284-292 Plains Road East
Burlington, ON
Transportation Impact Study

Paradigm Transportation Solutions Limited

September 2021

ptsl.com

Project Summary

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284-292 Plains Road East, Burlington, ON Transportation Impact Study

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Executive Summary

Content

284 Plains Road Development Inc. has retained Paradigm Transportation Solutions Limited (Paradigm) to conduct this Transportation Impact Study (TIS) and Parking Justification for a proposed mid-rise residential development located at 284-292 Plains Road East in the City of Burlington.

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

Development Concept

The subject site is located at 284-292 Plains Road East in the City of Burlington. The site is adjacent to the City of Burlington's Aldershot Mobility Hub area. The city defines this area as an intensification area and is intended to foster a more pedestrian and transit friendly urban environment through a mix of dense residential, employment, and retail land uses.

The proposed 6-storey mid-rise development contains 117 residential condominium units and 142 parking spaces (1.21 spaces per unit). Five layby parking spaces are proposed across the site's Plains Road East frontage. The allocation of the site's parking supply for occupants and visitors is not identified on the site plan. Construction is anticipated to occur in one phase with build-out estimated by Year 2023.

The proposed site plan consolidates the three existing private driveways to Plains Road East into one driveway. The proposed driveway is located approximately 75 m west of Filmandale Road.

Conclusions

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

- **Study Area**: The intersections that form the study area include:
  - Plains Road East and Shadeland Avenue/Gallagher Road (signalized);
  - Plains Road East and Filmandale Road (unsignalized);
  - Plains Road East and Downsview Drive (signalized); and
  - Plains Road East and proposed site driveway.



- **Existing Traffic Conditions**: The intersections within the study area are generally operating with acceptable levels of service during the AM and PM peak hours. The following critical movements are noted:
  - Plains Road East at Shadeland Avenue/Gallagher Road: The northbound and southbound queue lengths are estimated to exceed the current available storage length; and
  - Plains Road East at Filmandale Road/Private Driveway: Localized congestion is occurring on the southbound approach (private driveway).
- **Forecast Traffic**: The forecast traffic volumes near the subject site have been assessed for a five-year horizon (Year 2028) from the anticipated build-out date (Year 2023).
- **Background Traffic Conditions**: The noted queue lengths and localized congestion previously identified under existing conditions are anticipated to continue to occur.
- **Site Generated Traffic**: The subject site is forecast to generate approximately 40 vehicle trips during the AM peak hour and approximately 52 vehicle trips during the PM peak hour.
- **Parking Demand**: The proposed parking supply consists of 142 on-site spaces and 5 lay-by spaces across the site's Plains Road East frontage. The proposed parking supply is in line with parking rates identified in the City-Wide Parking Standards Review if the requirement for maintenance spaces is excluded. The layby spaces provide additional flexibility to the subject site and surrounding land uses for short term increases in parking demand.
- **Transportation Demand Management**: The site concept plan includes TDM measures intended to assist in mitigating the site's transportation and parking impacts. Measures are aimed at walk, transit, cycling, parking, and education/promotion.
- **Total Traffic Conditions**: The intersections within the study area are forecast to operate with levels of service like background traffic conditions. No additional critical movements are noted because of the addition of the site-generated traffic.

Recommendations

Based on the findings of this study, it is recommended that:

- The site's 142 on-site parking spaces be allocated as follows:
  - Occupant parking – 117 spaces (1.00 spaces per unit); and

  - Visitor parking – 25 spaces (0.21 spaces per unit).
- The site's bicycle parking supply should be increased. A total of 59 long-term bicycle parking spaces and 6 short-term bicycle parking spaces should be incorporated into the site plan.
- The City of Burlington consider extending the northbound and southbound storage lengths at the Plains Road East and Shadeland Avenue/Gallagher Road intersection to accommodate 20 m and 35 m of storage, respectively.

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1 Introduction

1.1 Overview

284 Plains Road Development Inc. has retained Paradigm Transportation Solutions Limited (Paradigm) to conduct this Transportation Impact Study (TIS) and Parking Justification for a proposed mid-rise residential development located at 284-292 Plains Road East in the City of Burlington. **Figure 1.1** illustrates the site location.

Pre-study consultation was conducted with City of Burlington staff via email in August 2020. **Appendix A** contains the pre-study consultation material. The study follows the Halton Region TIS Guidelines[1].

The scope of the study includes:

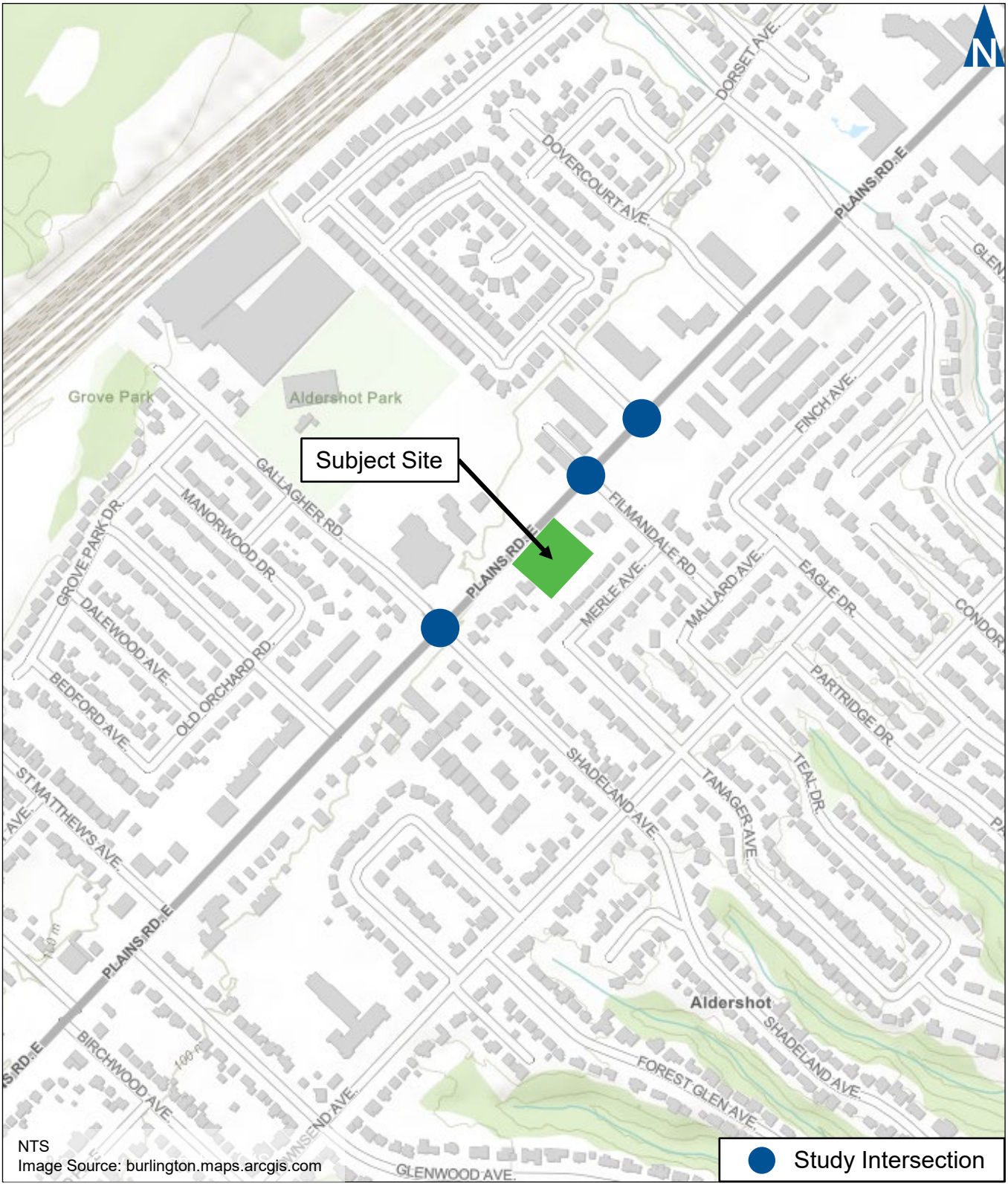
- Assessment of the current traffic conditions within the study area;
- Estimates of background traffic growth;
- Estimates of additional traffic generated by the subject site;
- Analyses of the impact of the future traffic on the surrounding road network;
- Recommendations necessary to mitigate this future traffic in a satisfactory manner; and
- Estimates of the site's parking demand.

1.2 Study Area

The study area intersections assessed in this study include:

- Plains Road East and Shadeland Avenue/Gallagher Road (signalized);
- Plains Road East and Filmandale Road/Private Driveway (unsignalized);
- Plains Road East and Downsview Drive (signalized); and
- Plains Road East and the proposed site driveway.

[1] Halton Region Transportation Impact Study Guidelines. January 2015



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Location of Subject Site

2 Existing Conditions

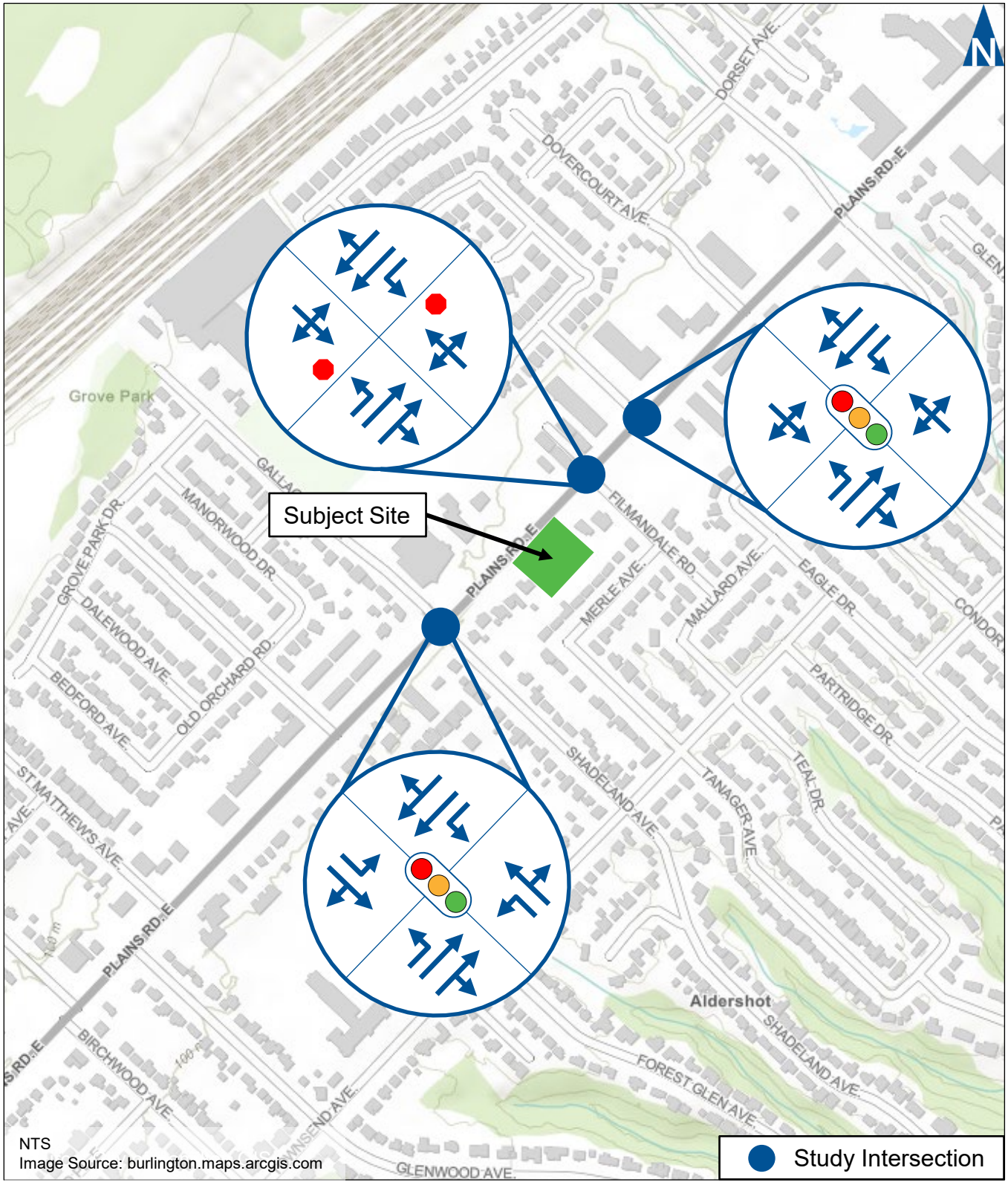
2.1 Road Network

The roadways of interest within the study area include:

- **Plains Road East**, an east-west five-lane multi-purpose arterial[2] roadway with a centre two-way left-turn lane. The roadway has a posted speed limit of 60 km/h and during school bell times, a flashing posted speed limit of 40 km/h is in effect. Sidewalks are present on both sides of this roadway within the study area. The intersections with Shadeland Avenue/Gallagher Road and Downsview Drive are signalized and operate with auxiliary turn lanes. No on-street parking is permitted within the study area.
- **Shadeland Avenue/Gallagher Road**, a north-south two-lane local roadway with a posted speed limit of 40 km/h. Sidewalks are present along the east side of this roadway. No on-street parking restrictions are noted in the study area.
- **Filmandale Road**, a north-south two-lane local roadway with an unposted assumed speed limit of 40 km/h. A private driveway forms the north leg of the Filmandale Road and Plains Road East intersection. No sidewalks are present within the study area. No on-street parking restrictions are noted in the study area.
- **Downsview Drive**, a north-south two-lane local roadway with a posted speed limit of 40 km/h. A private driveway forms the south leg of the Downsview Drive and Plains Road East intersection. Sidewalks are present on both sides of the roadway. No on-street parking restrictions are noted in the study area.

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

[2] *Classification of Transportation Facilities*, City of Burlington, May 2010.



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Existing Traffic Control and Lane Configuration

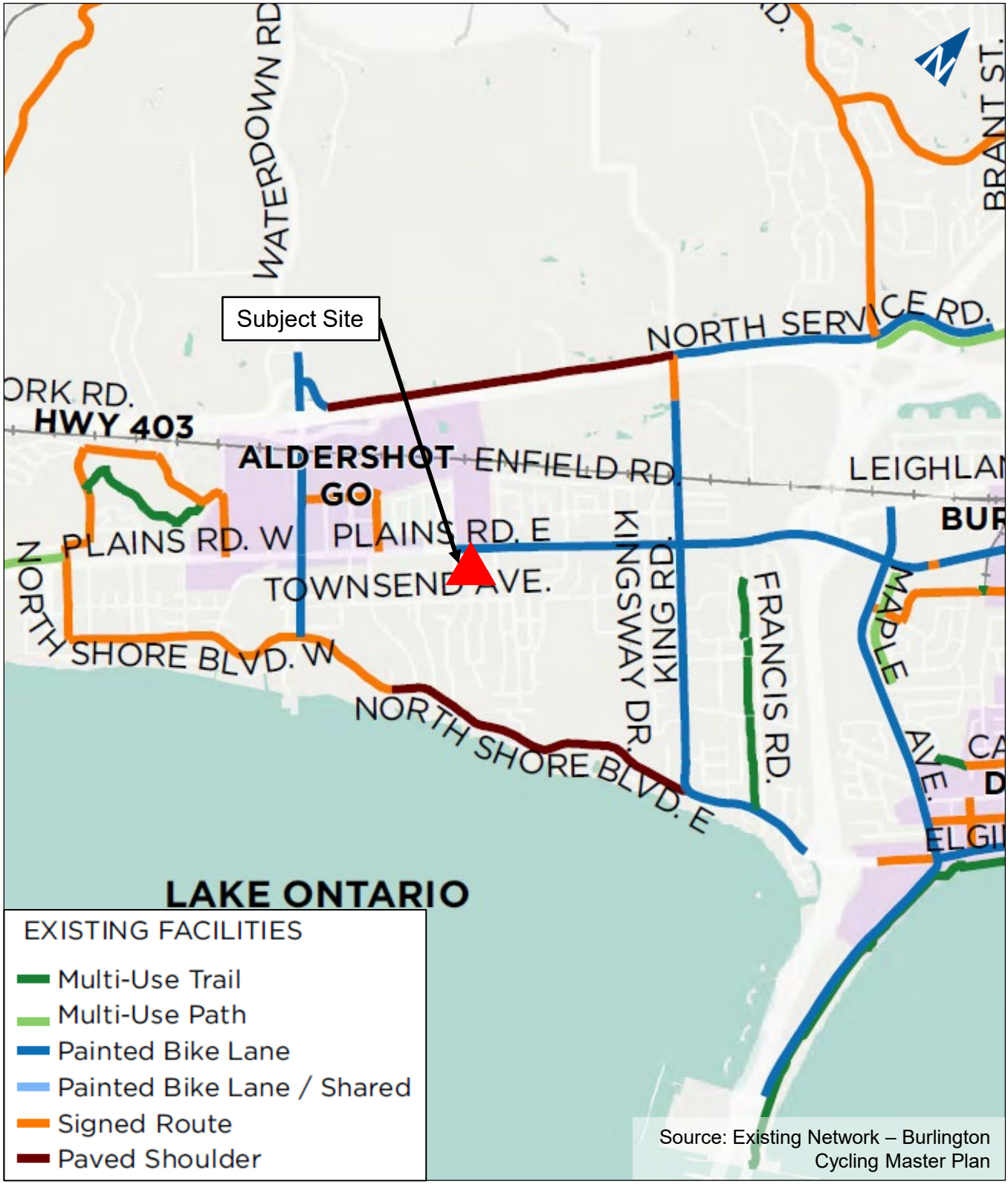
2.2 Cycling Network

The City of Burlington's bicycle network provides a variety of cycling facilities within the immediate area. **Figure 2.2** illustrates the existing cycling network.

On-street bicycle lanes are provided in both directions along Plains Road East, east of Shadeland Avenue/Gallagher Road.

The City of Burlington's draft Cycling Plan[3] identifies a Protected Bikeway along Plains Road East and a Shared Use Lane on Filmandale Road.

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



Source: Existing Network – Burlington Cycling Master Plan

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Existing Cycling Network

2.3 Transit Service

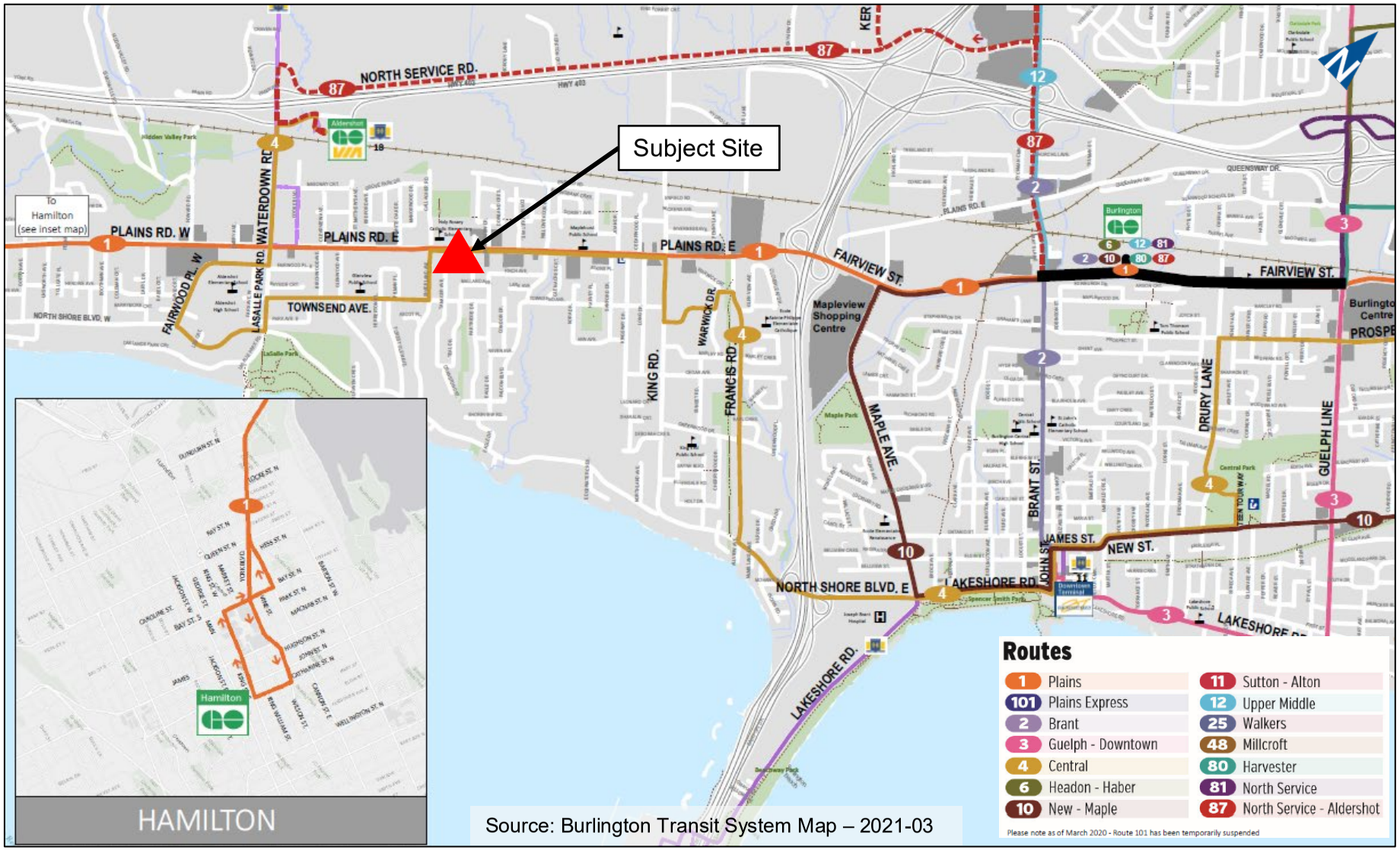
Burlington Transit operates two routes adjacent to the subject site. **Table 2.1** summarizes the existing routes, service headways and schedule. **Figure 2.3** illustrates the existing transit network.

The closest eastbound and westbound transit stops are located at the Plains Road East intersection with Downsview Drive, approximately 160 m to the west (2-minute walk). **Figure 2.4** illustrates the nearby transit stops.

TABLE 2.1: EXISTING TRANSIT ROUTES

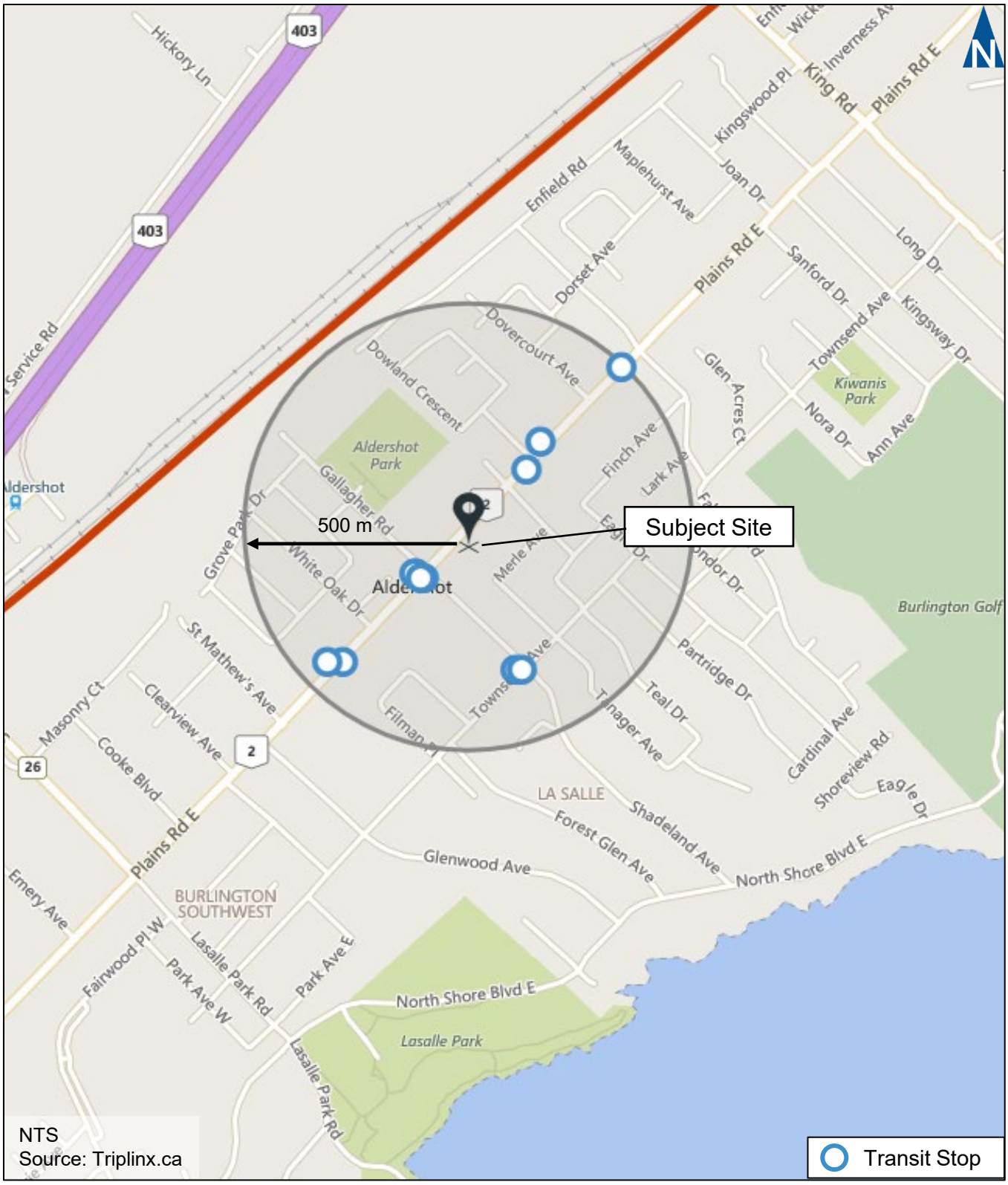
Route	Description
Burlington Transit Route 1/101 (Plains/Plains Express) *	Offers service 7-days a week between the Appleby GO Station and the City of Hamilton (King & James). Weekday headways range from 10-15 minutes depending on time of day. Weekend headways are in the order of 15-30 minutes.
Burlington Transit Route 4 (Central)	Offers service 7-days a week between the Appleby GO Station and Aldershot GO Station. Weekday headways are in the order of 30 minutes and weekend headways are in the order of 60 minutes.

* Route 101 is not in service at time of writing due to COVID-19 containment measures. Service headways may vary.



Existing Transit Network

Figure 2.3



Existing Nearby Transit Stops

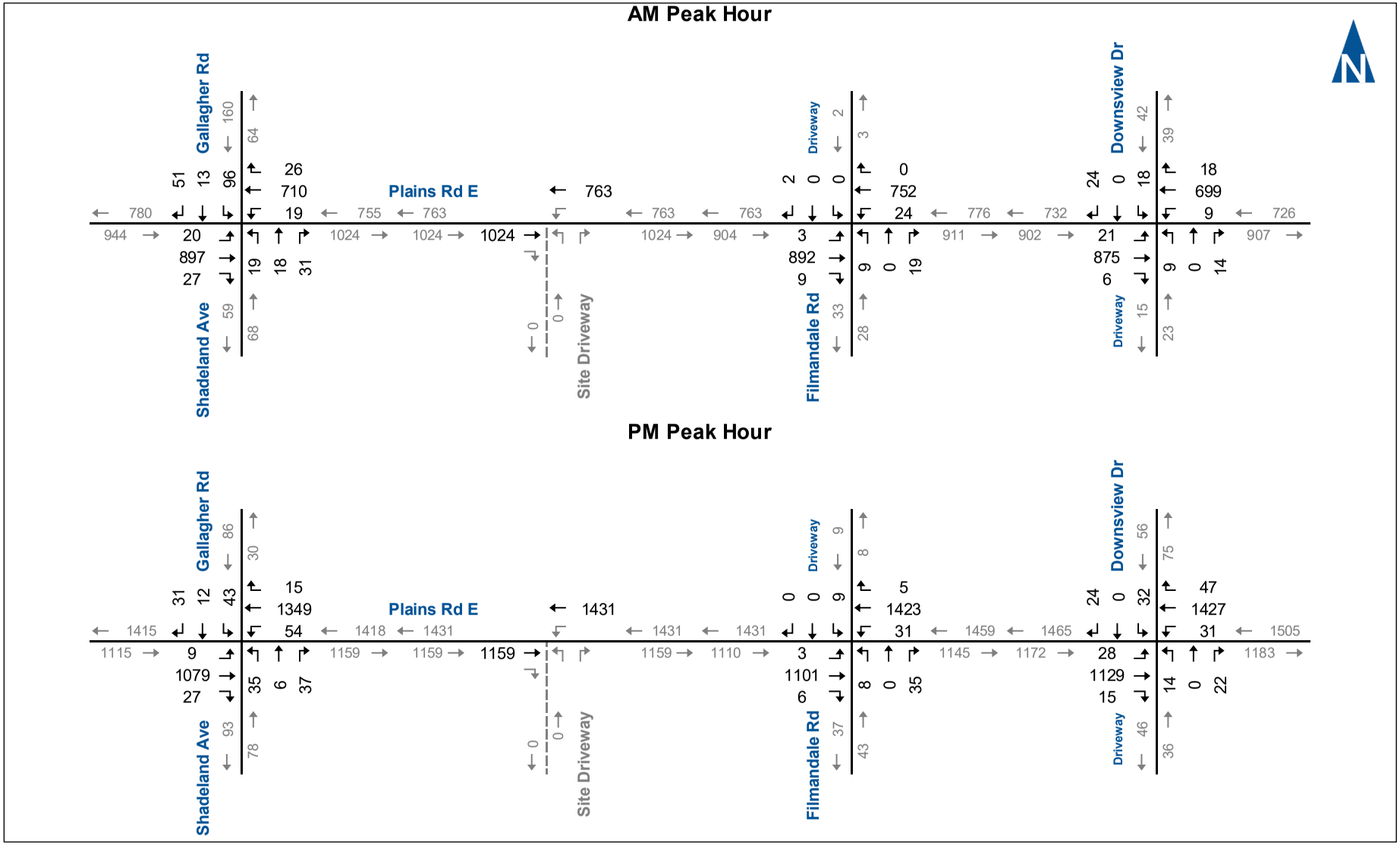
2.4 Traffic Volumes

Turning movement counts were collected at the study area intersections by Pyramid Traffic Incorporated in September 2020.

