Permitted	0.427			0.269			0.708			0.713		
Satd. Flow (perm)	715	3555	0	457	3465	0	1359	1699	0	1337	1646	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		6			11			47			61	
Link Speed (k/h)		60			60			40			40	
Link Distance (m)		182.7			307.2			153.2			143.4	
Travel Time (s)		11.0			18.4			13.8			12.9	
Confl. Peds. (#/hr)	10		3	3		10	1		4	4		1
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	14%	2%	4%	13%	4%	7%	0%	0%	0%	2%	0%	2%
Adj. Flow (vph)	25	887	30	20	528	32	17	20	47	106	15	61
Shared Lane Traffic (%)												
Lane Group Flow (vph)	25	917	0	20	560	0	17	67	0	106	76	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane		Yes			Yes							
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	2	2		6	6		8	8		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)	40.5	40.5		40.5	40.5		34.6	34.6		34.6	34.6	
Total Split (s)	75.0	75.0		75.0	75.0		35.0	35.0		35.0	35.0	
Total Split (%)	68.2%	68.2%		68.2%	68.2%		31.8%	31.8%		31.8%	31.8%	
Maximum Green (s)	69.5	69.5		69.5	69.5		28.4	28.4		28.4	28.4	
Yellow Time (s)	3.7	3.7		3.7	3.7		3.0	3.0		3.0	3.0	
All-Red Time (s)	1.8	1.8		1.8	1.8		3.6	3.6		3.6	3.6	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.5	5.5		5.5	5.5		6.6	6.6		6.6	6.6	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		5.0	5.0		5.0	5.0	
Recall Mode	C-Max	C-Max		C-Max	C-Max		Max	Max		Max	Max	
Walk Time (s)	28.0	28.0		28.0	28.0		12.0	12.0		12.0	12.0	
Flash Don't Walk (s)	7.0	7.0		7.0	7.0		16.0	16.0		16.0	16.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	69.5	69.5		69.5	69.5		28.4	28.4		28.4	28.4	
Actuated g/C Ratio	0.63	0.63		0.63	0.63		0.26	0.26		0.26	0.26	
v/c Ratio	0.06	0.41		0.07	0.26		0.05	0.14		0.31	0.16	
Control Delay (s/veh)	6.7	9.7		8.6	9.1		31.3	14.2		35.9	11.9	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay (s/veh)	6.7	9.7		8.6	9.1		31.3	14.2		35.9	11.9	
LOS	A	A		A	A		C	B		D	B	
Approach Delay (s/veh)		9.6			9.0			17.7			25.9	
Approach LOS		A			A			B			C	
Queue Length 50th (m)	1.9	47.0		1.5	25.0		2.8	3.2		18.4	2.4	
Queue Length 95th (m)	5.0	56.4		4.5	31.8		8.1	13.1		32.6	12.7	
Internal Link Dist (m)		158.7			283.2			129.2			119.4	
Turn Bay Length (m)	45.0			30.0			15.0			35.0		
Base Capacity (vph)	451	2248		288	2193		350	473		345	470	
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	0.06	0.41		0.07	0.26		0.05	0.14		0.31	0.16	

Intersection Summary	
Area Type:	Other
Cycle Length: 110	
Actuated Cycle Length: 110	
Offset: 52 (47%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green	
Natural Cycle: 80	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.41	
Intersection Signal Delay (s/veh): 11.4	Intersection LOS: B

Intersection Capacity Utilization 62.6% ICU Level of Service B
Analysis Period (min) 15

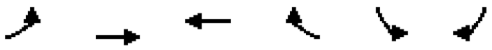
Splits and Phases: 103: Shadeland Avenue/Gallagher Road & Plains Road East



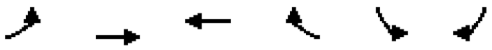
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	22	772	26	17	459	28	15	17	41	92	13	53
Future Volume (vph)	22	772	26	17	459	28	15	17	41	92	13	53
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5		5.5	5.5		6.6	6.6		6.6	6.6	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	0.99	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00		1.00	0.99		1.00	0.89		1.00	0.88	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1590	3556		1613	3467		1823	1699		1782	1646	
Flt Permitted	0.43	1.00		0.27	1.00		0.71	1.00		0.71	1.00	
Satd. Flow (perm)	714	3556		457	3467		1358	1699		1338	1646	
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	25	887	30	20	528	32	17	20	47	106	15	61
RTOR Reduction (vph)	0	2	0	0	4	0	0	35	0	0	45	0
Lane Group Flow (vph)	25	915	0	20	556	0	17	32	0	106	31	0
Confl. Peds. (#/hr)	10		3	3		10	1		4	4		1
Heavy Vehicles (%)	14%	2%	4%	13%	4%	7%	0%	0%	0%	2%	0%	2%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	69.5	69.5		69.5	69.5		28.4	28.4		28.4	28.4	
Effective Green, g (s)	69.5	69.5		69.5	69.5		28.4	28.4		28.4	28.4	
Actuated g/C Ratio	0.63	0.63		0.63	0.63		0.26	0.26		0.26	0.26	
Clearance Time (s)	5.5	5.5		5.5	5.5		6.6	6.6		6.6	6.6	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	451	2246		288	2190		350	438		345	424	
v/s Ratio Prot		c0.26			0.16			0.02			0.02	
v/s Ratio Perm	0.04			0.04			0.01			c0.08		
v/c Ratio	0.06	0.41		0.07	0.25		0.05	0.07		0.31	0.07	
Uniform Delay, d1	7.7	10.0		7.8	8.9		30.7	30.9		32.9	30.8	
Progression Factor	0.81	0.90		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	0.5		0.5	0.3		0.3	0.3		2.3	0.3	
Delay (s)	6.5	9.6		8.3	9.2		30.9	31.2		35.2	31.2	
Level of Service	A	A		A	A		C	C		D	C	
Approach Delay (s/veh)		9.5			9.1			31.1			33.5	
Approach LOS		A			A			C			C	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	12.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.38		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	12.1
Intersection Capacity Utilization	62.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	22	867	1233	17	18	16
Future Volume (vph)	22	867	1233	17	18	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	15.0			0.0	0.0	0.0
Storage Lanes	1			0	1	1
Taper Length (m)	7.6				7.6	
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	1.00
Ped Bike Factor	1.00		1.00		1.00	0.98
Frt			0.998			0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1825	3614	3606	0	1825	1526
Flt Permitted	0.208				0.950	
Satd. Flow (perm)	399	3614	3606	0	1819	1494
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)			3			16
Link Speed (k/h)		60	60		40	
Link Distance (m)		166.7	285.8		199.5	
Travel Time (s)		10.0	17.1		18.0	
Confl. Peds. (#/hr)	6			6	2	6
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	0%	1%	1%	0%	0%	7%
Adj. Flow (vph)	22	885	1258	17	18	16
Shared Lane Traffic (%)						
Lane Group Flow (vph)	22	885	1275	0	18	16
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.7	3.7		3.7	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.9	4.9		4.9	
Two way Left Turn Lane		Yes	Yes			
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24			14	24	14
Number of Detectors	1	2	2		1	1
Detector Template	Left	Thru	Thru		Left	Right
Leading Detector (m)	6.1	30.5	30.5		6.1	6.1
Trailing Detector (m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Size(m)	6.1	1.8	1.8		6.1	6.1
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0		0.0	0.0
Detector 2 Position(m)		28.7	28.7			
Detector 2 Size(m)		1.8	1.8			
Detector 2 Type		Cl+Ex	Cl+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			