Due to abnormal traffic patterns caused by the COVID-19 pandemic, the traffic volumes were compared to historical data collected by the City of Burlington (April 2019).

An adjustment factor of 1.45 was applied to the September 2020 traffic volumes to represent pre-pandemic traffic conditions, based on the historical data. In addition, the April 2019 turning movement count volumes recorded for the north leg of the Plains Road East intersection with Gallagher Road were used to reflect typical school volumes. The adjustment factor was reviewed and confirmed by City Transportation Planning Staff during pre-study consultation.

Figure 2.5 illustrates the existing base year AM and PM peak hour traffic volumes at the study area intersections. **Appendix B** contains the existing count data and signal timings.



Base Year Traffic Volumes

284-292 Plains Road East TIS PS TDM
200104

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 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 intersections in the study area were evaluated using the existing lane configuration, traffic control, existing base year traffic volumes and signal timings. The intersection analysis considered three separate measures of performance:

- The LOS for each turning movement;
- The volume to capacity ratio (v/c) for each movement; and
- The 95th percentile queue lengths estimated using Synchro.

Synchro 10 was used to determine traffic operations at the study area intersections. In accordance with the Halton Region's TIS Guidelines[4], the following criteria were used in the determination of critical movements:

- Volume/capacity (V/C) ratios for overall intersection operations, through movements or shared through/turning movements increased to 0.85 or above.
- V/C ratios for exclusive movements that will exceed 0.95.
- 95th percentile queue lengths for individual movements exceeds available lane storage; and
- Level of Service (LOS), based on average delay per vehicle, on individual movements exceeds LOS D.

Table 2.2 summarizes the base year level of service conditions, and the following critical movements are noted:

[4] Halton Region Transportation Impact Study Guidelines – January 2015

Plains Road East at Shadeland Avenue/Gallagher Road

- Southbound left-turn queue is estimated to exceed the current available storage length by approximately 18 m (33 m total) during the AM peak hour;
- Northbound left-turn queue is estimated to exceed the current available storage length by approximately 2 m (17 m total) during the PM peak hour;
- Southbound left-turn queue is estimated to exceed the current available storage length by approximately 4 m (19 m total) during the PM peak hour.

Plains Road East at Filmandale Road/Private Driveway

- Southbound approach (private driveway) is estimated to operate at LOS E (v/c = 0.09) during the PM peak hour.

Appendix C contains the supporting detailed Synchro 10 output.

TABLE 2.2: EXISTING 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 Rd E & Shadeland Ave / Gallagher Rd	TCS	LOS	A	A	>	**A**	A	A	>	**A**	C	C	>	**C**	D	C	>	**D**	**A**
			Delay	4	5	>	**5**	4	5	>	**5**	35	34	>	**34**	39	34	>	**37**	**9**
			V/C	0.07	0.39	>		0.06	0.32	>		0.11	0.09	>		0.43	0.09	>		
			95th	4	55	>		4	40	>		10	13	>		33	13	>		
			Storage	45	-	>		40	-	>		15	-	>		15	-	>		
			Avail.	41	-	>		36	-	>		5	-	>		-18	-	>		
	Plains Rd E & Filmandale Rd	TWSC	LOS	A	A	A	**A**	B	A	A	**A**	<	B	>	**B**	<	B	>	**B**	
			Delay	9	0	0	**0**	11	0	0	**0**	<	15	>	**15**	<	10	>	**10**	
			V/C	0.00	0.37	0.19		0.04	0.31	0.16		<	0.07	>		<	0.00	>		
			95th	0	0	0		1	0	0		<	2	>		<	0	>		
			Storage	15	-	>		30	-	>		<	-	>		<	-	>		
			Avail.	15	-	>		29	-	>		<	-	>		<	-	>		
	Plains Rd E & Downsview Dr	TCS	LOS	A	A	>	**A**	A	A	>	**A**	<	D	>	**D**	<	D	>	**D**	**A**
			Delay	1	2	>	**2**	2	2	>	**2**	<	41	>	**41**	<	42	>	**42**	**3**
			V/C	0.04	0.34	>		0.03	0.28	>		<	0.02	>		<	0.11	>		
			95th	1	16	>		1	22	>		<	6	>		<	13	>		
			Storage	30	-	>		15	-	>		<	-	>		<	-	>		
			Avail.	29	-	>		14	-	>		<	-	>		<	-	>		
PM Peak Hour	Plains Rd E & Shadeland Ave / Gallagher Rd	TCS	LOS	A	A	>	**A**	A	A	>	**A**	D	D	>	**D**	D	D	>	**D**	**A**
			Delay	3	4	>	**4**	4	4	>	**4**	42	39	>	**40**	42	39	>	**41**	**6**
			V/C	0.05	0.44	>		0.21	0.55	>		0.27	0.06	>		0.29	0.09	>		
			95th	2	55	>		7	63	>		17	11	>		19	12	>		
			Storage	45	-	>		40	-	>		15	-	>		15	-	>		
			Avail.	43	-	>		33	-	>		-2	-	>		-4	-	>		
	Plains Rd E & Filmandale Rd	TWSC	LOS	B	A	A	**A**	B	A	A	**A**	<	C	>	**C**	<	E	>	**E**	
			Delay	14	0	0	**0**	12	0	0	**0**	<	16	>	**16**	<	43	>	**43**	
			V/C	0.01	0.49	0.25		0.06	0.63	0.32		<	0.13	>		<	0.09	>		
			95th	0	0	0		2	0	0		<	4	>		<	2	>		
			Storage	15	-	>		30	-	>		<	-	>		<	-	>		
			Avail.	15	-	>		28	-	>		<	-	>		<	-	>		
	Plains Rd E & Downsview Dr	TCS	LOS	A	A	>	**A**	A	A	>	**A**	<	D	>	**D**	<	D	>	**D**	**A**
			Delay	4	3	>	**3**	3	4	>	**4**	<	41	>	**41**	<	42	>	**42**	**5**
			V/C	0.16	0.44	>		0.11	0.58	>		<	0.07	>		<	0.22	>		
			95th	4	42	>		4	76	>		<	11	>		<	18	>		
			Storage	30	-	>		15	-	>		<	-	>		<	-	>		
			Avail.	26	-	>		11	-	>		<	-	>		<	-	>		

TWSC - Two-Way Stop Control
TCS - Traffic Control Signal
MOE - Measure of Effectiveness
LOS - Level of Service
V/C - Volume to Capacity Ratio
Avail. - Available Storage (m)
> - Shared Right-Turn Lane
< - Shared Left-Turn Lane

3 Development Concept

3.1 Site Description

The subject site is located at 284-292 Plains Road East in the City of Burlington. The site is adjacent to the City of Burlington's Aldershot Mobility Hub area[5]. The city defines this area as an intensification area and is intended to foster a more pedestrian and transit friendly urban environment through a mix of dense residential, employment, and retail land uses. **Figure 3.1** illustrates the layout of the subject site.

The proposed 6-storey mid-rise development contains 117 residential condominium units and 142 parking spaces (1.21 spaces per unit). Five layby parking spaces are proposed across the site's Plains Road East frontage. The allocation of the site's parking supply for occupants and visitors is not identified on the site plan. Construction is anticipated to occur in one phase with build-out estimated by Year 2023.

The proposed site plan consolidates the three existing private driveways to Plains Road East into one driveway. The proposed driveway is located approximately 75 m west of Filmandale Road.

A sidewalk connection is proposed between the building's main entrance and the existing sidewalk across the site's Plains Road East frontage. The ground floor units fronting Plains Road East have direct at grade connections to the existing sidewalk along Plains Road East.

[5] *Aldershot Mobility Hub Study Area*, City of Burlington, https://www.burlington.ca/en/services-for-you/aldershot-go-mobility-hub-study.asp



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Site Concept Plan

284-292 Plains Road East TIS PS TDM
200104

Figure 3.1

3.2 Transportation Demand Management

The site plan includes Transportation Demand Management (TDM) measures to help improve transportation efficiency (reduced congestion), encourage use of alternative modes, reduce reliance on single occupant vehicles, and encourage a change in behaviour. The proposed TDM measures include:

- **Walking** – Pedestrian oriented design with walking paths to connect the development with adjacent sidewalks. The pedestrian realm to the rear of the building will include amenities such as benches, seating areas and pedestrian scale lighting;
- **Transit** – Proximity to existing transit service (City and Regional GO Transit) and discounted transit passes for first time purchasers during the first year of occupancy will be included as a marketing item;
- **Cycling** – On-site bicycle parking
  - Bicycle parking – 12 spaces are proposed at the rear of the building;
  - The site connects to the City's existing cycling network; and
  - The City of Burlington's Cycling Plan identifies a Protected Bikeway along Plains Road East through the study area.
- **Parking** – Reduced on-site parking supply to complement the future intensification plans for the Mobility Hub. The Aldershot Mobility Hub envisions a dense walkable, bikeable and transit-oriented urban environment with a mix of land uses.

  The applicant intends to unbundle parking costs from residential unit costs. This allows residents to purchase a unit without a parking space.
- **Wayfinding and Travel Planning** – Travel planning resources for residents (individualized marketing, active transportation transit information, transit and cycling maps, community resources) will be provided. Wayfinding signage to major destinations such as schools, public amenities, GO transit and commercial areas will be provide in the landscaping plan or lobby area; and
- **Education/ Promotion, Incentives** – Contribute to building a strong TDM brand in marketing material.

3.3 Site Traffic Forecast

The Institute of Transportation Engineers (ITE) Trip Generation[6] methods are used to estimate the site trip generation. Land Use Code Multifamily Housing (Mid-Rise) (221) was used to estimate the site's trip generation. **Table 3.1** summarizes the site's estimated trip generation.

The subject site is forecast to generate approximately 38 vehicle trips during the AM peak hour and approximately 49 vehicle trips during the PM peak hour. To remain conservative, no reductions have been made to account for modal choice.

TABLE 3.1: ESTIMATED TRIP GENERATION

Land Use	Dwelling Units	AM Peak Hour			PM Peak Hour		
		In	Out	Sum	In	Out	Sum
Multifamily Housing (Mid-Rise) (221)[1]	117	10	30	**40**	31	21	**52**
Total Generation		**10**	**30**	**40**	**31**	**21**	**52**

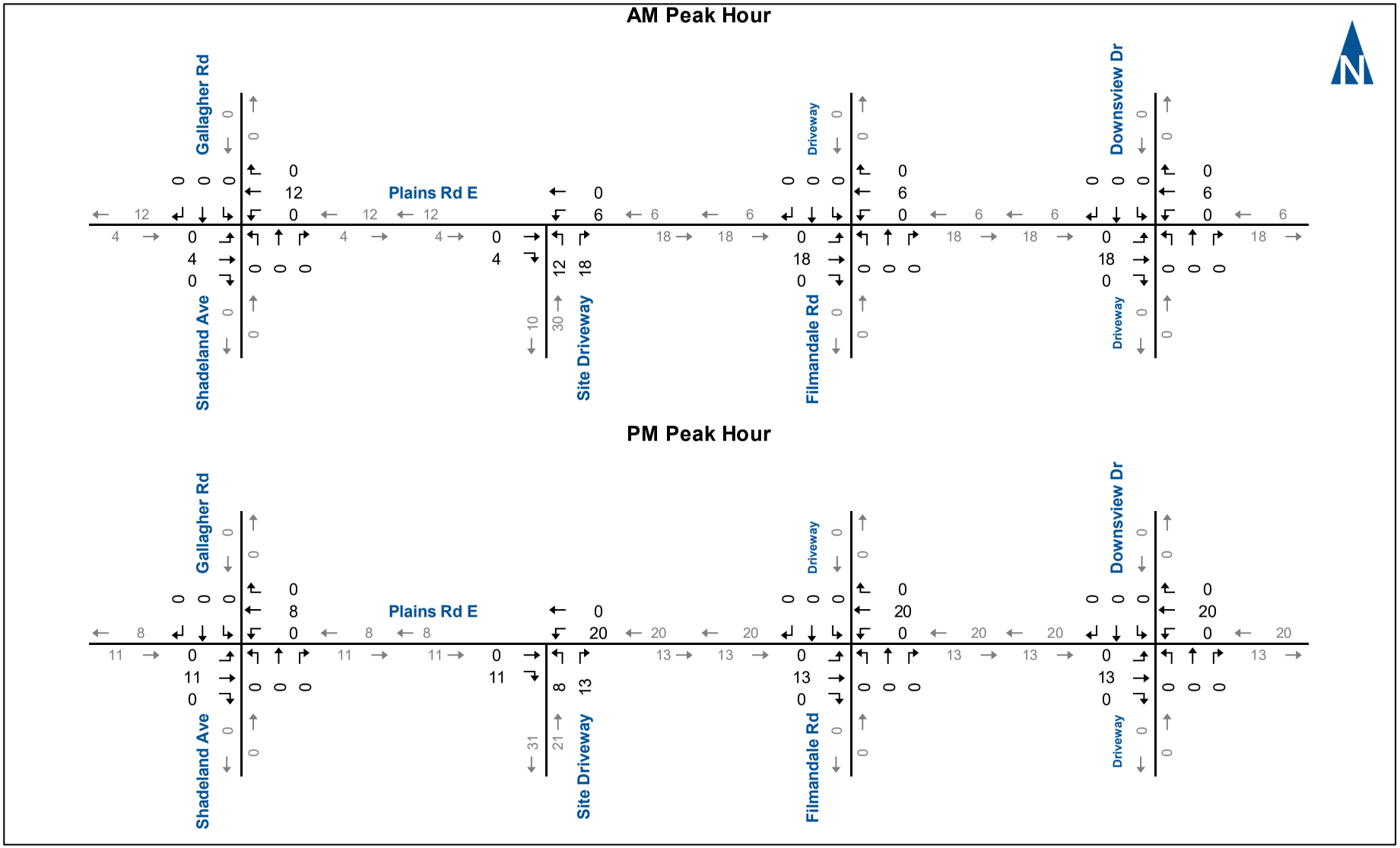
1 Fitted Curve Equation: AM Peak Hour, Ln(T) = 0.98 Ln(X) - 0.98
Fitted Curve Equation: PM Peak Hour, Ln(T) = 0.96 Ln(X) - 0.63

Table 3.2 summarizes the estimated trip distribution. The distribution for site generated traffic is based on existing travel patterns as documented under existing conditions. Travel patterns are expected to follow the existing commuter flows observed for the surrounding residential land uses. **Figure 3.2** illustrates the site-generated traffic estimates.

TABLE 3.2: ESTIMATED PEAK HOUR TRIP DISTRIBUTION

Origin/Destination	AM Peak Hour		PM Peak Hour	
	In	Out	In	Out
West via Plains Rd E	40%	40%	35%	40%
East via Plains Rd E	60%	60%	65%	60%
Total	**100%**	**100%**	**100%**	**100%**

[6] Trip Generation Manual 10th Edition Institute of Transportation Engineers Washington DC



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Site Generated Traffic

4 Future Conditions

The assessment of the future traffic conditions contained in this section includes the forecast traffic volumes and the level of service analysis.

4.1 Traffic Forecast

A five-year horizon (Year 2028) following the anticipated build-out of the site (Year 2023) has been assessed. The likely future traffic volumes near the subject site are estimated to consist of:

- Increased non-site traffic (generalized background traffic growth);
- Traffic generated by the build-out of nearby in-stream developments; and
- Traffic generated by the subject site (**Section 3.3**).

4.1.1 Generalized Background Traffic

The non-site traffic increase is the generalized traffic growth near the subject site, which is anticipated to follow the average increase in population in the area. During pre-study consultations, City staff identified an annual growth rate of 1% per annum.

4.1.2 Other Developments

During pre-study consultations, City staff requested the inclusion of traffic generated by the following nearby in-stream developments:

- 53-71 Plains Road East, a mixed-use development estimated to contain approximately 450 residential units with ground floor commercial space[7]; and
- 484 Plains Road East, a mixed-use development estimated to contain approximately 397 residential units with ground floor commercial space[8].

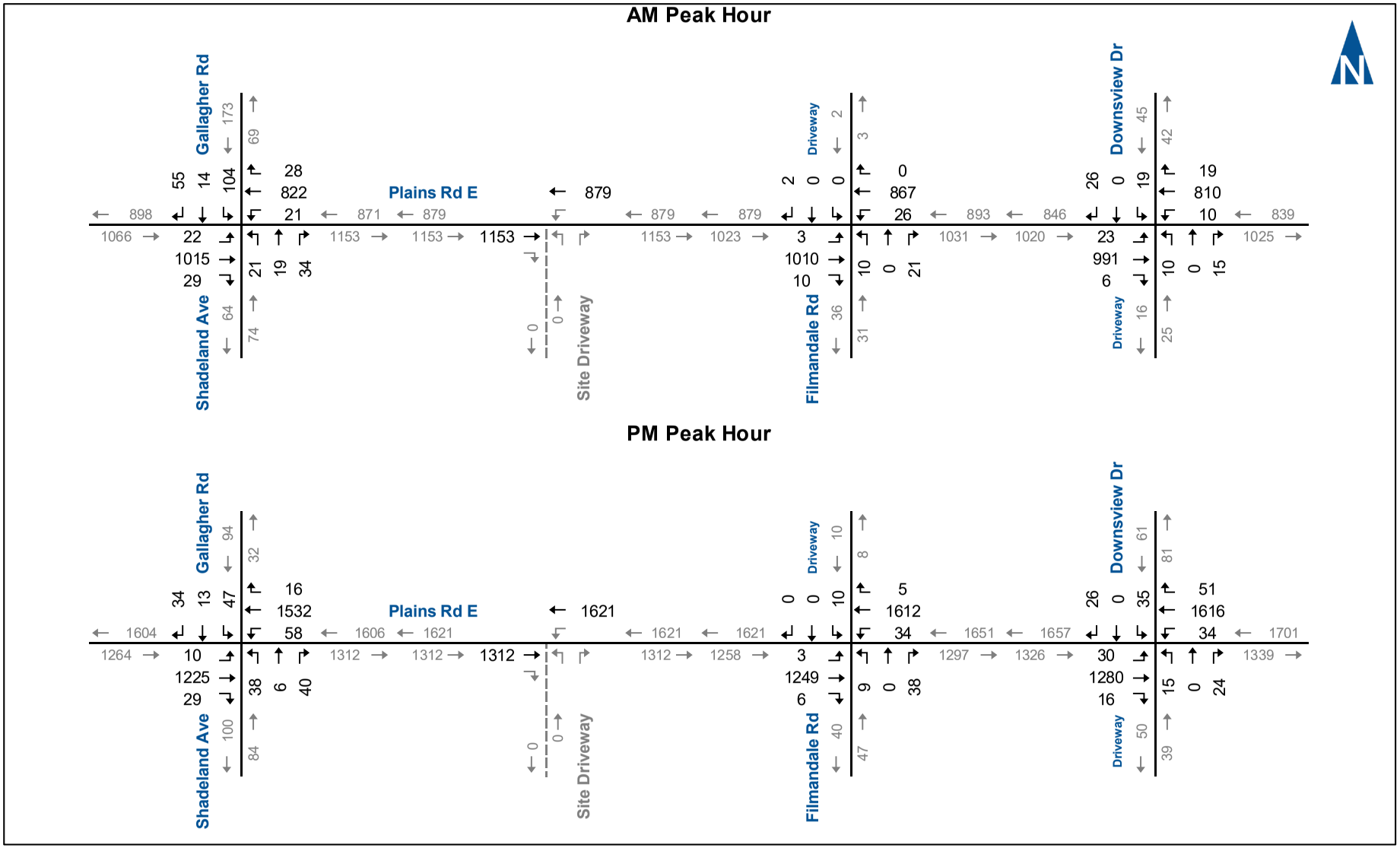
Appendix D contains the detailed traffic forecast for the adjacent development applications.

[7] 53 & 71 Plains Road East Transportation Impact Study, Parking Study & TDM Options Report. Paradigm Transportation Solutions Limited. December 2017.
[8] 484 Plains Road East Mixed-Use Development Transportation Impact Study, BA Consulting Group Ltd., October 2017.



Figure 4.1 illustrates the forecast Background Traffic volumes, which is the combination of the generalized background growth and the traffic volumes generated by the adjacent developments.

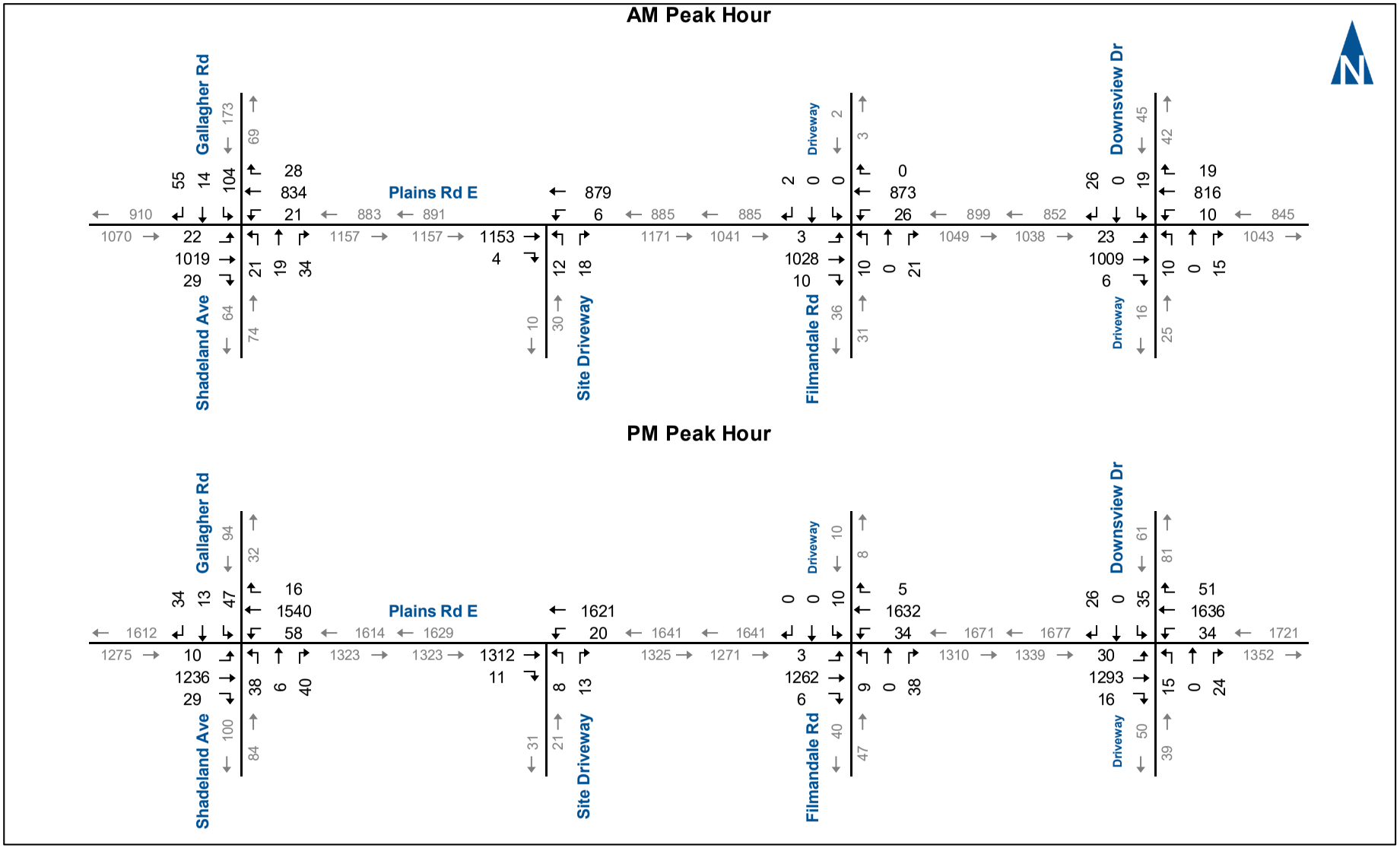
Figure 4.2 illustrates the forecast Total Traffic volumes which is the combination of the forecast background traffic volumes and the site-generated traffic volumes.



Forecast Background Traffic

284-292 Plains Road East TIS PS TDM
200104

Figure 4.1



Forecast Total Traffic

Figure 4.2

4.2 Background Traffic Operations

The study area intersection operations analyses for the background traffic forecast followed the same methodology used for existing conditions. Signal timings have been optimized. **Table 4.1** summarizes the level of service conditions for the forecast background traffic volumes and the following critical movements are noted:

Plains Road East at Shadeland Avenue/Gallagher Road

- Southbound left-turn queue is estimated to exceed the current available storage length by approximately 20 m (35 m total) during the AM peak hour;
- Northbound left-turn queue is estimated to exceed the current available storage length by approximately 2 m (17 m total) during the PM peak hour;
- Southbound left-turn queue is estimated to exceed the current available storage length by approximately 5 m (20 m total) during the PM peak hour.

Plains Road East at Filmandale Road/Private Driveway

- Southbound approach (private driveway) is estimated to operate at LOS F (v/c < 0.15) during the PM peak hour.

Appendix E contains the supporting detailed Synchro 10 output

The above noted capacity deficiencies are forecast to occur under the future background condition. These deficiencies are not related, nor are a result of the development of the subject site.

To accommodate the forecast southbound left-turn queue at the Plains Road East and Shadeland Avenue/Gallagher Road intersection, the city can consider extending the left-turn lane to provide 35 m of storage.

To accommodate the forecast northbound left-turn queue at the Plains Road East and Shadeland Avenue/Gallagher Road intersection, the city can consider extending the left-turn lane to provide 20 m of storage. The queue is forecast to exceed the storage length by 2 m and can likely be accommodated by the taper lane length.

TABLE 4.1: 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 Rd E & Shadeland Ave / Gallagher Rd	TCS	LOS	A	A	>	**A**	A	A	>	**A**	C	C	>	**C**	D	C	>	**D**	**A**
			Delay	5	6	>	**6**	4	5	>	**5**	35	34	>	**34**	39	34	>	**37**	**9**
			V/C	0.09	0.45	>		0.08	0.37	>		0.12	0.09	>		0.46	0.10	>		
			95th	5	66	>		4	47	>		10	13	>		35	14	>		
			Storage	45	-	>		40	-	>		15	-	>		15	-	>		
			Avail.	40	-	>		36	-	>		5	-	>		-20	-	>		
	Plains Rd E & Filmandale Rd	TWSC	LOS	A	A	A	**A**	B	A	A	**A**	<	C	>	**C**	<	B	>	**B**	
			Delay	10	0	0	**0**	11	0	0	**0**	<	15	>	**15**	<	11	>	**11**	
			V/C	0.00	0.42	0.22		0.04	0.36	0.18		<	0.08	>		<	0.00	>		
			95th	0	0	0		1	0	0		<	2	>		<	0	>		
			Storage	15	-	>		30	-	>		<	-	>		<	-	>		
			Avail.	15	-	>		29	-	>		<	-	>		<	-	>		
	Plains Rd E & Downsview Dr	TCS	LOS	A	A	>	**A**	A	A	>	**A**	<	D	>	**D**	<	D	>	**D**	**A**
			Delay	2	2	>	**2**	2	3	>	**2**	<	41	>	**41**	<	42	>	**42**	**4**
			V/C	0.05	0.38	>		0.03	0.32	>		<	0.02	>		<	0.13	>		
			95th	2	22	>		1	27	>		<	7	>		<	14	>		
			Storage	30	-	>		15	-	>		<	-	>		<	-	>		
			Avail.	28	-	>		14	-	>		<	-	>		<	-	>		
PM Peak Hour	Plains Rd E & Shadeland Ave / Gallagher Rd	TCS	LOS	A	A	>	**A**	A	A	>	**A**	D	D	>	**D**	D	D	>	**D**	**A**
			Delay	3	4	>	**4**	5	5	>	**5**	42	39	>	**40**	42	40	>	**41**	**7**
			V/C	0.06	0.50	>		0.27	0.63	>		0.28	0.06	>		0.31	0.15	>		
			95th	2	69	>		8	79	>		17	11	>		20	15	>		
			Storage	45	-	>		40	-	>		15	-	>		15	-	>		
			Avail.	43	-	>		32	-	>		-2	-	>		-5	-	>		
	Plains Rd E & Filmandale Rd	TWSC	LOS	C	A	A	**A**	B	A	A	**A**	<	C	>	**C**	<	F	>	**F**	
			Delay	16	0	0	**0**	13	0	0	**0**	<	19	>	**19**	<	59	>	**59**	
			V/C	0.01	0.56	0.28		0.08	0.72	0.36		<	0.16	>		<	0.13	>		
			95th	0	0	0		2	0	0		<	5	>		<	3	>		
			Storage	15	-	>		30	-	>		<	-	>		<	-	>		
			Avail.	15	-	>		28	-	>		<	-	>		<	-	>		
	Plains Rd E & Downsview Dr	TCS	LOS	A	A	>	**A**	A	A	>	**A**	<	D	>	**D**	<	D	>	**D**	**A**
			Delay	6	3	>	**3**	3	5	>	**5**	<	41	>	**41**	<	42	>	**42**	**5**
			V/C	0.24	0.50	>		0.15	0.66	>		<	0.09	>		<	0.23	>		
			95th	4	46	>		5	99	>		<	12	>		<	18	>		
			Storage	30	-	>		15	-	>		<	-	>		<	-	>		
			Avail.	26	-	>		10	-	>		<	-	>		<	-	>		

TWSC - Two-Way Stop Control *LOS - Level of Service* *> - Shared Right-Turn Lane*

TCS - Traffic Control Signal *V/C - Volume to Capacity Ratio* *< - Shared Left-Turn Lane*

MOE - Measure of Effectiveness *Avail. - Available Storage (m)*

4.3 Total Traffic Operations

The study area intersection operations analyses for the total traffic forecast followed the same methodology used for background conditions. Signal timings have been optimized. **Table 4.2** summarizes the level of service conditions for the forecast total traffic volumes.

Total traffic operations are forecast to operate like background conditions and no additional critical movements are noted.

The capacity deficiencies forecast to occur under the future background conditions are expected to continue to occur with the addition of site generated traffic. Minor increases in delay and queueing is expected because of the additional site-generated traffic.