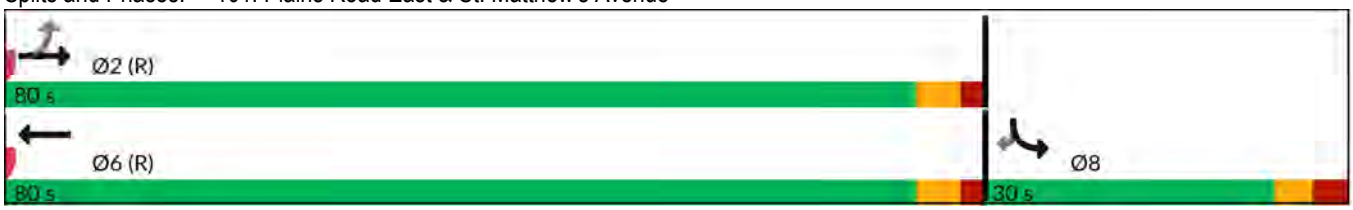


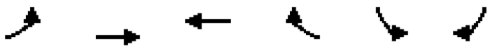
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Turn Type	Perm	NA	NA		Prot	Perm
Protected Phases		2	6		8	
Permitted Phases	2					8
Detector Phase	2	2	6		8	8
Switch Phase						
Minimum Initial (s)	8.0	8.0	8.0		8.0	8.0
Minimum Split (s)	45.5	45.5	45.5		27.0	27.0
Total Split (s)	80.0	80.0	80.0		30.0	30.0
Total Split (%)	72.7%	72.7%	72.7%		27.3%	27.3%
Maximum Green (s)	74.6	74.6	74.6		24.0	24.0
Yellow Time (s)	3.7	3.7	3.7		3.0	3.0
All-Red Time (s)	1.7	1.7	1.7		3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	5.4	5.4	5.4		6.0	6.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	C-Max	C-Max	C-Max		None	None
Walk Time (s)	30.0	30.0	30.0		8.0	8.0
Flash Don't Walk (s)	8.0	8.0	8.0		13.0	13.0
Pedestrian Calls (#/hr)	0	0	0		0	0
Act Effct Green (s)	98.3	98.3	98.3		8.1	8.1
Actuated g/C Ratio	0.89	0.89	0.89		0.07	0.07
v/c Ratio	0.06	0.27	0.40		0.14	0.13
Control Delay (s/veh)	2.2	1.8	4.4		50.2	23.3
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay (s/veh)	2.2	1.8	4.4		50.2	23.3
LOS	A	A	A		D	C
Approach Delay (s/veh)		1.8	4.4		37.5	
Approach LOS		A	A		D	
Queue Length 50th (m)	0.7	17.4	91.1		3.7	0.0
Queue Length 95th (m)	2.0	22.5	111.9		10.8	6.8
Internal Link Dist (m)		142.7	261.8		175.5	
Turn Bay Length (m)	15.0					
Base Capacity (vph)	356	3229	3222		398	338
Starvation Cap Reductn	0	0	0		0	0
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.06	0.27	0.40		0.05	0.05

Intersection Summary	
Area Type:	Other
Cycle Length: 110	
Actuated Cycle Length: 110	
Offset: 94 (85%), Referenced to phase 2:EBTL and 6:WBT, Start of Green	
Natural Cycle: 75	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.40	
Intersection Signal Delay (s/veh): 3.8	Intersection LOS: A

Intersection Capacity Utilization 52.8% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 101: Plains Road East & St. Matthew's Avenue

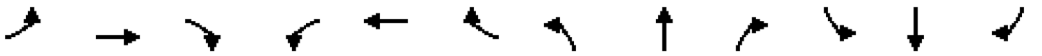




Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	22	867	1233	17	18	16
Future Volume (vph)	22	867	1233	17	18	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.4	5.4	5.4		6.0	6.0
Lane Util. Factor	1.00	0.95	0.95		1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00		1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	1.00		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1823	3614	3606		1825	1494
Flt Permitted	0.21	1.00	1.00		0.95	1.00
Satd. Flow (perm)	398	3614	3606		1825	1494
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	22	885	1258	17	18	16
RTOR Reduction (vph)	0	0	0	0	0	15
Lane Group Flow (vph)	22	885	1275	0	18	1
Confl. Peds. (#/hr)	6			6	2	6
Heavy Vehicles (%)	0%	1%	1%	0%	0%	7%
Turn Type	Perm	NA	NA		Prot	Perm
Protected Phases		2	6		8	
Permitted Phases	2					8
Actuated Green, G (s)	93.7	93.7	93.7		4.9	4.9
Effective Green, g (s)	93.7	93.7	93.7		4.9	4.9
Actuated g/C Ratio	0.85	0.85	0.85		0.04	0.04
Clearance Time (s)	5.4	5.4	5.4		6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	339	3078	3071		81	66
v/s Ratio Prot		0.24	c0.35		c0.01	
v/s Ratio Perm	0.06					0.00
v/c Ratio	0.06	0.29	0.42		0.22	0.01
Uniform Delay, d1	1.3	1.6	1.9		50.7	50.2
Progression Factor	1.00	1.00	2.17		1.00	1.00
Incremental Delay, d2	0.4	0.2	0.4		1.4	0.1
Delay (s)	1.6	1.8	4.4		52.1	50.3
Level of Service	A	A	A		D	D
Approach Delay (s/veh)		1.8	4.4		51.3	
Approach LOS		A	A		D	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	4.1	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	11.4
Intersection Capacity Utilization	52.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



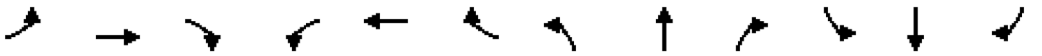
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	22	839	19	5	1204	39	8	0	11	19	0	22
Future Volume (vph)	22	839	19	5	1204	39	8	0	11	19	0	22
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	35.0		0.0	15.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	7.6			7.6			2.5			7.6		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.996			0.995			0.923			0.928	
Flt Protected	0.950			0.950				0.979			0.977	
Satd. Flow (prot)	1825	3564	0	1789	3594	0	0	1702	0	0	1696	0
Flt Permitted	0.950			0.950				0.979			0.977	
Satd. Flow (perm)	1825	3564	0	1789	3594	0	0	1702	0	0	1696	0
Link Speed (k/h)		60			60			50			40	
Link Distance (m)		285.8			182.7			95.0			131.2	
Travel Time (s)		17.1			11.0			6.8			11.8	
Confl. Peds. (#/hr)	5					5						
Peak Hour Factor	0.97	0.97	0.92	0.92	0.97	0.97	0.92	0.92	0.92	0.97	0.92	0.97
Heavy Vehicles (%)	0%	2%	2%	2%	1%	3%	2%	2%	2%	0%	2%	5%
Adj. Flow (vph)	23	865	21	5	1241	40	9	0	12	20	0	23
Shared Lane Traffic (%)												
Lane Group Flow (vph)	23	886	0	5	1281	0	0	21	0	0	43	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			1.6			4.9	
Two way Left Turn Lane		Yes			Yes							
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 44.5%		ICU Level of Service A	
Analysis Period (min) 15			