The queuing issue forecast to occur for the northbound and southbound left-turn movements at the Plains Road East and Shadeland Avenue/Gallagher Road intersection is expected to continue. The forecast queue lengths remain unchanged compared to the background traffic operation. Site generated traffic is not expected to contribute volumes to these movements.

The site driveway approach to Plains Road East is forecast to operate with delays in LOS B to C range with a v/c ratio of less than 0.10. Queue lengths on the site driveway approach are forecast to be less than 5 m.

The westbound left-turn movement into the subject site is forecast to operate with delays in the LOS A range with a v/c ratio of less than 0.05. The westbound left-turn queue length is forecast to be less than 5 m and can be accommodated by the existing centre two-way left-turn lane.

Appendix F contains the supporting detailed Synchro 10 output

TABLE 4.2: TOTAL TRAFFIC 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 Rd E & Shadeland Ave / Gallagher Rd	TCS	LOS	A	A	>	A	A	A	>	A	C	C	>	C	D	C	>	D	A
			Delay	5	6	>	6	4	5	>	5	35	34	>	34	39	34	>	37	9
			V/C	0.09	0.45	>		0.08	0.37	>		0.12	0.09	>		0.46	0.10	>		
			95th	5	66	>		4	48	>		10	13	>		35	14	>		
			Storage	45	-	>		40	-	>		15	-	>		15	-	>		
			Avail.	40	-	>		36	-	>		5	-	>		-20	-	>		
	Plains Rd E & Filmandale Rd	TWSC	LOS	A	A	A	A	B	A	A	A	<	C	>	C	<	B	>	B	
			Delay	10	0	0	0	11	0	0	0	<	15	>	15	<	11	>	11	
			V/C	0.00	0.43	0.22		0.05	0.36	0.18		<	0.08	>		<	0.00	>		
			95th	0	0	0		1	0	0		<	2	>		<	0	>		
			Storage	15	-	>		30	-	>		<	-	>		<	-	>		
			Avail.	15	-	>		29	-	>		<	-	>		<	-	>		
	Plains Rd E & Downsview Dr	TCS	LOS	A	A	>	A	A	A	>	A	<	D	>	D	<	D	>	D	A
			Delay	2	2	>	2	2	3	>	3	<	41	>	41	<	42	>	42	4
			V/C	0.05	0.39	>		0.03	0.32	>		<	0.02	>		<	0.13	>		
			95th	2	23	>		1	27	>		<	7	>		<	14	>		
			Storage	30	-	>		15	-	>		<	-	>		<	-	>		
			Avail.	28	-	>		14	-	>		<	-	>		<	-	>		
	Plains Rd E & Site Driveway	TWSC	LOS	-	A	A	A	A	A	-	A	B	-	>	B					
			Delay	-	0	0	0	0	0	-	0	15	-	>	15					
			V/C	-	0.49	0.25		0.01	0.37	-		0.08	-	>						
			95th	-	0	0		0	0	-		2	-	>						
PM Peak Hour	Plains Rd E & Shadeland Ave / Gallagher Rd	TCS	LOS	A	A	>	A	A	A	>	A	D	D	>	D	D	D	>	D	A
			Delay	3	4	>	4	5	4	>	4	42	39	>	40	42	40	>	41	6
			V/C	0.06	0.51	>		0.27	0.63	>		0.28	0.06	>		0.31	0.15	>		
			95th	2	70	>		7	68	>		17	11	>		20	15	>		
			Storage	45	-	>		40	-	>		15	-	>		15	-	>		
			Avail.	43	-	>		33	-	>		-2	-	>		-5	-	>		
	Plains Rd E & Filmandale Rd	TWSC	LOS	C	A	A	A	B	A	A	A	<	C	>	C	<	F	>	F	
			Delay	16	0	0	0	13	0	0	0	<	16	>	16	<	60	>	60	
			V/C	0.01	0.56	0.29		0.08	0.73	0.37		<	0.14	>		<	0.13	>		
			95th	0	0	0		2	0	0		<	4	>		<	4	>		
			Storage	15	-	>		30	-	>		<	-	>		<	-	>		
			Avail.	15	-	>		28	-	>		<	-	>		<	-	>		
	Plains Rd E & Downsview Dr	TCS	LOS	A	A	>	A	A	A	>	A	<	D	>	D	<	D	>	D	A
			Delay	6	3	>	3	3	5	>	5	<	41	>	41	<	42	>	42	5
			V/C	0.24	0.51	>		0.16	0.67	>		<	0.09	>		<	0.23	>		
			95th	4	44	>		5	102	>		<	12	>		<	18	>		
			Storage	30	-	>		15	-	>		<	-	>		<	-	>		
			Avail.	27	-	>		10	-	>		<	-	>		<	-	>		
	Plains Rd E & Site Driveway	TWSC	LOS	-	A	A	A	A	A	-	A	C	-	>	C					
			Delay	-	0	0	0	1	0	-	0	16	-	>	16					
			V/C	-	0.56	0.29		0.04	0.69	-		0.07	-	>						
			95th	-	0	0		1	0	-		2	-	>						

TWSC - Two-Way Stop Control
TCS - Traffic Control Signal
MOE - Measure of Effectiveness
LOS - Level of Service
V/C - Volume to Capacity Ratio
Avail. - Available Storage (m)
> - Shared Right-Turn Lane
< - Shared Left-Turn Lane

5 Parking Justification

5.1 Proposed Parking Supply

The site's parking demand is proposed to be accommodated on site. The site statistics indicate a vehicle parking supply of 142 spaces (1.21 spaces per unit). 134 spaces are contained in the proposed two-level underground parking structure and the remaining spaces (8) are located at grade.

Six of the underground parking spaces are reduced in length (5.7 m) and are reserved for small cars. Five layby parking spaces are proposed across the site's Plains Road East frontage.

These spaces are not technically counted towards the site's parking supply. The layby spaces would likely be used by visitors to the subject site or surrounding land uses.

The parking supply is reduced when compared to the City's Zoning By-law 2020 requirements to complement the future intensification plans for the Mobility Hub. The Aldershot Mobility Hub envisions a dense walkable, bikeable and transit-oriented urban environment with a mix of land uses.

The site statistics indicate 12 proposed bicycle parking spaces located at the rear of the building.

5.2 Zoning By-Law Requirements

The Zoning By-law 2020 parking requirements apply to the entire City of Burlington, including the low-density suburban areas and the denser urbanized environments such as the downtown and the other identified Intensification Areas in the City. The city recognizes the need to update the Zoning By-law to reflect modern trends in transportation and the different environments present throughout the city.

The City of Burlington's Zoning By-law 2020[9] prescribes parking ratios for apartment buildings for Occupants (O) and Visitors (V). The following parking ratios are noted:

- Minimum Parking Ratio – Apartment Units
  - 1.25 occupant spaces per one-bedroom unit;
  - 1.50 occupant spaces per two-bedroom unit;

[9] Zoning By-Law 2020/Part 1 - General Conditions and Provisions/2.0 General Provisions

- 1.75 occupant spaces per three or more-bedroom unit; and
- 0.35 visitor spaces per unit.

Table 5.1 summarizes the site's Zoning By-law 2020 parking requirements for the current site concept plan.

Overall, the site's parking supply is considered deficient by 43 spaces when compared to Zoning By-law 2020. It is noted that the current site statistics do not differentiate between resident and visitor parking.

TABLE 5.1: ZONING BY-LAW PARKING REQUIREMENT

Apartment Building	Units	Ratio	Calculation
Occupant - 1 Bedroom	89	1.25	111
Occupant - 2 Bedroom	25	1.50	38
Occupant - 3 Bedroom	3	1.75	5
Visitor – all units	117	0.35	41
Total			**195**

5.3 City-Wide Parking Standards Review

5.3.1 Vehicle Parking

The City of Burlington is updating the 30-year-old Zoning By-law that regulates off-street parking requirements. The City of Burlington's City-Wide Parking Standards Review[10] report includes recommended parking ratios for various land uses throughout the city and provides unique ratios for sites located within Intensification Areas such as the subject site.

The City-Wide Parking Standards Review offers a parking ratio domain for Intensification Areas with maximum and minimum ratios defined.

The City-Wide Parking Standards Review survey data observed a maximum parking demand of 1.10 space per unit, with a maximum visitor demand of 0.10 space per unit. The recommended parking ratios for apartment units in an Intensification Area are noted as follows:

- Maximum Parking Ratios;
  - Occupant parking – 1.50 spaces per unit; and

[10] Burlington City-Wide Parking Standards Review Consolidated Report Prepared for City of Burlington by IBI Group, July 2017

  - Visitor parking – 0.25 spaces per unit.
- Minimum Parking Ratios; and
  - Occupant parking – 1.00 spaces per unit; and
  - Visitor parking – 0.25 spaces per unit.
- 1.00 space per 75 units is recommended to be reserved as "maintenance vehicle parking."

Table 5.2 summarizes the site's parking requirements based on the City-wide parking standards review.

TABLE 5.2: CITY-WIDE PARKING STANDARDS REVIEW - RATE

Land Use: Apartment Units (Intensification Area)	Number of Units	Ratio		Calculation		
		O	V	O	V	Total
Apartment Units	117	1.00	0.25	117	29	**146**
Maintenance Vehicle Parking						**2**
Total						**148**

The need for maintenance spaces to be reserved at all times does not incorporate the broader goals and initiatives of shared parking.

Shared parking is a form of parking management that can allow parking spaces to be shared by more than one user group. Parking utilization patterns for residential land uses typically follow a predictable pattern. Occupant parking demand peaks overnight while residents are home and visitor parking demand peaks in the evening hours.

Maintenance services typically operate during normal business hours (M-F 08:00-18:00). Off peak services are provided on a demand basis and would be less predictable. As maintenance services typically operate during normal business hours when visitor parking demand is lower, there is an opportunity to allow maintenance vehicles to share the visitor parking supply.

The site operator can manage the visitor parking supply by requiring visitors and maintenance workers to sign-in and by encouraging residents to schedule services during the day. The site's loading zone can be used by maintenance vehicles for short-term parking.

The proposed parking supply includes 142 on-site spaces and five lay-by spaces across the site's Plains Road East frontage. The proposed parking supply is in line with the parking rates identified in the City-Wide Parking Standards Review for occupant and visitor parking if the

5 lay-by spaces are allocated for visitors and the requirement for maintenance vehicle parking is excluded.

The site's 142 on-site parking spaces be allocated as follows:

- Occupant parking – 117 spaces (1.00 spaces per unit); and
- Visitor parking – 25 spaces (0.21 spaces per unit).

When the five lay-by spaces are counted as visitor parking, a ratio of 0.25 spaces per unit is achieved. This is in line with the City's requirements.

The small car spaces (six spaces) are accessed by a drive aisle measuring 6.3 m, which is 0.3 m wider than the drive aisle width outlined in the city's site plan guidelines. The small car parking spaces should be assigned to occupants and tied to specific units. Potential purchasers should be made aware of the small car parking space and the potential limitations associated with these spaces based on their personal vehicle. As parking management is part of the site's TDM program, the site's parking supply for occupants can be managed with little risk to the city.

5.3.2 Bicycle Parking

The City-Wide Parking Standards Review outlines the recommended bicycle parking ratios for apartment units. The recommended bicycle parking ratios for apartment units are noted as follows:

- Long-term bicycle parking – 0.50 spaces per unit; and
- Short-term bicycle parking – 0.05 spaces per unit.

The site statistics indicate 12 proposed bicycle parking spaces located at the rear of the building.

To support Active Transportation and to help mitigate the site's transportation and parking impacts, the site's bicycle parking supply should be increased. A total of 59 long-term bicycle parking spaces and 6 short-term bicycle parking spaces should be incorporated into the site plan.

Long-term bicycle parking should be provided in a secure location on the ground floor or on the first floor in the below grade vehicle parking. Short-term bicycle parking should be located near main building entrances in a visible, well-lit location. Ideally, short-term bicycle parking should be weather protected.



5.4 Parking Reduction

The City of Burlington currently does not have a checklist or other sources to determine potential reductions in parking due to the provision of TDM measures. The Region of Waterloo TDM Checklist quantifies estimated parking reductions.

The Region of Waterloo TDM Checklist[11] was reviewed to determine potential parking reductions based on the TDM plan outlined in **Section 3.2**. **Appendix G** contains the Region of Waterloo TDM Checklist.

With the TDM measures proposed, the site's potential parking reduction is calculated to be 10% of the parking requirement. The reduction in parking is related to:

- **Pedestrian & Cyclist Orientation – 2% reduction**
  - Development incorporates functional building entrances that are oriented to public space or to locations where pedestrians and transit users arrive from such as a street, square, park, or plaza – 1% reduction.
  - Provision of active uses at-grade along street frontages.
- **Parking – 3% reduction**
  - 75% of parking or more is located underground or in a structure – 3% reduction
- **Trip Reduction Incentives – 5% reduction**
  - The building owner/occupant agrees to charge for parking as a separate cost to occupants – 5% reduction.

In total a 10% reduction to the City-Wide Parking Standards Review rates results in a parking requirement of 133 spaces. With 142 spaces proposed, the site's parking demand is estimated to be less than the proposed supply. The site's parking demand is forecast to be contained on-site.

[11] Region of Waterloo Report P-13-088, Proposed Revisions to the Regional Transportation Impact Study Guidelines, September 10, 2013

6 Conclusions and Recommendations

6.1 Conclusions

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

- **Site Concept**: The proposed 6-storey mid-rise development contains 117 residential condominium units and 142 parking spaces (1.21 spaces per unit). The proposed parking supply consists of 142 on-site spaces and 5 lay-by spaces across the site's Plains Road East frontage. Vehicle access is proposed by a private driveway to Plain Road East located approximately 75 m west of Filmandale Road. Build-out is estimated in Year 2023.
- **Study Area**: The intersections that form the study area include:
  - Plains Road East and Shadeland Avenue/Gallagher Road (signalized);
  - Plains Road East and Filmandale Road (unsignalized);
  - Plains Road East and Downsview Drive (signalized); and
  - Plains Road East and proposed site driveway.
- **Existing Traffic Conditions**: The intersections within the study area are generally operating with acceptable levels of service during the AM and PM peak hours. The following critical movements are noted:
  - Plains Road East at Shadeland Avenue/Gallagher Road: The northbound and southbound queue lengths are estimated to exceed the current available storage length; and
  - Plains Road East at Filmandale Road/Private Driveway: Localized congestion is occurring on the southbound approach (private driveway).
- **Forecast Traffic**: The forecast traffic volumes near the subject site have been assessed for a five-year horizon (Year 2028) from the anticipated build-out date (Year 2023).
- **Background Traffic Conditions**: The noted queue lengths and localized congestion previously identified under existing conditions are anticipated to continue to occur.
- **Site Generated Traffic**: The subject site is forecast to generate approximately 40 vehicle trips during the AM peak hour and approximately 52 vehicle trips during the PM peak hour.

- **Parking Demand**: The proposed parking supply consists of 142 on-site spaces and 5 lay-by spaces across the site's Plains Road East frontage. The proposed parking supply is in line with parking rates identified in the City-Wide Parking Standards Review if the requirement for maintenance spaces is excluded. The layby spaces provide additional flexibility to the subject site and surrounding land uses for short term increases in parking demand.
- **Transportation Demand Management**: The site concept plan includes TDM measures intended to assist in mitigating the site's transportation and parking impacts. Measures are aimed at walk, transit, cycling, parking, and education/promotion.
- **Total Traffic Conditions**: The intersections within the study area are forecast to operate with levels of service like background traffic conditions. No additional critical movements are noted because of the addition of the site-generated traffic.

6.2 Recommendations

Based on the findings of this study, it is recommended that:

- The site's 142 on-site parking spaces be allocated as follows:
  - Occupant parking – 117 spaces (1.00 spaces per unit); and
  - Visitor parking – 25 spaces (0.21 spaces per unit).
- The site's bicycle parking supply should be increased. A total of 59 long-term bicycle parking spaces and 6 short-term bicycle parking spaces should be incorporated into the site plan.
- The City of Burlington consider extending the northbound and southbound storage lengths at the Plains Road East and Shadeland Avenue/Gallagher Road intersection to accommodate 20 m and 35 m of storage, respectively.

Appendix A

Pre-Study Consultation

Scott Catton

From: Scott Catton
Sent: Wednesday, 5 August, 2020 01:17 PM
To: Lucas, Steve
Cc: Ozimkovic , Danijel
Subject: 200104 (284-292 Plains Road East TIS PS) Proposed Scope of Work
Attachments: 20042 - 284-292 Plains Rd E, Burlington - Drawing Set.pdf

Lucas, Steve Steve.Lucas@burlington.ca

Hi Steve,
Hope all is well on your end.

We've been retained to complete a TIS and parking study for the proposed development of 284-292 Plains Road East. The site concept plan includes a 9-storey mid-rise building with 156 units. Parking is noted on the site statistics to be 195 spaces (1.25 per unit) (9 at grade spaces). The AM trip generation is estimated to be 53 trips. The PM trip generation is estimated to be 68 trips. Build-out is estimated to be late 2021. A copy of the current site concept plan is attached.

Can you please review our proposed scope of work and provide comment?

Items I would like to have input on include:

- Method to develop baseline volumes for analysis. See our suggested approach below;
- Adjacent developments to include in the traffic forecast;
- Suggested generalized Growth rate of 1% per annum (consistent with the study we're working on down the street at 40-70 Plains Road); and
- Any planned geometric or traffic control improvements at the intersections in the study area (I don't think there will be any as the road was recently reconstructed); and

Suggested Scope of Work

- A **Transportation Impact Study** to evaluate the effects of the proposed development on the transportation system and recommend improvements, if necessary, to address potential impacts. The study will follow the Region of Halton Transportation Impact Study Guidelines (2015). Proposed study area:
    - Plains Road East at Filmandale Road (unsignalized);
    - Plains Road East at Shadeland Avenue/Gallagher Road (signalized); and
    - The proposed site driveway to Plains Road East.

  Traffic forecasts and analysis will be completed for one (1) planning horizon (five years from the anticipated build out date (Year 2026) and two analysis periods (weekday AM and PM peak hours).

- A **Parking Study** to estimate the parking demand generated by the proposed development and establish the number of on-site parking spaces that should be provided, recognizing site constraints and local conditions. If needed, a strategy would be developed to satisfy the parking demands of the proposed development.

Task 1 – Pre-Study Consultation and Data Assembly

We will contact the City of Burlington (the review agency) to request their feedback on the scope of work, study area and other assumptions.

We will gather available data, relevant background reports and any other information about the study area pertinent to the assessment (e.g. other approved developments in the vicinity, zoning by-law provisions). Any apparent data gaps or discrepancies will be addressed with the review agencies.

We will visit the site to observe current traffic and parking conditions on roads in the study area. Roadway configuration and traffic control will be documented, with a figure illustrating the study area prepared. Parking regulations and legal on-street and off-site parking supply within convenient walking distance of the subject site (200 metres) will be inventoried. Other related features such as pedestrian and cycling facilities and transit stops will be noted.

Task 2 – Forecasting and Analysis

Transportation Impact Study

We will prepare vehicle traffic forecasts for each planning horizon and analysis period. The components of the forecasts are as follows:

- Existing baseline Year 2020 volumes will be derived from the historical and new (August 2020) traffic counts. Suggested approach for developing volumes for use is outlined below.

- Future Background volumes for the remaining horizon years will be estimated by applying a growth rate to the Existing volumes and adding anticipated trips from nearby approved and in-stream developments. Growth rates and developments to include in the background traffic forecasts will be confirmed with the review agencies during Task 1;

- Vehicle trips generated by the proposed development will be forecast based on the rates contained in the Institute of Transportation Engineers (ITE) Trip Generation Manual (10th Edition). These trips will be distributed and assigned to the study area intersections based on existing traffic patterns and/or Transportation Tomorrow Survey data. The resulting net site-generated traffic will be added to the Future Background estimates to produce Future Total volumes for each future horizon year and analysis period.

We will analyze the operation of the study area intersections for the Existing, Future Background (without the development) and Future Total (with the development) traffic conditions for each horizon year and analysis period using Synchro software. Volume-to-capacity (v/c) ratios, Level of Service (LOS) and queuing will be assessed.

Based on the analysis results, we will identify any operational deficiencies as well as the net impact of the proposed development on the study area road network. The need for road improvements (e.g., auxiliary turn lanes) and/or other mitigating measures (e.g., traffic control device modifications) to address deficiencies will be determined.

We will assess whether these measures are required due to non-site traffic (i.e. Existing or Future Background) or the increase in volumes resulting from the proposed development (i.e. Future Total). We will explore opportunities to reduce vehicular traffic volumes generated by the proposed development through non-auto mode use, including public transit, walking and cycling, and other potential TDM measures.

Parking Justification Report

We will calculate the parking supply required for the proposed development by the municipal zoning by-law. If the planned parking supply does not meet the by-law requirement, we will forecast peak parking demand based on the rates obtained from the Institute of Transportation Engineers (ITE) Parking Generation (5th Edition). This forecast will be further refined through consideration of typical auto ownership characteristics for land uses of this nature.

If the planned parking supply for the proposed development will adequately serve the forecast peak demand, we will provide a justification for the proposed number of spaces, recognizing site constraints, local conditions and potential spillover impacts. If not, we will identify parking management measures that could be considered to alleviate the projected supply deficit (e.g., transit, active transportation, TDM strategies, shared parking). This may include use of legal on-street and off-site parking nearby.

Task 3 – Report Preparation

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

Baseline Year 2020 Traffic Volumes.

COVID-19 containment measures have depressed typical traffic volumes. To develop a baseline condition suitable for analysis purposes we propose the following.

1. Collection of new TMC data at the study area intersections noted above.
    a. Plains Road East at Filmandale Road;
    b. Plains Road East at Shadeland Avenue/Gallagher Road; and
2. Collection of a new TMC at the intersection of Plains Road East and Clearview Drive.
3. Using December 2019 TMC data we have collected for Plains Road East and Clearview Drive we will develop a factor to adjust the new TMC data (item #1 above) up to a baseline condition for use the report.

Thanks very much.

Scott Catton, C.E.T.
Senior Project Manager

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p: 905.381.2229 x302
e: scatton@ptsl.com
w: www.ptsl.com

Since 1998, our unique "work at home" business model has enabled us to harness technology, offer high quality service and strong communication with our clients and now allows us to carry on our work for you during COVID-19.

Let's stay safe and look out for each other. We will get through this together.

Appendix B

Existing Data

Plains Rd E @ Filmandale Rd

Morning Peak Diagram

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

One Hour Peak
From: 9:00:00
To: 10:00:00

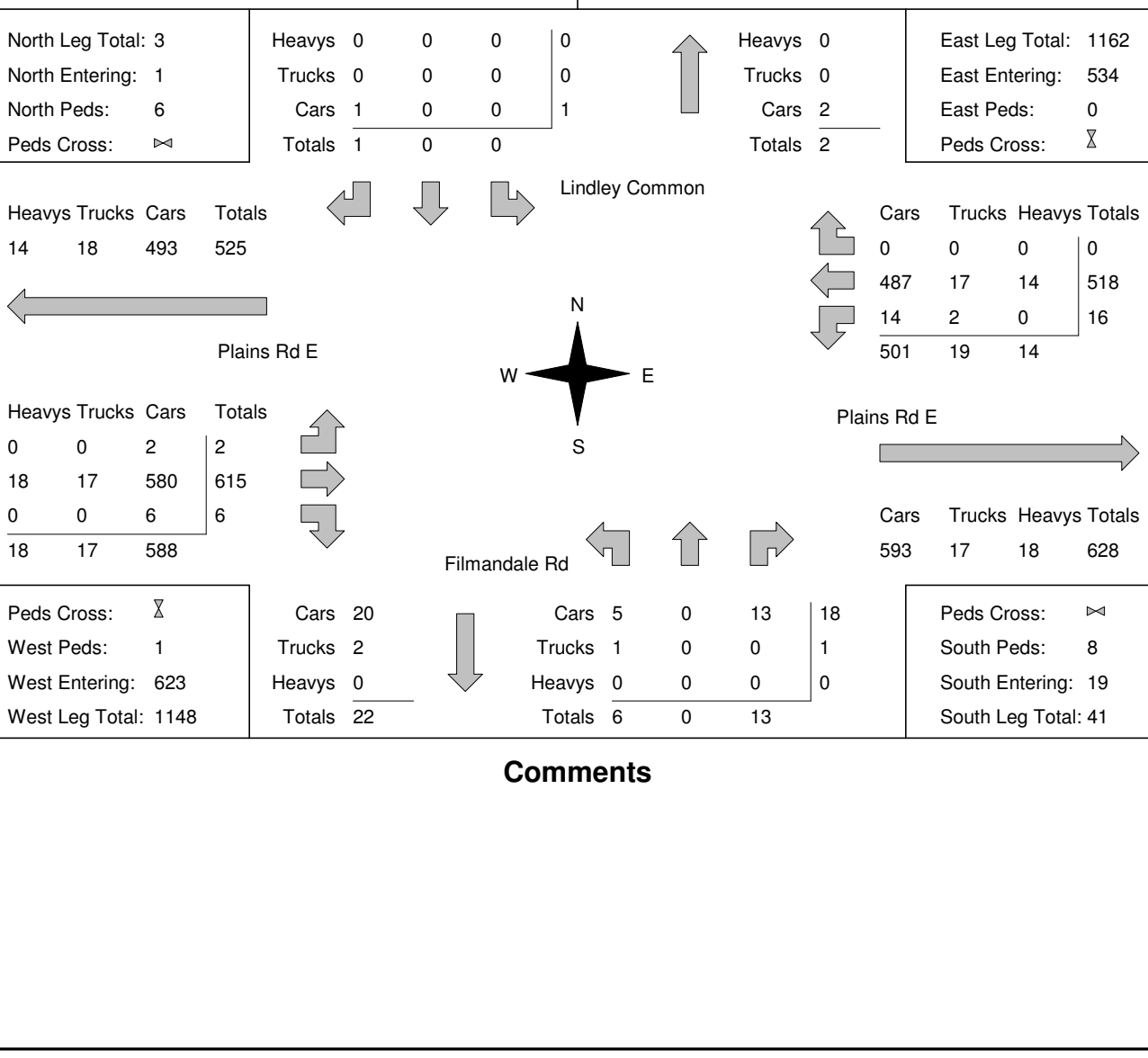
Municipality: Burlington
Site #: 0000000002
Intersection: Plains Rd E & Filmandale Rd
TFR File #: 2
Count date: 19-Aug-2020

Weather conditions:
Sunny/Dry

Person(s) who counted:
Teresa

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

Major Road: Plains Rd E runs W/E



Comments

Plains Rd E @ Filmandale Rd

Mid-day Peak Diagram

Specified Period
From: 11:00:00
To: 13:00:00

One Hour Peak
From: 11:45:00
To: 12:45:00

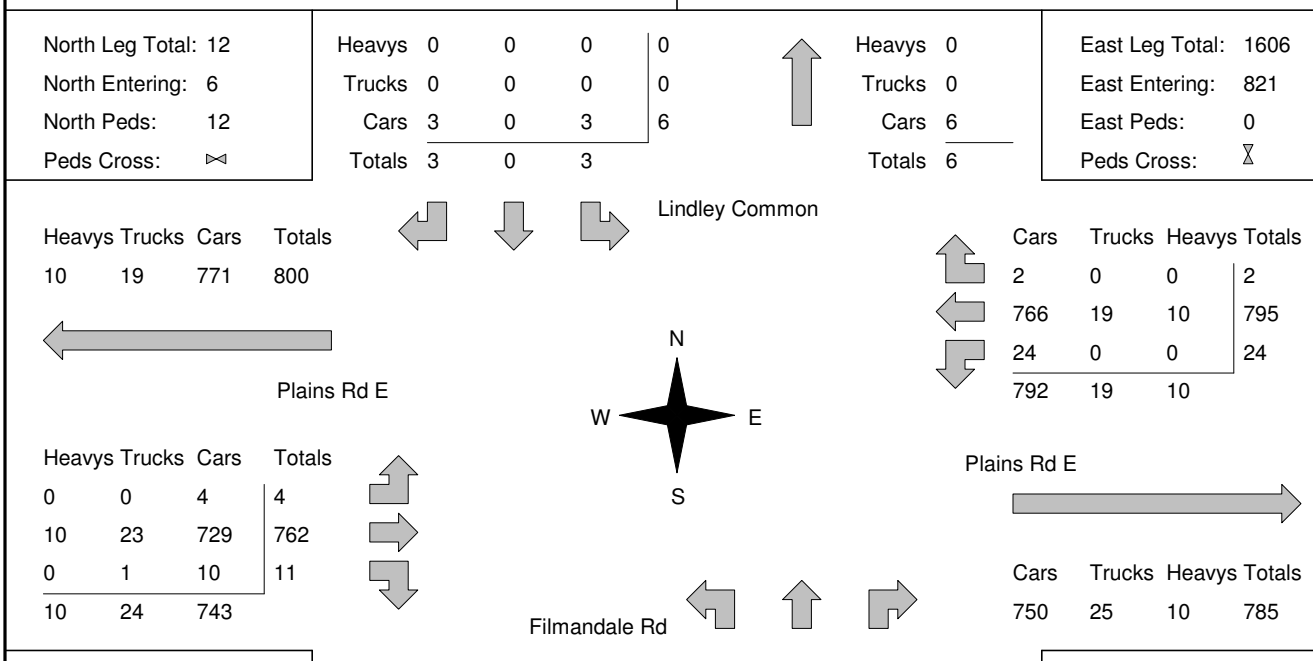
Municipality: Burlington
Site #: 0000000002
Intersection: Plains Rd E & Filmandale Rd
TFR File #: 2
Count date: 19-Aug-2020

Weather conditions:
Sunny/Dry

Person(s) who counted:
Teresa

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

Major Road: Plains Rd E runs W/E



Comments

Plains Rd E @ Filmandale Rd

Afternoon Peak Diagram

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

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

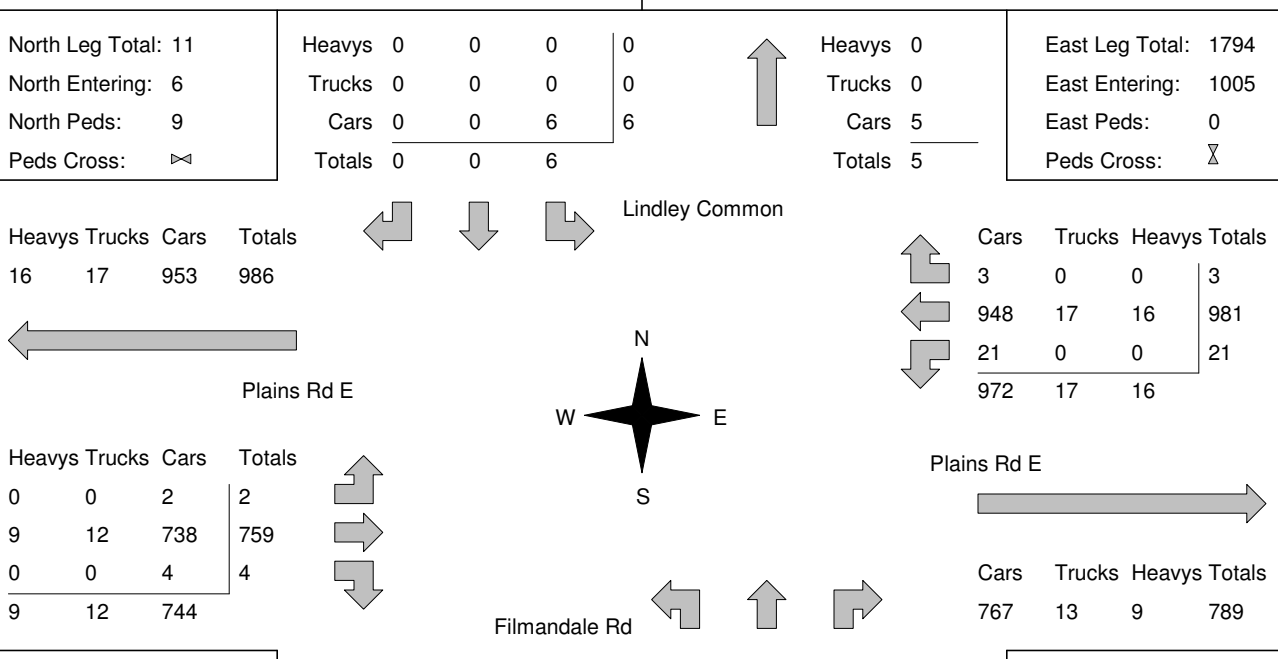
Municipality: Burlington
Site #: 0000000002
Intersection: Plains Rd E & Filmandale Rd
TFR File #: 2
Count date: 19-Aug-2020

Weather conditions:
Sunny/Dry

Person(s) who counted:
Teresa

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

Major Road: Plains Rd E runs W/E



Comments

Plains Rd E @ Filmandale Rd

Total Count Diagram

Municipality: Burlington
Site #: 0000000002
Intersection: Plains Rd E & Filmandale Rd
TFR File #: 2
Count date: 19-Aug-2020

Weather conditions:
Sunny/Dry

Person(s) who counted:
Teresa

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

Major Road: Plains Rd E runs W/E

North Leg Total:	53
North Entering:	25
North Peds:	86
Peds Cross:	⋈

Heavys	0	0	0	0
Trucks	0	0	0	0
Cars	5	0	20	25
Totals	5	0	20	

Heavys	0
Trucks	0
Cars	28
Totals	28

East Leg Total:	11190
East Entering:	5832
East Peds:	3
Peds Cross:	⧖

Lindley Common

Heavys	Trucks	Cars	Totals
110	156	5453	5719

Cars	Trucks	Heavys	Totals
17	0	0	17
5414	155	110	5679
133	3	0	136
5564	158	110	

Plains Rd E

N
W E
S

Heavys	Trucks	Cars	Totals
0	0	10	10
108	137	4948	5193
2	3	59	64
110	140	5017	

Plains Rd E

Cars	Trucks	Heavys	Totals
5109	141	108	5358

Filmandale Rd

Peds Cross:	⧖
West Peds:	5
West Entering:	5267
West Leg Total:	10986

Cars	192
Trucks	6
Heavys	2
Totals	200

Cars	34	1	141	176
Trucks	1	0	4	5
Heavys	0	0	0	0
Totals	35	1	145	

Peds Cross:	⋈
South Peds:	74
South Entering:	181
South Leg Total:	381

Comments

Plains Rd E @ Downsview Dr

Morning Peak Diagram

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

One Hour Peak
From: 9:00:00
To: 10:00:00

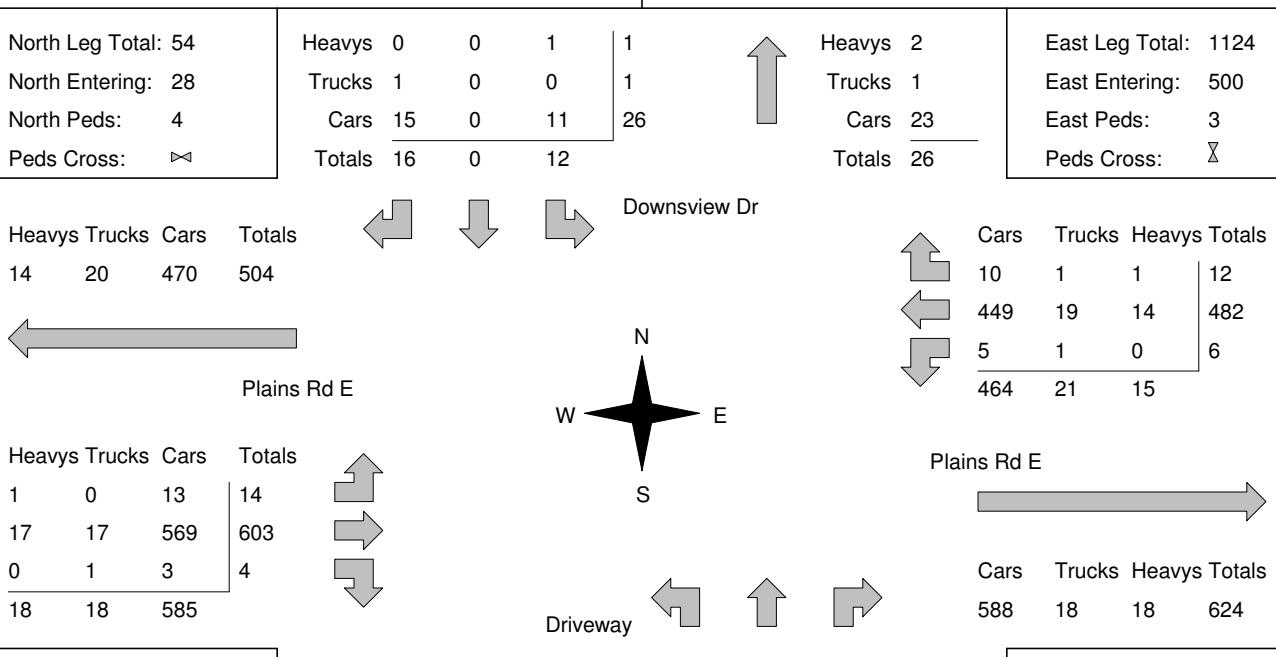
Municipality: Burlington
Site #: 0000000003
Intersection: Plains Rd E & Downsview Dr
TFR File #: 3
Count date: 19-Aug-2020

Weather conditions:
Sunny/Dry

Person(s) who counted:
Ela

**** Signalized Intersection ****

Major Road: Plains Rd E runs W/E



Comments

Plains Rd E @ Downsview Dr

Mid-day Peak Diagram

Specified Period
From: 11:00:00
To: 13:00:00

One Hour Peak
From: 11:30:00
To: 12:30:00

Municipality: Burlington
Site #: 0000000003
Intersection: Plains Rd E & Downsview Dr
TFR File #: 3
Count date: 19-Aug-2020

Weather conditions:
Sunny/Dry

Person(s) who counted:
Ela

**** Signalized Intersection ****

Major Road: Plains Rd E runs W/E

North Leg Total: 63
North Entering: 29
North Peds: 5
Peds Cross: ⋈

Heavys	0	0	1	1
Trucks	2	0	2	4
Cars	14	0	10	24
Totals	16	0	13	

Heavys	1
Trucks	0
Cars	33
Totals	34

East Leg Total: 1629
East Entering: 804
East Peds: 2
Peds Cross: ⧖

Downsview Dr

Heavys	Trucks	Cars	Totals
10	26	764	800

Cars	Trucks	Heavys	Totals
14	0	0	14
746	24	10	780
10	0	0	10
770	24	10	

Plains Rd E

N
W E
S

Heavys	Trucks	Cars	Totals
1	0	19	20
7	33	760	800
0	1	3	4
8	34	782	

Plains Rd E

Cars	Trucks	Heavys	Totals
782	35	8	825

Driveway

Peds Cross: ⧖
West Peds: 1
West Entering: 824
West Leg Total: 1624

Cars	13
Trucks	1
Heavys	0
Totals	14

Cars	4	0	12	16
Trucks	0	0	0	0
Heavys	0	0	0	0
Totals	4	0	12	

Peds Cross: ⋈
South Peds: 8
South Entering: 16
South Leg Total: 30

Comments

Plains Rd E @ Downsview 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 #: 0000000003
Intersection: Plains Rd E & Downsview Dr
TFR File #: 3
Count date: 19-Aug-2020

Weather conditions:
Sunny/Dry

Person(s) who counted:
Ela

**** Signalized Intersection ****

Major Road: Plains Rd E runs W/E

North Leg Total:	89
North Entering:	38
North Peds:	10
Peds Cross:	⋈

Heavys	0	0	0	0
Trucks	0	0	0	0
Cars	16	0	22	38
Totals	16	0	22	

Heavys	0
Trucks	0
Cars	51
Totals	51

East Leg Total:	1852
East Entering:	1037
East Peds:	11
Peds Cross:	⧖

Downsview Dr

Heavys	Trucks	Cars	Totals
17	18	974	1009

Cars	Trucks	Heavys	Totals
32	0	0	32
949	18	17	984
21	0	0	21
1002	18	17	

Plains Rd E

N
W E
S

Heavys	Trucks	Cars	Totals
0	0	19	19
9	17	752	778
0	0	10	10
9	17	781	

Plains Rd E

Cars	Trucks	Heavys	Totals
788	18	9	815

Driveway

Peds Cross:	⧖
West Peds:	2
West Entering:	807
West Leg Total:	1816

Cars	31			
Trucks	0			
Heavys	0			
Totals	31			

Cars	9	0	14	23
Trucks	0	0	1	1
Heavys	0	0	0	0
Totals	9	0	15	

Peds Cross:	⋈
South Peds:	17
South Entering:	24
South Leg Total:	55

Comments

Plains Rd E @ Downsview Dr

Total Count Diagram

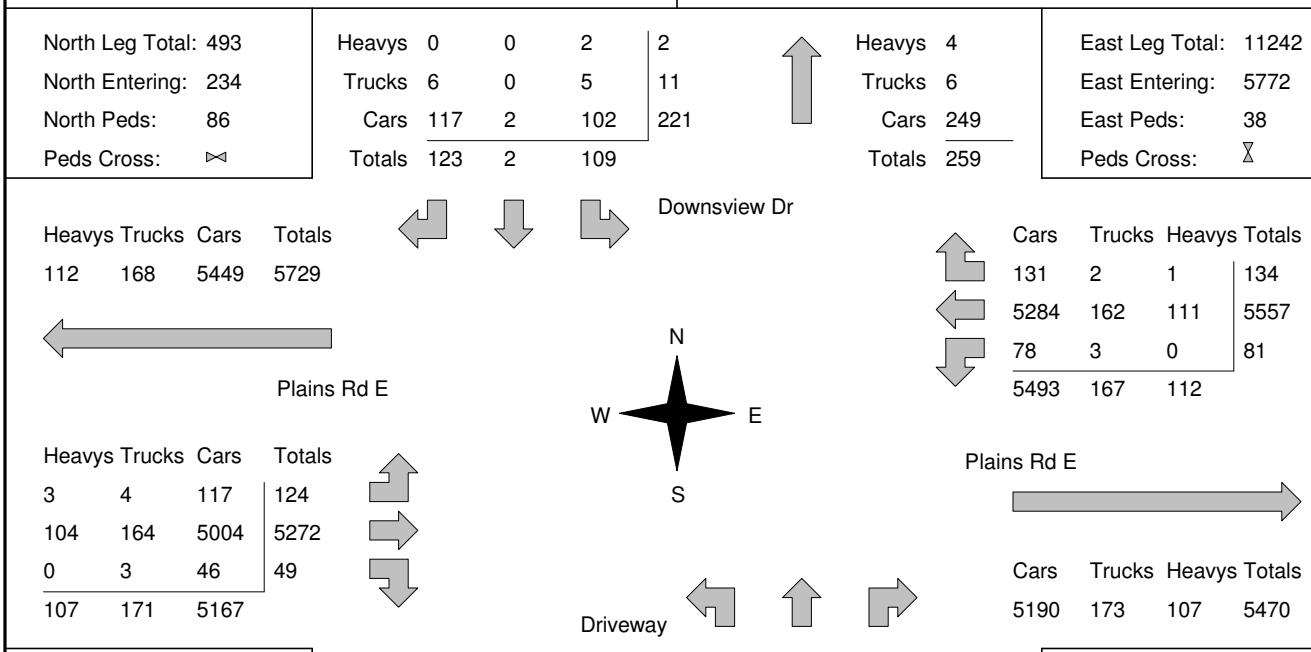
Municipality: Burlington
Site #: 0000000003
Intersection: Plains Rd E & Downsview Dr
TFR File #: 3
Count date: 19-Aug-2020

Weather conditions:
Sunny/Dry

Person(s) who counted:
Ela

**** Signalized Intersection ****

Major Road: Plains Rd E runs W/E



Comments

Plains Rd E @ Gallagher Rd

Morning Peak Diagram

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

One Hour Peak
From: 9:00:00
To: 10:00:00

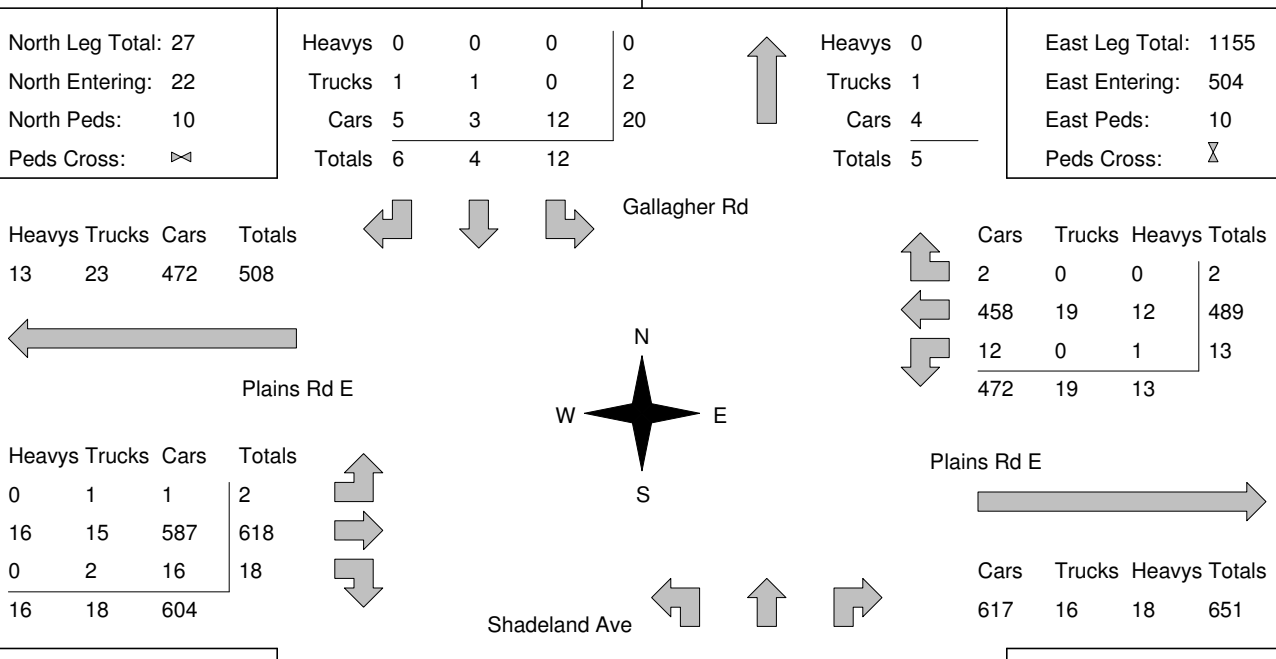
Municipality: Burlington
Site #: 0000000001
Intersection: Plains Rd E & Gallagher Rd
TFR File #: 1
Count date: 18-Aug-2020

Weather conditions:
Sunny/Dry

Person(s) who counted:
Greg

**** Signalized Intersection ****

Major Road: Plains Rd E runs W/E



Comments

Plains Rd E @ Gallagher Rd

Mid-day Peak Diagram

Specified Period
From: 11:00:00
To: 13:00:00

One Hour Peak
From: 11:30:00
To: 12:30:00

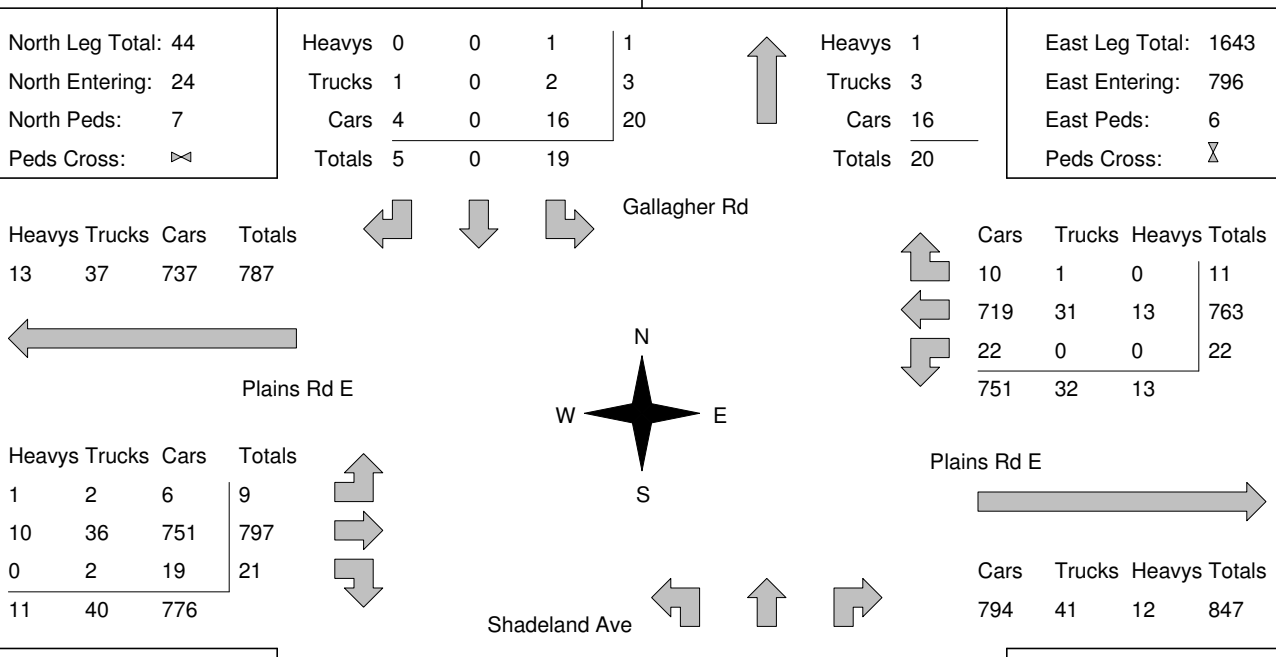
Municipality: Burlington
Site #: 0000000001
Intersection: Plains Rd E & Gallagher Rd
TFR File #: 1
Count date: 18-Aug-2020

Weather conditions:
Sunny/Dry

Person(s) who counted:
Greg

**** Signalized Intersection ****

Major Road: Plains Rd E runs W/E



Comments

Plains Rd E @ Gallagher Rd

Afternoon Peak Diagram

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

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

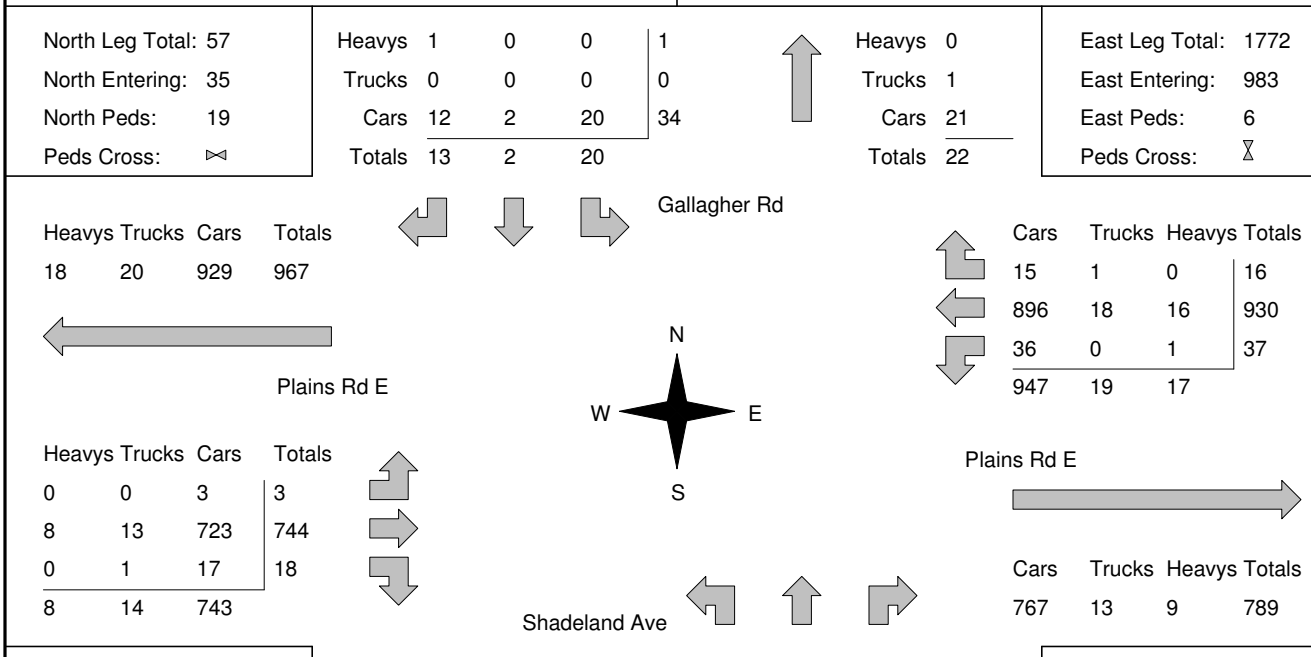
Municipality: Burlington
Site #: 0000000001
Intersection: Plains Rd E & Gallagher Rd
TFR File #: 1
Count date: 18-Aug-2020

Weather conditions:
Sunny/Dry

Person(s) who counted:
Greg

**** Signalized Intersection ****

Major Road: Plains Rd E runs W/E



Comments

Plains Rd E @ Gallagher Rd

Total Count Diagram

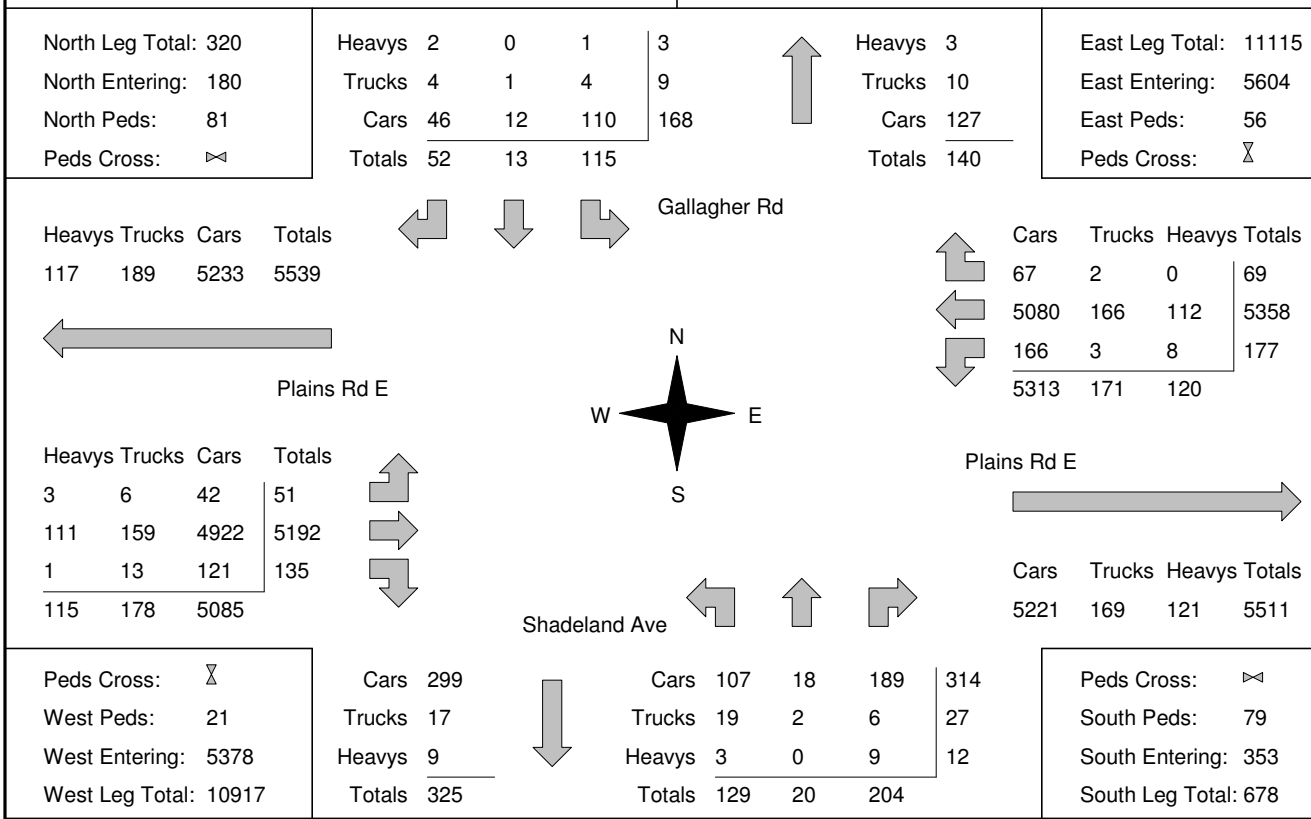
Municipality: Burlington
Site #: 0000000001
Intersection: Plains Rd E & Gallagher Rd
TFR File #: 1
Count date: 18-Aug-2020

Weather conditions:
Sunny/Dry

Person(s) who counted:
Greg

**** Signalized Intersection ****

Major Road: Plains Rd E runs W/E



Comments

200862-Plains Rd E & Shadeland Ave

Morning Peak Diagram

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

One Hour Peak
From: 8:00:00
To: 9:00:00

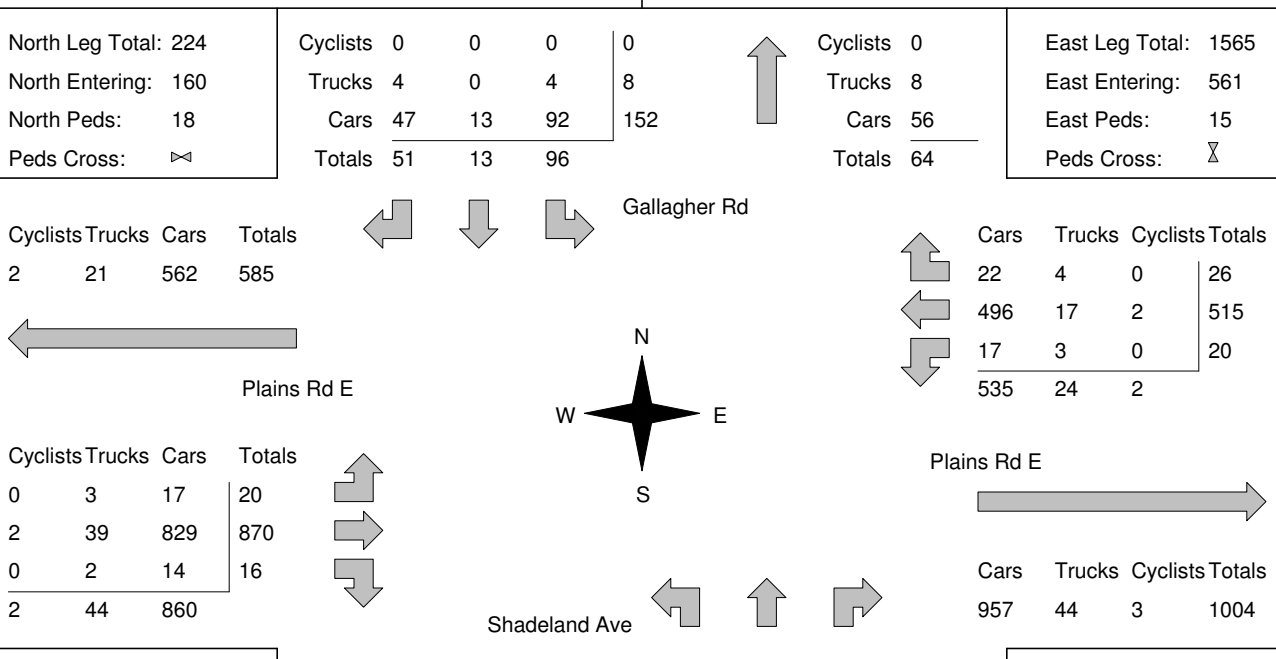
Municipality: Burlington
Site #: 0000200862
Intersection: Plains Rd E & Shadeland Ave
TFR File #: 1
Count date: 25-Apr-2019