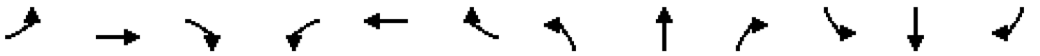
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	22	839	19	5	1204	39	8	0	11	19	0	22
Future Volume (Veh/h)	22	839	19	5	1204	39	8	0	11	19	0	22
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.97	0.97	0.92	0.92	0.97	0.97	0.92	0.92	0.92	0.97	0.92	0.97
Hourly flow rate (vph)	23	865	21	5	1241	40	9	0	12	20	0	23
Pedestrians											5	
Lane Width (m)											3.7	
Walking Speed (m/s)											1.1	
Percent Blockage											0	
Right turn flare (veh)												
Median type		TWLTL			TWLTL							
Median storage veh)		2			2							
Upstream signal (m)		286			183							
pX, platoon unblocked	0.79			0.98			0.80	0.80	0.98	0.80	0.80	0.79
vC, conflicting volume	1286			886			1575	2218	443	1767	2208	646
vC1, stage 1 conf vol							922	922		1276	1276	
vC2, stage 2 conf vol							654	1296		491	932	
vCu, unblocked vol	840			839			1107	1906	386	1345	1894	33
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	7.0
tC, 2 stage (s)							6.5	5.5		6.5	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.4
p0 queue free %	96			99			97	100	98	92	100	97
cM capacity (veh/h)	635			774			276	212	599	239	223	808

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	23	577	309	5	827	454	21	43
Volume Left	23	0	0	5	0	0	9	20
Volume Right	0	0	21	0	0	40	12	23
cSH	635	1700	1700	774	1700	1700	399	384
Volume to Capacity	0.04	0.34	0.18	0.01	0.49	0.27	0.05	0.11
Queue Length 95th (m)	0.9	0.0	0.0	0.1	0.0	0.0	1.3	2.9
Control Delay (s/veh)	10.9	0.0	0.0	9.7	0.0	0.0	14.5	15.6
Lane LOS	B			A			B	C
Approach Delay (s/veh)	0.3			0.0			14.5	15.6
Approach LOS							B	C

Intersection Summary				
Average Delay	0.6			
Intersection Capacity Utilization	44.5%	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)	3	818	28	50	1214	23	30	2	27	37	2	16
Future Volume (vph)	3	818	28	50	1214	23	30	2	27	37	2	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	45.0		0.0	30.0		0.0	15.0		0.0	35.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.6			7.6			7.6			7.6		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00	1.00		1.00	1.00			0.98		0.99		
Frt		0.995			0.997			0.860			0.867	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1372	3593	0	1722	3599	0	1825	1623	0	1772	1666	0
Flt Permitted	0.163			0.289			0.746			0.738		
Satd. Flow (perm)	235	3593	0	522	3599	0	1433	1623	0	1367	1666	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		6			3			28			16	
Link Speed (k/h)		60			60			40			40	
Link Distance (m)		182.7			307.2			153.2			143.4	
Travel Time (s)		11.0			18.4			13.8			12.9	
Confl. Peds. (#/hr)	7		10	10		7			6	6		
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	33%	1%	0%	6%	1%	5%	0%	0%	0%	3%	0%	0%
Adj. Flow (vph)	3	835	29	51	1239	23	31	2	28	38	2	16
Shared Lane Traffic (%)												
Lane Group Flow (vph)	3	864	0	51	1262	0	31	30	0	38	18	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane		Yes			Yes							
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	2	2		6	6		8	8		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)	40.5	40.5		40.5	40.5		34.6	34.6		34.6	34.6	
Total Split (s)	75.0	75.0		75.0	75.0		35.0	35.0		35.0	35.0	
Total Split (%)	68.2%	68.2%		68.2%	68.2%		31.8%	31.8%		31.8%	31.8%	
Maximum Green (s)	69.5	69.5		69.5	69.5		28.4	28.4		28.4	28.4	
Yellow Time (s)	3.7	3.7		3.7	3.7		3.0	3.0		3.0	3.0	
All-Red Time (s)	1.8	1.8		1.8	1.8		3.6	3.6		3.6	3.6	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.5	5.5		5.5	5.5		6.6	6.6		6.6	6.6	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		5.0	5.0		5.0	5.0	
Recall Mode	C-Max	C-Max		C-Max	C-Max		Max	Max		Max	Max	
Walk Time (s)	28.0	28.0		28.0	28.0		12.0	12.0		12.0	12.0	
Flash Don't Walk (s)	7.0	7.0		7.0	7.0		16.0	16.0		16.0	16.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	69.5	69.5		69.5	69.5		28.4	28.4		28.4	28.4	
Actuated g/C Ratio	0.63	0.63		0.63	0.63		0.26	0.26		0.26	0.26	
v/c Ratio	0.02	0.38		0.16	0.55		0.08	0.07		0.11	0.04	
Control Delay (s/veh)	12.0	13.4		9.7	12.6		31.9	12.3		32.3	15.1	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay (s/veh)	12.0	13.4		9.7	12.6		31.9	12.3		32.3	15.1	
LOS	B	B		A	B		C	B		C	B	
Approach Delay (s/veh)		13.4			12.5			22.2			26.8	
Approach LOS		B			B			C			C	
Queue Length 50th (m)	0.3	52.6		4.1	74.4		5.1	0.3		6.2	0.3	
Queue Length 95th (m)	m1.1	72.2		9.7	91.5		12.7	7.6		14.7	5.9	
Internal Link Dist (m)		158.7			283.2			129.2			119.4	
Turn Bay Length (m)	45.0			30.0			15.0			35.0		
Base Capacity (vph)	148	2272		329	2275		369	439		352	442	
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	0.02	0.38		0.16	0.55		0.08	0.07		0.11	0.04	

Intersection Summary	
Area Type:	Other
Cycle Length: 110	
Actuated Cycle Length: 110	
Offset: 40 (36%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green	
Natural Cycle: 80	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.55	
Intersection Signal Delay (s/veh): 13.5	Intersection LOS: B

Intersection Capacity Utilization 75.0% ICU Level of Service D
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 103: Shadeland Avenue/Gallagher Road & Plains Road East



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	818	28	50	1214	23	30	2	27	37	2	16
Future Volume (vph)	3	818	28	50	1214	23	30	2	27	37	2	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5		5.5	5.5		6.6	6.6		6.6	6.6	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.98		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		0.99	1.00	
Frt	1.00	0.99		1.00	1.00		1.00	0.86		1.00	0.87	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1370	3593		1715	3599		1825	1623		1760	1665	
Flt Permitted	0.16	1.00		0.29	1.00		0.75	1.00		0.74	1.00	
Satd. Flow (perm)	235	3593		522	3599		1433	1623		1366	1665	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	3	835	29	51	1239	23	31	2	28	38	2	16
RTOR Reduction (vph)	0	2	0	0	1	0	0	21	0	0	12	0
Lane Group Flow (vph)	3	862	0	51	1261	0	31	9	0	38	6	0
Confl. Peds. (#/hr)	7		10	10		7			6	6		
Heavy Vehicles (%)	33%	1%	0%	6%	1%	5%	0%	0%	0%	3%	0%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	69.5	69.5		69.5	69.5		28.4	28.4		28.4	28.4	
Effective Green, g (s)	69.5	69.5		69.5	69.5		28.4	28.4		28.4	28.4	
Actuated g/C Ratio	0.63	0.63		0.63	0.63		0.26	0.26		0.26	0.26	
Clearance Time (s)	5.5	5.5		5.5	5.5		6.6	6.6		6.6	6.6	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	148	2270		329	2273		369	419		352	429	
v/s Ratio Prot		0.24			c0.35			0.01			0.00	
v/s Ratio Perm	0.01			0.10			0.02			c0.03		
v/c Ratio	0.02	0.38		0.16	0.55		0.08	0.02		0.11	0.01	
Uniform Delay, d1	7.6	9.8		8.3	11.5		30.9	30.4		31.1	30.4	
Progression Factor	1.50	1.32		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	0.5		1.0	1.0		0.4	0.1		0.6	0.1	
Delay (s)	11.6	13.4		9.3	12.5		31.4	30.5		31.8	30.4	
Level of Service	B	B		A	B		C	C		C	C	
Approach Delay (s/veh)		13.4			12.3			31.0			31.3	
Approach LOS		B			B			C			C	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	13.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	12.1
Intersection Capacity Utilization	75.0%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Appendix I