Weather conditions:
Sunny

Person(s) who counted:
Nick

**** Signalized Intersection ****

Major Road: Plains Rd E runs W/E



Comments

200862-Plains Rd E & Shadeland Ave

Mid-day Peak Diagram

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

One Hour Peak
From: 11:45:00
To: 12:45:00

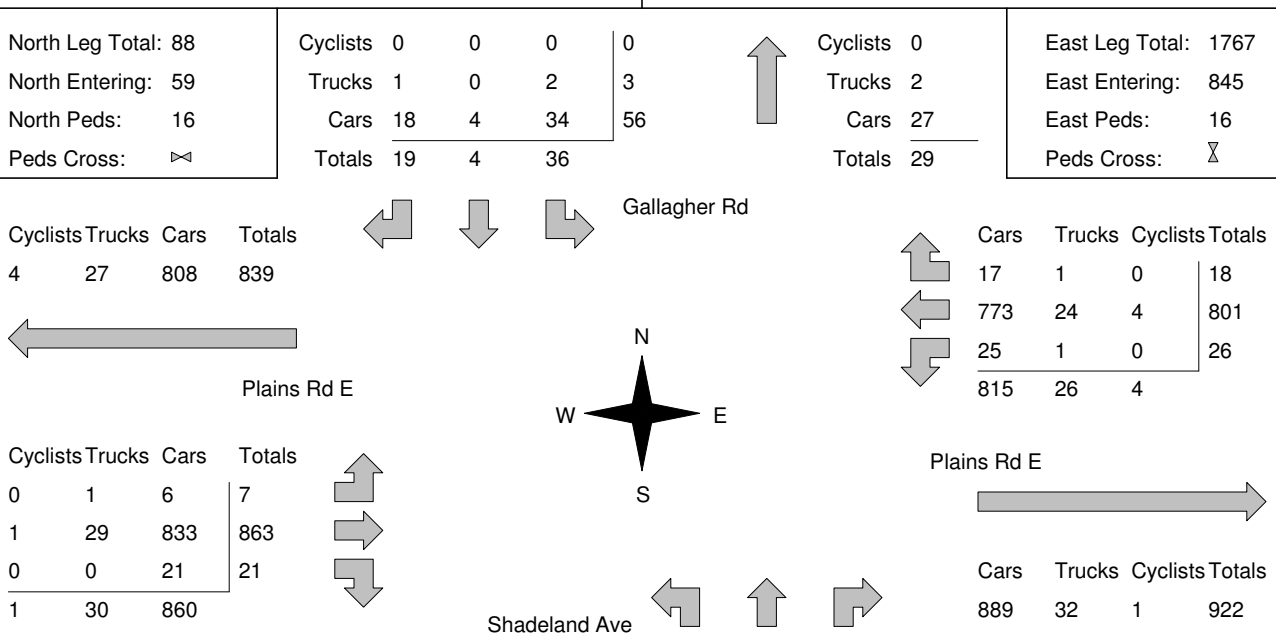
Municipality: Burlington
Site #: 0000200862
Intersection: Plains Rd E & Shadeland Ave
TFR File #: 1
Count date: 25-Apr-2019

Weather conditions:
Sunny

Person(s) who counted:
Nick

**** Signalized Intersection ****

Major Road: Plains Rd E runs W/E



Comments

200862-Plains Rd E & Shadeland Ave

Afternoon Peak Diagram

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

One Hour Peak
From: 16:15:00
To: 17:15:00

Municipality: Burlington
Site #: 0000200862
Intersection: Plains Rd E & Shadeland Ave
TFR File #: 1
Count date: 25-Apr-2019

Weather conditions:
Sunny

Person(s) who counted:
Nick

**** Signalized Intersection ****

Major Road: Plains Rd E runs W/E

North Leg Total: 116
North Entering: 86
North Peds: 14
Peds Cross: ⋈

Cyclists	0	0	0	0
Trucks	2	0	1	3
Cars	29	12	42	83
Totals	31	12	43	

Cyclists	1
Trucks	1
Cars	28
Totals	30

East Leg Total: 2307
East Entering: 1422
East Peds: 11
Peds Cross: ⧖

Gallagher Rd

Cyclists	Trucks	Cars	Totals
6	36	1373	1415

Cars	Trucks	Cyclists	Totals
15	0	0	15
1327	33	6	1366
39	2	0	41
1381	35	6	

Plains Rd E

N
W E
S

Cyclists	Trucks	Cars	Totals
0	1	8	9
5	12	794	811
0	2	21	23
5	15	823	

Plains Rd E

Cars	Trucks	Cyclists	Totals
866	13	6	885

Shadeland Ave

Peds Cross: ⧖
West Peds: 2
West Entering: 843
West Leg Total: 2258

Cars	72
Trucks	4
Cyclists	0
Totals	76

Cars	17	5	30	52
Trucks	1	0	0	1
Cyclists	0	1	1	2
Totals	18	6	31	

Peds Cross: ⋈
South Peds: 9
South Entering: 55
South Leg Total: 131

Comments

200862-Plains Rd E & Shadeland Ave

Total Count Diagram

Municipality: Burlington
Site #: 0000200862
Intersection: Plains Rd E & Shadeland Ave
TFR File #: 1
Count date: 25-Apr-2019

Weather conditions:
Sunny

Person(s) who counted:
Nick

**** Signalized Intersection ****

Major Road: Plains Rd E runs W/E

North Leg Total: 887
North Entering: 642
North Peds: 129
Peds Cross: ⋈

Cyclists	0	2	0	2
Trucks	16	0	13	29
Cars	201	46	364	611
Totals	217	48	377	

Cyclists	1
Trucks	21
Cars	223
Totals	245

East Leg Total: 14204
East Entering: 7128
East Peds: 77
Peds Cross: ⧖

Gallagher Rd

Cyclists	Trucks	Cars	Totals
27	221	6882	7130

Cars	Trucks	Cyclists	Totals
122	8	0	130
6545	199	27	6771
215	12	0	227
6882	219	27	

Plains Rd E

N
W E
S

Cyclists	Trucks	Cars	Totals
0	12	61	73
27	202	6200	6429
2	8	173	183
29	222	6434	

Plains Rd E

Cars	Trucks	Cyclists	Totals
6821	224	31	7076

Shadeland Ave

Peds Cross: ⧖
West Peds: 39
West Entering: 6685
West Leg Total: 13815

Cars	434
Trucks	20
Cyclists	4
Totals	458

Cars	136	40	257	433
Trucks	6	1	9	16
Cyclists	0	1	4	5
Totals	142	42	270	

Peds Cross: ⋈
South Peds: 67
South Entering: 454
South Leg Total: 912

Comments

200862-Plains Rd E & Shadeland Ave
Traffic Count Summary

Intersection: Plains Rd E & Shadeland Ave | **Count Date:** 25-Apr-2019 | **Municipality:** Burlington

North Approach Totals

Hour Ending	Includes Cars, Trucks, & Cyclists: Left	Thru	Right	Grand Total	Total Peds	North/South Total Approaches
7:00:00	0	0	0	0	0	0
8:00:00	18	4	11	33	11	82
9:00:00	96	13	51	160	18	235
11:00:00	0	0	0	0	0	0
12:00:00	40	2	22	64	21	117
13:00:00	28	4	19	51	14	97
14:00:00	19	2	14	35	7	91
15:00:00	0	0	0	0	0	0
16:00:00	91	7	42	140	30	213
17:00:00	46	12	38	96	16	156
18:00:00	39	4	20	63	12	105
Totals:	377	48	217	642	129	1096

South Approach Totals

Hour Ending	Includes Cars, Trucks, & Cyclists: Left	Thru	Right	Grand Total	Total Peds
7:00:00	0	0	0	0	0
8:00:00	12	3	34	49	2
9:00:00	19	18	38	75	1
11:00:00	0	0	0	0	0
12:00:00	19	4	30	53	11
13:00:00	17	2	27	46	4
14:00:00	15	3	38	56	5
15:00:00	0	0	0	0	0
16:00:00	28	3	42	73	16
17:00:00	18	3	39	60	10
18:00:00	14	6	22	42	18
Totals:	142	42	270	454	67

East Approach Totals

Hour Ending	Includes Cars, Trucks, & Cyclists: Left	Thru	Right	Grand Total	Total Peds	East/West Total Approaches
7:00:00	0	0	0	0	0	0
8:00:00	14	420	9	443	1	1395
9:00:00	20	515	26	561	15	1467
11:00:00	0	0	0	0	0	0
12:00:00	28	724	16	768	9	1549
13:00:00	21	805	15	841	16	1722
14:00:00	24	755	11	790	3	1573
15:00:00	0	0	0	0	0	0
16:00:00	42	987	11	1040	16	1875
17:00:00	41	1316	15	1372	8	2227
18:00:00	37	1249	27	1313	9	2005
Totals:	227	6771	130	7128	77	13813

West Approach Totals

Hour Ending	Includes Cars, Trucks, & Cyclists: Left	Thru	Right	Grand Total	Total Peds
7:00:00	0	0	0	0	0
8:00:00	8	928	16	952	3
9:00:00	20	870	16	906	7
11:00:00	0	0	0	0	0
12:00:00	9	747	25	781	7
13:00:00	10	849	22	881	7
14:00:00	3	754	26	783	2
15:00:00	0	0	0	0	0
16:00:00	8	803	24	835	7
17:00:00	10	818	27	855	2
18:00:00	5	660	27	692	4
Totals:	73	6429	183	6685	39

Calculated Values for Traffic Crossing Major Street

Hours Ending:	8:00	9:00	12:00	13:00	14:00	16:00	17:00	18:00
Crossing Values:	38	155	79	72	42	149	86	72

Intersection Name:	TS ID:	Line No:	Model:	IP address:	Controller Make:
Plains @ Downsview	114	4	ACS/3	172.22.18.2	Econolite

Type of Operation: 8 Phase Semi-Actuated

*-Start from Main Menu

No	Date			Description	Prepared by
	Y	M	D		MA
3	2019	11	18	Full Signal	

PHASE DESCRIPTION

Ph1		Ph5	
Ph2	EB/WB - Plains Road	Ph6	
Ph3		Ph7	
Ph4	NB/SB - Downsview Drive	Ph8	

PHASE IN USE/EXCLUSIVE PED (MM) *- 1 - 2

Phase:	1	2	3	4	5	6	7	8
Phase in Use		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				
Walk		28		10				
Ped. Clearance		7		11				
Pedestrian Carry Over								
Vehicle Extension		3		3				
MAX 1		35		25				
MAX 2		35		25				
Yellow Change		4		3				
Red Clearance		2		4				
Phase Minimum:	**1**	**42**	**1**	**29**	**1**	**1**	**1**	**1**

PHASE DATA - VEHICLE AND PEDESTRIAN RECALLS * - 2 - 8

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

COORDINATION: COORDINATOR PATTERN, SPLIT PATTERN *** - 3 - 2, - 3 - 3**

Coordinator Pattern (CP)	Cycle Length	Offset (sec)	Timing Plan	Split Pattern	Phases (sec)							
					1	2	3	4	5	6	7	8
1	100	29	1	1		70		30				
2	90	8	1	2		60		30				
3	100	74	1	3		70		30				
4	85	13	1	4		55		30				
10	0	0	1	0		0		0				

TIME BASE: ACTION PLAN, DAY PLAN *** - 5 - 2, - 5 - 3, -5 - 4**

Day Plan	Sched. #	Action Plan	Time Period	Pattern	Timing Plan
1	1	4	06:00	4	1
1	1	1	07:00	1	1
1	1	2	09:00	2	1
1	1	3	15:30	3	1
1	1	4	19:00	4	1
1	1	10	22:00	254	1
2	2	4	08:00	4	1
2	2	3	10:30	3	1
2	2	4	17:00	4	1
2	2	10	21:00	10	1
3	3	4	09:30	4	1
3	3	2	12:00	2	1
3	3	4	17:00	4	1
3	3	10	21:00	10	1

Schedule 1 = Day Plan 1
Schedule 2 = Day Plan 2
Schedule 3 = Day Plan 3

Day Plan 1 (Weekday)
Day Plan 2 (Saturday)
Day Plan 3 (Sunday, Holidays)

Action Plan 10 = free (254)

Note:

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	6	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:
Plains Road @ Shadeland	115	4	ACS/3	172.22.17.2	Econolite

Type of Operation: 8 Phase Semi-Actuated

*-Start from Main Menu

No	Date			Description	Prepared by
	Y	M	D		EN
4	2017	9	25	Split 5 timings adjusted and Day Plan adjusted to help with student drop off/Pick up.	

PHASE DESCRIPTION

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

PHASE IN USE/EXCLUSIVE PED (MM) *- 1 - 2

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		4		4		4		4
Red Clearance		2		3		2		3
Phase Minimum:	**1**	**42**	**1**	**36**	**1**	**42**	**1**	**36**

PHASE DATA - VEHICLE AND PEDESTRIAN RECALLS * - 2 - 8

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

COORDINATION: COORDINATOR PATTERN, SPLIT PATTERN *** - 3 - 2, - 3 - 3**

Coordinator Pattern (CP)	Cycle Length	Offset (sec)	Timing Plan	Split Pattern	Phases (sec)							
					1	2	3	4	5	6	7	8
1	100	26	1	1		65		35		65		35
2	90	29	1	2		55		35		55		35
3	100	77	1	3		65		35		65		35
4	85	84	1	4		49		36		49		36
5	100	25	1	5		48		52		48		52
10	0	0	1	10		0		0		0		0

TIME BASE: ACTION PLAN, DAY PLAN *** - 5 - 2, - 5 - 3, -5 - 4**

Day Plan	Sched. #	Action Plan	Time Period	Pattern	Timing Plan
1	1	4	06:00	4	
1	1	1	07:00	1	
1	1	5	08:15	5	
1	1	1	08:45	1	
1	1	2	09:00	2	
1	1	5	14:45	5	
1	1	3	15:30	3	
1	1	4	19:00	4	
1	1	10	22:00	254	
2	2	4	08:00	4	
2	2	3	10:30	3	
2	2	4	17:00	4	
2	2	10	21:00	254	
3	3	4	09:30	4	
3	3	2	12:00	2	
3	3	4	17:00	4	
3	3	10	21:00	254	

Schedule 1 = Day Plan 1
Schedule 2 = Day Plan 2
Schedule 3 = Day Plan 3

Day Plan 1 (Weekday)
Day Plan 2 (Saturday)
Day Plan 3 (Sunday, Holidays)

Action Plan 10 = free (254)

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	6	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

Appendix C

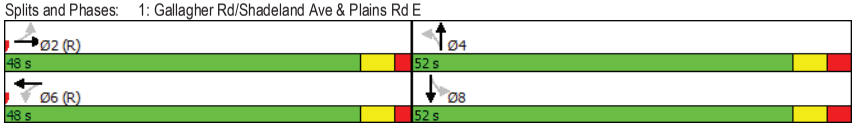
Existing Traffic Operations

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	897	27	19	710	26	19	18	31	96	13	51
Future Volume (vph)	20	897	27	19	710	26	19	18	31	96	13	51
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.5	3.3	3.6	3.5	3.3	3.6	3.5	3.3	3.6	3.5
Storage Length (m)	45.0		0.0	40.0		0.0	15.0		0.0	15.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00	1.00		1.00	1.00		1.00	0.99		0.99	0.99	
Frt		0.996			0.995			0.905			0.880	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1163	3416	0	1616	3391	0	1332	1557	0	1745	1394	0
Flt Permitted	0.334			0.262			0.712			0.723		
Satd. Flow (perm)	407	3416	0	445	3391	0	996	1557	0	1315	1394	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		4			5			33			55	
Link Speed (k/h)		60			60			40			40	
Link Distance (m)		129.9			163.1			89.7			84.4	
Travel Time (s)		7.8			9.8			8.1			7.6	
Confl. Peds. (#/hr)	10		7	7		10	2		10	10		2
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	50%	5%	11%	8%	6%	0%	31%	0%	14%	0%	25%	17%
Adj. Flow (vph)	22	965	29	20	763	28	20	19	33	103	14	55
Shared Lane Traffic (%)												
Lane Group Flow (vph)	22	994	0	20	791	0	20	52	0	103	69	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Detector Phase	2	2		6	6		4	4		8	8	
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		8.0	8.0		8.0	8.0	
Minimum Split (s)	42.0	42.0		42.0	42.0		35.0	35.0		35.0	35.0	
Total Split (s)	48.0	48.0		48.0	48.0		52.0	52.0		52.0	52.0	
Total Split (%)	48.0%	48.0%		48.0%	48.0%		52.0%	52.0%		52.0%	52.0%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		3.0	3.0		3.0	3.0	
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0		-3.0	-3.0		-3.0	-3.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	C-Max	C-Max		C-Max	C-Max		None	None		None	None	
Act Effct Green (s)	73.8	73.8		73.8	73.8		18.2	18.2		18.2	18.2	
Actuated g/C Ratio	0.74	0.74		0.74	0.74		0.18	0.18		0.18	0.18	
v/c Ratio	0.07	0.39		0.06	0.32		0.11	0.17		0.43	0.23	
Control Delay	5.5	5.8		5.2	5.2		33.2	17.3		40.9	13.8	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	5.5	5.8		5.2	5.2		33.2	17.3		40.9	13.8	
LOS	A	A		A	A		C	B		D	B	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		5.8			5.2			21.7			30.0	
Approach LOS		A			A			C			C	
Queue Length 50th (m)	1.1	32.8		0.9	23.8		3.4	3.3		18.9	2.4	
Queue Length 95th (m)	4.2	54.7		3.8	39.5		9.6	12.7		33.0	13.3	
Internal Link Dist (m)		105.9			139.1			65.7			60.4	
Turn Bay Length (m)	45.0			40.0			15.0			15.0		
Base Capacity (vph)	300	2522		328	2504		478	764		631	697	
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	0.07	0.39		0.06	0.32		0.04	0.07		0.16	0.10	

Intersection Summary		
Area Type:	Other	
Cycle Length: 100		
Actuated Cycle Length: 100		
Offset: 25 (25%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green		
Natural Cycle: 80		
Control Type: Actuated-Coordinated		
Maximum v/c Ratio: 0.43		
Intersection Signal Delay: 8.1	Intersection LOS: A	
Intersection Capacity Utilization 48.6%	ICU Level of Service A	
Analysis Period (min) 15		

Splits and Phases: 1: Gallagher Rd/Shadeland Ave & Plains Rd E



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	897	27	19	710	26	19	18	31	96	13	51
Future Volume (vph)	20	897	27	19	710	26	19	18	31	96	13	51
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.5	3.3	3.6	3.5	3.3	3.6	3.5	3.3	3.6	3.5
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
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	1.00	1.00		1.00	1.00		1.00	1.00		0.99	1.00	
Frt	1.00	1.00		1.00	0.99		1.00	0.90		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)	1158	3414		1612	3390		1329	1556		1727	1394	
Flt Permitted	0.33	1.00		0.26	1.00		0.71	1.00		0.72	1.00	
Satd. Flow (perm)	407	3414		445	3390		996	1556		1315	1394	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	22	965	29	20	763	28	20	19	33	103	14	55
RTOR Reduction (vph)	0	1	0	0	1	0	0	27	0	0	45	0
Lane Group Flow (vph)	22	993	0	20	790	0	20	25	0	103	24	0
Confl. Peds. (#/hr)	10		7	7		10	2		10	10		2
Heavy Vehicles (%)	50%	5%	11%	8%	6%	0%	31%	0%	14%	0%	25%	17%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	71.8	71.8		71.8	71.8		15.2	15.2		15.2	15.2	
Effective Green, g (s)	73.8	73.8		73.8	73.8		18.2	18.2		18.2	18.2	
Actuated g/C Ratio	0.74	0.74		0.74	0.74		0.18	0.18		0.18	0.18	
Clearance Time (s)	6.0	6.0		6.0	6.0		7.0	7.0		7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	300	2519		328	2501		181	283		239	253	
v/s Ratio Prot		c0.29			0.23			0.02			0.02	
v/s Ratio Perm	0.05			0.04			0.02			c0.08		
v/c Ratio	0.07	0.39		0.06	0.32		0.11	0.09		0.43	0.09	
Uniform Delay, d1	3.6	4.8		3.6	4.5		34.1	34.0		36.3	34.0	
Progression Factor	1.00	1.00		0.99	0.98		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.5	0.5		0.4	0.3		0.6	0.3		2.6	0.3	
Delay (s)	4.1	5.3		3.9	4.7		34.7	34.3		38.9	34.4	
Level of Service	A	A		A	A		C	C		D	C	
Approach Delay (s)		5.3			4.7			34.4			37.1	
Approach LOS		A			A			C			D	

Intersection Summary				
HCM 2000 Control Delay	8.7	HCM 2000 Level of Service	A	
HCM 2000 Volume to Capacity ratio	0.40			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0	
Intersection Capacity Utilization	48.6%	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)	3	892	9	24	752	0	9	0	19	0	0	2
Future Volume (vph)	3	892	9	24	752	0	9	0	19	0	0	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.5	3.3	3.6	3.5	3.3	3.6	3.5	3.3	3.6	3.5
Storage Length (m)	15.0		0.0	30.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.998						0.910			0.865	
Flt Protected	0.950			0.950				0.984				
Satd. Flow (prot)	1745	3401	0	1544	3406	0	0	1610	0	0	1644	0
Flt Permitted	0.950			0.950				0.984				
Satd. Flow (perm)	1745	3401	0	1544	3406	0	0	1610	0	0	1644	0
Link Speed (k/h)		40			40			40			40	
Link Distance (m)		88.7			86.0			84.7			62.2	
Travel Time (s)		8.0			7.7			7.6			5.6	
Confl. Peds. (#/hr)	6		8	8		6	1					1
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	0%	6%	0%	13%	6%	0%	17%	0%	0%	0%	0%	0%
Adj. Flow (vph)	3	949	10	26	800	0	10	0	20	0	0	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	3	959	0	26	800	0	0	30	0	0	2	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	40.0%	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)	3	892	9	24	752	0	9	0	19	0	0	2
Future Volume (Veh/h)	3	892	9	24	752	0	9	0	19	0	0	2
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	3	949	10	26	800	0	10	0	20	0	0	2
Pedestrians		1						8			6	
Lane Width (m)		3.5						3.6			3.6	
Walking Speed (m/s)		1.2						1.2			1.2	
Percent Blockage		0						1			1	
Right turn flare (veh)												
Median type		TWLTL			TWLTL							
Median storage veh)		2			2							
Upstream signal (m)		252			86							
pX, platoon unblocked	0.96			0.95			0.97	0.97	0.95	0.97	0.97	0.96
vC, conflicting volume	806			967			1423	1826	488	1358	1831	407
vC1, stage 1 conf vol							968	968		858	858	
vC2, stage 2 conf vol							455	858		500	973	
vCu, unblocked vol	715			868			1196	1610	365	1130	1615	300
tC, single (s)	4.1			4.4			7.8	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)							6.8	5.5		6.5	5.5	
tF (s)	2.2			2.3			3.7	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			96			96	100	97	100	100	100
cM capacity (veh/h)	855			669			249	268	604	302	257	671

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	3	633	326	26	533	267	30	2
Volume Left	3	0	0	26	0	0	10	0
Volume Right	0	0	10	0	0	0	20	2
cSH	855	1700	1700	669	1700	1700	410	671
Volume to Capacity	0.00	0.37	0.19	0.04	0.31	0.16	0.07	0.00
Queue Length 95th (m)	0.1	0.0	0.0	1.0	0.0	0.0	1.9	0.1
Control Delay (s)	9.2	0.0	0.0	10.6	0.0	0.0	14.5	10.4
Lane LOS	A			B			B	B
Approach Delay (s)	0.0			0.3			14.5	10.4
Approach LOS							B	B

Intersection Summary					
Average Delay		0.4			
Intersection Capacity Utilization		40.0%	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	875	6	9	699	18	9	0	14	18	0	24
Future Volume (vph)	21	875	6	9	699	18	9	0	14	18	0	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.5	3.3	3.6	3.5	3.3	3.6	3.5	3.3	3.6	3.5
Storage Length (m)	30.0		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)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00	1.00		1.00	1.00			0.99			0.99	
Frt		0.999			0.996			0.919			0.922	
Flt Protected	0.950			0.950				0.980			0.979	
Satd. Flow (prot)	1631	3398	0	1491	3350	0	0	1590	0	0	1591	0
Flt Permitted	0.357			0.295				0.890			0.852	
Satd. Flow (perm)	612	3398	0	461	3350	0	0	1442	0	0	1383	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1			5			33			33	
Link Speed (k/h)		60			60			40			40	
Link Distance (m)		86.0			172.6			90.8			124.3	
Travel Time (s)		5.2			10.4			8.2			11.2	
Confl. Peds. (#/hr)	4		11	11		4	2		3	3		2
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	7%	6%	25%	17%	7%	17%	0%	0%	11%	8%	0%	6%
Adj. Flow (vph)	22	931	6	10	744	19	10	0	15	19	0	26
Shared Lane Traffic (%)												
Lane Group Flow (vph)	22	937	0	10	763	0	0	25	0	0	45	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			2			4			4	
Permitted Phases	2			2			4			4		
Detector Phase	2	2		2	2		4	4		4	4	
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		8.0	8.0		8.0	8.0	
Minimum Split (s)	41.0	41.0		41.0	41.0		28.0	28.0		28.0	28.0	
Total Split (s)	70.0	70.0		70.0	70.0		30.0	30.0		30.0	30.0	
Total Split (%)	70.0%	70.0%		70.0%	70.0%		30.0%	30.0%		30.0%	30.0%	
Yellow Time (s)	4.0	4.0		4.0	4.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		4.0	4.0		4.0	4.0	
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0			-3.0			-3.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	C-Max	C-Max		C-Max	C-Max		None	None		None	None	
Act Effct Green (s)	84.4	84.4		84.4	84.4			11.4			11.4	
Actuated g/C Ratio	0.84	0.84		0.84	0.84			0.11			0.11	
v/c Ratio	0.04	0.33		0.03	0.27			0.13			0.24	
Control Delay	1.5	1.6		2.2	2.4			12.1			21.9	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	1.5	1.6		2.2	2.4			12.1			21.9	
LOS	A	A		A	A			B			C	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		1.6			2.4			12.1			21.9	
Approach LOS		A			A			B			C	
Queue Length 50th (m)	0.6	12.9		0.3	14.9			0.0			2.2	
Queue Length 95th (m)	m1.4	16.0		1.3	22.1			6.3			12.7	
Internal Link Dist (m)		62.0			148.6			66.8			100.3	
Turn Bay Length (m)	30.0			15.0								
Base Capacity (vph)	516	2869		389	2829			399			384	
Starvation Cap Reductn	0	0		0	0			0			0	
Spillback Cap Reductn	0	0		0	0			0			0	
Storage Cap Reductn	0	0		0	0			0			0	
Reduced v/c Ratio	0.04	0.33		0.03	0.27			0.06			0.12	

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 100			
Offset: 29 (29%), Referenced to phase 2:EBWB and 6:, Start of Green			
Natural Cycle: 70			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.33			
Intersection Signal Delay: 2.6		Intersection LOS: A	
Intersection Capacity Utilization 43.5%		ICU Level of Service A	
Analysis Period (min) 15			
m Volume for 95th percentile queue is metered by upstream signal.			

Splits and Phases: 3: Downsview Dr & Plains Rd E



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	21	875	6	9	699	18	9	0	14	18	0	24
Future Volume (vph)	21	875	6	9	699	18	9	0	14	18	0	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.5	3.3	3.6	3.5	3.3	3.6	3.5	3.3	3.6	3.5
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			0.99			0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	1.00		1.00	1.00			0.92			0.92	
Flt Protected	0.95	1.00		0.95	1.00			0.98			0.98	
Satd. Flow (prot)	1628	3398		1485	3351			1589			1589	
Flt Permitted	0.36	1.00		0.30	1.00			0.89			0.85	
Satd. Flow (perm)	612	3398		461	3351			1442			1382	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	22	931	6	10	744	19	10	0	15	19	0	26
RTOR Reduction (vph)	0	0	0	0	1	0	0	23	0	0	30	0
Lane Group Flow (vph)	22	937	0	10	762	0	0	2	0	0	15	0
Confl. Peds. (#/hr)	4		11	11		4	2		3	3		2
Heavy Vehicles (%)	7%	6%	25%	17%	7%	17%	0%	0%	11%	8%	0%	6%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			2			4			4	
Permitted Phases	2			2			4			4		
Actuated Green, G (s)	80.2	80.2		80.2	80.2			6.8			6.8	
Effective Green, g (s)	82.2	82.2		82.2	82.2			9.8			9.8	
Actuated g/C Ratio	0.82	0.82		0.82	0.82			0.10			0.10	
Clearance Time (s)	6.0	6.0		6.0	6.0			7.0			7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	503	2793		378	2754			141			135	
v/s Ratio Prot		c0.28			0.23							
v/s Ratio Perm	0.04			0.02				0.00			c0.01	
v/c Ratio	0.04	0.34		0.03	0.28			0.02			0.11	
Uniform Delay, d1	1.6	2.2		1.6	2.1			40.7			41.1	
Progression Factor	0.65	0.56		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.2	0.3		0.1	0.2			0.0			0.4	
Delay (s)	1.2	1.5		1.7	2.3			40.8			41.5	
Level of Service	A	A		A	A			D			D	
Approach Delay (s)		1.5			2.3			40.8			41.5	
Approach LOS		A			A			D			D	

Intersection Summary					
HCM 2000 Control Delay	3.4	HCM 2000 Level of Service		A	
HCM 2000 Volume to Capacity ratio	0.31				
Actuated Cycle Length (s)	100.0	Sum of lost time (s)		8.0	
Intersection Capacity Utilization	43.5%	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)	9	1079	27	54	1349	15	35	6	37	43	12	31
Future Volume (vph)	9	1079	27	54	1349	15	35	6	37	43	12	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.5	3.3	3.6	3.5	3.3	3.6	3.5	3.3	3.6	3.5
Storage Length (m)	45.0		0.0	40.0		0.0	15.0		0.0	15.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00	1.00		1.00	1.00		1.00	0.98		0.99	0.99	
Frt		0.996			0.998			0.872			0.891	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1745	3485	0	1694	3462	0	1544	1577	0	1745	1584	0
Flt Permitted	0.144			0.206			0.726			0.726		
Satd. Flow (perm)	264	3485	0	366	3462	0	1178	1577	0	1325	1584	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		4			2			41			34	
Link Speed (k/h)		60			60			40			40	
Link Distance (m)		129.9			163.1			89.7			84.4	
Travel Time (s)		7.8			9.8			8.1			7.6	
Confl. Peds. (#/hr)	19		14	14		19	2		6	6		2
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	0%	3%	6%	3%	4%	6%	13%	0%	4%	0%	0%	8%
Adj. Flow (vph)	10	1199	30	60	1499	17	39	7	41	48	13	34
Shared Lane Traffic (%)												
Lane Group Flow (vph)	10	1229	0	60	1516	0	39	48	0	48	47	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Detector Phase	2	2		6	6		4	4		8	8	
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		8.0	8.0		8.0	8.0	
Minimum Split (s)	42.0	42.0		42.0	42.0		35.0	35.0		35.0	35.0	
Total Split (s)	65.0	65.0		65.0	65.0		35.0	35.0		35.0	35.0	
Total Split (%)	65.0%	65.0%		65.0%	65.0%		35.0%	35.0%		35.0%	35.0%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		3.0	3.0		3.0	3.0	
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0		-3.0	-3.0		-3.0	-3.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	C-Max	C-Max		C-Max	C-Max		None	None		None	None	
Act Effct Green (s)	81.7	81.7		81.7	81.7		14.1	14.1		14.1	14.1	
Actuated g/C Ratio	0.82	0.82		0.82	0.82		0.14	0.14		0.14	0.14	
v/c Ratio	0.05	0.43		0.20	0.54		0.24	0.19		0.26	0.19	
Control Delay	3.8	4.2		5.2	4.6		40.7	15.6		40.8	18.6	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	3.8	4.2		5.2	4.6		40.7	15.6		40.8	18.6	
LOS	A	A		A	A		D	B		D	B	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		4.2			4.6			26.8			29.8	
Approach LOS		A			A			C			C	
Queue Length 50th (m)	0.4	35.2		2.5	49.2		7.2	1.3		8.9	2.3	
Queue Length 95th (m)	1.9	55.2		m7.1	62.6		16.7	11.1		19.1	12.4	
Internal Link Dist (m)		105.9			139.1			65.7			60.4	
Turn Bay Length (m)	45.0			40.0			15.0			15.0		
Base Capacity (vph)	215	2847		298	2828		365	517		410	514	
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	0.43		0.20	0.54		0.11	0.09		0.12	0.09	

Intersection Summary		
Area Type:	Other	
Cycle Length: 100		
Actuated Cycle Length: 100		
Offset: 77 (77%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green		
Natural Cycle: 80		
Control Type: Actuated-Coordinated		
Maximum v/c Ratio: 0.54		
Intersection Signal Delay: 5.9	Intersection LOS: A	
Intersection Capacity Utilization 62.8%	ICU Level of Service B	
Analysis Period (min) 15		
m Volume for 95th percentile queue is metered by upstream signal.		

Splits and Phases: 1: Gallagher Rd/Shadeland Ave & Plains Rd E



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	9	1079	27	54	1349	15	35	6	37	43	12	31
Future Volume (vph)	9	1079	27	54	1349	15	35	6	37	43	12	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.5	3.3	3.6	3.5	3.3	3.6	3.5	3.3	3.6	3.5
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.98		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		0.99	1.00	
Frt	1.00	1.00		1.00	1.00		1.00	0.87		1.00	0.89	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1740	3486		1689	3463		1541	1577		1734	1585	
Flt Permitted	0.14	1.00		0.21	1.00		0.73	1.00		0.73	1.00	
Satd. Flow (perm)	264	3486		367	3463		1178	1577		1325	1585	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	10	1199	30	60	1499	17	39	7	41	48	13	34
RTOR Reduction (vph)	0	1	0	0	0	0	0	36	0	0	30	0
Lane Group Flow (vph)	10	1228	0	60	1516	0	39	12	0	48	17	0
Confl. Peds. (#/hr)	19		14	14		19	2		6	6		2
Heavy Vehicles (%)	0%	3%	6%	3%	4%	6%	13%	0%	4%	0%	0%	8%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	77.5	77.5		77.5	77.5		9.5	9.5		9.5	9.5	
Effective Green, g (s)	79.5	79.5		79.5	79.5		12.5	12.5		12.5	12.5	
Actuated g/C Ratio	0.80	0.80		0.80	0.80		0.12	0.12		0.12	0.12	
Clearance Time (s)	6.0	6.0		6.0	6.0		7.0	7.0		7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	209	2771		291	2753		147	197		165	198	
v/s Ratio Prot		0.35			c0.44			0.01			0.01	
v/s Ratio Perm	0.04			0.16			0.03			c0.04		
v/c Ratio	0.05	0.44		0.21	0.55		0.27	0.06		0.29	0.09	
Uniform Delay, d1	2.2	3.2		2.5	3.7		39.6	38.6		39.7	38.7	
Progression Factor	1.00	1.00		0.99	0.90		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.4	0.5		1.6	0.8		2.0	0.3		2.0	0.4	
Delay (s)	2.6	3.8		4.0	4.1		41.6	38.9		41.8	39.1	
Level of Service	A	A		A	A		D	D		D	D	
Approach Delay (s)		3.8			4.1			40.1			40.5	
Approach LOS		A			A			D			D	

Intersection Summary			
HCM 2000 Control Delay	6.2	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	62.8%	ICU Level of Service	B
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)	3	1101	6	31	1423	5	8	0	35	9	0	0
Future Volume (vph)	3	1101	6	31	1423	5	8	0	35	9	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.5	3.3	3.6	3.5	3.3	3.6	3.5	3.3	3.6	3.5
Storage Length (m)	15.0		0.0	30.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.999			0.999			0.890				
Flt Protected	0.950			0.950				0.991			0.950	
Satd. Flow (prot)	1745	3502	0	1745	3502	0	0	1623	0	0	1805	0
Flt Permitted	0.950			0.950				0.991			0.950	
Satd. Flow (perm)	1745	3502	0	1745	3502	0	0	1623	0	0	1805	0
Link Speed (k/h)		40			40			40			40	
Link Distance (m)		88.7			86.0			84.7			62.2	
Travel Time (s)		8.0			7.7			7.6			5.6	
Confl. Peds. (#/hr)	9		12	12		9						
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	0%	3%	0%	0%	3%	0%	0%	0%	4%	0%	0%	0%
Adj. Flow (vph)	3	1251	7	35	1617	6	9	0	40	10	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	3	1258	0	35	1623	0	0	49	0	0	10	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	49.5%	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)	3	1101	6	31	1423	5	8	0	35	9	0	0
Future Volume (Veh/h)	3	1101	6	31	1423	5	8	0	35	9	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	3	1251	7	35	1617	6	9	0	40	10	0	0
Pedestrians								12			9	
Lane Width (m)								3.6			3.6	
Walking Speed (m/s)								1.2			1.2	
Percent Blockage								1			1	
Right turn flare (veh)												
Median type		TWLTL			TWLTL							
Median storage veh)		2			2							
Upstream signal (m)		252			86							
pX, platoon unblocked	0.83			0.94			0.86	0.86	0.94	0.86	0.86	0.83
vC, conflicting volume	1632			1270			2151	2974	641	2370	2975	820
vC1, stage 1 conf vol							1272	1272		1699	1699	
vC2, stage 2 conf vol							878	1702		672	1276	
vCu, unblocked vol	1342			1156			1684	2646	486	1940	2646	358
tC, single (s)	4.1			4.1			7.5	6.5	7.0	7.5	6.5	6.9
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	3.3
p0 queue free %	99			94			95	100	92	91	100	100
cM capacity (veh/h)	426			568			178	126	485	106	123	527

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	3	834	424	35	1078	545	49	10
Volume Left	3	0	0	35	0	0	9	10
Volume Right	0	0	7	0	0	6	40	0
cSH	426	1700	1700	568	1700	1700	368	106
Volume to Capacity	0.01	0.49	0.25	0.06	0.63	0.32	0.13	0.09
Queue Length 95th (m)	0.2	0.0	0.0	1.6	0.0	0.0	3.6	2.4
Control Delay (s)	13.5	0.0	0.0	11.8	0.0	0.0	16.3	42.5
Lane LOS	B			B			C	E
Approach Delay (s)	0.0			0.2			16.3	42.5
Approach LOS							C	E

Intersection Summary					
Average Delay	0.6				
Intersection Capacity Utilization	49.5%	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)	28	1129	15	31	1427	47	14	0	22	32	0	24
Future Volume (vph)	28	1129	15	31	1427	47	14	0	22	32	0	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.5	3.3	3.6	3.5	3.3	3.6	3.5	3.3	3.6	3.5
Storage Length (m)	30.0		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)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00	1.00		1.00	1.00			0.98			0.99	
Frt		0.998			0.995			0.919			0.942	
Flt Protected	0.950			0.950				0.980			0.972	
Satd. Flow (prot)	1745	3497	0	1745	3454	0	0	1615	0	0	1729	0
Flt Permitted	0.127			0.200				0.874			0.850	
Satd. Flow (perm)	233	3497	0	366	3454	0	0	1439	0	0	1499	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3			7			33			33	
Link Speed (k/h)		60			60			40			40	
Link Distance (m)		86.0			172.6			90.8			124.3	
Travel Time (s)		5.2			10.4			8.2			11.2	
Confl. Peds. (#/hr)	10		17	17		10	2		11	11		2
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	0%	3%	0%	0%	4%	0%	0%	0%	7%	0%	0%	0%
Adj. Flow (vph)	31	1254	17	34	1586	52	16	0	24	36	0	27
Shared Lane Traffic (%)												
Lane Group Flow (vph)	31	1271	0	34	1638	0	0	40	0	0	63	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			2			4			4	
Permitted Phases	2			2			4			4		
Detector Phase	2	2		2	2		4	4		4	4	
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		8.0	8.0		8.0	8.0	
Minimum Split (s)	41.0	41.0		41.0	41.0		28.0	28.0		28.0	28.0	
Total Split (s)	70.0	70.0		70.0	70.0		30.0	30.0		30.0	30.0	
Total Split (%)	70.0%	70.0%		70.0%	70.0%		30.0%	30.0%		30.0%	30.0%	
Yellow Time (s)	4.0	4.0		4.0	4.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		4.0	4.0		4.0	4.0	
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0			-3.0			-3.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	C-Max	C-Max		C-Max	C-Max		None	None		None	None	
Act Effct Green (s)	83.9	83.9		83.9	83.9			11.9			11.9	
Actuated g/C Ratio	0.84	0.84		0.84	0.84			0.12			0.12	
v/c Ratio	0.16	0.43		0.11	0.57			0.20			0.30	
Control Delay	4.4	3.0		3.4	4.3			18.8			26.4	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	4.4	3.0		3.4	4.3			18.8			26.4	
LOS	A	A		A	A			B			C	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		3.1			4.3			18.8			26.4	
Approach LOS		A			A			B			C	
Queue Length 50th (m)	1.0	28.7		1.1	47.2			1.3			5.7	
Queue Length 95th (m)	m3.7	42.3		4.0	75.6			10.9			17.7	
Internal Link Dist (m)		62.0			148.6			66.8			100.3	
Turn Bay Length (m)	30.0			15.0								
Base Capacity (vph)	195	2933		307	2897			398			414	
Starvation Cap Reductn	0	0		0	0			0			0	
Spillback Cap Reductn	0	0		0	0			0			0	
Storage Cap Reductn	0	0		0	0			0			0	
Reduced v/c Ratio	0.16	0.43		0.11	0.57			0.10			0.15	

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 100			
Offset: 74 (74%), Referenced to phase 2:EBWB and 6:, Start of Green			
Natural Cycle: 70			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.57			
Intersection Signal Delay: 4.4		Intersection LOS: A	
Intersection Capacity Utilization 57.6%		ICU Level of Service B	
Analysis Period (min) 15			
m Volume for 95th percentile queue is metered by upstream signal.			

Splits and Phases: 3: Downsview Dr & Plains Rd E



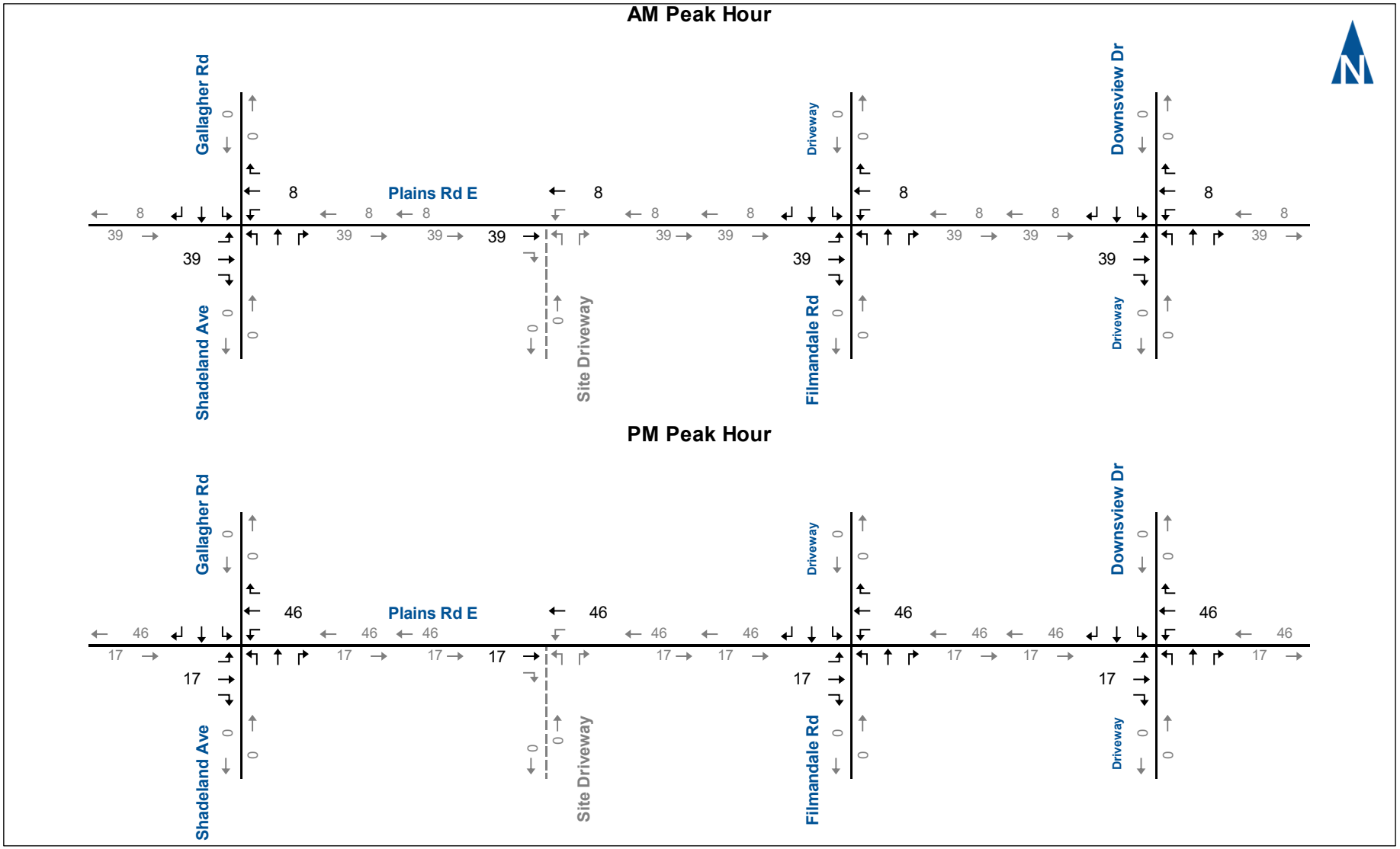
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	28	1129	15	31	1427	47	14	0	22	32	0	24
Future Volume (vph)	28	1129	15	31	1427	47	14	0	22	32	0	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.5	3.3	3.6	3.5	3.3	3.6	3.5	3.3	3.6	3.5
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			0.98			0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			0.99	
Frt	1.00	1.00		1.00	1.00			0.92			0.94	
Flt Protected	0.95	1.00		0.95	1.00			0.98			0.97	
Satd. Flow (prot)	1743	3497		1738	3455			1614			1715	
Flt Permitted	0.13	1.00		0.20	1.00			0.87			0.85	
Satd. Flow (perm)	233	3497		366	3455			1438			1500	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	31	1254	17	34	1586	52	16	0	24	36	0	27
RTOR Reduction (vph)	0	1	0	0	1	0	0	30	0	0	30	0
Lane Group Flow (vph)	31	1270	0	34	1637	0	0	10	0	0	33	0
Confl. Peds. (#/hr)	10		17	17		10	2		11	11		2
Heavy Vehicles (%)	0%	3%	0%	0%	4%	0%	0%	0%	7%	0%	0%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			2			4			4	
Permitted Phases	2			2			4			4		
Actuated Green, G (s)	79.7	79.7		79.7	79.7			7.3			7.3	
Effective Green, g (s)	81.7	81.7		81.7	81.7			10.3			10.3	
Actuated g/C Ratio	0.82	0.82		0.82	0.82			0.10			0.10	
Clearance Time (s)	6.0	6.0		6.0	6.0			7.0			7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	190	2857		299	2822			148			154	
v/s Ratio Prot		0.36			c0.47							
v/s Ratio Perm	0.13			0.09				0.01			c0.02	
v/c Ratio	0.16	0.44		0.11	0.58			0.07			0.22	
Uniform Delay, d1	1.9	2.6		1.8	3.2			40.5			41.1	
Progression Factor	0.94	0.90		1.00	1.00			1.00			1.00	
Incremental Delay, d2	1.8	0.5		0.8	0.9			0.2			0.7	
Delay (s)	3.6	2.8		2.6	4.1			40.7			41.9	
Level of Service	A	A		A	A			D			D	
Approach Delay (s)		2.9			4.0			40.7			41.9	
Approach LOS		A			A			D			D	

Intersection Summary					
HCM 2000 Control Delay	4.8	HCM 2000 Level of Service		A	
HCM 2000 Volume to Capacity ratio	0.54				
Actuated Cycle Length (s)	100.0	Sum of lost time (s)		8.0	
Intersection Capacity Utilization	57.6%	ICU Level of Service		B	
Analysis Period (min)	15				
c Critical Lane Group					

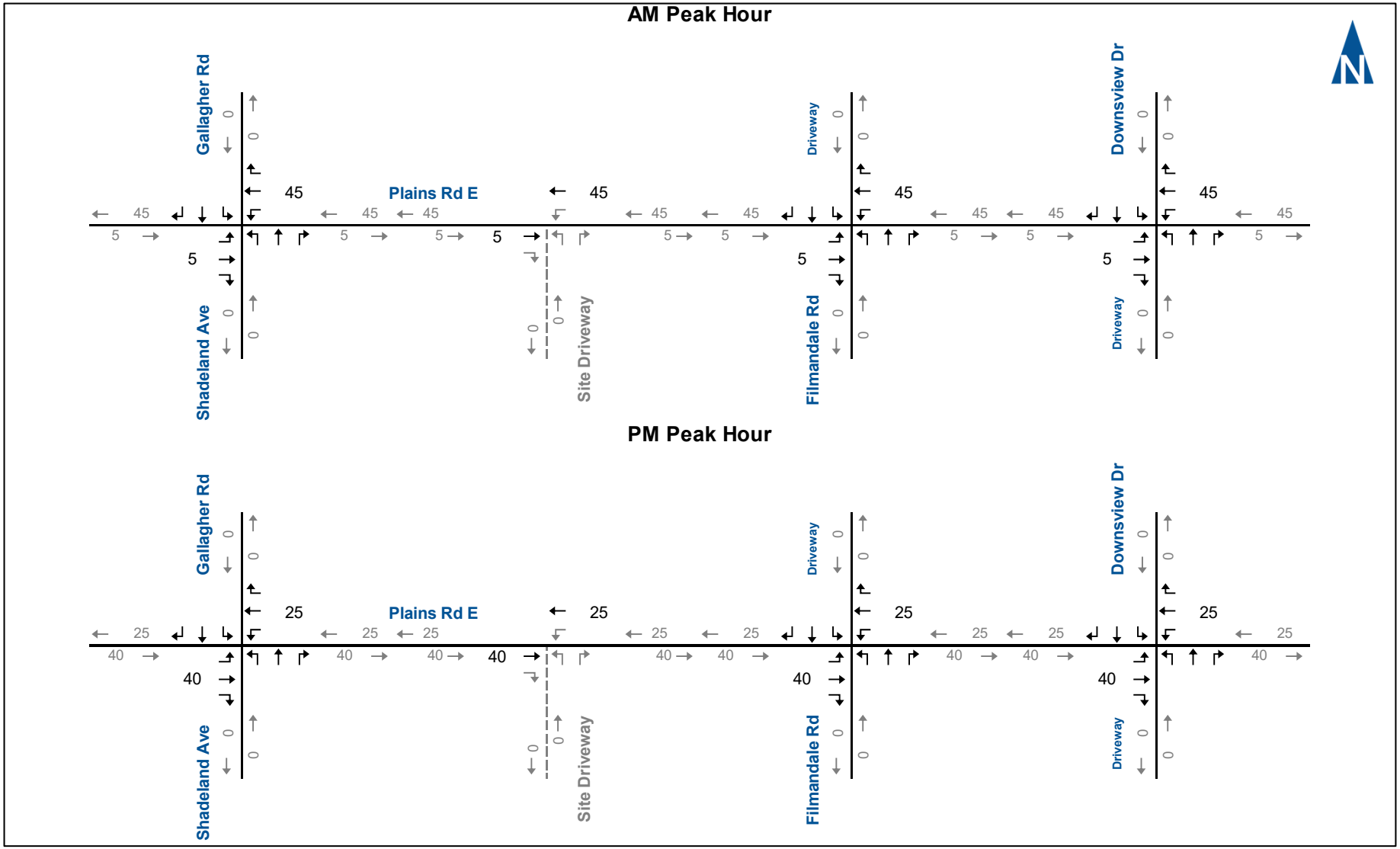
Appendix D

Detailed Background Traffic Forecast





53-71 Plains Road East Development
Background Traffic Forecast



484 Plains Road East Development Background Traffic Forecast

Appendix E

Background Traffic Operations

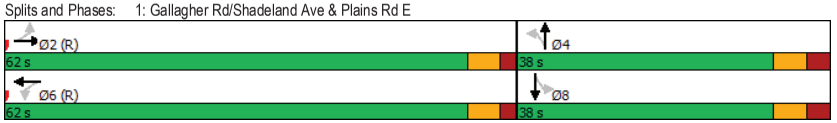


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	21	1015	29	20	821	28	20	19	33	103	14	55
Future Volume (vph)	21	1015	29	20	821	28	20	19	33	103	14	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.5	3.3	3.6	3.5	3.3	3.6	3.5	3.3	3.6	3.5
Storage Length (m)	45.0		0.0	40.0		0.0	15.0		0.0	15.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00	1.00		1.00	1.00		1.00	0.99		0.99	0.99	
Frt		0.996			0.995			0.905			0.880	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1163	3416	0	1616	3391	0	1332	1556	0	1745	1394	0
Flt Permitted	0.288			0.223			0.709			0.721		
Satd. Flow (perm)	351	3416	0	379	3391	0	992	1556	0	1311	1394	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5			6			35			59	
Link Speed (k/h)		60			60			40			40	
Link Distance (m)		129.9			163.1			89.7			84.4	
Travel Time (s)		7.8			9.8			8.1			7.6	
Confl. Peds. (#/hr)	10		7	7		10	2		10	10		2
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	50%	5%	11%	8%	6%	0%	31%	0%	14%	0%	25%	17%
Adj. Flow (vph)	23	1091	31	22	883	30	22	20	35	111	15	59
Shared Lane Traffic (%)												
Lane Group Flow (vph)	23	1122	0	22	913	0	22	55	0	111	74	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Detector Phase	2	2		6	6		4	4		8	8	
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		8.0	8.0		8.0	8.0	
Minimum Split (s)	42.0	42.0		42.0	42.0		35.0	35.0		35.0	35.0	
Total Split (s)	62.0	62.0		62.0	62.0		38.0	38.0		38.0	38.0	
Total Split (%)	62.0%	62.0%		62.0%	62.0%		38.0%	38.0%		38.0%	38.0%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		3.0	3.0		3.0	3.0	
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0		-3.0	-3.0		-3.0	-3.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	C-Max	C-Max		C-Max	C-Max		None	None		None	None	
Act Effct Green (s)	73.4	73.4		73.4	73.4		18.6	18.6		18.6	18.6	
Actuated g/C Ratio	0.73	0.73		0.73	0.73		0.19	0.19		0.19	0.19	
v/c Ratio	0.09	0.45		0.08	0.37		0.12	0.17		0.45	0.24	
Control Delay	6.0	6.4		5.8	5.6		33.0	16.9		41.2	13.4	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	6.0	6.4		5.8	5.6		33.0	16.9		41.2	13.4	
LOS	A	A		A	A		C	B		D	B	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		6.4			5.6			21.5			30.1	
Approach LOS		A			A			C			C	
Queue Length 50th (m)	1.1	40.0		1.0	29.5		3.8	3.4		20.3	2.5	
Queue Length 95th (m)	4.6	66.0		4.3	47.0		10.0	13.0		35.1	13.8	
Internal Link Dist (m)		105.9			139.1			65.7			60.4	
Turn Bay Length (m)	45.0			40.0			15.0			15.0		
Base Capacity (vph)	257	2507		278	2489		337	552		445	512	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.09	0.45		0.08	0.37		0.07	0.10		0.25	0.14	

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 100			
Offset: 25 (25%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green			
Natural Cycle: 80			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.45			
Intersection Signal Delay: 8.5		Intersection LOS: A	
Intersection Capacity Utilization 48.9%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 1: Gallagher Rd/Shadeland Ave & Plains Rd E



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	21	1015	29	20	821	28	20	19	33	103	14	55
Future Volume (vph)	21	1015	29	20	821	28	20	19	33	103	14	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.5	3.3	3.6	3.5	3.3	3.6	3.5	3.3	3.6	3.5
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
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	1.00	1.00		1.00	1.00		1.00	1.00		0.99	1.00	
Frt	1.00	1.00		1.00	1.00		1.00	0.90		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)	1159	3416		1613	3391		1329	1555		1728	1394	
Flt Permitted	0.29	1.00		0.22	1.00		0.71	1.00		0.72	1.00	
Satd. Flow (perm)	352	3416		378	3391		992	1555		1311	1394	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	23	1091	31	22	883	30	22	20	35	111	15	59
RTOR Reduction (vph)	0	1	0	0	2	0	0	28	0	0	48	0
Lane Group Flow (vph)	23	1121	0	22	911	0	22	27	0	111	26	0
Confl. Peds. (#/hr)	10		7	7		10	2		10	10		2
Heavy Vehicles (%)	50%	5%	11%	8%	6%	0%	31%	0%	14%	0%	25%	17%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	71.4	71.4		71.4	71.4		15.6	15.6		15.6	15.6	
Effective Green, g (s)	73.4	73.4		73.4	73.4		18.6	18.6		18.6	18.6	
Actuated g/C Ratio	0.73	0.73		0.73	0.73		0.19	0.19		0.19	0.19	
Clearance Time (s)	6.0	6.0		6.0	6.0		7.0	7.0		7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	258	2507		277	2488		184	289		243	259	
v/s Ratio Prot		c0.33			0.27			0.02			0.02	
v/s Ratio Perm	0.07			0.06			0.02			c0.08		
v/c Ratio	0.09	0.45		0.08	0.37		0.12	0.09		0.46	0.10	
Uniform Delay, d1	3.8	5.3		3.8	4.8		33.9	33.7		36.2	33.8	
Progression Factor	1.00	1.00		1.00	0.97		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.7	0.6		0.5	0.4		0.6	0.3		2.8	0.4	
Delay (s)	4.5	5.8		4.3	5.1		34.5	34.0		39.0	34.1	
Level of Service	A	A		A	A		C	C		D	C	
Approach Delay (s)		5.8			5.1			34.1			37.1	
Approach LOS		A			A			C			D	

Intersection Summary				
HCM 2000 Control Delay	8.9	HCM 2000 Level of Service	A	
HCM 2000 Volume to Capacity ratio	0.45			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0	
Intersection Capacity Utilization	48.9%	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)	3	1009	9	25	867	0	9	0	20	0	0	2
Future Volume (vph)	3	1009	9	25	867	0	9	0	20	0	0	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.5	3.3	3.6	3.5	3.3	3.6	3.5	3.3	3.6	3.5
Storage Length (m)	15.0		0.0	30.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.999						0.909			0.865	
Flt Protected	0.950			0.950				0.984				
Satd. Flow (prot)	1745	3404	0	1544	3406	0	0	1611	0	0	1644	0
Flt Permitted	0.950			0.950				0.984				
Satd. Flow (perm)	1745	3404	0	1544	3406	0	0	1611	0	0	1644	0
Link Speed (k/h)		40			40			40			40	
Link Distance (m)		88.7			86.0			84.7			62.2	
Travel Time (s)		8.0			7.7			7.6			5.6	
Confl. Peds. (#/hr)	6		8	8		6	1					1
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	0%	6%	0%	13%	6%	0%	17%	0%	0%	0%	0%	0%
Adj. Flow (vph)	3	1073	10	27	922	0	10	0	21	0	0	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	3	1083	0	27	922	0	0	31	0	0	2	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	43.2%	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)	3	1009	9	25	867	0	9	0	20	0	0	2
Future Volume (Veh/h)	3	1009	9	25	867	0	9	0	20	0	0	2
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	3	1073	10	27	922	0	10	0	21	0	0	2
Pedestrians		1						8			6	
Lane Width (m)		3.5						3.6			3.6	
Walking Speed (m/s)		1.2						1.2			1.2	
Percent Blockage		0						1			1	
Right turn flare (veh)												
Median type		TWLTL			TWLTL							
Median storage veh)		2			2							
Upstream signal (m)		252			86							
pX, platoon unblocked	0.95			0.92			0.94	0.94	0.92	0.94	0.94	0.95
vC, conflicting volume	928			1091			1610	2074	550	1546	2079	468
vC1, stage 1 conf vol							1092	1092		982	982	
vC2, stage 2 conf vol							518	982		564	1097	
vCu, unblocked vol	811			920			1273	1764	330	1205	1769	324
tC, single (s)	4.1			4.4			7.8	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)							6.8	5.5		6.5	5.5	
tF (s)	2.2			2.3			3.7	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			96			96	100	97	100	100	100
cM capacity (veh/h)	776			613			222	237	612	264	226	637

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	3	715	368	27	615	307	31	2
Volume Left	3	0	0	27	0	0	10	0
Volume Right	0	0	10	0	0	0	21	2
cSH	776	1700	1700	613	1700	1700	391	637
Volume to Capacity	0.00	0.42	0.22	0.04	0.36	0.18	0.08	0.00
Queue Length 95th (m)	0.1	0.0	0.0	1.1	0.0	0.0	2.1	0.1
Control Delay (s)	9.7	0.0	0.0	11.1	0.0	0.0	15.0	10.7
Lane LOS	A			B			C	B
Approach Delay (s)	0.0			0.3			15.0	10.7
Approach LOS							C	B

Intersection Summary					
Average Delay	0.4				
Intersection Capacity Utilization	43.2%	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	991	6	9	809	19	9	0	15	19	0	25
Future Volume (vph)	22	991	6	9	809	19	9	0	15	19	0	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.5	3.3	3.6	3.5	3.3	3.6	3.5	3.3	3.6	3.5
Storage Length (m)	30.0		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)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00	1.00		1.00	1.00			0.99			0.99	
Frt		0.999			0.997			0.917			0.922	
Flt Protected	0.950			0.950				0.981			0.979	
Satd. Flow (prot)	1631	3398	0	1491	3355	0	0	1585	0	0	1591	0
Flt Permitted	0.314			0.257				0.896			0.850	
Satd. Flow (perm)	538	3398	0	402	3355	0	0	1446	0	0	1379	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1			5			33			33	
Link Speed (k/h)		60			60			40			40	
Link Distance (m)		86.0			172.6			90.8			124.3	
Travel Time (s)		5.2			10.4			8.2			11.2	
Confl. Peds. (#/hr)	4		11	11		4	2		3	3		2
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	7%	6%	25%	17%	7%	17%	0%	0%	11%	8%	0%	6%
Adj. Flow (vph)	23	1054	6	10	861	20	10	0	16	20	0	27
Shared Lane Traffic (%)												
Lane Group Flow (vph)	23	1060	0	10	881	0	0	26	0	0	47	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			2			4			4	
Permitted Phases	2			2			4			4		
Detector Phase	2	2		2	2		4	4		4	4	
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		8.0	8.0		8.0	8.0	
Minimum Split (s)	41.0	41.0		41.0	41.0		28.0	28.0		28.0	28.0	
Total Split (s)	70.0	70.0		70.0	70.0		30.0	30.0		30.0	30.0	
Total Split (%)	70.0%	70.0%		70.0%	70.0%		30.0%	30.0%		30.0%	30.0%	
Yellow Time (s)	4.0	4.0		4.0	4.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		4.0	4.0		4.0	4.0	
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0			-3.0			-3.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	C-Max	C-Max		C-Max	C-Max		None	None		None	None	
Act Effct Green (s)	84.4	84.4		84.4	84.4			11.4			11.4	
Actuated g/C Ratio	0.84	0.84		0.84	0.84			0.11			0.11	
v/c Ratio	0.05	0.37		0.03	0.31			0.13			0.25	
Control Delay	2.0	2.2		2.3	2.6			12.6			22.7	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	2.0	2.2		2.3	2.6			12.6			22.7	
LOS	A	A		A	A			B			C	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		2.2			2.6			12.6			22.7	
Approach LOS		A			A			B			C	
Queue Length 50th (m)	0.6	17.8		0.3	18.1			0.0			2.6	
Queue Length 95th (m)	m1.7	21.6		1.4	27.0			6.5			13.5	
Internal Link Dist (m)		62.0			148.6			66.8			100.3	
Turn Bay Length (m)	30.0			15.0								
Base Capacity (vph)	454	2868		339	2832			400			382	
Starvation Cap Reductn	0	0		0	0			0			0	
Spillback Cap Reductn	0	0		0	0			0			0	
Storage Cap Reductn	0	0		0	0			0			0	
Reduced v/c Ratio	0.05	0.37		0.03	0.31			0.07			0.12	

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 100			
Offset: 29 (29%), Referenced to phase 2:EBWB and 6:, Start of Green			
Natural Cycle: 70			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.37			
Intersection Signal Delay: 3.0		Intersection LOS: A	
Intersection Capacity Utilization 43.5%		ICU Level of Service A	
Analysis Period (min) 15			
m Volume for 95th percentile queue is metered by upstream signal.			