Signal Warrant

Signal Justification Calculation for Existing Volumes (OTM Book 12 - Justification 7)

Horizon Year: 2030 Total
Region/City/Township: Burlington

Major Street: Plains Road East
North/South: N
Minor Street: White Oak Drive/ Site Driveway

Number of Approach Lanes: 2 or more
Tee Intersection? N
Flow Conditions: Restricted

PM Forecast Only? N

Warrant Results		
150% Satisfied	**No**	Justification for new intersections with forecast traffic
120% Satisfied	**No**	Justification for existing intersections with forecast traffic

Time Period	Major Street: Plains Road East						Minor Street: White Oak Drive/ Site Driveway						Peds Crossing Main Road
	Eastbound			Westbound			Northbound			Southbound			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
AM Peak Hour	32	783	6	4	502	20	8	0	9	22	0	33	0
PM Peak Hour	22	839	19	5	1204	39	8	0	11	19	0	22	0
Average Hourly Volume	**14**	**406**	**6**	**2**	**427**	**15**	**4**	**0**	**5**	**10**	**0**	**14**	**0**

Warrant 1 - Minimum Vehicular Volume

Warrant	AHV
1A - All	902
1B - Minor	33
2A - Major	869
2B - Cross	14

1A

Approach Lanes	1		2 or more		Average Hourly Volume
Flow Conditions	Free	Restricted	Free	Restricted	
				X	
All Approaches	480	720	600	900	902
				% Fulfilled	**100.2%**

1B

Approach Lanes	1		2 or more		Average Hourly Volume
Flow Conditions	Free	Restricted	Free	Restricted	
		X			
Minor Street Approaches	120	170	120	170	33
				% Fulfilled	**19.4%**

Warrant 2 - Delay To Cross Traffic

2A

Approach Lanes	1		2 or more		Average Hourly Volume
Flow Conditions	Free	Restricted	Free	Restricted	
				X	
Major Street Approaches	480	720	600	900	869
				% Fulfilled	**96.5%**

2B

Approach Lanes	1		2 or more		Average Hourly Volume
Flow Conditions	Free	Restricted	Free	Restricted	
		X			
Traffic Crossing Major Street	50	75	120	170	14
				% Fulfilled	**19.0%**

Appendix J

MMLOS Data Sheets

LOS AND DATA ENTRY - Use this to enter what you know and for detailed or summary results presentation

Actual	D	F	C	D	C
SCENARIO:	*Plains Road East*				
Area Type:	*Urban Main Street*				
MODE					
Type	SEGMENTS				
Target (Custom if necessary)	C	B	D	D	E
Adjustment for Planning Direction	None	None	None	None	None
Reasons for adjustment (if applicable)					
Adjustment for Strategic Policy	None	None	None	None	None
Reasons for adjustment (if applicable)					
Actual	D	F	C	D	C

Active Transportation Design Check	
Do the pedestrian facilities provide direct access to all properties along the segment? (Direct access can be provided by an adjacent facility or designated crossing to the property in question)	Yes
Does the bicycle facility selected correspond with the minimum appropriate facility type identified in the context appropriate nomograph (Figure 6.1, 6.2)?	No
-	
-	
-	

MMLOS Evaluation

Measure 1	Pedestrian Facility Width (m)	Bike Facility Width per Direction (m)	Transit Facility Type	Width of Curb Lane (m)	Mid-block V/C Ratio
	Less than 1.5	Less than 1.2	Mixed traffic with > 1 lane per direction	Less than 3.4	Less than 0.60
Measure 2	Pedestrian Buffer Width (m)	Bike Buffer Width (m)	Transit Passenger Amenities	Car Level of Service	Curb Lane Conflicts
	Greater than 2.5		Moderate presence of passenger amenities such as shelters, seating, shade trees, etc.	C	9+
Measure 3	Max Distance Between Controlled Crossings (m)	Conflicts with Other Modes (in-lane conflicts and cross point conflicts)	Pedestrian Level of Service	-	-
	Greater than 320	Two "high" conflict indicators	D		
Measure 4		-	-	-	-

LOS AND DATA ENTRY - Use this to enter what you know and for detailed or summary results presentation

Actual	E	F	F	C	C
SCENARIO:	*Shadeland Avenue*				
Area Type:	*Neighbourhood Main Street*				
MODE					
Type	**SEGMENTS**				
Target (Custom if necessary)	D	C	D	D	D
Adjustment for Planning Direction	None	None	None	None	None
Reasons for adjustment (if applicable)					
Adjustment for Strategic Policy	None	None	None	None	None
Reasons for adjustment (if applicable)					
Actual	E	F	F	C	C

Active Transportation Design Check	
Do the pedestrian facilities provide direct access to all properties along the segment? (Direct access can be provided by an adjacent facility or designated crossing to the property in question)	Yes
Does the bicycle facility selected correspond with the minimum appropriate facility type identified in the context appropriate nomograph (Figure 6.1, 6.2)?	No
-	
-	
-	

MMLOS Evaluation

Measure 1	Pedestrian Facility Width (m)	Bike Facility Width per Direction (m)	Transit Facility Type	Width of Curb Lane (m)	Mid-block V/C Ratio
	1.5 - 1.7	Less than 1.2	Mixed traffic with 1 lane per direction	3.4 - 3.6	Less than 0.60
Measure 2	Pedestrian Buffer Width (m)	Bike Buffer Width (m)	Transit Passenger Amenities	Car Level of Service	Curb Lane Conflicts
			No presence of passenger amenities such as shelters, seating, shade trees, etc.	C	9+
Measure 3	Max Distance Between Controlled Crossings (m)	Conflicts with Other Modes (in-lane conflicts and cross point conflicts)	Pedestrian Level of Service	-	-
	261 - 290	Two "high" conflict indicators	E		
Measure 4		-	-	-	-

LOS AND DATA ENTRY - Use this to enter what you know and for detailed or summary results presentation

Actual	E	F	F	D	C
SCENARIO:	*Gallagher Road*				
Area Type:	*Neighbourhood Main Street*				
MODE					
Type	**SEGMENTS**				
Target (Custom if necessary)	D	C	D	D	D
Adjustment for Planning Direction	None	None	None	None	None
Reasons for adjustment (if applicable)					
Adjustment for Strategic Policy	None	None	None	None	None
Reasons for adjustment (if applicable)					
Actual	E	F	F	D	C

Active Transportation Design Check	
Do the pedestrian facilities provide direct access to all properties along the segment? (Direct access can be provided by an adjacent facility or designated crossing to the property in question)	Yes
Does the bicycle facility selected correspond with the minimum appropriate facility type identified in the context appropriate nomograph (Figure 6.1, 6.2)?	No
-	
-	
-	

MMLOS Evaluation

Measure 1	Pedestrian Facility Width (m)	Bike Facility Width per Direction (m)	Transit Facility Type	Width of Curb Lane (m)	Mid-block V/C Ratio
	1.5 - 1.7	Less than 1.2	Mixed traffic with 1 lane per direction	Less than 3.4	Less than 0.60
Measure 2	Pedestrian Buffer Width (m)	Bike Buffer Width (m)	Transit Passenger Amenities	Car Level of Service	Curb Lane Conflicts
	1.3 - 1.5		No presence of passenger amenities such as shelters, seating, shade trees, etc.	C	9+
Measure 3	Max Distance Between Controlled Crossings (m)	Conflicts with Other Modes (in-lane conflicts and cross point conflicts)	Pedestrian Level of Service	-	-
	Greater than 320	Two "high" conflict indicators	E		
Measure 4		-	-	-	-