Splits and Phases: 3: Downsview Dr & Plains Rd E



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	22	991	6	9	809	19	9	0	15	19	0	25
Future Volume (vph)	22	991	6	9	809	19	9	0	15	19	0	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.5	3.3	3.6	3.5	3.3	3.6	3.5	3.3	3.6	3.5
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			0.99			0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	1.00		1.00	1.00			0.92			0.92	
Flt Protected	0.95	1.00		0.95	1.00			0.98			0.98	
Satd. Flow (prot)	1628	3399		1486	3353			1583			1590	
Flt Permitted	0.31	1.00		0.26	1.00			0.90			0.85	
Satd. Flow (perm)	538	3399		402	3353			1446			1380	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	23	1054	6	10	861	20	10	0	16	20	0	27
RTOR Reduction (vph)	0	0	0	0	1	0	0	23	0	0	30	0
Lane Group Flow (vph)	23	1060	0	10	880	0	0	3	0	0	17	0
Confl. Peds. (#/hr)	4		11	11		4	2		3	3		2
Heavy Vehicles (%)	7%	6%	25%	17%	7%	17%	0%	0%	11%	8%	0%	6%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			2			4			4	
Permitted Phases	2			2			4			4		
Actuated Green, G (s)	80.2	80.2		80.2	80.2			6.8			6.8	
Effective Green, g (s)	82.2	82.2		82.2	82.2			9.8			9.8	
Actuated g/C Ratio	0.82	0.82		0.82	0.82			0.10			0.10	
Clearance Time (s)	6.0	6.0		6.0	6.0			7.0			7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	442	2793		330	2756			141			135	
v/s Ratio Prot		c0.31			0.26							
v/s Ratio Perm	0.04			0.02				0.00			c0.01	
v/c Ratio	0.05	0.38		0.03	0.32			0.02			0.13	
Uniform Delay, d1	1.7	2.3		1.6	2.1			40.8			41.2	
Progression Factor	0.85	0.76		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.2	0.4		0.2	0.3			0.1			0.4	
Delay (s)	1.6	2.1		1.8	2.5			40.8			41.6	
Level of Service	A	A		A	A			D			D	
Approach Delay (s)		2.1			2.4			40.8			41.6	
Approach LOS		A			A			D			D	

Intersection Summary			
HCM 2000 Control Delay	3.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.35		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	43.5%	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)	9	1225	29	58	1531	16	37	6	40	46	12	33
Future Volume (vph)	9	1225	29	58	1531	16	37	6	40	46	12	33
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.5	3.3	3.6	3.5	3.3	3.6	3.5	3.3	3.6	3.5
Storage Length (m)	45.0		0.0	40.0		0.0	15.0		0.0	15.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		1.00		1.00	1.00		1.00	0.98		0.99	0.99	
Frt		0.997			0.998			0.871			0.889	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1745	3489	0	1694	3462	0	1544	1574	0	1745	1578	0
Flt Permitted	0.109			0.168			0.724			0.724		
Satd. Flow (perm)	200	3489	0	299	3462	0	1174	1574	0	1322	1578	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		4			2			44			23	
Link Speed (k/h)		60			60			40			40	
Link Distance (m)		129.9			163.1			89.7			84.4	
Travel Time (s)		7.8			9.8			8.1			7.6	
Confl. Peds. (#/hr)	19		14	14		19	2		6	6		2
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	0%	3%	6%	3%	4%	6%	13%	0%	4%	0%	0%	8%
Adj. Flow (vph)	10	1361	32	64	1701	18	41	7	44	51	13	37
Shared Lane Traffic (%)												
Lane Group Flow (vph)	10	1393	0	64	1719	0	41	51	0	51	50	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Detector Phase	2	2		6	6		4	4		8	8	
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		8.0	8.0		8.0	8.0	
Minimum Split (s)	42.0	42.0		42.0	42.0		35.0	35.0		35.0	35.0	
Total Split (s)	65.0	65.0		65.0	65.0		35.0	35.0		35.0	35.0	
Total Split (%)	65.0%	65.0%		65.0%	65.0%		35.0%	35.0%		35.0%	35.0%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		3.0	3.0		3.0	3.0	
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0		-3.0	-3.0		-3.0	-3.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	C-Max	C-Max		C-Max	C-Max		None	None		None	None	
Act Effct Green (s)	81.5	81.5		81.5	81.5		14.3	14.3		14.3	14.3	
Actuated g/C Ratio	0.82	0.82		0.82	0.82		0.14	0.14		0.14	0.14	
v/c Ratio	0.06	0.49		0.26	0.61		0.24	0.19		0.27	0.20	
Control Delay	4.3	4.7		6.8	5.3		40.6	15.0		40.9	24.9	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	4.3	4.7		6.8	5.3		40.6	15.0		40.9	24.9	
LOS	A	A		A	A		D	B		D	C	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		4.7			5.4			26.5			33.0	
Approach LOS		A			A			C			C	
Queue Length 50th (m)	0.4	43.6		2.9	61.2		7.6	1.3		9.4	4.9	
Queue Length 95th (m)	2.1	68.5		m8.0	78.6		17.2	11.4		20.0	15.2	
Internal Link Dist (m)		105.9			139.1			65.7			60.4	
Turn Bay Length (m)	45.0			40.0			15.0			15.0		
Base Capacity (vph)	163	2843		243	2821		363	518		409	505	
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	0.49		0.26	0.61		0.11	0.10		0.12	0.10	

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 100			
Offset: 77 (77%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green			
Natural Cycle: 80			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.61			
Intersection Signal Delay: 6.5		Intersection LOS: A	
Intersection Capacity Utilization 66.2%		ICU Level of Service C	
Analysis Period (min) 15			
m Volume for 95th percentile queue is metered by upstream signal.			

Splits and Phases: 1: Gallagher Rd/Shadeland Ave & Plains Rd E



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	9	1225	29	58	1531	16	37	6	40	46	12	33
Future Volume (vph)	9	1225	29	58	1531	16	37	6	40	46	12	33
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.5	3.3	3.6	3.5	3.3	3.6	3.5	3.3	3.6	3.5
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.98		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		0.99	1.00	
Frt	1.00	1.00		1.00	1.00		1.00	0.87		1.00	0.89	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1742	3487		1690	3463		1541	1574		1734	1578	
Flt Permitted	0.11	1.00		0.17	1.00		0.72	1.00		0.72	1.00	
Satd. Flow (perm)	200	3487		299	3463		1175	1574		1321	1578	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	10	1361	32	64	1701	18	41	7	44	51	13	37
RTOR Reduction (vph)	0	1	0	0	0	0	0	38	0	0	20	0
Lane Group Flow (vph)	10	1392	0	64	1719	0	41	13	0	51	30	0
Confl. Peds. (#/hr)	19		14	14		19	2		6	6		2
Heavy Vehicles (%)	0%	3%	6%	3%	4%	6%	13%	0%	4%	0%	0%	8%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	77.3	77.3		77.3	77.3		9.7	9.7		9.7	9.7	
Effective Green, g (s)	79.3	79.3		79.3	79.3		12.7	12.7		12.7	12.7	
Actuated g/C Ratio	0.79	0.79		0.79	0.79		0.13	0.13		0.13	0.13	
Clearance Time (s)	6.0	6.0		6.0	6.0		7.0	7.0		7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	158	2765		237	2746		149	199		167	200	
v/s Ratio Prot		0.40			c0.50			0.01			0.02	
v/s Ratio Perm	0.05			0.21			0.03			c0.04		
v/c Ratio	0.06	0.50		0.27	0.63		0.28	0.06		0.31	0.15	
Uniform Delay, d1	2.3	3.6		2.7	4.3		39.5	38.4		39.6	38.8	
Progression Factor	1.00	1.00		0.96	0.88		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.8	0.7		2.7	1.1		2.1	0.3		2.2	0.7	
Delay (s)	3.0	4.2		5.3	4.8		41.6	38.7		41.8	39.6	
Level of Service	A	A		A	A		D	D		D	D	
Approach Delay (s)		4.2			4.8			40.0			40.7	
Approach LOS		A			A			D			D	

Intersection Summary				
HCM 2000 Control Delay	6.6	HCM 2000 Level of Service	A	
HCM 2000 Volume to Capacity ratio	0.58			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0	
Intersection Capacity Utilization	66.2%	ICU Level of Service	C	
Analysis Period (min)	15			
c Critical Lane Group				

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	1249	6	33	1611	5	8	0	37	9	0	0
Future Volume (vph)	3	1249	6	33	1611	5	8	0	37	9	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.5	3.3	3.6	3.5	3.3	3.6	3.5	3.3	3.6	3.5
Storage Length (m)	15.0		0.0	30.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.999						0.889				
Flt Protected	0.950			0.950				0.991			0.950	
Satd. Flow (prot)	1745	3502	0	1745	3505	0	0	1621	0	0	1805	0
Flt Permitted	0.950			0.950				0.991			0.950	
Satd. Flow (perm)	1745	3502	0	1745	3505	0	0	1621	0	0	1805	0
Link Speed (k/h)		40			40			40			40	
Link Distance (m)		88.7			86.0			84.7			62.2	
Travel Time (s)		8.0			7.7			7.6			5.6	
Confl. Peds. (#/hr)	9		12	12		9						
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	0%	3%	0%	0%	3%	0%	0%	0%	4%	0%	0%	0%
Adj. Flow (vph)	3	1419	7	38	1831	6	9	0	42	10	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	3	1426	0	38	1837	0	0	51	0	0	10	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	54.7%	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)	3	1249	6	33	1611	5	8	0	37	9	0	0
Future Volume (Veh/h)	3	1249	6	33	1611	5	8	0	37	9	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	3	1419	7	38	1831	6	9	0	42	10	0	0
Pedestrians								12			9	
Lane Width (m)								3.6			3.6	
Walking Speed (m/s)								1.2			1.2	
Percent Blockage								1			1	
Right turn flare (veh)												
Median type		TWLTL			TWLTL							
Median storage veh)		2			2							
Upstream signal (m)		252			86							
pX, platoon unblocked	0.76			0.94			0.79	0.79	0.94	0.79	0.79	0.76
vC, conflicting volume	1846			1438			2432	3362	725	2676	3363	928
vC1, stage 1 conf vol							1440	1440		1919	1919	
vC2, stage 2 conf vol							992	1922		758	1444	
vCu, unblocked vol	1489			1336			1937	3108	576	2245	3109	287
tC, single (s)	4.1			4.1			7.5	6.5	7.0	7.5	6.5	6.9
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	3.3
p0 queue free %	99			92			94	100	90	87	100	100
cM capacity (veh/h)	347			486			140	96	423	77	92	543

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	3	946	480	38	1221	616	51	10
Volume Left	3	0	0	38	0	0	9	10
Volume Right	0	0	7	0	0	6	42	0
cSH	347	1700	1700	486	1700	1700	312	77
Volume to Capacity	0.01	0.56	0.28	0.08	0.72	0.36	0.16	0.13
Queue Length 95th (m)	0.2	0.0	0.0	2.0	0.0	0.0	4.6	3.4
Control Delay (s)	15.5	0.0	0.0	13.0	0.0	0.0	18.8	58.9
Lane LOS	C			B			C	F
Approach Delay (s)	0.0			0.3			18.8	58.9
Approach LOS							C	F

Intersection Summary					
Average Delay	0.6				
Intersection Capacity Utilization	54.7%	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)	30	1279	16	33	1616	50	15	0	23	34	0	25
Future Volume (vph)	30	1279	16	33	1616	50	15	0	23	34	0	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.5	3.3	3.6	3.5	3.3	3.6	3.5	3.3	3.6	3.5
Storage Length (m)	30.0		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)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00	1.00		1.00	1.00			0.98			0.99	
Frt		0.998			0.995			0.918			0.943	
Flt Protected	0.950			0.950				0.981			0.972	
Satd. Flow (prot)	1745	3497	0	1745	3454	0	0	1614	0	0	1731	0
Flt Permitted	0.094			0.163				0.872			0.849	
Satd. Flow (perm)	173	3497	0	299	3454	0	0	1434	0	0	1499	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3			7			33			33	
Link Speed (k/h)		60			60			40			40	
Link Distance (m)		86.0			172.6			90.8			124.3	
Travel Time (s)		5.2			10.4			8.2			11.2	
Confl. Peds. (#/hr)	10		17	17		10	2		11	11		2
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	0%	3%	0%	0%	4%	0%	0%	0%	7%	0%	0%	0%
Adj. Flow (vph)	33	1421	18	37	1796	56	17	0	26	38	0	28
Shared Lane Traffic (%)												
Lane Group Flow (vph)	33	1439	0	37	1852	0	0	43	0	0	66	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			2			4			4	
Permitted Phases	2			2			4			4		
Detector Phase	2	2		2	2		4	4		4	4	
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		8.0	8.0		8.0	8.0	
Minimum Split (s)	41.0	41.0		41.0	41.0		28.0	28.0		28.0	28.0	
Total Split (s)	72.0	72.0		72.0	72.0		28.0	28.0		28.0	28.0	
Total Split (%)	72.0%	72.0%		72.0%	72.0%		28.0%	28.0%		28.0%	28.0%	
Yellow Time (s)	4.0	4.0		4.0	4.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		4.0	4.0		4.0	4.0	
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0			-3.0			-3.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	C-Max	C-Max		C-Max	C-Max		None	None		None	None	
Act Effct Green (s)	83.7	83.7		83.7	83.7			12.1			12.1	
Actuated g/C Ratio	0.84	0.84		0.84	0.84			0.12			0.12	
v/c Ratio	0.23	0.49		0.15	0.64			0.21			0.32	
Control Delay	6.6	3.3		4.1	5.2			19.9			27.1	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	6.6	3.3		4.1	5.2			19.9			27.1	
LOS	A	A		A	A			B			C	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		3.4			5.2			19.9			27.1	
Approach LOS		A			A			B			C	
Queue Length 50th (m)	1.1	35.3		1.2	60.6			1.9			6.2	
Queue Length 95th (m)	m3.8	46.4		4.6	99.1			11.8			18.4	
Internal Link Dist (m)		62.0			148.6			66.8			100.3	
Turn Bay Length (m)	30.0			15.0								
Base Capacity (vph)	145	2929		250	2893			369			384	
Starvation Cap Reductn	0	0		0	0			0			0	
Spillback Cap Reductn	0	0		0	0			0			0	
Storage Cap Reductn	0	0		0	0			0			0	
Reduced v/c Ratio	0.23	0.49		0.15	0.64			0.12			0.17	

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 100			
Offset: 74 (74%), Referenced to phase 2:EBWB and 6:, Start of Green			
Natural Cycle: 75			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.64			
Intersection Signal Delay: 5.0		Intersection LOS: A	
Intersection Capacity Utilization 63.0%		ICU Level of Service B	
Analysis Period (min) 15			
m Volume for 95th percentile queue is metered by upstream signal.			

Splits and Phases: 3: Downsview Dr & Plains Rd E



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	1279	16	33	1616	50	15	0	23	34	0	25
Future Volume (vph)	30	1279	16	33	1616	50	15	0	23	34	0	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.5	3.3	3.6	3.5	3.3	3.6	3.5	3.3	3.6	3.5
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			0.98			0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			0.99	
Frt	1.00	1.00		1.00	1.00			0.92			0.94	
Flt Protected	0.95	1.00		0.95	1.00			0.98			0.97	
Satd. Flow (prot)	1743	3498		1740	3456			1613			1716	
Flt Permitted	0.09	1.00		0.16	1.00			0.87			0.85	
Satd. Flow (perm)	173	3498		299	3456			1433			1499	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	33	1421	18	37	1796	56	17	0	26	38	0	28
RTOR Reduction (vph)	0	1	0	0	1	0	0	30	0	0	30	0
Lane Group Flow (vph)	33	1438	0	37	1851	0	0	13	0	0	36	0
Confl. Peds. (#/hr)	10		17	17		10	2		11	11		2
Heavy Vehicles (%)	0%	3%	0%	0%	4%	0%	0%	0%	7%	0%	0%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			2			4			4	
Permitted Phases	2			2			4			4		
Actuated Green, G (s)	79.5	79.5		79.5	79.5			7.5			7.5	
Effective Green, g (s)	81.5	81.5		81.5	81.5			10.5			10.5	
Actuated g/C Ratio	0.82	0.82		0.82	0.82			0.10			0.10	
Clearance Time (s)	6.0	6.0		6.0	6.0			7.0			7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	140	2850		243	2816			150			157	
v/s Ratio Prot		0.41			c0.54							
v/s Ratio Perm	0.19			0.12				0.01			c0.02	
v/c Ratio	0.24	0.50		0.15	0.66			0.09			0.23	
Uniform Delay, d1	2.1	2.9		2.0	3.7			40.4			41.1	
Progression Factor	0.90	0.87		1.00	1.00			1.00			1.00	
Incremental Delay, d2	3.7	0.6		1.3	1.2			0.3			0.8	
Delay (s)	5.7	3.1		3.3	4.9			40.7			41.8	
Level of Service	A	A		A	A			D			D	
Approach Delay (s)		3.2			4.9			40.7			41.8	
Approach LOS		A			A			D			D	

Intersection Summary					
HCM 2000 Control Delay	5.3	HCM 2000 Level of Service		A	
HCM 2000 Volume to Capacity ratio	0.61				
Actuated Cycle Length (s)	100.0	Sum of lost time (s)		8.0	
Intersection Capacity Utilization	63.0%	ICU Level of Service		B	
Analysis Period (min)	15				
c Critical Lane Group					

Appendix F

Total Traffic Operations

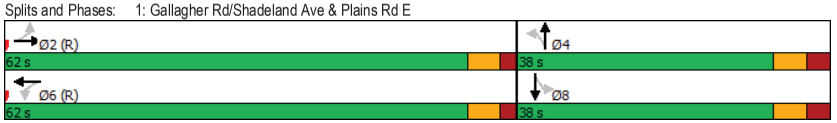


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	21	1019	29	20	833	28	20	19	33	103	14	55
Future Volume (vph)	21	1019	29	20	833	28	20	19	33	103	14	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.5	3.3	3.6	3.5	3.3	3.6	3.5	3.3	3.6	3.5
Storage Length (m)	45.0		0.0	40.0		0.0	15.0		0.0	15.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00	1.00		1.00	1.00		1.00	0.99		0.99	0.99	
Frt		0.996			0.995			0.905			0.880	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1163	3416	0	1616	3391	0	1332	1556	0	1745	1394	0
Flt Permitted	0.284			0.221			0.709			0.721		
Satd. Flow (perm)	347	3416	0	375	3391	0	992	1556	0	1311	1394	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5			6			35			59	
Link Speed (k/h)		60			60			40			40	
Link Distance (m)		129.9			163.1			89.7			84.4	
Travel Time (s)		7.8			9.8			8.1			7.6	
Confl. Peds. (#/hr)	10		7	7		10	2		10	10		2
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	50%	5%	11%	8%	6%	0%	31%	0%	14%	0%	25%	17%
Adj. Flow (vph)	23	1096	31	22	896	30	22	20	35	111	15	59
Shared Lane Traffic (%)												
Lane Group Flow (vph)	23	1127	0	22	926	0	22	55	0	111	74	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Detector Phase	2	2		6	6		4	4		8	8	
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		8.0	8.0		8.0	8.0	
Minimum Split (s)	42.0	42.0		42.0	42.0		35.0	35.0		35.0	35.0	
Total Split (s)	62.0	62.0		62.0	62.0		38.0	38.0		38.0	38.0	
Total Split (%)	62.0%	62.0%		62.0%	62.0%		38.0%	38.0%		38.0%	38.0%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		3.0	3.0		3.0	3.0	
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0		-3.0	-3.0		-3.0	-3.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	C-Max	C-Max		C-Max	C-Max		None	None		None	None	
Act Effct Green (s)	73.4	73.4		73.4	73.4		18.6	18.6		18.6	18.6	
Actuated g/C Ratio	0.73	0.73		0.73	0.73		0.19	0.19		0.19	0.19	
v/c Ratio	0.09	0.45		0.08	0.37		0.12	0.17		0.45	0.24	
Control Delay	6.0	6.5		5.7	5.6		33.0	16.9		41.2	13.4	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	6.0	6.5		5.7	5.6		33.0	16.9		41.2	13.4	
LOS	A	A		A	A		C	B		D	B	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		6.4			5.6			21.5			30.1	
Approach LOS		A			A			C			C	
Queue Length 50th (m)	1.1	40.3		1.0	30.2		3.8	3.4		20.3	2.5	
Queue Length 95th (m)	4.6	66.3		4.4	47.5		10.0	13.0		35.1	13.8	
Internal Link Dist (m)		105.9			139.1			65.7			60.4	
Turn Bay Length (m)	45.0			40.0			15.0			15.0		
Base Capacity (vph)	254	2507		275	2489		337	552		445	512	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.09	0.45		0.08	0.37		0.07	0.10		0.25	0.14	

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 100			
Offset: 25 (25%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green			
Natural Cycle: 80			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.45			
Intersection Signal Delay: 8.5		Intersection LOS: A	
Intersection Capacity Utilization 48.9%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 1: Gallagher Rd/Shadeland Ave & Plains Rd E



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	21	1019	29	20	833	28	20	19	33	103	14	55
Future Volume (vph)	21	1019	29	20	833	28	20	19	33	103	14	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.5	3.3	3.6	3.5	3.3	3.6	3.5	3.3	3.6	3.5
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
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	1.00	1.00		1.00	1.00		1.00	1.00		0.99	1.00	
Frt	1.00	1.00		1.00	1.00		1.00	0.90		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)	1159	3416		1613	3392		1329	1555		1728	1394	
Flt Permitted	0.28	1.00		0.22	1.00		0.71	1.00		0.72	1.00	
Satd. Flow (perm)	346	3416		376	3392		992	1555		1311	1394	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	23	1096	31	22	896	30	22	20	35	111	15	59
RTOR Reduction (vph)	0	1	0	0	2	0	0	28	0	0	48	0
Lane Group Flow (vph)	23	1126	0	22	924	0	22	27	0	111	26	0
Confl. Peds. (#/hr)	10		7	7		10	2		10	10		2
Heavy Vehicles (%)	50%	5%	11%	8%	6%	0%	31%	0%	14%	0%	25%	17%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	71.4	71.4		71.4	71.4		15.6	15.6		15.6	15.6	
Effective Green, g (s)	73.4	73.4		73.4	73.4		18.6	18.6		18.6	18.6	
Actuated g/C Ratio	0.73	0.73		0.73	0.73		0.19	0.19		0.19	0.19	
Clearance Time (s)	6.0	6.0		6.0	6.0		7.0	7.0		7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	253	2507		275	2489		184	289		243	259	
v/s Ratio Prot		c0.33			0.27			0.02			0.02	
v/s Ratio Perm	0.07			0.06			0.02			c0.08		
v/c Ratio	0.09	0.45		0.08	0.37		0.12	0.09		0.46	0.10	
Uniform Delay, d1	3.8	5.3		3.8	4.9		33.9	33.7		36.2	33.8	
Progression Factor	1.00	1.00		0.99	0.97		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.7	0.6		0.6	0.4		0.6	0.3		2.8	0.4	
Delay (s)	4.5	5.9		4.3	5.1		34.5	34.0		39.0	34.1	
Level of Service	A	A		A	A		C	C		D	C	
Approach Delay (s)		5.8			5.1			34.1			37.1	
Approach LOS		A			A			C			D	

Intersection Summary				
HCM 2000 Control Delay	8.9	HCM 2000 Level of Service	A	
HCM 2000 Volume to Capacity ratio	0.45			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0	
Intersection Capacity Utilization	48.9%	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)	3	1027	9	25	873	0	9	0	20	0	0	2
Future Volume (vph)	3	1027	9	25	873	0	9	0	20	0	0	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.5	3.3	3.6	3.5	3.3	3.6	3.5	3.3	3.6	3.5
Storage Length (m)	15.0		0.0	30.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.999						0.909			0.865	
Flt Protected	0.950			0.950				0.984				
Satd. Flow (prot)	1745	3404	0	1544	3406	0	0	1611	0	0	1644	0
Flt Permitted	0.950			0.950				0.984				
Satd. Flow (perm)	1745	3404	0	1544	3406	0	0	1611	0	0	1644	0
Link Speed (k/h)		40			40			40			40	
Link Distance (m)		88.7			86.0			84.7			62.2	
Travel Time (s)		8.0			7.7			7.6			5.6	
Confl. Peds. (#/hr)	6		8	8		6	1					1
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	0%	6%	0%	13%	6%	0%	17%	0%	0%	0%	0%	0%
Adj. Flow (vph)	3	1093	10	27	929	0	10	0	21	0	0	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	3	1103	0	27	929	0	0	31	0	0	2	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	43.7%	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)	3	1027	9	25	873	0	9	0	20	0	0	2
Future Volume (Veh/h)	3	1027	9	25	873	0	9	0	20	0	0	2
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	3	1093	10	27	929	0	10	0	21	0	0	2
Pedestrians		1						8			6	
Lane Width (m)		3.5						3.6			3.6	
Walking Speed (m/s)		1.2						1.2			1.2	
Percent Blockage		0						1			1	
Right turn flare (veh)												
Median type		TWLTL			TWLTL							
Median storage veh)		2			2							
Upstream signal (m)		252			86							
pX, platoon unblocked	0.95			0.92			0.95	0.95	0.92	0.95	0.95	0.95
vC, conflicting volume	935			1111			1634	2101	560	1562	2106	472
vC1, stage 1 conf vol							1112	1112		989	989	
vC2, stage 2 conf vol							522	989		574	1117	
vCu, unblocked vol	816			947			1299	1793	348	1224	1798	326
tC, single (s)	4.1			4.4			7.8	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)							6.8	5.5		6.5	5.5	
tF (s)	2.2			2.3			3.7	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			95			95	100	96	100	100	100
cM capacity (veh/h)	772			600			215	232	598	260	221	635

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	3	729	374	27	619	310	31	2
Volume Left	3	0	0	27	0	0	10	0
Volume Right	0	0	10	0	0	0	21	2
cSH	772	1700	1700	600	1700	1700	379	635
Volume to Capacity	0.00	0.43	0.22	0.05	0.36	0.18	0.08	0.00
Queue Length 95th (m)	0.1	0.0	0.0	1.1	0.0	0.0	2.1	0.1
Control Delay (s)	9.7	0.0	0.0	11.3	0.0	0.0	15.3	10.7
Lane LOS	A			B			C	B
Approach Delay (s)	0.0			0.3			15.3	10.7
Approach LOS							C	B

Intersection Summary					
Average Delay	0.4				
Intersection Capacity Utilization	43.7%	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)	22	1009	6	9	815	19	9	0	15	19	0	25
Future Volume (vph)	22	1009	6	9	815	19	9	0	15	19	0	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.5	3.3	3.6	3.5	3.3	3.6	3.5	3.3	3.6	3.5
Storage Length (m)	30.0		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)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00	1.00		1.00	1.00			0.99			0.99	
Frt		0.999			0.997			0.917			0.922	
Flt Protected	0.950			0.950				0.981			0.979	
Satd. Flow (prot)	1631	3398	0	1491	3355	0	0	1585	0	0	1591	0
Flt Permitted	0.312			0.251				0.896			0.850	
Satd. Flow (perm)	535	3398	0	393	3355	0	0	1446	0	0	1379	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1			5			33			33	
Link Speed (k/h)		60			60			40			40	
Link Distance (m)		86.0			172.6			90.8			124.3	
Travel Time (s)		5.2			10.4			8.2			11.2	
Confl. Peds. (#/hr)	4		11	11		4	2		3	3		2
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	7%	6%	25%	17%	7%	17%	0%	0%	11%	8%	0%	6%
Adj. Flow (vph)	23	1073	6	10	867	20	10	0	16	20	0	27
Shared Lane Traffic (%)												
Lane Group Flow (vph)	23	1079	0	10	887	0	0	26	0	0	47	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			2			4			4	
Permitted Phases	2			2			4			4		
Detector Phase	2	2		2	2		4	4		4	4	
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		8.0	8.0		8.0	8.0	
Minimum Split (s)	41.0	41.0		41.0	41.0		28.0	28.0		28.0	28.0	
Total Split (s)	70.0	70.0		70.0	70.0		30.0	30.0		30.0	30.0	
Total Split (%)	70.0%	70.0%		70.0%	70.0%		30.0%	30.0%		30.0%	30.0%	
Yellow Time (s)	4.0	4.0		4.0	4.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		4.0	4.0		4.0	4.0	
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0			-3.0			-3.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	C-Max	C-Max		C-Max	C-Max		None	None		None	None	
Act Effct Green (s)	84.4	84.4		84.4	84.4			11.4			11.4	
Actuated g/C Ratio	0.84	0.84		0.84	0.84			0.11			0.11	
v/c Ratio	0.05	0.38		0.03	0.31			0.13			0.25	
Control Delay	2.1	2.2		2.3	2.6			12.6			22.7	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	2.1	2.2		2.3	2.6			12.6			22.7	
LOS	A	A		A	A			B			C	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		2.2			2.6			12.6			22.7	
Approach LOS		A			A			B			C	
Queue Length 50th (m)	0.6	18.3		0.3	18.2			0.0			2.6	
Queue Length 95th (m)	m1.7	22.5		1.4	27.1			6.5			13.5	
Internal Link Dist (m)		62.0			148.6			66.8			100.3	
Turn Bay Length (m)	30.0			15.0								
Base Capacity (vph)	451	2868		331	2832			400			382	
Starvation Cap Reductn	0	0		0	0			0			0	
Spillback Cap Reductn	0	0		0	0			0			0	
Storage Cap Reductn	0	0		0	0			0			0	
Reduced v/c Ratio	0.05	0.38		0.03	0.31			0.07			0.12	

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 100			
Offset: 29 (29%), Referenced to phase 2:EBWB and 6:, Start of Green			
Natural Cycle: 70			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.38			
Intersection Signal Delay: 3.0		Intersection LOS: A	
Intersection Capacity Utilization 43.5%		ICU Level of Service A	
Analysis Period (min) 15			
m Volume for 95th percentile queue is metered by upstream signal.			

Splits and Phases: 3: Downsview Dr & Plains Rd E



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	22	1009	6	9	815	19	9	0	15	19	0	25
Future Volume (vph)	22	1009	6	9	815	19	9	0	15	19	0	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.5	3.3	3.6	3.5	3.3	3.6	3.5	3.3	3.6	3.5
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			0.99			0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	1.00		1.00	1.00			0.92			0.92	
Flt Protected	0.95	1.00		0.95	1.00			0.98			0.98	
Satd. Flow (prot)	1628	3399		1486	3353			1583			1590	
Flt Permitted	0.31	1.00		0.25	1.00			0.90			0.85	
Satd. Flow (perm)	534	3399		393	3353			1446			1380	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	23	1073	6	10	867	20	10	0	16	20	0	27
RTOR Reduction (vph)	0	0	0	0	1	0	0	23	0	0	30	0
Lane Group Flow (vph)	23	1079	0	10	886	0	0	3	0	0	17	0
Confl. Peds. (#/hr)	4		11	11		4	2		3	3		2
Heavy Vehicles (%)	7%	6%	25%	17%	7%	17%	0%	0%	11%	8%	0%	6%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			2			4			4	
Permitted Phases	2			2			4			4		
Actuated Green, G (s)	80.2	80.2		80.2	80.2			6.8			6.8	
Effective Green, g (s)	82.2	82.2		82.2	82.2			9.8			9.8	
Actuated g/C Ratio	0.82	0.82		0.82	0.82			0.10			0.10	
Clearance Time (s)	6.0	6.0		6.0	6.0			7.0			7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	438	2793		323	2756			141			135	
v/s Ratio Prot		c0.32			0.26							
v/s Ratio Perm	0.04			0.03				0.00			c0.01	
v/c Ratio	0.05	0.39		0.03	0.32			0.02			0.13	
Uniform Delay, d1	1.7	2.3		1.6	2.2			40.8			41.2	
Progression Factor	0.86	0.76		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.2	0.4		0.2	0.3			0.1			0.4	
Delay (s)	1.6	2.1		1.8	2.5			40.8			41.6	
Level of Service	A	A		A	A			D			D	
Approach Delay (s)		2.1			2.5			40.8			41.6	
Approach LOS		A			A			D			D	

Intersection Summary			
HCM 2000 Control Delay	3.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.36		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	43.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1153	4	6	879	12	18
Future Volume (vph)	1153	4	6	879	12	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.6	3.5	3.3	3.6	3.3	3.5
Lane Util. Factor	0.95	0.95	0.95	0.95	1.00	1.00
Frt					0.918	
Flt Protected					0.981	
Satd. Flow (prot)	3539	0	0	3539	1622	0
Flt Permitted					0.981	
Satd. Flow (perm)	3539	0	0	3539	1622	0
Link Speed (k/h)	40			40	40	
Link Distance (m)	163.1			88.7	97.0	
Travel Time (s)	14.7			8.0	8.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1253	4	7	955	13	20
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1257	0	0	962	33	0
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	42.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	1153	4	6	879	12	18
Future Volume (Veh/h)	1153	4	6	879	12	18
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1253	4	7	955	13	20
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLTL			TWLTL		
Median storage veh)	2			2		
Upstream signal (m)	163			175		
pX, platoon unblocked			0.87		0.89	0.87
vC, conflicting volume			1257		1746	628
vC1, stage 1 conf vol					1255	
vC2, stage 2 conf vol					492	
vCu, unblocked vol			1004		1425	284
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)					5.8	
tF (s)			2.2		3.5	3.3
p0 queue free %			99		95	97
cM capacity (veh/h)			599		257	623

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	835	422	325	637	33
Volume Left	0	0	7	0	13
Volume Right	0	4	0	0	20
cSH	1700	1700	599	1700	399
Volume to Capacity	0.49	0.25	0.01	0.37	0.08
Queue Length 95th (m)	0.0	0.0	0.3	0.0	2.1
Control Delay (s)	0.0	0.0	0.4	0.0	14.8
Lane LOS			A		B
Approach Delay (s)	0.0		0.1		14.8
Approach LOS					B

Intersection Summary				
Average Delay	0.3			
Intersection Capacity Utilization	42.0%	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)	9	1236	29	58	1539	16	37	6	40	46	12	33
Future Volume (vph)	9	1236	29	58	1539	16	37	6	40	46	12	33
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.5	3.3	3.6	3.5	3.3	3.6	3.5	3.3	3.6	3.5
Storage Length (m)	45.0		0.0	40.0		0.0	15.0		0.0	15.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		1.00		1.00	1.00		1.00	0.98		0.99	0.99	
Frt		0.997			0.998			0.871			0.889	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1745	3489	0	1694	3462	0	1544	1574	0	1745	1578	0
Flt Permitted	0.108			0.166			0.724			0.724		
Satd. Flow (perm)	198	3489	0	295	3462	0	1174	1574	0	1322	1578	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		4			2			44			22	
Link Speed (k/h)		60			60			40			40	
Link Distance (m)		129.9			163.1			89.7			84.4	
Travel Time (s)		7.8			9.8			8.1			7.6	
Confl. Peds. (#/hr)	19		14	14		19	2		6	6		2
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	0%	3%	6%	3%	4%	6%	13%	0%	4%	0%	0%	8%
Adj. Flow (vph)	10	1373	32	64	1710	18	41	7	44	51	13	37
Shared Lane Traffic (%)												
Lane Group Flow (vph)	10	1405	0	64	1728	0	41	51	0	51	50	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Detector Phase	2	2		6	6		4	4		8	8	
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		8.0	8.0		8.0	8.0	
Minimum Split (s)	42.0	42.0		42.0	42.0		35.0	35.0		35.0	35.0	
Total Split (s)	65.0	65.0		65.0	65.0		35.0	35.0		35.0	35.0	
Total Split (%)	65.0%	65.0%		65.0%	65.0%		35.0%	35.0%		35.0%	35.0%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		3.0	3.0		3.0	3.0	
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0		-3.0	-3.0		-3.0	-3.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	C-Max	C-Max		C-Max	C-Max		None	None		None	None	
Act Effct Green (s)	81.5	81.5		81.5	81.5		14.3	14.3		14.3	14.3	
Actuated g/C Ratio	0.82	0.82		0.82	0.82		0.14	0.14		0.14	0.14	
v/c Ratio	0.06	0.49		0.27	0.61		0.24	0.19		0.27	0.20	
Control Delay	4.3	4.7		6.2	4.8		40.6	15.0		40.9	25.5	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	4.3	4.7		6.2	4.8		40.6	15.0		40.9	25.5	
LOS	A	A		A	A		D	B		D	C	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		4.7			4.9			26.5			33.3	
Approach LOS		A			A			C			C	
Queue Length 50th (m)	0.4	44.2		2.9	59.3		7.6	1.3		9.4	5.1	
Queue Length 95th (m)	2.0	69.5		m6.6	67.8		17.2	11.4		20.0	15.3	
Internal Link Dist (m)		105.9			139.1			65.7			60.4	
Turn Bay Length (m)	45.0			40.0			15.0			15.0		
Base Capacity (vph)	161	2843		240	2821		363	518		409	504	
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	0.49		0.27	0.61		0.11	0.10		0.12	0.10	

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 100			
Offset: 77 (77%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green			
Natural Cycle: 80			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.61			
Intersection Signal Delay: 6.2		Intersection LOS: A	
Intersection Capacity Utilization 66.2%		ICU Level of Service C	
Analysis Period (min) 15			
m Volume for 95th percentile queue is metered by upstream signal.			

Splits and Phases: 1: Gallagher Rd/Shadeland Ave & Plains Rd E



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	9	1236	29	58	1539	16	37	6	40	46	12	33
Future Volume (vph)	9	1236	29	58	1539	16	37	6	40	46	12	33
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.5	3.3	3.6	3.5	3.3	3.6	3.5	3.3	3.6	3.5
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.98		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		0.99	1.00	
Frt	1.00	1.00		1.00	1.00		1.00	0.87		1.00	0.89	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1742	3487		1690	3463		1541	1574		1734	1578	
Flt Permitted	0.11	1.00		0.17	1.00		0.72	1.00		0.72	1.00	
Satd. Flow (perm)	197	3487		295	3463		1175	1574		1321	1578	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	10	1373	32	64	1710	18	41	7	44	51	13	37
RTOR Reduction (vph)	0	1	0	0	0	0	0	38	0	0	19	0
Lane Group Flow (vph)	10	1404	0	64	1728	0	41	13	0	51	31	0
Confl. Peds. (#/hr)	19		14	14		19	2		6	6		2
Heavy Vehicles (%)	0%	3%	6%	3%	4%	6%	13%	0%	4%	0%	0%	8%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	77.3	77.3		77.3	77.3		9.7	9.7		9.7	9.7	
Effective Green, g (s)	79.3	79.3		79.3	79.3		12.7	12.7		12.7	12.7	
Actuated g/C Ratio	0.79	0.79		0.79	0.79		0.13	0.13		0.13	0.13	
Clearance Time (s)	6.0	6.0		6.0	6.0		7.0	7.0		7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	156	2765		233	2746		149	199		167	200	
v/s Ratio Prot		0.40			c0.50			0.01			0.02	
v/s Ratio Perm	0.05			0.22			0.03			c0.04		
v/c Ratio	0.06	0.51		0.27	0.63		0.28	0.06		0.31	0.15	
Uniform Delay, d1	2.3	3.6		2.7	4.3		39.5	38.4		39.6	38.9	
Progression Factor	1.00	1.00		0.93	0.81		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.8	0.7		2.3	0.9		2.1	0.3		2.2	0.8	
Delay (s)	3.0	4.3		4.8	4.3		41.6	38.7		41.8	39.6	
Level of Service	A	A		A	A		D	D		D	D	
Approach Delay (s)		4.2			4.4			40.0			40.7	
Approach LOS		A			A			D			D	

Intersection Summary				
HCM 2000 Control Delay	6.4	HCM 2000 Level of Service	A	
HCM 2000 Volume to Capacity ratio	0.58			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0	
Intersection Capacity Utilization	66.2%	ICU Level of Service	C	
Analysis Period (min)	15			
c Critical Lane Group				

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	1262	6	33	1631	5	8	0	37	9	0	0
Future Volume (vph)	3	1262	6	33	1631	5	8	0	37	9	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.5	3.3	3.6	3.5	3.3	3.6	3.5	3.3	3.6	3.5
Storage Length (m)	15.0		0.0	30.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.999						0.889				
Flt Protected	0.950			0.950				0.991			0.950	
Satd. Flow (prot)	1745	3502	0	1745	3505	0	0	1621	0	0	1805	0
Flt Permitted	0.950			0.950				0.991			0.950	
Satd. Flow (perm)	1745	3502	0	1745	3505	0	0	1621	0	0	1805	0
Link Speed (k/h)		40			40			40			40	
Link Distance (m)		88.7			86.0			84.7			62.2	
Travel Time (s)		8.0			7.7			7.6			5.6	
Confl. Peds. (#/hr)	9		12	12		9						
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	0%	3%	0%	0%	3%	0%	0%	0%	4%	0%	0%	0%
Adj. Flow (vph)	3	1434	7	38	1853	6	9	0	42	10	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	3	1441	0	38	1859	0	0	51	0	0	10	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	55.2%	ICU Level of Service B	
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	1262	6	33	1631	5	8	0	37	9	0	0
Future Volume (Veh/h)	3	1262	6	33	1631	5	8	0	37	9	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	3	1434	7	38	1853	6	9	0	42	10	0	0
Pedestrians								12			9	
Lane Width (m)								3.6			3.6	
Walking Speed (m/s)								1.2			1.2	
Percent Blockage								1			1	
Right turn flare (veh)												
Median type		TWLTL			TWLTL							
Median storage veh)		2			2							
Upstream signal (m)		252			86							
pX, platoon unblocked	0.76			0.86			0.82	0.82	0.86	0.82	0.82	0.76
vC, conflicting volume	1868			1453			2458	3400	732	2706	3400	938
vC1, stage 1 conf vol							1456	1456		1941	1941	
vC2, stage 2 conf vol							1002	1944		765	1459	
vCu, unblocked vol	1504			1209			1600	2742	375	1901	2743	276
tC, single (s)	4.1			4.1			7.5	6.5	7.0	7.5	6.5	6.9
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	3.3
p0 queue free %	99			92			94	100	92	87	100	100
cM capacity (veh/h)	339			499			156	97	527	76	94	547

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	3	956	485	38	1235	624	51	10
Volume Left	3	0	0	38	0	0	9	10
Volume Right	0	0	7	0	0	6	42	0
cSH	339	1700	1700	499	1700	1700	371	76
Volume to Capacity	0.01	0.56	0.29	0.08	0.73	0.37	0.14	0.13
Queue Length 95th (m)	0.2	0.0	0.0	2.0	0.0	0.0	3.8	3.5
Control Delay (s)	15.7	0.0	0.0	12.8	0.0	0.0	16.2	59.6
Lane LOS	C			B			C	F
Approach Delay (s)	0.0			0.3			16.2	59.6
Approach LOS							C	F

Intersection Summary					
Average Delay	0.6				
Intersection Capacity Utilization	55.2%	ICU Level of Service		B	
Analysis Period (min)	15				

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	1292	16	33	1636	50	15	0	23	34	0	25
Future Volume (vph)	30	1292	16	33	1636	50	15	0	23	34	0	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.5	3.3	3.6	3.5	3.3	3.6	3.5	3.3	3.6	3.5
Storage Length (m)	30.0		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)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00	1.00		1.00	1.00			0.98			0.99	
Frt		0.998			0.996			0.918			0.943	
Flt Protected	0.950			0.950				0.981			0.972	
Satd. Flow (prot)	1745	3497	0	1745	3458	0	0	1614	0	0	1731	0
Flt Permitted	0.092			0.160				0.872			0.849	
Satd. Flow (perm)	169	3497	0	293	3458	0	0	1434	0	0	1499	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3			7			33			33	
Link Speed (k/h)		60			60			40			40	
Link Distance (m)		86.0			172.6			90.8			124.3	
Travel Time (s)		5.2			10.4			8.2			11.2	
Confl. Peds. (#/hr)	10		17	17		10	2		11	11		2
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	0%	3%	0%	0%	4%	0%	0%	0%	7%	0%	0%	0%
Adj. Flow (vph)	33	1436	18	37	1818	56	17	0	26	38	0	28
Shared Lane Traffic (%)												
Lane Group Flow (vph)	33	1454	0	37	1874	0	0	43	0	0	66	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			2			4			4	
Permitted Phases	2			2			4			4		
Detector Phase	2	2		2	2		4	4		4	4	
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		8.0	8.0		8.0	8.0	
Minimum Split (s)	41.0	41.0		41.0	41.0		28.0	28.0		28.0	28.0	
Total Split (s)	72.0	72.0		72.0	72.0		28.0	28.0		28.0	28.0	
Total Split (%)	72.0%	72.0%		72.0%	72.0%		28.0%	28.0%		28.0%	28.0%	
Yellow Time (s)	4.0	4.0		4.0	4.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		4.0	4.0		4.0	4.0	
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0			-3.0			-3.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	C-Max	C-Max		C-Max	C-Max		None	None		None	None	
Act Effct Green (s)	83.7	83.7		83.7	83.7			12.1			12.1	
Actuated g/C Ratio	0.84	0.84		0.84	0.84			0.12			0.12	
v/c Ratio	0.23	0.50		0.15	0.65			0.21			0.32	
Control Delay	6.6	3.2		4.2	5.3			19.9			27.1	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	6.6	3.2		4.2	5.3			19.9			27.1	
LOS	A	A		A	A			B			C	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		3.3			5.3			19.9			27.1	
Approach LOS		A			A			B			C	
Queue Length 50th (m)	1.2	35.6		1.2	62.0			1.9			6.2	
Queue Length 95th (m)	m3.5	44.1		4.7	101.8			11.8			18.4	
Internal Link Dist (m)		62.0			148.6			66.8			100.3	
Turn Bay Length (m)	30.0			15.0								
Base Capacity (vph)	141	2929		245	2896			369			384	
Starvation Cap Reductn	0	0		0	0			0			0	
Spillback Cap Reductn	0	0		0	0			0			0	
Storage Cap Reductn	0	0		0	0			0			0	
Reduced v/c Ratio	0.23	0.50		0.15	0.65			0.12			0.17	

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 100			
Offset: 74 (74%), Referenced to phase 2:EBWB and 6:, Start of Green			
Natural Cycle: 75			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.65			
Intersection Signal Delay: 5.1		Intersection LOS: A	
Intersection Capacity Utilization 63.5%		ICU Level of Service B	
Analysis Period (min) 15			
m Volume for 95th percentile queue is metered by upstream signal.			

Splits and Phases: 3: Downsview Dr & Plains Rd E



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	1292	16	33	1636	50	15	0	23	34	0	25
Future Volume (vph)	30	1292	16	33	1636	50	15	0	23	34	0	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.5	3.3	3.6	3.5	3.3	3.6	3.5	3.3	3.6	3.5
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			0.98			0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			0.99	
Frt	1.00	1.00		1.00	1.00			0.92			0.94	
Flt Protected	0.95	1.00		0.95	1.00			0.98			0.97	
Satd. Flow (prot)	1743	3498		1740	3456			1613			1716	
Flt Permitted	0.09	1.00		0.16	1.00			0.87			0.85	
Satd. Flow (perm)	168	3498		293	3456			1433			1499	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	33	1436	18	37	1818	56	17	0	26	38	0	28
RTOR Reduction (vph)	0	1	0	0	1	0	0	30	0	0	30	0
Lane Group Flow (vph)	33	1453	0	37	1873	0	0	13	0	0	36	0
Confl. Peds. (#/hr)	10		17	17		10	2		11	11		2
Heavy Vehicles (%)	0%	3%	0%	0%	4%	0%	0%	0%	7%	0%	0%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			2			4			4	
Permitted Phases	2			2			4			4		
Actuated Green, G (s)	79.5	79.5		79.5	79.5			7.5			7.5	
Effective Green, g (s)	81.5	81.5		81.5	81.5			10.5			10.5	
Actuated g/C Ratio	0.82	0.82		0.82	0.82			0.10			0.10	
Clearance Time (s)	6.0	6.0		6.0	6.0			7.0			7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	136	2850		238	2816			150			157	
v/s Ratio Prot		0.42			c0.54							
v/s Ratio Perm	0.20			0.13				0.01			c0.02	
v/c Ratio	0.24	0.51		0.16	0.67			0.09			0.23	
Uniform Delay, d1	2.1	2.9		2.0	3.7			40.4			41.1	
Progression Factor	0.87	0.84		1.00	1.00			1.00			1.00	
Incremental Delay, d2	3.8	0.6		1.4	1.3			0.3			0.8	
Delay (s)	5.7	3.0		3.3	5.0			40.7			41.8	
Level of Service	A	A		A	A			D			D	
Approach Delay (s)		3.1			5.0			40.7			41.8	
Approach LOS		A			A			D			D	

Intersection Summary					
HCM 2000 Control Delay	5.3	HCM 2000 Level of Service		A	
HCM 2000 Volume to Capacity ratio	0.62				
Actuated Cycle Length (s)	100.0	Sum of lost time (s)		8.0	
Intersection Capacity Utilization	63.5%	ICU Level of Service		B	
Analysis Period (min)	15				
c Critical Lane Group					

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1312	11	20	1621	8	13
Future Volume (vph)	1312	11	20	1621	8	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.6	3.5	3.3	3.6	3.3	3.5
Lane Util. Factor	0.95	0.95	0.95	0.95	1.00	1.00
Frt	0.999				0.918	
Flt Protected				0.999	0.981	
Satd. Flow (prot)	3536	0	0	3536	1622	0
Flt Permitted				0.999	0.981	
Satd. Flow (perm)	3536	0	0	3536	1622	0
Link Speed (k/h)	40			40	40	
Link Distance (m)	163.1			88.7	97.0	
Travel Time (s)	14.7			8.0	8.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1426	12	22	1762	9	14
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1438	0	0	1784	23	0
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	68.9%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	1312	11	20	1621	8	13
Future Volume (Veh/h)	1312	11	20	1621	8	13
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1426	12	22	1762	9	14
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLTL			TWLTL		
Median storage veh)	2			2		
Upstream signal (m)	163			175		
pX, platoon unblocked			0.85		0.83	0.85
vC, conflicting volume			1438		2357	719
vC1, stage 1 conf vol					1432	
vC2, stage 2 conf vol					925	
vCu, unblocked vol			1173		1436	331
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)					5.8	
tF (s)			2.2		3.5	3.3
p0 queue free %			96		96	98
cM capacity (veh/h)			506		209	568

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	951	487	609	1175	23
Volume Left	0	0	22	0	9
Volume Right	0	12	0	0	14
cSH	1700	1700	506	1700	340
Volume to Capacity	0.56	0.29	0.04	0.69	0.07
Queue Length 95th (m)	0.0	0.0	1.1	0.0	1.7
Control Delay (s)	0.0	0.0	1.2	0.0	16.4
Lane LOS			A		C
Approach Delay (s)	0.0		0.4		16.4
Approach LOS					C

Intersection Summary				
Average Delay	0.4			
Intersection Capacity Utilization	68.9%	ICU Level of Service		C
Analysis Period (min)	15			

Appendix G

Region of Waterloo TDM Worksheet

Region of Waterloo

Parking Management Worksheet

Version 9/18/2013

Appendix I

Case Study: 284-292 Plains Road East **Site Context:**

Date: 2021-08-04 **Reduction Worksheet No:**

"**Urban Growth Centres -** (UGC) area classification includes the Downtown / Uptown and RT Station Areas of Kitchener, Waterloo and Cambridge.

"**Intensification Corridor**" (IC) classification is applied to sites within 800 metres of the future CTC line

"**Other**" classification applies to all other sites

Please highlight the cell percentages applicable to your development under the appropriate classification. Please note that the Parking Management Worksheet and the Transportation Demand Management (TDM) Checklist are not designed for residential properties, but can be used for mixed-use developments. Local municipalities are the decision-making bodies with respect to consideration of parking reductions below Zoning By-law requirements.

TABLE A	**Pedestrian and Cyclist Orientation**			
In creating an environment that supports pedestrian and cycling activity, the public realm must be accessible, safe, and comfortable to encourage movement on the street and in the surrounding area(s). These facilities and features should encourage walking and cycling.				
	Features	**UGC**	**IC**	**Other**
A1	Development incorporates functional building entrances that are oriented to public space or to locations where pedestrians and transit users arrive from such as a street, square, park or plaza.	1%	1%	1%
A2	Continuous sidewalks (1.5m min. width) are provided along both sides of all adjacent public streets and pedestrian walkways (1.5m min width) are provided through large parking areas to link the building with the public street sidewalk system	0%	0%	1%
A3	Non-Residential: Development provides secure bike storage for 4% of the building occupants	2%	2%	1%
A4	Shower and change facilities provided on-site consistent with LEED requirements.	1%	1%	1%
A5	Provision of active uses at-grade along street frontages.	1%	1%	1%
	Category Maximum	**4%**	**4%**	**4%**
	Available Parking Reduction		**2%**	

TABLE B	**Public Transportation Access**			
The availability and proximity of convenient public transit service with direct pedestrian linkages to the building will provide viable travel options for employees, visitors and residents.				
	Features	**UGC**	**IC**	**Other**
B1	Bus shelters with seating are provided at the transit stop immediately adjacent to the development, in consultation with Transportation Planning at the Region of Waterloo	0%	0%	1%
B2	Information regarding public transit routes, schedules and fares are provided in an accessible and visible location on site and in adjacent bus stops	0%	0%	1%
B3a	Located in an UGC or within 800 m of a future Rapid Transit Station	24%	12%	0%
B3b	Located within 600m a transit route with 15 minute headways (or less) or is located in a designated mixed use corridor or node. **Note: Points are awarded for either B3a, B3b or B3c only. Please choose whichever represents the highest order of transit.**	-	-	3%
B3c	Located within 400 metres of a bus service with headways of 15 min to 30 min. **Note: Points are awarded for either B3a, B3b or B3c only. Please choose whichever represents the highest order of transit.**	-	-	1%
	Category Maximum	**24%**	**12%**	**5%**
	Available Parking Reduction		**0%**	

TABLE C	Parking			
Vehicle parking facilities can affect the character, travel mode and cost of a development. Reducing parking supply to match expected demand can have a positive influence on the selection of alternative travel modes.				
	Features	**UGC**	**IC**	**Other**
C1	Provides priority parking for carpooling/vanpooling participants equivalent to 5% of employee spaces	0%	0%	5%
C2	Commercial Uses: Provide car-share spaces equivalent to 2% of building occupants	2%	2%	0%
C3	Implements paid parking system on all or part of the site (e.g. parking permits, paid parking zones near main entrances)	2%	2%	1%
C4	Parking is not located on major street frontage.	0%	0%	1%
C5	25% to 50% of parking is located underground or in a structure	2%	1%	0%
C6	50% to 75% of parking is located underground or in a structure	4%	2%	0%
C7	75% of parking or more is located underground or in a structure	5%	3%	0%
	Category Maximum	**6%**	**4%**	**6%**
	Available Parking Reduction		**3%**	

Sample Parking Reduction Worksheet **FORM-2**

Case Study: 284-292 Plains Road East **Site Context:** 0
Date: 2021-08-04 **Worksheet No:** 0

TABLE D	Trip Reduction Incentives			
A formal TDM plan will identify specific initiatives that will be initiated in order to encourage reduced single occupant vehicle travel.				
	Features	**UGC**	**IC**	**Other**
D1	The building owner/occupant will provide a ride matching service for car/vanpooling	0%	0%	1%
D2	The building owner/occupant will provide emergency ride home options	3%	2%	1%
D3	The building owner/occupant will provide subsidized transit passes for all occupants for a period of two years	10%	4%	2%
D4	The building owner/occupant agrees to charge for parking as a separate cost to occupants	10%	5%	2%
D5	The building owner/occupant agrees to provide reduced cost for users of car/van pool, bicycle, moped/motorcycle spaces	0%	0%	1%
D6	The development agrees to join Travelwise (TMA) that provides the same services outlined under items D1 and D2	9%	6%	4%
	Category Maximum	**23%**	**11%**	**7%**
	Available Parking Reduction		**5%**	

TABLE E	Parking Reduction Summary				
Please indicate the total reduction available based upon Tables A through D above.					
		Maximum Achievable Reduction			
Category	**Reduction Achieved**	**UGC**	**IC**	**Other**	**Comments**
Pedestrian & Cyclist Orientation	**2%**	4%	4%	4%	
Public Transit Access	**0%**	24%	12%	5%	
Parking	**3%**	6%	4%	6%	
Trip Reduction Incentives	**5%**	23%	11%	7%	
TOTAL	**10%**	**57%**	**31%**	**22%**	

TABLE F	TOTAL REDUCTION ACHIEVED	10%

Comments: