



**1012 Snyder's Road West,
Baden, ON
Transportation Impact Study**

Paradigm Transportation Solutions Limited

April 2021



Project Summary



Project Number
200068

1012 Snyder's Road West, Baden ON
Transportation Impact Study

April 2021

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Executive Summary

Content

Activa Holdings Inc. (Activa) and Snyders Road (Baden) GP Inc. (SRBGP) retained Paradigm Transportation Solutions (Paradigm) to conduct this Transportation Impact Study for two proposed residential developments at 1012 Snyder's Road West in the community of Baden, Township of Wilmot, Ontario.

This Transportation Impact Study (TIS) includes an analysis of existing traffic conditions, a description of the proposed development, traffic forecasts for five-year horizon from the assumed full build-out date (2028), and any recommendations required to improve future traffic conditions.

Development Concept

The subject lands include two parcels under separate ownership. Activa proposes a maximum 192 single detached homes and 238 townhomes for a total of 430 residential units on the northerly lands.

Snyders Road (Baden) GP Inc. (SRBGP) proposes a maximum of 238 single detached homes, 98 townhomes, and an elementary school on the westerly development parcel. The elementary school will have an assumed capacity of 250 students with the catchment area contained in Baden and rural Wilmot.

Vehicle access to the Activa development is proposed via new municipal street extensions of Isaac Shantz Drive at Kropf Drive and , Jacob Cressman Drive at Michael Myers Road. The SRBGP development proposes a new municipal street connection to Snyder's Road opposite Christian Street and new municipal street extensions of Wagler Avenue at Hunsberger Drive and Bettschen Lane at Michael Myers Road.

Conclusions

Based on the investigations carried out, it is concluded that:

- ▶ **Existing Traffic Conditions:** All study area intersections are currently operating within acceptable levels of service. Speed survey data collected by the Township shows that there the Township roads are currently experiencing 95th percentile speeds at or below the posted speed limits.



- ▶ **Development Trip Generation:** The development is forecast to generate approximately 709 and 599 trips during the AM and PM peak hours, respectively;
- ▶ **2028 Background Traffic Conditions:** All study area intersections are forecast to continue to operate within acceptable levels of service during the AM and PM peak hours.
- ▶ **2028 Total Traffic Conditions:** All study area intersections are forecast to continue to operate within acceptable levels of service with the following critical movements:
 - Snyder's Road at Livingston Boulevard/Foundry Street:
 - Forecast to operate with acceptable level of service, the northbound and southbound left-turn movements are forecast to have queues greater than their available storage lengths during the AM peak hour, and the northbound left-turn movement during the PM peak hour.
 - Snyder's Road at Livingston Boulevard:
 - The southbound shared left/right-turn movement is forecast to operate at LOS F with v/c ratio of 0.86 during the AM peak hour. The v/c ratio indicates that while there is delay, there remains excess capacity for this movement.
 - Snyder's Road at Christian Street/Street One:
 - The southbound shared left/through/right-turn movement is forecast to operate at LOS F with v/c ratio of 0.79 during the AM peak hour. The v/c ratio indicates that while there is delay, there remains excess capacity for this movement.
- ▶ **Remedial Measures:** a 25-metre eastbound left-turn lane on Snyder's Road West at Christian Street/Street One is warranted under 2028 total traffic conditions based on site traffic generated by Snyders Road (Baden) Development.
- ▶ Left-turn lanes are not warranted on Livingston Boulevard at Jacob Cressman Drive and Isaac Shantz Drive.
- ▶ Traffic signals are not justified based on OTM Book 12 Justification 7 under 2028 total traffic conditions for the intersections of Snyder's Road West at Livingston Boulevard and Snyder's Road West at Christian Street/Street One.

Recommendations

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



- ▶ A 25-metre eastbound left-turn lane be constructed on Snyder's Road at Christian Street/Street One
- ▶ The Region of Waterloo and Township of Wilmot monitor the future traffic volumes on Snyder's Road West to ensure appropriate forms of traffic control are in place.
- ▶ Any existing speeding concerns can be address by Township staff through traffic calming measures with public engagement to determine the most appropriate measures to implement.
- ▶ Any traffic calming measures internal to the new subdivisions should be addressed through detailed engineering design and consider safer pedestrian crossings in the vicinity of the proposed school.



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1 Introduction

1.1 Overview

Activa Holdings Inc. (Activa) and Synders Road (Baden) GP Inc (SRBGP) retained Paradigm Transportation Solutions (Paradigm) to conduct this Transportation Impact Study for a two proposed residential developments at 1012 Snyder's Road West in the community of Baden, Township of Wilmot, Ontario. **Figure 1.1** illustrates the subject development location.

1.2 Purpose and Scope

The purpose of this report is to identify and assess the potential traffic impact resulting from the proposed development. The scope of the study, developed in consultation with the Region of Waterloo and Township of Wilmot staff via e-mail in June 2020 as well as two virtual meetings includes:

- ▶ Assessment of the existing traffic and site conditions within the study area including daily traffic volumes and vehicle speeds on the local Township roads that should be addressed by the Township;
- ▶ Estimates of background traffic growth for five years beyond estimated full build-out (2028);
- ▶ Estimates of additional traffic generated by the subject site;
- ▶ Analyses of the impact of the future traffic on the surrounding road network as well as the forecast daily traffic volumes and vehicles speeds on the local township roads; and
- ▶ Recommendations necessary to mitigate the site generated traffic in a satisfactory manner.

Based on the pre-study consultation, the following intersections were identified for investigation in this study:

- ▶ Snyder's Road and Livingston Boulevard/Foundry Street;
- ▶ Snyder's Road West and Livingston Boulevard;
- ▶ Snyder's Road West and Christian Street;
- ▶ Isaac Shantz Drive and Kropf Drive;
- ▶ Jacob Cressman Drive and Livingston Boulevard;
- ▶ Jacob Cressman and Michael Myers Road;
- ▶ Isaac Shantz Drive and Livingston Boulevard;



- ▶ Wagler Avenue and Hunsberger Drive;
- ▶ Wagler Avenue and Livingston Boulevard (West); and
- ▶ Wagler Avenue and Livingston Boulevard (East).

Appendix A contains the pre-study consultation material and responses from the Region of Waterloo and Township of Wilmot.

This study meets the Region of Waterloo Transportation Impact Study Guidelines¹ requirements.

¹ Transportation Impact Study Guidelines, Region of Waterloo, July 2014.





2 Existing Conditions

This section documents current traffic conditions, operational deficiencies, and constraints experienced by the public travelling at the intersections within the study area. The operational deficiencies and constraints identified at this stage will be fundamental to the process of defining the required remedial measures.

2.1 Roadway Characteristics

The main Regional roadway² near the subject site is:

- ▶ **Snyder's Road** is an east-west arterial roadway with a posted speed limit of 50 km/h. No visible cycling facilities are present along this roadway. Sidewalks are present on both sides of this roadway.

The main Township of Wilmot roadways³ near the subject include:

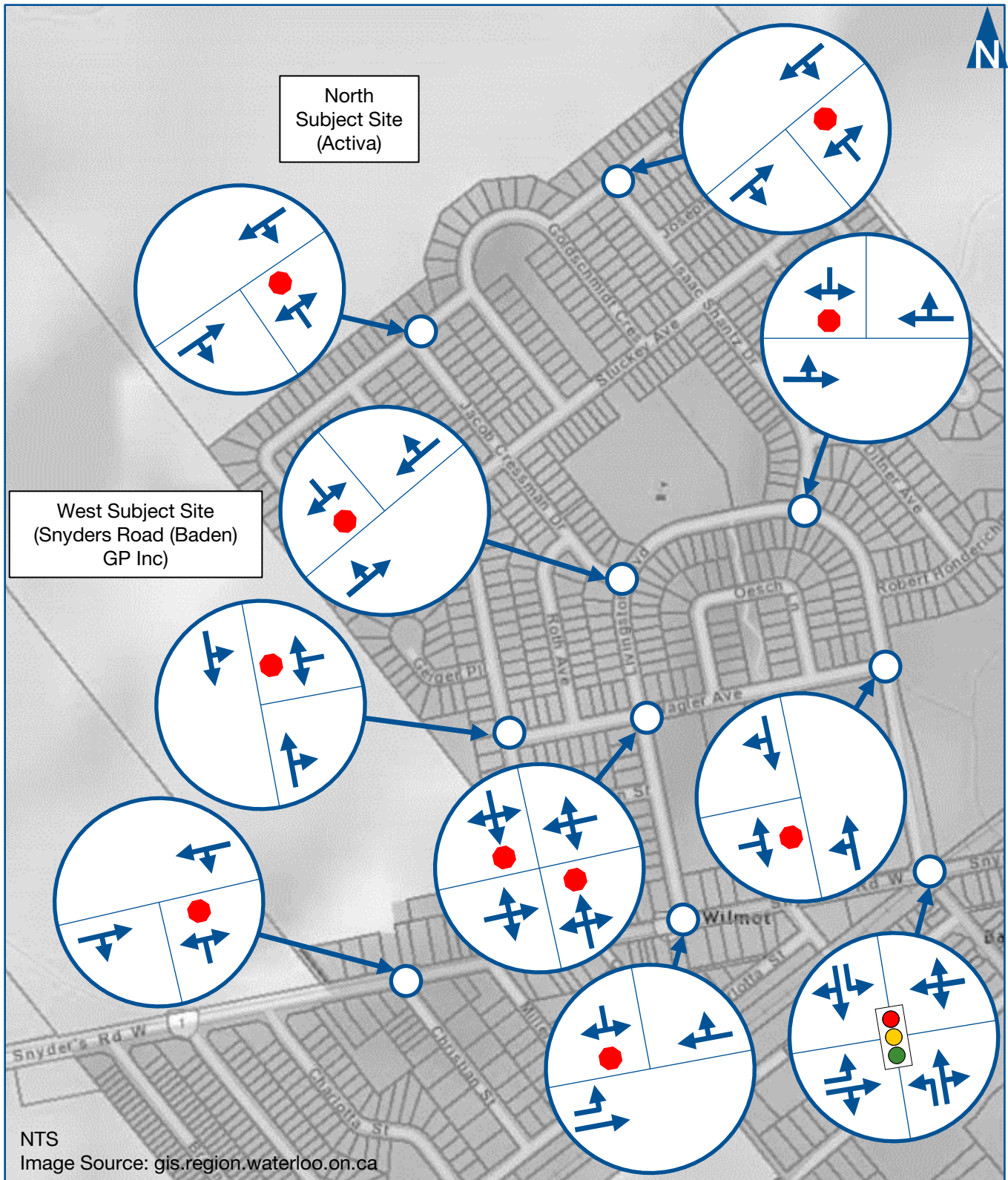
- ▶ **Livingston Boulevard** is a north-south Township roadway with a two-lane cross-section. This roadway has an assumed speed limit of 50 km/h. No visible cycling facilities are present along this roadway. Sidewalks are present on both sides of this roadway.
- ▶ **Jacob Cressman Drive** is a north-south Township road with a two-lane cross-section. This roadway has an assumed speed limit of 50 km/h. No visible cycling facilities are present along this roadway. Sidewalks are present on both sides of this roadway.
- ▶ **Isaac Shantz Drive** is a north-south Township road with a two-lane cross-section. This roadway has an assumed speed limit of 50 km/h. No visible cycling facilities are present along this roadway. Sidewalks are present on both sides of this roadway.
- ▶ **Wagler Avenue** is an east-west Township road with a two-lane cross-section. This roadway has an assumed speed limit of 50 km/h. No visible cycling facilities are present along this roadway. Sidewalks are present on both sides of this roadway.

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

² Region of Waterloo Regional Official Plan, Map 5B Existing, Planned and Proposed Roads and Corridors, 2015

³ Township of Wilmot Official Plan, Map 6.1 Transportation, 2019





2.2 Traffic Volumes

2.2.1 Peak Hour Volumes

Figure 2.2a and **Figure 2.2b** display the existing AM and PM weekday peak hour turning movement traffic volumes. These volumes were collected by Paradigm in March 2020 prior to the Federal and Provincial Governments actions on Covid-19.

Appendix B contains the detailed traffic counts for the study area intersections.

2.2.2 Daily Volumes

Table 2.1 shows the daily traffic volumes on the local roads in the study area. The daily volumes were derived from the base year PM peak hour traffic volume shown in **Figure 2.2b**. Typical Traffic Engineering standards to calculate daily traffic volumes assume PM peak hour volumes to be 10 per cent of total daily traffic.

The Transportation Association of Canada (TAC)⁴ identifies 1,000 or less vehicles per day for local residential roads and 8,000 or less for residential collector roads. The Township roads in the study area are designated as local roads:

- ▶ Livingston Boulevard;
- ▶ Isaac Shantz Drive;
- ▶ Jacob Cressman Drive; and
- ▶ Wagler Avenue.

Several sections of the local road network exceed the local road threshold (1,000 vpd) including:

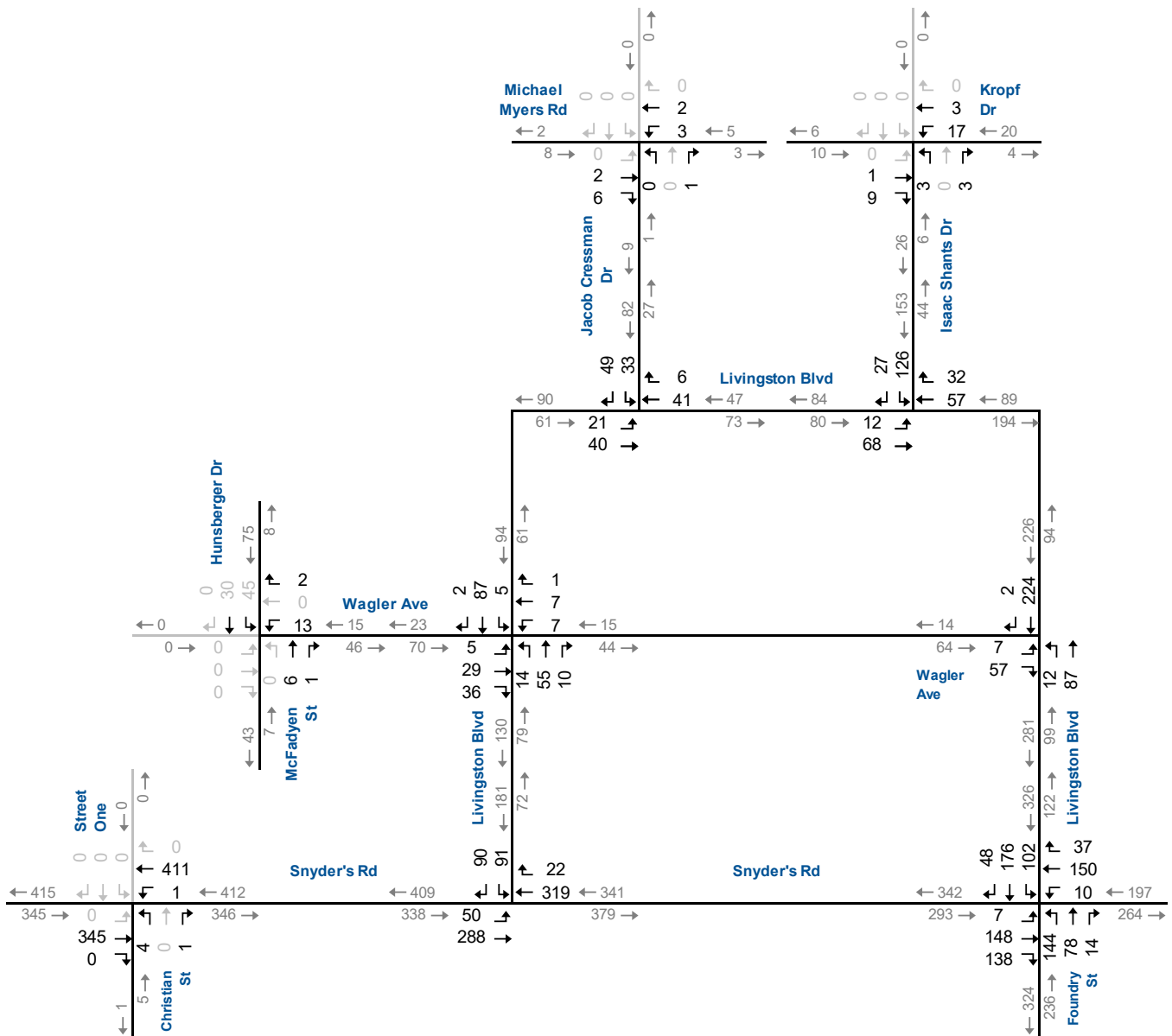
- ▶ Livingston Boulevard in between:
 - Snyder's Road and Wagler Avenue;
 - Wagler Avenue and Isaac Shantz Drive;
 - Isaac Shantz Drive and Jacob Cressman Drive;
 - Wagler Avenue and Snyder's Road West;
- ▶ Wagler Avenue between Livingston Boulevard and Hunsberger Drive; and

⁴ Transportation Association of Canada, Geometric Design Guide for Canadian Roads, Table 2.6.5: Characteristics of Urban Roads, June 2017



- ▶ Isaac Shantz Drive between Livingston Boulevard and Ditner Avenue.





Existing Traffic Volumes AM Peak Hour

1012 Snyder's Road West, Baden TIS
200068

Figure 2.2a

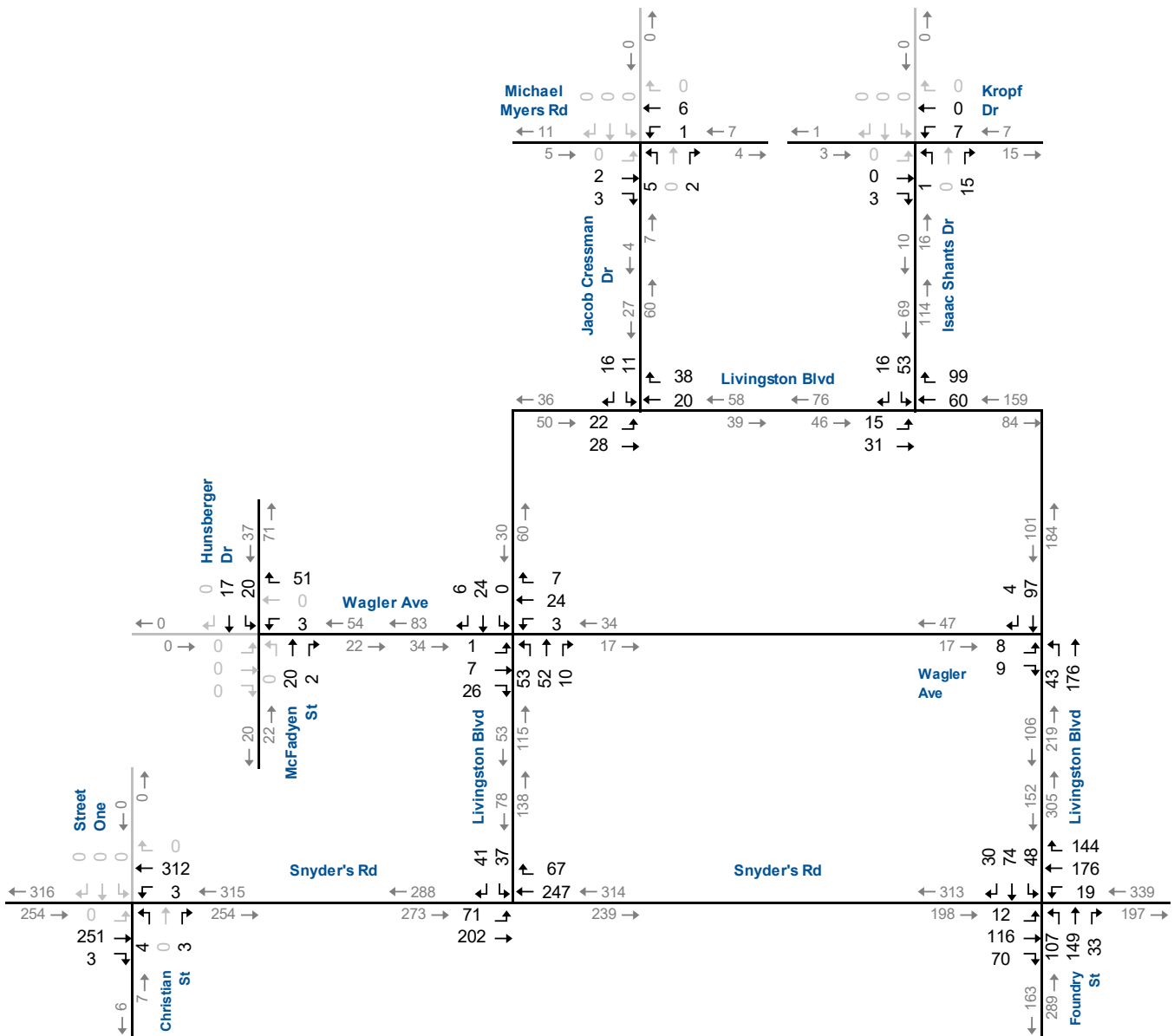


TABLE 2.1: DAILY TRAFFIC VOLUMES

Road Section		Vehicles Per Day		
From	To	PM Peak Hour		Two-Way Daily Traffic
		NB/EB	SB/WB	
Livingston Boulevard				
Snyder's Road	Wagler Avenue	219	106	3,250
Wagler Avenue	Issac Shantz Drive	184	101	2,850
Isaac Shantz Drive	Jacob Cressman Drive	46	76	1,220
Jacob Cressman Drive	Wagler Avenue	60	36	960
Wagler Avenue	Snyder's Road	115	53	1,680
Wagler Avenue				
Livingston Boulevard (East)	Livingston Boulevard (West)	17	47	640
Livingston Boulevard	Hunsberger Drive	34	83	1,170
Isaac Shantz Drive				
Livingston Boulevard	Ditner Avenue	114	69	1,830
Joseph Lichti Lane	Kropf Drive	16	10	260
Jacob Cressman Drive				
Livingston Boulevard	Roth Avenue	60	27	870
Stockey Avenue	Michael Myers Road	7	4	110



2.2.3 Vehicle Speeds

Over three consecutive days in 2018, the Township of Wilmot collected speed data on five sections of roadway in the study area including Livingston Boulevard, Jacob Cressman Drive, and Isaac Shantz Drive. All five sections of roadway have a speed limit of 50 km/h. The percentile speed is defined as the speed at or below which percentage of all vehicles are observed to travel under free-flowing conditions past a monitored point. For example, the 85th percentile speed is therefore the speed at or below 85% of all vehicles observed to travel at. 85th percentile speed is used as the industry standard to set the speed limit at a safe speed, minimizing crashes, and promoting uniform traffic flow along a corridor.

Table 2.2 summarizes the percentile speed and average speed for these five sections and indicates the following:

- ▶ Jacob Cressman Drive between Livingston Boulevard and Roth Avenue was observed to have an 85th percentile speed of 42km/h;
- ▶ Livingston Boulevard between Isaac Shantz Drive and Jacob Cressman Boulevard was observed to have an 85th percentile speed of 48 km/h;
- ▶ Isaac Shantz Drive between Livingston Boulevard and Ditner Avenue was observed to have an 85th percentile speed of 38 km/h;
- ▶ Livingston Boulevard between McFadyen Street and Snyder's Road West was observed to have an 85th percentile speed of 45 km/h; and
- ▶ Livingston Boulevard between Snyder's Road East and Wagler Avenue was observed to have an 85th percentile speed of 58 km/h, higher than the 50 km/h speed limit.

Four of the five sections observed have 85th percentile speeds lower than the 50 km/h speed limits with the 95th percentile speeds at or below the posted speed which is generally acceptable within the Township

The section of Livingston Boulevard between Snyder's Road East and Wagler Avenue has an 85th percentile speeds greater than the 50 km/h speed limit and a higher number of vehicles exceeding 50 km/h which indicates a potential vehicle speeding area. The 95th percentile is not much higher than the 85th percentile which indicates a tighter spread of vehicle speeds.



TABLE 2.2: SPEED SUMMARY

Speed (km/h)	Northbound				Southbound				Combined			
	Day 1	Day 2	Day 3	Avg	Day 1	Day 2	Day 3	Avg	Day 1	Day 2	Day 3	Avg
Jacob Cressman Drive (Livingston Boulevard and Roth Avenue)												
15% Percentile	9	8	8	8	7	7	7	7	8	7	7	7
50% Percentile	28	26	26	27	22	22	22	22	5	4	25	11
85% Percentile	46	44	44	45	38	38	37	38	43	41	42	42
95% Percentile	49	49	49	49	45	45	44	45	49	48	48	48
Mean Speed	37	36	36	36	34	34	34	34	36	35	35	35
Livingston Boulevard (Isaac Shantz Drive and Jacob Cressman Drive)												
15% Percentile	12	12	11	12	10	10	10	10	11	11	11	11
50% Percentile	40	38	38	39	33	33	32	33	36	35	35	35
85% Percentile	49	48	48	48	47	47	47	47	48	48	48	48
95% Percentile	52	51	51	51	50	50	50	50	51	50	50	50
Mean Speed	40	40	40	40	39	39	38	39	40	39	39	39
Isaac Shantz Drive (Livingston Boulevard and Ditner Avenue)												
15% Percentile	7	7	7	7	7	7	7	7	7	7	7	7
50% Percentile	24	23	23	23	22	22	22	22	23	23	23	23
85% Percentile	40	39	39	39	38	38	37	38	39	38	38	38
95% Percentile	47	47	47	47	45	45	44	45	46	46	46	46
Mean Speed	35	35	36	35	35	34	35	35	35	35	35	35
Livingston Boulevard (McFadyen Street and Snyder's Road West)												
15% Percentile	9	9	8	9	8	8	8	8	8	8	8	8
50% Percentile	31	30	28	30	26	27	26	26	28	28	27	28
85% Percentile	47	46	46	46	44	45	44	44	46	45	45	45
95% Percentile	50	50	49	50	49	49	49	49	49	49	49	49
Mean Speed	39	39	38	39	37	37	37	37	38	38	38	38
Livingston Boulevard (Snyder's Road East and Walger Avenue)												
15% Percentile	41	42	42	42	41	42	42	42	41	42	42	42
50% Percentile	48	49	48	48	48	49	49	49	48	49	48	48
85% Percentile	58	58	56	57	57	58	58	58	58	58	57	58
95% Percentile	61	61	60	61	61	61	60	61	61	61	60	61
Mean Speed	49	49	48	49	49	49	49	49	49	49	49	49



2.3 Transit Network

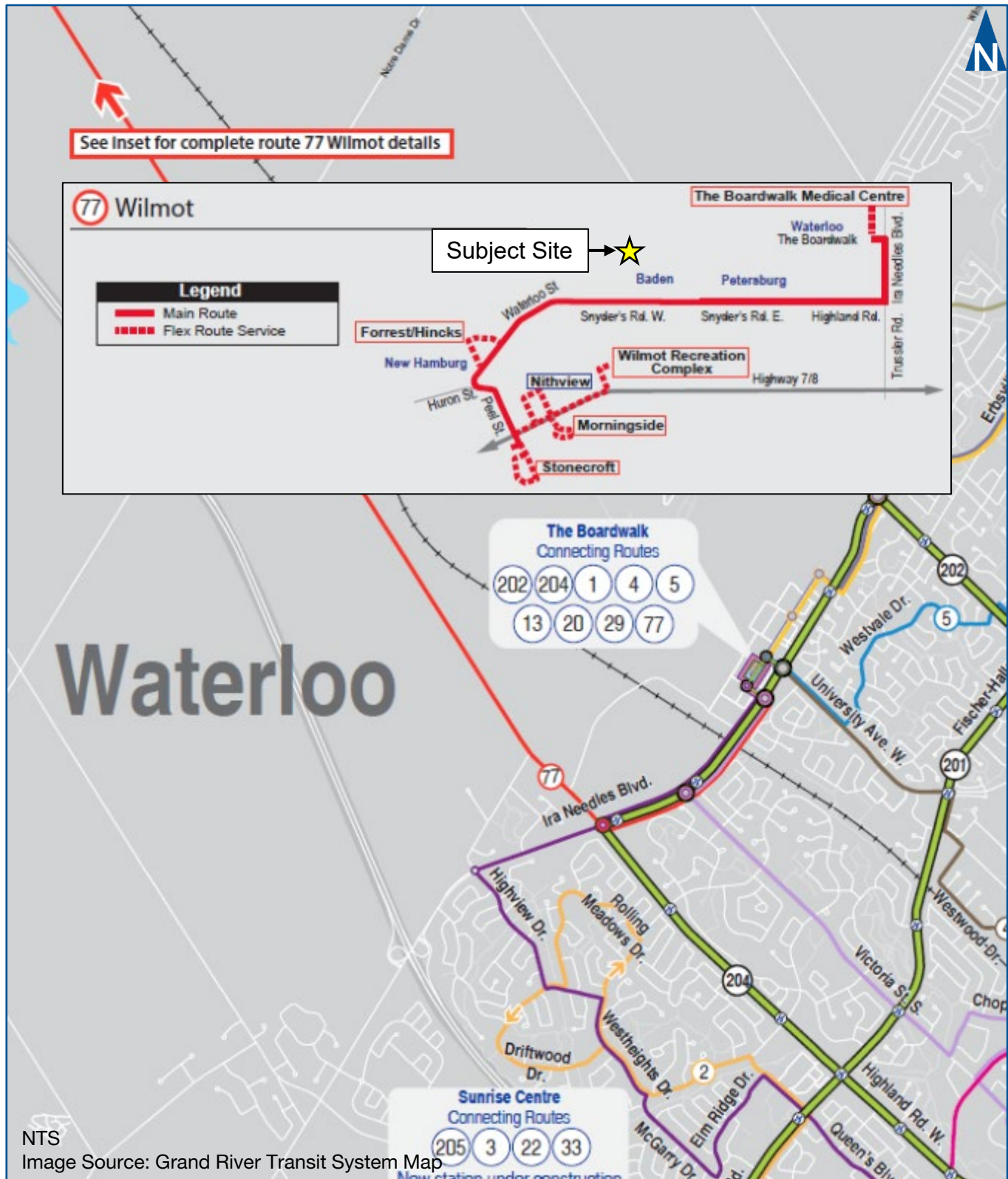
Figure 2.3 illustrates the existing transit network. Grand River Transit operates one route within the study area:

- ▶ **Route 77** Wilmot travels along Snyder's Road through Baden connecting New Hamburg with the Boardwalk Transit terminal where further connections to the Grand River Transit network is available. Service is provided Monday to Friday only during the AM period (from 6:30 AM to 12:09 PM) and PM period (2:34 PM to 7:24 PM) with headways generally every 60 to 75 minutes.

The closest bus stops in Baden are situated on Snyder's Road West with the westbound stop in front of the Township administrative office and the eastbound stop on the westside of the Snyder's Road and Livingston Boulevard/Foundry Street intersection.

These bus stops are approximately 1.1 km (12-minute walk) from the Activa development and 0.75 km (10-minute walk) from the Snyder's Road (Baden) development.





2.4 Traffic Operations

Intersection level of service (LOS) is a recognized method of quantifying the average delay experienced by drivers 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 intending to make a particular movement, compared to the estimated capacity for that movement. The capacity is based on a number of criteria related to the opposing traffic flows and intersection geometry.

The highest possible rating is LOS A, under which the average total delay is equal or less than 10.0 seconds per vehicle. When the average delay exceeds 80 seconds for signalized intersections, 50 seconds for unsignalized intersections or when the volume to capacity ratio is greater than 1.0, the movement is classed as LOS F and remedial measures are usually implemented, if they are feasible. LOS E is usually used as a guideline for the determination of road improvement needs on through lanes, while LOS F may be acceptable for left-turn movements at peak times, depending on delays.

The operations of the study intersections were evaluated using the existing lane configurations, traffic controls and the existing traffic peak volumes. Signal timings were provided by the Region of Waterloo during pre-consultation.

The level of service conditions on the existing road network have been assessed using Synchro 9. Movements are considered critical under the following conditions:

- ▶ 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 dedicated turning movements that will exceed 0.90;
- ▶ 95th percentile queue lengths for individual movements exceeds available lane storage.

Table 2.3a and Table 2.3b summarize the existing intersection operations for the weekday AM and PM peak hours, respectively. The entries in the table indicating the AM and PM peak hour level of service (LOS), volume to capacity ratios (V/C), and 95th percentile queues experienced. All intersections operate within acceptable levels, with no specific problem movements under existing traffic conditions.

Appendix C contains the detailed Synchro 9 reports.



TABLE 2.3A: EXISTING TRAFFIC OPERATIONS – AM PEAK HOUR

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	Snyder's Road & Livingston Boulevard / Foundry Street	TCS	LOS Delay V/C Q Ex Avail.	C 24 0.02 4 35 31	C 33 0.53 68 > >	> > > > >	C 32	< < < < <	B 16 0.27 37 > >	> > > > >	B 16	C 22 0.35 36 50 14	B 18 0.13 20 > >	> > > > >	C 20	B 19 0.19 25 35 10	C 21 0.32 47 > >	> > > > >	C 20	C 23 0.41	
	Snyder's Road & Livingston Boulevard	TWSC	LOS Delay V/C Q Ex Avail.	A 8 0.04 1 50 49	A 0 0.17 0 > >	> > > > >	A 1	> > > > >	A 0 0.20 0 > >	> > > > >	A 0	> > > > >	> > > > >	> > > > >	> > > > >	C 17 0.37 14 > >	> > > > >	C 17	A 4		
	Snyder's Road & Christian Street	TWSC	LOS Delay V/C Q Ex Avail.	> > > > >	A 0 0.20 0 > >	> > > > >	A 0	< < < < <	A 0 0.00 0 > >	> > > > >	A 0	B 14 0.01 0 > >	> > > > >	> > > > >	B 14	> > > > >	> > > > >	> > > > >	> > > > >	A 0	
	Wagler Avenue & Livingston Boulevard (East)	TWSC	LOS Delay V/C Q Ex Avail.	A 10 0.08 2 > >	> > > > >	> > > > >	A 10	> > > > >	> > > > >	> > > > >	> > > > >	> > > > >	< < < < <	A 1 0.01 0 > >	> > > > >	A 1	> > > > >	A 0 0.13 0 > >	> > > > >	A 0	A 2
	Wagler Avenue & Livingston Boulevard (West)	TWSC	LOS Delay V/C Q Ex Avail.	< < < < <	B 10 0.09 2 > >	> > > > >	B 10	< < < < <	B 11 0.02 1 > >	> > > > >	B 11	< < < < <	A 1 0.01 0 > >	> > > > >	A 1	< < < < <	A 0 0.00 0 > >	> > > > >	A 0	A 4	
	Wagler Avenue & Hunsberger Drive / McFadyen Street	TWSC	LOS Delay V/C Q Ex Avail.	> > > > >	> > > > >	> > > > >	> > > > >	A 9 0.01 0 > >	> > > > >	> > > > >	A 9	> > > > >	A 0 0.00 0 > >	> > > > >	A 0	< < < < <	A 5 0.03 1 > >	> > > > >	A 5	A 5	
	Livingston Boulevard & Isaac Shantz Drive	TWSC	LOS Delay V/C Q Ex Avail.	< < < < <	A 1 0.01 0 > >	> > > > >	A 1	> > > > >	A 0 0.05 0 > >	> > > > >	A 0	> > > > >	> > > > >	> > > > >	> > > > >	B 11 0.19 6 > >	> > > > >	B 11	A 5		
	Livingston Boulevard & Jacob Cressman Drive	TWSC	LOS Delay V/C Q Ex Avail.	< < < < <	A 3 0.01 0 > >	> > > > >	A 3	> > > > >	A 0 0.03 0 > >	> > > > >	A 0	> > > > >	> > > > >	> > > > >	> > > > >	A 9 0.09 2 > >	> > > > >	A 9	A 5		
	Issac Shantz Drive & Kropf Drive	TWSC	LOS Delay V/C Q Ex Avail.	> > > > >	A 0 0.01 0 > >	> > > > >	A 0	< < < < <	A 6 0.01 0 > >	> > > > >	A 6	A 9 0.01 0 > >	> > > > >	> > > > >	A 9	> > > > >	> > > > >	> > > > >	> > > > >	A 5	
	Jacob Cressman Drive & Michael Myers Road	TWSC	LOS Delay V/C Q Ex Avail.	> > > > >	A 0 0.00 0 > >	> > > > >	A 0	< < < < <	A 4 0.00 0 > >	> > > > >	A 4	A 8 0.00 0 > >	> > > > >	> > > > >	A 8	> > > > >	> > > > >	> > > > >	> > > > >	A 2	

MOE - Measure of Effectiveness

LOS - Level of Service

Delay - Average Delay per Vehicle in Seconds

Q - 95th Percentile Queue Length (m)

Ex - Existing Available Storage (m)

Avail. - Available Storage (m)

TCS - Traffic Control Signal

TWSC - Two-Way Stop Control

< - Shared Left-turn

> - Shared Right-turn



TABLE 2.3B: EXISTING TRAFFIC OPERATIONS – PM PEAK HOUR

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	
PM Peak Hour	Snyder's Road & Livingston Boulevard / Foundry Street	TCS	LOS Delay V/C Q Ex Avail.	B 18 0.03 5 35 30	C 21 0.28 36 30	> > > >	C 21	< < < <	B 13 0.39 48 30	> > > >	B 13	C 24 0.25 29 50 21	C 25 0.31 42 35 20	> > > >	C 24	C 23 0.13 15 23 20	C 23 0.16 23 20	> > > >	C 23	B 20 0.40
	Snyder's Road & Livingston Boulevard	TWSC	LOS Delay V/C Q Ex Avail.	A 8 0.06 2 50 49	A 0 0.12 0	> > > >	A 2	< < < <	A 0 0.18 0	> > > >	A 0					B 13 0.14 4	> > > >	B 13	A 2	
	Snyder's Road & Christian Street	TWSC	LOS Delay V/C Q Ex Avail.		A 0 0.15 0	> > > >	A 0	< < < <	A 0 0.00 0	> > > >	A 0	B 11 0.01 0		> > > >	B 11					A 0
	Wagler Avenue & Livingston Boulevard (East)	TWSC	LOS Delay V/C Q Ex Avail.	B 10 0.02 1		> > > >	B 10					< < < <	A 2 0.03 1		A 2		A 0 0.06 0	> > > >	A 0	A 2
	Wagler Avenue & Livingston Boulevard (West)	TWSC	LOS Delay V/C Q Ex Avail.	< < < < <	A 9 0.04 1	> > > >	A 9	< < < <	B 10 0.05 1	> > > >	B 10	< < < <	A 4 0.03 1	> > > >	A 4	< < < <	A 0 0.00 0	> > > >	A 0	A 5
	Wagler Avenue & Hunsberger Drive / McFadyen Street	TWSC	LOS Delay V/C Q Ex Avail.					A 9 0.05 1		> > > >	A 9		A 0 0.01 0	> > > >	A 0	< < < <	A 4 0.01 0		A 4	A 5
	Livingston Boulevard & Isaac Shantz Drive	TWSC	LOS Delay V/C Q Ex Avail.	< < < < <	A 3 0.01 0		A 3		A 0 0.09 0	> > > >	A 0					A 10 0.08 2	> > > >	A 10	A 3	
	Livingston Boulevard & Jacob Cressman Drive	TWSC	LOS Delay V/C Q Ex Avail.	< < < < <	A 3 0.01 0		A 3		A 0 0.03 0	> > > >	A 0					A 9 0.03 1	> > > >	A 9	A 3	
	Issac Shantz Drive & Kropf Drive	TWSC	LOS Delay V/C Q Ex Avail.		A 0 0.00 0	> > > >	A 0	< < < <	A 7 0.00 0	> > > >	A 7	A 8 0.02 0		> > > >	A 8					A 7
	Jacob Cressman Drive & Michael Myers Road	TWSC	LOS Delay V/C Q Ex Avail.		A 0 0.00 0	> > > >	A 0	< < < <	A 1 0.00 0	> > > >	A 1	A 9 0.01 0		> > > >	A 9					A 4

MOE - Measure of Effectiveness

LOS - Level of Service

Delay - Average Delay per Vehicle in Seconds

Q - 95th Percentile Queue Length (m)

Ex - Existing Available Storage (m)

Avail. - Available Storage (m)

TCS - Traffic Control Signal

TWSC - Two-Way Stop Control

< - Shared Left-turn

> - Shared Right-turn



3 Development Concept

3.1 Development Description

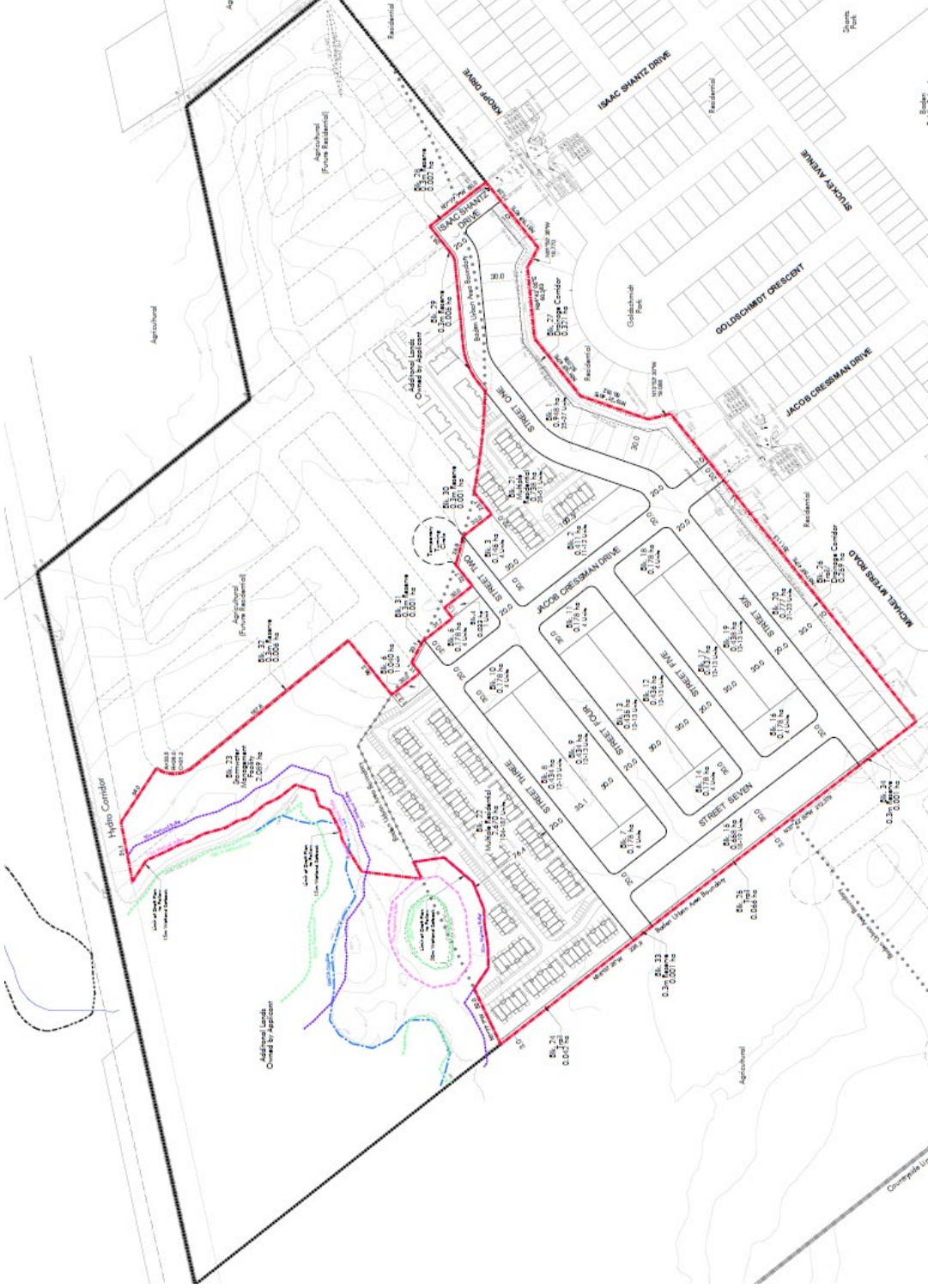
The subject lands are located to the west and north of the existing residential development north of Snyder's Road in Baden, ON.

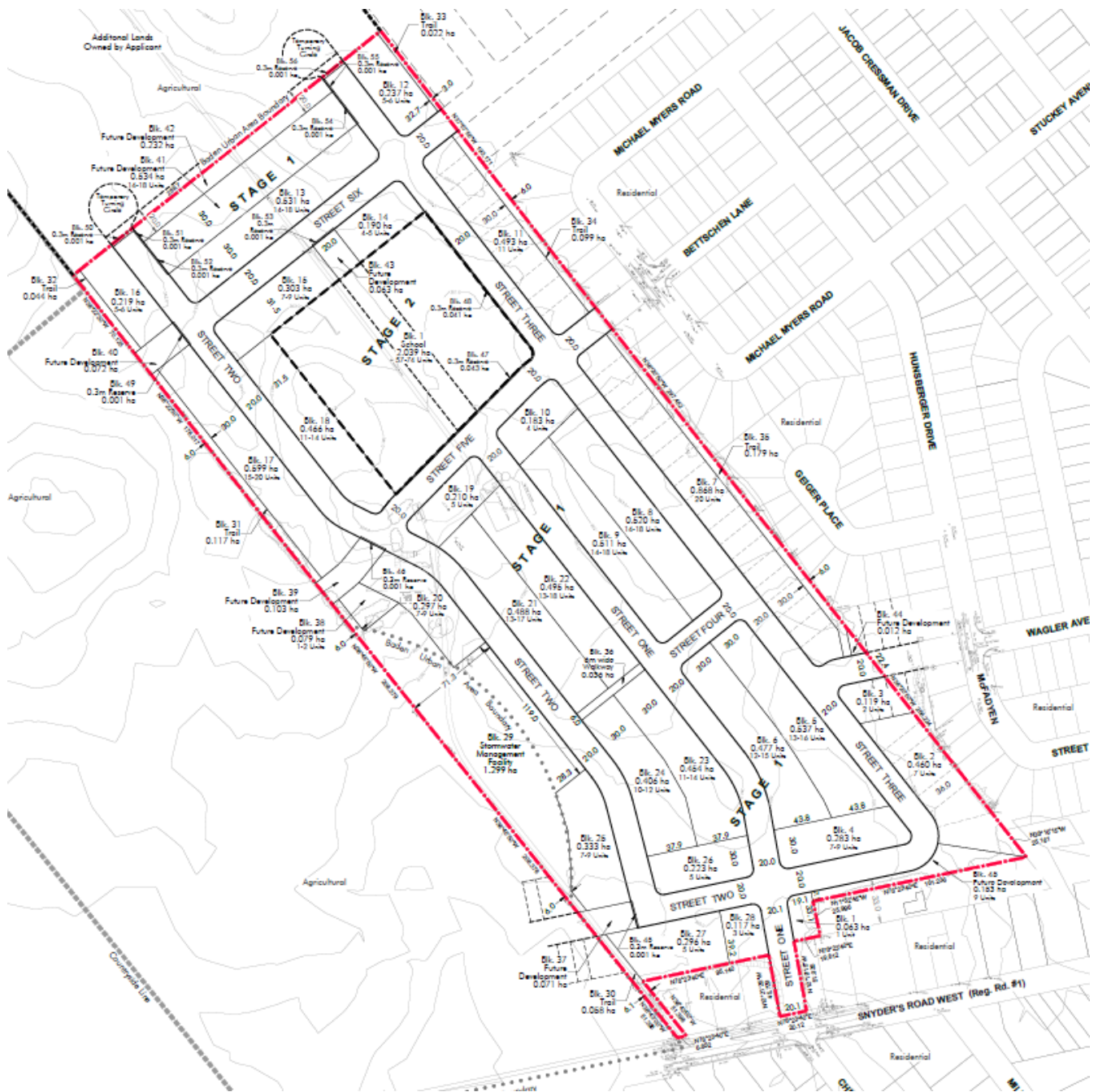
Activa proposes a maximum 192 single detached homes and 238 townhomes for a total of 430 residential units on the northerly parcel.

Snyders Road (Baden) GP Inc (SRBGP) proposes a maximum of 238 single detached homes, 98 townhomes, and an elementary school on the western development area. The elementary school has an assumed capacity of 250 students with catchment area containing Baden and rural Wilmot.

Vehicle access to the Activa development is proposed via new municipal street extensions of Isaac Shantz Drive at Kropf Drive and , Jacob Cressman Drive at Michael Myers Road. The SRBGP development proposes a new municipal street connection to Snyder's Road opposite Christian Street and new municipal street extensions of Wagler Avenue at Hunsberger Drive and Bettschen Lane at Michael Myers Road. **Figure 3.1a** and **Figure 3.1b** show the proposed development concepts.







NTS



Proposed Development Concept (Snyders Road (Baden) GP Inc)

1012 Snyder's Road West, Baden TIS
200068

Figure 3.1b

3.2 Site Trip Generation

The Institute of Transportation Engineers (ITE) Trip Generation⁵ methods were used to calculate the site trip generation. The following Land Use Codes (LUC) were used:

- ▶ LUC 210 (Single-Family Detached Housing);
- ▶ LUC 220 (Multifamily Housing, Low-Rise); and
- ▶ LUC 520 (Elementary School).

Regression equation rates were used to calculate the trips generated by the residential uses. Average rates were used to calculate the trips generated by the Elementary School. The Elementary School trips were also reduced by 25 per cent to account for any internal trips from the new residential developments.

The Township of Wilmot has recently introduced secondary suites in existing homes. These secondary suites are typically in basements of single detached or semi-detached homes as additional parking is usually provided in the larger driveways. As this is fairly new to the Township, there are no details on the exact number of secondary suites have been permitted and built. Therefore, it was assumed an additional 10 per cent of the single-family lots would be included as secondary suites.

Table 3.1 summarizes the estimated trip generation. The two developments are forecast to generate 730 AM peak hour trips and 597 PM peak hour trips. No reductions for alternative modes of transportation were assumed.

TABLE 3.1: TRIP GENERATION

ITE Land Use	Units	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
North Property (Activa)							
210 - Single Family Detached Housing	192	35	106	141	98	58	156
Secondary Suites	19	5	13	18	11	6	17
220 - Multifamily Housing, Low Rise	238	42	139	181	82	48	130
North Property Trip Generation		82	258	340	191	112	303
West Property (Snyders Road (Baden) GP Inc)							
210 - Single Family Detached Housing	238	42	124	166	115	68	183
Secondary Suites	23	5	16	21	13	7	20
220 - Multifamily Housing, Low Rise	98	18	59	77	37	22	59
520 - Elementary School (Students)	250	91	77	168	21	22	43
Internal School Trips	25%	-23	-19	-42	-5	-6	-11
West Property Trip Generation		133	257	390	181	113	294
Net Total Trip Generation		215	515	730	372	225	597

⁵ *Trip Generation Tenth Edition*, Institute of Transportation Engineers, Washington D.C., 2017



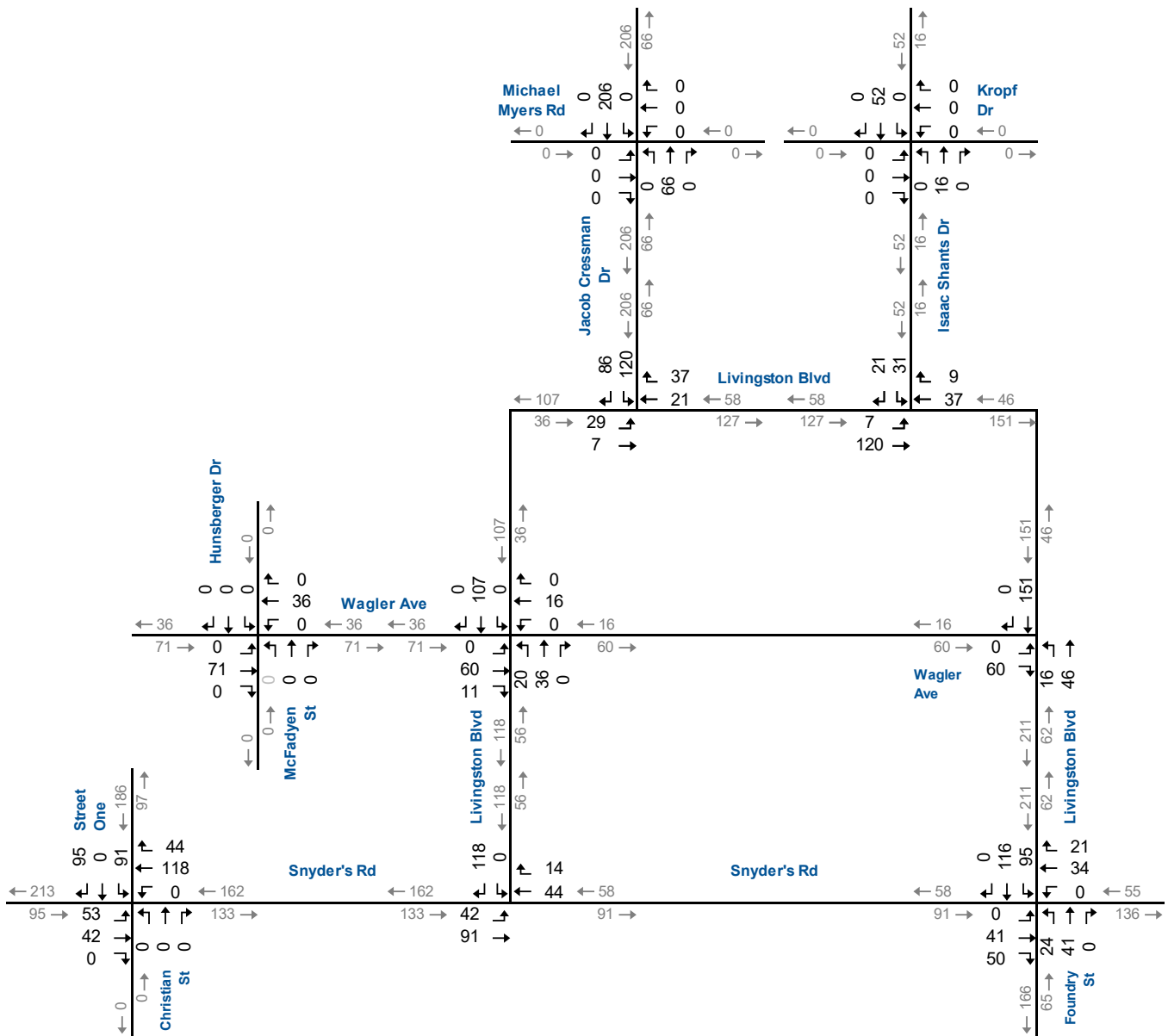
The trip assignment used for this study was based on the existing traffic patterns as it follows that the new development residents would have similar travel patterns to the existing, established residential neighbourhood. The trip assignment is shown in **Table 3.2**.

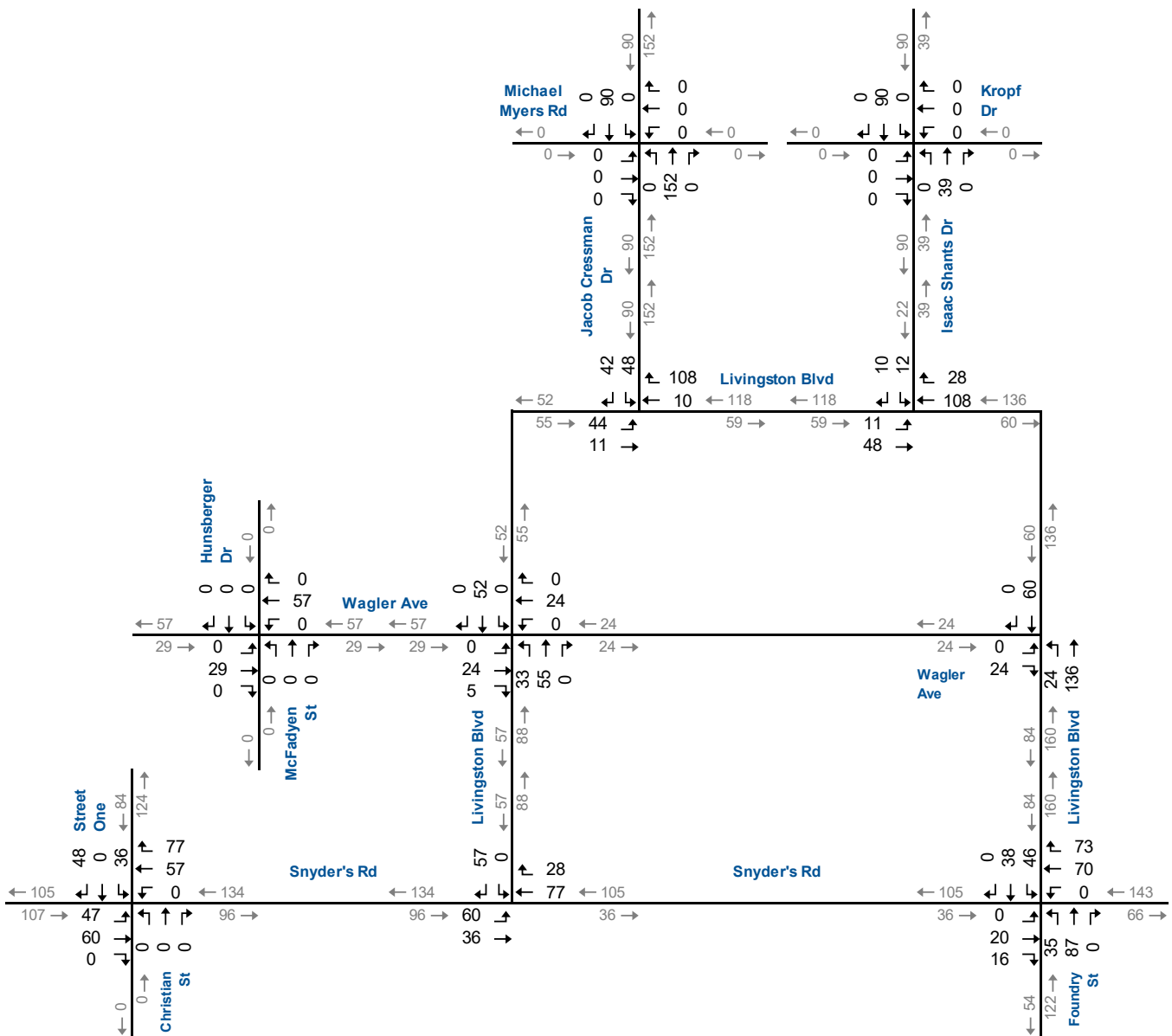
TABLE 3.2: TRIP ASSIGNMENT

Direction	Route	AM Peak Hour		PM Peak Hour	
		In	Out	In	Out
East	Snyder's Road	25%	26%	38%	29%
South	Foundry Street	30%	32%	33%	24%
West	Snyder's Road	44%	41%	29%	47%
Total		100%	100%	100%	100%

Figure 3.2a and **Figure 3.2b** contain the AM and PM peak hour trip assignment for the AM and PM peak hours, respectively.







4 Evaluation of Future Traffic Conditions

The assessment of the future traffic conditions contained in this section includes the future traffic forecasts as well as the level of service analysis.

4.1 2028 Background Horizon

4.1.1 2028 Background Traffic Growth

The 2028 background traffic volumes reflect an assumed annual growth rate of 1.5% per annum applied to the existing traffic volumes. The growth rate was provided by the Region/Township during the pre-study consultation. The growth rate was also applied to the traffic from the established residential neighbourhood centred around Livingston Boulevard. The growth to these traffic volumes should account for any secondary suites in the neighbourhood.

The site generated traffic assignments from the following study was included in the background traffic forecast include:

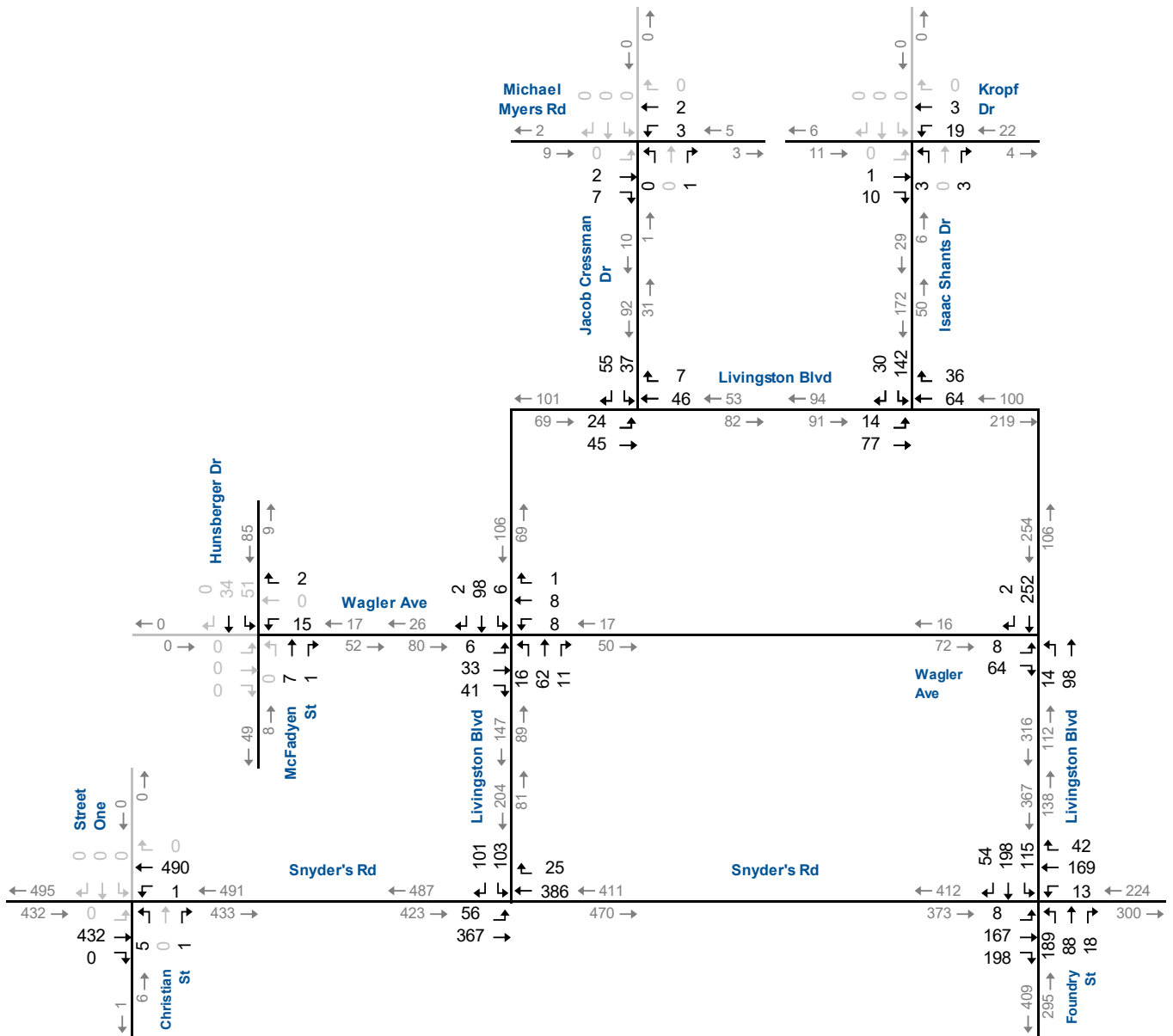
- ▶ Schmidt, Baden⁶ – a residential and employment land development situated off of Foundry Street (residential lands including 29 single family homes and 264 multifamily units) and Gingerich Street (approximately 12.44 hectares of employment lands). Trip generation determined using ITE equations rates and existing distribution.

The detailed trip assignments for the background developments is provided in **Appendix D**.

Figure 4.1a and **Figure 4.1b** illustrate the 2028 background traffic volume forecasts

⁶ Schmidt Estate, Foundry Street and Gingerich Road, Bade, Transportation Impact Assessment, Paradigm Transportation Solutions Limited, 2020 (190568)





2028 Background Traffic Volumes AM Peak Hour

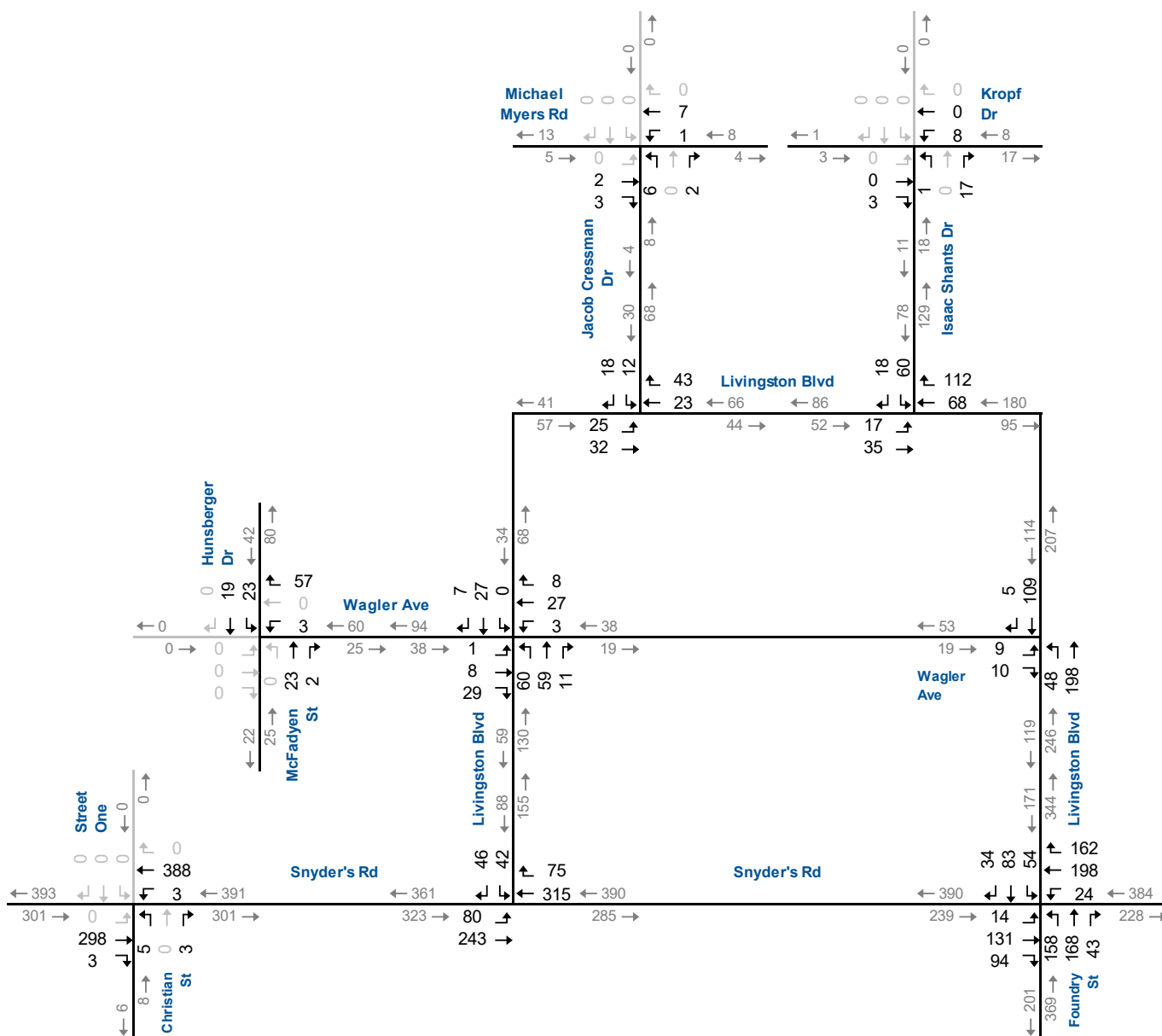
1012 Snyder's Road West, Baden TIS
200068

Figure 4.1a

2028 Background Traffic Volumes PM Peak Hour

1012 Snyder's Road West, Baden TIS
200068

Figure 4.1 b



4.1.2 2028 Background Traffic Operations

The study area intersection operations analysis for the background traffic scenario followed the same methodology used for the existing traffic conditions. **Table 4.1** details the level of service conditions.

All study area intersections are forecast to operate within acceptable levels of service during the AM and PM peak hours.

Appendix E contains the supporting detailed Synchro 9 reports.



TABLE 4.1A: 2028 BACKGROUND TRAFFIC OPERATIONS – AM PEAK HOUR

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	Snyder's Road & Livingston Boulevard / Foundry Street	TCS	LOS Delay V/C Q Ex Avail.	C 24 0.02 5 35 30	D 38 0.68 91	> > > >	D 38	< < < <	B 17 0.31 42	> > > >	B 17	C 25 0.48 50 50 0	B 18 0.15 23	> > > >	C 23	B 19 0.22 28 35 8	C 21 0.36 53	> > > >	C 21	C 25 0.54
	Snyder's Road & Livingston Boulevard	TWSC	LOS Delay V/C Q Ex Avail.	A 8 0.05 1 50 49	A 0 0.22 0	> > > >	A 1	> > > >	A 0 0.24 0	> > > >	A 0					C 23 0.50 22	> > > >	C 23	A 5	
	Snyder's Road & Christian Street	TWSC	LOS Delay V/C Q Ex Avail.		A 0 0.25 0	> > > >	A 0	< < < <	A 0 0.00 0	> > > >	A 0	C 16 0.02 0	> > > >	C 16			> > > >		A 0	
	Wagler Avenue & Livingston Boulevard (East)	TWSC	LOS Delay V/C Q Ex Avail.	B 10 0.10 3	> > > >	B 10				< < < <	A 1 0.01 0	> > > >	A 1		A 0 0.15 0	> > > >	A 0	A 2		
	Wagler Avenue & Livingston Boulevard (West)	TWSC	LOS Delay V/C Q Ex Avail.	< < < <	B 10 0.10 3	> > > >	B 10	< < < <	B 11 0.03 1	> > > >	B 11	< < < <	A 1 0.01 0	> > > >	A 1	< < < <	A 0 0.00 0	> > > >	A 0	A 4
	Wagler Avenue & Hunsberger Drive / McFadyen Street	TWSC	LOS Delay V/C Q Ex Avail.			> > > >		A 9 0.02 0	> > > >	A 9		A 0 0.00 0	> > > >	A 0	< < < <	A 5 0.03 1	> > > >	A 5	A 5	
	Livingston Boulevard & Isaac Shantz Drive	TWSC	LOS Delay V/C Q Ex Avail.	< < < <	A 1 0.01 0	> > > >	A 1		A 0 0.06 0	> > > >	A 0					B 11 0.22 7	> > > >	B 11	A 6	
	Livingston Boulevard & Jacob Cressman Drive	TWSC	LOS Delay V/C Q Ex Avail.	< < < <	A 3 0.02 0	> > > >	A 3		A 0 0.03 0	> > > >	A 0					A 9 0.10 3	> > > >	A 9	A 5	
	Issac Shantz Drive & Kropf Drive	TWSC	LOS Delay V/C Q Ex Avail.		A 0 0.01 0	> > > >	A 0	< < < <	A 6 0.01 0	> > > >	A 6	A 9 0.01 0	> > > >	A 9			> > > >		A 5	
	Jacob Cressman Drive & Michael Myers Road	TWSC	LOS Delay V/C Q Ex Avail.		A 0 0.01 0	> > > >	A 0	< < < <	A 4 0.00 0	> > > >	A 4	A 8 0.00 0	> > > >	A 8			> > > >		A 2	

MOE - Measure of Effectiveness

LOS - Level of Service

Delay - Average Delay per Vehicle in Seconds

Q - 95th Percentile Queue Length (m)

Ex. - Existing Available Storage (m)

Avail. - Available Storage (m)

TCS - Traffic Control Signal

TWSC - Two-Way Stop Control

< - Shared Left-turn

> - Shared Right-turn



TABLE 4.1B: 2028 BACKGROUND TRAFFIC OPERATIONS – PM PEAK HOUR

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		
PM Peak Hour	Snyder's Road & Livingston Boulevard / Foundry Street	TCS	LOS Delay V/C Q Ex Avail.	B 19 0.04 6 35 29	C 22 0.34 44 44 29	> > > > >	C 22	< < < < <	B 14 0.45 57 57 29	> > > > >	B 14	C 26 0.38 42 50 9	C 25 0.36 48 48 9	> > > > >	C 26	C 23 0.16 17 35 18	C 23 0.19 26 26 18	> > > > >	C 23	C 21 0.47	
	Snyder's Road & Livingston Boulevard	TWSC	LOS Delay V/C Q Ex Avail.	A 8 0.07 2 50 49	A 0 0.14 0 0 49	> > > > >	A 2	> > > > >	A 0 0.23 0 0 49	> > > > >	A 0					B 15 0.19 6 6 49	> > > > >	B 15	A 2		
	Snyder's Road & Christian Street	TWSC	LOS Delay V/C Q Ex Avail.		A 0 0.18 0 0 49	> > > > >	A 0	< < < < <	A 0 0.00 0 0 49		A 0	B 13 0.02 0 0 49	> > > > >	B 13						A 0	
	Wagler Avenue & Livingston Boulevard (East)	TWSC	LOS Delay V/C Q Ex Avail.	B 10 0.03 1 1 49		> > > > >	B 10					< < < < <	A 2 0.03 1 1 49		A 2		A 0 0.07 0 0 49	> > > > >	A 0	A 2	
	Wagler Avenue & Livingston Boulevard (West)	TWSC	LOS Delay V/C Q Ex Avail.	< < < < <	A 9 0.04 1 1 49	> > > > >	A 9	< < < < <	B 10 0.05 1 1 49	> > > > >	B 10	< < < < <	A 4 0.04 1 1 49	> > > > >	A 4	< < < < <	A 0 0.00 0 0 49	> > > > >	A 0	A 5	
	Wagler Avenue & Hunsberger Drive / McFadyen Street	TWSC	LOS Delay V/C Q Ex Avail.					A 9 0.06 2 2 49	> > > > >	A 9		A 0 0.01 0 0 49	> > > > >	A 0	< < < < <	A 4 0.01 0 0 49				A 4	A 5
	Livingston Boulevard & Isaac Shantz Drive	TWSC	LOS Delay V/C Q Ex Avail.	< < < < <	A 3 0.01 0 0 49	> > > > >	A 3		A 0 0.11 0 0 49	> > > > >	A 0					A 10 0.10 3 3 49	> > > > >	A 10	A 3		
	Livingston Boulevard & Jacob Cressman Drive	TWSC	LOS Delay V/C Q Ex Avail.	< < < < <	A 3 0.02 0 0 49	> > > > >	A 3		A 0 0.04 0 0 49	> > > > >	A 0					A 9 0.03 1 1 49	> > > > >	A 9	A 3		
	Issac Shantz Drive & Kropf Drive	TWSC	LOS Delay V/C Q Ex Avail.		A 0 0.00 0 0 49	> > > > >	A 0	< < < < <	A 7 0.00 0 0 49		A 7	A 8 0.02 0 0 49	> > > > >	A 8						A 7	
	Jacob Cressman Drive & Michael Myers Road	TWSC	LOS Delay V/C Q Ex Avail.		A 0 0.00 0 0 49	> > > > >	A 0	< < < < <	A 1 0.00 0 0 49		A 1	A 9 0.01 0 0 49	> > > > >	A 9						A 4	

MOE - Measure of Effectiveness

LOS - Level of Service

Delay - Average Delay per Vehicle in Seconds

Q - 95th Percentile Queue Length (m)

Ex. - Existing Available Storage (m)

Avail. - Available Storage (m)

TCS - Traffic Control Signal

TWSC - Two-Way Stop Control

< - Shared Left-turn

> - Shared Right-turn



4.2 2028 Total Traffic Horizon

4.2.1 2028 Total Traffic Volumes

Figure 4.2a and **Figure 4.2b** illustrate the 2028 total (background + site traffic) traffic volume forecasts.

4.2.2 2028 Total Traffic Operations

The study area intersection operations analysis for the future total traffic scenario followed the same methodology used for the existing and background traffic conditions. **Table 4.2** details the level of service conditions.

All study area intersections, including the site accesses are forecast to operate within acceptable levels of service during the AM and PM peak hour with the following critical movements:

- ▶ Snyder's Road at Livingston Boulevard/Foundry Street:
 - With both movements operating with acceptable level of service, the northbound and southbound left-turn movements are forecast to have queues greater than their available storage lengths during the AM peak hour. The northbound left-turn movement is forecast to operate with acceptable level of service but will have a queue length greater than its available storage length during the PM peak hour.
- ▶ Snyder's Road at Livingston Boulevard:
 - The southbound shared left/right-turn movement is forecast to operate at LOS F with v/c ratio of 0.86 during the AM peak hour. The v/c ratio indicates that while there is delay, there remains excess capacity for this movement.
- ▶ Snyder's Road at Christian Street/Street One:
 - The southbound shared left/through/right-turn movement is forecast to operate at LOS F with v/c ratio of 0.79 during the AM peak hour. The v/c ratio indicates that while there is delay, there remains excess capacity for this movement.

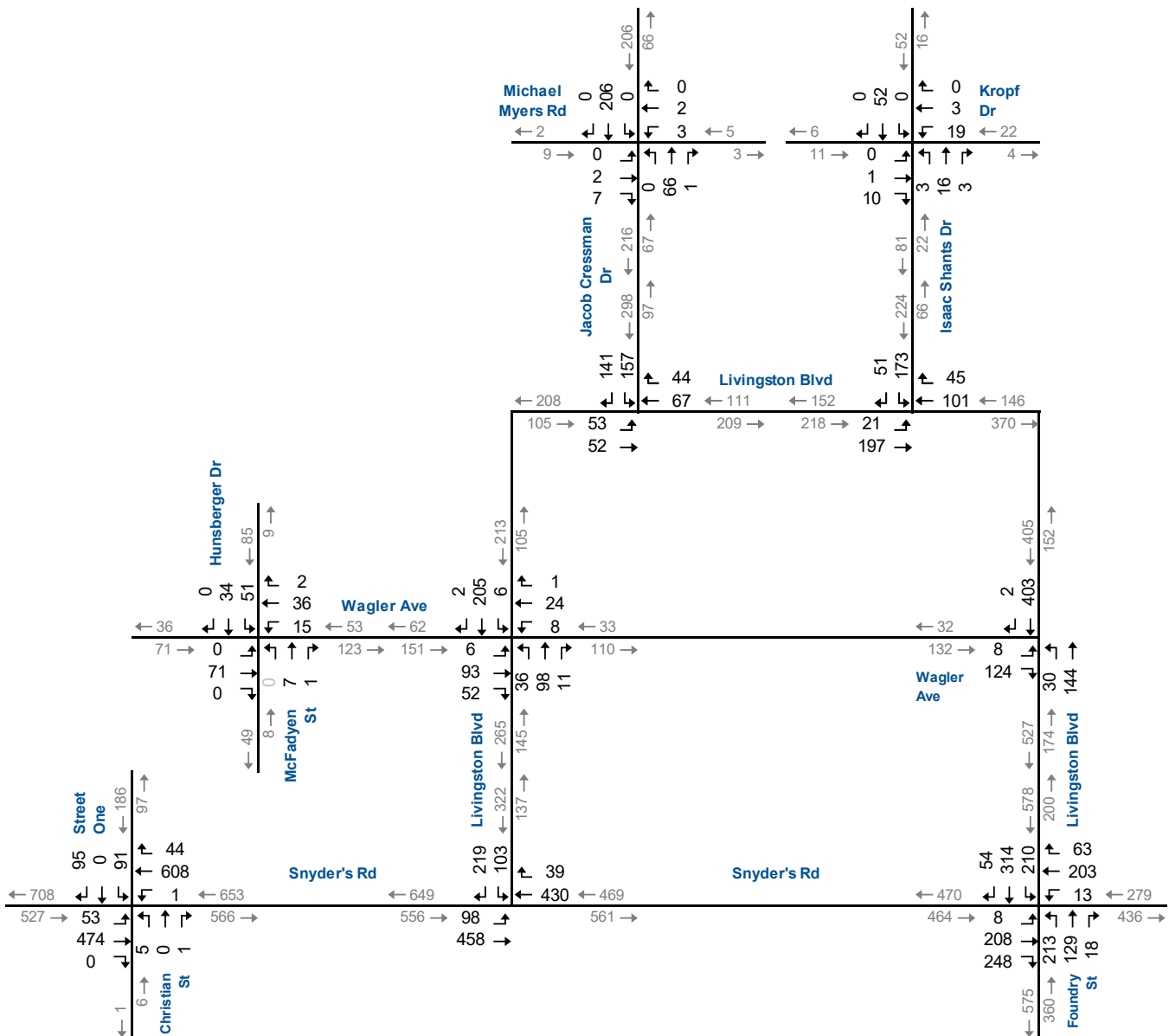
Appendix F contains the supporting detailed Synchro 9 reports.



2028 Total Traffic Volumes AM Peak Hour

1012 Snyder's Road West, Baden TIS
200068

Figure 4.2a



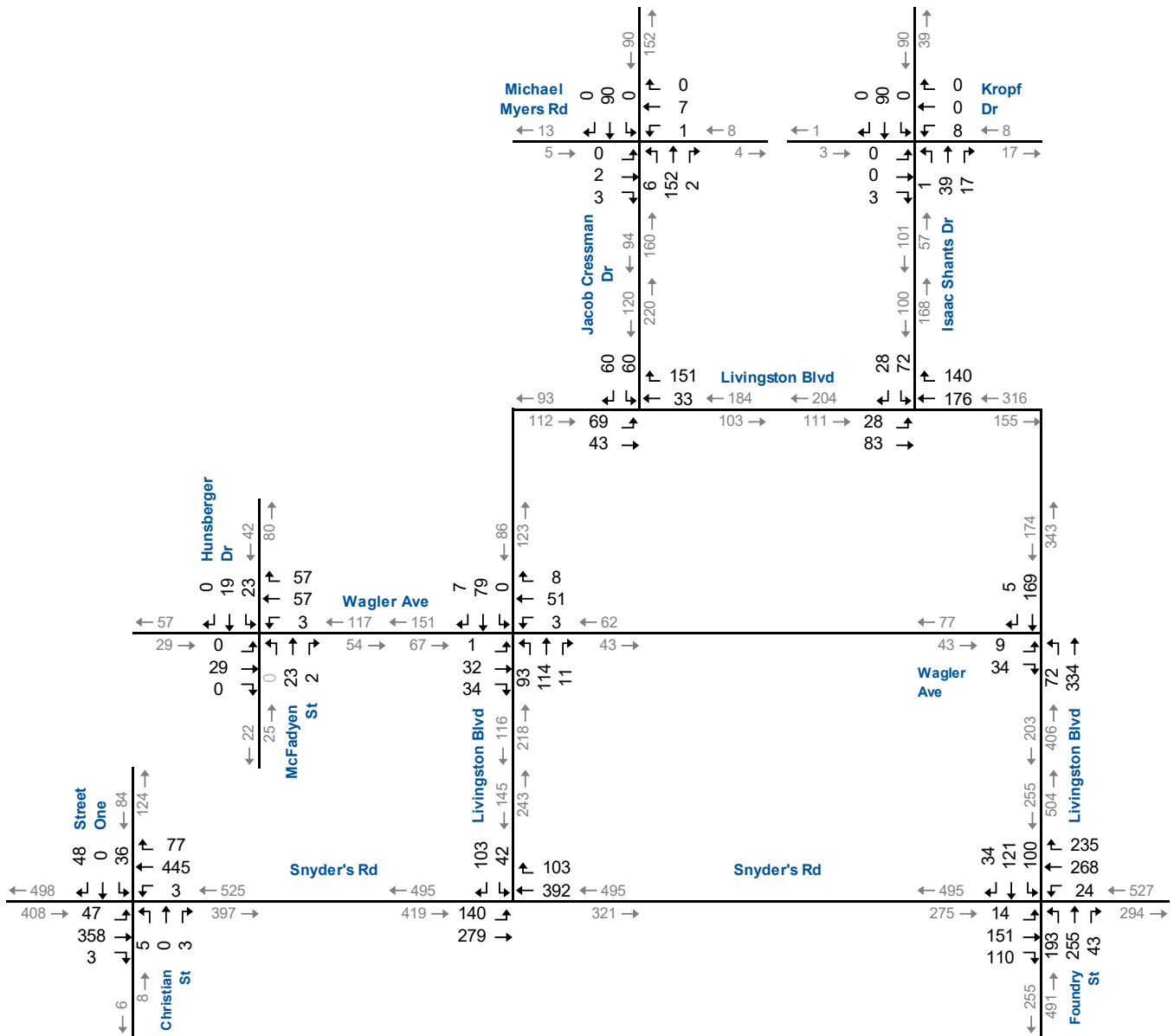


TABLE 4.2A: 2028 TOTAL TRAFFIC OPERATIONS – AM PEAK HOUR

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	Snyder's Road & Livingston Boulevard / Foundry Street	TCS	LOS Delay V/C Q Ex Avail.	C 24 0.02 5 35 30	D 53 0.88 140	> > > >	D 52	< < < <	B 18 0.39 54	> > > >	B 18	D 37 0.71 74 50 -24	B 19 0.21 31	> > > >	C 30	C 23 0.43 51 35 -16	C 24	> > > >	C 24	C 32 0.73
	Snyder's Road & Livingston Boulevard	TWSC	LOS Delay V/C Q Ex Avail.	A 9 0.09 2 50 48	A 0 0.27 0	> > > >	A 2	> > > >	A 0	> > > >	A 0					F 52 0.86 66	> > > >	F 52	B 13	
	Snyder's Road & Christian Street / Street One	TWSC	LOS Delay V/C Q Ex Avail.	< < < <	A 2 0.06 1	> > > >	A 2	< < < <	A 0 0.00 0	> > > >	A 0	< < < <	E 36 0.05 1	> > > >	E 36	< < < <	F 61 0.79 47	> > > >	F 61	A 9
	Wagler Avenue & Livingston Boulevard (East)	TWSC	LOS Delay V/C Q Ex Avail.	B 12 0.21 6	> > > >	B 12	> > > >					< < < <	A 2 0.03 1	> > > >	A 2		A 0 0.24 0	> > > >	A 0	A 3
	Wagler Avenue & Livingston Boulevard (West)	TWSC	LOS Delay V/C Q Ex Avail.	< < < <	B 14 0.26 8	> > > >	B 14	< < < <	B 13 0.07 2	> > > >	B 13	< < < <	A 2 0.03 1	> > > >	A 2	< < < <	A 0 0.00 0	> > > >	A 0	A 5
	Wagler Avenue & Hunsberger Drive / McFadyen Street	TWSC	LOS Delay V/C Q Ex Avail.	< < < <	B 11 0.10 3	> > > >	B 11	< < < <	A 10 0.07 2	> > > >	A 10	< < < <	A 0 0.00 0	> > > >	A 0	< < < <	A 5 0.03 1	> > > >	A 5	A 8
	Livingston Boulevard & Isaac Shantz Drive	TWSC	LOS Delay V/C Q Ex Avail.	< < < <	A 1 0.02 0	> > > >	A 1	> > > >	A 0 0.09 0	> > > >	A 0	> > > >				B 14 0.35 13	> > > >	B 14	A 6	
	Livingston Boulevard & Jacob Cressman Drive	TWSC	LOS Delay V/C Q Ex Avail.	< < < <	A 4 0.04 1	> > > >	A 4	> > > >	A 0 0.07 0	> > > >	A 0	> > > >				B 12 0.38 14	> > > >	B 12	A 8	
	Issac Shantz Drive & Kropf Drive	TWSC	LOS Delay V/C Q Ex Avail.	< < < <	A 0 0.00 0	> > > >	A 0	< < < <	A 6 0.01 0	> > > >	A 6	< < < <	A 9 0.03 1	> > > >	A 9	< < < <	A 10 0.06 2	> > > >	A 10	A 8
	Jacob Cressman Drive & Michael Myers Road	TWSC	LOS Delay V/C Q Ex Avail.	< < < <	A 0 0.00 0	> > > >	A 0	< < < <	A 4 0.00 0	> > > >	A 4	< < < <	A 9 0.08 2	> > > >	A 9	< < < <	B 10 0.24 7	> > > >	B 10	A 10

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Q - 95th Percentile Queue Length (m)

Ex. - Existing Available Storage (m)

Avail. - Available Storage (m)

TCS - Traffic Control Signal

TWSC - Two-Way Stop Control

< - Shared Left-turn

> - Shared Right-turn



TABLE 4.2B: 2028 TOTAL TRAFFIC OPERATIONS – PM PEAK HOUR

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		
PM Peak Hour	Snyder's Road & Livingston Boulevard / Foundry Street	TCS	LOS Delay V/C Q Ex Avail.	B 19 0.04 6 35 29	C 23 0.40 53 5 29	> > > > >	C 23	< < < < <	B 18 0.62 93 5 29	> > > > >	B 18	C 30 0.50 52 50 -2	C 29 0.52 71 5 29	> > > > >	C 29	C 28 0.38 30 35 5	C 24 0.26 35 5 29	> > > > >	C 25	C 24 0.65	
	Snyder's Road & Livingston Boulevard	TWSC	LOS Delay V/C Q Ex Avail.	A 9 0.13 4 50 46	A 0 0.16 0 50 46	> > > > >	A 3	> > > > >	A 0 0.29 0 50 46	> > > > >	A 0	> > > > >	> > > > >	> > > > >	C 19 0.36 13 5 29	> > > > >	C 19	> > > > >	A 4		
	Snyder's Road & Christian Street / Street One	TWSC	LOS Delay V/C Q Ex Avail.	< < < < <	A 1 0.04 1 5 29	> > > > >	A 1	< < < < <	A 0 0.00 0 5 29	> > > > >	A 0	< < < < <	C 19 0.03 1 5 29	> > > > >	C 19	< < < < <	C 18 0.24 7 5 29	> > > > >	C 18	A 2	
	Wagler Avenue & Livingston Boulevard (East)	TWSC	LOS Delay V/C Q Ex Avail.	B 11 0.06 2 5 29	> > > > >	B 11	> > > > >	> > > > >	> > > > >	> > > > >	> > > > >	< < < < <	A 2 0.05 1 5 29	> > > > >	A 2	A 0 0.10 0 5 29	> > > > >	A 0	> > > > >	A 2	
	Wagler Avenue & Livingston Boulevard (West)	TWSC	LOS Delay V/C Q Ex Avail.	< < < < <	B 11 0.10 3 5 29	> > > > >	B 11	< < < < <	B 13 0.12 3 5 29	> > > > >	B 13	< < < < <	A 4 0.06 2 5 29	> > > > >	A 4	< < < < <	A 0 0.00 0 5 29	> > > > >	A 0	> > > > >	A 5
	Wagler Avenue & Hunsberger Drive / McFadyen Street	TWSC	LOS Delay V/C Q Ex Avail.	< < < < <	A 10 0.04 1 5 29	> > > > >	A 10	< < < < <	A 10 0.13 4 5 29	> > > > >	A 10	< < < < <	A 0 0.00 0 5 29	> > > > >	A 0	< < < < <	A 4 0.01 0 5 29	> > > > >	A 4	> > > > >	A 7
	Livingston Boulevard & Isaac Shantz Drive	TWSC	LOS Delay V/C Q Ex Avail.	< < < < <	A 2 0.02 1 5 29	> > > > >	A 2	> > > > >	A 0 0.19 0 5 29	> > > > >	A 0	> > > > >	> > > > >	> > > > >	> > > > >	B 12 0.16 4 5 29	> > > > >	B 12	> > > > >	A 3	
	Livingston Boulevard & Jacob Cressman Drive	TWSC	LOS Delay V/C Q Ex Avail.	< < < < <	A 5 0.05 1 5 29	> > > > >	A 5	> > > > >	A 0 0.11 0 5 29	> > > > >	A 0	> > > > >	> > > > >	> > > > >	> > > > >	B 11 0.16 4 5 29	> > > > >	B 11	> > > > >	A 4	
	Issac Shantz Drive & Kropf Drive	TWSC	LOS Delay V/C Q Ex Avail.	< < < < <	A 0 0.00 0 5 29	> > > > >	A 0	< < < < <	A 7 0.00 0 5 29	> > > > >	A 7	< < < < <	A 9 0.06 2 5 29	> > > > >	A 9	< < < < <	A 9 0.03 1 5 29	> > > > >	A 9	> > > > >	A 9
	Jacob Cressman Drive & Michael Myers Road	TWSC	LOS Delay V/C Q Ex Avail.	< < < < <	A 0 0.00 0 5 29	> > > > >	A 0	< < < < <	A 1 0.00 0 5 29	> > > > >	A 1	< < < < <	B 10 0.19 5 5 29	> > > > >	B 10	< < < < <	A 10 0.10 3 5 29	> > > > >	A 10	> > > > >	A 10

MOE - Measure of Effectiveness

LOS - Level of Service

Delay - Average Delay per Vehicle in Seconds

Q - 95th Percentile Queue Length (m)

Ex. - Existing Available Storage (m)

Avail. - Available Storage (m)

TCS - Traffic Control Signal

TWSC - Two-Way Stop Control

< - Shared Left-turn

> - Shared Right-turn



4.3 Future Daily Traffic Volumes

Table 4.3 shows the forecast future daily traffic volumes on the local roads in the study area. The daily volumes were derived from the PM peak hour traffic volumes shown in **Figure 2.2b**, **Figure 3.2b**, **Figure 4.1b**, and **Figure 4.2b**. PM peak hour volumes were assumed to be 10 per cent of total daily traffic.

With the forecast background traffic growth and the introduction of the site generated traffic, several sections of the local road network exceed the Transportation Association of Canada (TAC) local road threshold of 1,000 vehicles per day including:

- ▶ All of Livingston Boulevard with daily vehicles ranging from 1,160 to 5,090 over the TAC threshold. Site generated traffic accounts for approximately 47% to 92% of the excess volume;
- ▶ Wagler Avenue between Livingston Boulevard and Hunsberger Drive with daily vehicles ranging from 200 to 1,180 over the TAC threshold. Site generated traffic accounts for approximately 73 to 240% of the excess volume;
- ▶ Isaac Shantz Drive between Livingston Boulevard and Ditner Avenue with daily vehicles 1,680 over the TAC threshold. Site generated traffic accounts for 36% of the excess volume; and
- ▶ Jacob Cressman Drive from Livingston Boulevard to Michael Myers Road with daily vehicles ranging from 1,540 to 2,400 over the TAC threshold. Site generated traffic accounts for all excess volumes.

In an ideal road system, public lanes connect with local roads, local roads with collectors, collectors with arterials, and arterials with expressways and freeways. The TAC definition for a residential collector road⁷ is a road on which traffic movement and access have similar importance, less than 8,000 vehicles per day, and provides for traffic from local roads to access arterial roads and vice versa. Based on this criteria, Livingston Boulevard can be considered to operate as a collector road as it provides connection to Snyder's Road from the various Townships roads and will have up to 6,150 forecast daily traffic volumes.

⁷ Transportation Association of Canada, Geometric Design Guide for Canadian Roads, June 2017, Table 2.6.5: Characteristics of Urban Roads



TABLE 4.3: FUTURE DAILY TRAFFIC VOLUMES

Road Section		Two-Way Daily Traffic			
From	To	2020 Existing	2028 Background	Site Generated	2028 Total
Livingston Boulevard					
Snyder's Road	Wagler Avenue	3,250	3,650	2,440	6,090
Wagler Avenue	Issac Shantz Drive	2,850	3,210	1,960	5,170
Isaac Shantz Drive	Jacob Cressman Drive	1,120	1,380	1,770	3,150
Jacob Cressman Drive	Wagler Avenue	960	1,090	1,070	2,160
Wagler Avenue	Snyder's Road	1,680	1,890	1,450	3,340
Wagler Avenue					
Livingston Boulevard (East)	Livingston Boulevard (West)	640	720	480	1,200
Livingston Boulevard	Hunsberger Drive	1,170	1,320	860	2,180
Isaac Shantz Drive					
Livingston Boulevard	Ditner Avenue	1,830	2,070	610	2,680
Joseph Lichti Lane	Kropf Drive	260	290	610	900
Jacob Cressman Drive					
Livingston Boulevard	Roth Avenue	870	980	2,420	3,400
Stockey Avenue	Michael Myers Road	110	120	2,420	2,540



4.3.1 Future Development

After completion of these developments, there remains an additional 16 +/- hectares available land to be developed within the Countryside Line in the Aactiva lands and approximately 20 hectares in the Snyders Road (Baden) GP Inc. (SRBGP) lands.

Based on a rate of 45 to 55 people/jobs per hectare and 2.8 people per unit (assuming 100 per cent single detached), the future Aactiva lands can expect a future maximum of 318 units and SRBGP a future maximum of 392 units.

Using the equation rates from the Institute of Transportation Engineers (ITE) Trip Generation⁸ methods for the single-family detached housing land use (LUC 210), **Table 4.4** summarizes the estimated trip generation. The future trip generation is estimated to be approximately 231 AM peak hour trips and 253 PM peak hour trips for the Aactiva Lands and 283 AM peak hour trips and 309 PM peak hour trips for the SRBGP lands.

TABLE 4.4: FUTURE LANDS TRIP GENERATION

Future Lands	ITE	Units	AM Peak Hour			PM Peak Hour		
	LUC		In	Out	Total	In	Out	Total
Aactiva	210	318	58	173	231	159	94	253
Snyders Road (Baden) GP Inc	210	392	71	212	283	195	114	309
Future Total Trip Generation		710	129	385	514	354	208	562

With PM peak hour volumes assumed to be 10 per cent of total daily traffic, the future development would include an additional 5,620 daily trips to the neighbouring road network.

Future transportation studies will be required as part of the application process for these future lands. Approval of these lands would be dependent on future traffic impacts mitigation.

⁸ *Trip Generation Tenth Edition*, Institute of Transportation Engineers, Washington D.C., 2017



5 Remedial Measures

5.1 Left-Turn Lane Warrants

The Ministry of Transportation's Design Supplement for the Transportation Association of Canada (TAC) Geometric Design Guide for Canadian Roads⁹ provides guidance on the assessment and/or need for auxiliary left-turn lanes

The warrants have been completed for:

- ▶ Snyder's Road West and Christian Street/Street One (eastbound);
- ▶ Livingston Boulevard at Jacob Cressman Drive, and
- ▶ Livingston Boulevard at Isaac Shantz Drive.

A design speed of 60 km/h (10 km/h over the assumed speed limit) has been used for the analysis purposes. **Table 5.1** summarizes the left-turn lane warrants.

The warrant analysis suggests that an eastbound left-turn lane with 25 metres of storage is warranted on Snyder's Road West at Christian Street/Street One. Left-turn lanes are not warranted on the Livingston Boulevard intersections with Jacob Cressman Drive and Isaac Shantz Drive.

The eastbound left-turn lane on Snyder's Road West at Christian Street/Street One is warranted due to traffic generated from the Synders Road (Baden) GP Inc. (SRBGP) development.

Appendix G contains the left-turn lane warrant nomographs

⁹ MTO Design Supplement for TAC Geometric Design Guide for Canadian Roads, June 2017 Appendix 9 for Chapter 9 Intersections



TABLE 5.1: LEFT-TURN LANE WARRANT SUMMARY

Roadway	Snyder's Road West		Livingston Boulevard							
Intersection	Christian Street		Jacob Cressman Drive				Isaac Shantz Drive			
Approach Direction	Eastbound		Northbound				Eastbound			
Design Speed	60 km/h		60 km/h				60 km/h			
Horizon	Total 2028		Background 2028		Total 2028		Background 2028		Total 2028	
Peak Hour	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
Advancing Volume	527	408	69	57	105	112	91	52	218	111
Opposing Volumes	653	525	53	66	111	184	100	180	146	316
Left Turning Traffic	53	47	24	25	53	69	14	17	21	28
% of Left Turning Traffic	10%	12%	35%	44%	50%	62%	15%	33%	10%	25%
Figure Used*	9A-6	9A-6	9A-9	9A-9	9A-9	9A-9	9A-7	9A-9	9A-6	9A-8
Warranted	Yes	Yes	No	No	No	No	No	No	No	No
Storage Length Required	25m	15m	--	--	--	--	--	--	--	--

Based on MTO Design Supplement for TAC Geometric Design Guide for Canadian Roads - June 2017



5.2 Traffic Control Improvements

The traffic analysis in **Section 4** of the report indicates that traffic control improvements may be required to accommodate forecast traffic volumes.

The intersections of Snyder's Road West with Livingston Boulevard (West) and Christian Street/Street One were assessed using the Ontario Traffic Manual (OTM Book 12 – Justification 7) procedures¹⁰. **Appendix H** contains the detailed analysis. **Table 5.2** summarizes the results. It indicates that a traffic control signals are not justified at the intersections of Snyder's Road West at Livingston Boulevard (West) and Snyder's Road West and Christian Street/Street One.

TABLE 5.2: TRAFFIC SIGNAL WARRANT SUMMARY

Intersection	Horizon Year	OTM Warrants					
		1A	1B	2A	2B	120%	150%
Snyder's Road West & Livingston Boulevard	2028 Total	125%	65%	101%	73%	No	No
Snyder's Road West & Christian Street/Street One	2028 Total	125%	59%	110%	79%	No	No

As traffic volumes increase over time, actual traffic volumes may satisfy the minimum warrant criteria post 2028 horizon year. It is recommended that the Region of Waterloo and Township of Wilmot monitor the future traffic volumes to ensure appropriate forms of traffic control are in place.

5.3 Traffic Calming

Various road users, including pedestrians, cyclists, automobiles, transit, trucks, and service vehicles, are intended to co-exist in relative safety and harmony on urban residential roads. When problems related to high traffic speeds, high traffic volumes, poor roadway geometry, poor traffic operations, or any combination of these characteristics are experienced, residential streets are no longer perceived as being pleasant or safe for all road uses (e.g. pedestrians, cyclists, and even drivers). A solution to mitigate these poor characteristics is traffic calming.

Traffic calming is a contentious subject and should be dealt with in a clear, concise, and transparent process that should meet the needs and expectations of the community. This section outlines several

¹⁰ Ontario Traffic Manual Book 12, Ministry of Transportation of Ontario, July 2001.



measures that could be implemented along the study area roadways, however if measures are implemented, they should be initiated and implemented based on consultation with the community.

The implementation of traffic calming should be well designed to minimize the inconvenience to local services such as garbage collection, snow ploughing, emergency services, and residents. There is also value in adding traffic calming measures incrementally to respond to local traffic issues while avoiding creating an excess “nuisance” to community travel. The following outlines measures that could be considered:

- ▶ **Narrowing**, decreases the overall width of the road and serves as a visual cue to drivers that they are entering a neighbourhood street or area. When used in this way the narrowing is called a ‘gateway’ to minor streets
- ▶ **Corner Extension/Bulb-Out**, the horizontal extension of the sidewalk into the street results in a narrower roadway section. An effective method for narrowing pedestrian crossing distances and increase pedestrian visibility. Can also facilitate midblock crossing (known as a ‘choker’) to add public space and facilitate midblock pedestrian crossings on low-volume streets.
- ▶ **Radar Speed Signs**, to slow vehicles down by making drivers aware they are driving at speeds above the posted speed limits.
- ▶ **Pavement Treatments**, special pavement textures (cobblestones, bricks, etc.) and markings to designate special areas.
- ▶ **Pedestrian Crossover**, where a crossing that is not signalized exists, such as to get to parks or schools, a pedestrian crossover can be used to satisfy a desired line. Pedestrian crossovers can be raised to meet sidewalk height to slow vehicles down and increase safety and accessibility for pedestrians. Variation of signage, signals and line painting can increase visibility of pedestrians to drivers.
- ▶ **On-Street Parking**, the allocation of paved roadway space to parking of vehicles. It narrows the road travel lanes and increases side friction to traffic flow. On-street parking can either be parallel or angled, but parallel is generally preferred for maximized speed reduction.
- ▶ **Tighter Corner Radii** affects traffic turning speeds. A tighter radius forces a driver to reduce speed. It is particularly helpful for intersections with high pedestrian traffic.
- ▶ **Rumble Strips**, low bumps or grooves cut into the pavement that make a noise when driven over. Useful in approaching stop



signs and marking edge of pavement. Not typically used in residential neighbourhoods due to noise they create.

- ▶ **Perceptual Design Features**, patterns painted onto road surfaces and other perceptual design features that encourage drivers to reduce their speeds.
- ▶ **Street Trees**, planting trees along a street to create a sense of enclosure and improve the pedestrian environment.
- ▶ **Neotraditional Street Design**, narrower lanes, shorter blocks, T-intersections, and other design features to control traffic speed and volumes.
- ▶ **Roadway Striping**, painting roadway markings that narrow traffic lanes and encourage lower traffic speeds.

As currently no significant speed issues exist, any existing speeding concerns can be address by Township staff through traffic calming measures with public engagement to determine the most appropriate measures to implement.

As for the two development properties, any traffic calming measures internal to the new subdivisions should be addressed through detailed engineering design and consider safer pedestrian crossings in the vicinity of the proposed school.



6 Conclusions and Recommendations

6.1 Conclusions

Based on the investigations carried out, it is concluded that:

- ▶ **Existing Traffic Conditions:** All study area intersections are currently operating within acceptable levels of service. Speed survey data collected by the Township shows that the Township roads are currently experiencing 95th percentile speeds at or below the posted speed limits;
- ▶ **Development Trip Generation:** The development is forecast to generate approximately 709 and 599 trips during the AM and PM peak hours, respectively;
- ▶ **2028 Background Traffic Conditions:** All study area intersections are forecast to continue to operate within acceptable levels of service;
- ▶ **2028 Total Traffic Conditions:** All study area intersections are forecast to continue to operate within acceptable levels of service with the following critical movements:
 - Snyder's Road at Livingston Boulevard/Foundry Street:
 - Forecast to operate with acceptable level of service, the northbound and southbound left-turn movements are forecast to have queues greater than their available storage lengths during the AM peak hour, and the northbound left-turn movement during the PM peak hour.
 - Snyder's Road at Livingston Boulevard:
 - The southbound shared left/right-turn movement is forecast to operate at LOS F with v/c ratio of 0.86 during the AM peak hour. The v/c ratio indicates that while there is delay, there remains excess capacity for this movement.
 - Snyder's Road at Christian Street/Street One:
 - The southbound shared left/through/right-turn movement is forecast to operate at LOS F with v/c ratio of 0.79 during the AM peak hour. The v/c ratio indicates that while there is delay, there remains excess capacity for this movement.
- ▶ **Remedial Measures:** a 25-metre eastbound left-turn lane on Snyder's Road West at Christian Street/Street One is warranted



under 2028 total traffic conditions based on site traffic generated by Snyders Road (Baden) Development.

- ▶ Left-turn lanes are not warranted on Livingston Boulevard at Jacob Cressman Drive and Isaac Shantz Drive.
- ▶ Traffic signals are not warranted based on OTM Book 12 Justification under 2028 total traffic conditions for the intersections of Snyder's Road West at Livingston Boulevard and Snyder's Road West at Christian Street/Street One.

6.2 Recommendations

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

- ▶ A 25-metre eastbound left-turn lane be constructed on Snyder's Road at Christian Street/Street One
- ▶ The Region of Waterloo and Township of Wilmot monitor the future traffic volumes on Snyder's Road West to ensure appropriate forms of traffic control are in place.
- ▶ Any existing speeding concerns can be address by Township staff through traffic calming measures with public engagement to determine the most appropriate measures to implement.
- ▶ Any traffic calming measures internal to the new subdivisions should be addressed through detailed engineering design and consider safer pedestrian crossings in the vicinity of the proposed school.



Appendix A

Pre-Study Consultation



APPENDIX A:
PRE-STUDY CONFERENCE FORM
1012 Synder's Road West, Baden

Item	Description	Details
ISSUES		
1	List any issues expected that may impact the content or recommendations of the subject Transportation Impact Study.	○
INTRODUCTION		
2	Nature of application (Attach a drawing)	○ Official Plan Amendment ○ Zoning Amendment ○ Site Plan Control Application ○ Plan of Subdivision
3	TIS process, and relevant policies, procedures and approvals	○ Guidelines for the preparation of Transportation Impact Studies in Support of Development Applications ○ Transportation Impact Studies Requirements for Capacity Analysis, Roundabouts, Turn Lanes
4	Public Meeting	○ Unknown currently
CONTEXT		
5	Study intersections (Intersections to be analyzed) Note: the consultant is responsible to identify any further intersections impacted as the study progresses.	Isaac Shantz Drive and Kropf Drive
		Jacob Cressman Drive and Livingston Boulevard
		Jacob Cressman and Michael Myers Road
		Isaac Shantz Drive and Livingston Boulevard
		Wagler Avenue and Hunsberger Drive
		Wagler Avenue and Livingston Boulevard (West)
		Wagler Avenue and Livingston Boulevard (East)
		Livingston Boulevard/Foundry Street and Snyder's Road
		Livingston Boulevard and Snyder's Road
		Snyder's Road and Christian Street
6	Size and number of phases of development	Northern (Activa) – 430 residential units Western (Nideva) – 319 residential + elementary school
7	Approved and pending approval development applications	○ Unknown currently
8	Planned transportation system improvements	○ Unknown currently
TRAVEL DEMAND		
9	Horizon years	○ 5 years after full build-out (2028)

Item	Description	Details
10	Peak hour determination	○ AM weekday peak hour of adjacent roadway ○ PM weekday peak hour of adjacent roadway
11	Background	○ Historical traffic/transit counts ○ ROW travel demand forecasts ○ Schmidt Estates, Baden TIS ○
12	Trip generation	○ ITE average rates ○ ITE fitted equation
13	Trip reductions (TDM, internal, pass-by)	○ ITE internal capture reductions for mixed-use developments ○ Transportation Tomorrow Survey 2016 Mode Splits
14	Trip distribution	○ ITE trip distribution IN/OUT split
15	Trip assignment	○ Local traffic pattern ○ Transportation Tomorrow Survey 2016
EVALUATION OF IMPACTS		
16	Traffic impact analysis (Use approved software)	○ Unsignalized intersections ○ left turn warrant analysis ○ signal warrant analysis ○ Signalized intersections ○ LOS, v/c, delay, queuing ○ Existing signal timings for existing conditions ○ Optimize signal timings for future conditions ○ Use existing cycle length to respect coordinated corridor ○ Queuing analysis

Item	Description	Details
17	Roundabout feasibility (Use approved software)	Initial screening
18	Transit assessment	○ Presence of bus stops ○ Frequency and hours of service
19	Pedestrian assessment	○ Presence, connectivity, and width of sidewalks ○ Barriers and buffers from traffic ○ Crossing opportunities at intersections ○ Delay at intersections ○ Number of driveways and traffic volumes at the driveways ○ Presence of illumination ○ Future needs (desire lines / policy / accessibility / demand)
20	Cycling assessment	○ Presence of a dedicated facility ○ Network connectivity
21	Safety analysis	○ Access conflict evaluation
22	Site access and circulation	○ Review sight distances at all new access points
23	Submission format	○ Three hard copies of main report including appendices (other than analysis results/output e.g. Synchro reports) ○ Minimum one original hard copy must be sealed by a professional engineer ○ Electronic copy of complete report and all appendices ○ Electronic copy of operational analysis files (e.g. Synchro, Arcady) ○ Electronic copy of all signal warrant calculation files ○

Appendix B

Existing Traffic Data





Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Isaac Shantz Drive & Kropf Drive
Site Code: 200068
Start Date: 03/05/2020
Page No: 1

Turning Movement Data

Start Time	Kropf Drive Eastbound					Kropf Drive Westbound					Isaac Shantz Drive Northbound					Int. Total
	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Left	Right	U-Turn	Peds	App. Total	
7:30 AM	0	2	0	0	2	4	0	0	0	4	0	0	0	1	0	6
7:45 AM	0	1	0	0	1	4	1	0	1	5	1	2	0	0	3	9
Hourly Total	0	3	0	0	3	8	1	0	1	9	1	2	0	1	3	15
8:00 AM	0	5	0	0	5	5	2	0	1	7	2	1	0	9	3	15
8:15 AM	1	1	0	1	2	4	0	0	2	4	0	0	0	5	0	6
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM	1	0	0	0	1	2	1	0	0	3	1	0	0	0	1	5
Hourly Total	2	6	0	1	8	11	3	0	3	14	3	1	0	14	4	26
9:00 AM	0	0	0	0	0	2	0	0	0	2	0	1	0	0	1	3
9:15 AM	0	1	0	0	1	1	0	0	0	1	1	2	0	0	3	5
9:30 AM	0	1	0	0	1	2	0	0	0	2	0	0	0	1	0	3
9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hourly Total	0	2	0	0	2	5	0	0	0	5	1	3	0	1	4	11
10:00 AM	0	0	0	0	0	0	1	0	0	1	0	2	0	1	2	3
10:15 AM	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	0	0	0	1	0	0	1	0	0	1	0	2	0	1	2	3
12:00 PM	0	1	0	0	1	0	0	0	0	0	1	0	0	1	1	2
12:15 PM	1	0	0	0	1	1	0	0	0	1	0	2	0	0	2	4
12:30 PM	1	0	0	0	1	2	1	0	0	3	3	1	0	0	4	8
12:45 PM	0	2	0	0	2	1	0	0	0	1	1	3	0	0	4	7
Hourly Total	2	3	0	0	5	4	1	0	0	5	5	6	0	1	11	21
1:00 PM	0	0	0	0	0	1	1	0	0	2	1	2	0	0	3	5
1:15 PM	1	1	0	0	2	0	0	0	0	0	0	0	0	0	0	2
1:30 PM	0	0	0	0	0	1	0	0	0	1	0	2	0	0	2	3
1:45 PM	0	2	0	0	2	0	0	0	0	0	0	0	0	0	0	2
Hourly Total	1	3	0	0	4	2	1	0	0	3	1	4	0	0	5	12
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3:00 PM	0	0	0	0	0	0	0	0	5	0	1	1	0	8	2	2
3:15 PM	1	0	0	0	1	0	0	0	0	0	1	1	0	0	2	3
3:30 PM	0	1	0	0	1	0	2	0	0	2	3	4	0	0	7	10
3:45 PM	0	0	0	0	0	1	1	0	0	2	1	2	0	0	3	5
Hourly Total	1	1	0	0	2	1	3	0	5	4	6	8	0	8	14	20
4:00 PM	0	1	0	0	1	1	0	0	0	1	1	1	0	3	2	4
4:15 PM	1	0	0	0	1	3	0	0	0	3	1	1	0	0	2	6
4:30 PM	1	1	0	0	2	1	0	0	0	1	3	2	0	0	5	8

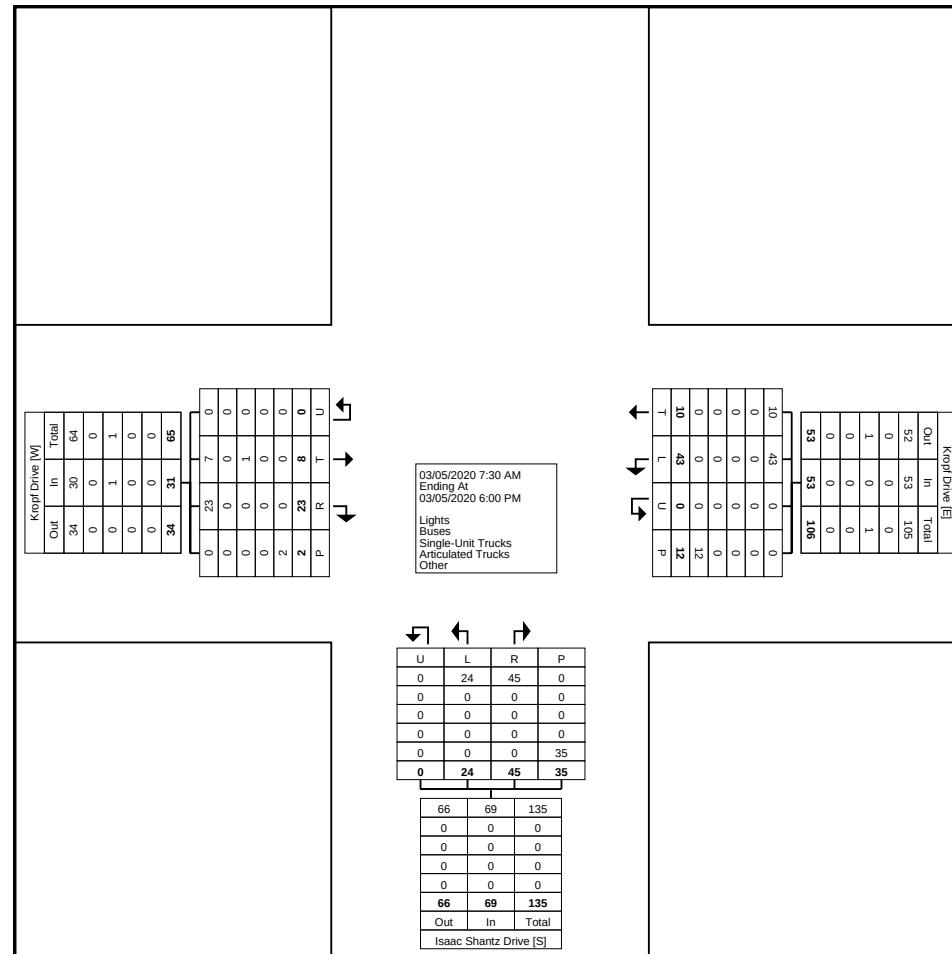
4:45 PM	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1
Hourly Total	2	2	0	0	4	5	0	0	0	5	6	4	0	3	10	19
5:00 PM	0	1	0	0	1	1	0	0	0	1	0	4	0	4	4	6
5:15 PM	0	1	0	0	1	2	0	0	0	2	0	4	0	1	4	7
5:30 PM	0	1	0	0	1	1	0	0	3	1	1	3	0	0	4	6
5:45 PM	0	0	0	0	0	3	0	0	0	3	0	4	0	1	4	7
Hourly Total	0	3	0	0	3	7	0	0	3	7	1	15	0	6	16	26
Grand Total	8	23	0	2	31	43	10	0	12	53	24	45	0	35	69	153
Approach %	25.8	74.2	0.0	-	-	81.1	18.9	0.0	-	-	34.8	65.2	0.0	-	-	-
Total %	5.2	15.0	0.0	-	20.3	28.1	6.5	0.0	-	34.6	15.7	29.4	0.0	-	45.1	-
Lights	7	23	0	-	30	43	10	0	-	53	24	45	0	-	69	152
% Lights	87.5	100.0	-	-	96.8	100.0	100.0	-	-	100.0	100.0	100.0	-	-	100.0	99.3
Buses	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Buses	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Single-Unit Trucks	1	0	0	-	1	0	0	0	-	0	0	0	0	-	0	1
% Single-Unit Trucks	12.5	0.0	-	-	3.2	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.7
Articulated Trucks	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Articulated Trucks	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Road	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	0.0	-	-	-	-	0.0	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	2	-	-	-	-	12	-	-	-	-	35	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	100.0	-	-	-	-	100.0	-	-



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Isaac Shantz Drive & Kropf Drive
Site Code: 200068
Start Date: 03/05/2020
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Turning Movement Data Plot



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

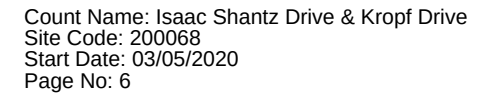
Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@ptsl.com

Count Name: Isaac Shantz Drive & Kropf Drive
Site Code: 200068
Start Date: 03/05/2020
Page No: 4

Turning Movement Peak Hour Data (7:30 AM)

Start Time	Kropf Drive Eastbound					Kropf Drive Westbound					Isaac Shantz Drive Northbound					Int. Total
	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Left	Right	U-Turn	Peds	App. Total	
7:30 AM	0	2	0	0	2	4	0	0	0	4	0	0	0	1	0	6
7:45 AM	0	1	0	0	1	4	1	0	1	5	1	2	0	0	3	9
8:00 AM	0	5	0	0	5	5	2	0	1	7	2	1	0	9	3	15
8:15 AM	1	1	0	1	2	4	0	0	2	4	0	0	0	5	0	6
Total	1	9	0	1	10	17	3	0	4	20	3	3	0	15	6	36
Approach %	10.0	90.0	0.0	-	-	85.0	15.0	0.0	-	-	50.0	50.0	0.0	-	-	-
Total %	2.8	25.0	0.0	-	27.8	47.2	8.3	0.0	-	55.6	8.3	8.3	0.0	-	16.7	-
PHF	0.250	0.450	0.000	-	0.500	0.850	0.375	0.000	-	0.714	0.375	0.375	0.000	-	0.500	0.600
Lights	1	9	0	-	10	17	3	0	-	20	3	3	0	-	6	36
% Lights	100.0	100.0	-	-	100.0	100.0	100.0	-	-	100.0	100.0	100.0	-	-	100.0	100.0
Buses	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Buses	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Single-Unit Trucks	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Single-Unit Trucks	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Articulated Trucks	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Articulated Trucks	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Road	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	0.0	-	-	-	-	0.0	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	1	-	-	-	-	4	-	-	-	-	15	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	100.0	-	-	-	-	100.0	-	-

Turning Movement Peak Hour Data Plot (7:30 AM)

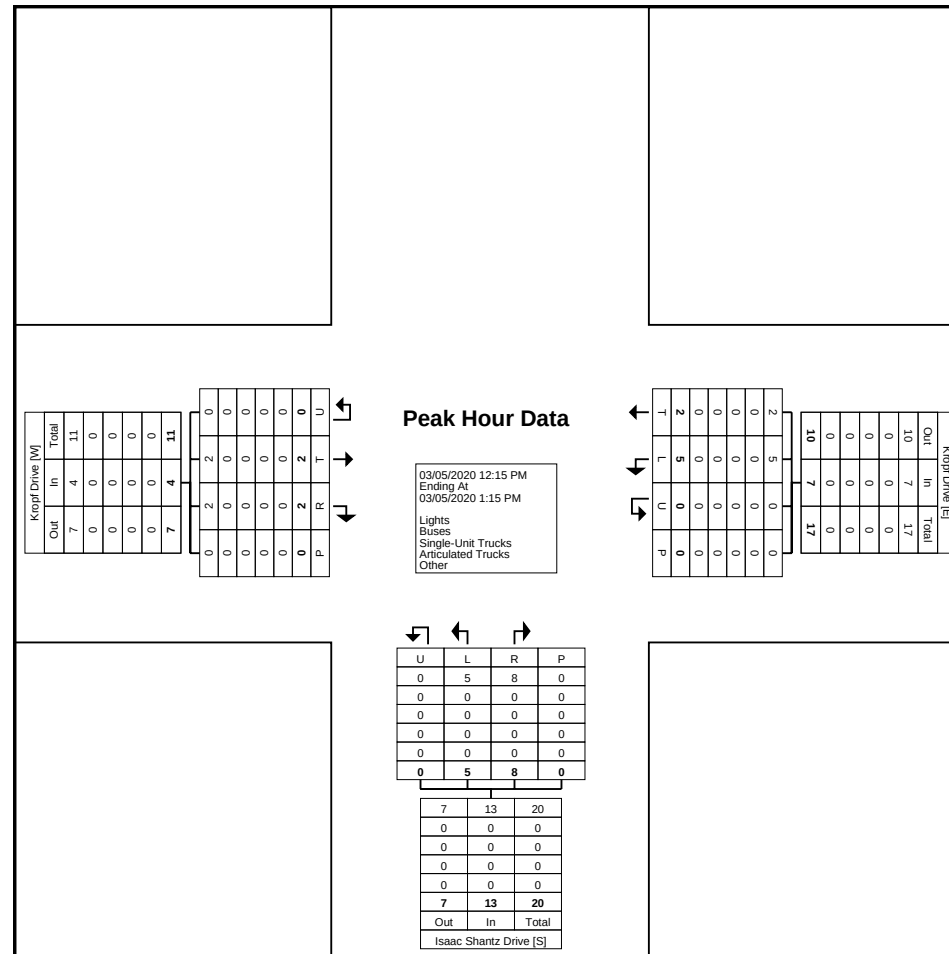




Paradigm Transportation Solutions Limited
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Count Name: Isaac Shantz Drive & Kropf Drive
Site Code: 200068
Start Date: 03/05/2020
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Turning Movement Peak Hour Data Plot (12:15 PM)



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@ptsl.com

Count Name: Isaac Shantz Drive & Kropf Drive
Site Code: 200068
Start Date: 03/05/2020
Page No: 8

Turning Movement Peak Hour Data (5:00 PM)

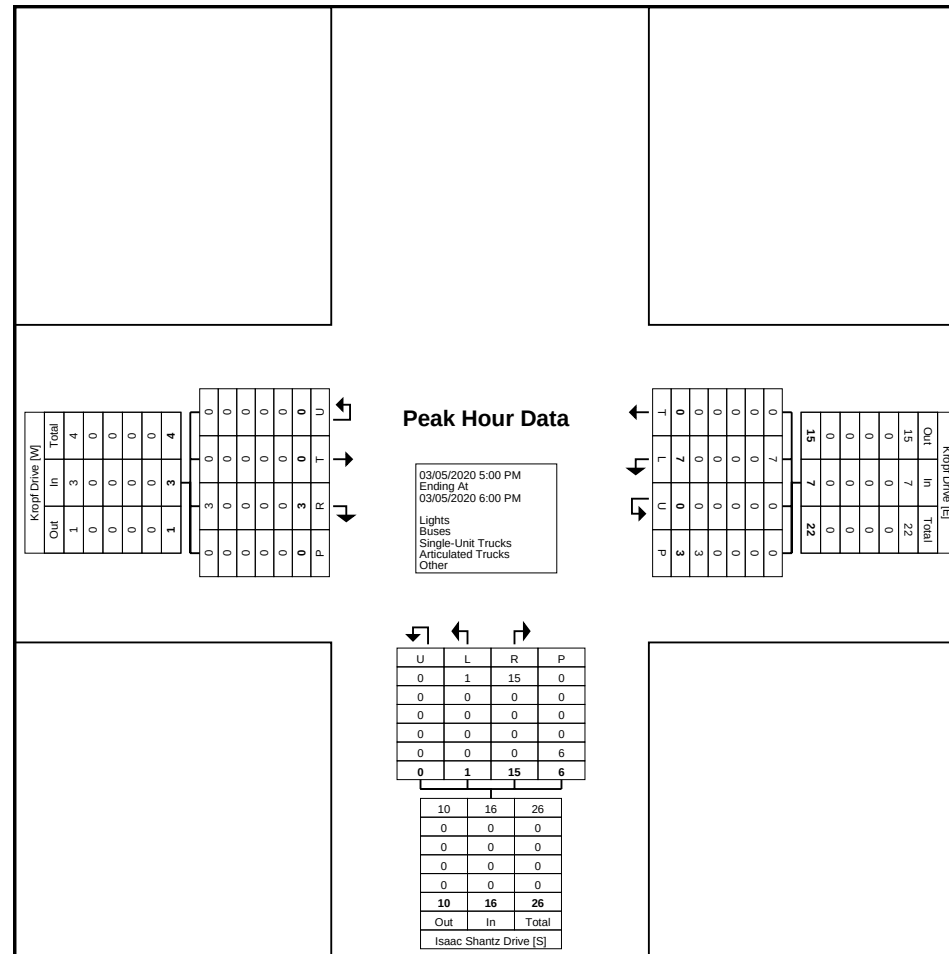
Start Time	Kropf Drive Eastbound					Kropf Drive Westbound					Isaac Shantz Drive Northbound					Int. Total
	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Left	Right	U-Turn	Peds	App. Total	
5:00 PM	0	1	0	0	1	1	0	0	0	1	0	4	0	4	4	6
5:15 PM	0	1	0	0	1	2	0	0	0	2	0	4	0	1	4	7
5:30 PM	0	1	0	0	1	1	0	0	3	1	1	3	0	0	4	6
5:45 PM	0	0	0	0	0	3	0	0	0	3	0	4	0	1	4	7
Total	0	3	0	0	3	7	0	0	3	7	1	15	0	6	16	26
Approach %	0.0	100.0	0.0	-	-	100.0	0.0	0.0	-	-	6.3	93.8	0.0	-	-	-
Total %	0.0	11.5	0.0	-	11.5	26.9	0.0	0.0	-	26.9	3.8	57.7	0.0	-	61.5	-
PHF	0.000	0.750	0.000	-	0.750	0.583	0.000	0.000	-	0.583	0.250	0.938	0.000	-	1.000	0.929
Lights	0	3	0	-	3	7	0	0	-	7	1	15	0	-	16	26
% Lights	-	100.0	-	-	100.0	100.0	-	-	-	100.0	100.0	100.0	-	-	100.0	100.0
Buses	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Buses	-	0.0	-	-	0.0	0.0	-	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Single-Unit Trucks	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Single-Unit Trucks	-	0.0	-	-	0.0	0.0	-	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Articulated Trucks	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Articulated Trucks	-	0.0	-	-	0.0	0.0	-	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Road	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Bicycles on Road	-	0.0	-	-	0.0	0.0	-	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	0.0	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	0	-	-	-	-	3	-	-	-	-	6	-	-
% Pedestrians	-	-	-	-	-	-	-	-	100.0	-	-	-	-	100.0	-	-



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

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519-896-3163 cbowness@pts1.com

Count Name: Isaac Shantz Drive & Kropf Drive
Site Code: 200068
Start Date: 03/05/2020
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Turning Movement Peak Hour Data Plot (5:00 PM)



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Isaac Shantz Drive & Livingston Blvd
Site Code: 200068
Start Date: 03/05/2020
Page No: 1

Turning Movement Data

Start Time	Livingston Blvd Eastbound					Livingston Blvd Northbound					Isaac Shantz Drive Southbound					Int. Total
	Left	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	
7:30 AM	3	19	0	0	22	8	4	0	1	12	34	4	0	0	38	72
7:45 AM	2	16	0	0	18	19	11	0	0	30	26	13	0	0	39	87
Hourly Total	5	35	0	0	40	27	15	0	1	42	60	17	0	0	77	159
8:00 AM	6	16	0	1	22	28	13	0	0	41	34	7	0	14	41	104
8:15 AM	1	17	0	5	18	2	4	0	0	6	32	3	0	15	35	59
8:30 AM	1	4	0	0	5	3	2	0	0	5	24	0	0	0	24	34
8:45 AM	0	6	0	1	6	3	6	0	0	9	13	1	0	0	14	29
Hourly Total	8	43	0	7	51	36	25	0	0	61	103	11	0	29	114	226
9:00 AM	4	5	0	0	9	4	5	0	0	9	11	4	0	3	15	33
9:15 AM	2	7	0	0	9	5	3	0	0	8	12	4	0	1	16	33
9:30 AM	0	5	0	1	5	4	6	0	1	10	12	3	0	0	15	30
9:45 AM	2	5	0	0	7	4	2	0	0	6	3	2	0	0	5	18
Hourly Total	8	22	0	1	30	17	16	0	1	33	38	13	0	4	51	114
10:00 AM	1	8	0	0	9	2	6	0	0	8	12	0	0	0	12	29
10:15 AM	0	5	0	0	5	3	2	0	0	5	4	0	0	1	4	14
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	1	13	0	0	14	5	8	0	0	13	16	0	0	1	16	43
12:00 PM	2	5	0	0	7	2	6	0	0	8	7	0	0	0	7	22
12:15 PM	2	2	0	2	4	3	5	0	2	8	8	3	0	1	11	23
12:30 PM	5	4	0	2	9	6	4	0	0	10	8	0	0	0	8	27
12:45 PM	1	3	0	0	4	4	7	0	0	11	9	1	0	0	10	25
Hourly Total	10	14	0	4	24	15	22	0	2	37	32	4	0	1	36	97
1:00 PM	3	7	0	0	10	4	5	0	0	9	7	2	0	1	9	28
1:15 PM	1	2	0	0	3	2	5	0	1	7	5	1	0	0	6	16
1:30 PM	0	1	0	0	1	4	8	0	0	12	5	1	0	1	6	19
1:45 PM	2	6	0	0	8	4	5	0	0	9	6	1	0	0	7	24
Hourly Total	6	16	0	0	22	14	23	0	1	37	23	5	0	2	28	87
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3:00 PM	1	16	0	0	17	3	16	0	1	19	15	1	0	0	16	52
3:15 PM	1	9	0	0	10	8	11	0	0	19	7	2	0	0	9	38
3:30 PM	3	4	0	3	7	4	18	0	0	22	7	0	0	4	7	36
3:45 PM	1	2	0	0	3	6	23	0	0	29	7	3	0	0	10	42
Hourly Total	6	31	0	3	37	21	68	0	1	89	36	6	0	4	42	168
4:00 PM	4	7	0	0	11	8	19	0	1	27	13	3	0	3	16	54
4:15 PM	5	5	0	0	10	19	21	0	0	40	12	5	0	3	17	67
4:30 PM	4	14	0	0	18	15	24	0	2	39	17	5	0	0	22	79

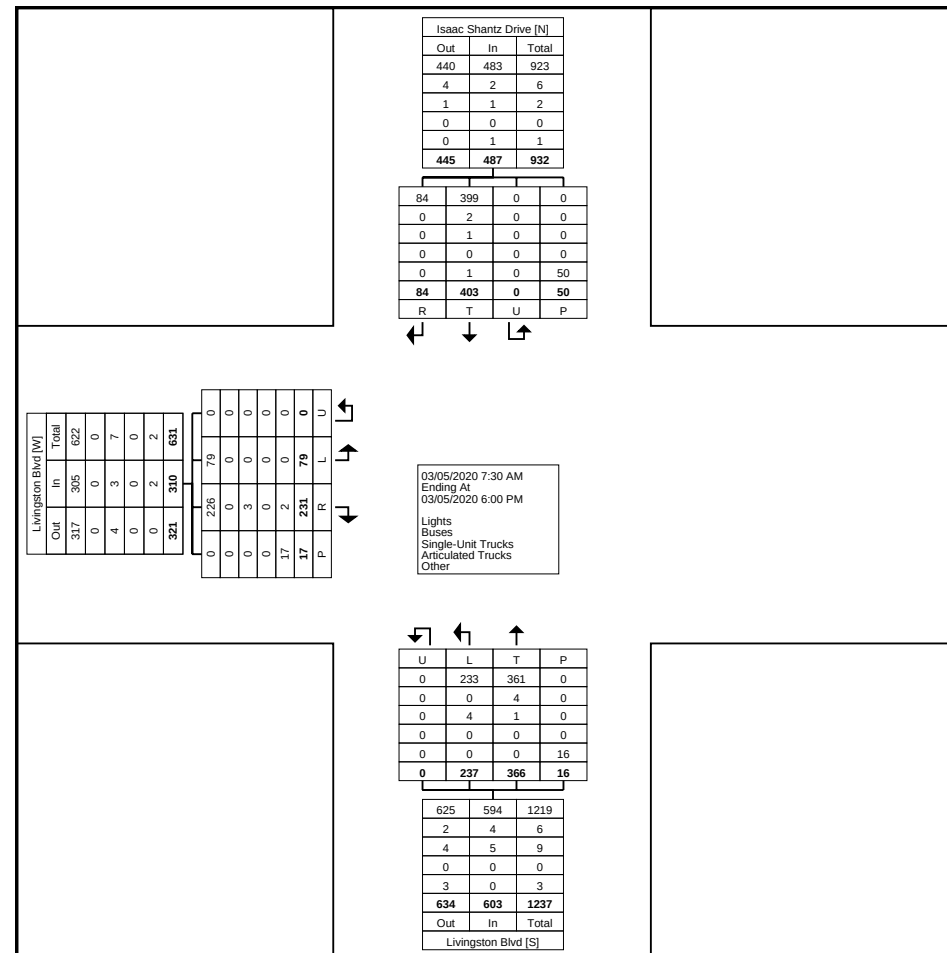
4:45 PM	2	8	0	1	10	13	29	0	0	42	12	2	0	0	14	66
Hourly Total	15	34	0	1	49	55	93	0	3	148	54	15	0	6	69	266
5:00 PM	4	4	0	0	8	13	25	0	2	38	12	4	0	3	16	62
5:15 PM	6	7	0	0	13	12	24	0	3	36	7	3	0	0	10	59
5:30 PM	6	3	0	1	9	12	30	0	0	42	9	1	0	0	10	61
5:45 PM	4	9	0	0	13	10	17	0	2	27	13	5	0	0	18	58
Hourly Total	20	23	0	1	43	47	96	0	7	143	41	13	0	3	54	240
Grand Total	79	231	0	17	310	237	366	0	16	603	403	84	0	50	487	1400
Approach %	25.5	74.5	0.0	-	-	39.3	60.7	0.0	-	-	82.8	17.2	0.0	-	-	-
Total %	5.6	16.5	0.0	-	22.1	16.9	26.1	0.0	-	43.1	28.8	6.0	0.0	-	34.8	-
Lights	79	226	0	-	305	233	361	0	-	594	399	84	0	-	483	1382
% Lights	100.0	97.8	-	-	98.4	98.3	98.6	-	-	98.5	99.0	100.0	-	-	99.2	98.7
Buses	0	0	0	-	0	0	4	0	-	4	2	0	0	-	2	6
% Buses	0.0	0.0	-	-	0.0	0.0	1.1	-	-	0.7	0.5	0.0	-	-	0.4	0.4
Single-Unit Trucks	0	3	0	-	3	4	1	0	-	5	1	0	0	-	1	9
% Single-Unit Trucks	0.0	1.3	-	-	1.0	1.7	0.3	-	-	0.8	0.2	0.0	-	-	0.2	0.6
Articulated Trucks	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Articulated Trucks	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Road	0	2	0	-	2	0	0	0	-	0	1	0	0	-	1	3
% Bicycles on Road	0.0	0.9	-	-	0.6	0.0	0.0	-	-	0.0	0.2	0.0	-	-	0.2	0.2
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	0.0	-	-	-	-	0.0	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	17	-	-	-	-	16	-	-	-	-	50	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	100.0	-	-	-	-	100.0	-	-



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
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Count Name: Isaac Shantz Drive & Livingston
Blvd
Site Code: 200068
Start Date: 03/05/2020
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Turning Movement Data Plot



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Isaac Shantz Drive & Livingston
Blvd
Site Code: 200068
Start Date: 03/05/2020
Page No: 4

Turning Movement Peak Hour Data (7:30 AM)

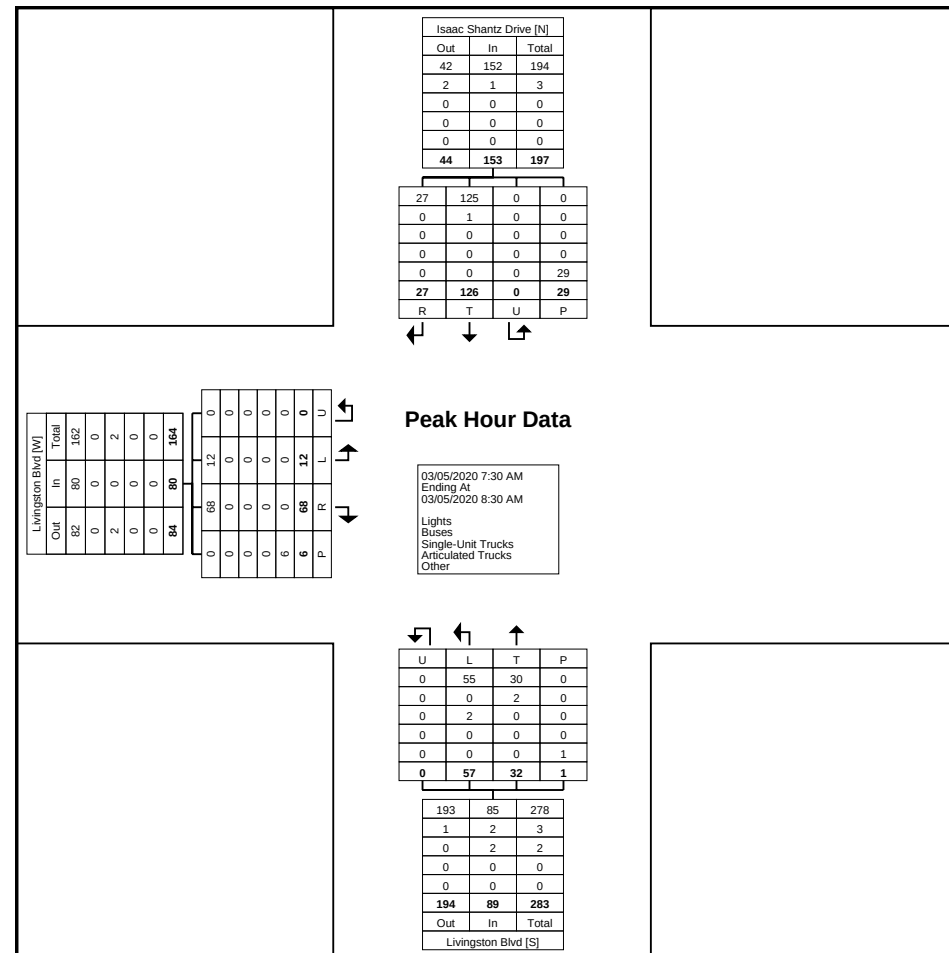
Start Time	Livingston Blvd Eastbound					Livingston Blvd Northbound					Isaac Shantz Drive Southbound					Int. Total
	Left	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	
7:30 AM	3	19	0	0	22	8	4	0	1	12	34	4	0	0	38	72
7:45 AM	2	16	0	0	18	19	11	0	0	30	26	13	0	0	39	87
8:00 AM	6	16	0	1	22	28	13	0	0	41	34	7	0	14	41	104
8:15 AM	1	17	0	5	18	2	4	0	0	6	32	3	0	15	35	59
Total	12	68	0	6	80	57	32	0	1	89	126	27	0	29	153	322
Approach %	15.0	85.0	0.0	-	-	64.0	36.0	0.0	-	-	82.4	17.6	0.0	-	-	-
Total %	3.7	21.1	0.0	-	24.8	17.7	9.9	0.0	-	27.6	39.1	8.4	0.0	-	47.5	-
PHF	0.500	0.895	0.000	-	0.909	0.509	0.615	0.000	-	0.543	0.926	0.519	0.000	-	0.933	0.774
Lights	12	68	0	-	80	55	30	0	-	85	125	27	0	-	152	317
% Lights	100.0	100.0	-	-	100.0	96.5	93.8	-	-	95.5	99.2	100.0	-	-	99.3	98.4
Buses	0	0	0	-	0	0	2	0	-	2	1	0	0	-	1	3
% Buses	0.0	0.0	-	-	0.0	0.0	6.3	-	-	2.2	0.8	0.0	-	-	0.7	0.9
Single-Unit Trucks	0	0	0	-	0	2	0	0	-	2	0	0	0	-	0	2
% Single-Unit Trucks	0.0	0.0	-	-	0.0	3.5	0.0	-	-	2.2	0.0	0.0	-	-	0.0	0.6
Articulated Trucks	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Articulated Trucks	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Road	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	0.0	-	-	-	-	0.0	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	6	-	-	-	-	1	-	-	-	-	29	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	100.0	-	-	-	-	100.0	-	-



Paradigm Transportation Solutions Limited
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Count Name: Isaac Shantz Drive & Livingston
Blvd
Site Code: 200068
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Turning Movement Peak Hour Data Plot (7:30 AM)



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
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Count Name: Isaac Shantz Drive & Livingston
Blvd
Site Code: 200068
Start Date: 03/05/2020
Page No: 6

Turning Movement Peak Hour Data (12:15 PM)

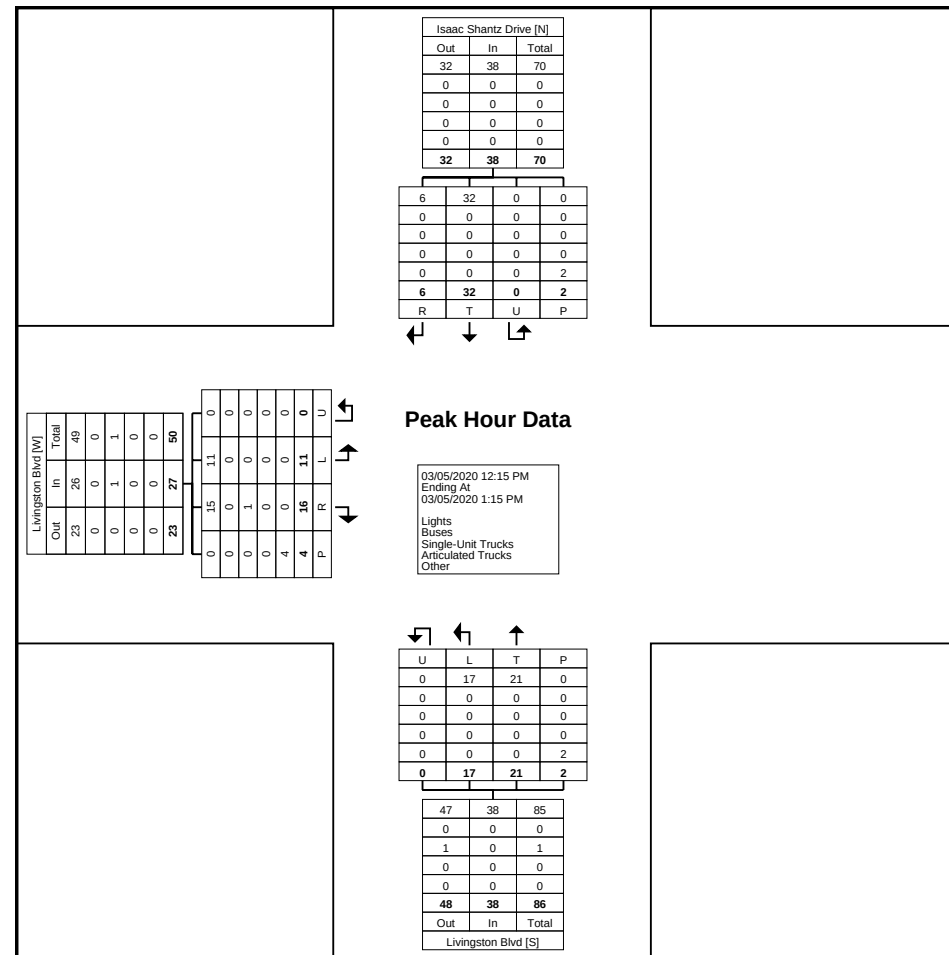
Start Time	Livingston Blvd Eastbound					Livingston Blvd Northbound					Isaac Shantz Drive Southbound					Int. Total
	Left	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	
12:15 PM	2	2	0	2	4	3	5	0	2	8	8	3	0	1	11	23
12:30 PM	5	4	0	2	9	6	4	0	0	10	8	0	0	0	8	27
12:45 PM	1	3	0	0	4	4	7	0	0	11	9	1	0	0	10	25
1:00 PM	3	7	0	0	10	4	5	0	0	9	7	2	0	1	9	28
Total	11	16	0	4	27	17	21	0	2	38	32	6	0	2	38	103
Approach %	40.7	59.3	0.0	-	-	44.7	55.3	0.0	-	-	84.2	15.8	0.0	-	-	-
Total %	10.7	15.5	0.0	-	26.2	16.5	20.4	0.0	-	36.9	31.1	5.8	0.0	-	36.9	-
PHF	0.550	0.571	0.000	-	0.675	0.708	0.750	0.000	-	0.864	0.889	0.500	0.000	-	0.864	0.920
Lights	11	15	0	-	26	17	21	0	-	38	32	6	0	-	38	102
% Lights	100.0	93.8	-	-	96.3	100.0	100.0	-	-	100.0	100.0	100.0	-	-	100.0	99.0
Buses	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Buses	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Single-Unit Trucks	0	1	0	-	1	0	0	0	-	0	0	0	0	-	0	1
% Single-Unit Trucks	0.0	6.3	-	-	3.7	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	1.0
Articulated Trucks	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Articulated Trucks	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Road	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	0.0	-	-	-	-	0.0	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	4	-	-	-	-	2	-	-	-	-	2	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	100.0	-	-	-	-	100.0	-	-



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Isaac Shantz Drive & Livingston
Blvd
Site Code: 200068
Start Date: 03/05/2020
Page No: 7



Turning Movement Peak Hour Data Plot (12:15 PM)



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Isaac Shantz Drive & Livingston
Blvd
Site Code: 200068
Start Date: 03/05/2020
Page No: 8

Turning Movement Peak Hour Data (4:15 PM)

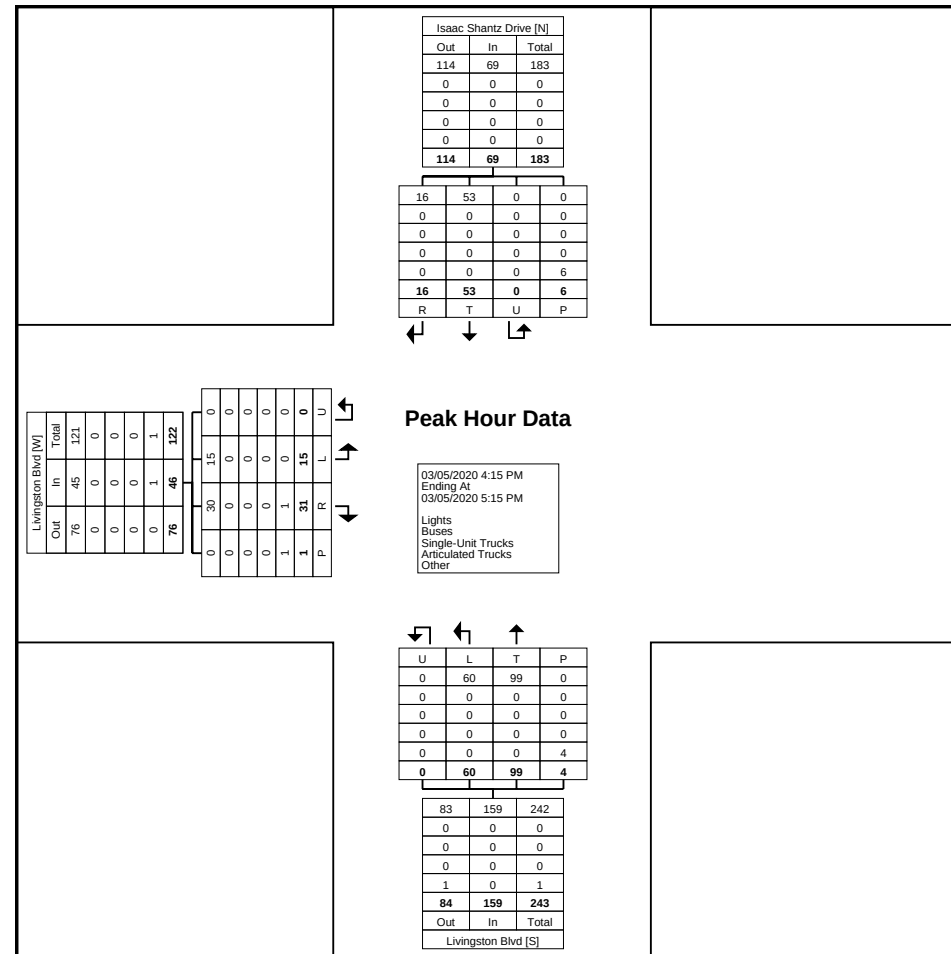
Start Time	Livingston Blvd Eastbound					Livingston Blvd Northbound					Isaac Shantz Drive Southbound					Int. Total
	Left	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	
4:15 PM	5	5	0	0	10	19	21	0	0	40	12	5	0	3	17	67
4:30 PM	4	14	0	0	18	15	24	0	2	39	17	5	0	0	22	79
4:45 PM	2	8	0	1	10	13	29	0	0	42	12	2	0	0	14	66
5:00 PM	4	4	0	0	8	13	25	0	2	38	12	4	0	3	16	62
Total	15	31	0	1	46	60	99	0	4	159	53	16	0	6	69	274
Approach %	32.6	67.4	0.0	-	-	37.7	62.3	0.0	-	-	76.8	23.2	0.0	-	-	-
Total %	5.5	11.3	0.0	-	16.8	21.9	36.1	0.0	-	58.0	19.3	5.8	0.0	-	25.2	-
PHF	0.750	0.554	0.000	-	0.639	0.789	0.853	0.000	-	0.946	0.779	0.800	0.000	-	0.784	0.867
Lights	15	30	0	-	45	60	99	0	-	159	53	16	0	-	69	273
% Lights	100.0	96.8	-	-	97.8	100.0	100.0	-	-	100.0	100.0	100.0	-	-	100.0	99.6
Buses	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Buses	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Single-Unit Trucks	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Single-Unit Trucks	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Articulated Trucks	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Articulated Trucks	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Road	0	1	0	-	1	0	0	0	-	0	0	0	0	-	0	1
% Bicycles on Road	0.0	3.2	-	-	2.2	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.4
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	0.0	-	-	-	-	0.0	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	1	-	-	-	-	4	-	-	-	-	6	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	100.0	-	-	-	-	100.0	-	-



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@ptsl.com

Count Name: Isaac Shantz Drive & Livingston
Blvd
Site Code: 200068
Start Date: 03/05/2020
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Turning Movement Peak Hour Data Plot (4:15 PM)



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Jacob Cressman Drive &
Livingston Blvd
Site Code: 200068
Start Date: 03/05/2020
Page No: 1

Turning Movement Data

Start Time	Livingston Blvd Westbound					Livingston Blvd Northbound					Jacob Cressman Drive Southbound					Int. Total
	Left	Right	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	
7:30 AM	4	0	0	0	4	2	8	0	1	10	11	7	0	1	18	32
7:45 AM	17	1	0	0	18	5	8	0	0	13	7	17	0	0	24	55
Hourly Total	21	1	0	0	22	7	16	0	1	23	18	24	0	1	42	87
8:00 AM	10	4	0	2	14	7	17	0	0	24	10	10	0	13	20	58
8:15 AM	10	1	0	0	11	7	7	0	2	14	5	15	0	3	20	45
8:30 AM	2	1	0	0	3	1	1	0	0	2	3	6	0	1	9	14
8:45 AM	1	1	0	0	2	2	2	0	0	4	7	1	0	0	8	14
Hourly Total	23	7	0	2	30	17	27	0	2	44	25	32	0	17	57	131
9:00 AM	5	1	0	0	6	2	5	0	0	7	5	4	0	0	9	22
9:15 AM	3	2	0	0	5	2	3	0	0	5	2	4	0	0	6	16
9:30 AM	5	3	0	28	8	4	2	0	0	6	4	2	0	0	6	20
9:45 AM	1	3	0	0	4	3	2	0	0	5	4	2	0	0	6	15
Hourly Total	14	9	0	28	23	11	12	0	0	23	15	12	0	0	27	73
10:00 AM	4	1	0	0	5	3	5	0	0	8	2	0	0	1	2	15
10:15 AM	2	2	0	0	4	3	1	0	0	4	1	5	0	4	6	14
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	6	3	0	0	9	6	6	0	0	12	3	5	0	5	8	29
12:00 PM	4	1	0	0	5	5	5	0	0	10	3	0	0	0	3	18
12:15 PM	4	3	0	0	7	3	3	0	0	6	0	1	0	0	1	14
12:30 PM	3	3	0	0	6	0	7	0	0	7	0	4	0	0	4	17
12:45 PM	2	1	0	0	3	2	2	0	0	4	2	1	0	1	3	10
Hourly Total	13	8	0	0	21	10	17	0	0	27	5	6	0	1	11	59
1:00 PM	5	3	0	0	8	4	8	0	0	12	3	2	0	0	5	25
1:15 PM	2	0	0	0	2	2	1	0	0	3	0	5	0	0	5	10
1:30 PM	4	1	0	0	5	1	3	0	0	4	2	0	0	0	2	11
1:45 PM	4	0	0	0	4	2	4	0	0	6	1	3	0	1	4	14
Hourly Total	15	4	0	0	19	9	16	0	0	25	6	10	0	1	16	60
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3:00 PM	4	2	0	0	6	4	3	0	0	7	0	1	0	4	1	14
3:15 PM	5	4	0	0	9	9	1	0	0	10	0	2	0	0	2	21
3:30 PM	5	1	0	0	6	5	3	0	2	8	0	5	0	4	5	19
3:45 PM	2	5	0	0	7	8	1	0	0	9	2	8	0	1	10	26
Hourly Total	16	12	0	0	28	26	8	0	2	34	2	16	0	9	18	80
4:00 PM	5	1	0	0	6	8	5	0	2	13	5	4	0	4	9	28
4:15 PM	4	13	0	0	17	3	6	0	0	9	2	3	0	5	5	31
4:30 PM	6	10	0	2	16	4	6	0	0	10	4	2	0	4	6	32

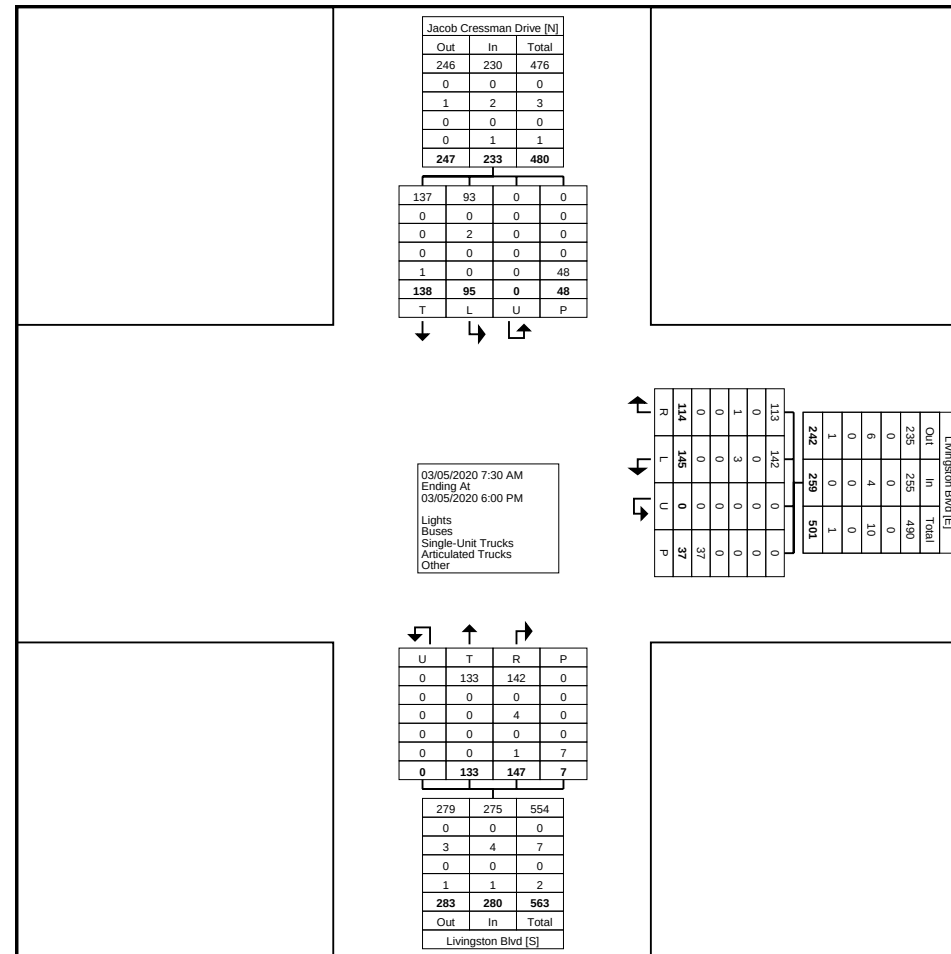
4:45 PM	6	8	0	0	14	6	5	0	0	11	2	9	0	0	11	36
Hourly Total	21	32	0	2	53	21	22	0	2	43	13	18	0	13	31	127
5:00 PM	5	11	0	2	16	7	8	0	0	15	0	4	0	0	4	35
5:15 PM	3	9	0	3	12	5	9	0	0	14	5	1	0	0	6	32
5:30 PM	2	10	0	0	12	4	3	0	0	7	1	4	0	1	5	24
5:45 PM	6	8	0	0	14	10	3	0	0	13	2	6	0	0	8	35
Hourly Total	16	38	0	5	54	26	23	0	0	49	8	15	0	1	23	126
Grand Total	145	114	0	37	259	133	147	0	7	280	95	138	0	48	233	772
Approach %	56.0	44.0	0.0	-	-	47.5	52.5	0.0	-	-	40.8	59.2	0.0	-	-	-
Total %	18.8	14.8	0.0	-	33.5	17.2	19.0	0.0	-	36.3	12.3	17.9	0.0	-	30.2	-
Lights	142	113	0	-	255	133	142	0	-	275	93	137	0	-	230	760
% Lights	97.9	99.1	-	-	98.5	100.0	96.6	-	-	98.2	97.9	99.3	-	-	98.7	98.4
Buses	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Buses	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Single-Unit Trucks	3	1	0	-	4	0	4	0	-	4	2	0	0	-	2	10
% Single-Unit Trucks	2.1	0.9	-	-	1.5	0.0	2.7	-	-	1.4	2.1	0.0	-	-	0.9	1.3
Articulated Trucks	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Articulated Trucks	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Road	0	0	0	-	0	0	1	0	-	1	0	1	0	-	1	2
% Bicycles on Road	0.0	0.0	-	-	0.0	0.0	0.7	-	-	0.4	0.0	0.7	-	-	0.4	0.3
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	0.0	-	-	-	-	0.0	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	37	-	-	-	-	7	-	-	-	-	48	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	100.0	-	-	-	-	100.0	-	-



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Jacob Cressman Drive &
Livingston Blvd
Site Code: 200068
Start Date: 03/05/2020
Page No: 3



Turning Movement Data Plot



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Jacob Cressman Drive &
Livingston Blvd
Site Code: 200068
Start Date: 03/05/2020
Page No: 4

Turning Movement Peak Hour Data (7:30 AM)

Start Time	Livingston Blvd Westbound					Livingston Blvd Northbound					Jacob Cressman Drive Southbound					Int. Total
	Left	Right	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	
7:30 AM	4	0	0	0	4	2	8	0	1	10	11	7	0	1	18	32
7:45 AM	17	1	0	0	18	5	8	0	0	13	7	17	0	0	24	55
8:00 AM	10	4	0	2	14	7	17	0	0	24	10	10	0	13	20	58
8:15 AM	10	1	0	0	11	7	7	0	2	14	5	15	0	3	20	45
Total	41	6	0	2	47	21	40	0	3	61	33	49	0	17	82	190
Approach %	87.2	12.8	0.0	-	-	34.4	65.6	0.0	-	-	40.2	59.8	0.0	-	-	-
Total %	21.6	3.2	0.0	-	24.7	11.1	21.1	0.0	-	32.1	17.4	25.8	0.0	-	43.2	-
PHF	0.603	0.375	0.000	-	0.653	0.750	0.588	0.000	-	0.635	0.750	0.721	0.000	-	0.854	0.819
Lights	40	6	0	-	46	21	40	0	-	61	33	48	0	-	81	188
% Lights	97.6	100.0	-	-	97.9	100.0	100.0	-	-	100.0	100.0	98.0	-	-	98.8	98.9
Buses	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Buses	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Single-Unit Trucks	1	0	0	-	1	0	0	0	-	0	0	0	0	-	0	1
% Single-Unit Trucks	2.4	0.0	-	-	2.1	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.5
Articulated Trucks	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Articulated Trucks	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Road	0	0	0	-	0	0	0	0	-	0	0	1	0	-	1	1
% Bicycles on Road	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	2.0	-	-	1.2	0.5
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	0.0	-	-	-	-	0.0	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	2	-	-	-	-	3	-	-	-	-	17	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	100.0	-	-	-	-	100.0	-	-

Turning Movement Peak Hour Data Plot (7:30 AM)



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@ptsl.com

Count Name: Jacob Cressman Drive &
Livingston Blvd
Site Code: 200068
Start Date: 03/05/2020
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Turning Movement Peak Hour Data (12:15 PM)

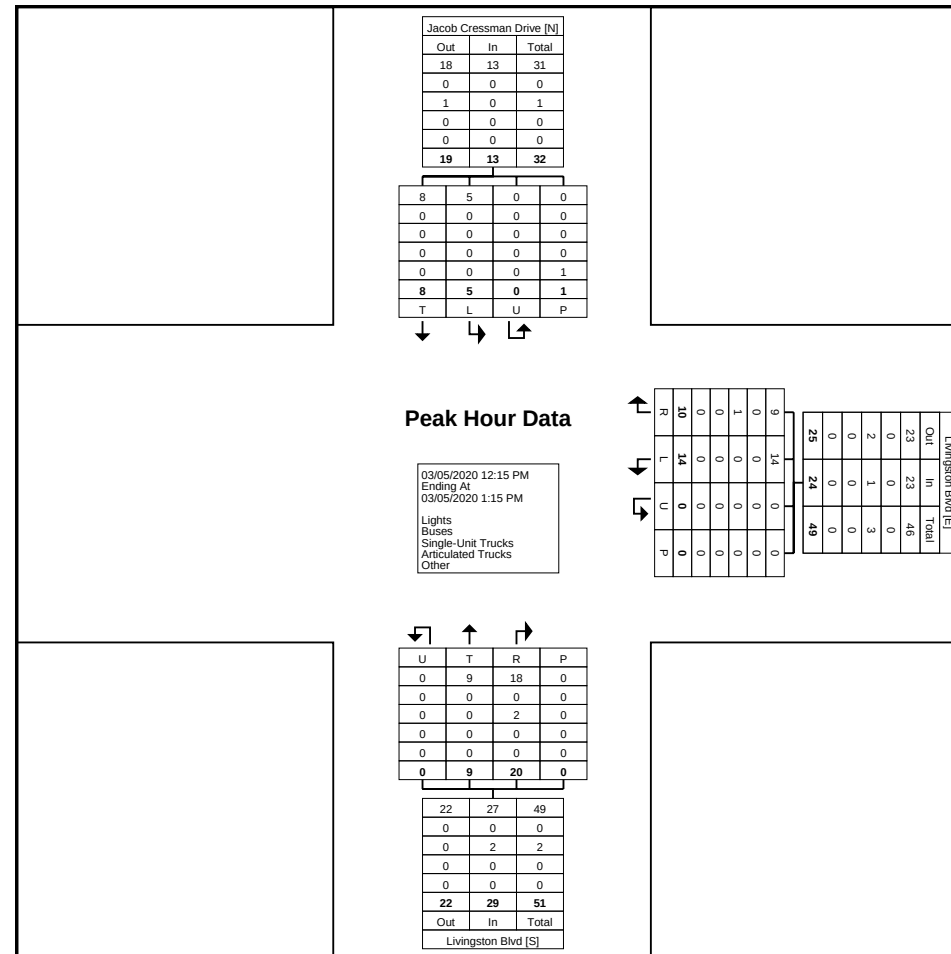
Start Time	Livingston Blvd Westbound					Livingston Blvd Northbound					Jacob Cressman Drive Southbound					Int. Total
	Left	Right	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	
12:15 PM	4	3	0	0	7	3	3	0	0	6	0	1	0	0	1	14
12:30 PM	3	3	0	0	6	0	7	0	0	7	0	4	0	0	4	17
12:45 PM	2	1	0	0	3	2	2	0	0	4	2	1	0	1	3	10
1:00 PM	5	3	0	0	8	4	8	0	0	12	3	2	0	0	5	25
Total	14	10	0	0	24	9	20	0	0	29	5	8	0	1	13	66
Approach %	58.3	41.7	0.0	-	-	31.0	69.0	0.0	-	-	38.5	61.5	0.0	-	-	-
Total %	21.2	15.2	0.0	-	36.4	13.6	30.3	0.0	-	43.9	7.6	12.1	0.0	-	19.7	-
PHF	0.700	0.833	0.000	-	0.750	0.563	0.625	0.000	-	0.604	0.417	0.500	0.000	-	0.650	0.660
Lights	14	9	0	-	23	9	18	0	-	27	5	8	0	-	13	63
% Lights	100.0	90.0	-	-	95.8	100.0	90.0	-	-	93.1	100.0	100.0	-	-	100.0	95.5
Buses	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Buses	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Single-Unit Trucks	0	1	0	-	1	0	2	0	-	2	0	0	0	-	0	3
% Single-Unit Trucks	0.0	10.0	-	-	4.2	0.0	10.0	-	-	6.9	0.0	0.0	-	-	0.0	4.5
Articulated Trucks	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Articulated Trucks	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Road	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	1	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-



Paradigm Transportation Solutions Limited
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Count Name: Jacob Cressman Drive &
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Site Code: 200068
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Turning Movement Peak Hour Data Plot (12:15 PM)



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Count Name: Jacob Cressman Drive &
Livingston Blvd
Site Code: 200068
Start Date: 03/05/2020
Page No: 8

Turning Movement Peak Hour Data (4:30 PM)

Start Time	Livingston Blvd Westbound					Livingston Blvd Northbound					Jacob Cressman Drive Southbound					Int. Total
	Left	Right	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	
4:30 PM	6	10	0	2	16	4	6	0	0	10	4	2	0	4	6	32
4:45 PM	6	8	0	0	14	6	5	0	0	11	2	9	0	0	11	36
5:00 PM	5	11	0	2	16	7	8	0	0	15	0	4	0	0	4	35
5:15 PM	3	9	0	3	12	5	9	0	0	14	5	1	0	0	6	32
Total	20	38	0	7	58	22	28	0	0	50	11	16	0	4	27	135
Approach %	34.5	65.5	0.0	-	-	44.0	56.0	0.0	-	-	40.7	59.3	0.0	-	-	-
Total %	14.8	28.1	0.0	-	43.0	16.3	20.7	0.0	-	37.0	8.1	11.9	0.0	-	20.0	-
PHF	0.833	0.864	0.000	-	0.906	0.786	0.778	0.000	-	0.833	0.550	0.444	0.000	-	0.614	0.938
Lights	20	38	0	-	58	22	27	0	-	49	11	16	0	-	27	134
% Lights	100.0	100.0	-	-	100.0	100.0	96.4	-	-	98.0	100.0	100.0	-	-	100.0	99.3
Buses	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Buses	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Single-Unit Trucks	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Single-Unit Trucks	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Articulated Trucks	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Articulated Trucks	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Road	0	0	0	-	0	0	1	0	-	1	0	0	0	-	0	1
% Bicycles on Road	0.0	0.0	-	-	0.0	0.0	3.6	-	-	2.0	0.0	0.0	-	-	0.0	0.7
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	0.0	-	-	-	-	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	7	-	-	-	-	0	-	-	-	-	4	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	-	-	-	-	-	100.0	-	-

Turning Movement Peak Hour Data Plot (4:30 PM)



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Jacob Cressman Drive & Michael
Myers Road
Site Code: 200068
Start Date: 03/05/2020
Page No: 1

Turning Movement Data

Start Time	Michael Myers Road Eastbound					Michael Myers Road Westbound					Jacob Cressman Drive Northbound					Int. Total
	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Left	Right	U-Turn	Peds	App. Total	
7:30 AM	0	0	0	0	0	1	0	0	0	1	0	0	0	2	0	1
7:45 AM	0	2	0	0	2	2	0	0	0	2	0	1	0	0	1	5
Hourly Total	0	2	0	0	2	3	0	0	0	3	0	1	0	2	1	6
8:00 AM	2	3	0	0	5	0	2	0	0	2	0	0	0	2	0	7
8:15 AM	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	1
8:30 AM	0	0	0	0	0	1	0	0	1	1	0	0	0	0	0	1
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1
Hourly Total	2	4	0	0	6	1	2	0	1	3	0	1	0	3	1	10
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1
9:15 AM	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	1
9:30 AM	0	0	0	0	0	1	0	0	0	1	3	0	0	1	3	4
9:45 AM	0	1	0	0	1	0	0	0	0	0	1	0	0	0	1	2
Hourly Total	0	2	0	0	2	1	0	0	0	1	4	1	0	1	5	8
10:00 AM	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	1
10:15 AM	0	1	0	0	1	0	0	0	0	0	1	0	0	1	1	2
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	0	2	0	0	2	0	0	0	0	0	1	0	0	1	1	3
12:00 PM	1	1	0	0	2	0	1	0	2	1	0	1	0	0	1	4
12:15 PM	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
12:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:45 PM	0	0	0	0	0	0	1	0	0	1	0	1	0	0	1	2
Hourly Total	1	1	0	0	2	0	2	0	3	2	0	2	0	0	2	6
1:00 PM	0	1	0	0	1	0	1	0	0	1	0	0	0	0	0	2
1:15 PM	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
1:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0
1:45 PM	1	0	0	0	1	0	1	0	0	1	0	0	0	0	0	2
Hourly Total	2	1	0	0	3	0	2	0	0	2	0	0	0	2	0	5
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3:00 PM	0	0	0	2	0	0	1	0	0	1	0	0	0	1	0	1
3:15 PM	0	0	0	4	0	0	0	0	0	0	0	1	0	2	1	1
3:30 PM	0	1	0	0	1	2	0	0	0	2	0	0	0	0	0	3
3:45 PM	0	1	1	0	2	2	0	0	0	2	1	1	0	1	2	6
Hourly Total	0	2	1	6	3	4	1	0	0	5	1	2	0	4	3	11
4:00 PM	0	1	0	0	1	2	1	0	0	3	1	0	0	4	1	5
4:15 PM	2	0	0	0	2	0	0	0	0	0	3	1	0	8	4	6
4:30 PM	1	0	0	0	1	1	0	0	0	1	0	0	0	0	0	2

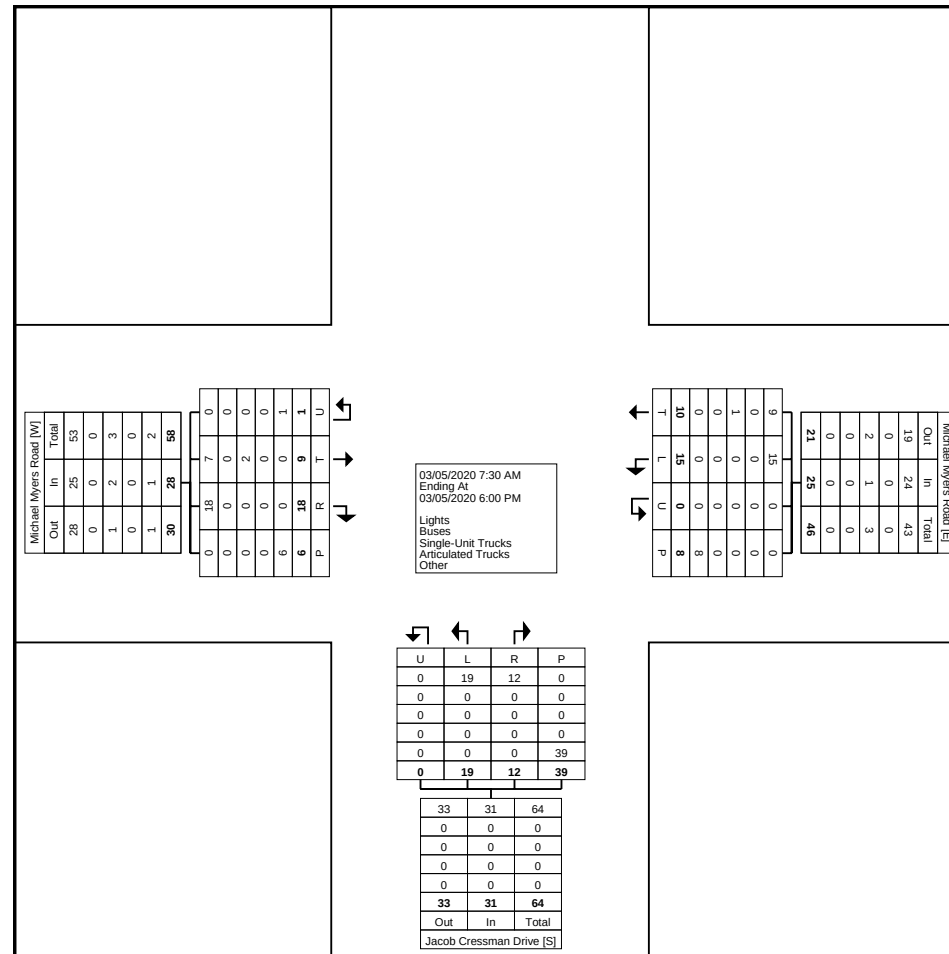
4:45 PM	0	0	0	0	0	1	0	0	4	1	1	0	0	4	1	2
Hourly Total	3	1	0	0	4	4	1	0	4	5	5	1	0	16	6	15
5:00 PM	1	0	0	0	1	1	0	0	0	1	1	1	0	6	2	4
5:15 PM	0	2	0	0	2	0	2	0	0	2	1	1	0	3	2	6
5:30 PM	0	0	0	0	0	0	0	0	0	0	4	1	0	0	5	5
5:45 PM	0	1	0	0	1	1	0	0	0	1	2	1	0	1	3	5
Hourly Total	1	3	0	0	4	2	2	0	0	4	8	4	0	10	12	20
Grand Total	9	18	1	6	28	15	10	0	8	25	19	12	0	39	31	84
Approach %	32.1	64.3	3.6	-	-	60.0	40.0	0.0	-	-	61.3	38.7	0.0	-	-	-
Total %	10.7	21.4	1.2	-	33.3	17.9	11.9	0.0	-	29.8	22.6	14.3	0.0	-	36.9	-
Lights	7	18	0	-	25	15	9	0	-	24	19	12	0	-	31	80
% Lights	77.8	100.0	0.0	-	89.3	100.0	90.0	-	-	96.0	100.0	100.0	-	-	100.0	95.2
Buses	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Buses	0.0	0.0	0.0	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Single-Unit Trucks	2	0	0	-	2	0	1	0	-	1	0	0	0	-	0	3
% Single-Unit Trucks	22.2	0.0	0.0	-	7.1	0.0	10.0	-	-	4.0	0.0	0.0	-	-	0.0	3.6
Articulated Trucks	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Articulated Trucks	0.0	0.0	0.0	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Road	0	0	1	-	1	0	0	0	-	0	0	0	0	-	0	1
% Bicycles on Road	0.0	0.0	100.0	-	3.6	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	1.2
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	0.0	-	-	-	-	0.0	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	6	-	-	-	-	8	-	-	-	-	39	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	100.0	-	-	-	-	100.0	-	-



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Jacob Cressman Drive & Michael
Myers Road
Site Code: 200068
Start Date: 03/05/2020
Page No: 3



Turning Movement Data Plot



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@ptsll.com

Count Name: Jacob Cressman Drive & Michael
Myers Road
Site Code: 200068
Start Date: 03/05/2020
Page No: 4

Turning Movement Peak Hour Data (7:30 AM)

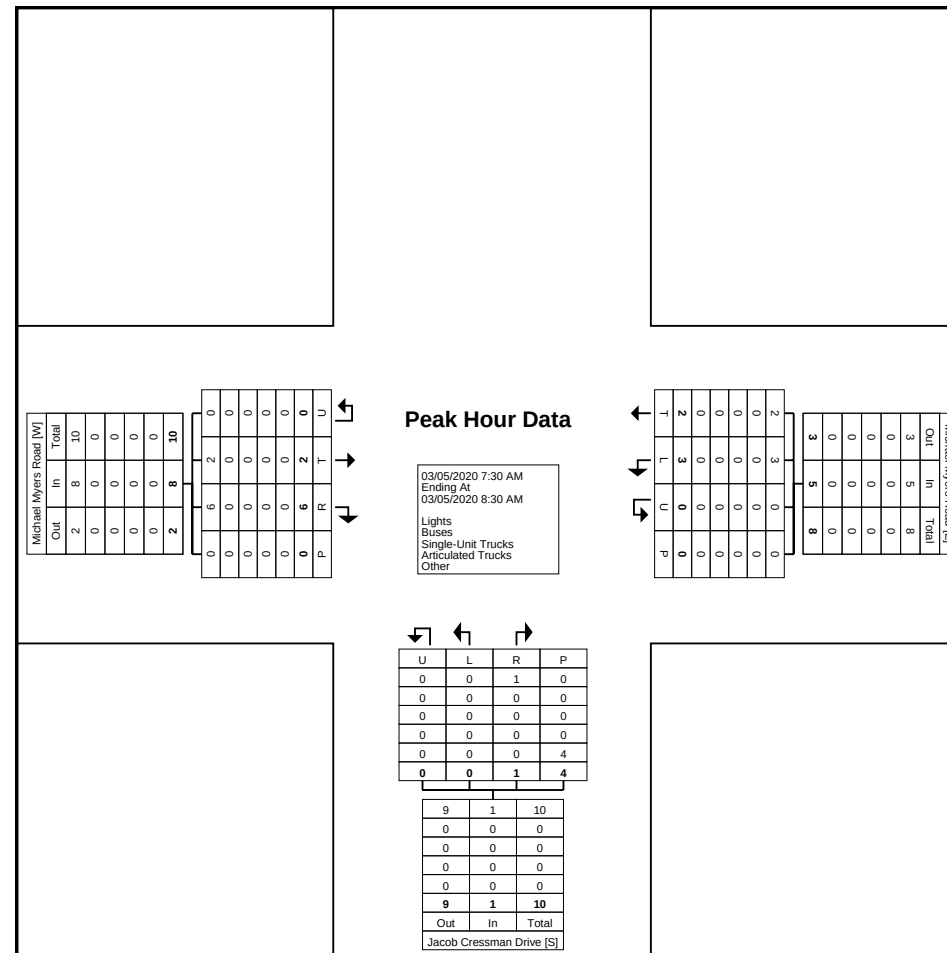
Start Time	Michael Myers Road Eastbound					Michael Myers Road Westbound					Jacob Cressman Drive Northbound					Int. Total
	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Left	Right	U-Turn	Peds	App. Total	
7:30 AM	0	0	0	0	0	1	0	0	0	1	0	0	0	2	0	1
7:45 AM	0	2	0	0	2	2	0	0	0	2	0	1	0	0	1	5
8:00 AM	2	3	0	0	5	0	2	0	0	2	0	0	0	2	0	7
8:15 AM	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	1
Total	2	6	0	0	8	3	2	0	0	5	0	1	0	4	1	14
Approach %	25.0	75.0	0.0	-	-	60.0	40.0	0.0	-	-	0.0	100.0	0.0	-	-	-
Total %	14.3	42.9	0.0	-	57.1	21.4	14.3	0.0	-	35.7	0.0	7.1	0.0	-	7.1	-
PHF	0.250	0.500	0.000	-	0.400	0.375	0.250	0.000	-	0.625	0.000	0.250	0.000	-	0.250	0.500
Lights	2	6	0	-	8	3	2	0	-	5	0	1	0	-	1	14
% Lights	100.0	100.0	-	-	100.0	100.0	100.0	-	-	100.0	-	100.0	-	-	100.0	100.0
Buses	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Buses	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	-	0.0	-	-	0.0	0.0
Single-Unit Trucks	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Single-Unit Trucks	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	-	0.0	-	-	0.0	0.0
Articulated Trucks	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Articulated Trucks	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	-	0.0	-	-	0.0	0.0
Bicycles on Road	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	-	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	4	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Jacob Cressman Drive & Michael
Myers Road
Site Code: 200068
Start Date: 03/05/2020
Page No: 5



Turning Movement Peak Hour Data Plot (7:30 AM)



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Jacob Cressman Drive & Michael
Myers Road
Site Code: 200068
Start Date: 03/05/2020
Page No: 6

Turning Movement Peak Hour Data (12:00 PM)

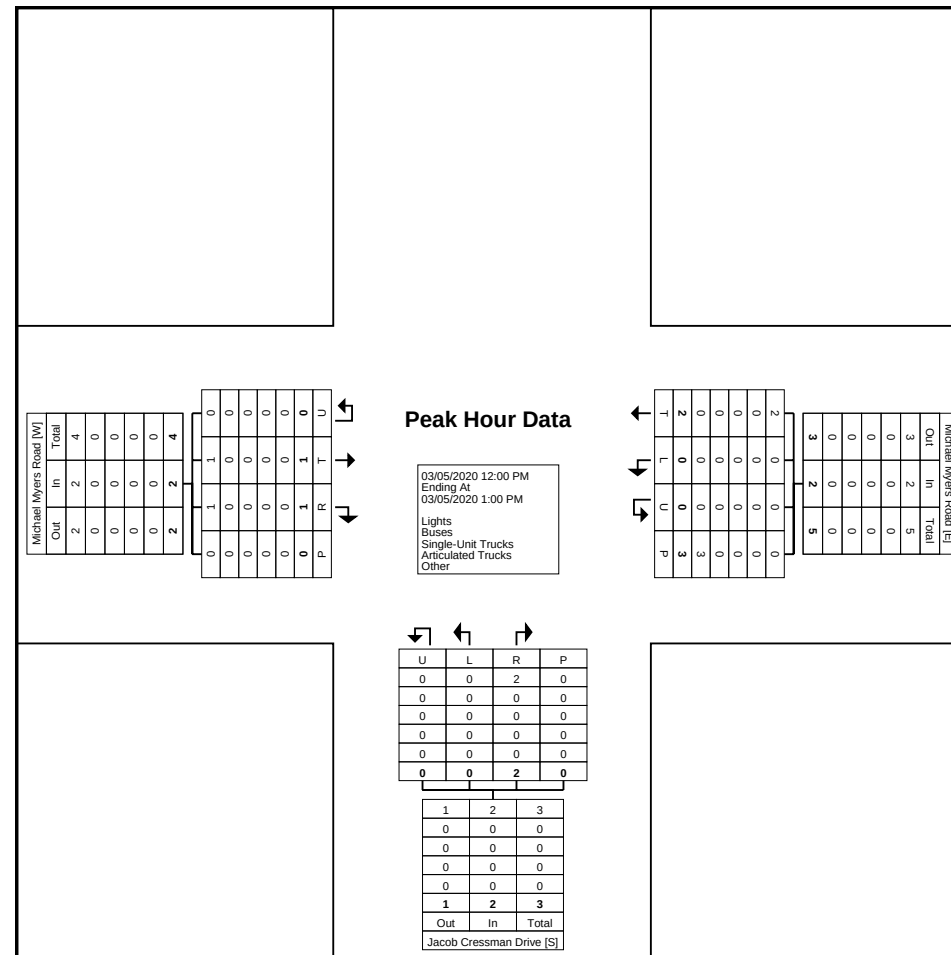
Start Time	Michael Myers Road Eastbound					Michael Myers Road Westbound					Jacob Cressman Drive Northbound					Int. Total
	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Left	Right	U-Turn	Peds	App. Total	
12:00 PM	1	1	0	0	2	0	1	0	2	1	0	1	0	0	1	4
12:15 PM	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
12:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:45 PM	0	0	0	0	0	0	1	0	0	1	0	1	0	0	1	2
Total	1	1	0	0	2	0	2	0	3	2	0	2	0	0	2	6
Approach %	50.0	50.0	0.0	-	-	0.0	100.0	0.0	-	-	0.0	100.0	0.0	-	-	-
Total %	16.7	16.7	0.0	-	33.3	0.0	33.3	0.0	-	33.3	0.0	33.3	0.0	-	33.3	-
PHF	0.250	0.250	0.000	-	0.250	0.000	0.500	0.000	-	0.500	0.000	0.500	0.000	-	0.500	0.375
Lights	1	1	0	-	2	0	2	0	-	2	0	2	0	-	2	6
% Lights	100.0	100.0	-	-	100.0	-	100.0	-	-	100.0	-	100.0	-	-	100.0	100.0
Buses	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Buses	0.0	0.0	-	-	0.0	-	0.0	-	-	0.0	-	0.0	-	-	0.0	0.0
Single-Unit Trucks	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Single-Unit Trucks	0.0	0.0	-	-	0.0	-	0.0	-	-	0.0	-	0.0	-	-	0.0	0.0
Articulated Trucks	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Articulated Trucks	0.0	0.0	-	-	0.0	-	0.0	-	-	0.0	-	0.0	-	-	0.0	0.0
Bicycles on Road	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	-	-	0.0	-	0.0	-	-	0.0	-	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	0.0	-	-	-	-	-	-	-
Pedestrians	-	-	-	0	-	-	-	-	3	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	-	-



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Jacob Cressman Drive & Michael
Myers Road
Site Code: 200068
Start Date: 03/05/2020
Page No: 7



Turning Movement Peak Hour Data Plot (12:00 PM)



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@ptsll.com

Count Name: Jacob Cressman Drive & Michael
Myers Road
Site Code: 200068
Start Date: 03/05/2020
Page No: 8

Turning Movement Peak Hour Data (3:30 PM)

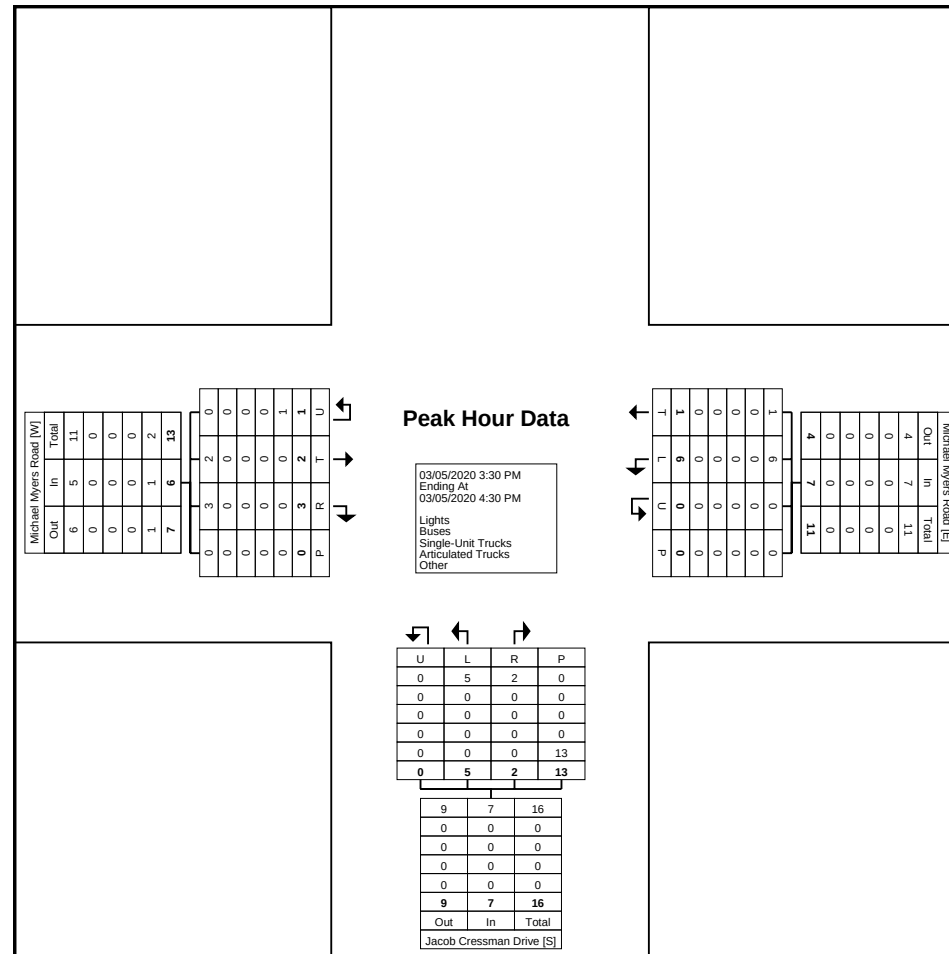
Start Time	Michael Myers Road Eastbound					Michael Myers Road Westbound					Jacob Cressman Drive Northbound					Int. Total
	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Left	Right	U-Turn	Peds	App. Total	
3:30 PM	0	1	0	0	1	2	0	0	0	2	0	0	0	0	0	3
3:45 PM	0	1	1	0	2	2	0	0	0	2	1	1	0	1	2	6
4:00 PM	0	1	0	0	1	2	1	0	0	3	1	0	0	4	1	5
4:15 PM	2	0	0	0	2	0	0	0	0	0	3	1	0	8	4	6
Total	2	3	1	0	6	6	1	0	0	7	5	2	0	13	7	20
Approach %	33.3	50.0	16.7	-	-	85.7	14.3	0.0	-	-	71.4	28.6	0.0	-	-	-
Total %	10.0	15.0	5.0	-	30.0	30.0	5.0	0.0	-	35.0	25.0	10.0	0.0	-	35.0	-
PHF	0.250	0.750	0.250	-	0.750	0.750	0.250	0.000	-	0.583	0.417	0.500	0.000	-	0.438	0.833
Lights	2	3	0	-	5	6	1	0	-	7	5	2	0	-	7	19
% Lights	100.0	100.0	0.0	-	83.3	100.0	100.0	-	-	100.0	100.0	100.0	-	-	100.0	95.0
Buses	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Buses	0.0	0.0	0.0	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Single-Unit Trucks	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Single-Unit Trucks	0.0	0.0	0.0	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Articulated Trucks	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Articulated Trucks	0.0	0.0	0.0	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Road	0	0	1	-	1	0	0	0	-	0	0	0	0	-	0	1
% Bicycles on Road	0.0	0.0	100.0	-	16.7	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	5.0
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	13	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Jacob Cressman Drive & Michael
Myers Road
Site Code: 200068
Start Date: 03/05/2020
Page No: 9



Turning Movement Peak Hour Data Plot (3:30 PM)



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Livingston Blvd & Snyder's Road
Site Code: 200068
Start Date: 03/05/2020
Page No: 1

Turning Movement Data

Start Time	Snyder's Road Eastbound					Snyder's Road Westbound					Livingston Blvd Southbound					Int. Total
	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Left	Right	U-Turn	Peds	App. Total	
7:30 AM	12	63	0	0	75	61	3	0	0	64	25	9	0	5	34	173
7:45 AM	18	71	0	0	89	105	3	0	0	108	21	45	0	5	66	263
Hourly Total	30	134	0	0	164	166	6	0	0	172	46	54	0	10	100	436
8:00 AM	23	80	0	0	103	107	12	0	0	119	22	17	0	0	39	261
8:15 AM	7	74	0	0	81	46	4	0	0	50	23	19	0	0	42	173
8:30 AM	2	61	0	0	63	37	3	0	0	40	12	8	0	1	20	123
8:45 AM	4	33	0	0	37	27	3	0	0	30	8	4	0	1	12	79
Hourly Total	36	248	0	0	284	217	22	0	0	239	65	48	0	2	113	636
9:00 AM	4	29	0	0	33	25	4	0	0	29	12	8	0	0	20	82
9:15 AM	4	47	0	0	51	49	4	0	0	53	8	4	0	0	12	116
9:30 AM	3	35	0	0	38	28	5	0	0	33	7	4	0	3	11	82
9:45 AM	3	34	0	0	37	21	6	0	0	27	7	5	0	2	12	76
Hourly Total	14	145	0	0	159	123	19	0	0	142	34	21	0	5	55	356
10:00 AM	4	34	0	0	38	31	7	0	0	38	3	6	0	2	9	85
10:15 AM	5	39	0	0	44	26	6	0	0	32	5	6	0	0	11	87
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	9	73	0	0	82	57	13	0	0	70	8	12	0	2	20	172
12:00 PM	7	32	0	0	39	29	3	0	0	32	6	4	0	1	10	81
12:15 PM	6	28	0	1	34	36	3	0	0	39	4	4	0	0	8	81
12:30 PM	10	40	0	0	50	32	2	0	0	34	6	5	0	4	11	95
12:45 PM	7	35	0	0	42	40	5	0	0	45	3	5	0	0	8	95
Hourly Total	30	135	0	1	165	137	13	0	0	150	19	18	0	5	37	352
1:00 PM	9	36	0	0	45	40	9	0	0	49	1	6	0	0	7	101
1:15 PM	3	41	0	4	44	46	5	0	0	51	4	10	0	5	14	109
1:30 PM	7	46	0	0	53	28	4	0	3	32	2	4	0	3	6	91
1:45 PM	8	39	0	0	47	56	5	0	0	61	1	6	0	2	7	115
Hourly Total	27	162	0	4	189	170	23	0	3	193	8	26	0	10	34	416
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3:00 PM	7	45	0	0	52	42	8	0	0	50	9	7	0	2	16	118
3:15 PM	9	45	0	0	54	48	9	0	0	57	4	9	0	0	13	124
3:30 PM	9	46	0	0	55	42	15	0	0	57	5	9	0	3	14	126
3:45 PM	11	42	0	2	53	56	13	0	0	69	10	13	0	1	23	145
Hourly Total	36	178	0	2	214	188	45	0	0	233	28	38	0	6	66	513
4:00 PM	16	40	0	0	56	45	14	0	0	59	6	14	0	6	20	135
4:15 PM	11	47	0	0	58	54	13	0	2	67	7	8	0	2	15	140
4:30 PM	20	41	0	0	61	62	14	0	0	76	4	15	0	0	19	156

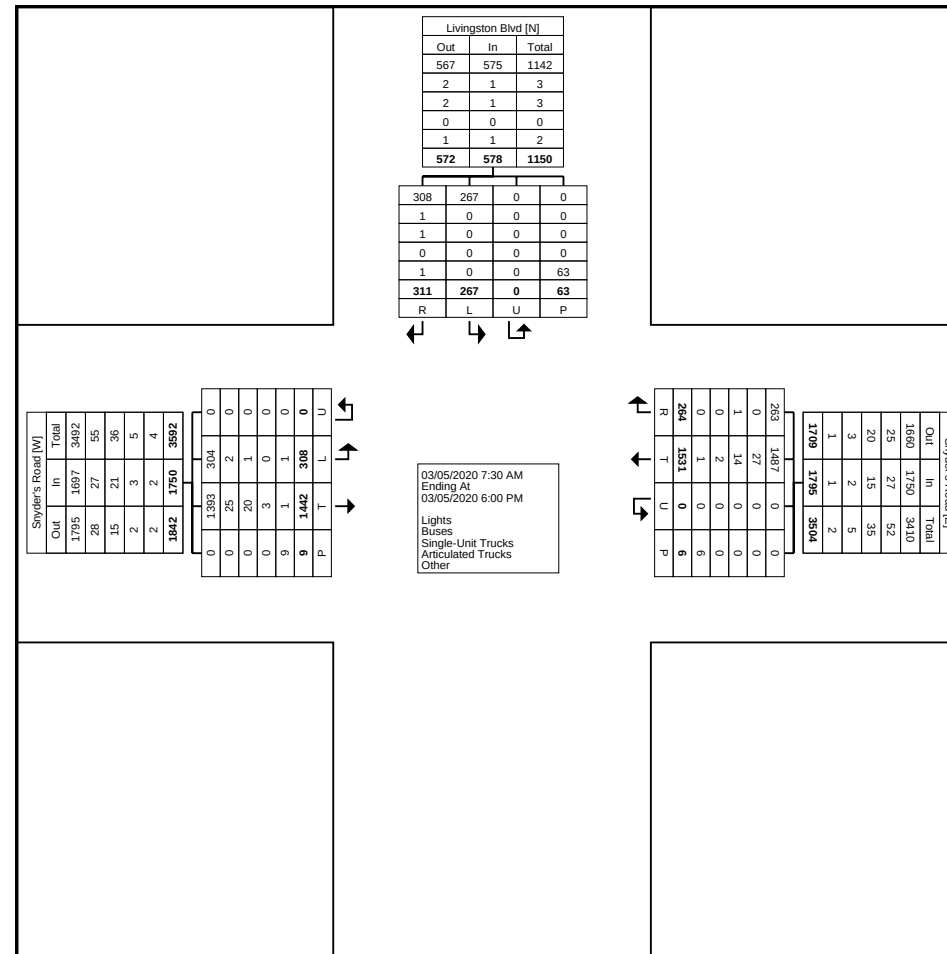
4:45 PM	8	37	0	0	45	65	15	0	0	80	5	16	0	3	21	146
Hourly Total	55	165	0	0	220	226	56	0	2	282	22	53	0	11	75	577
5:00 PM	20	63	0	0	83	65	13	0	0	78	9	15	0	0	24	185
5:15 PM	16	48	0	0	64	68	18	0	1	86	6	8	0	5	14	164
5:30 PM	10	49	0	0	59	65	12	0	0	77	8	7	0	2	15	151
5:45 PM	25	42	0	2	67	49	24	0	0	73	14	11	0	5	25	165
Hourly Total	71	202	0	2	273	247	67	0	1	314	37	41	0	12	78	665
Grand Total	308	1442	0	9	1750	1531	264	0	6	1795	267	311	0	63	578	4123
Approach %	17.6	82.4	0.0	-	-	85.3	14.7	0.0	-	-	46.2	53.8	0.0	-	-	-
Total %	7.5	35.0	0.0	-	42.4	37.1	6.4	0.0	-	43.5	6.5	7.5	0.0	-	14.0	-
Lights	304	1393	0	-	1697	1487	263	0	-	1750	267	308	0	-	575	4022
% Lights	98.7	96.6	-	-	97.0	97.1	99.6	-	-	97.5	100.0	99.0	-	-	99.5	97.6
Buses	2	25	0	-	27	27	0	0	-	27	0	1	0	-	1	55
% Buses	0.6	1.7	-	-	1.5	1.8	0.0	-	-	1.5	0.0	0.3	-	-	0.2	1.3
Single-Unit Trucks	1	20	0	-	21	14	1	0	-	15	0	1	0	-	1	37
% Single-Unit Trucks	0.3	1.4	-	-	1.2	0.9	0.4	-	-	0.8	0.0	0.3	-	-	0.2	0.9
Articulated Trucks	0	3	0	-	3	2	0	0	-	2	0	0	0	-	0	5
% Articulated Trucks	0.0	0.2	-	-	0.2	0.1	0.0	-	-	0.1	0.0	0.0	-	-	0.0	0.1
Bicycles on Road	1	1	0	-	2	1	0	0	-	1	0	1	0	-	1	4
% Bicycles on Road	0.3	0.1	-	-	0.1	0.1	0.0	-	-	0.1	0.0	0.3	-	-	0.2	0.1
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	1	-	-	-	-	2	-	-
% Bicycles on Crosswalk	-	-	-	0.0	-	-	-	-	16.7	-	-	-	-	3.2	-	-
Pedestrians	-	-	-	9	-	-	-	-	5	-	-	-	-	61	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	83.3	-	-	-	-	96.8	-	-



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Livingston Blvd & Snyder's Road
Site Code: 200068
Start Date: 03/05/2020
Page No: 3



Turning Movement Data Plot



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@ptsI.com

Count Name: Livingston Blvd & Snyder's Road
Site Code: 200068
Start Date: 03/05/2020
Page No: 4

Turning Movement Peak Hour Data (7:30 AM)

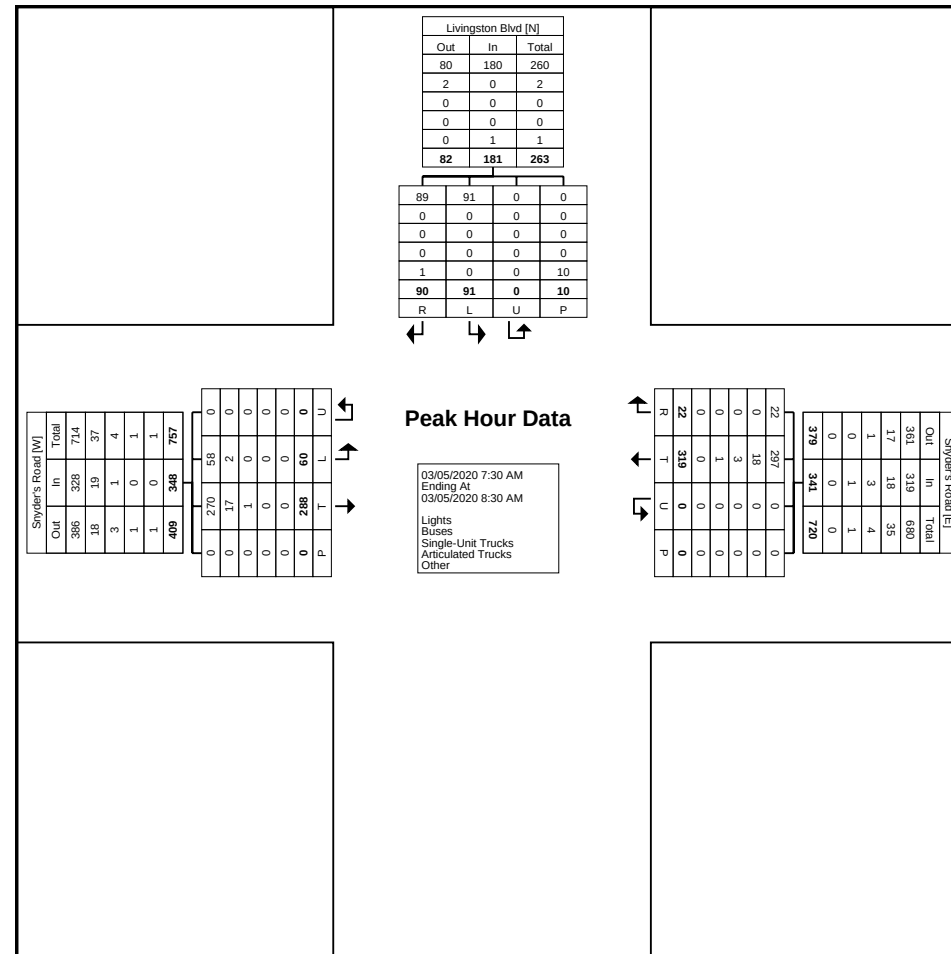
Start Time	Snyder's Road Eastbound					Snyder's Road Westbound					Livingston Blvd Southbound					Int. Total
	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Left	Right	U-Turn	Peds	App. Total	
7:30 AM	12	63	0	0	75	61	3	0	0	64	25	9	0	5	34	173
7:45 AM	18	71	0	0	89	105	3	0	0	108	21	45	0	5	66	263
8:00 AM	23	80	0	0	103	107	12	0	0	119	22	17	0	0	39	261
8:15 AM	7	74	0	0	81	46	4	0	0	50	23	19	0	0	42	173
Total	60	288	0	0	348	319	22	0	0	341	91	90	0	10	181	870
Approach %	17.2	82.8	0.0	-	-	93.5	6.5	0.0	-	-	50.3	49.7	0.0	-	-	-
Total %	6.9	33.1	0.0	-	40.0	36.7	2.5	0.0	-	39.2	10.5	10.3	0.0	-	20.8	-
PHF	0.652	0.900	0.000	-	0.845	0.745	0.458	0.000	-	0.716	0.910	0.500	0.000	-	0.686	0.827
Lights	58	270	0	-	328	297	22	0	-	319	91	89	0	-	180	827
% Lights	96.7	93.8	-	-	94.3	93.1	100.0	-	-	93.5	100.0	98.9	-	-	99.4	95.1
Buses	2	17	0	-	19	18	0	0	-	18	0	0	0	-	0	37
% Buses	3.3	5.9	-	-	5.5	5.6	0.0	-	-	5.3	0.0	0.0	-	-	0.0	4.3
Single-Unit Trucks	0	1	0	-	1	3	0	0	-	3	0	0	0	-	0	4
% Single-Unit Trucks	0.0	0.3	-	-	0.3	0.9	0.0	-	-	0.9	0.0	0.0	-	-	0.0	0.5
Articulated Trucks	0	0	0	-	0	1	0	0	-	1	0	0	0	-	0	1
% Articulated Trucks	0.0	0.0	-	-	0.0	0.3	0.0	-	-	0.3	0.0	0.0	-	-	0.0	0.1
Bicycles on Road	0	0	0	-	0	0	0	0	-	0	0	1	0	-	1	1
% Bicycles on Road	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	1.1	-	-	0.6	0.1
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	10	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Livingston Blvd & Snyder's Road
Site Code: 200068
Start Date: 03/05/2020
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Turning Movement Peak Hour Data Plot (7:30 AM)



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Livingston Blvd & Snyder's Road
Site Code: 200068
Start Date: 03/05/2020
Page No: 6

Turning Movement Peak Hour Data (1:00 PM)

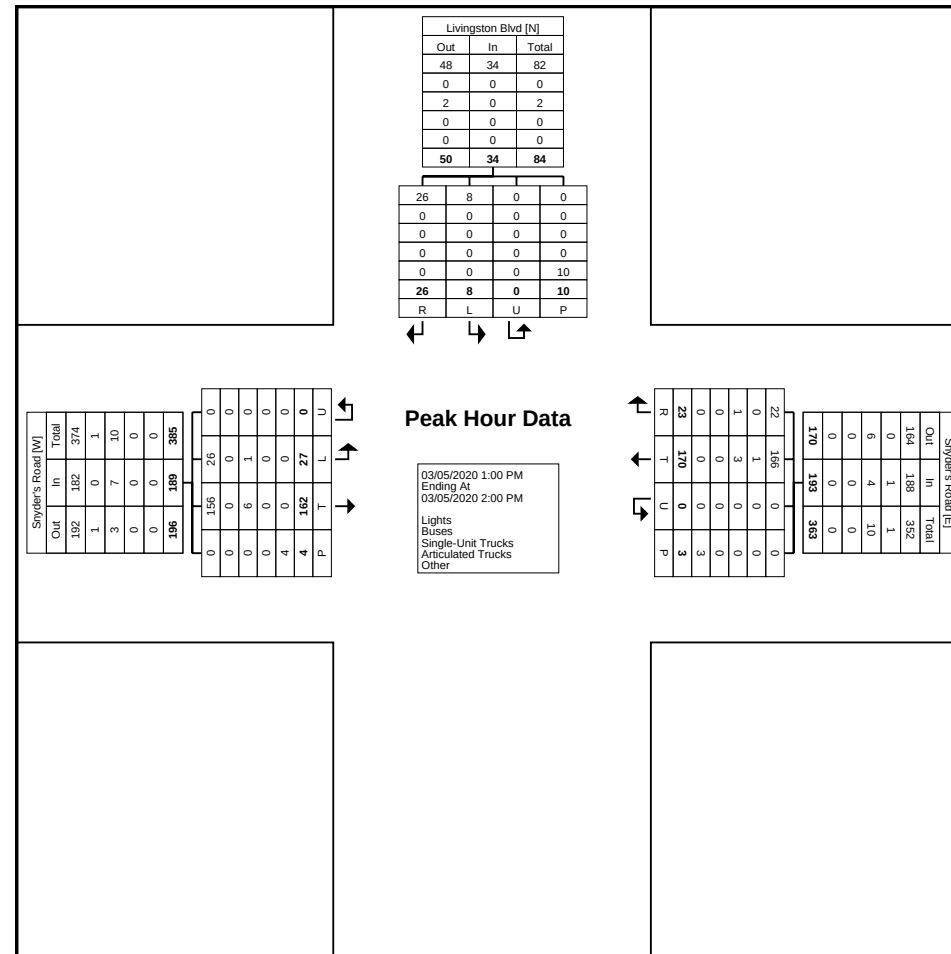
Start Time	Snyder's Road Eastbound					Snyder's Road Westbound					Livingston Blvd Southbound					Int. Total
	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Left	Right	U-Turn	Peds	App. Total	
1:00 PM	9	36	0	0	45	40	9	0	0	49	1	6	0	0	7	101
1:15 PM	3	41	0	4	44	46	5	0	0	51	4	10	0	5	14	109
1:30 PM	7	46	0	0	53	28	4	0	3	32	2	4	0	3	6	91
1:45 PM	8	39	0	0	47	56	5	0	0	61	1	6	0	2	7	115
Total	27	162	0	4	189	170	23	0	3	193	8	26	0	10	34	416
Approach %	14.3	85.7	0.0	-	-	88.1	11.9	0.0	-	-	23.5	76.5	0.0	-	-	-
Total %	6.5	38.9	0.0	-	45.4	40.9	5.5	0.0	-	46.4	1.9	6.3	0.0	-	8.2	-
PHF	0.750	0.880	0.000	-	0.892	0.759	0.639	0.000	-	0.791	0.500	0.650	0.000	-	0.607	0.904
Lights	26	156	0	-	182	166	22	0	-	188	8	26	0	-	34	404
% Lights	96.3	96.3	-	-	96.3	97.6	95.7	-	-	97.4	100.0	100.0	-	-	100.0	97.1
Buses	0	0	0	-	0	1	0	0	-	1	0	0	0	-	0	1
% Buses	0.0	0.0	-	-	0.0	0.6	0.0	-	-	0.5	0.0	0.0	-	-	0.0	0.2
Single-Unit Trucks	1	6	0	-	7	3	1	0	-	4	0	0	0	-	0	11
% Single-Unit Trucks	3.7	3.7	-	-	3.7	1.8	4.3	-	-	2.1	0.0	0.0	-	-	0.0	2.6
Articulated Trucks	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Articulated Trucks	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Road	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	1	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	0.0	-	-	-	-	33.3	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	4	-	-	-	-	2	-	-	-	-	10	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	66.7	-	-	-	-	100.0	-	-



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
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Count Name: Livingston Blvd & Snyder's Road
Site Code: 200068
Start Date: 03/05/2020
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Turning Movement Peak Hour Data Plot (1:00 PM)



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Livingston Blvd & Snyder's Road
Site Code: 200068
Start Date: 03/05/2020
Page No: 8

Turning Movement Peak Hour Data (5:00 PM)

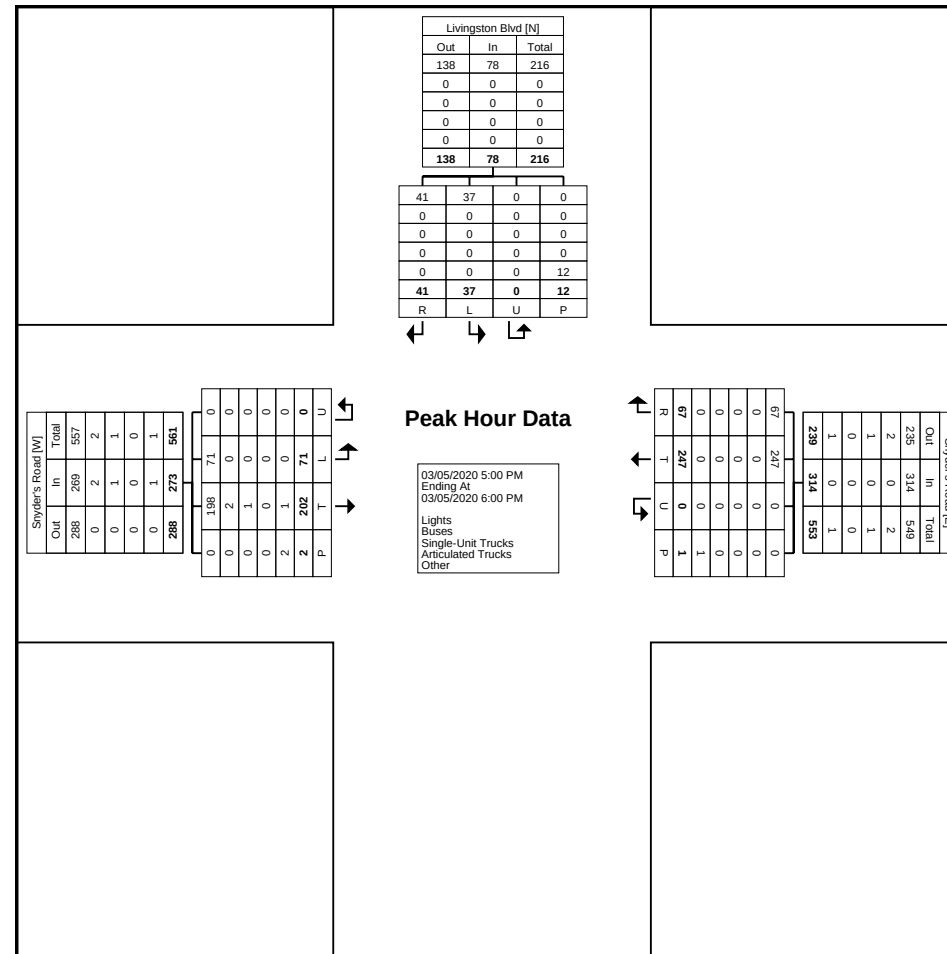
Start Time	Snyder's Road Eastbound					Snyder's Road Westbound					Livingston Blvd Southbound					Int. Total
	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Left	Right	U-Turn	Peds	App. Total	
5:00 PM	20	63	0	0	83	65	13	0	0	78	9	15	0	0	24	185
5:15 PM	16	48	0	0	64	68	18	0	1	86	6	8	0	5	14	164
5:30 PM	10	49	0	0	59	65	12	0	0	77	8	7	0	2	15	151
5:45 PM	25	42	0	2	67	49	24	0	0	73	14	11	0	5	25	165
Total	71	202	0	2	273	247	67	0	1	314	37	41	0	12	78	665
Approach %	26.0	74.0	0.0	-	-	78.7	21.3	0.0	-	-	47.4	52.6	0.0	-	-	-
Total %	10.7	30.4	0.0	-	41.1	37.1	10.1	0.0	-	47.2	5.6	6.2	0.0	-	11.7	-
PHF	0.710	0.802	0.000	-	0.822	0.908	0.698	0.000	-	0.913	0.661	0.683	0.000	-	0.780	0.899
Lights	71	198	0	-	269	247	67	0	-	314	37	41	0	-	78	661
% Lights	100.0	98.0	-	-	98.5	100.0	100.0	-	-	100.0	100.0	100.0	-	-	100.0	99.4
Buses	0	2	0	-	2	0	0	0	-	0	0	0	0	-	0	2
% Buses	0.0	1.0	-	-	0.7	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.3
Single-Unit Trucks	0	1	0	-	1	0	0	0	-	0	0	0	0	-	0	1
% Single-Unit Trucks	0.0	0.5	-	-	0.4	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.2
Articulated Trucks	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Articulated Trucks	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Road	0	1	0	-	1	0	0	0	-	0	0	0	0	-	0	1
% Bicycles on Road	0.0	0.5	-	-	0.4	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.2
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	0.0	-	-	-	-	0.0	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	2	-	-	-	-	1	-	-	-	-	12	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	100.0	-	-	-	-	100.0	-	-



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@ptsl.com

Count Name: Livingston Blvd & Snyder's Road
Site Code: 200068
Start Date: 03/05/2020
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Turning Movement Peak Hour Data Plot (5:00 PM)



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cdowness@ptsl.com

Count Name: Livingston Blvd/Foundry Street &
Snyder's Road
Site Code: 200068
Start Date: 03/05/2020
Page No: 1

Turning Movement Data

Start Time	Snyder's Road Eastbound						Snyder's Road Westbound						Foundry Street Northbound						Livingston Blvd Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
7:30 AM	0	29	45	0	0	74	3	36	5	0	0	44	28	12	2	0	0	42	17	51	14	0	4	82	242
7:45 AM	1	39	34	0	0	74	3	50	13	0	1	66	49	23	4	0	0	76	29	35	8	0	1	72	288
Hourly Total	1	68	79	0	0	148	6	86	18	0	1	110	77	35	6	0	0	118	46	86	22	0	5	154	530
8:00 AM	4	36	34	0	0	74	1	47	17	0	0	65	45	28	4	0	0	77	32	43	15	0	1	90	306
8:15 AM	2	44	25	0	0	71	3	17	2	0	1	22	22	15	4	0	0	41	24	47	11	0	0	82	216
8:30 AM	1	32	34	0	0	67	5	17	2	0	0	24	20	7	3	0	0	30	9	35	10	0	0	54	175
8:45 AM	2	20	13	0	1	35	6	14	5	0	1	25	13	8	1	0	0	22	11	21	8	0	0	40	122
Hourly Total	9	132	106	0	1	247	15	95	26	0	2	136	100	58	12	0	0	170	76	146	44	0	1	266	819
9:00 AM	1	21	14	0	0	36	0	11	5	0	1	16	12	12	1	0	0	25	11	15	9	0	0	35	112
9:15 AM	2	21	15	0	0	38	3	28	3	0	0	34	18	13	1	0	0	32	10	12	12	0	0	34	138
9:30 AM	4	30	18	0	0	52	2	14	6	0	0	22	13	10	4	0	0	27	9	17	7	0	0	33	134
9:45 AM	0	27	18	0	0	45	1	14	10	0	0	25	11	9	2	0	0	22	11	8	6	0	2	25	117
Hourly Total	7	99	65	0	0	171	6	67	24	0	1	97	54	44	8	0	0	106	41	52	34	0	2	127	501
10:00 AM	2	24	6	0	0	32	1	21	6	0	0	28	6	6	3	0	0	15	5	18	6	0	0	29	104
10:15 AM	0	27	14	0	0	41	4	26	3	0	0	33	11	9	6	0	0	26	7	4	4	0	0	15	115
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	2	51	20	0	0	73	5	47	9	0	0	61	17	15	9	0	0	41	12	22	10	0	0	44	219
12:00 PM	3	16	9	0	1	28	6	13	4	0	4	23	11	14	9	0	0	34	9	14	8	0	4	31	116
12:15 PM	1	23	10	0	0	34	2	22	14	0	0	38	10	8	3	1	2	22	6	12	11	0	3	29	123
12:30 PM	0	29	18	0	0	47	2	22	3	0	0	27	10	14	6	0	0	30	8	13	6	0	4	27	131
12:45 PM	1	18	17	0	0	36	6	24	9	0	2	39	19	13	4	0	0	36	9	8	8	0	2	25	136
Hourly Total	5	86	54	0	1	145	16	81	30	0	6	127	50	49	22	1	2	122	32	47	33	0	13	112	506
1:00 PM	0	23	20	0	1	43	6	29	2	0	0	37	16	14	3	0	0	33	4	12	5	0	0	21	134
1:15 PM	1	25	19	0	1	45	3	28	6	0	0	37	19	13	3	0	2	35	11	6	9	0	2	26	143
1:30 PM	3	24	23	0	2	50	1	21	11	0	0	33	11	11	2	0	0	24	12	12	3	0	1	27	134
1:45 PM	0	26	11	0	1	37	4	34	13	0	3	51	18	10	3	0	0	31	8	17	6	0	3	31	150
Hourly Total	4	98	73	0	5	175	14	112	32	0	3	158	64	48	11	0	2	123	35	47	23	0	6	105	561
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3:00 PM	6	25	17	0	1	48	4	23	12	0	4	39	19	16	5	0	0	40	18	21	8	0	6	47	174
3:15 PM	0	33	9	0	5	42	2	24	9	0	0	35	23	35	3	0	2	61	15	16	7	0	4	38	176
3:30 PM	1	30	21	0	2	52	6	29	9	0	2	44	26	29	4	0	2	59	9	20	10	0	3	39	194
3:45 PM	2	26	18	0	1	46	2	33	22	0	2	57	21	30	8	0	1	59	14	8	9	0	4	31	193
Hourly Total	9	114	65	0	9	188	14	109	52	0	8	175	89	110	20	0	5	219	56	65	34	0	17	155	737
4:00 PM	2	19	19	0	2	40	4	42	16	0	0	62	24	29	4	0	2	57	15	16	6	0	4	37	196
4:15 PM	3	36	20	0	7	59	4	30	19	0	0	53	19	41	4	0	8	64	9	17	18	0	0	44	220

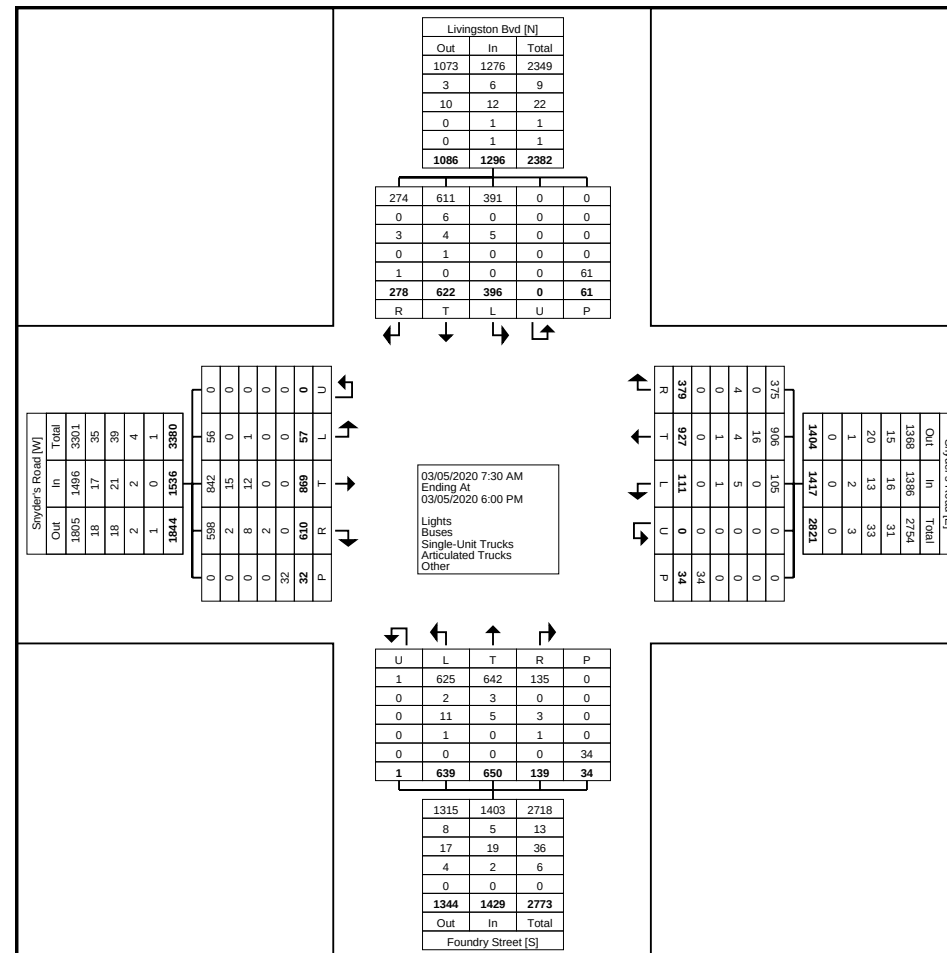
4:30 PM	1	23	22	0	3	46	6	46	20	0	1	72	19	41	4	0	3	64	15	26	8	0	1	49	231
4:45 PM	3	32	14	0	3	49	4	45	27	0	4	76	27	43	5	0	4	75	9	23	8	0	0	40	240
Hourly Total	9	110	75	0	15	194	18	163	82	0	5	263	89	154	17	0	17	260	48	82	40	0	5	170	887
5:00 PM	6	26	25	0	0	57	3	43	34	0	5	80	33	30	5	0	1	68	10	18	6	0	2	34	239
5:15 PM	1	30	16	0	1	47	8	40	22	0	3	70	31	36	10	0	1	77	15	17	9	0	3	41	235
5:30 PM	2	28	15	0	0	45	4	48	31	0	0	83	16	40	13	0	4	69	14	16	7	0	5	37	234
5:45 PM	2	27	17	0	0	46	2	36	19	0	0	57	19	31	6	0	2	56	11	24	16	0	2	51	210
Hourly Total	11	111	73	0	1	195	17	167	106	0	8	290	99	137	34	0	8	270	50	75	38	0	12	163	918
Grand Total	57	869	610	0	32	1536	111	927	379	0	34	1417	639	650	139	1	34	1429	396	622	278	0	61	1296	5678
Approach %	3.7	56.6	39.7	0.0	-	-	7.8	65.4	26.7	0.0	-	-	44.7	45.5	9.7	0.1	-	-	30.6	48.0	21.5	0.0	-	-	-
Total %	1.0	15.3	10.7	0.0	-	27.1	2.0	16.3	6.7	0.0	-	25.0	11.3	11.4	2.4	0.0	-	25.2	7.0	11.0	4.9	0.0	-	22.8	-
Lights	56	842	598	0	-	1496	105	906	375	0	-	1386	625	642	135	1	-	1403	391	611	274	0	-	1276	5561
% Lights	98.2	96.9	98.0	-	-	97.4	94.6	97.7	98.9	-	-	97.8	97.8	98.8	97.1	100.0	-	98.2	98.7	98.2	98.6	-	-	98.5	97.9
Buses	0	15	2	0	-	17	0	16	0	0	-	16	2	3	0	0	-	5	0	6	0	0	-	6	44
% Buses	0.0	1.7	0.3	-	-	1.1	0.0	1.7	0.0	-	-	1.1	0.3	0.5	0.0	0.0	-	0.3	0.0	1.0	0.0	-	-	0.5	0.8
Single-Unit Trucks	1	12	8	0	-	21	5	4	4	0	-	13	11	5	3	0	-	19	5	4	3	0	-	12	65
% Single-Unit Trucks	1.8	1.4	1.3	-	-	1.4	4.5	0.4	1.1	-	-	0.9	1.7	0.8	2.2	0.0	-	1.3	1.3	0.6	1.1	-	-	0.9	1.1
Articulated Trucks	0	0	2	0	-	2	1	1	0	0	-	2	1	0	1	0	-	2	0	1	0	0	-	1	7
% Articulated Trucks	0.0	0.0	0.3	-	-	0.1	0.9	0.1	0.0	-	-	0.1	0.2	0.0	0.7	0.0	-	0.1	0.0	0.2	0.0	-	-	0.1	0.1
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	1	0	-	1	1
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.4	-	-	0.1	0.0
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	32	-	-	-	-	-	34	-	-	-	-	-	34	-	-	-	-	-	61	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-



Paradigm Transportation Solutions Limited
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Count Name: Livingston Blvd/Foundry Street &
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Turning Movement Data Plot



Paradigm Transportation Solutions Limited
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Count Name: Livingston Blvd/Foundry Street &
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Turning Movement Peak Hour Data (7:30 AM)

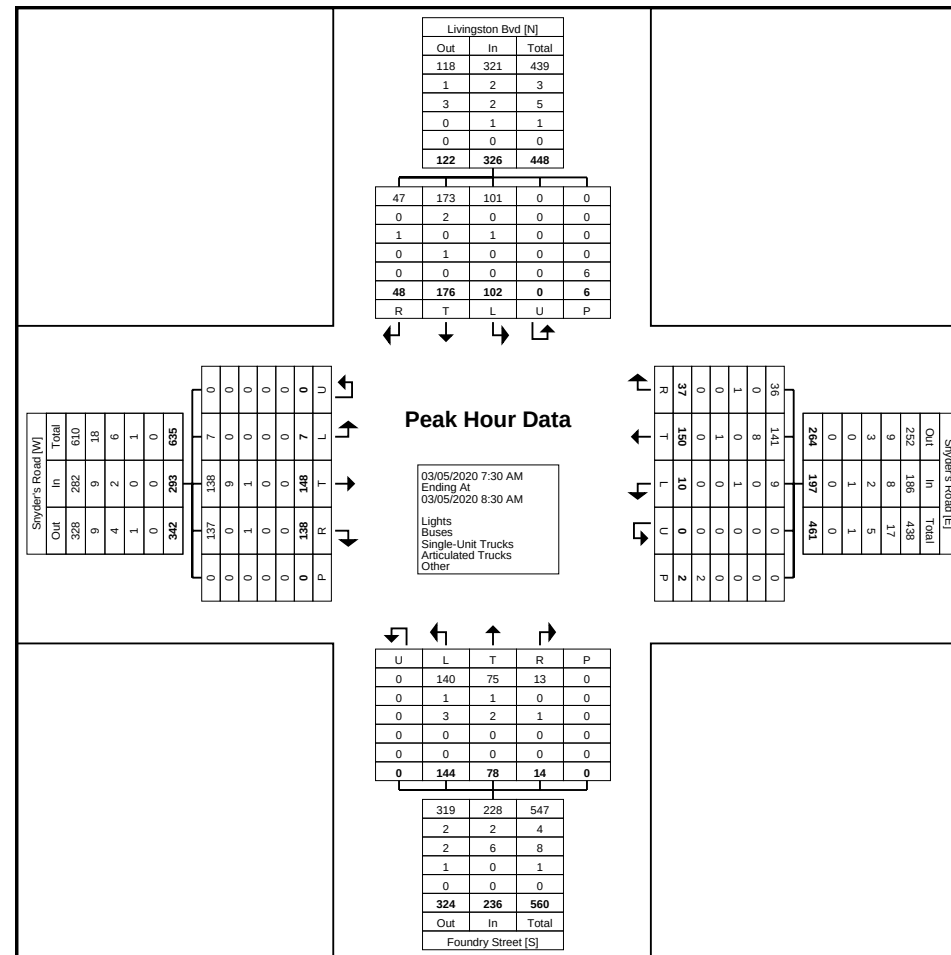
Start Time	Snyder's Road Eastbound						Snyder's Road Westbound						Foundry Street Northbound						Livingston Blvd Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
7:30 AM	0	29	45	0	0	74	3	36	5	0	0	44	28	12	2	0	0	42	17	51	14	0	4	82	242
7:45 AM	1	39	34	0	0	74	3	50	13	0	1	66	49	23	4	0	0	76	29	35	8	0	1	72	288
8:00 AM	4	36	34	0	0	74	1	47	17	0	0	65	45	28	4	0	0	77	32	43	15	0	1	90	306
8:15 AM	2	44	25	0	0	71	3	17	2	0	1	22	22	15	4	0	0	41	24	47	11	0	0	82	216
Total	7	148	138	0	0	293	10	150	37	0	2	197	144	78	14	0	0	236	102	176	48	0	6	326	1052
Approach %	2.4	50.5	47.1	0.0	-	-	5.1	76.1	18.8	0.0	-	-	61.0	33.1	5.9	0.0	-	-	31.3	54.0	14.7	0.0	-	-	-
Total %	0.7	14.1	13.1	0.0	-	27.9	1.0	14.3	3.5	0.0	-	18.7	13.7	7.4	1.3	0.0	-	22.4	9.7	16.7	4.6	0.0	-	31.0	-
PHF	0.438	0.841	0.767	0.000	-	0.990	0.833	0.750	0.544	0.000	-	0.746	0.735	0.696	0.875	0.000	-	0.766	0.797	0.863	0.800	0.000	-	0.906	0.859
Lights	7	138	137	0	-	282	9	141	36	0	-	186	140	75	13	0	-	228	101	173	47	0	-	321	1017
% Lights	100.0	93.2	99.3	-	-	96.2	90.0	94.0	97.3	-	-	94.4	97.2	96.2	92.9	-	-	96.6	99.0	98.3	97.9	-	-	98.5	96.7
Buses	0	9	0	0	-	9	0	8	0	0	-	8	1	1	0	0	-	2	0	2	0	0	-	2	21
% Buses	0.0	6.1	0.0	-	-	3.1	0.0	5.3	0.0	-	-	4.1	0.7	1.3	0.0	-	-	0.8	0.0	1.1	0.0	-	-	0.6	2.0
Single-Unit Trucks	0	1	1	0	-	2	1	0	1	0	-	2	3	2	1	0	-	6	1	0	1	0	-	2	12
% Single-Unit Trucks	0.0	0.7	0.7	-	-	0.7	10.0	0.0	2.7	-	-	1.0	2.1	2.6	7.1	-	-	2.5	1.0	0.0	2.1	-	-	0.6	1.1
Articulated Trucks	0	0	0	0	-	0	0	1	0	0	-	1	0	0	0	0	-	0	0	1	0	0	-	1	2
% Articulated Trucks	0.0	0.0	0.0	-	-	0.0	0.0	0.7	0.0	-	-	0.5	0.0	0.0	0.0	-	-	0.0	0.0	0.6	0.0	-	-	0.3	0.2
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	0.0	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	0	-	-	-	-	-	2	-	-	-	-	-	0	-	-	-	-	-	6	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-



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Count Name: Livingston Blvd/Foundry Street &
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Turning Movement Peak Hour Data (1:00 PM)

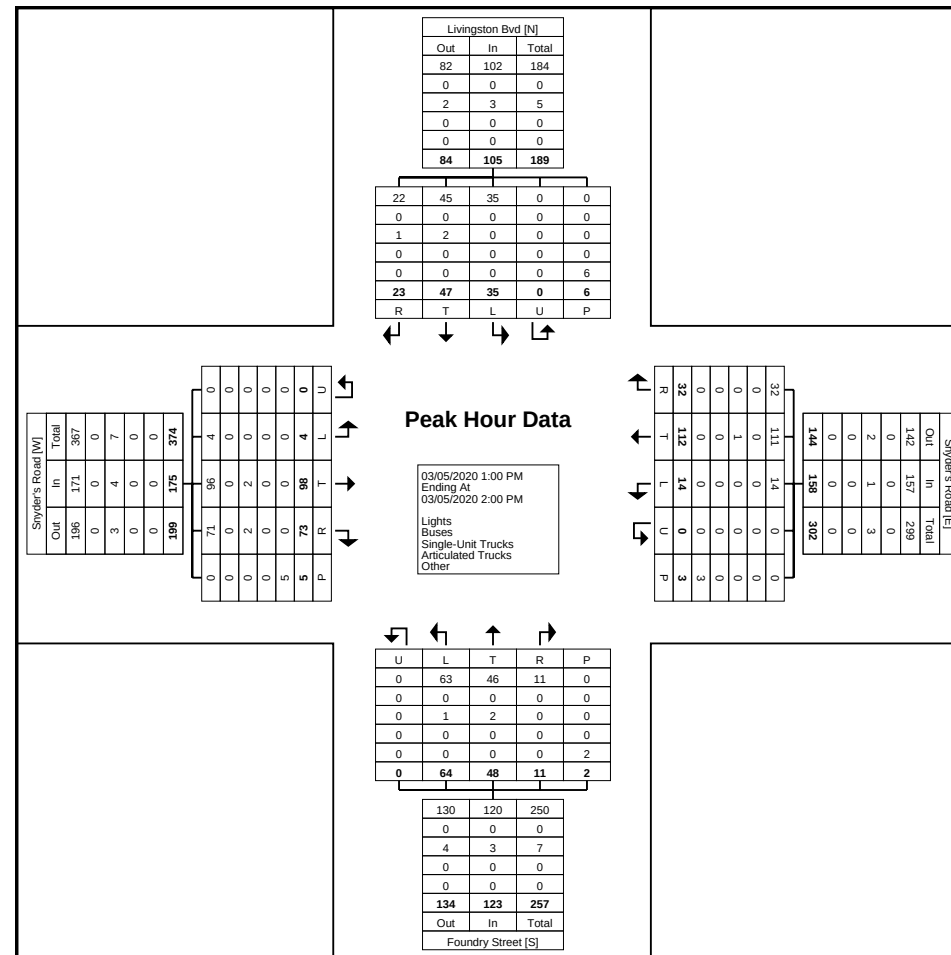
Start Time	Snyder's Road Eastbound						Snyder's Road Westbound						Foundry Street Northbound						Livingston Blvd Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
1:00 PM	0	23	20	0	1	43	6	29	2	0	0	37	16	14	3	0	0	33	4	12	5	0	0	21	134
1:15 PM	1	25	19	0	1	45	3	28	6	0	0	37	19	13	3	0	2	35	11	6	9	0	2	26	143
1:30 PM	3	24	23	0	2	50	1	21	11	0	0	33	11	11	2	0	0	24	12	12	3	0	1	27	134
1:45 PM	0	26	11	0	1	37	4	34	13	0	3	51	18	10	3	0	0	31	8	17	6	0	3	31	150
Total	4	98	73	0	5	175	14	112	32	0	3	158	64	48	11	0	2	123	35	47	23	0	6	105	561
Approach %	2.3	56.0	41.7	0.0	-	-	8.9	70.9	20.3	0.0	-	-	52.0	39.0	8.9	0.0	-	-	33.3	44.8	21.9	0.0	-	-	-
Total %	0.7	17.5	13.0	0.0	-	31.2	2.5	20.0	5.7	0.0	-	28.2	11.4	8.6	2.0	0.0	-	21.9	6.2	8.4	4.1	0.0	-	18.7	-
PHF	0.333	0.942	0.793	0.000	-	0.875	0.583	0.824	0.615	0.000	-	0.775	0.842	0.857	0.917	0.000	-	0.879	0.729	0.691	0.639	0.000	-	0.847	0.935
Lights	4	96	71	0	-	171	14	111	32	0	-	157	63	46	11	0	-	120	35	45	22	0	-	102	550
% Lights	100.0	98.0	97.3	-	-	97.7	100.0	99.1	100.0	-	-	99.4	98.4	95.8	100.0	-	-	97.6	100.0	95.7	95.7	-	-	97.1	98.0
Buses	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Buses	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Single-Unit Trucks	0	2	2	0	-	4	0	1	0	0	-	1	1	2	0	0	-	3	0	2	1	0	-	3	11
% Single-Unit Trucks	0.0	2.0	2.7	-	-	2.3	0.0	0.9	0.0	-	-	0.6	1.6	4.2	0.0	-	-	2.4	0.0	4.3	4.3	-	-	2.9	2.0
Articulated Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Articulated Trucks	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	5	-	-	-	-	-	3	-	-	-	-	-	2	-	-	-	-	-	6	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-



Paradigm Transportation Solutions Limited
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Turning Movement Peak Hour Data (4:45 PM)

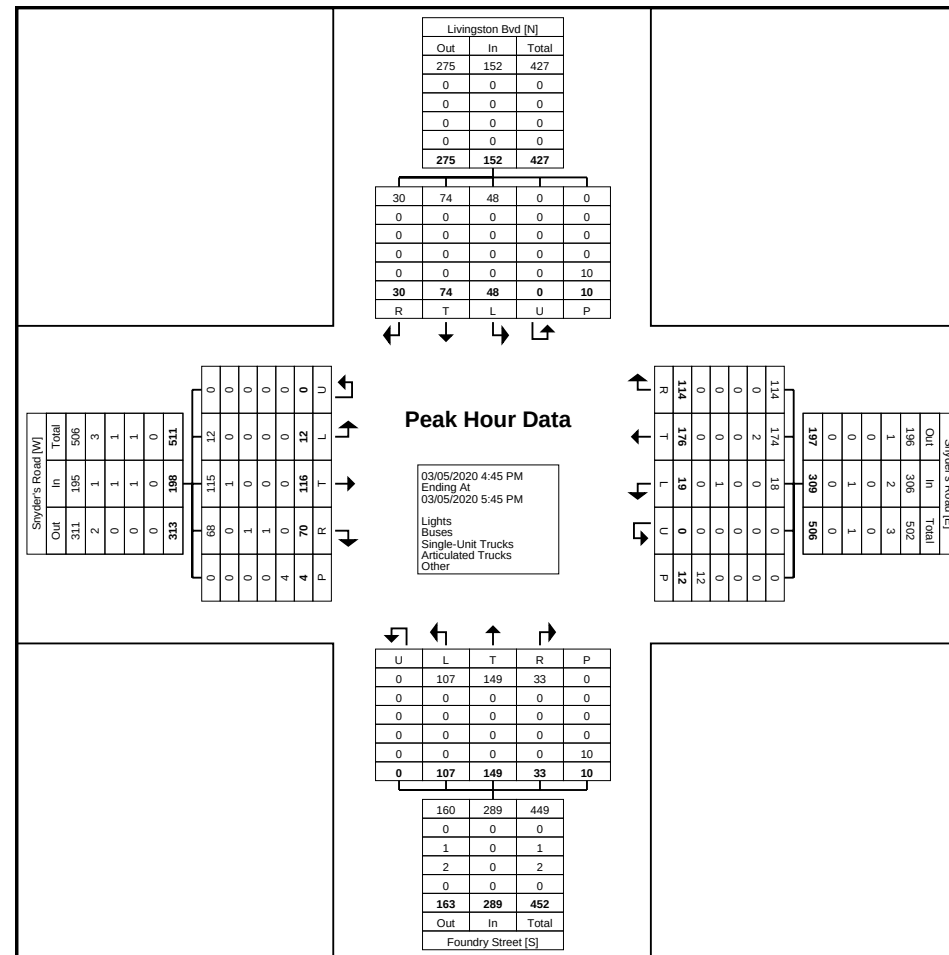
Start Time	Snyder's Road Eastbound						Snyder's Road Westbound						Foundry Street Northbound						Livingston Blvd Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
4:45 PM	3	32	14	0	3	49	4	45	27	0	4	76	27	43	5	0	4	75	9	23	8	0	0	40	240
5:00 PM	6	26	25	0	0	57	3	43	34	0	5	80	33	30	5	0	1	68	10	18	6	0	2	34	239
5:15 PM	1	30	16	0	1	47	8	40	22	0	3	70	31	36	10	0	1	77	15	17	9	0	3	41	235
5:30 PM	2	28	15	0	0	45	4	48	31	0	0	83	16	40	13	0	4	69	14	16	7	0	5	37	234
Total	12	116	70	0	4	198	19	176	114	0	12	309	107	149	33	0	10	289	48	74	30	0	10	152	948
Approach %	6.1	58.6	35.4	0.0	-	-	6.1	57.0	36.9	0.0	-	-	37.0	51.6	11.4	0.0	-	-	31.6	48.7	19.7	0.0	-	-	-
Total %	1.3	12.2	7.4	0.0	-	20.9	2.0	18.6	12.0	0.0	-	32.6	11.3	15.7	3.5	0.0	-	30.5	5.1	7.8	3.2	0.0	-	16.0	-
PHF	0.500	0.906	0.700	0.000	-	0.868	0.594	0.917	0.838	0.000	-	0.931	0.811	0.866	0.635	0.000	-	0.938	0.800	0.804	0.833	0.000	-	0.927	0.988
Lights	12	115	68	0	-	195	18	174	114	0	-	306	107	149	33	0	-	289	48	74	30	0	-	152	942
% Lights	100.0	99.1	97.1	-	-	98.5	94.7	98.9	100.0	-	-	99.0	100.0	100.0	100.0	-	-	100.0	100.0	100.0	100.0	-	-	100.0	99.4
Buses	0	1	0	0	-	1	0	2	0	0	-	2	0	0	0	0	-	0	0	0	0	0	-	0	3
% Buses	0.0	0.9	0.0	-	-	0.5	0.0	1.1	0.0	-	-	0.6	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.3
Single-Unit Trucks	0	0	1	0	-	1	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	1
% Single-Unit Trucks	0.0	0.0	1.4	-	-	0.5	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.1
Articulated Trucks	0	0	1	0	-	1	1	0	0	0	-	1	0	0	0	0	-	0	0	0	0	0	-	0	2
% Articulated Trucks	0.0	0.0	1.4	-	-	0.5	5.3	0.0	0.0	-	-	0.3	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.2
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	4	-	-	-	-	-	12	-	-	-	-	-	10	-	-	-	-	-	10	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cdowness@ptsil.com

Count Name: Livingston Blvd/Foundry Street &
Snyder's Road
Site Code: 200068
Start Date: 03/05/2020
Page No: 9





Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Snyder's Road & Christian Street
Site Code: 200068
Start Date: 03/05/2020
Page No: 1

Turning Movement Data

Start Time	Snyder's Road Eastbound					Snyder's Road Westbound					Christian Street Northbound					Int. Total
	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Left	Right	U-Turn	Peds	App. Total	
7:30 AM	72	0	0	0	72	0	68	0	0	68	0	0	0	1	0	140
7:45 AM	87	0	0	0	87	0	151	0	0	151	1	0	0	0	1	239
Hourly Total	159	0	0	0	159	0	219	0	0	219	1	0	0	1	1	379
8:00 AM	103	0	0	0	103	0	126	0	0	126	1	1	0	1	2	231
8:15 AM	83	0	0	0	83	1	66	0	0	67	2	0	0	0	2	152
8:30 AM	61	0	0	0	61	0	47	0	0	47	2	0	0	0	2	110
8:45 AM	33	0	0	0	33	2	31	0	0	33	1	0	0	0	1	67
Hourly Total	280	0	0	0	280	3	270	0	0	273	6	1	0	1	7	560
9:00 AM	34	0	0	0	34	0	34	0	0	34	1	0	0	0	1	69
9:15 AM	51	2	0	0	53	0	53	0	0	53	0	0	0	0	0	106
9:30 AM	36	0	0	0	36	1	31	0	0	32	0	1	0	1	1	69
9:45 AM	36	1	0	0	37	0	27	0	0	27	0	1	0	0	1	65
Hourly Total	157	3	0	0	160	1	145	0	0	146	1	2	0	1	3	309
10:00 AM	38	1	0	0	39	0	36	0	0	36	1	0	0	0	1	76
10:15 AM	37	0	0	0	37	0	30	0	0	30	0	0	0	0	0	67
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	75	1	0	0	76	0	66	0	0	66	1	0	0	0	1	143
12:00 PM	38	0	0	0	38	2	32	0	0	34	0	0	0	0	0	72
12:15 PM	29	2	0	0	31	0	40	0	0	40	1	2	0	0	3	74
12:30 PM	51	0	0	0	51	0	38	0	0	38	1	0	0	0	1	90
12:45 PM	42	0	0	0	42	0	43	0	0	43	2	0	0	0	2	87
Hourly Total	160	2	0	0	162	2	153	0	0	155	4	2	0	0	6	323
1:00 PM	45	2	0	0	47	0	43	0	0	43	0	0	0	1	0	90
1:15 PM	45	1	0	0	46	1	56	0	0	57	0	1	0	1	1	104
1:30 PM	50	1	0	0	51	1	29	0	0	30	0	0	0	1	0	81
1:45 PM	47	0	0	0	47	0	60	0	1	60	2	0	0	1	2	109
Hourly Total	187	4	0	0	191	2	188	0	1	190	2	1	0	4	3	384
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3:00 PM	53	2	0	0	55	1	51	0	2	52	2	0	0	5	2	109
3:15 PM	53	4	0	0	57	1	52	0	0	53	0	2	0	0	2	112
3:30 PM	53	0	0	0	53	0	48	0	0	48	1	0	0	0	1	102
3:45 PM	54	0	0	0	54	1	68	0	0	69	0	0	0	3	0	123
Hourly Total	213	6	0	0	219	3	219	0	2	222	3	2	0	8	5	446
4:00 PM	54	1	0	0	55	0	53	0	0	53	1	0	0	2	1	109
4:15 PM	57	0	0	0	57	0	59	0	0	59	2	1	0	4	3	119
4:30 PM	63	0	0	0	63	1	79	0	0	80	1	1	0	2	2	145

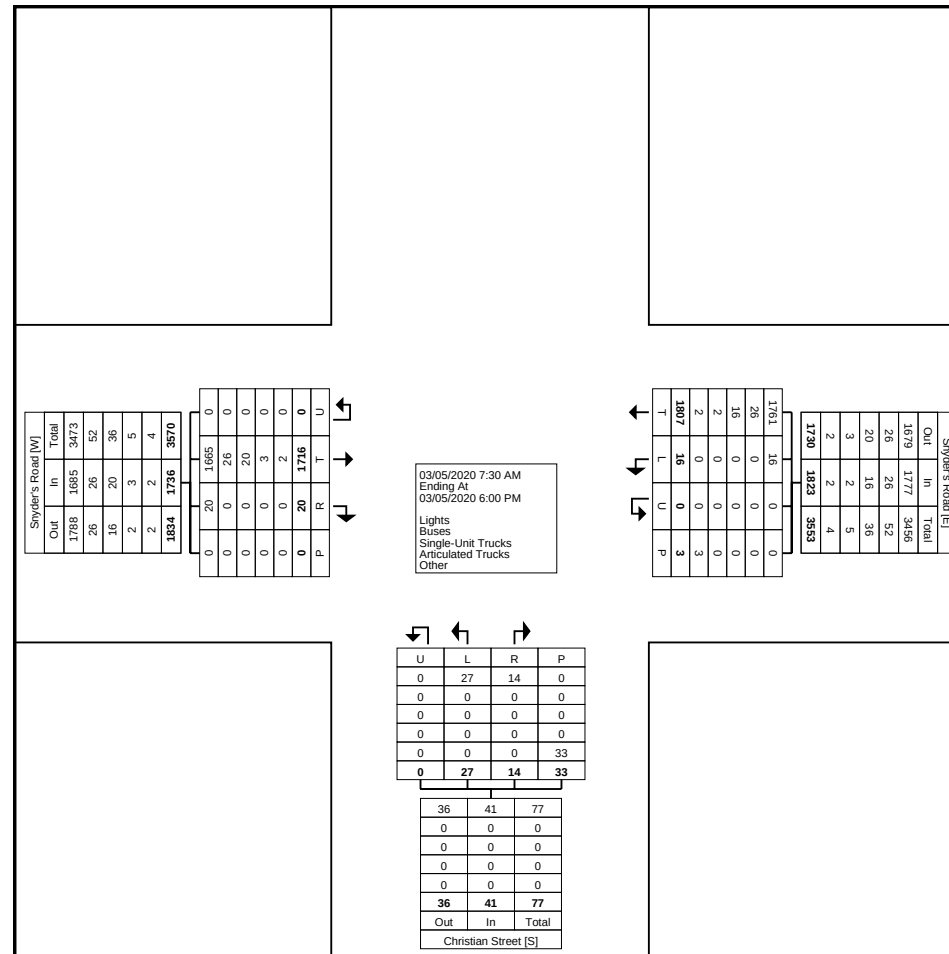
4:45 PM	45	1	0	0	46	0	78	0	0	78	0	0	0	0	0	124
Hourly Total	219	2	0	0	221	1	269	0	0	270	4	2	0	8	6	497
5:00 PM	83	1	0	0	84	1	78	0	0	79	1	0	0	0	1	164
5:15 PM	60	1	0	0	61	1	77	0	0	78	2	2	0	3	4	143
5:30 PM	58	0	0	0	58	1	64	0	0	65	1	2	0	0	3	126
5:45 PM	65	0	0	0	65	1	59	0	0	60	1	0	0	7	1	126
Hourly Total	266	2	0	0	268	4	278	0	0	282	5	4	0	10	9	559
Grand Total	1716	20	0	0	1736	16	1807	0	3	1823	27	14	0	33	41	3600
Approach %	98.8	1.2	0.0	-	-	0.9	99.1	0.0	-	-	65.9	34.1	0.0	-	-	-
Total %	47.7	0.6	0.0	-	48.2	0.4	50.2	0.0	-	50.6	0.8	0.4	0.0	-	1.1	-
Lights	1665	20	0	-	1685	16	1761	0	-	1777	27	14	0	-	41	3503
% Lights	97.0	100.0	-	-	97.1	100.0	97.5	-	-	97.5	100.0	100.0	-	-	100.0	97.3
Buses	26	0	0	-	26	0	26	0	-	26	0	0	0	-	0	52
% Buses	1.5	0.0	-	-	1.5	0.0	1.4	-	-	1.4	0.0	0.0	-	-	0.0	1.4
Single-Unit Trucks	20	0	0	-	20	0	16	0	-	16	0	0	0	-	0	36
% Single-Unit Trucks	1.2	0.0	-	-	1.2	0.0	0.9	-	-	0.9	0.0	0.0	-	-	0.0	1.0
Articulated Trucks	3	0	0	-	3	0	2	0	-	2	0	0	0	-	0	5
% Articulated Trucks	0.2	0.0	-	-	0.2	0.0	0.1	-	-	0.1	0.0	0.0	-	-	0.0	0.1
Bicycles on Road	2	0	0	-	2	0	2	0	-	2	0	0	0	-	0	4
% Bicycles on Road	0.1	0.0	-	-	0.1	0.0	0.1	-	-	0.1	0.0	0.0	-	-	0.0	0.1
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	1	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	0.0	-	-	-	-	3.0	-	-
Pedestrians	-	-	-	0	-	-	-	-	3	-	-	-	-	32	-	-
% Pedestrians	-	-	-	-	-	-	-	-	100.0	-	-	-	-	97.0	-	-



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@ptsil.com

Count Name: Snyder's Road & Christian Street
Site Code: 200068
Start Date: 03/05/2020
Page No: 3



Turning Movement Data Plot



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Snyder's Road & Christian Street
Site Code: 200068
Start Date: 03/05/2020
Page No: 4

Turning Movement Peak Hour Data (7:30 AM)

Start Time	Snyder's Road Eastbound					Snyder's Road Westbound					Christian Street Northbound					Int. Total
	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Left	Right	U-Turn	Peds	App. Total	
7:30 AM	72	0	0	0	72	0	68	0	0	68	0	0	0	1	0	140
7:45 AM	87	0	0	0	87	0	151	0	0	151	1	0	0	0	1	239
8:00 AM	103	0	0	0	103	0	126	0	0	126	1	1	0	1	2	231
8:15 AM	83	0	0	0	83	1	66	0	0	67	2	0	0	0	2	152
Total	345	0	0	0	345	1	411	0	0	412	4	1	0	2	5	762
Approach %	100.0	0.0	0.0	-	-	0.2	99.8	0.0	-	-	80.0	20.0	0.0	-	-	-
Total %	45.3	0.0	0.0	-	45.3	0.1	53.9	0.0	-	54.1	0.5	0.1	0.0	-	0.7	-
PHF	0.837	0.000	0.000	-	0.837	0.250	0.680	0.000	-	0.682	0.500	0.250	0.000	-	0.625	0.797
Lights	325	0	0	-	325	1	388	0	-	389	4	1	0	-	5	719
% Lights	94.2	-	-	-	94.2	100.0	94.4	-	-	94.4	100.0	100.0	-	-	100.0	94.4
Buses	19	0	0	-	19	0	17	0	-	17	0	0	0	-	0	36
% Buses	5.5	-	-	-	5.5	0.0	4.1	-	-	4.1	0.0	0.0	-	-	0.0	4.7
Single-Unit Trucks	1	0	0	-	1	0	4	0	-	4	0	0	0	-	0	5
% Single-Unit Trucks	0.3	-	-	-	0.3	0.0	1.0	-	-	1.0	0.0	0.0	-	-	0.0	0.7
Articulated Trucks	0	0	0	-	0	0	1	0	-	1	0	0	0	-	0	1
% Articulated Trucks	0.0	-	-	-	0.0	0.0	0.2	-	-	0.2	0.0	0.0	-	-	0.0	0.1
Bicycles on Road	0	0	0	-	0	0	1	0	-	1	0	0	0	-	0	1
% Bicycles on Road	0.0	-	-	-	0.0	0.0	0.2	-	-	0.2	0.0	0.0	-	-	0.0	0.1
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	2	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-

Turning Movement Peak Hour Data Plot (7:30 AM)



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Snyder's Road & Christian Street
Site Code: 200068
Start Date: 03/05/2020
Page No: 6

Turning Movement Peak Hour Data (1:00 PM)

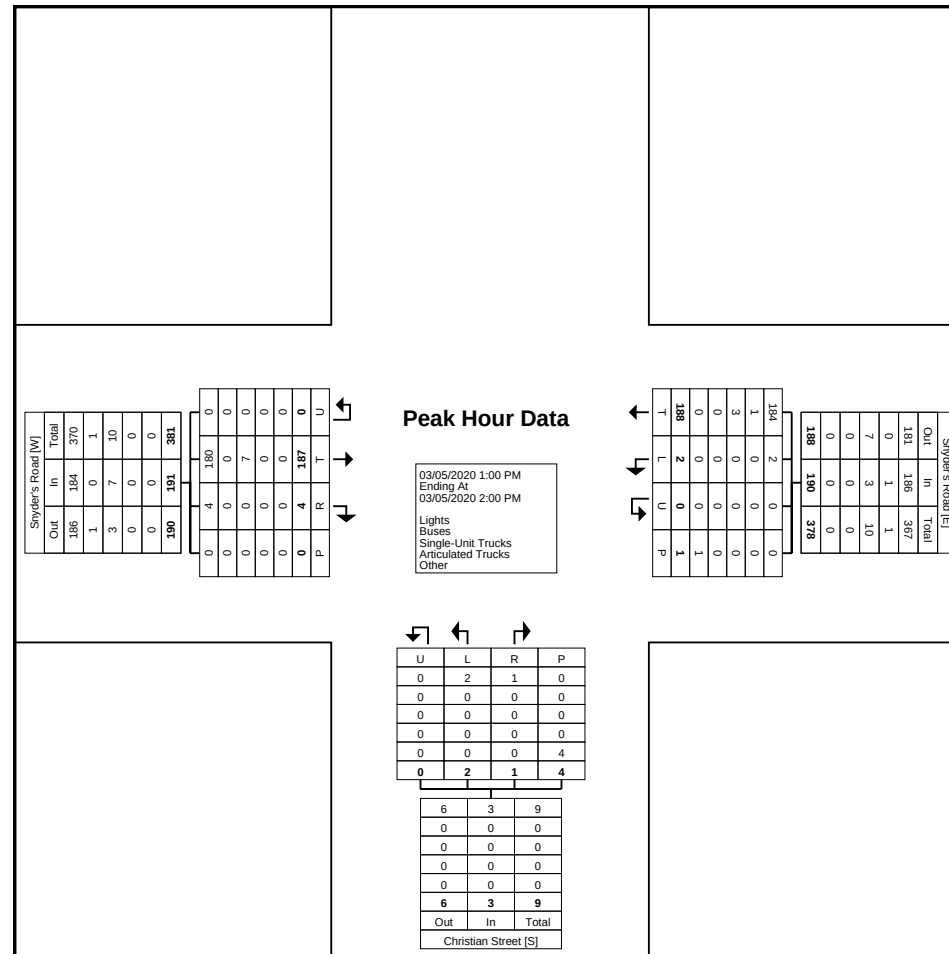
Start Time	Snyder's Road Eastbound					Snyder's Road Westbound					Christian Street Northbound					Int. Total
	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Left	Right	U-Turn	Peds	App. Total	
1:00 PM	45	2	0	0	47	0	43	0	0	43	0	0	0	1	0	90
1:15 PM	45	1	0	0	46	1	56	0	0	57	0	1	0	1	1	104
1:30 PM	50	1	0	0	51	1	29	0	0	30	0	0	0	1	0	81
1:45 PM	47	0	0	0	47	0	60	0	1	60	2	0	0	1	2	109
Total	187	4	0	0	191	2	188	0	1	190	2	1	0	4	3	384
Approach %	97.9	2.1	0.0	-	-	1.1	98.9	0.0	-	-	66.7	33.3	0.0	-	-	-
Total %	48.7	1.0	0.0	-	49.7	0.5	49.0	0.0	-	49.5	0.5	0.3	0.0	-	0.8	-
PHF	0.935	0.500	0.000	-	0.936	0.500	0.783	0.000	-	0.792	0.250	0.250	0.000	-	0.375	0.881
Lights	180	4	0	-	184	2	184	0	-	186	2	1	0	-	3	373
% Lights	96.3	100.0	-	-	96.3	100.0	97.9	-	-	97.9	100.0	100.0	-	-	100.0	97.1
Buses	0	0	0	-	0	0	1	0	-	1	0	0	0	-	0	1
% Buses	0.0	0.0	-	-	0.0	0.0	0.5	-	-	0.5	0.0	0.0	-	-	0.0	0.3
Single-Unit Trucks	7	0	0	-	7	0	3	0	-	3	0	0	0	-	0	10
% Single-Unit Trucks	3.7	0.0	-	-	3.7	0.0	1.6	-	-	1.6	0.0	0.0	-	-	0.0	2.6
Articulated Trucks	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Articulated Trucks	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Road	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	0.0	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	0	-	-	-	-	1	-	-	-	-	4	-	-
% Pedestrians	-	-	-	-	-	-	-	-	100.0	-	-	-	-	100.0	-	-



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
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Count Name: Snyder's Road & Christian Street
Site Code: 200068
Start Date: 03/05/2020
Page No: 7



Turning Movement Peak Hour Data Plot (1:00 PM)



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Snyder's Road & Christian Street
Site Code: 200068
Start Date: 03/05/2020
Page No: 8

Turning Movement Peak Hour Data (4:30 PM)

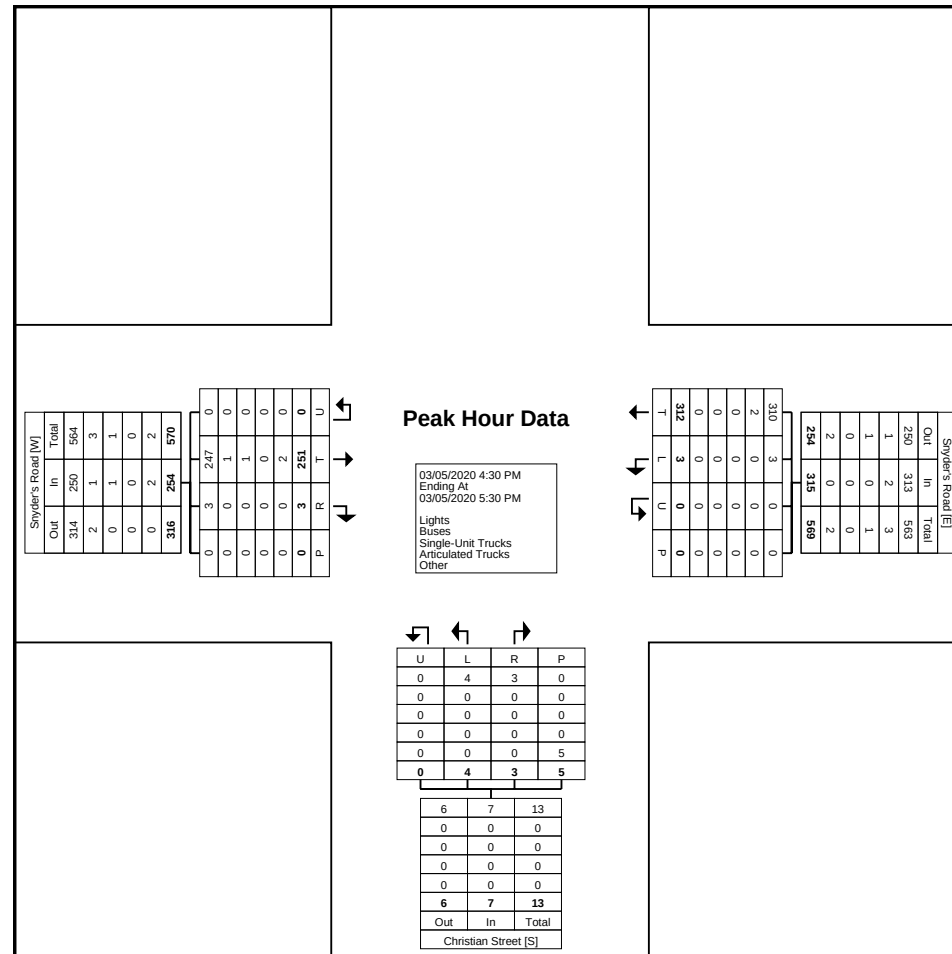
Start Time	Snyder's Road Eastbound					Snyder's Road Westbound					Christian Street Northbound					Int. Total
	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Left	Right	U-Turn	Peds	App. Total	
4:30 PM	63	0	0	0	63	1	79	0	0	80	1	1	0	2	2	145
4:45 PM	45	1	0	0	46	0	78	0	0	78	0	0	0	0	0	124
5:00 PM	83	1	0	0	84	1	78	0	0	79	1	0	0	0	1	164
5:15 PM	60	1	0	0	61	1	77	0	0	78	2	2	0	3	4	143
Total	251	3	0	0	254	3	312	0	0	315	4	3	0	5	7	576
Approach %	98.8	1.2	0.0	-	-	1.0	99.0	0.0	-	-	57.1	42.9	0.0	-	-	-
Total %	43.6	0.5	0.0	-	44.1	0.5	54.2	0.0	-	54.7	0.7	0.5	0.0	-	1.2	-
PHF	0.756	0.750	0.000	-	0.756	0.750	0.987	0.000	-	0.984	0.500	0.375	0.000	-	0.438	0.878
Lights	247	3	0	-	250	3	310	0	-	313	4	3	0	-	7	570
% Lights	98.4	100.0	-	-	98.4	100.0	99.4	-	-	99.4	100.0	100.0	-	-	100.0	99.0
Buses	1	0	0	-	1	0	2	0	-	2	0	0	0	-	0	3
% Buses	0.4	0.0	-	-	0.4	0.0	0.6	-	-	0.6	0.0	0.0	-	-	0.0	0.5
Single-Unit Trucks	1	0	0	-	1	0	0	0	-	0	0	0	0	-	0	1
% Single-Unit Trucks	0.4	0.0	-	-	0.4	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.2
Articulated Trucks	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Articulated Trucks	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Road	2	0	0	-	2	0	0	0	-	0	0	0	0	-	0	2
% Bicycles on Road	0.8	0.0	-	-	0.8	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.3
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	5	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@ptsll.com

Count Name: Snyder's Road & Christian Street
Site Code: 200068
Start Date: 03/05/2020
Page No: 9



Turning Movement Peak Hour Data Plot (4:30 PM)



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@ptsI.com

Count Name: Snyder's Road & Christian Street
Site Code: 200068
Start Date: 03/05/2020
Page No: 10



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Wagler Ave & Hunsberger Drive
Site Code: 200068
Start Date: 03/05/2020
Page No: 1

Turning Movement Data

Start Time	Wagler Avenue Westbound					Henry McFarlyen St Northbound					Hunsberger Drive Southbound					Int. Total
	Left	Right	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	
7:30 AM	0	2	0	2	2	2	0	0	0	2	9	10	0	0	19	23
7:45 AM	1	3	0	1	4	0	0	0	0	0	13	7	0	0	20	24
Hourly Total	1	5	0	3	6	2	0	0	0	2	22	17	0	0	39	47
8:00 AM	0	2	0	2	2	4	1	0	0	5	15	7	0	1	22	29
8:15 AM	1	6	0	0	7	0	0	0	0	0	8	6	0	0	14	21
8:30 AM	0	2	0	1	2	0	0	0	1	0	1	5	0	0	6	8
8:45 AM	0	1	0	0	1	1	1	0	0	2	4	1	0	0	5	8
Hourly Total	1	11	0	3	12	5	2	0	1	7	28	19	0	1	47	66
9:00 AM	0	2	0	0	2	0	0	0	0	0	2	5	0	0	7	9
9:15 AM	0	2	0	0	2	0	0	0	0	0	2	1	0	0	3	5
9:30 AM	0	1	0	0	1	1	0	0	0	1	2	3	0	0	5	7
9:45 AM	0	3	0	0	3	2	0	0	0	2	3	3	0	0	6	11
Hourly Total	0	8	0	0	8	3	0	0	0	3	9	12	0	0	21	32
10:00 AM	1	2	0	0	3	0	0	0	0	0	2	2	0	0	4	7
10:15 AM	0	2	0	0	2	1	0	0	0	1	1	0	0	0	1	4
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	1	4	0	0	5	1	0	0	0	1	3	2	0	0	5	11
12:00 PM	0	5	0	1	5	0	0	0	0	0	2	2	0	0	4	9
12:15 PM	0	3	0	0	3	1	0	0	0	1	2	1	0	0	3	7
12:30 PM	0	3	0	0	3	1	0	0	0	1	2	0	0	0	2	6
12:45 PM	1	4	0	0	5	3	0	0	0	3	2	2	0	0	4	12
Hourly Total	1	15	0	1	16	5	0	0	0	5	8	5	0	0	13	34
1:00 PM	0	4	0	1	4	0	1	0	0	1	1	3	0	0	4	9
1:15 PM	0	3	0	0	3	0	1	0	0	1	2	2	0	0	4	8
1:30 PM	0	5	0	1	5	1	1	0	0	2	2	0	0	0	2	9
1:45 PM	0	2	0	0	2	2	0	0	0	2	0	1	0	0	1	5
Hourly Total	0	14	0	2	14	3	3	0	0	6	5	6	0	0	11	31
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3:00 PM	1	1	0	0	2	3	0	0	0	3	1	3	0	0	4	9
3:15 PM	0	4	0	0	4	1	0	0	0	1	1	4	0	0	5	10
3:30 PM	0	4	0	1	4	3	0	0	0	3	2	2	0	0	4	11
3:45 PM	0	5	0	2	5	4	1	0	0	5	5	4	0	2	9	19
Hourly Total	1	14	0	3	15	11	1	0	0	12	9	13	0	2	22	49
4:00 PM	0	4	0	0	4	3	0	0	0	3	4	2	0	0	6	13
4:15 PM	1	5	0	2	6	1	0	0	0	1	1	3	0	0	4	11
4:30 PM	0	11	0	2	11	5	0	0	0	5	2	4	0	0	6	22

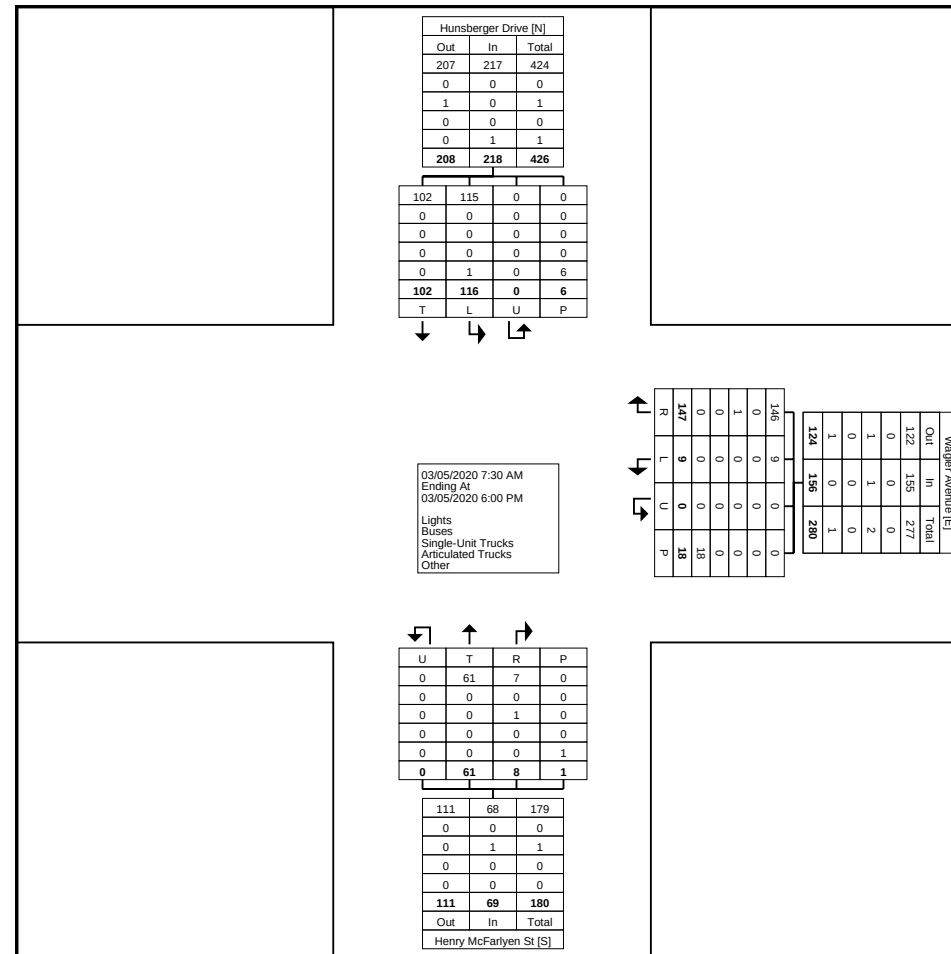
4:45 PM	0	5	0	0	5	2	0	0	0	2	5	2	0	1	7	14
Hourly Total	1	25	0	4	26	11	0	0	0	11	12	11	0	1	23	60
5:00 PM	0	16	0	0	16	5	0	0	0	5	5	3	0	0	8	29
5:15 PM	3	12	0	2	15	3	1	0	0	4	7	6	0	2	13	32
5:30 PM	0	11	0	0	11	2	1	0	0	3	4	1	0	0	5	19
5:45 PM	0	12	0	0	12	10	0	0	0	10	4	7	0	0	11	33
Hourly Total	3	51	0	2	54	20	2	0	0	22	20	17	0	2	37	113
Grand Total	9	147	0	18	156	61	8	0	1	69	116	102	0	6	218	443
Approach %	5.8	94.2	0.0	-	-	88.4	11.6	0.0	-	-	53.2	46.8	0.0	-	-	-
Total %	2.0	33.2	0.0	-	35.2	13.8	1.8	0.0	-	15.6	26.2	23.0	0.0	-	49.2	-
Lights	9	146	0	-	155	61	7	0	-	68	115	102	0	-	217	440
% Lights	100.0	99.3	-	-	99.4	100.0	87.5	-	-	98.6	99.1	100.0	-	-	99.5	99.3
Buses	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Buses	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Single-Unit Trucks	0	1	0	-	1	0	1	0	-	1	0	0	0	-	0	2
% Single-Unit Trucks	0.0	0.7	-	-	0.6	0.0	12.5	-	-	1.4	0.0	0.0	-	-	0.0	0.5
Articulated Trucks	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Articulated Trucks	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Road	0	0	0	-	0	0	0	0	-	0	1	0	0	-	1	1
% Bicycles on Road	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.9	0.0	-	-	0.5	0.2
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	0.0	-	-	-	-	0.0	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	18	-	-	-	-	1	-	-	-	-	6	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	100.0	-	-	-	-	100.0	-	-



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Wagler Ave & Hunsberger Drive
Site Code: 200068
Start Date: 03/05/2020
Page No: 3



Turning Movement Data Plot



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@ptsll.com

Count Name: Wagler Ave & Hunsberger Drive
Site Code: 200068
Start Date: 03/05/2020
Page No: 4

Turning Movement Peak Hour Data (7:30 AM)

Start Time	Wagler Avenue Westbound					Henry McFarlyen St Northbound					Hunsberger Drive Southbound					Int. Total
	Left	Right	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	
7:30 AM	0	2	0	2	2	2	0	0	0	2	9	10	0	0	19	23
7:45 AM	1	3	0	1	4	0	0	0	0	0	13	7	0	0	20	24
8:00 AM	0	2	0	2	2	4	1	0	0	5	15	7	0	1	22	29
8:15 AM	1	6	0	0	7	0	0	0	0	0	8	6	0	0	14	21
Total	2	13	0	5	15	6	1	0	0	7	45	30	0	1	75	97
Approach %	13.3	86.7	0.0	-	-	85.7	14.3	0.0	-	-	60.0	40.0	0.0	-	-	-
Total %	2.1	13.4	0.0	-	15.5	6.2	1.0	0.0	-	7.2	46.4	30.9	0.0	-	77.3	-
PHF	0.500	0.542	0.000	-	0.536	0.375	0.250	0.000	-	0.350	0.750	0.750	0.000	-	0.852	0.836
Lights	2	13	0	-	15	6	1	0	-	7	45	30	0	-	75	97
% Lights	100.0	100.0	-	-	100.0	100.0	100.0	-	-	100.0	100.0	100.0	-	-	100.0	100.0
Buses	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Buses	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Single-Unit Trucks	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Single-Unit Trucks	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Articulated Trucks	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Articulated Trucks	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Road	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	0.0	-	-	-	-	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	5	-	-	-	-	0	-	-	-	-	1	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	-	-	-	-	-	100.0	-	-

Turning Movement Peak Hour Data Plot (7:30 AM)

Start Time	Wagler Avenue Westbound					Henry McFarlen St Northbound					Hunsberger Drive Southbound					Int. Total
	Left	Right	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	
12:45 PM	1	4	0	0	5	3	0	0	0	3	2	2	0	0	4	12
1:00 PM	0	4	0	1	4	0	1	0	0	1	1	3	0	0	4	9
1:15 PM	0	3	0	0	3	0	1	0	0	1	2	2	0	0	4	8
1:30 PM	0	5	0	1	5	1	1	0	0	2	2	0	0	0	2	9
Total	1	16	0	2	17	4	3	0	0	7	7	7	0	0	14	38
Approach %	5.9	94.1	0.0	-	-	57.1	42.9	0.0	-	-	50.0	50.0	0.0	-	-	-
Total %	2.6	42.1	0.0	-	44.7	10.5	7.9	0.0	-	18.4	18.4	18.4	0.0	-	36.8	-
PHF	0.250	0.800	0.000	-	0.850	0.333	0.750	0.000	-	0.583	0.875	0.583	0.000	-	0.875	0.792
Lights	1	15	0	-	16	4	2	0	-	6	7	7	0	-	14	36
% Lights	100.0	93.8	-	-	94.1	100.0	66.7	-	-	85.7	100.0	100.0	-	-	100.0	94.7
Buses	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Buses	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Single-Unit Trucks	0	1	0	-	1	0	1	0	-	1	0	0	0	-	0	2
% Single-Unit Trucks	0.0	6.3	-	-	5.9	0.0	33.3	-	-	14.3	0.0	0.0	-	-	0.0	5.3
Articulated Trucks	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Articulated Trucks	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Road	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	0.0	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	2	-	-	-	-	0	-	-	-	-	0	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	-

Turning Movement Peak Hour Data Plot (12:45 PM)



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Wagler Ave & Hunsberger Drive
Site Code: 200068
Start Date: 03/05/2020
Page No: 8

Turning Movement Peak Hour Data (5:00 PM)

Start Time	Wagler Avenue Westbound					Henry McFarlyen St Northbound					Hunsberger Drive Southbound					Int. Total
	Left	Right	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	
5:00 PM	0	16	0	0	16	5	0	0	0	5	5	3	0	0	8	29
5:15 PM	3	12	0	2	15	3	1	0	0	4	7	6	0	2	13	32
5:30 PM	0	11	0	0	11	2	1	0	0	3	4	1	0	0	5	19
5:45 PM	0	12	0	0	12	10	0	0	0	10	4	7	0	0	11	33
Total	3	51	0	2	54	20	2	0	0	22	20	17	0	2	37	113
Approach %	5.6	94.4	0.0	-	-	90.9	9.1	0.0	-	-	54.1	45.9	0.0	-	-	-
Total %	2.7	45.1	0.0	-	47.8	17.7	1.8	0.0	-	19.5	17.7	15.0	0.0	-	32.7	-
PHF	0.250	0.797	0.000	-	0.844	0.500	0.500	0.000	-	0.550	0.714	0.607	0.000	-	0.712	0.856
Lights	3	51	0	-	54	20	2	0	-	22	20	17	0	-	37	113
% Lights	100.0	100.0	-	-	100.0	100.0	100.0	-	-	100.0	100.0	100.0	-	-	100.0	100.0
Buses	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Buses	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Single-Unit Trucks	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Single-Unit Trucks	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Articulated Trucks	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Articulated Trucks	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Road	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	0.0	-	-	-	-	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	2	-	-	-	-	0	-	-	-	-	2	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	-	-	-	-	-	100.0	-	-

Turning Movement Peak Hour Data Plot (5:00 PM)



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Wagler Avenue & Livingston Blvd
(East)
Site Code: 200068
Start Date: 03/05/2020
Page No: 1

Turning Movement Data

Start Time	Wagler Avenue Eastbound					Livingston Blvd Northbound					Livingston Blvd Southbound					Int. Total
	Left	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	
7:30 AM	1	11	0	1	12	3	9	0	0	12	63	2	0	1	65	89
7:45 AM	0	17	0	1	17	4	30	0	0	34	46	0	0	0	46	97
Hourly Total	1	28	0	2	29	7	39	0	0	46	109	2	0	1	111	186
8:00 AM	6	14	0	0	20	1	40	0	0	41	61	0	0	0	61	122
8:15 AM	0	15	0	0	15	4	8	0	0	12	54	0	0	0	54	81
8:30 AM	0	8	0	0	8	0	4	0	0	4	33	0	0	0	33	45
8:45 AM	0	5	0	1	5	1	9	0	0	10	25	0	0	0	25	40
Hourly Total	6	42	0	1	48	6	61	0	0	67	173	0	0	0	173	288
9:00 AM	0	5	0	1	5	2	10	0	1	12	20	0	0	0	20	37
9:15 AM	0	4	0	0	4	1	7	0	0	8	21	0	0	0	21	33
9:30 AM	2	4	0	2	6	5	10	0	0	15	20	0	0	0	20	41
9:45 AM	0	5	0	0	5	1	7	0	0	8	12	0	0	0	12	25
Hourly Total	2	18	0	3	20	9	34	0	1	43	73	0	0	0	73	136
10:00 AM	0	2	0	0	2	1	11	0	0	12	20	0	0	0	20	34
10:15 AM	0	4	0	0	4	0	8	0	0	8	9	0	0	0	9	21
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	0	6	0	0	6	1	19	0	0	20	29	0	0	0	29	55
12:00 PM	0	3	0	0	3	5	9	1	0	15	15	0	0	0	15	33
12:15 PM	1	3	0	2	4	3	10	0	0	13	12	0	0	0	12	29
12:30 PM	1	2	0	3	3	5	10	0	0	15	14	0	0	0	14	32
12:45 PM	1	0	0	0	1	1	12	0	0	13	14	0	0	0	14	28
Hourly Total	3	8	0	5	11	14	41	1	0	56	55	0	0	0	55	122
1:00 PM	0	2	0	0	2	2	9	0	1	11	13	1	0	0	14	27
1:15 PM	0	3	0	2	3	2	8	0	0	10	8	0	0	0	8	21
1:30 PM	0	1	0	2	1	3	12	0	0	15	9	0	0	0	9	25
1:45 PM	0	4	0	1	4	3	11	0	0	14	16	0	0	0	16	34
Hourly Total	0	10	0	5	10	10	40	0	1	50	46	1	0	0	47	107
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3:00 PM	2	1	0	4	3	5	26	0	0	31	31	0	0	0	31	65
3:15 PM	0	3	0	1	3	6	21	0	0	27	20	0	0	1	20	50
3:30 PM	1	6	0	3	7	3	26	0	0	29	15	0	0	0	15	51
3:45 PM	2	4	0	0	6	5	32	0	0	37	14	3	0	0	17	60
Hourly Total	5	14	0	8	19	19	105	0	0	124	80	3	0	1	83	226
4:00 PM	1	5	0	0	6	6	30	0	2	36	24	1	0	0	25	67
4:15 PM	0	3	0	9	3	5	51	0	0	56	24	0	0	0	24	83
4:30 PM	2	0	0	12	2	10	43	0	0	53	37	1	0	0	38	93

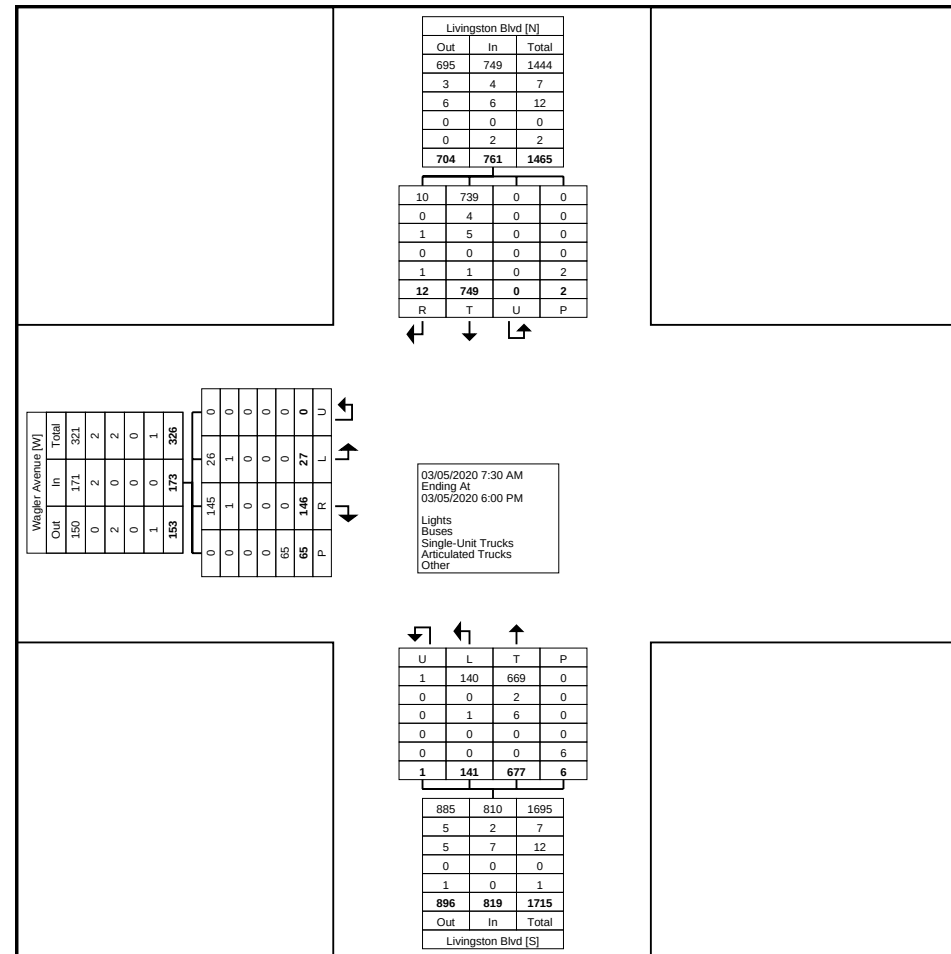
4:45 PM	3	2	0	6	5	10	47	0	0	57	26	0	0	0	26	88
Hourly Total	6	10	0	27	16	31	171	0	2	202	111	2	0	0	113	331
5:00 PM	1	0	0	6	1	9	43	0	0	52	14	1	0	0	15	68
5:15 PM	2	7	0	3	9	14	43	0	1	57	20	2	0	0	22	88
5:30 PM	0	1	0	2	1	14	49	0	0	63	17	1	0	0	18	82
5:45 PM	1	2	0	3	3	7	32	0	1	39	22	0	0	0	22	64
Hourly Total	4	10	0	14	14	44	167	0	2	211	73	4	0	0	77	302
Grand Total	27	146	0	65	173	141	677	1	6	819	749	12	0	2	761	1753
Approach %	15.6	84.4	0.0	-	-	17.2	82.7	0.1	-	-	98.4	1.6	0.0	-	-	-
Total %	1.5	8.3	0.0	-	9.9	8.0	38.6	0.1	-	46.7	42.7	0.7	0.0	-	43.4	-
Lights	26	145	0	-	171	140	669	1	-	810	739	10	0	-	749	1730
% Lights	96.3	99.3	-	-	98.8	99.3	98.8	100.0	-	98.9	98.7	83.3	-	-	98.4	98.7
Buses	1	1	0	-	2	0	2	0	-	2	4	0	0	-	4	8
% Buses	3.7	0.7	-	-	1.2	0.0	0.3	0.0	-	0.2	0.5	0.0	-	-	0.5	0.5
Single-Unit Trucks	0	0	0	-	0	1	6	0	-	7	5	1	0	-	6	13
% Single-Unit Trucks	0.0	0.0	-	-	0.0	0.7	0.9	0.0	-	0.9	0.7	8.3	-	-	0.8	0.7
Articulated Trucks	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Articulated Trucks	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Road	0	0	0	-	0	0	0	0	-	0	1	1	0	-	2	2
% Bicycles on Road	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	0.0	0.1	8.3	-	-	0.3	0.1
Bicycles on Crosswalk	-	-	-	2	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	3.1	-	-	-	-	0.0	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	63	-	-	-	-	6	-	-	-	-	2	-	-
% Pedestrians	-	-	-	96.9	-	-	-	-	100.0	-	-	-	-	100.0	-	-



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
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Count Name: Wagler Avenue & Livingston Blvd
(East)
Site Code: 200068
Start Date: 03/05/2020
Page No: 3



Turning Movement Data Plot



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Wagler Avenue & Livingston Blvd
(East)
Site Code: 200068
Start Date: 03/05/2020
Page No: 4

Turning Movement Peak Hour Data (7:30 AM)

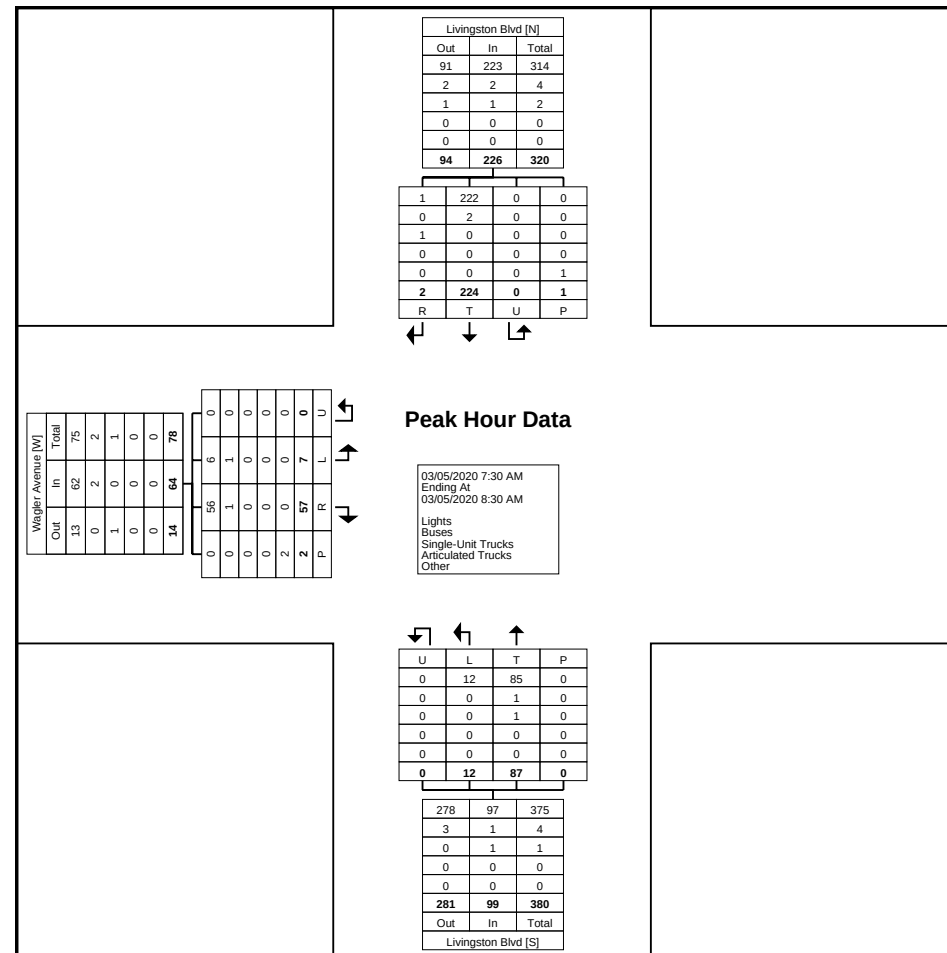
Start Time	Wagler Avenue Eastbound					Livingston Blvd Northbound					Livingston Blvd Southbound					Int. Total
	Left	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	
7:30 AM	1	11	0	1	12	3	9	0	0	12	63	2	0	1	65	89
7:45 AM	0	17	0	1	17	4	30	0	0	34	46	0	0	0	46	97
8:00 AM	6	14	0	0	20	1	40	0	0	41	61	0	0	0	61	122
8:15 AM	0	15	0	0	15	4	8	0	0	12	54	0	0	0	54	81
Total	7	57	0	2	64	12	87	0	0	99	224	2	0	1	226	389
Approach %	10.9	89.1	0.0	-	-	12.1	87.9	0.0	-	-	99.1	0.9	0.0	-	-	-
Total %	1.8	14.7	0.0	-	16.5	3.1	22.4	0.0	-	25.4	57.6	0.5	0.0	-	58.1	-
PHF	0.292	0.838	0.000	-	0.800	0.750	0.544	0.000	-	0.604	0.889	0.250	0.000	-	0.869	0.797
Lights	6	56	0	-	62	12	85	0	-	97	222	1	0	-	223	382
% Lights	85.7	98.2	-	-	96.9	100.0	97.7	-	-	98.0	99.1	50.0	-	-	98.7	98.2
Buses	1	1	0	-	2	0	1	0	-	1	2	0	0	-	2	5
% Buses	14.3	1.8	-	-	3.1	0.0	1.1	-	-	1.0	0.9	0.0	-	-	0.9	1.3
Single-Unit Trucks	0	0	0	-	0	0	1	0	-	1	0	1	0	-	1	2
% Single-Unit Trucks	0.0	0.0	-	-	0.0	0.0	1.1	-	-	1.0	0.0	50.0	-	-	0.4	0.5
Articulated Trucks	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Articulated Trucks	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Road	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	1	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	50.0	-	-	-	-	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	1	-	-	-	-	0	-	-	-	-	1	-	-
% Pedestrians	-	-	-	50.0	-	-	-	-	-	-	-	-	-	100.0	-	-



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Wagler Avenue & Livingston Blvd
(East)
Site Code: 200068
Start Date: 03/05/2020
Page No: 5



Turning Movement Peak Hour Data Plot (7:30 AM)

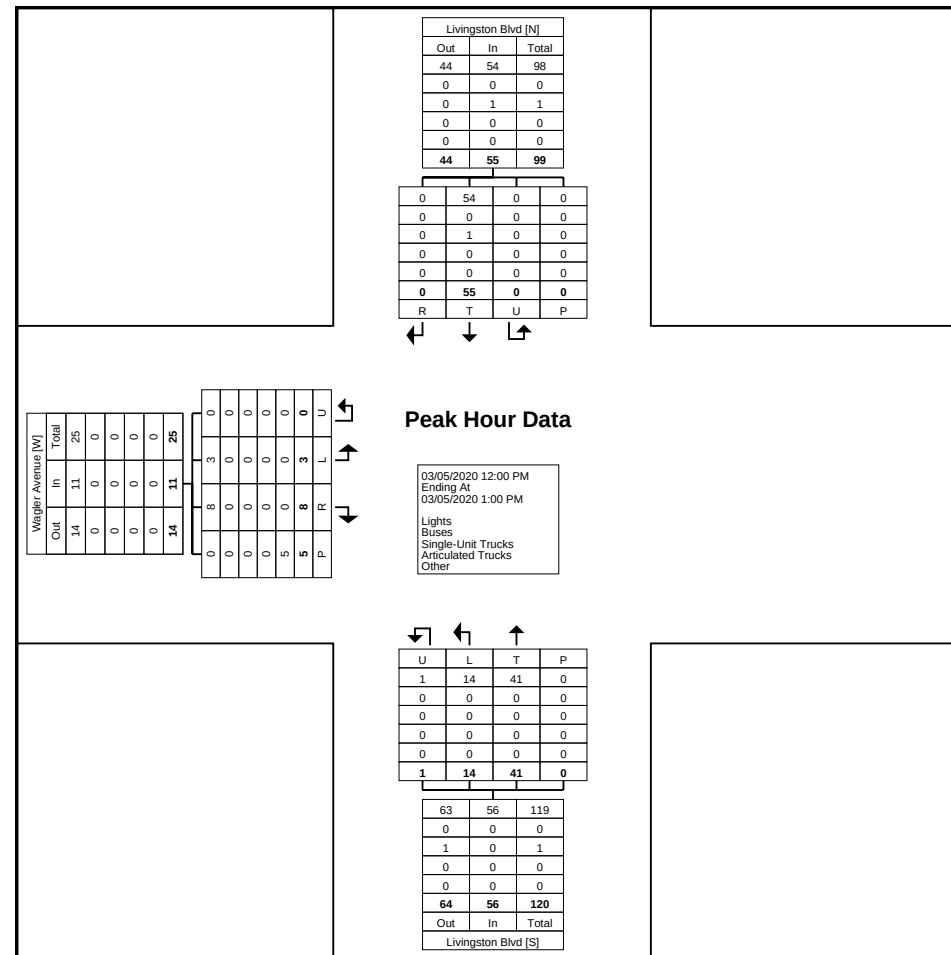
Start Time	Wagler Avenue Eastbound					Livingston Blvd Northbound					Livingston Blvd Southbound					Int. Total
	Left	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	
12:00 PM	0	3	0	0	3	5	9	1	0	15	15	0	0	0	15	33
12:15 PM	1	3	0	2	4	3	10	0	0	13	12	0	0	0	12	29
12:30 PM	1	2	0	3	3	5	10	0	0	15	14	0	0	0	14	32
12:45 PM	1	0	0	0	1	1	12	0	0	13	14	0	0	0	14	28
Total	3	8	0	5	11	14	41	1	0	56	55	0	0	0	55	122
Approach %	27.3	72.7	0.0	-	-	25.0	73.2	1.8	-	-	100.0	0.0	0.0	-	-	-
Total %	2.5	6.6	0.0	-	9.0	11.5	33.6	0.8	-	45.9	45.1	0.0	0.0	-	45.1	-
PHF	0.750	0.667	0.000	-	0.688	0.700	0.854	0.250	-	0.933	0.917	0.000	0.000	-	0.917	0.924
Lights	3	8	0	-	11	14	41	1	-	56	54	0	0	-	54	121
% Lights	100.0	100.0	-	-	100.0	100.0	100.0	100.0	-	100.0	98.2	-	-	-	98.2	99.2
Buses	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Buses	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	0.0	0.0	-	-	-	0.0	0.0
Single-Unit Trucks	0	0	0	-	0	0	0	0	-	0	1	0	0	-	1	1
% Single-Unit Trucks	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	0.0	1.8	-	-	-	1.8	0.8
Articulated Trucks	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Articulated Trucks	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	0.0	0.0	-	-	-	0.0	0.0
Bicycles on Road	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	0.0	0.0	-	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	0.0	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	5	-	-	-	-	0	-	-	-	-	0	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	-



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

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Count Name: Wagler Avenue & Livingston Blvd
(East)
Site Code: 200068
Start Date: 03/05/2020
Page No: 7



Turning Movement Peak Hour Data Plot (12:00 PM)



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@ptsl.com

Count Name: Wagler Avenue & Livingston Blvd
(East)
Site Code: 200068
Start Date: 03/05/2020
Page No: 8

Turning Movement Peak Hour Data (4:30 PM)

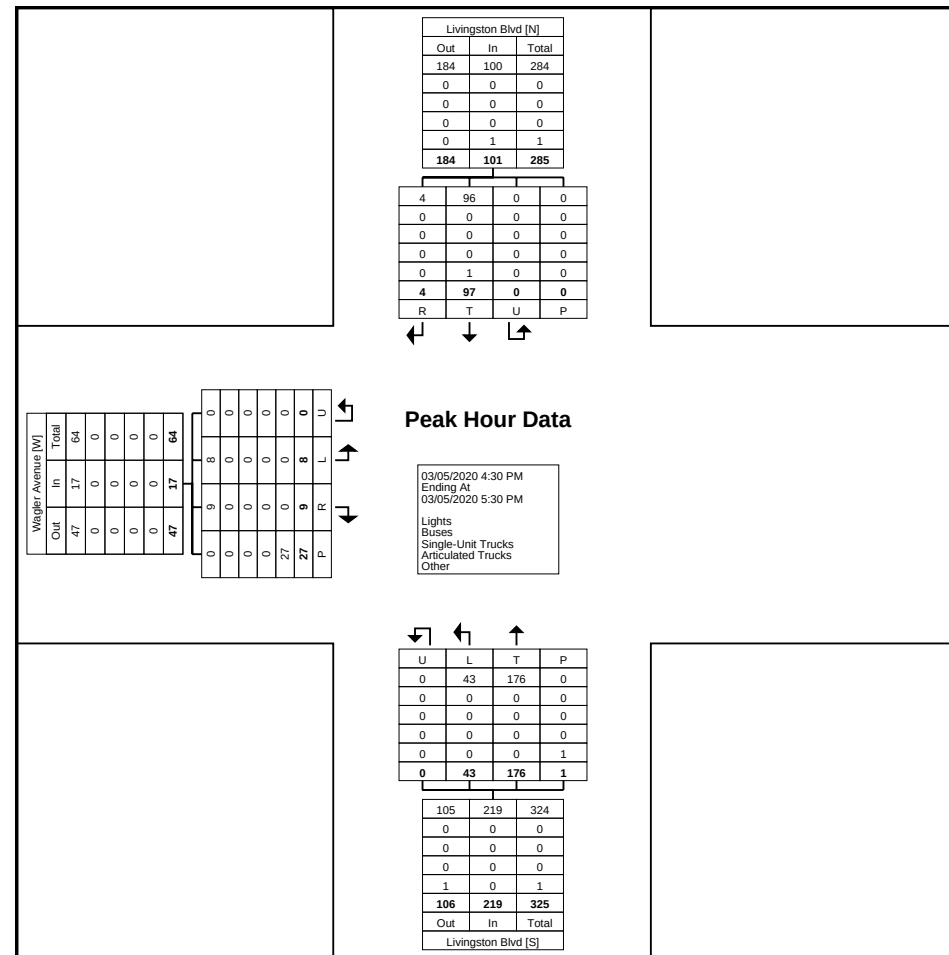
Start Time	Wagler Avenue Eastbound					Livingston Blvd Northbound					Livingston Blvd Southbound					Int. Total
	Left	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	
4:30 PM	2	0	0	12	2	10	43	0	0	53	37	1	0	0	38	93
4:45 PM	3	2	0	6	5	10	47	0	0	57	26	0	0	0	26	88
5:00 PM	1	0	0	6	1	9	43	0	0	52	14	1	0	0	15	68
5:15 PM	2	7	0	3	9	14	43	0	1	57	20	2	0	0	22	88
Total	8	9	0	27	17	43	176	0	1	219	97	4	0	0	101	337
Approach %	47.1	52.9	0.0	-	-	19.6	80.4	0.0	-	-	96.0	4.0	0.0	-	-	-
Total %	2.4	2.7	0.0	-	5.0	12.8	52.2	0.0	-	65.0	28.8	1.2	0.0	-	30.0	-
PHF	0.667	0.321	0.000	-	0.472	0.768	0.936	0.000	-	0.961	0.655	0.500	0.000	-	0.664	0.906
Lights	8	9	0	-	17	43	176	0	-	219	96	4	0	-	100	336
% Lights	100.0	100.0	-	-	100.0	100.0	100.0	-	-	100.0	99.0	100.0	-	-	99.0	99.7
Buses	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Buses	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Single-Unit Trucks	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Single-Unit Trucks	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Articulated Trucks	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Articulated Trucks	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Road	0	0	0	-	0	0	0	0	-	0	1	0	0	-	1	1
% Bicycles on Road	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	1.0	0.0	-	-	1.0	0.3
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	0.0	-	-	-	-	0.0	-	-	-	-	-	-	-
Pedestrians	-	-	-	27	-	-	-	-	1	-	-	-	-	0	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	100.0	-	-	-	-	-	-	-



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

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Count Name: Wagler Avenue & Livingston Blvd
(East)
Site Code: 200068
Start Date: 03/05/2020
Page No: 9



Turning Movement Peak Hour Data Plot (4:30 PM)



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cdowness@ptsl.com

Count Name: Wagler Avenue & Livingston Blvd
(West)
Site Code: 200068
Start Date: 03/05/2020
Page No: 1

Turning Movement Data

Start Time	Wagler Avenue Eastbound						Wagler Avenue Westbound						Livingston Blvd Northbound						Livingston Blvd Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
7:30 AM	1	5	7	0	7	13	3	0	0	0	4	3	2	9	3	1	1	15	1	10	0	0	3	11	42
7:45 AM	2	8	11	0	2	21	3	3	0	0	2	6	4	11	2	0	0	17	1	35	1	0	0	37	81
Hourly Total	3	13	18	0	9	34	6	3	0	0	6	9	6	20	5	1	1	32	2	45	1	0	3	48	123
8:00 AM	1	9	10	0	7	20	1	0	0	0	0	1	6	22	4	0	0	32	1	17	0	0	0	18	71
8:15 AM	1	7	8	0	1	16	0	4	1	0	0	5	2	13	1	0	0	16	2	25	1	0	0	28	65
8:30 AM	1	2	5	0	1	8	0	0	0	0	0	0	2	1	0	0	0	3	0	7	0	1	0	8	19
8:45 AM	0	3	5	0	0	8	0	1	0	0	0	1	1	4	0	0	0	5	0	2	0	0	0	2	16
Hourly Total	3	21	28	0	9	52	1	5	1	0	0	7	11	40	5	0	0	56	3	51	1	1	0	56	171
9:00 AM	0	2	3	0	0	5	0	1	0	0	1	1	2	7	0	0	1	9	0	9	0	0	0	9	24
9:15 AM	0	0	4	0	0	4	0	1	0	0	1	1	1	5	1	0	0	7	0	8	0	0	1	8	20
9:30 AM	0	1	3	0	0	4	0	3	0	0	1	3	0	6	0	0	2	6	2	5	0	0	0	7	20
9:45 AM	0	0	4	0	0	4	0	1	0	0	3	1	2	5	0	0	3	7	0	4	0	0	0	4	16
Hourly Total	0	3	14	0	0	17	0	6	0	0	6	6	5	23	1	0	6	29	2	26	0	0	1	28	80
10:00 AM	0	1	2	0	2	3	0	1	0	0	1	1	3	6	0	0	1	9	0	3	0	0	2	3	16
10:15 AM	0	0	3	0	0	3	0	0	0	0	8	0	1	4	3	0	0	8	0	6	1	0	7	7	18
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	0	1	5	0	2	6	0	1	0	0	9	1	4	10	3	0	1	17	0	9	1	0	9	10	34
12:00 PM	0	0	3	0	1	3	0	4	0	0	0	4	2	8	0	0	0	10	1	3	0	0	0	4	21
12:15 PM	0	1	3	0	0	4	0	1	1	0	3	2	2	4	1	0	0	7	0	4	0	1	2	5	18
12:30 PM	0	1	4	0	1	5	1	3	0	0	0	4	2	8	1	0	0	11	0	5	0	0	0	5	25
12:45 PM	0	0	2	0	2	2	2	1	0	0	1	3	3	3	1	0	0	7	0	2	1	0	6	3	15
Hourly Total	0	2	12	0	4	14	3	9	1	0	4	13	9	23	3	0	0	35	1	14	1	1	8	17	79
1:00 PM	0	1	0	0	1	1	0	1	0	0	0	1	3	13	1	0	1	17	0	4	2	0	0	6	25
1:15 PM	0	2	2	0	1	4	1	1	0	0	1	2	3	3	2	0	1	8	0	6	0	0	0	6	20
1:30 PM	0	1	1	0	2	2	1	2	0	0	2	3	4	5	0	0	1	9	0	4	0	0	2	4	18
1:45 PM	0	0	0	0	1	0	1	1	0	0	3	2	5	5	1	0	0	11	0	6	0	0	3	6	19
Hourly Total	0	4	3	0	5	7	3	5	0	0	6	8	15	26	4	0	3	45	0	20	2	0	5	22	82
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3:00 PM	0	0	4	0	5	4	0	3	1	0	2	4	1	7	2	0	2	10	0	6	0	0	1	6	24
3:15 PM	0	1	1	0	0	2	0	3	1	0	2	4	3	9	0	0	0	12	0	7	0	0	1	7	25
3:30 PM	0	1	2	0	4	3	0	1	0	0	1	1	6	8	2	0	0	16	2	8	0	0	1	10	30
3:45 PM	0	2	5	0	0	7	1	2	0	0	1	3	4	9	4	0	2	17	0	10	0	0	1	10	37
Hourly Total	0	4	12	0	9	16	1	9	2	0	6	12	14	33	8	0	4	55	2	31	0	0	4	33	116
4:00 PM	0	1	5	0	3	6	2	3	0	0	7	5	8	12	3	0	1	23	0	11	0	0	0	11	45
4:15 PM	1	1	3	0	4	5	1	2	3	0	2	6	9	9	1	0	0	19	1	7	0	0	4	8	38

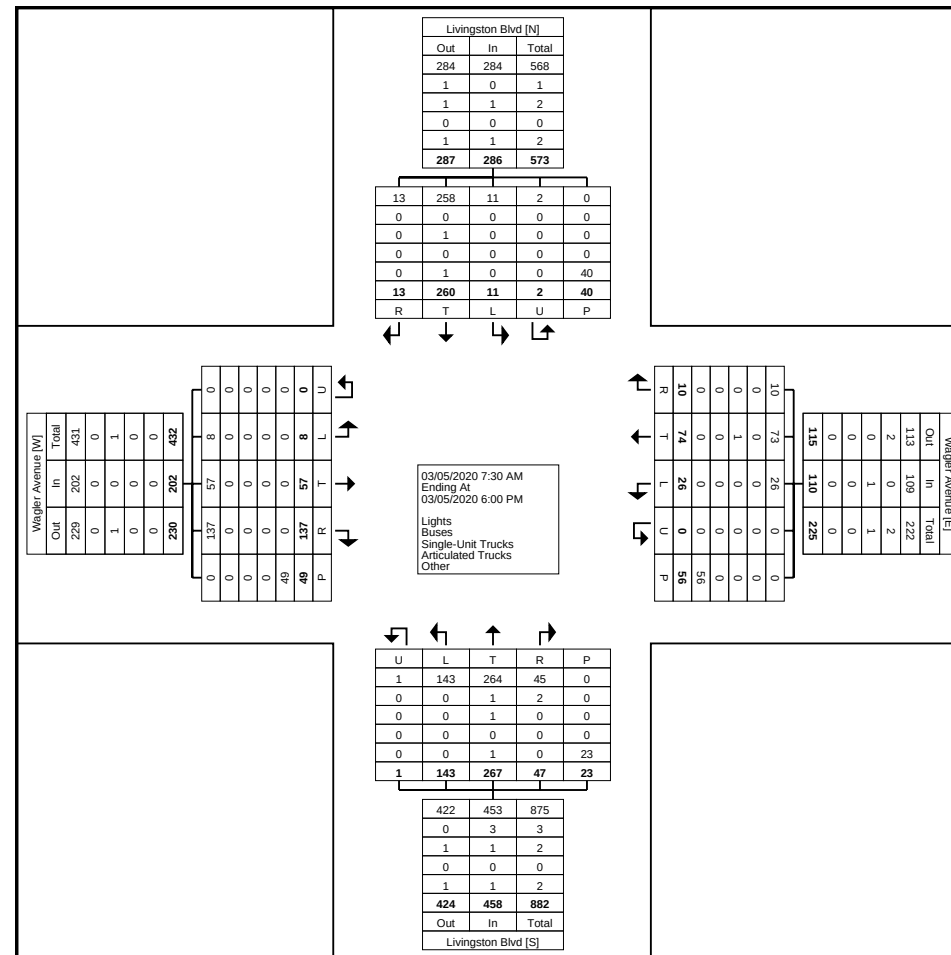
4:30 PM	0	0	6	0	0	6	2	5	0	0	5	7	10	12	1	0	2	23	0	7	1	0	2	8	44
4:45 PM	0	0	5	0	2	5	0	2	0	0	1	2	9	7	3	0	2	19	0	15	0	0	2	15	41
Hourly Total	1	2	19	0	9	22	5	12	3	0	15	20	36	40	8	0	5	84	1	40	1	0	8	42	168
5:00 PM	1	1	9	0	0	11	1	7	2	0	1	10	12	14	0	0	1	26	0	7	2	0	0	9	56
5:15 PM	0	5	4	0	0	9	2	8	1	0	3	11	11	16	3	0	0	30	0	3	1	0	2	4	54
5:30 PM	0	1	5	0	1	6	3	6	0	0	0	9	7	7	3	0	2	17	0	4	2	0	0	6	38
5:45 PM	0	0	8	0	1	8	1	3	0	0	0	4	13	15	4	0	0	32	0	10	1	0	0	11	55
Hourly Total	1	7	26	0	2	34	7	24	3	0	4	34	43	52	10	0	3	105	0	24	6	0	2	30	203
Grand Total	8	57	137	0	49	202	26	74	10	0	56	110	143	267	47	1	23	458	11	260	13	2	40	286	1056
Approach %	4.0	28.2	67.8	0.0	-	-	23.6	67.3	9.1	0.0	-	-	31.2	58.3	10.3	0.2	-	-	3.8	90.9	4.5	0.7	-	-	-
Total %	0.8	5.4	13.0	0.0	-	19.1	2.5	7.0	0.9	0.0	-	10.4	13.5	25.3	4.5	0.1	-	43.4	1.0	24.6	1.2	0.2	-	27.1	-
Lights	8	57	137	0	-	202	26	73	10	0	-	109	143	264	45	1	-	453	11	258	13	2	-	284	1048
% Lights	100.0	100.0	100.0	-	-	100.0	100.0	98.6	100.0	-	-	99.1	100.0	98.9	95.7	100.0	-	98.9	100.0	99.2	100.0	100.0	-	99.3	99.2
Buses	0	0	0	0	-	0	0	0	0	0	-	0	0	1	2	0	-	3	0	0	0	0	-	0	3
% Buses	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.4	4.3	0.0	-	0.7	0.0	0.0	0.0	0.0	-	0.0	0.3
Single-Unit Trucks	0	0	0	0	-	0	0	1	0	0	-	1	0	1	0	0	-	1	0	1	0	0	-	1	3
% Single-Unit Trucks	0.0	0.0	0.0	-	-	0.0	0.0	1.4	0.0	-	-	0.9	0.0	0.4	0.0	0.0	-	0.2	0.0	0.4	0.0	0.0	-	0.3	0.3
Articulated Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Articulated Trucks	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	1	0	0	-	1	0	1	0	0	-	1	2
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.4	0.0	0.0	-	0.2	0.0	0.4	0.0	0.0	-	0.3	0.2
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	49	-	-	-	-	-	56	-	-	-	-	-	23	-	-	-	-	-	40	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

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Count Name: Wagler Avenue & Livingston Blvd
(West)
Site Code: 200068
Start Date: 03/05/2020
Page No: 3



Turning Movement Data Plot



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@ptsll.com

Count Name: Wagler Avenue & Livingston Blvd
(West)
Site Code: 200068
Start Date: 03/05/2020
Page No: 4

Turning Movement Peak Hour Data (7:30 AM)

Start Time	Wagler Avenue Eastbound						Wagler Avenue Westbound						Livingston Blvd Northbound						Livingston Blvd Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
7:30 AM	1	5	7	0	7	13	3	0	0	0	4	3	2	9	3	1	1	15	1	10	0	0	3	11	42
7:45 AM	2	8	11	0	2	21	3	3	0	0	2	6	4	11	2	0	0	17	1	35	1	0	0	37	81
8:00 AM	1	9	10	0	7	20	1	0	0	0	0	1	6	22	4	0	0	32	1	17	0	0	0	18	71
8:15 AM	1	7	8	0	1	16	0	4	1	0	0	5	2	13	1	0	0	16	2	25	1	0	0	28	65
Total	5	29	36	0	17	70	7	7	1	0	6	15	14	55	10	1	1	80	5	87	2	0	3	94	259
Approach %	7.1	41.4	51.4	0.0	-	-	46.7	46.7	6.7	0.0	-	-	17.5	68.8	12.5	1.3	-	-	5.3	92.6	2.1	0.0	-	-	-
Total %	1.9	11.2	13.9	0.0	-	27.0	2.7	2.7	0.4	0.0	-	5.8	5.4	21.2	3.9	0.4	-	30.9	1.9	33.6	0.8	0.0	-	36.3	-
PHF	0.625	0.806	0.818	0.000	-	0.833	0.583	0.438	0.250	0.000	-	0.625	0.583	0.625	0.625	0.250	-	0.625	0.625	0.621	0.500	0.000	-	0.635	0.799
Lights	5	29	36	0	-	70	7	7	1	0	-	15	14	55	8	1	-	78	5	86	2	0	-	93	256
% Lights	100.0	100.0	100.0	-	-	100.0	100.0	100.0	100.0	-	-	100.0	100.0	100.0	80.0	100.0	-	97.5	100.0	98.9	100.0	-	-	98.9	98.8
Buses	0	0	0	0	-	0	0	0	0	0	-	0	0	0	2	0	-	2	0	0	0	0	-	0	2
% Buses	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	20.0	0.0	-	2.5	0.0	0.0	0.0	-	-	0.0	0.8
Single-Unit Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Single-Unit Trucks	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Articulated Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Articulated Trucks	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	1	0	0	-	1	1
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	1.1	0.0	-	-	1.1	0.4
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	17	-	-	-	-	-	6	-	-	-	-	-	1	-	-	-	-	-	3	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-

Turning Movement Peak Hour Data Plot (7:30 AM)



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@ptsll.com

Count Name: Wagler Avenue & Livingston Blvd
(West)
Site Code: 200068
Start Date: 03/05/2020
Page No: 6

Turning Movement Peak Hour Data (12:30 PM)

Start Time	Wagler Avenue Eastbound						Wagler Avenue Westbound						Livingston Blvd Northbound						Livingston Blvd Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
12:30 PM	0	1	4	0	1	5	1	3	0	0	0	4	2	8	1	0	0	11	0	5	0	0	0	5	25
12:45 PM	0	0	2	0	2	2	2	1	0	0	1	3	3	3	1	0	0	7	0	2	1	0	6	3	15
1:00 PM	0	1	0	0	1	1	0	1	0	0	0	1	3	13	1	0	1	17	0	4	2	0	0	6	25
1:15 PM	0	2	2	0	1	4	1	1	0	0	1	2	3	3	2	0	1	8	0	6	0	0	0	6	20
Total	0	4	8	0	5	12	4	6	0	0	2	10	11	27	5	0	2	43	0	17	3	0	6	20	85
Approach %	0.0	33.3	66.7	0.0	-	-	40.0	60.0	0.0	0.0	-	-	25.6	62.8	11.6	0.0	-	-	0.0	85.0	15.0	0.0	-	-	-
Total %	0.0	4.7	9.4	0.0	-	14.1	4.7	7.1	0.0	0.0	-	11.8	12.9	31.8	5.9	0.0	-	50.6	0.0	20.0	3.5	0.0	-	23.5	-
PHF	0.000	0.500	0.500	0.000	-	0.600	0.500	0.500	0.000	0.000	-	0.625	0.917	0.519	0.625	0.000	-	0.632	0.000	0.708	0.375	0.000	-	0.833	0.850
Lights	0	4	8	0	-	12	4	6	0	0	-	10	11	26	5	0	-	42	0	17	3	0	-	20	84
% Lights	-	100.0	100.0	-	-	100.0	100.0	100.0	-	-	-	100.0	100.0	96.3	100.0	-	-	97.7	-	100.0	100.0	-	-	100.0	98.8
Buses	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Buses	-	0.0	0.0	-	-	0.0	0.0	0.0	-	-	-	0.0	0.0	0.0	0.0	-	-	0.0	-	0.0	0.0	-	-	0.0	0.0
Single-Unit Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	1	0	0	-	1	0	0	0	0	-	0	1
% Single-Unit Trucks	-	0.0	0.0	-	-	0.0	0.0	0.0	-	-	-	0.0	0.0	3.7	0.0	-	-	2.3	-	0.0	0.0	-	-	0.0	1.2
Articulated Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Articulated Trucks	-	0.0	0.0	-	-	0.0	0.0	0.0	-	-	-	0.0	0.0	0.0	0.0	-	-	0.0	-	0.0	0.0	-	-	0.0	0.0
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Bicycles on Road	-	0.0	0.0	-	-	0.0	0.0	0.0	-	-	-	0.0	0.0	0.0	0.0	-	-	0.0	-	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	5	-	-	-	-	-	2	-	-	-	-	-	2	-	-	-	-	-	6	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-

Turning Movement Peak Hour Data Plot (12:30 PM)



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@ptsl.com

Count Name: Wagler Avenue & Livingston Blvd
(West)
Site Code: 200068
Start Date: 03/05/2020
Page No: 8

Turning Movement Peak Hour Data (5:00 PM)

Start Time	Wagler Avenue Eastbound						Wagler Avenue Westbound						Livingston Blvd Northbound						Livingston Blvd Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
5:00 PM	1	1	9	0	0	11	1	7	2	0	1	10	12	14	0	0	1	26	0	7	2	0	0	9	56
5:15 PM	0	5	4	0	0	9	2	8	1	0	3	11	11	16	3	0	0	30	0	3	1	0	2	4	54
5:30 PM	0	1	5	0	1	6	3	6	0	0	0	9	7	7	3	0	2	17	0	4	2	0	0	6	38
5:45 PM	0	0	8	0	1	8	1	3	0	0	0	4	13	15	4	0	0	32	0	10	1	0	0	11	55
Total	1	7	26	0	2	34	7	24	3	0	4	34	43	52	10	0	3	105	0	24	6	0	2	30	203
Approach %	2.9	20.6	76.5	0.0	-	-	20.6	70.6	8.8	0.0	-	-	41.0	49.5	9.5	0.0	-	-	0.0	80.0	20.0	0.0	-	-	-
Total %	0.5	3.4	12.8	0.0	-	16.7	3.4	11.8	1.5	0.0	-	16.7	21.2	25.6	4.9	0.0	-	51.7	0.0	11.8	3.0	0.0	-	14.8	-
PHF	0.250	0.350	0.722	0.000	-	0.773	0.583	0.750	0.375	0.000	-	0.773	0.827	0.813	0.625	0.000	-	0.820	0.000	0.600	0.750	0.000	-	0.682	0.906
Lights	1	7	26	0	-	34	7	24	3	0	-	34	43	51	10	0	-	104	0	24	6	0	-	30	202
% Lights	100.0	100.0	100.0	-	-	100.0	100.0	100.0	100.0	-	-	100.0	100.0	98.1	100.0	-	-	99.0	-	100.0	100.0	-	-	100.0	99.5
Buses	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Buses	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	-	0.0	0.0	-	-	0.0	0.0
Single-Unit Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Single-Unit Trucks	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	-	0.0	0.0	-	-	0.0	0.0
Articulated Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Articulated Trucks	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	-	0.0	0.0	-	-	0.0	0.0
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	1	0	0	-	1	0	0	0	0	-	0	1
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	1.9	0.0	-	-	1.0	-	0.0	0.0	-	-	0.0	0.5
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	2	-	-	-	-	-	4	-	-	-	-	-	3	-	-	-	-	-	2	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-

Turning Movement Peak Hour Data Plot (5:00 PM)

Fixed Time Operation

Non-Actuated protected/permissive left-turn phase for the Westbound Approach

Signal Timing in Effect:

14:30 - 16:00 Monday to Friday

Snyder's Road

Green	35.0	seconds			
Amber	4.1	seconds	Walk	15.0	seconds
All Red	3.0	seconds	FDW	20.0	seconds

WB OVLP A

LT arrows & Green	8.0	seconds
Amber	4.1	seconds
All Red	5.0	seconds

Foundry Street

Green	30.0	seconds			
Amber	4.1	seconds	Walk	20.0	seconds
All Red	4.0	seconds	FDW	10.0	seconds
TOTAL	97.3	seconds			

Signal Timing in Effect:

All Other Times

Snyder's Road

Green	30.0	seconds			
Amber	4.1	seconds	Walk	10.0	seconds
All Red	3.0	seconds	FDW	20.0	seconds

WB OVLP A

LT arrows & Green	8.0	seconds
Amber	4.1	seconds
All Red	5.0	seconds

Foundry Street

Green	21.0	seconds			
Amber	4.1	seconds	Walk	11.0	seconds
All Red	4.0	seconds	FDW	10.0	seconds
TOTAL	83.3	seconds			

Signal Timing in Effect:

07:30 - 08:30, Monday to Friday

Snyder's Road

Green	30.0	seconds			
Amber	4.1	seconds	Walk	10.0	seconds
All Red	3.0	seconds	FDW	20.0	seconds

WB OVLP A

LT arrows & Green	8.0	seconds
Amber	4.1	seconds
All Red	5.0	seconds

Foundry Street

Green	40.0	seconds			
Amber	4.1	seconds	Walk	30.0	seconds
All Red	4.0	seconds	FDW	10.0	seconds
TOTAL	102.3	seconds			

Appendix C

Existing Operation Reports



Lanes, Volumes, Timings

1: Foundry St/Livingston Blvd & Snyder's Rd

Existing (2020)

Timing Plan: AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↱		↰	↱	
Traffic Volume (vph)	7	148	138	10	150	37	144	78	14	102	176	48
Future Volume (vph)	7	148	138	10	150	37	144	78	14	102	176	48
Ideal Flow (vphpl)	1775	1650	1650	1550	1550	1550	1775	1650	1650	1775	1650	1650
Storage Length (m)	35.0		0.0	0.0		0.0	50.0		0.0	35.0		0.0
Storage Lanes	1		0	0		0	1		0	1		0
Taper Length (m)	40.0			7.5			25.0			35.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99				0.99			1.00		1.00		
Frt		0.928			0.975			0.977			0.968	
Flt Protected	0.950				0.997		0.950			0.950		
Satd. Flow (prot)	1686	1471	0	0	1418	0	1637	1538	0	1670	1566	0
Flt Permitted	0.634				0.992		0.559			0.697		
Satd. Flow (perm)	1117	1471	0	0	1411	0	963	1538	0	1222	1566	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		49			16			11			17	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		299.0			280.1			388.3			251.4	
Travel Time (s)		21.5			20.2			28.0			18.1	
Confl. Peds. (#/hr)	6					6			2	2		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	7%	1%	10%	6%	3%	3%	4%	7%	1%	2%	2%
Adj. Flow (vph)	7	148	138	10	150	37	144	78	14	102	176	48
Shared Lane Traffic (%)												
Lane Group Flow (vph)	7	286	0	0	197	0	144	92	0	102	224	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Right	Left	Left	Right	
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.09	1.20	1.20	1.29	1.29	1.29	1.09	1.20	1.20	1.09	1.20	1.20
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		4		3	8			2			6	
Permitted Phases	4			8			2			6		
Minimum Split (s)	37.1	37.1		14.1	39.1		48.1	48.1		48.1	48.1	
Total Split (s)	37.1	37.1		17.1	54.2		48.1	48.1		48.1	48.1	
Total Split (%)	36.3%	36.3%		16.7%	53.0%		47.0%	47.0%		47.0%	47.0%	
Maximum Green (s)	30.0	30.0		13.0	47.1		40.0	40.0		40.0	40.0	
Yellow Time (s)	4.1	4.1		4.1	4.1		4.1	4.1		4.1	4.1	
All-Red Time (s)	3.0	3.0		0.0	3.0		4.0	4.0		4.0	4.0	
Lost Time Adjust (s)	-3.1	-3.1			-3.1		-4.1	-4.1		-4.1	-4.1	
Total Lost Time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Walk Time (s)	10.0	10.0			10.0		30.0	30.0		30.0	30.0	
Flash Dont Walk (s)	20.0	20.0			20.0		10.0	10.0		10.0	10.0	
Pedestrian Calls (#/hr)	0	0			0		0	0		0	0	

1012 Snyder's Road, Baden TIS
PTSL (200068)Synchro 9 Report
Page 1

Lanes, Volumes, Timings

1: Foundry St/Livingston Blvd & Snyder's Rd

Existing (2020)

Timing Plan: AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Act Effct Green (s)	33.1	33.1			50.2		44.1	44.1		44.1	44.1	
Actuated g/C Ratio	0.32	0.32			0.49		0.43	0.43		0.43	0.43	
v/c Ratio	0.02	0.56			0.28		0.35	0.14		0.19	0.33	
Control Delay	24.0	28.5			15.4		22.5	16.2		19.5	19.5	
Queue Delay	0.0	0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay	24.0	28.5			15.4		22.5	16.2		19.5	19.5	
LOS	C	C			B		C	B		B	B	
Approach Delay		28.4			15.4			20.0			19.5	
Approach LOS		C			B			C			B	

Intersection Summary

Area Type: Other

Cycle Length: 102.3

Actuated Cycle Length: 102.3

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 100

Control Type: Pretimed

Maximum v/c Ratio: 0.56

Intersection Signal Delay: 21.3

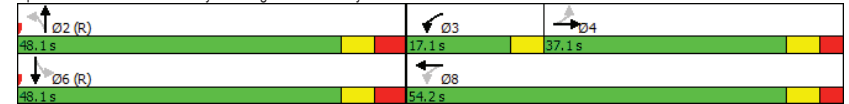
Intersection Capacity Utilization 74.4%

Intersection LOS: C

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 1: Foundry St/Livingston Blvd & Snyder's Rd

1012 Snyder's Road, Baden TIS
PTSL (200068)Synchro 9 Report
Page 2

Queues

1: Foundry St/Livingston Blvd & Snyder's Rd

Existing (2020)

Timing Plan: AM Peak Hour

	↖	→	←	↙	↑	↘	↓
Lane Group	EBL	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	7	286	197	144	92	102	224
v/c Ratio	0.02	0.56	0.28	0.35	0.14	0.19	0.33
Control Delay	24.0	28.5	15.4	22.5	16.2	19.5	19.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.0	28.5	15.4	22.5	16.2	19.5	19.5
Queue Length 50th (m)	1.0	40.5	21.3	19.7	9.9	12.9	27.7
Queue Length 95th (m)	4.3	68.4	36.8	36.1	20.2	24.6	46.5
Internal Link Dist (m)		275.0	256.1		364.3		227.4
Turn Bay Length (m)	35.0			50.0		35.0	
Base Capacity (vph)	361	509	701	415	669	526	684
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.02	0.56	0.28	0.35	0.14	0.19	0.33
Intersection Summary							

HCM Signalized Intersection Capacity Analysis

1: Foundry St/Livingston Blvd & Snyder's Rd

Existing (2020)

Timing Plan: AM Peak Hour

	↖	→	↙	↘	←	↖	↙	↑	↘	↙	↓	↘
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↘			↘	↖	↖	↘		↖	↘	
Traffic Volume (vph)	7	148	138	10	150	37	144	78	14	102	176	48
Future Volume (vph)	7	148	138	10	150	37	144	78	14	102	176	48
Ideal Flow (vphpl)	1775	1650	1650	1550	1550	1550	1775	1650	1650	1775	1650	1650
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00			0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	0.99	1.00			1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.93			0.97		1.00	0.98		1.00	0.97	
Flt Protected	0.95	1.00			1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1673	1470			1418		1637	1538		1666	1566	
Flt Permitted	0.63	1.00			0.99		0.56	1.00		0.70	1.00	
Satd. Flow (perm)	1116	1470			1411		963	1538		1223	1566	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	7	148	138	10	150	37	144	78	14	102	176	48
RTOR Reduction (vph)	0	33	0	0	8	0	0	6	0	0	10	0
Lane Group Flow (vph)	7	253	0	0	189	0	144	86	0	102	214	0
Confl. Peds. (#/hr)	6					6			2	2		
Heavy Vehicles (%)	0%	7%	1%	10%	6%	3%	3%	4%	7%	1%	2%	2%
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		4		3	8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	30.0	30.0			47.1		40.0	40.0		40.0	40.0	
Effective Green, g (s)	33.1	33.1			50.2		44.1	44.1		44.1	44.1	
Actuated g/C Ratio	0.32	0.32			0.49		0.43	0.43		0.43	0.43	
Clearance Time (s)	7.1	7.1			7.1		8.1	8.1		8.1	8.1	
Lane Grp Cap (vph)	361	475			693		415	663		527	675	
v/s Ratio Prot		c0.17			c0.04			0.06			0.14	
v/s Ratio Perm	0.01				0.09		c0.15			0.08		
v/c Ratio	0.02	0.53			0.27		0.35	0.13		0.19	0.32	
Uniform Delay, d1	23.6	28.3			15.3		19.5	17.5		18.1	19.2	
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.01	1.01	
Incremental Delay, d2	0.1	4.2			1.0		2.3	0.4		0.8	1.2	
Delay (s)	23.7	32.5			16.3		21.8	17.9		19.0	20.5	
Level of Service	C	C			B		C	B		B	C	
Approach Delay (s)		32.3			16.3			20.3			20.1	
Approach LOS		C			B			C			C	
Intersection Summary												
HCM 2000 Control Delay		22.8								C		
HCM 2000 Volume to Capacity ratio		0.41										
Actuated Cycle Length (s)		102.3								12.1		
Intersection Capacity Utilization		74.4%								D		
Analysis Period (min)		15										
c Critical Lane Group												

Lanes, Volumes, Timings
2: Snyder's Rd & Livingston Blvd

Existing (2020)
Timing Plan: AM Peak Hour

	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↗	↖	↔	↔	↔
Traffic Volume (vph)	50	288	319	22	91	90
Future Volume (vph)	50	288	319	22	91	90
Ideal Flow (vphpl)	1650	1650	1650	1650	1765	1765
Storage Length (m)	50.0			0.0	0.0	0.0
Storage Lanes	1			0	1	0
Taper Length (m)	35.0				7.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt			0.991		0.933	
Flt Protected	0.950				0.975	
Satd. Flow (prot)	1522	1557	1535	0	1606	0
Flt Permitted	0.950				0.975	
Satd. Flow (perm)	1522	1557	1535	0	1606	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		342.5	299.0		251.5	
Travel Time (s)		24.7	21.5		18.1	
Confl. Peds. (#/hr)	10			10		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	3%	6%	7%	0%	0%	0%
Adj. Flow (vph)	50	288	319	22	91	90
Shared Lane Traffic (%)						
Lane Group Flow (vph)	50	288	341	0	181	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.6	3.6		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.20	1.20	1.20	1.20	1.10	1.10
Turning Speed (k/h)	25			15	25	15
Sign Control		Free	Free		Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization 45.6%	ICU Level of Service A					
Analysis Period (min) 15						

HCM Unsignalized Intersection Capacity Analysis
2: Snyder's Rd & Livingston Blvd

Existing (2020)
Timing Plan: AM Peak Hour

	EBL	EBT	WBT	WBR	SBL	SBR
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↗	↖	↔	↔	↔
Traffic Volume (veh/h)	50	288	319	22	91	90
Future Volume (Veh/h)	50	288	319	22	91	90
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	50	288	319	22	91	90
Pedestrians					10	
Lane Width (m)					3.6	
Walking Speed (m/s)					1.2	
Percent Blockage					1	
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)			299			
pX, platoon unblocked						
vC, conflicting volume	351				728	340
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	351				728	340
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	96				76	87
cM capacity (veh/h)	1192				374	701
Direction, Lane #	EB 1	EB 2	WB 1	SB 1		
Volume Total	50	288	341	181		
Volume Left	50	0	0	91		
Volume Right	0	0	22	90		
cSH	1192	1700	1700	487		
Volume to Capacity	0.04	0.17	0.20	0.37		
Queue Length 95th (m)	1.0	0.0	0.0	13.6		
Control Delay (s)	8.2	0.0	0.0	16.7		
Lane LOS	A			C		
Approach Delay (s)	1.2		0.0	16.7		
Approach LOS				C		
Intersection Summary						
Average Delay			4.0			
Intersection Capacity Utilization			45.6%		ICU Level of Service	A
Analysis Period (min)			15			

Lanes, Volumes, Timings
3: Christian St & Snyder's Rd

Existing (2020)
Timing Plan: AM Peak Hour

						
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	345	0	1	411	4	1
Future Volume (vph)	345	0	1	411	4	1
Ideal Flow (vphpl)	1650	1650	1650	1650	1765	1765
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt					0.973	
Flt Protected					0.962	
Satd. Flow (prot)	1557	0	0	1557	1652	0
Flt Permitted					0.962	
Satd. Flow (perm)	1557	0	0	1557	1652	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	587.8			342.5	168.2	
Travel Time (s)	42.3			24.7	12.1	
Confl. Peds. (#/hr)		2	2			
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	6%	0%	0%	6%	0%	0%
Adj. Flow (vph)	345	0	1	411	4	1
Shared Lane Traffic (%)						
Lane Group Flow (vph)	345	0	0	412	5	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			3.6	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.20	1.20	1.20	1.20	1.10	1.10
Turning Speed (k/h)		15	25		25	15
Sign Control	Free			Free	Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	35.8%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
3: Christian St & Snyder's Rd

Existing (2020)
Timing Plan: AM Peak Hour

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔			↔	↔	
Traffic Volume (veh/h)	345	0	1	411	4	1
Future Volume (Veh/h)	345	0	1	411	4	1
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	345	0	1	411	4	1
Pedestrians					2	
Lane Width (m)					3.6	
Walking Speed (m/s)					1.2	
Percent Blockage					0	
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			347		760	347
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			347		760	347
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		99	100
cM capacity (veh/h)			1221		376	699
Direction, Lane #						
Volume Total	345	412	5			
Volume Left	0	1	4			
Volume Right	0	0	1			
cSH	1700	1221	414			
Volume to Capacity	0.20	0.00	0.01			
Queue Length 95th (m)	0.0	0.0	0.3			
Control Delay (s)	0.0	0.0	13.8			
Lane LOS		A	B			
Approach Delay (s)	0.0	0.0	13.8			
Approach LOS			B			
Intersection Summary						
Average Delay			0.1			
Intersection Capacity Utilization			35.8%		ICU Level of Service	A
Analysis Period (min)			15			

Lanes, Volumes, Timings
4: Livingston Blvd & Wagler Ave

Existing (2020)
Timing Plan: AM Peak Hour

	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	W			W	W	
Traffic Volume (vph)	7	57	12	87	224	2
Future Volume (vph)	7	57	12	87	224	2
Ideal Flow (vphpl)	1765	1765	1650	1650	1650	1650
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.880				0.999	
Flt Protected	0.995			0.994		
Satd. Flow (prot)	1496	0	0	1612	1625	0
Flt Permitted	0.995			0.994		
Satd. Flow (perm)	1496	0	0	1612	1625	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	297.7			251.4	141.5	
Travel Time (s)	21.4			18.1	10.2	
Confl. Peds. (#/hr)	1		2			2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	14%	2%	0%	2%	1%	50%
Adj. Flow (vph)	7	57	12	87	224	2
Shared Lane Traffic (%)						
Lane Group Flow (vph)	64	0	0	99	226	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			3.6	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.10	1.10	1.20	1.20	1.20	1.20
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization 27.8%	ICU Level of Service A					
Analysis Period (min) 15						

HCM Unsignalized Intersection Capacity Analysis
4: Livingston Blvd & Wagler Ave

Existing (2020)
Timing Plan: AM Peak Hour

	EBL	EBR	NBL	NBT	SBT	SBR
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	W			W	W	
Traffic Volume (veh/h)	7	57	12	87	224	2
Future Volume (Veh/h)	7	57	12	87	224	2
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	7	57	12	87	224	2
Pedestrians	2				1	
Lane Width (m)	3.6				3.6	
Walking Speed (m/s)	1.2				1.2	
Percent Blockage	0				0	
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)				251		
pX, platoon unblocked						
vC, conflicting volume	339	227	228			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	339	227	228			
tC, single (s)	6.5	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.6	3.3	2.2			
p0 queue free %	99	93	99			
cM capacity (veh/h)	626	811	1350			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	64	99	226			
Volume Left	7	12	0			
Volume Right	57	0	2			
cSH	786	1350	1700			
Volume to Capacity	0.08	0.01	0.13			
Queue Length 95th (m)	2.1	0.2	0.0			
Control Delay (s)	10.0	1.0	0.0			
Lane LOS	A	A				
Approach Delay (s)	10.0	1.0	0.0			
Approach LOS	A					
Intersection Summary						
Average Delay		1.9				
Intersection Capacity Utilization		27.8%		ICU Level of Service		A
Analysis Period (min)		15				

Lanes, Volumes, Timings
5: Livingston Blvd & Wagler Ave

Existing (2020)
Timing Plan: AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	29	36	7	7	1	14	55	10	5	87	2
Future Volume (vph)	5	29	36	7	7	1	14	55	10	5	87	2
Ideal Flow (vphpl)	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.931			0.991			0.983			0.997	
Flt Protected		0.996			0.977			0.991			0.997	
Satd. Flow (prot)	0	1437	0	0	1501	0	0	1473	0	0	1527	0
Flt Permitted		0.996			0.977			0.991			0.997	
Satd. Flow (perm)	0	1437	0	0	1501	0	0	1473	0	0	1527	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		158.5			297.7			251.5			116.3	
Travel Time (s)		11.4			21.4			18.1			8.4	
Confl. Peds. (#/hr)	3		1	1		3	17		6	6		17
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	20%	0%	1%	0%
Adj. Flow (vph)	5	29	36	7	7	1	14	55	10	5	87	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	70	0	0	15	0	0	79	0	0	94	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	23.2%											
Analysis Period (min)	15											
ICU Level of Service A												

HCM Unsignalized Intersection Capacity Analysis
5: Livingston Blvd & Wagler Ave

Existing (2020)
Timing Plan: AM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (veh/h)	5	29	36	7	7	1	14	55	10	5	87	2
Future Volume (Veh/h)	5	29	36	7	7	1	14	55	10	5	87	2
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	5	29	36	7	7	1	14	55	10	5	87	2
Pedestrians		17			6			1			3	
Lane Width (m)		3.6			3.6			3.6			3.6	
Walking Speed (m/s)		1.2			1.2			1.2			1.2	
Percent Blockage		1			1			0			0	
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	210	214	106	244	210	69	106			71		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	210	214	106	244	210	69	106			71		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	96	96	99	99	100	99			100		
cM capacity (veh/h)	714	665	939	645	669	992	1477			1535		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	70	15	79	94								
Volume Left	5	7	14	5								
Volume Right	36	1	10	2								
cSH	787	672	1477	1535								
Volume to Capacity	0.09	0.02	0.01	0.00								
Queue Length 95th (m)	2.3	0.5	0.2	0.1								
Control Delay (s)	10.0	10.5	1.4	0.4								
Lane LOS	B	B	A	A								
Approach Delay (s)	10.0	10.5	1.4	0.4								
Approach LOS	B	B										
Intersection Summary												
Average Delay		3.9										
Intersection Capacity Utilization		23.2%										
Analysis Period (min)		15										
ICU Level of Service A												

Lanes, Volumes, Timings
6: McFadyen St/Hunsberger Dr & Wagler Ave

Existing (2020)
Timing Plan: AM Peak Hour

	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W		R			R
Traffic Volume (vph)	2	13	6	1	45	30
Future Volume (vph)	2	13	6	1	45	30
Ideal Flow (vphpl)	1765	1765	1650	1650	1650	1650
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.883		0.981			
Flt Protected	0.993					0.971
Satd. Flow (prot)	1548	0	1619	0	0	1602
Flt Permitted	0.993					0.971
Satd. Flow (perm)	1548	0	1619	0	0	1602
Link Speed (k/h)	50		50			50
Link Distance (m)	158.5		76.5			91.6
Travel Time (s)	11.4		5.5			6.6
Confl. Peds. (#/hr)		1		5	5	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	2	13	6	1	45	30
Shared Lane Traffic (%)						
Lane Group Flow (vph)	15	0	7	0	0	75
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.6		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.10	1.10	1.20	1.20	1.20	1.20
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization 21.7%	ICU Level of Service A					
Analysis Period (min) 15						

HCM Unsignalized Intersection Capacity Analysis
6: McFadyen St/Hunsberger Dr & Wagler Ave

Existing (2020)
Timing Plan: AM Peak Hour

	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W		R			R
Traffic Volume (veh/h)	2	13	6	1	45	30
Future Volume (Veh/h)	2	13	6	1	45	30
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	2	13	6	1	45	30
Pedestrians	5					1
Lane Width (m)	3.6					3.6
Walking Speed (m/s)	1.2					1.2
Percent Blockage	0					0
Right turn flare (veh)						
Median type		None			None	
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	132	12			12	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	132	12			12	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	99			97	
cM capacity (veh/h)	840	1068			1613	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	15	7	75			
Volume Left	2	0	45			
Volume Right	13	1	0			
cSH	1031	1700	1613			
Volume to Capacity	0.01	0.00	0.03			
Queue Length 95th (m)	0.4	0.0	0.7			
Control Delay (s)	8.5	0.0	4.5			
Lane LOS	A		A			
Approach Delay (s)	8.5	0.0	4.5			
Approach LOS	A					
Intersection Summary						
Average Delay		4.8				
Intersection Capacity Utilization		21.7%		ICU Level of Service	A	
Analysis Period (min)		15				

Lanes, Volumes, Timings
7: Livingston Blvd & Isaac Shantz Dr

Existing (2020)
Timing Plan: AM Peak Hour

						
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	12	68	57	32	126	27
Future Volume (vph)	12	68	57	32	126	27
Ideal Flow (vphpl)	1650	1650	1650	1650	1765	1765
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt			0.951		0.976	
Flt Protected		0.993			0.960	
Satd. Flow (prot)	0	1638	1530	0	1654	0
Flt Permitted		0.993			0.960	
Satd. Flow (perm)	0	1638	1530	0	1654	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		37.8	84.0		90.3	
Travel Time (s)		2.7	6.0		6.5	
Confl. Peds. (#/hr)	29			29	1	6
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	4%	0%	0%	0%
Adj. Flow (vph)	12	68	57	32	126	27
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	80	89	0	153	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.20	1.20	1.20	1.20	1.10	1.10
Turning Speed (k/h)	25			15	25	15
Sign Control		Free	Free		Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	28.3%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
7: Livingston Blvd & Isaac Shantz Dr

Existing (2020)
Timing Plan: AM Peak Hour

	EBL	EBT	WBT	WBR	SBL	SBR
Movement						
Lane Configurations		↗	↘		↖	↗
Traffic Volume (veh/h)	12	68	57	32	126	27
Future Volume (Veh/h)	12	68	57	32	126	27
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	12	68	57	32	126	27
Pedestrians		6	1		29	
Lane Width (m)		3.6	3.6		3.6	
Walking Speed (m/s)		1.2	1.2		1.2	
Percent Blockage		1	0		2	
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	118				195	108
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	118				195	108
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				84	97
cM capacity (veh/h)	1447				772	924
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	80	89	153			
Volume Left	12	0	126			
Volume Right	0	32	27			
cSH	1447	1700	795			
Volume to Capacity	0.01	0.05	0.19			
Queue Length 95th (m)	0.2	0.0	5.7			
Control Delay (s)	1.2	0.0	10.6			
Lane LOS	A		B			
Approach Delay (s)	1.2	0.0	10.6			
Approach LOS			B			
Intersection Summary						
Average Delay			5.3			
Intersection Capacity Utilization		28.3%		ICU Level of Service		A
Analysis Period (min)		15				

Lanes, Volumes, Timings
8: Livingston Blvd & Jacob Cressman Dr

Existing (2020)
Timing Plan: AM Peak Hour

						
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	21	40	41	6	33	49
Future Volume (vph)	21	40	41	6	33	49
Ideal Flow (vphpl)	1650	1650	1650	1650	1765	1765
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt			0.983		0.919	
Flt Protected		0.983			0.980	
Satd. Flow (prot)	0	1622	1594	0	1590	0
Flt Permitted		0.983			0.980	
Satd. Flow (perm)	0	1622	1594	0	1590	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		46.4	52.4		52.9	
Travel Time (s)		3.3	3.8		3.8	
Confl. Peds. (#/hr)	17			17	2	3
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	2%	0%	0%	0%
Adj. Flow (vph)	21	40	41	6	33	49
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	61	47	0	82	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.20	1.20	1.20	1.20	1.10	1.10
Turning Speed (k/h)	25			15	25	15
Sign Control		Free	Free		Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	23.3%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
8: Livingston Blvd & Jacob Cressman Dr

Existing (2020)
Timing Plan: AM Peak Hour

	EBL	EBT	WBT	WBR	SBL	SBR
Movement						
Lane Configurations		↔	↔		↔	
Traffic Volume (veh/h)	21	40	41	6	33	49
Future Volume (Veh/h)	21	40	41	6	33	49
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	21	40	41	6	33	49
Pedestrians		3	2		17	
Lane Width (m)		3.6	3.6		3.6	
Walking Speed (m/s)		1.2	1.2		1.2	
Percent Blockage		0	0		1	
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	64				145	64
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	64				145	64
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				96	95
cM capacity (veh/h)	1529				827	989
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	61	47	82			
Volume Left	21	0	33			
Volume Right	0	6	49			
cSH	1529	1700	917			
Volume to Capacity	0.01	0.03	0.09			
Queue Length 95th (m)	0.3	0.0	2.4			
Control Delay (s)	2.6	0.0	9.3			
Lane LOS	A		A			
Approach Delay (s)	2.6	0.0	9.3			
Approach LOS			A			
Intersection Summary						
Average Delay			4.9			
Intersection Capacity Utilization		23.3%		ICU Level of Service		A
Analysis Period (min)		15				

Lanes, Volumes, Timings
9: Isaac Shantz Dr & Kropf Dr

Existing (2020)
Timing Plan: AM Peak Hour

						
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1	9	17	3	3	3
Future Volume (vph)	1	9	17	3	3	3
Ideal Flow (vphpl)	1650	1650	1650	1650	1765	1765
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.878				0.932	
Flt Protected				0.959	0.976	
Satd. Flow (prot)	1449	0	0	1582	1606	0
Flt Permitted				0.959	0.976	
Satd. Flow (perm)	1449	0	0	1582	1606	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	82.2			95.1	387.0	
Travel Time (s)	5.9			6.8	27.9	
Confl. Peds. (#/hr)		15	15		1	4
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	1	9	17	3	3	3
Shared Lane Traffic (%)						
Lane Group Flow (vph)	10	0	0	20	6	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.20	1.20	1.20	1.20	1.10	1.10
Turning Speed (k/h)		15	25		25	15
Sign Control	Free			Free	Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	19.2%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
9: Isaac Shantz Dr & Kropf Dr

Existing (2020)
Timing Plan: AM Peak Hour

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↖			↗	↖	↗
Traffic Volume (veh/h)	1	9	17	3	3	3
Future Volume (Veh/h)	1	9	17	3	3	3
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	1	9	17	3	3	3
Pedestrians	1			4	15	
Lane Width (m)	3.6			3.6	3.6	
Walking Speed (m/s)	1.2			1.2	1.2	
Percent Blockage	0			0	1	
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			25		58	24
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			25		58	24
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		100	100
cM capacity (veh/h)			1583		931	1041
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	10	20	6			
Volume Left	0	17	3			
Volume Right	9	0	3			
cSH	1700	1583	983			
Volume to Capacity	0.01	0.01	0.01			
Queue Length 95th (m)	0.0	0.3	0.1			
Control Delay (s)	0.0	6.2	8.7			
Lane LOS		A	A			
Approach Delay (s)	0.0	6.2	8.7			
Approach LOS			A			
Intersection Summary						
Average Delay			4.9			
Intersection Capacity Utilization		19.2%		ICU Level of Service		A
Analysis Period (min)			15			

Lanes, Volumes, Timings
10: Jacob Cressman Dr & Michael Myers Rd

Existing (2020)
Timing Plan: AM Peak Hour

						
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	2	6	3	2	0	1
Future Volume (vph)	2	6	3	2	0	1
Ideal Flow (vphpl)	1650	1650	1650	1650	1765	1765
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.899				0.865	
Flt Protected				0.971		
Satd. Flow (prot)	1483	0	0	1602	1527	0
Flt Permitted				0.971		
Satd. Flow (perm)	1483	0	0	1602	1527	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	94.5			86.8	341.5	
Travel Time (s)	6.8			6.2	24.6	
Confl. Peds. (#/hr)		4	4			
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	2	6	3	2	0	1
Shared Lane Traffic (%)						
Lane Group Flow (vph)	8	0	0	5	1	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.20	1.20	1.20	1.20	1.10	1.10
Turning Speed (k/h)		15	25		25	15
Sign Control	Free			Free	Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	14.6%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
10: Jacob Cressman Dr & Michael Myers Rd

Existing (2020)
Timing Plan: AM Peak Hour

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↗			↖	↗	↖
Traffic Volume (veh/h)	2	6	3	2	0	1
Future Volume (Veh/h)	2	6	3	2	0	1
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	2	6	3	2	0	1
Pedestrians					4	
Lane Width (m)					3.6	
Walking Speed (m/s)					1.2	
Percent Blockage					0	
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			12		17	9
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			12		17	9
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			1615		1001	1075
Direction, Lane #						
Volume Total	8	5	1			
Volume Left	0	3	0			
Volume Right	6	0	1			
cSH	1700	1615	1075			
Volume to Capacity	0.00	0.00	0.00			
Queue Length 95th (m)	0.0	0.0	0.0			
Control Delay (s)	0.0	4.3	8.4			
Lane LOS		A	A			
Approach Delay (s)	0.0	4.3	8.4			
Approach LOS			A			
Intersection Summary						
Average Delay			2.1			
Intersection Capacity Utilization			14.6%		ICU Level of Service	A
Analysis Period (min)			15			

Lanes, Volumes, Timings

1: Foundry St/Livingston Blvd & Snyder's Rd

Existing (2020)

Timing Plan: PM Peak Hour

	↖	→	↗	↖	←	↖	↖	↖	↖	↖	↖	↖
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↖			↖		↖	↖		↖	↖	
Traffic Volume (vph)	12	116	70	19	176	144	107	149	33	48	74	30
Future Volume (vph)	12	116	70	19	176	144	107	149	33	48	74	30
Ideal Flow (vphpl)	1775	1650	1650	1550	1550	1550	1775	1650	1650	1775	1650	1650
Storage Length (m)	35.0		0.0	0.0		0.0	50.0		0.0	35.0		0.0
Storage Lanes	1		0	0		0	1		0	1		0
Taper Length (m)	40.0			7.5			25.0			35.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	0.99			0.99		0.99	0.99		0.99	0.99	
Frt	0.944				0.943		0.973			0.957		
Flt Protected	0.950				0.997		0.950			0.950		
Satd. Flow (prot)	1686	1511	0	0	1425	0	1686	1594	0	1686	1567	0
Flt Permitted	0.557				0.985		0.690			0.584		
Satd. Flow (perm)	980	1511	0	0	1407	0	1218	1594	0	1022	1567	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		37			63			13			23	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		299.0			280.1			388.3			251.4	
Travel Time (s)		21.5			20.2			28.0			18.1	
Confl. Peds. (#/hr)	10		10	10		10	4		12	12		4
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	1%	3%	5%	1%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	12	116	70	19	176	144	107	149	33	48	74	30
Shared Lane Traffic (%)												
Lane Group Flow (vph)	12	186	0	0	339	0	107	182	0	48	104	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Right	Left	Left	Right	
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.09	1.20	1.20	1.29	1.29	1.29	1.09	1.20	1.20	1.09	1.20	1.20
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		4		3	8			2			6	
Permitted Phases	4			8			2			6		
Minimum Split (s)	42.1	42.1		14.1	42.1		48.1	48.1		48.1	48.1	
Total Split (s)	42.1	42.1		17.1	59.2		38.1	38.1		38.1	38.1	
Total Split (%)	43.3%	43.3%		17.6%	60.8%		39.2%	39.2%		39.2%	39.2%	
Maximum Green (s)	35.0	35.0		8.0	52.1		30.0	30.0		30.0	30.0	
Yellow Time (s)	4.1	4.1		4.1	4.1		4.1	4.1		4.1	4.1	
All-Red Time (s)	3.0	3.0		5.0	3.0		4.0	4.0		4.0	4.0	
Lost Time Adjust (s)	-3.1	-3.1			-3.1		-4.1	-4.1		-4.1	-4.1	
Total Lost Time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes										
Walk Time (s)	15.0	15.0			15.0		20.0	20.0		20.0	20.0	
Flash Dont Walk (s)	20.0	20.0			20.0		10.0	10.0		10.0	10.0	
Pedestrian Calls (#/hr)	0	0			0		0	0		0	0	

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Lanes, Volumes, Timings

1: Foundry St/Livingston Blvd & Snyder's Rd

Existing (2020)

Timing Plan: PM Peak Hour

	↖	→	↗	↖	←	↖	↖	↖	↖	↖	↖	↖
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Act Effct Green (s)	38.1	38.1			55.2		34.1	34.1		34.1	34.1	
Actuated g/C Ratio	0.39	0.39			0.57		0.35	0.35		0.35	0.35	
v/c Ratio	0.03	0.30			0.41		0.25	0.32		0.13	0.18	
Control Delay	18.8	17.8			11.2		24.5	23.3		23.2	18.2	
Queue Delay	0.0	0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay	18.8	17.8			11.2		24.5	23.3		23.2	18.2	
LOS	B	B			B		C	C		C	B	
Approach Delay		17.8			11.2			23.8			19.8	
Approach LOS		B			B			C			B	

Intersection Summary

Area Type: Other

Cycle Length: 97.3

Actuated Cycle Length: 97.3

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 105

Control Type: Pretimed

Maximum v/c Ratio: 0.41

Intersection Signal Delay: 17.6

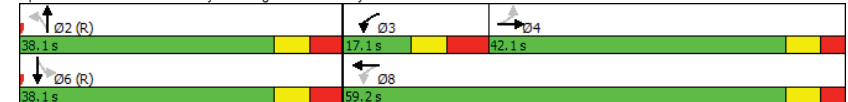
Intersection LOS: B

Intersection Capacity Utilization 84.2%

ICU Level of Service E

Analysis Period (min) 15

Splits and Phases: 1: Foundry St/Livingston Blvd & Snyder's Rd

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Queues

1: Foundry St/Livingston Blvd & Snyder's Rd

Existing (2020)

Timing Plan: PM Peak Hour

	EBL	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group	EBL	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	12	186	339	107	182	48	104
v/c Ratio	0.03	0.30	0.41	0.25	0.32	0.13	0.18
Control Delay	18.8	17.8	11.2	24.5	23.3	23.2	18.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	18.8	17.8	11.2	24.5	23.3	23.2	18.2
Queue Length 50th (m)	1.4	19.6	28.0	14.9	24.1	6.4	10.8
Queue Length 95th (m)	5.2	36.4	47.8	28.6	41.9	14.8	22.9
Internal Link Dist (m)		275.0	256.1		364.3		227.4
Turn Bay Length (m)	35.0			50.0		35.0	
Base Capacity (vph)	383	614	827	426	567	358	564
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.30	0.41	0.25	0.32	0.13	0.18

Intersection Summary

HCM Signalized Intersection Capacity Analysis

1: Foundry St/Livingston Blvd & Snyder's Rd

Existing (2020)

Timing Plan: PM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔		↔	↔		↔	↔		↔	↔	
Traffic Volume (vph)	12	116	70	19	176	144	107	149	33	48	74	30
Future Volume (vph)	12	116	70	19	176	144	107	149	33	48	74	30
Ideal Flow (vphpl)	1775	1650	1650	1550	1550	1550	1775	1650	1650	1775	1650	1650
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.99			0.99		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	0.99	1.00			1.00		0.99	1.00		0.99	1.00	
Frt	1.00	0.94			0.94		1.00	0.97		1.00	0.96	
Flt Protected	0.95	1.00			1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1672	1511			1424		1677	1594		1662	1567	
Flt Permitted	0.56	1.00			0.98		0.69	1.00		0.58	1.00	
Satd. Flow (perm)	980	1511			1406		1218	1594		1022	1567	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	12	116	70	19	176	144	107	149	33	48	74	30
RTOR Reduction (vph)	0	23	0	0	27	0	0	8	0	0	15	0
Lane Group Flow (vph)	12	163	0	0	312	0	107	174	0	48	89	0
Confl. Peds. (#/hr)	10		10	10		10	4		12	12		4
Heavy Vehicles (%)	0%	1%	3%	5%	1%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		4		3	8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	35.0	35.0			52.1		30.0	30.0		30.0	30.0	
Effective Green, g (s)	38.1	38.1			55.2		34.1	34.1		34.1	34.1	
Actuated g/C Ratio	0.39	0.39			0.57		0.35	0.35		0.35	0.35	
Clearance Time (s)	7.1	7.1			7.1		8.1	8.1		8.1	8.1	
Lane Grp Cap (vph)	383	591			799		426	558		358	549	
v/s Ratio Prot		0.11			c0.04			c0.11			0.06	
v/s Ratio Perm	0.01				c0.18		0.09			0.05		
v/c Ratio	0.03	0.28			0.39		0.25	0.31		0.13	0.16	
Uniform Delay, d1	18.2	20.2			11.7		22.5	23.0		21.5	21.8	
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.01	1.01	
Incremental Delay, d2	0.2	1.2			1.4		1.4	1.4		0.8	0.6	
Delay (s)	18.4	21.4			13.1		23.9	24.5		22.6	22.6	
Level of Service	B	C			B		C	C		C	C	
Approach Delay (s)		21.2			13.1			24.3			22.6	
Approach LOS		C			B			C			C	

Intersection Summary

HCM 2000 Control Delay	19.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	97.3	Sum of lost time (s)	17.1
Intersection Capacity Utilization	84.2%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
2: Snyder's Rd & Livingston Blvd

Existing (2020)
Timing Plan: PM Peak Hour

						
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	71	202	247	67	37	41
Future Volume (vph)	71	202	247	67	37	41
Ideal Flow (vphpl)	1650	1650	1650	1650	1765	1765
Storage Length (m)	50.0			0.0	0.0	0.0
Storage Lanes	1			0	1	0
Taper Length (m)	35.0				7.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt			0.971		0.929	
Flt Protected	0.950				0.977	
Satd. Flow (prot)	1568	1634	1602	0	1602	0
Flt Permitted	0.950				0.977	
Satd. Flow (perm)	1568	1634	1602	0	1602	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		342.5	299.0		251.5	
Travel Time (s)		24.7	21.5		18.1	
Confl. Peds. (#/hr)	12			12	1	2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	1%	0%	0%	0%	0%
Adj. Flow (vph)	71	202	247	67	37	41
Shared Lane Traffic (%)						
Lane Group Flow (vph)	71	202	314	0	78	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.6	3.6		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.20	1.20	1.20	1.20	1.10	1.10
Turning Speed (k/h)	25			15	25	15
Sign Control		Free	Free		Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	40.0%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
2: Snyder's Rd & Livingston Blvd

Existing (2020)
Timing Plan: PM Peak Hour

	EBL	EBT	WBT	WBR	SBL	SBR
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔
Traffic Volume (veh/h)	71	202	247	67	37	41
Future Volume (Veh/h)	71	202	247	67	37	41
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	71	202	247	67	37	41
Pedestrians		2	1		12	
Lane Width (m)		3.6	3.6		3.6	
Walking Speed (m/s)		1.2	1.2		1.2	
Percent Blockage		0	0		1	
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)			299			
pX, platoon unblocked						
vC, conflicting volume	326				638	294
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	326				638	294
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	94				91	94
cM capacity (veh/h)	1233				414	741
Direction, Lane #	EB 1	EB 2	WB 1	SB 1		
Volume Total	71	202	314	78		
Volume Left	71	0	0	37		
Volume Right	0	0	67	41		
cSH	1233	1700	1700	539		
Volume to Capacity	0.06	0.12	0.18	0.14		
Queue Length 95th (m)	1.5	0.0	0.0	4.0		
Control Delay (s)	8.1	0.0	0.0	12.8		
Lane LOS	A			B		
Approach Delay (s)	2.1		0.0	12.8		
Approach LOS				B		
Intersection Summary						
Average Delay			2.4			
Intersection Capacity Utilization			40.0%		ICU Level of Service	A
Analysis Period (min)			15			

Lanes, Volumes, Timings
3: Christian St & Snyder's Rd

Existing (2020)
Timing Plan: PM Peak Hour

						
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	251	3	3	312	4	3
Future Volume (vph)	251	3	3	312	4	3
Ideal Flow (vphpl)	1650	1650	1650	1650	1765	1765
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.998				0.942	
Flt Protected					0.972	
Satd. Flow (prot)	1615	0	0	1634	1616	0
Flt Permitted					0.972	
Satd. Flow (perm)	1615	0	0	1634	1616	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	587.8			342.5	168.2	
Travel Time (s)	42.3			24.7	12.1	
Confl. Peds. (#/hr)		5	5			
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	0%	0%	1%	0%	0%
Adj. Flow (vph)	251	3	3	312	4	3
Shared Lane Traffic (%)						
Lane Group Flow (vph)	254	0	0	315	7	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			3.6	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.20	1.20	1.20	1.20	1.10	1.10
Turning Speed (k/h)		15	25		25	15
Sign Control	Free			Free	Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	31.7%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
3: Christian St & Snyder's Rd

Existing (2020)
Timing Plan: PM Peak Hour

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔			↔	↔	
Traffic Volume (veh/h)	251	3	3	312	4	3
Future Volume (Veh/h)	251	3	3	312	4	3
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	251	3	3	312	4	3
Pedestrians					5	
Lane Width (m)					3.6	
Walking Speed (m/s)					1.2	
Percent Blockage					0	
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			259		576	258
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			259		576	258
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		99	100
cM capacity (veh/h)			1312		480	783
Direction, Lane #						
Volume Total	254	315	7			
Volume Left	0	3	4			
Volume Right	3	0	3			
cSH	1700	1312	575			
Volume to Capacity	0.15	0.00	0.01			
Queue Length 95th (m)	0.0	0.1	0.3			
Control Delay (s)	0.0	0.1	11.3			
Lane LOS		A	B			
Approach Delay (s)	0.0	0.1	11.3			
Approach LOS			B			
Intersection Summary						
Average Delay			0.2			
Intersection Capacity Utilization			31.7%		ICU Level of Service	A
Analysis Period (min)			15			

Lanes, Volumes, Timings
4: Livingston Blvd & Wagler Ave

Existing (2020)
Timing Plan: PM Peak Hour

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	8	9	43	176	97	4
Future Volume (vph)	8	9	43	176	97	4
Ideal Flow (vphpl)	1765	1765	1650	1650	1650	1650
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.929				0.995	
Flt Protected	0.977			0.990		
Satd. Flow (prot)	1602	0	0	1634	1626	0
Flt Permitted	0.977			0.990		
Satd. Flow (perm)	1602	0	0	1634	1626	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	297.7			251.4	141.5	
Travel Time (s)	21.4			18.1	10.2	
Confl. Peds. (#/hr)		1	27			27
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	0%	1%	0%
Adj. Flow (vph)	8	9	43	176	97	4
Shared Lane Traffic (%)						
Lane Group Flow (vph)	17	0	0	219	101	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			3.6	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.10	1.10	1.20	1.20	1.20	1.20
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	30.4%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
4: Livingston Blvd & Wagler Ave

Existing (2020)
Timing Plan: PM Peak Hour

	EBL	EBR	NBL	NBT	SBT	SBR
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	W			W	W	
Traffic Volume (veh/h)	8	9	43	176	97	4
Future Volume (Veh/h)	8	9	43	176	97	4
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	8	9	43	176	97	4
Pedestrians	27			1		
Lane Width (m)	3.6			3.6		
Walking Speed (m/s)	1.2			1.2		
Percent Blockage	2			0		
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)				251		
pX, platoon unblocked						
vC, conflicting volume	388	127	128			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	388	127	128			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	99	99	97			
cM capacity (veh/h)	587	907	1437			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	17	219	101			
Volume Left	8	43	0			
Volume Right	9	0	4			
cSH	722	1437	1700			
Volume to Capacity	0.02	0.03	0.06			
Queue Length 95th (m)	0.6	0.7	0.0			
Control Delay (s)	10.1	1.7	0.0			
Lane LOS	B	A				
Approach Delay (s)	10.1	1.7	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay		1.6				
Intersection Capacity Utilization		30.4%		ICU Level of Service	A	
Analysis Period (min)		15				

Lanes, Volumes, Timings
5: Livingston Blvd & Wagler Ave

Existing (2020)
Timing Plan: PM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	1	7	26	3	24	7	53	52	10	0	24	6
Future Volume (vph)	1	7	26	3	24	7	53	52	10	0	24	6
Ideal Flow (vphpl)	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.897			0.972			0.988			0.973	
Flt Protected		0.999			0.996			0.977				
Satd. Flow (prot)	0	1389	0	0	1501	0	0	1483	0	0	1508	0
Flt Permitted		0.999			0.996			0.977				
Satd. Flow (perm)	0	1389	0	0	1501	0	0	1483	0	0	1508	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		158.5			297.7			251.5			116.3	
Travel Time (s)		11.4			21.4			18.1			8.4	
Confl. Peds. (#/hr)	3		2	2		3	2		4	4		2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	2%	0%	0%	0%	0%
Adj. Flow (vph)	1	7	26	3	24	7	53	52	10	0	24	6
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	34	0	0	34	0	0	115	0	0	30	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type: Other
Control Type: Unsignalized
Intersection Capacity Utilization 25.8%
Analysis Period (min) 15

HCM Unsignalized Intersection Capacity Analysis
5: Livingston Blvd & Wagler Ave

Existing (2020)
Timing Plan: PM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (veh/h)	1	7	26	3	24	7	53	52	10	0	24	6
Future Volume (Veh/h)	1	7	26	3	24	7	53	52	10	0	24	6
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	1	7	26	3	24	7	53	52	10	0	24	6
Pedestrians		2			4			2			3	
Lane Width (m)		3.6			3.6			3.6			3.6	
Walking Speed (m/s)		1.2			1.2			1.2			1.2	
Percent Blockage		0			0			0			0	
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	214	201	31	226	199	64	32			66		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	214	201	31	226	199	64	32			66		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	99	98	100	96	99	97			100		
cM capacity (veh/h)	698	672	1045	686	674	1000	1591			1544		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	34	34	115	30								
Volume Left	1	3	53	0								
Volume Right	26	7	10	6								
cSH	926	723	1591	1544								
Volume to Capacity	0.04	0.05	0.03	0.00								
Queue Length 95th (m)	0.9	1.2	0.8	0.0								
Control Delay (s)	9.0	10.2	3.5	0.0								
Lane LOS	A	B	A									
Approach Delay (s)	9.0	10.2	3.5	0.0								
Approach LOS	A	B										

Intersection Summary

Average Delay 5.0
Intersection Capacity Utilization 25.8%
Analysis Period (min) 15

Lanes, Volumes, Timings
6: McFadyen St/Hunsberger Dr & Wagler Ave

Existing (2020)
Timing Plan: PM Peak Hour

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	3	51	20	2	20	17
Future Volume (vph)	3	51	20	2	20	17
Ideal Flow (vphpl)	1765	1765	1650	1650	1650	1650
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.872		0.988			
Flt Protected	0.997					0.974
Satd. Flow (prot)	1534	0	1630	0	0	1607
Flt Permitted	0.997					0.974
Satd. Flow (perm)	1534	0	1630	0	0	1607
Link Speed (k/h)	50		50			50
Link Distance (m)	158.5		76.5			91.6
Travel Time (s)	11.4		5.5			6.6
Confl. Peds. (#/hr)		2		2	2	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	3	51	20	2	20	17
Shared Lane Traffic (%)						
Lane Group Flow (vph)	54	0	22	0	0	37
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.6		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.10	1.10	1.20	1.20	1.20	1.20
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	20.0%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
6: McFadyen St/Hunsberger Dr & Wagler Ave

Existing (2020)
Timing Plan: PM Peak Hour

	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W		T			T
Traffic Volume (veh/h)	3	51	20	2	20	17
Future Volume (Veh/h)	3	51	20	2	20	17
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	3	51	20	2	20	17
Pedestrians	2					2
Lane Width (m)	3.6					3.6
Walking Speed (m/s)	1.2					1.2
Percent Blockage	0					0
Right turn flare (veh)						
Median type		None			None	
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	80	25			24	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	80	25			24	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	95			99	
cM capacity (veh/h)	914	1053			1601	
Direction, Lane #						
	WB 1	NB 1	SB 1			
Volume Total	54	22	37			
Volume Left	3	0	20			
Volume Right	51	2	0			
cSH	1045	1700	1601			
Volume to Capacity	0.05	0.01	0.01			
Queue Length 95th (m)	1.3	0.0	0.3			
Control Delay (s)	8.6	0.0	4.0			
Lane LOS	A		A			
Approach Delay (s)	8.6	0.0	4.0			
Approach LOS	A					
Intersection Summary						
Average Delay		5.4				
Intersection Capacity Utilization		20.0%		ICU Level of Service		A
Analysis Period (min)		15				

Lanes, Volumes, Timings
7: Livingston Blvd & Isaac Shantz Dr

Existing (2020)
Timing Plan: PM Peak Hour

						
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	15	31	60	99	53	16
Future Volume (vph)	15	31	60	99	53	16
Ideal Flow (vphpl)	1650	1650	1650	1650	1765	1765
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt			0.916		0.969	
Flt Protected		0.984			0.963	
Satd. Flow (prot)	0	1624	1511	0	1647	0
Flt Permitted		0.984			0.963	
Satd. Flow (perm)	0	1624	1511	0	1647	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		37.8	84.0		90.3	
Travel Time (s)		2.7	6.0		6.5	
Confli. Peds. (#/hr)	6			6	4	1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	15	31	60	99	53	16
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	46	159	0	69	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.20	1.20	1.20	1.20	1.10	1.10
Turning Speed (k/h)	25			15	25	15
Sign Control		Free	Free		Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	28.4%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
7: Livingston Blvd & Isaac Shantz Dr

Existing (2020)
Timing Plan: PM Peak Hour

	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↗	↘		↖	↗
Traffic Volume (veh/h)	15	31	60	99	53	16
Future Volume (Veh/h)	15	31	60	99	53	16
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	15	31	60	99	53	16
Pedestrians		1	4		6	
Lane Width (m)		3.6	3.6		3.6	
Walking Speed (m/s)		1.2	1.2		1.2	
Percent Blockage		0	0		1	
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	165				180	116
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	165				180	116
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				93	98
cM capacity (veh/h)	1418				798	936
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	46	159	69			
Volume Left	15	0	53			
Volume Right	0	99	16			
cSH	1418	1700	826			
Volume to Capacity	0.01	0.09	0.08			
Queue Length 95th (m)	0.3	0.0	2.2			
Control Delay (s)	2.5	0.0	9.8			
Lane LOS	A		A			
Approach Delay (s)	2.5	0.0	9.8			
Approach LOS			A			
Intersection Summary						
Average Delay			2.9			
Intersection Capacity Utilization		28.4%		ICU Level of Service		A
Analysis Period (min)		15				

Lanes, Volumes, Timings
8: Livingston Blvd & Jacob Cressman Dr

Existing (2020)
Timing Plan: PM Peak Hour

						
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	22	28	20	38	11	16
Future Volume (vph)	22	28	20	38	11	16
Ideal Flow (vphpl)	1650	1650	1650	1650	1765	1765
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt			0.912		0.920	
Flt Protected		0.978			0.980	
Satd. Flow (prot)	0	1614	1505	0	1591	0
Flt Permitted		0.978			0.980	
Satd. Flow (perm)	0	1614	1505	0	1591	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		46.4	52.4		52.9	
Travel Time (s)		3.3	3.8		3.8	
Confl. Peds. (#/hr)	4			4	7	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	22	28	20	38	11	16
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	50	58	0	27	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.20	1.20	1.20	1.20	1.10	1.10
Turning Speed (k/h)	25			15	25	15
Sign Control		Free	Free		Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	19.8%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
8: Livingston Blvd & Jacob Cressman Dr

Existing (2020)
Timing Plan: PM Peak Hour

	EBL	EBT	WBT	WBR	SBL	SBR
Movement						
Lane Configurations		↔	↔		↔	
Traffic Volume (veh/h)	22	28	20	38	11	16
Future Volume (Veh/h)	22	28	20	38	11	16
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	22	28	20	38	11	16
Pedestrians			7		4	
Lane Width (m)			3.6		3.6	
Walking Speed (m/s)			1.2		1.2	
Percent Blockage			1		0	
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	62				122	43
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	62				122	43
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				99	98
cM capacity (veh/h)	1549				858	1030
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	50	58	27			
Volume Left	22	0	11			
Volume Right	0	38	16			
cSH	1549	1700	952			
Volume to Capacity	0.01	0.03	0.03			
Queue Length 95th (m)	0.3	0.0	0.7			
Control Delay (s)	3.3	0.0	8.9			
Lane LOS	A		A			
Approach Delay (s)	3.3	0.0	8.9			
Approach LOS			A			
Intersection Summary						
Average Delay			3.0			
Intersection Capacity Utilization		19.8%		ICU Level of Service		A
Analysis Period (min)		15				

Lanes, Volumes, Timings
9: Isaac Shantz Dr & Kropf Dr

Existing (2020)
Timing Plan: PM Peak Hour

						
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	0	3	7	0	1	15
Future Volume (vph)	0	3	7	0	1	15
Ideal Flow (vphpl)	1650	1650	1650	1650	1765	1765
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.865				0.873	
Flt Protected				0.950	0.997	
Satd. Flow (prot)	1427	0	0	1568	1536	0
Flt Permitted				0.950	0.997	
Satd. Flow (perm)	1427	0	0	1568	1536	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	82.2			95.1	387.0	
Travel Time (s)	5.9			6.8	27.9	
Confl. Peds. (#/hr)		6	6			3
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	0	3	7	0	1	15
Shared Lane Traffic (%)						
Lane Group Flow (vph)	3	0	0	7	16	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.20	1.20	1.20	1.20	1.10	1.10
Turning Speed (k/h)		15	25		25	15
Sign Control	Free			Free	Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	17.7%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
9: Isaac Shantz Dr & Kropf Dr

Existing (2020)
Timing Plan: PM Peak Hour

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↗			↖	↗	↖
Traffic Volume (veh/h)	0	3	7	0	1	15
Future Volume (Veh/h)	0	3	7	0	1	15
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	3	7	0	1	15
Pedestrians				3	6	
Lane Width (m)				3.6	3.6	
Walking Speed (m/s)				1.2	1.2	
Percent Blockage				0	1	
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			9		22	10
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			9		22	10
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	99
cM capacity (veh/h)			1616		991	1068
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	3	7	16			
Volume Left	0	7	1			
Volume Right	3	0	15			
cSH	1700	1616	1063			
Volume to Capacity	0.00	0.00	0.02			
Queue Length 95th (m)	0.0	0.1	0.4			
Control Delay (s)	0.0	7.2	8.4			
Lane LOS		A	A			
Approach Delay (s)	0.0	7.2	8.4			
Approach LOS		A				
Intersection Summary						
Average Delay		7.1				
Intersection Capacity Utilization		17.7%			ICU Level of Service	A
Analysis Period (min)		15				

Lanes, Volumes, Timings
10: Jacob Cressman Dr & Michael Myers Rd

Existing (2020)
Timing Plan: PM Peak Hour

						
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	2	3	1	6	5	2
Future Volume (vph)	2	3	1	6	5	2
Ideal Flow (vphpl)	1650	1650	1650	1650	1765	1765
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.919				0.961	
Flt Protected				0.993	0.966	
Satd. Flow (prot)	1516	0	0	1638	1629	0
Flt Permitted				0.993	0.966	
Satd. Flow (perm)	1516	0	0	1638	1629	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	94.5			86.8	341.5	
Travel Time (s)	6.8			6.2	24.6	
Confl. Peds. (#/hr)		13	13			
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	0%	0%	2%
Adj. Flow (vph)	2	3	1	6	5	2
Shared Lane Traffic (%)						
Lane Group Flow (vph)	5	0	0	7	7	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.20	1.20	1.20	1.20	1.10	1.10
Turning Speed (k/h)		15	25		25	15
Sign Control	Free			Free	Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	16.8%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
10: Jacob Cressman Dr & Michael Myers Rd

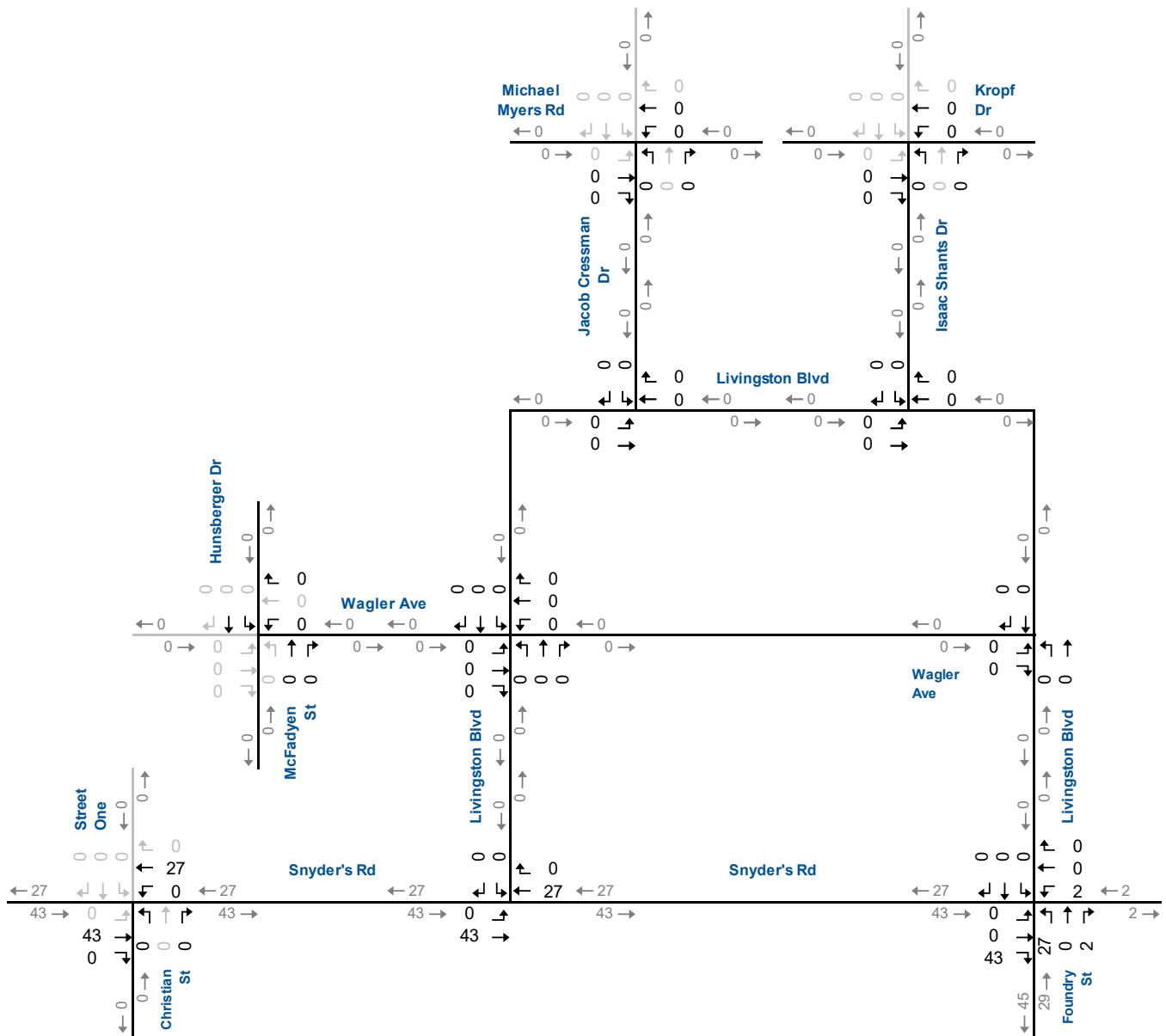
Existing (2020)
Timing Plan: PM Peak Hour

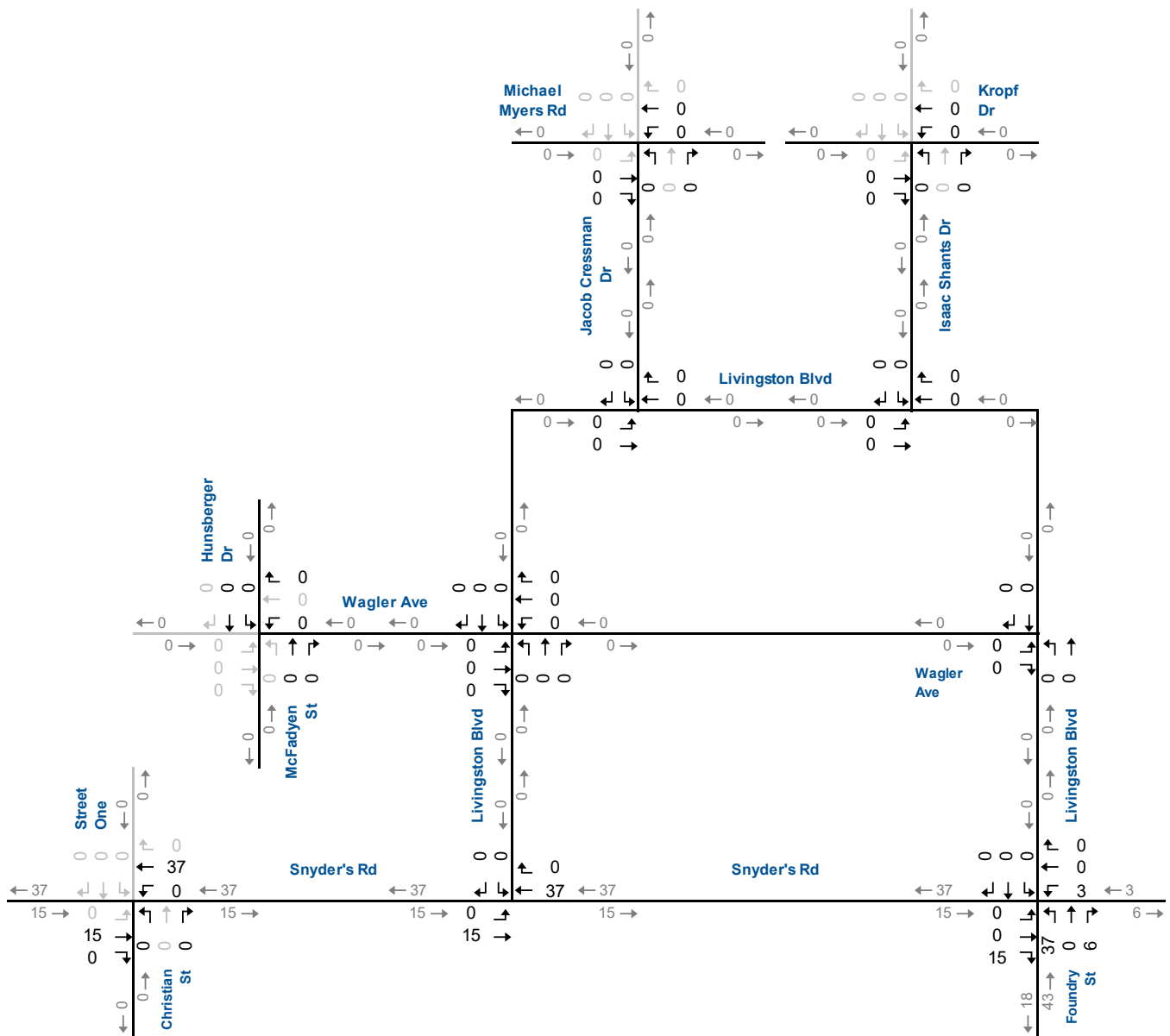
	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↘			↗	↖	↗
Traffic Volume (veh/h)	2	3	1	6	5	2
Future Volume (Veh/h)	2	3	1	6	5	2
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	2	3	1	6	5	2
Pedestrians					13	
Lane Width (m)					3.6	
Walking Speed (m/s)					1.2	
Percent Blockage					1	
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			18		24	16
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			18		24	16
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		99	100
cM capacity (veh/h)			1595		985	1051
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	5	7	7			
Volume Left	0	1	5			
Volume Right	3	0	2			
cSH	1700	1595	1003			
Volume to Capacity	0.00	0.00	0.01			
Queue Length 95th (m)	0.0	0.0	0.2			
Control Delay (s)	0.0	1.0	8.6			
Lane LOS	A	A	A			
Approach Delay (s)	0.0	1.0	8.6			
Approach LOS			A			
Intersection Summary						
Average Delay			3.6			
Intersection Capacity Utilization			16.8%		ICU Level of Service	A
Analysis Period (min)			15			

Appendix D

Background Development Trip Assignment







Schmidt Estates Traffic Assignment PM Peak Hour

Appendix E

Background Operation Reports



Lanes, Volumes, Timings

1: Foundry St/Livingston Blvd & Snyder's Rd

Background (2028)

AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱	↲	↰	↱	↲	↰	↱	↲	↰	↱	↲
Traffic Volume (vph)	8	167	198	13	169	42	189	88	18	115	198	54
Future Volume (vph)	8	167	198	13	169	42	189	88	18	115	198	54
Ideal Flow (vphpl)	1775	1650	1650	1550	1550	1550	1775	1650	1650	1775	1650	1650
Storage Length (m)	35.0		0.0	0.0		0.0	50.0		0.0	35.0		0.0
Storage Lanes	1		0	0		0	1		0	1		0
Taper Length (m)	40.0			7.5			25.0			35.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99				0.99			1.00		1.00		
Frt		0.919			0.975			0.975			0.968	
Flt Protected	0.950				0.997		0.950			0.950		
Satd. Flow (prot)	1686	1462	0	0	1418	0	1637	1533	0	1670	1566	0
Flt Permitted	0.619				0.986		0.528			0.689		
Satd. Flow (perm)	1091	1462	0	0	1402	0	910	1533	0	1208	1566	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		62			16			13			17	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		299.0			280.1			388.3			251.4	
Travel Time (s)		21.5			20.2			28.0			18.1	
Confl. Peds. (#/hr)	6					6			2	2		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	7%	1%	10%	6%	3%	3%	4%	7%	1%	2%	2%
Adj. Flow (vph)	8	167	198	13	169	42	189	88	18	115	198	54
Shared Lane Traffic (%)												
Lane Group Flow (vph)	8	365	0	0	224	0	189	106	0	115	252	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Right	Left	Left	Right	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.09	1.20	1.20	1.29	1.29	1.29	1.09	1.20	1.20	1.09	1.20	1.20
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		4		3	8			2			6	
Permitted Phases	4			8			2			6		
Minimum Split (s)	37.1	37.1		14.1	39.1		48.1	48.1		48.1	48.1	
Total Split (s)	37.1	37.1		17.1	54.2		48.1	48.1		48.1	48.1	
Total Split (%)	36.3%	36.3%		16.7%	53.0%		47.0%	47.0%		47.0%	47.0%	
Maximum Green (s)	30.0	30.0		13.0	47.1		40.0	40.0		40.0	40.0	
Yellow Time (s)	4.1	4.1		4.1	4.1		4.1	4.1		4.1	4.1	
All-Red Time (s)	3.0	3.0		0.0	3.0		4.0	4.0		4.0	4.0	
Lost Time Adjust (s)	-3.1	-3.1			-3.1		-4.1	-4.1		-4.1	-4.1	
Total Lost Time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Walk Time (s)	10.0	10.0			10.0		30.0	30.0		30.0	30.0	
Flash Dont Walk (s)	20.0	20.0			20.0		10.0	10.0		10.0	10.0	
Pedestrian Calls (#/hr)	0	0			0		0	0		0	0	

1012 Snyder's Road, Baden TIS
PTSL (200068)Synchro 9 Report
Page 1

Lanes, Volumes, Timings

1: Foundry St/Livingston Blvd & Snyder's Rd

Background (2028)

AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Act Effct Green (s)	33.1	33.1			50.2		44.1	44.1		44.1	44.1	
Actuated g/C Ratio	0.32	0.32			0.49		0.43	0.43		0.43	0.43	
v/c Ratio	0.02	0.71			0.32		0.48	0.16		0.22	0.37	
Control Delay	24.0	33.8			16.1		26.1	16.3		19.9	20.3	
Queue Delay	0.0	0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay	24.0	33.8			16.1		26.1	16.3		19.9	20.3	
LOS	C	C			B		C	B		B	C	
Approach Delay		33.6			16.1			22.6			20.1	
Approach LOS		C			B			C			C	

Intersection Summary

Area Type: Other

Cycle Length: 102.3

Actuated Cycle Length: 102.3

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 100

Control Type: Pretimed

Maximum v/c Ratio: 0.71

Intersection Signal Delay: 24.0

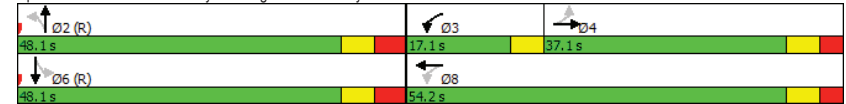
Intersection Capacity Utilization 77.7%

Analysis Period (min) 15

Intersection LOS: C

ICU Level of Service D

Splits and Phases: 1: Foundry St/Livingston Blvd & Snyder's Rd

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Queues

1: Foundry St/Livingston Blvd & Snyder's Rd

Background (2028)

AM Peak Hour

	↖	→	←	↙	↑	↘	↓
Lane Group	EBL	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	8	365	224	189	106	115	252
v/c Ratio	0.02	0.71	0.32	0.48	0.16	0.22	0.37
Control Delay	24.0	33.8	16.1	26.1	16.3	19.9	20.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.0	33.8	16.1	26.1	16.3	19.9	20.3
Queue Length 50th (m)	1.1	55.6	25.1	27.7	11.5	14.6	32.1
Queue Length 95th (m)	4.6	91.1	42.2	49.6	22.5	27.5	52.5
Internal Link Dist (m)		275.0	256.1		364.3		227.4
Turn Bay Length (m)	35.0			50.0		35.0	
Base Capacity (vph)	353	514	698	392	668	520	684
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.02	0.71	0.32	0.48	0.16	0.22	0.37

Intersection Summary

HCM Signalized Intersection Capacity Analysis

1: Foundry St/Livingston Blvd & Snyder's Rd

Background (2028)

AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	8	167	198	13	169	42	189	88	18	115	198	54
Future Volume (vph)	8	167	198	13	169	42	189	88	18	115	198	54
Ideal Flow (vphpl)	1775	1650	1650	1550	1550	1550	1775	1650	1650	1775	1650	1650
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00			0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	0.99	1.00			1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.92			0.97		1.00	0.97		1.00	0.97	
Flt Protected	0.95	1.00			1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1674	1461			1418		1637	1533		1666	1566	
Flt Permitted	0.62	1.00			0.99		0.53	1.00		0.69	1.00	
Satd. Flow (perm)	1090	1461			1402		910	1533		1207	1566	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	8	167	198	13	169	42	189	88	18	115	198	54
RTOR Reduction (vph)	0	42	0	0	8	0	0	7	0	0	10	0
Lane Group Flow (vph)	8	323	0	0	216	0	189	99	0	115	242	0
Confl. Peds. (#/hr)	6					6			2	2		
Heavy Vehicles (%)	0%	7%	1%	10%	6%	3%	3%	4%	7%	1%	2%	2%
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		4		3	8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	30.0	30.0			47.1		40.0	40.0		40.0	40.0	
Effective Green, g (s)	33.1	33.1			50.2		44.1	44.1		44.1	44.1	
Actuated g/C Ratio	0.32	0.32			0.49		0.43	0.43		0.43	0.43	
Clearance Time (s)	7.1	7.1			7.1		8.1	8.1		8.1	8.1	
Lane Grp Cap (vph)	352	472			690		392	660		520	675	
v/s Ratio Prot		c0.22			c0.05			0.06			0.15	
v/s Ratio Perm	0.01				0.10		c0.21			0.10		
v/c Ratio	0.02	0.68			0.31		0.48	0.15		0.22	0.36	
Uniform Delay, d1	23.6	30.1			15.7		20.9	17.7		18.3	19.6	
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.01	1.00	
Incremental Delay, d2	0.1	7.8			1.2		4.2	0.5		1.0	1.5	
Delay (s)	23.7	37.9			16.9		25.1	18.2		19.4	21.1	
Level of Service	C	D			B		C	B		B	C	
Approach Delay (s)		37.6			16.9			22.6			20.6	
Approach LOS		D			B			C			C	

Intersection Summary

HCM 2000 Control Delay	25.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	102.3	Sum of lost time (s)	12.1
Intersection Capacity Utilization	77.7%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
2: Snyder's Rd & Livingston Blvd

Background (2028)
AM Peak Hour

						
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	56	367	386	25	103	101
Future Volume (vph)	56	367	386	25	103	101
Ideal Flow (vphpl)	1650	1650	1650	1650	1765	1765
Storage Length (m)	50.0			0.0	0.0	0.0
Storage Lanes	1			0	1	0
Taper Length (m)	35.0				7.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt			0.992		0.933	
Flt Protected	0.950				0.975	
Satd. Flow (prot)	1522	1557	1536	0	1606	0
Flt Permitted	0.950				0.975	
Satd. Flow (perm)	1522	1557	1536	0	1606	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		342.5	299.0		251.5	
Travel Time (s)		24.7	21.5		18.1	
Confl. Peds. (#/hr)	10			10		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	3%	6%	7%	0%	0%	0%
Adj. Flow (vph)	56	367	386	25	103	101
Shared Lane Traffic (%)						
Lane Group Flow (vph)	56	367	411	0	204	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.6	3.6		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.20	1.20	1.20	1.20	1.10	1.10
Turning Speed (k/h)	25			15	25	15
Sign Control		Free	Free		Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	51.6%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
2: Snyder's Rd & Livingston Blvd

Background (2028)
AM Peak Hour

	EBL	EBT	WBT	WBR	SBL	SBR
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↔	↔		↔	↔
Traffic Volume (veh/h)	56	367	386	25	103	101
Future Volume (Veh/h)	56	367	386	25	103	101
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	56	367	386	25	103	101
Pedestrians					10	
Lane Width (m)					3.6	
Walking Speed (m/s)					1.2	
Percent Blockage					1	
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)			299			
pX, platoon unblocked	0.98				0.98	0.98
vC, conflicting volume	421				888	408
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	397				874	385
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	95				65	84
cM capacity (veh/h)	1122				298	648
Direction, Lane #	EB 1	EB 2	WB 1	SB 1		
Volume Total	56	367	411	204		
Volume Left	56	0	0	103		
Volume Right	0	0	25	101		
cSH	1122	1700	1700	406		
Volume to Capacity	0.05	0.22	0.24	0.50		
Queue Length 95th (m)	1.3	0.0	0.0	21.8		
Control Delay (s)	8.4	0.0	0.0	22.5		
Lane LOS	A			C		
Approach Delay (s)	1.1		0.0	22.5		
Approach LOS				C		
Intersection Summary						
Average Delay			4.9			
Intersection Capacity Utilization			51.6%		ICU Level of Service	A
Analysis Period (min)			15			

Lanes, Volumes, Timings
3: Christian St & Snyder's Rd

Background (2028)
AM Peak Hour

						
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	432	0	1	490	5	1
Future Volume (vph)	432	0	1	490	5	1
Ideal Flow (vphpl)	1650	1650	1650	1650	1765	1765
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt					0.977	
Flt Protected					0.960	
Satd. Flow (prot)	1557	0	0	1557	1655	0
Flt Permitted					0.960	
Satd. Flow (perm)	1557	0	0	1557	1655	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	587.8			342.5	168.2	
Travel Time (s)	42.3			24.7	12.1	
Confl. Peds. (#/hr)	2		2			
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	6%	0%	0%	6%	0%	0%
Adj. Flow (vph)	432	0	1	490	5	1
Shared Lane Traffic (%)						
Lane Group Flow (vph)	432	0	0	491	6	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			3.6	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.20	1.20	1.20	1.20	1.10	1.10
Turning Speed (k/h)	15		25	25		15
Sign Control	Free			Free	Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	40.6%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
3: Christian St & Snyder's Rd

Background (2028)
AM Peak Hour

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔			↔	↔	
Traffic Volume (veh/h)	432	0	1	490	5	1
Future Volume (Veh/h)	432	0	1	490	5	1
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	432	0	1	490	5	1
Pedestrians					2	
Lane Width (m)					3.6	
Walking Speed (m/s)					1.2	
Percent Blockage					0	
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			434		926	434
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			434		926	434
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		98	100
cM capacity (veh/h)			1135		300	625
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	432	491	6			
Volume Left	0	1	5			
Volume Right	0	0	1			
cSH	1700	1135	328			
Volume to Capacity	0.25	0.00	0.02			
Queue Length 95th (m)	0.0	0.0	0.4			
Control Delay (s)	0.0	0.0	16.2			
Lane LOS		A	C			
Approach Delay (s)	0.0	0.0	16.2			
Approach LOS			C			
Intersection Summary						
Average Delay			0.1			
Intersection Capacity Utilization			40.6%		ICU Level of Service	A
Analysis Period (min)			15			

Lanes, Volumes, Timings
4: Livingston Blvd & Wagler Ave

Background (2028)
AM Peak Hour

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	8	64	14	98	252	2
Future Volume (vph)	8	64	14	98	252	2
Ideal Flow (vphpl)	1765	1765	1650	1650	1650	1650
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.880				0.999	
Flt Protected	0.994			0.994		
Satd. Flow (prot)	1494	0	0	1612	1626	0
Flt Permitted	0.994			0.994		
Satd. Flow (perm)	1494	0	0	1612	1626	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	297.7			251.4	141.5	
Travel Time (s)	21.4			18.1	10.2	
Confl. Peds. (#/hr)	1		2			2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	14%	2%	0%	2%	1%	50%
Adj. Flow (vph)	8	64	14	98	252	2
Shared Lane Traffic (%)						
Lane Group Flow (vph)	72	0	0	112	254	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			3.6	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.10	1.10	1.20	1.20	1.20	1.20
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	30.9%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
4: Livingston Blvd & Wagler Ave

Background (2028)
AM Peak Hour

	EBL	EBR	NBL	NBT	SBT	SBR
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	W			W	W	
Traffic Volume (veh/h)	8	64	14	98	252	2
Future Volume (Veh/h)	8	64	14	98	252	2
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	8	64	14	98	252	2
Pedestrians	2				1	
Lane Width (m)	3.6				3.6	
Walking Speed (m/s)	1.2				1.2	
Percent Blockage	0				0	
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)				251		
pX, platoon unblocked						
vC, conflicting volume	382	255	256			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	382	255	256			
tC, single (s)	6.5	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.6	3.3	2.2			
p0 queue free %	99	92	99			
cM capacity (veh/h)	590	782	1318			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	72	112	254			
Volume Left	8	14	0			
Volume Right	64	0	2			
cSH	755	1318	1700			
Volume to Capacity	0.10	0.01	0.15			
Queue Length 95th (m)	2.5	0.3	0.0			
Control Delay (s)	10.3	1.0	0.0			
Lane LOS	B	A				
Approach Delay (s)	10.3	1.0	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay		2.0				
Intersection Capacity Utilization		30.9%		ICU Level of Service	A	
Analysis Period (min)		15				

Lanes, Volumes, Timings
5: Livingston Blvd & Wagler Ave

Background (2028)
AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	6	33	41	8	8	1	16	62	11	6	98	2
Future Volume (vph)	6	33	41	8	8	1	16	62	11	6	98	2
Ideal Flow (vphpl)	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.931			0.992			0.983			0.997	
Flt Protected		0.996			0.977			0.991			0.997	
Satd. Flow (prot)	0	1437	0	0	1502	0	0	1474	0	0	1527	0
Flt Permitted		0.996			0.977			0.991			0.997	
Satd. Flow (perm)	0	1437	0	0	1502	0	0	1474	0	0	1527	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		158.5			297.7			251.5			116.3	
Travel Time (s)		11.4			21.4			18.1			8.4	
Confl. Peds. (#/hr)	3		1	1		3	17		6	6		17
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	20%	0%	1%	0%
Adj. Flow (vph)	6	33	41	8	8	1	16	62	11	6	98	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	80	0	0	17	0	0	89	0	0	106	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	24.8%											
Analysis Period (min)	15											
ICU Level of Service A												

HCM Unsignalized Intersection Capacity Analysis
5: Livingston Blvd & Wagler Ave

Background (2028)
AM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (veh/h)	6	33	41	8	8	1	16	62	11	6	98	2
Future Volume (Veh/h)	6	33	41	8	8	1	16	62	11	6	98	2
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	6	33	41	8	8	1	16	62	11	6	98	2
Pedestrians		17			6			1			3	
Lane Width (m)		3.6			3.6			3.6			3.6	
Walking Speed (m/s)		1.2			1.2			1.2			1.2	
Percent Blockage		1			1			0			0	
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	236	239	117	275	234	76	117			79		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	236	239	117	275	234	76	117			79		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	95	96	99	99	100	99			100		
cM capacity (veh/h)	686	643	926	606	647	983	1463			1524		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	80	17	89	106								
Volume Left	6	8	16	6								
Volume Right	41	1	11	2								
cSH	767	640	1463	1524								
Volume to Capacity	0.10	0.03	0.01	0.00								
Queue Length 95th (m)	2.8	0.7	0.3	0.1								
Control Delay (s)	10.2	10.8	1.4	0.4								
Lane LOS	B	B	A	A								
Approach Delay (s)	10.2	10.8	1.4	0.4								
Approach LOS	B	B										
Intersection Summary												
Average Delay		4.0										
Intersection Capacity Utilization		24.8%										
Analysis Period (min)		15										
ICU Level of Service A												

Lanes, Volumes, Timings
6: McFadyen St/Hunsberger Dr & Wagler Ave

Background (2028)
AM Peak Hour

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	2	15	7	1	51	34
Future Volume (vph)	2	15	7	1	51	34
Ideal Flow (vphpl)	1765	1765	1650	1650	1650	1650
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.881		0.983			
Flt Protected	0.994					0.971
Satd. Flow (prot)	1546	0	1622	0	0	1602
Flt Permitted	0.994					0.971
Satd. Flow (perm)	1546	0	1622	0	0	1602
Link Speed (k/h)	50		50			50
Link Distance (m)	158.5		76.5			91.6
Travel Time (s)	11.4		5.5			6.6
Confl. Peds. (#/hr)		1		5	5	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	2	15	7	1	51	34
Shared Lane Traffic (%)						
Lane Group Flow (vph)	17	0	8	0	0	85
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.6		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.10	1.10	1.20	1.20	1.20	1.20
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	22.3%		ICU Level of Service A			
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
6: McFadyen St/Hunsberger Dr & Wagler Ave

Background (2028)
AM Peak Hour

	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W		R			R
Traffic Volume (veh/h)	2	15	7	1	51	34
Future Volume (Veh/h)	2	15	7	1	51	34
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	2	15	7	1	51	34
Pedestrians	5					1
Lane Width (m)	3.6					3.6
Walking Speed (m/s)	1.2					1.2
Percent Blockage	0					0
Right turn flare (veh)						
Median type		None			None	
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	148	14			13	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	148	14			13	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	99			97	
cM capacity (veh/h)	818	1067			1612	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	17	8	85			
Volume Left	2	0	51			
Volume Right	15	1	0			
cSH	1030	1700	1612			
Volume to Capacity	0.02	0.00	0.03			
Queue Length 95th (m)	0.4	0.0	0.8			
Control Delay (s)	8.6	0.0	4.5			
Lane LOS	A		A			
Approach Delay (s)	8.6	0.0	4.5			
Approach LOS	A					
Intersection Summary						
Average Delay		4.8				
Intersection Capacity Utilization		22.3%		ICU Level of Service	A	
Analysis Period (min)		15				

Lanes, Volumes, Timings
7: Livingston Blvd & Isaac Shantz Dr

Background (2028)
AM Peak Hour

						
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	14	77	64	36	142	30
Future Volume (vph)	14	77	64	36	142	30
Ideal Flow (vphpl)	1650	1650	1650	1650	1765	1765
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt			0.951		0.976	
Flt Protected		0.992			0.960	
Satd. Flow (prot)	0	1637	1530	0	1654	0
Flt Permitted		0.992			0.960	
Satd. Flow (perm)	0	1637	1530	0	1654	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		37.8	84.0		90.3	
Travel Time (s)		2.7	6.0		6.5	
Confl. Peds. (#/hr)	29			29	1	6
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	4%	0%	0%	0%
Adj. Flow (vph)	14	77	64	36	142	30
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	91	100	0	172	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.20	1.20	1.20	1.20	1.10	1.10
Turning Speed (k/h)	25			15	25	15
Sign Control		Free	Free		Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	29.9%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
7: Livingston Blvd & Isaac Shantz Dr

Background (2028)
AM Peak Hour

	EBL	EBT	WBT	WBR	SBL	SBR
Movement						
Lane Configurations		↔	↔		↔	
Traffic Volume (veh/h)	14	77	64	36	142	30
Future Volume (Veh/h)	14	77	64	36	142	30
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	14	77	64	36	142	30
Pedestrians		6	1		29	
Lane Width (m)		3.6	3.6		3.6	
Walking Speed (m/s)		1.2	1.2		1.2	
Percent Blockage		1	0		2	
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	129				217	117
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	129				217	117
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				81	97
cM capacity (veh/h)	1434				749	913
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	91	100	172			
Volume Left	14	0	142			
Volume Right	0	36	30			
cSH	1434	1700	773			
Volume to Capacity	0.01	0.06	0.22			
Queue Length 95th (m)	0.2	0.0	6.8			
Control Delay (s)	1.2	0.0	11.0			
Lane LOS	A		B			
Approach Delay (s)	1.2	0.0	11.0			
Approach LOS			B			
Intersection Summary						
Average Delay			5.5			
Intersection Capacity Utilization		29.9%		ICU Level of Service		A
Analysis Period (min)		15				

Lanes, Volumes, Timings
8: Livingston Blvd & Jacob Cressman Dr

Background (2028)
AM Peak Hour

						
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	24	45	46	7	37	55
Future Volume (vph)	24	45	46	7	37	55
Ideal Flow (vphpl)	1650	1650	1650	1650	1765	1765
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt			0.982		0.919	
Flt Protected		0.983			0.980	
Satd. Flow (prot)	0	1622	1593	0	1590	0
Flt Permitted		0.983			0.980	
Satd. Flow (perm)	0	1622	1593	0	1590	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		46.4	52.4		52.9	
Travel Time (s)		3.3	3.8		3.8	
Confl. Peds. (#/hr)	17			17	2	3
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	2%	0%	0%	0%
Adj. Flow (vph)	24	45	46	7	37	55
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	69	53	0	92	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.20	1.20	1.20	1.20	1.10	1.10
Turning Speed (k/h)	25			15	25	15
Sign Control		Free	Free		Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	24.3%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
8: Livingston Blvd & Jacob Cressman Dr

Background (2028)
AM Peak Hour

	EBL	EBT	WBT	WBR	SBL	SBR
Movement						
Lane Configurations		↔	↔		↔	
Traffic Volume (veh/h)	24	45	46	7	37	55
Future Volume (Veh/h)	24	45	46	7	37	55
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	24	45	46	7	37	55
Pedestrians		3	2		17	
Lane Width (m)		3.6	3.6		3.6	
Walking Speed (m/s)		1.2	1.2		1.2	
Percent Blockage		0	0		1	
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	70				162	70
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	70				162	70
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	98				95	94
cM capacity (veh/h)	1522				808	982
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	69	53	92			
Volume Left	24	0	37			
Volume Right	0	7	55			
cSH	1522	1700	904			
Volume to Capacity	0.02	0.03	0.10			
Queue Length 95th (m)	0.4	0.0	2.7			
Control Delay (s)	2.7	0.0	9.4			
Lane LOS	A		A			
Approach Delay (s)	2.7	0.0	9.4			
Approach LOS			A			
Intersection Summary						
Average Delay			4.9			
Intersection Capacity Utilization		24.3%		ICU Level of Service		A
Analysis Period (min)		15				

Lanes, Volumes, Timings
9: Isaac Shantz Dr & Kropf Dr

Background (2028)
AM Peak Hour

						
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1	10	19	3	3	3
Future Volume (vph)	1	10	19	3	3	3
Ideal Flow (vphpl)	1650	1650	1650	1650	1765	1765
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.877				0.932	
Flt Protected				0.959	0.976	
Satd. Flow (prot)	1447	0	0	1582	1606	0
Flt Permitted				0.959	0.976	
Satd. Flow (perm)	1447	0	0	1582	1606	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	82.2			95.1	387.0	
Travel Time (s)	5.9			6.8	27.9	
Confl. Peds. (#/hr)		15	15		1	4
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	1	10	19	3	3	3
Shared Lane Traffic (%)						
Lane Group Flow (vph)	11	0	0	22	6	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.20	1.20	1.20	1.20	1.10	1.10
Turning Speed (k/h)		15	25		25	15
Sign Control	Free			Free	Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	19.3%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
9: Isaac Shantz Dr & Kropf Dr

Background (2028)
AM Peak Hour

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↘			↖	↗	
Traffic Volume (veh/h)	1	10	19	3	3	3
Future Volume (Veh/h)	1	10	19	3	3	3
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	1	10	19	3	3	3
Pedestrians	1			4	15	
Lane Width (m)	3.6			3.6	3.6	
Walking Speed (m/s)	1.2			1.2	1.2	
Percent Blockage	0			0	1	
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			26		63	25
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			26		63	25
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		100	100
cM capacity (veh/h)			1581		924	1040
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	11	22	6			
Volume Left	0	19	3			
Volume Right	10	0	3			
cSH	1700	1581	979			
Volume to Capacity	0.01	0.01	0.01			
Queue Length 95th (m)	0.0	0.3	0.1			
Control Delay (s)	0.0	6.3	8.7			
Lane LOS	A	A	A			
Approach Delay (s)	0.0	6.3	8.7			
Approach LOS		A				
Intersection Summary						
Average Delay		4.9				
Intersection Capacity Utilization		19.3%		ICU Level of Service	A	
Analysis Period (min)		15				

Lanes, Volumes, Timings
10: Jacob Cressman Dr & Michael Myers Rd

Background (2028)
AM Peak Hour

						
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	2	7	3	2	0	1
Future Volume (vph)	2	7	3	2	0	1
Ideal Flow (vphpl)	1650	1650	1650	1650	1765	1765
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.895				0.865	
Flt Protected				0.971		
Satd. Flow (prot)	1477	0	0	1602	1527	0
Flt Permitted				0.971		
Satd. Flow (perm)	1477	0	0	1602	1527	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	94.5			86.8	341.5	
Travel Time (s)	6.8			6.2	24.6	
Confl. Peds. (#/hr)		4	4			
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	2	7	3	2	0	1
Shared Lane Traffic (%)						
Lane Group Flow (vph)	9	0	0	5	1	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.20	1.20	1.20	1.20	1.10	1.10
Turning Speed (k/h)		15	25		25	15
Sign Control	Free			Free	Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	14.6%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
10: Jacob Cressman Dr & Michael Myers Rd

Background (2028)
AM Peak Hour

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↘			↘	↗	
Traffic Volume (veh/h)	2	7	3	2	0	1
Future Volume (Veh/h)	2	7	3	2	0	1
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	2	7	3	2	0	1
Pedestrians					4	
Lane Width (m)					3.6	
Walking Speed (m/s)					1.2	
Percent Blockage					0	
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			13		18	10
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			13		18	10
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			1613		1000	1074
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	9	5	1			
Volume Left	0	3	0			
Volume Right	7	0	1			
cSH	1700	1613	1074			
Volume to Capacity	0.01	0.00	0.00			
Queue Length 95th (m)	0.0	0.0	0.0			
Control Delay (s)	0.0	4.3	8.4			
Lane LOS	A	A	A			
Approach Delay (s)	0.0	4.3	8.4			
Approach LOS		A				
Intersection Summary						
Average Delay		2.0				
Intersection Capacity Utilization		14.6%		ICU Level of Service	A	
Analysis Period (min)		15				

Lanes, Volumes, Timings

1: Foundry St/Livingston Blvd & Snyder's Rd

Background (2028)

PM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	14	131	94	24	198	162	158	168	43	54	83	34
Future Volume (vph)	14	131	94	24	198	162	158	168	43	54	83	34
Ideal Flow (vphpl)	1775	1650	1650	1550	1550	1550	1775	1650	1650	1775	1650	1650
Storage Length (m)	35.0		0.0	0.0		0.0	50.0		0.0	35.0		0.0
Storage Lanes	1		0	0		0	1		0	1		0
Taper Length (m)	40.0			7.5			25.0			35.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	0.99			0.99		0.99	0.99		0.99	0.99	
Frt	0.937				0.943		0.969			0.956		
Flt Protected	0.950				0.997		0.950			0.950		
Satd. Flow (prot)	1686	1497	0	0	1425	0	1686	1586	0	1686	1565	0
Flt Permitted	0.534				0.979		0.674			0.545		
Satd. Flow (perm)	940	1497	0	0	1398	0	1190	1586	0	954	1565	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		44			62			15			23	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		299.0			280.1			388.3			251.4	
Travel Time (s)		21.5			20.2			28.0			18.1	
Confl. Peds. (#/hr)	10		10	10		10	4		12	12		4
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	1%	3%	5%	1%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	14	131	94	24	198	162	158	168	43	54	83	34
Shared Lane Traffic (%)												
Lane Group Flow (vph)	14	225	0	0	384	0	158	211	0	54	117	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.09	1.20	1.20	1.29	1.29	1.29	1.09	1.20	1.20	1.09	1.20	1.20
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		4		3	8			2			6	
Permitted Phases	4			8			2			6		
Minimum Split (s)	42.1	42.1		14.1	42.1		48.1	48.1		48.1	48.1	
Total Split (s)	42.1	42.1		17.1	59.2		38.1	38.1		38.1	38.1	
Total Split (%)	43.3%	43.3%		17.6%	60.8%		39.2%	39.2%		39.2%	39.2%	
Maximum Green (s)	35.0	35.0		8.0	52.1		30.0	30.0		30.0	30.0	
Yellow Time (s)	4.1	4.1		4.1	4.1		4.1	4.1		4.1	4.1	
All-Red Time (s)	3.0	3.0		5.0	3.0		4.0	4.0		4.0	4.0	
Lost Time Adjust (s)	-3.1	-3.1			-3.1		-4.1	-4.1		-4.1	-4.1	
Total Lost Time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Walk Time (s)	15.0	15.0			15.0		20.0	20.0		20.0	20.0	
Flash Dont Walk (s)	20.0	20.0			20.0		10.0	10.0		10.0	10.0	
Pedestrian Calls (#/hr)	0	0			0		0	0		0	0	

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PTSL (200068)Synchro 9 Report
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Lanes, Volumes, Timings

1: Foundry St/Livingston Blvd & Snyder's Rd

Background (2028)

PM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Act Effct Green (s)	38.1	38.1			55.2		34.1	34.1		34.1	34.1	
Actuated g/C Ratio	0.39	0.39			0.57		0.35	0.35		0.35	0.35	
v/c Ratio	0.04	0.37			0.47		0.38	0.37		0.16	0.21	
Control Delay	18.9	18.8			12.3		27.0	24.2		23.5	18.8	
Queue Delay	0.0	0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay	18.9	18.8			12.3		27.0	24.2		23.5	18.8	
LOS	B	B			B		C	C		C	B	
Approach Delay		18.8			12.3			25.4			20.3	
Approach LOS		B			B			C			C	

Intersection Summary

Area Type: Other

Cycle Length: 97.3

Actuated Cycle Length: 97.3

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 105

Control Type: Pretimed

Maximum v/c Ratio: 0.47

Intersection Signal Delay: 19.0

Intersection LOS: B

Intersection Capacity Utilization 95.4%

ICU Level of Service F

Analysis Period (min) 15

Splits and Phases: 1: Foundry St/Livingston Blvd & Snyder's Rd

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PTSL (200068)Synchro 9 Report
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Queues

1: Foundry St/Livingston Blvd & Snyder's Rd

Background (2028)

PM Peak Hour

	EBL	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	14	225	384	158	211	54	117
v/c Ratio	0.04	0.37	0.47	0.38	0.37	0.16	0.21
Control Delay	18.9	18.8	12.3	27.0	24.2	23.5	18.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	18.9	18.8	12.3	27.0	24.2	23.5	18.8
Queue Length 50th (m)	1.7	24.5	34.3	23.2	28.5	7.3	12.6
Queue Length 95th (m)	5.7	44.2	57.0	41.5	48.4	16.6	25.8
Internal Link Dist (m)		275.0	256.1		364.3		227.4
Turn Bay Length (m)	35.0			50.0		35.0	
Base Capacity (vph)	368	612	823	417	565	334	563
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.04	0.37	0.47	0.38	0.37	0.16	0.21

Intersection Summary

HCM Signalized Intersection Capacity Analysis

1: Foundry St/Livingston Blvd & Snyder's Rd

Background (2028)

PM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	14	131	94	24	198	162	158	168	43	54	83	34
Traffic Volume (vph)	14	131	94	24	198	162	158	168	43	54	83	34
Future Volume (vph)	14	131	94	24	198	162	158	168	43	54	83	34
Ideal Flow (vphpl)	1775	1650	1650	1550	1550	1550	1775	1650	1650	1775	1650	1650
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.99			0.99		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	0.99	1.00			1.00		0.99	1.00		0.99	1.00	
Frt	1.00	0.94			0.94		1.00	0.97		1.00	0.96	
Flt Protected	0.95	1.00			1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1672	1497			1424		1677	1587		1664	1566	
Flt Permitted	0.53	1.00			0.98		0.67	1.00		0.55	1.00	
Satd. Flow (perm)	941	1497			1398		1190	1587		955	1566	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	14	131	94	24	198	162	158	168	43	54	83	34
RTOR Reduction (vph)	0	27	0	0	27	0	0	10	0	0	15	0
Lane Group Flow (vph)	14	198	0	0	357	0	158	201	0	54	102	0
Confl. Peds. (#/hr)	10		10	10		10	4		12	12		4
Heavy Vehicles (%)	0%	1%	3%	5%	1%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		4		3	8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	35.0	35.0			52.1		30.0	30.0		30.0	30.0	
Effective Green, g (s)	38.1	38.1			55.2		34.1	34.1		34.1	34.1	
Actuated g/C Ratio	0.39	0.39			0.57		0.35	0.35		0.35	0.35	
Clearance Time (s)	7.1	7.1			7.1		8.1	8.1		8.1	8.1	
Lane Grp Cap (vph)	368	586			796		417	556		334	548	
v/s Ratio Prot		0.13			c0.05			0.13			0.07	
v/s Ratio Perm	0.01				c0.20		c0.13			0.06		
v/c Ratio	0.04	0.34			0.45		0.38	0.36		0.16	0.19	
Uniform Delay, d1	18.3	20.8			12.2		23.7	23.5		21.8	22.0	
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	1.6			1.8		2.6	1.8		1.0	0.8	
Delay (s)	18.5	22.3			14.0		26.3	25.3		22.8	22.7	
Level of Service	B	C			B		C	C		C	C	
Approach Delay (s)		22.1			14.0			25.7			22.7	
Approach LOS		C			B			C			C	

Intersection Summary

HCM 2000 Control Delay	20.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	97.3	Sum of lost time (s)	17.1
Intersection Capacity Utilization	95.4%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
2: Snyder's Rd & Livingston Blvd

Background (2028)
PM Peak Hour

						
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	80	243	315	75	42	46
Future Volume (vph)	80	243	315	75	42	46
Ideal Flow (vphpl)	1650	1650	1650	1650	1765	1765
Storage Length (m)	50.0			0.0	0.0	0.0
Storage Lanes	1			0	1	0
Taper Length (m)	35.0				7.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt			0.974		0.929	
Flt Protected	0.950				0.977	
Satd. Flow (prot)	1568	1634	1607	0	1602	0
Flt Permitted	0.950				0.977	
Satd. Flow (perm)	1568	1634	1607	0	1602	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		342.5	299.0		251.5	
Travel Time (s)		24.7	21.5		18.1	
Confl. Peds. (#/hr)	12			12	1	2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	1%	0%	0%	0%	0%
Adj. Flow (vph)	80	243	315	75	42	46
Shared Lane Traffic (%)						
Lane Group Flow (vph)	80	243	390	0	88	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.6	3.6		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.20	1.20	1.20	1.20	1.10	1.10
Turning Speed (k/h)	25			15	25	15
Sign Control		Free	Free		Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	45.8%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
2: Snyder's Rd & Livingston Blvd

Background (2028)
PM Peak Hour

	EBL	EBT	WBT	WBR	SBL	SBR
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↗	↖	↔	↖	↗
Traffic Volume (veh/h)	80	243	315	75	42	46
Future Volume (Veh/h)	80	243	315	75	42	46
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	80	243	315	75	42	46
Pedestrians		2	1		12	
Lane Width (m)		3.6	3.6		3.6	
Walking Speed (m/s)		1.2	1.2		1.2	
Percent Blockage		0	0		1	
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)			299			
pX, platoon unblocked	0.99				0.99	0.99
vC, conflicting volume	402				768	366
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	391				761	355
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	93				88	93
cM capacity (veh/h)	1155				343	679
Direction, Lane #	EB 1	EB 2	WB 1	SB 1		
Volume Total	80	243	390	88		
Volume Left	80	0	0	42		
Volume Right	0	0	75	46		
cSH	1155	1700	1700	462		
Volume to Capacity	0.07	0.14	0.23	0.19		
Queue Length 95th (m)	1.8	0.0	0.0	5.6		
Control Delay (s)	8.3	0.0	0.0	14.6		
Lane LOS	A			B		
Approach Delay (s)	2.1		0.0	14.6		
Approach LOS				B		
Intersection Summary						
Average Delay			2.4			
Intersection Capacity Utilization			45.8%		ICU Level of Service	A
Analysis Period (min)			15			

Lanes, Volumes, Timings
3: Christian St & Snyder's Rd

Background (2028)
PM Peak Hour

						
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	298	3	3	388	5	3
Future Volume (vph)	298	3	3	388	5	3
Ideal Flow (vphpl)	1650	1650	1650	1650	1765	1765
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.999				0.949	
Flt Protected					0.970	
Satd. Flow (prot)	1616	0	0	1634	1625	0
Flt Permitted					0.970	
Satd. Flow (perm)	1616	0	0	1634	1625	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	587.8			342.5	168.2	
Travel Time (s)	42.3			24.7	12.1	
Confl. Peds. (#/hr)		5	5			
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	0%	0%	1%	0%	0%
Adj. Flow (vph)	298	3	3	388	5	3
Shared Lane Traffic (%)						
Lane Group Flow (vph)	301	0	0	391	8	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			3.6	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.20	1.20	1.20	1.20	1.10	1.10
Turning Speed (k/h)		15	25		25	15
Sign Control	Free			Free	Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	36.3%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
3: Christian St & Snyder's Rd

Background (2028)
PM Peak Hour

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔			↔	↔	
Traffic Volume (veh/h)	298	3	3	388	5	3
Future Volume (Veh/h)	298	3	3	388	5	3
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	298	3	3	388	5	3
Pedestrians					5	
Lane Width (m)					3.6	
Walking Speed (m/s)					1.2	
Percent Blockage					0	
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			306		698	304
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			306		698	304
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		99	100
cM capacity (veh/h)			1261		407	737
Direction, Lane #						
Volume Total	301	391	8			
Volume Left	0	3	5			
Volume Right	3	0	3			
cSH	1700	1261	489			
Volume to Capacity	0.18	0.00	0.02			
Queue Length 95th (m)	0.0	0.1	0.4			
Control Delay (s)	0.0	0.1	12.5			
Lane LOS		A	B			
Approach Delay (s)	0.0	0.1	12.5			
Approach LOS			B			
Intersection Summary						
Average Delay			0.2			
Intersection Capacity Utilization			36.3%		ICU Level of Service	A
Analysis Period (min)			15			

Lanes, Volumes, Timings
4: Livingston Blvd & Wagler Ave

Background (2028)
PM Peak Hour

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	9	10	48	198	109	5
Future Volume (vph)	9	10	48	198	109	5
Ideal Flow (vphpl)	1765	1765	1650	1650	1650	1650
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.929				0.994	
Flt Protected	0.977			0.990		
Satd. Flow (prot)	1602	0	0	1634	1625	0
Flt Permitted	0.977			0.990		
Satd. Flow (perm)	1602	0	0	1634	1625	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	297.7			251.4	141.5	
Travel Time (s)	21.4			18.1	10.2	
Confl. Peds. (#/hr)		1	27			27
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	0%	1%	0%
Adj. Flow (vph)	9	10	48	198	109	5
Shared Lane Traffic (%)						
Lane Group Flow (vph)	19	0	0	246	114	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			3.6	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.10	1.10	1.20	1.20	1.20	1.20
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	32.1%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
4: Livingston Blvd & Wagler Ave

Background (2028)
PM Peak Hour

	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	W			W	W	
Traffic Volume (veh/h)	9	10	48	198	109	5
Future Volume (Veh/h)	9	10	48	198	109	5
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	9	10	48	198	109	5
Pedestrians	27			1		
Lane Width (m)	3.6			3.6		
Walking Speed (m/s)	1.2			1.2		
Percent Blockage	2			0		
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)				251		
pX, platoon unblocked						
vC, conflicting volume	432	140	141			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	432	140	141			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	98	99	97			
cM capacity (veh/h)	552	893	1422			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	19	246	114			
Volume Left	9	48	0			
Volume Right	10	0	5			
cSH	690	1422	1700			
Volume to Capacity	0.03	0.03	0.07			
Queue Length 95th (m)	0.7	0.8	0.0			
Control Delay (s)	10.4	1.7	0.0			
Lane LOS	B	A				
Approach Delay (s)	10.4	1.7	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay		1.6				
Intersection Capacity Utilization		32.1%		ICU Level of Service	A	
Analysis Period (min)		15				

Lanes, Volumes, Timings
5: Livingston Blvd & Wagler Ave

Background (2028)
PM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	1	8	29	3	27	8	60	59	11	0	27	7
Future Volume (vph)	1	8	29	3	27	8	60	59	11	0	27	7
Ideal Flow (vphpl)	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.897			0.972			0.989			0.972	
Flt Protected		0.999			0.996			0.977				
Satd. Flow (prot)	0	1389	0	0	1501	0	0	1484	0	0	1507	0
Flt Permitted		0.999			0.996			0.977				
Satd. Flow (perm)	0	1389	0	0	1501	0	0	1484	0	0	1507	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		158.5			297.7			251.5			116.3	
Travel Time (s)		11.4			21.4			18.1			8.4	
Confl. Peds. (#/hr)	3		2	2		3	2		4	4		2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	2%	0%	0%	0%	0%
Adj. Flow (vph)	1	8	29	3	27	8	60	59	11	0	27	7
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	38	0	0	38	0	0	130	0	0	34	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization 27.2%	ICU Level of Service A											
Analysis Period (min) 15												

HCM Unsignalized Intersection Capacity Analysis
5: Livingston Blvd & Wagler Ave

Background (2028)
PM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (veh/h)	1	8	29	3	27	8	60	59	11	0	27	7
Future Volume (Veh/h)	1	8	29	3	27	8	60	59	11	0	27	7
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	1	8	29	3	27	8	60	59	11	0	27	7
Pedestrians		2			4			2			3	
Lane Width (m)		3.6			3.6			3.6			3.6	
Walking Speed (m/s)		1.2			1.2			1.2			1.2	
Percent Blockage		0			0			0			0	
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	242	226	34	254	224	72	36			74		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	242	226	34	254	224	72	36			74		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	99	97	100	96	99	96			100		
cM capacity (veh/h)	663	647	1041	652	649	991	1585			1533		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	38	38	130	34								
Volume Left	1	3	60	0								
Volume Right	29	8	11	7								
cSH	911	700	1585	1533								
Volume to Capacity	0.04	0.05	0.04	0.00								
Queue Length 95th (m)	1.0	1.4	0.9	0.0								
Control Delay (s)	9.1	10.4	3.6	0.0								
Lane LOS	A	B	A									
Approach Delay (s)	9.1	10.4	3.6	0.0								
Approach LOS	A	B										
Intersection Summary												
Average Delay			5.0									
Intersection Capacity Utilization 27.2%												
ICU Level of Service												A
Analysis Period (min)			15									

Lanes, Volumes, Timings
6: McFadyen St/Hunsberger Dr & Wagler Ave

Background (2028)
PM Peak Hour

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	3	57	23	2	23	19
Future Volume (vph)	3	57	23	2	23	19
Ideal Flow (vphpl)	1765	1765	1650	1650	1650	1650
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.872		0.989			
Flt Protected	0.998					0.973
Satd. Flow (prot)	1536	0	1632	0	0	1605
Flt Permitted	0.998					0.973
Satd. Flow (perm)	1536	0	1632	0	0	1605
Link Speed (k/h)	50		50			50
Link Distance (m)	158.5		76.5			91.6
Travel Time (s)	11.4		5.5			6.6
Confl. Peds. (#/hr)		2		2	2	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	3	57	23	2	23	19
Shared Lane Traffic (%)						
Lane Group Flow (vph)	60	0	25	0	0	42
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.6		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.10	1.10	1.20	1.20	1.20	1.20
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	20.7%		ICU Level of Service A			
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
6: McFadyen St/Hunsberger Dr & Wagler Ave

Background (2028)
PM Peak Hour

	WBL	WBR	NBT	NBR	SBL	SBT
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W	W	T	T	T	T
Traffic Volume (veh/h)	3	57	23	2	23	19
Future Volume (Veh/h)	3	57	23	2	23	19
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	3	57	23	2	23	19
Pedestrians	2					2
Lane Width (m)	3.6					3.6
Walking Speed (m/s)	1.2					1.2
Percent Blockage	0					0
Right turn flare (veh)						
Median type		None			None	
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	91	28			27	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	91	28			27	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	95			99	
cM capacity (veh/h)	900	1049			1597	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	60	25	42			
Volume Left	3	0	23			
Volume Right	57	2	0			
cSH	1041	1700	1597			
Volume to Capacity	0.06	0.01	0.01			
Queue Length 95th (m)	1.5	0.0	0.4			
Control Delay (s)	8.7	0.0	4.0			
Lane LOS	A		A			
Approach Delay (s)	8.7	0.0	4.0			
Approach LOS	A					
Intersection Summary						
Average Delay		5.4				
Intersection Capacity Utilization		20.7%		ICU Level of Service		A
Analysis Period (min)		15				

Lanes, Volumes, Timings
7: Livingston Blvd & Isaac Shantz Dr

Background (2028)
PM Peak Hour

						
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	17	35	68	112	60	18
Future Volume (vph)	17	35	68	112	60	18
Ideal Flow (vphpl)	1650	1650	1650	1650	1765	1765
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt			0.916		0.969	
Flt Protected		0.984			0.963	
Satd. Flow (prot)	0	1624	1511	0	1647	0
Flt Permitted		0.984			0.963	
Satd. Flow (perm)	0	1624	1511	0	1647	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		37.8	84.0		90.3	
Travel Time (s)		2.7	6.0		6.5	
Confl. Peds. (#/hr)	6			6	4	1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	17	35	68	112	60	18
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	52	180	0	78	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.20	1.20	1.20	1.20	1.10	1.10
Turning Speed (k/h)	25			15	25	15
Sign Control		Free	Free		Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	31.0%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
7: Livingston Blvd & Isaac Shantz Dr

Background (2028)
PM Peak Hour

	EBL	EBT	WBT	WBR	SBL	SBR
Movement						
Lane Configurations		↔	↔		↔	
Traffic Volume (veh/h)	17	35	68	112	60	18
Future Volume (Veh/h)	17	35	68	112	60	18
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	17	35	68	112	60	18
Pedestrians		1	4		6	
Lane Width (m)		3.6	3.6		3.6	
Walking Speed (m/s)		1.2	1.2		1.2	
Percent Blockage		0	0		1	
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	186				203	131
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	186				203	131
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				92	98
cM capacity (veh/h)	1394				774	919
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	52	180	78			
Volume Left	17	0	60			
Volume Right	0	112	18			
cSH	1394	1700	803			
Volume to Capacity	0.01	0.11	0.10			
Queue Length 95th (m)	0.3	0.0	2.6			
Control Delay (s)	2.6	0.0	10.0			
Lane LOS	A		A			
Approach Delay (s)	2.6	0.0	10.0			
Approach LOS			A			
Intersection Summary						
Average Delay			2.9			
Intersection Capacity Utilization		31.0%		ICU Level of Service		A
Analysis Period (min)		15				

Lanes, Volumes, Timings
8: Livingston Blvd & Jacob Cressman Dr

Background (2028)
PM Peak Hour

						
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	25	32	23	43	12	18
Future Volume (vph)	25	32	23	43	12	18
Ideal Flow (vphpl)	1650	1650	1650	1650	1765	1765
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt			0.912		0.919	
Flt Protected		0.979			0.980	
Satd. Flow (prot)	0	1615	1505	0	1590	0
Flt Permitted		0.979			0.980	
Satd. Flow (perm)	0	1615	1505	0	1590	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		46.4	52.4		52.9	
Travel Time (s)		3.3	3.8		3.8	
Confl. Peds. (#/hr)	4			4	7	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	25	32	23	43	12	18
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	57	66	0	30	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.20	1.20	1.20	1.20	1.10	1.10
Turning Speed (k/h)	25			15	25	15
Sign Control		Free	Free		Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	20.2%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
8: Livingston Blvd & Jacob Cressman Dr

Background (2028)
PM Peak Hour

	EBL	EBT	WBT	WBR	SBL	SBR
Movement						
Lane Configurations		↔	↔		↔	
Traffic Volume (veh/h)	25	32	23	43	12	18
Future Volume (Veh/h)	25	32	23	43	12	18
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	25	32	23	43	12	18
Pedestrians			7		4	
Lane Width (m)			3.6		3.6	
Walking Speed (m/s)			1.2		1.2	
Percent Blockage			1		0	
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	70				138	48
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	70				138	48
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	98				99	98
cM capacity (veh/h)	1538				839	1023
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	57	66	30			
Volume Left	25	0	12			
Volume Right	0	43	18			
cSH	1538	1700	940			
Volume to Capacity	0.02	0.04	0.03			
Queue Length 95th (m)	0.4	0.0	0.8			
Control Delay (s)	3.3	0.0	9.0			
Lane LOS	A		A			
Approach Delay (s)	3.3	0.0	9.0			
Approach LOS			A			
Intersection Summary						
Average Delay			3.0			
Intersection Capacity Utilization		20.2%		ICU Level of Service		A
Analysis Period (min)		15				

Lanes, Volumes, Timings
9: Isaac Shantz Dr & Kropf Dr

Background (2028)
PM Peak Hour

						
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	0	3	8	0	1	17
Future Volume (vph)	0	3	8	0	1	17
Ideal Flow (vphpl)	1650	1650	1650	1650	1765	1765
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.865				0.872	
Flt Protected				0.950	0.997	
Satd. Flow (prot)	1427	0	0	1568	1534	0
Flt Permitted				0.950	0.997	
Satd. Flow (perm)	1427	0	0	1568	1534	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	82.2			95.1	387.0	
Travel Time (s)	5.9			6.8	27.9	
Confl. Peds. (#/hr)		6	6			3
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	0	3	8	0	1	17
Shared Lane Traffic (%)						
Lane Group Flow (vph)	3	0	0	8	18	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.20	1.20	1.20	1.20	1.10	1.10
Turning Speed (k/h)		15	25		25	15
Sign Control	Free			Free	Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	18.1%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
9: Isaac Shantz Dr & Kropf Dr

Background (2028)
PM Peak Hour

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↘			↖	↗	
Traffic Volume (veh/h)	0	3	8	0	1	17
Future Volume (Veh/h)	0	3	8	0	1	17
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	3	8	0	1	17
Pedestrians				3	6	
Lane Width (m)				3.6	3.6	
Walking Speed (m/s)				1.2	1.2	
Percent Blockage				0	1	
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			9		24	10
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			9		24	10
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	98
cM capacity (veh/h)			1616		988	1068
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	3	8	18			
Volume Left	0	8	1			
Volume Right	3	0	17			
cSH	1700	1616	1064			
Volume to Capacity	0.00	0.00	0.02			
Queue Length 95th (m)	0.0	0.1	0.4			
Control Delay (s)	0.0	7.2	8.4			
Lane LOS		A	A			
Approach Delay (s)	0.0	7.2	8.4			
Approach LOS		A				
Intersection Summary						
Average Delay			7.2			
Intersection Capacity Utilization			18.1%		ICU Level of Service	A
Analysis Period (min)			15			

Lanes, Volumes, Timings
10: Jacob Cressman Dr & Michael Myers Rd

Background (2028)
PM Peak Hour

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↘			↗	↘	↗
Traffic Volume (vph)	2	3	1	7	6	2
Future Volume (vph)	2	3	1	7	6	2
Ideal Flow (vphpl)	1650	1650	1650	1650	1765	1765
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.919				0.966	
Flt Protected				0.994	0.964	
Satd. Flow (prot)	1516	0	0	1640	1635	0
Flt Permitted				0.994	0.964	
Satd. Flow (perm)	1516	0	0	1640	1635	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	94.5			86.8	341.5	
Travel Time (s)	6.8			6.2	24.6	
Confl. Peds. (#/hr)		13	13			
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	0%	0%	2%
Adj. Flow (vph)	2	3	1	7	6	2
Shared Lane Traffic (%)						
Lane Group Flow (vph)	5	0	0	8	8	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	3.6	
Link Offset(m)	0.0			0.0		
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.20	1.20	1.20	1.20	1.10	1.10
Turning Speed (k/h)		15	25		25	15
Sign Control	Free			Free	Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization 16.8%	ICU Level of Service A					
Analysis Period (min) 15						

HCM Unsignalized Intersection Capacity Analysis
10: Jacob Cressman Dr & Michael Myers Rd

Background (2028)
PM Peak Hour

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↘			↗	↘	↗
Traffic Volume (veh/h)	2	3	1	7	6	2
Future Volume (Veh/h)	2	3	1	7	6	2
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	2	3	1	7	6	2
Pedestrians					13	
Lane Width (m)					3.6	
Walking Speed (m/s)					1.2	
Percent Blockage					1	
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			18		26	16
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			18		26	16
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		99	100
cM capacity (veh/h)			1595		984	1051
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	5	8	8			
Volume Left	0	1	6			
Volume Right	3	0	2			
cSH	1700	1595	1000			
Volume to Capacity	0.00	0.00	0.01			
Queue Length 95th (m)	0.0	0.0	0.2			
Control Delay (s)	0.0	0.9	8.6			
Lane LOS		A	A			
Approach Delay (s)	0.0	0.9	8.6			
Approach LOS			A			
Intersection Summary						
Average Delay			3.6			
Intersection Capacity Utilization			16.8%		ICU Level of Service	A
Analysis Period (min)			15			

Appendix F

Total Operation Reports



Lanes, Volumes, Timings

1: Foundry St/Livingston Blvd & Snyder's Rd

Total (2028)

AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↱		↰	↱	
Traffic Volume (vph)	8	208	248	13	203	63	213	129	18	210	314	54
Future Volume (vph)	8	208	248	13	203	63	213	129	18	210	314	54
Ideal Flow (vphpl)	1775	1650	1650	1550	1550	1550	1775	1650	1650	1775	1650	1650
Storage Length (m)	35.0		0.0	0.0		0.0	50.0		0.0	35.0		0.0
Storage Lanes	1		0	0		0	1		0	1		0
Taper Length (m)	40.0			7.5			25.0			35.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99				0.99			1.00		1.00		
Frt		0.918			0.970			0.982			0.978	
Flt Protected	0.950				0.998		0.950			0.950		
Satd. Flow (prot)	1686	1460	0	0	1413	0	1637	1548	0	1670	1582	0
Flt Permitted	0.588				0.987		0.407			0.646		
Satd. Flow (perm)	1036	1460	0	0	1397	0	701	1548	0	1133	1582	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		62			20			9			11	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		299.0			280.1			388.3			251.4	
Travel Time (s)		21.5			20.2			28.0			18.1	
Confl. Peds. (#/hr)	6					6			2	2		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	7%	1%	10%	6%	3%	3%	4%	7%	1%	2%	2%
Adj. Flow (vph)	8	208	248	13	203	63	213	129	18	210	314	54
Shared Lane Traffic (%)												
Lane Group Flow (vph)	8	456	0	0	279	0	213	147	0	210	368	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.09	1.20	1.20	1.29	1.29	1.29	1.09	1.20	1.20	1.09	1.20	1.20
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		4		3	8			2			6	
Permitted Phases	4			8			2			6		
Minimum Split (s)	37.1	37.1		14.1	39.1		48.1	48.1		48.1	48.1	
Total Split (s)	37.1	37.1		17.1	54.2		48.1	48.1		48.1	48.1	
Total Split (%)	36.3%	36.3%		16.7%	53.0%		47.0%	47.0%		47.0%	47.0%	
Maximum Green (s)	30.0	30.0		13.0	47.1		40.0	40.0		40.0	40.0	
Yellow Time (s)	4.1	4.1		4.1	4.1		4.1	4.1		4.1	4.1	
All-Red Time (s)	3.0	3.0		0.0	3.0		4.0	4.0		4.0	4.0	
Lost Time Adjust (s)	-3.1	-3.1			-3.1		-4.1	-4.1		-4.1	-4.1	
Total Lost Time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes										
Walk Time (s)	10.0	10.0			10.0		30.0	30.0		30.0	30.0	
Flash Dont Walk (s)	20.0	20.0			20.0		10.0	10.0		10.0	10.0	
Pedestrian Calls (#/hr)	0	0			0		0	0		0	0	

1012 Snyder's Road, Baden TIS
PTSL (200068)Synchro 9 Report
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Lanes, Volumes, Timings

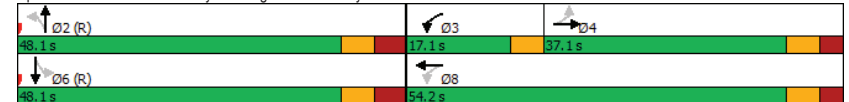
1: Foundry St/Livingston Blvd & Snyder's Rd

Total (2028)

AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Act Effct Green (s)	33.1	33.1			50.2		44.1	44.1		44.1	44.1	
Actuated g/C Ratio	0.32	0.32			0.49		0.43	0.43		0.43	0.43	
v/c Ratio	0.02	0.89			0.40		0.71	0.22		0.43	0.53	
Control Delay	24.0	49.3			17.3		38.9	18.2		23.8	24.4	
Queue Delay	0.0	0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay	24.0	49.3			17.3		38.9	18.2		23.8	24.4	
LOS	C	D			B		D	B		C	C	
Approach Delay		48.9			17.3			30.4			24.2	
Approach LOS		D			B			C			C	
Intersection Summary												
Area Type:	Other											
Cycle Length:	102.3											
Actuated Cycle Length:	102.3											
Offset:	0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green											
Natural Cycle:	100											
Control Type:	Pre-timed											
Maximum v/c Ratio:	0.89											
Intersection Signal Delay:	31.2											
Intersection Capacity Utilization	87.1%											
ICU Level of Service	E											
Analysis Period (min)	15											

Splits and Phases: 1: Foundry St/Livingston Blvd & Snyder's Rd

1012 Snyder's Road, Baden TIS
PTSL (200068)Synchro 9 Report
Page 2

Queues

1: Foundry St/Livingston Blvd & Snyder's Rd

Total (2028)

AM Peak Hour

	EBL	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group	EBL	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	8	456	279	213	147	210	368
v/c Ratio	0.02	0.89	0.40	0.71	0.22	0.43	0.53
Control Delay	24.0	49.3	17.3	38.9	18.2	23.8	24.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.0	49.3	17.3	38.9	18.2	23.8	24.4
Queue Length 50th (m)	1.1	79.3	32.7	35.5	17.6	29.9	53.8
Queue Length 95th (m)	4.7	#140.2	53.6	#73.8	31.4	50.9	82.9
Internal Link Dist (m)		275.0	256.1		364.3		227.4
Turn Bay Length (m)	35.0			50.0		35.0	
Base Capacity (vph)	335	514	697	302	672	488	688
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.02	0.89	0.40	0.71	0.22	0.43	0.53

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

1: Foundry St/Livingston Blvd & Snyder's Rd

Total (2028)

AM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↱		↰	↱	
Traffic Volume (vph)	8	208	248	13	203	63	213	129	18	210	314	54
Future Volume (vph)	8	208	248	13	203	63	213	129	18	210	314	54
Ideal Flow (vphpl)	1775	1650	1650	1550	1550	1550	1775	1650	1650	1775	1650	1650
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00			0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	0.99	1.00			1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.92			0.97		1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00			1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1675	1461			1411		1637	1548		1666	1582	
Flt Permitted	0.59	1.00			0.99		0.41	1.00		0.65	1.00	
Satd. Flow (perm)	1037	1461			1396		702	1548		1132	1582	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	8	208	248	13	203	63	213	129	18	210	314	54
RTOR Reduction (vph)	0	42	0	0	10	0	0	5	0	0	6	0
Lane Group Flow (vph)	8	414	0	0	269	0	213	142	0	210	362	0
Confl. Peds. (#/hr)	6					6			2	2		
Heavy Vehicles (%)	0%	7%	1%	10%	6%	3%	3%	4%	7%	1%	2%	2%
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		4		3	8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	30.0	30.0			47.1		40.0	40.0		40.0	40.0	
Effective Green, g (s)	33.1	33.1			50.2		44.1	44.1		44.1	44.1	
Actuated g/C Ratio	0.32	0.32			0.49		0.43	0.43		0.43	0.43	
Clearance Time (s)	7.1	7.1			7.1		8.1	8.1		8.1	8.1	
Lane Grp Cap (vph)	335	472			687		302	667		487	681	
v/s Ratio Prot		c0.28			c0.06			0.09			0.23	
v/s Ratio Perm	0.01				0.13		c0.30			0.19		
v/c Ratio	0.02	0.88			0.39		0.71	0.21		0.43	0.53	
Uniform Delay, d1	23.6	32.7			16.4		23.8	18.2		20.3	21.5	
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	20.0			1.7		13.0	0.7		2.8	3.0	
Delay (s)	23.7	52.7			18.1		36.8	19.0		23.1	24.4	
Level of Service	C	D			B		D	B		C	C	
Approach Delay (s)		52.2			18.1			29.5			23.9	
Approach LOS		D			B			C			C	

Intersection Summary

HCM 2000 Control Delay	32.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	102.3	Sum of lost time (s)	12.1
Intersection Capacity Utilization	87.1%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
2: Snyder's Rd & Livingston Blvd

Total (2028)
AM Peak Hour

	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	98	458	430	39	103	219
Future Volume (vph)	98	458	430	39	103	219
Ideal Flow (vphpl)	1650	1650	1650	1650	1765	1765
Storage Length (m)	50.0			0.0	0.0	0.0
Storage Lanes	1			0	1	0
Taper Length (m)	35.0				7.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt			0.989		0.908	
Flt Protected	0.950				0.984	
Satd. Flow (prot)	1522	1557	1533	0	1577	0
Flt Permitted	0.950				0.984	
Satd. Flow (perm)	1522	1557	1533	0	1577	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		342.5	299.0		251.5	
Travel Time (s)		24.7	21.5		18.1	
Confl. Peds. (#/hr)	10			10		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	3%	6%	7%	0%	0%	0%
Adj. Flow (vph)	98	458	430	39	103	219
Shared Lane Traffic (%)						
Lane Group Flow (vph)	98	458	469	0	322	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.6	3.6		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.20	1.20	1.20	1.20	1.10	1.10
Turning Speed (k/h)	25			15	25	15
Sign Control		Free	Free		Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization 65.8%	ICU Level of Service C					
Analysis Period (min) 15						

HCM Unsignalized Intersection Capacity Analysis
2: Snyder's Rd & Livingston Blvd

Total (2028)
AM Peak Hour

	EBL	EBT	WBT	WBR	SBL	SBR
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔
Traffic Volume (veh/h)	98	458	430	39	103	219
Future Volume (Veh/h)	98	458	430	39	103	219
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	98	458	430	39	103	219
Pedestrians					10	
Lane Width (m)					3.6	
Walking Speed (m/s)					1.2	
Percent Blockage					1	
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)			299			
pX, platoon unblocked	0.96				0.96	0.96
vC, conflicting volume	479				1114	460
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	439				1098	418
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	91				50	64
cM capacity (veh/h)	1065				206	610
Direction, Lane #	EB 1	EB 2	WB 1	SB 1		
Volume Total	98	458	469	322		
Volume Left	98	0	0	103		
Volume Right	0	0	39	219		
cSH	1065	1700	1700	374		
Volume to Capacity	0.09	0.27	0.28	0.86		
Queue Length 95th (m)	2.4	0.0	0.0	65.5		
Control Delay (s)	8.7	0.0	0.0	51.7		
Lane LOS	A			F		
Approach Delay (s)	1.5		0.0	51.7		
Approach LOS				F		
Intersection Summary						
Average Delay			13.0			
Intersection Capacity Utilization			65.8%		ICU Level of Service	C
Analysis Period (min)			15			

Lanes, Volumes, Timings

3: Christian St/Street One & Snyder's Rd

Total (2028)

AM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	53	474	0	1	608	44	5	0	1	91	0	95
Future Volume (vph)	53	474	0	1	608	44	5	0	1	91	0	95
Ideal Flow (vphpl)	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt					0.991			0.977			0.931	
Flt Protected		0.995						0.960			0.976	
Satd. Flow (prot)	0	1460	0	0	1453	0	0	1454	0	0	1408	0
Flt Permitted		0.995						0.960			0.976	
Satd. Flow (perm)	0	1460	0	0	1453	0	0	1454	0	0	1408	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		587.8			342.5			168.2			137.2	
Travel Time (s)		42.3			24.7			12.1			9.9	
Confl. Peds. (#/hr)			2	2								
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	6%	0%	0%	6%	2%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	53	474	0	1	608	44	5	0	1	91	0	95
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	527	0	0	653	0	0	6	0	0	186	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 99.6%

ICU Level of Service F

Analysis Period (min) 15

HCM Unsignalized Intersection Capacity Analysis

3: Christian St/Street One & Snyder's Rd

Total (2028)

AM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	53	474	0	1	608	44	5	0	1	91	0	95
Future Volume (Veh/h)	53	474	0	1	608	44	5	0	1	91	0	95
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	53	474	0	1	608	44	5	0	1	91	0	95
Pedestrians								2				
Lane Width (m)								3.6				
Walking Speed (m/s)								1.2				
Percent Blockage								0				
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	652			476			1309	1236	476	1213	1214	630
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	652			476			1309	1236	476	1213	1214	630
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	94			100			95	100	100	40	100	80
cM capacity (veh/h)	935			1095			105	167	592	153	172	485
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	527	653	6	186								
Volume Left	53	1	5	91								
Volume Right	0	44	1	95								
cSH	935	1095	122	235								
Volume to Capacity	0.06	0.00	0.05	0.79								
Queue Length 95th (m)	1.4	0.0	1.2	46.7								
Control Delay (s)	1.6	0.0	36.0	61.0								
Lane LOS	A	A	E	F								
Approach Delay (s)	1.6	0.0	36.0	61.0								
Approach LOS		E	F									

Intersection Summary

Average Delay 9.0

Intersection Capacity Utilization 99.6% ICU Level of Service F

Analysis Period (min) 15

Lanes, Volumes, Timings
4: Livingston Blvd & Wagler Ave

Total (2028)
AM Peak Hour

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	8	124	30	144	403	2
Future Volume (vph)	8	124	30	144	403	2
Ideal Flow (vphpl)	1765	1765	1650	1650	1650	1650
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.873				0.999	
Flt Protected	0.997			0.991		
Satd. Flow (prot)	1495	0	0	1609	1628	0
Flt Permitted	0.997			0.991		
Satd. Flow (perm)	1495	0	0	1609	1628	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	297.7			251.4	141.5	
Travel Time (s)	21.4			18.1	10.2	
Confl. Peds. (#/hr)	1		2			2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	14%	2%	0%	2%	1%	50%
Adj. Flow (vph)	8	124	30	144	403	2
Shared Lane Traffic (%)						
Lane Group Flow (vph)	132	0	0	174	405	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			3.6	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.10	1.10	1.20	1.20	1.20	1.20
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	53.7%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
4: Livingston Blvd & Wagler Ave

Total (2028)
AM Peak Hour

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	8	124	30	144	403	2
Future Volume (Veh/h)	8	124	30	144	403	2
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	8	124	30	144	403	2
Pedestrians	2				1	
Lane Width (m)	3.6				3.6	
Walking Speed (m/s)	1.2				1.2	
Percent Blockage	0				0	
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)				251		
pX, platoon unblocked						
vC, conflicting volume	611	406	407			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	611	406	407			
tC, single (s)	6.5	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.6	3.3	2.2			
p0 queue free %	98	81	97			
cM capacity (veh/h)	426	644	1161			
Direction, Lane #						
Volume Total	132	174	405			
Volume Left	8	30	0			
Volume Right	124	0	2			
cSH	624	1161	1700			
Volume to Capacity	0.21	0.03	0.24			
Queue Length 95th (m)	6.4	0.6	0.0			
Control Delay (s)	12.3	1.6	0.0			
Lane LOS	B	A				
Approach Delay (s)	12.3	1.6	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay		2.7				
Intersection Capacity Utilization		53.7%		ICU Level of Service		A
Analysis Period (min)		15				

Lanes, Volumes, Timings
5: Livingston Blvd & Wagler Ave

Total (2028)
AM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	6	93	52	8	24	1	36	98	11	6	205	2
Future Volume (vph)	6	93	52	8	24	1	36	98	11	6	205	2
Ideal Flow (vphpl)	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.954			0.996			0.990			0.999	
Flt Protected		0.998			0.988			0.988			0.999	
Satd. Flow (prot)	0	1476	0	0	1525	0	0	1493	0	0	1532	0
Flt Permitted		0.998			0.988			0.988			0.999	
Satd. Flow (perm)	0	1476	0	0	1525	0	0	1493	0	0	1532	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		158.5			297.7			251.5			116.3	
Travel Time (s)		11.4			21.4			18.1			8.4	
Confl. Peds. (#/hr)	3		1	1		3	17		6	6		17
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	20%	0%	1%	0%
Adj. Flow (vph)	6	93	52	8	24	1	36	98	11	6	205	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	151	0	0	33	0	0	145	0	0	213	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 44.9%

ICU Level of Service A

Analysis Period (min) 15

HCM Unsignalized Intersection Capacity Analysis
5: Livingston Blvd & Wagler Ave

Total (2028)
AM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (veh/h)	6	93	52	8	24	1	36	98	11	6	205	2
Future Volume (Veh/h)	6	93	52	8	24	1	36	98	11	6	205	2
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	6	93	52	8	24	1	36	98	11	6	205	2
Pedestrians		17			6			1			3	
Lane Width (m)		3.6			3.6			3.6			3.6	
Walking Speed (m/s)		1.2			1.2			1.2			1.2	
Percent Blockage		1			1			0			0	
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	426	422	224	499	418	112	224			115		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	426	422	224	499	418	112	224			115		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	81	94	98	95	100	97			100		
cM capacity (veh/h)	494	500	808	373	503	939	1337			1479		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	151	33	145	213								
Volume Left	6	8	36	6								
Volume Right	52	1	11	2								
cSH	575	470	1337	1479								
Volume to Capacity	0.26	0.07	0.03	0.00								
Queue Length 95th (m)	8.4	1.8	0.7	0.1								
Control Delay (s)	13.5	13.2	2.1	0.2								
Lane LOS	B	B	A	A								
Approach Delay (s)	13.5	13.2	2.1	0.2								
Approach LOS	B	B										

Intersection Summary

Average Delay 5.2

Intersection Capacity Utilization 44.9% ICU Level of Service A

Analysis Period (min) 15

Lanes, Volumes, Timings

6: McFadyen St/Hunsberger Dr & Wagler Ave

Total (2028)

AM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔				↔			↔	
Traffic Volume (vph)	0	71	0	2	36	15	0	7	1	51	34	0
Future Volume (vph)	0	71	0	2	36	15	0	7	1	51	34	0
Ideal Flow (vphpl)	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt					0.962			0.983				
Flt Protected					0.998						0.971	
Satd. Flow (prot)	0	1550	0	0	1488	0	0	1524	0	0	1505	0
Flt Permitted					0.998						0.971	
Satd. Flow (perm)	0	1550	0	0	1488	0	0	1524	0	0	1505	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		119.3			158.5			76.5			91.6	
Travel Time (s)		8.6			11.4			5.5			6.6	
Confl. Peds. (#/hr)						1			5	5		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	0	71	0	2	36	15	0	7	1	51	34	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	71	0	0	53	0	0	8	0	0	85	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 24.8%

ICU Level of Service A

Analysis Period (min) 15

HCM Unsignalized Intersection Capacity Analysis

6: McFadyen St/Hunsberger Dr & Wagler Ave

Total (2028)

AM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔				↔			↔	
Traffic Volume (veh/h)	0	71	0	2	36	15	0	7	1	51	34	0
Future Volume (Veh/h)	0	71	0	2	36	15	0	7	1	51	34	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	71	0	2	36	15	0	7	1	51	34	0
Pedestrians					5						1	
Lane Width (m)					3.6						3.6	
Walking Speed (m/s)					1.2						1.2	
Percent Blockage					0						0	
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	178	149	34	184	148	14	34			13		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	178	149	34	184	148	14	34			13		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	90	100	100	95	99	100			97		
cM capacity (veh/h)	727	720	1045	700	720	1067	1591			1612		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	71	53	8	85								
Volume Left	0	2	0	51								
Volume Right	0	15	1	0								
cSH	720	792	1591	1612								
Volume to Capacity	0.10	0.07	0.00	0.03								
Queue Length 95th (m)	2.6	1.7	0.0	0.8								
Control Delay (s)	10.5	9.9	0.0	4.5								
Lane LOS	B	A		A								
Approach Delay (s)	10.5	9.9	0.0	4.5								
Approach LOS	B	A										

Intersection Summary

Average Delay 7.6

Intersection Capacity Utilization 24.8%

ICU Level of Service A

Analysis Period (min) 15

Lanes, Volumes, Timings
7: Livingston Blvd & Isaac Shantz Dr

Total (2028)
AM Peak Hour

						
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	21	197	101	45	173	51
Future Volume (vph)	21	197	101	45	173	51
Ideal Flow (vphpl)	1650	1650	1650	1650	1765	1765
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt			0.958		0.969	
Flt Protected		0.995			0.963	
Satd. Flow (prot)	0	1642	1538	0	1647	0
Flt Permitted		0.995			0.963	
Satd. Flow (perm)	0	1642	1538	0	1647	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		37.8	84.0		90.3	
Travel Time (s)		2.7	6.0		6.5	
Confl. Peds. (#/hr)	29			29	1	6
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	4%	0%	0%	0%
Adj. Flow (vph)	21	197	101	45	173	51
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	218	146	0	224	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.20	1.20	1.20	1.20	1.10	1.10
Turning Speed (k/h)	25			15	25	15
Sign Control		Free	Free		Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	49.2%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
7: Livingston Blvd & Isaac Shantz Dr

Total (2028)
AM Peak Hour

	EBL	EBT	WBT	WBR	SBL	SBR
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↗	↘		↖	↗
Traffic Volume (veh/h)	21	197	101	45	173	51
Future Volume (Veh/h)	21	197	101	45	173	51
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	21	197	101	45	173	51
Pedestrians		6	1		29	
Lane Width (m)		3.6	3.6		3.6	
Walking Speed (m/s)		1.2	1.2		1.2	
Percent Blockage		1	0		2	
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	175				392	158
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	175				392	158
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	98				71	94
cM capacity (veh/h)	1379				591	866
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	218	146	224			
Volume Left	21	0	173			
Volume Right	0	45	51			
cSH	1379	1700	637			
Volume to Capacity	0.02	0.09	0.35			
Queue Length 95th (m)	0.4	0.0	12.6			
Control Delay (s)	0.9	0.0	13.7			
Lane LOS	A		B			
Approach Delay (s)	0.9	0.0	13.7			
Approach LOS			B			
Intersection Summary						
Average Delay			5.5			
Intersection Capacity Utilization		49.2%		ICU Level of Service		A
Analysis Period (min)		15				

Lanes, Volumes, Timings
8: Livingston Blvd & Jacob Cressman Dr

Total (2028)
AM Peak Hour

						
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	53	52	67	44	157	141
Future Volume (vph)	53	52	67	44	157	141
Ideal Flow (vphpl)	1650	1650	1650	1650	1765	1765
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt			0.946		0.936	
Flt Protected		0.975			0.974	
Satd. Flow (prot)	0	1609	1542	0	1609	0
Flt Permitted		0.975			0.974	
Satd. Flow (perm)	0	1609	1542	0	1609	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		46.4	52.4		52.9	
Travel Time (s)		3.3	3.8		3.8	
Confl. Peds. (#/hr)	17			17	2	3
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	2%	0%	0%	0%
Adj. Flow (vph)	53	52	67	44	157	141
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	105	111	0	298	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.20	1.20	1.20	1.20	1.10	1.10
Turning Speed (k/h)	25			15	25	15
Sign Control		Free	Free		Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	38.7%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
8: Livingston Blvd & Jacob Cressman Dr

Total (2028)
AM Peak Hour

	EBL	EBT	WBT	WBR	SBL	SBR
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔	↔		↔	↔
Traffic Volume (veh/h)	53	52	67	44	157	141
Future Volume (Veh/h)	53	52	67	44	157	141
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	53	52	67	44	157	141
Pedestrians		3	2		17	
Lane Width (m)		3.6	3.6		3.6	
Walking Speed (m/s)		1.2	1.2		1.2	
Percent Blockage		0	0		1	
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	128				266	109
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	128				266	109
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	96				77	85
cM capacity (veh/h)	1450				690	934
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	105	111	298			
Volume Left	53	0	157			
Volume Right	0	44	141			
cSH	1450	1700	787			
Volume to Capacity	0.04	0.07	0.38			
Queue Length 95th (m)	0.9	0.0	14.2			
Control Delay (s)	4.0	0.0	12.3			
Lane LOS	A		B			
Approach Delay (s)	4.0	0.0	12.3			
Approach LOS			B			
Intersection Summary						
Average Delay			8.0			
Intersection Capacity Utilization			38.7%		ICU Level of Service	A
Analysis Period (min)			15			

Lanes, Volumes, Timings
9: Isaac Shantz Dr & Kropf Dr

Total (2028)
AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1	10	19	3	0	3	16	3	0	52	0
Future Volume (vph)	0	1	10	19	3	0	3	16	3	0	52	0
Ideal Flow (vphpl)	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.877						0.982				
Flt Protected					0.959			0.993				
Satd. Flow (prot)	0	1359	0	0	1486	0	0	1511	0	0	1550	0
Flt Permitted					0.959			0.993				
Satd. Flow (perm)	0	1359	0	0	1486	0	0	1511	0	0	1550	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		82.2			95.1			387.0			134.8	
Travel Time (s)		5.9			6.8			27.9			9.7	
Confl. Peds. (#/hr)			15	15			1		4			
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	0	1	10	19	3	0	3	16	3	0	52	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	11	0	0	22	0	0	22	0	0	52	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Free			Free			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	20.4%											
Analysis Period (min)	15											
ICU Level of Service A												

HCM Unsignalized Intersection Capacity Analysis
9: Isaac Shantz Dr & Kropf Dr

Total (2028)
AM Peak Hour

	↖	→	↗	↖	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (veh/h)	0	1	10	19	3	0	3	16	3	0	52	0
Future Volume (Veh/h)	0	1	10	19	3	0	3	16	3	0	52	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	1	10	19	3	0	3	16	3	0	52	0
Pedestrians		1			4			15			52	
Lane Width (m)		3.6			3.6			3.6			3.6	
Walking Speed (m/s)		1.2			1.2			1.2			1.2	
Percent Blockage		0			0			1			0	
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	3			26			89	62	25	62	67	4
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	3			26			89	62	25	62	67	4
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			99			100	98	100	100	94	100
cM capacity (veh/h)	1632			1581			830	812	1040	901	807	1085
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	11	22	22	52								
Volume Left	0	19	3	0								
Volume Right	10	0	3	0								
cSH	1632	1581	840	807								
Volume to Capacity	0.00	0.01	0.03	0.06								
Queue Length 95th (m)	0.0	0.3	0.6	1.6								
Control Delay (s)	0.0	6.3	9.4	9.8								
Lane LOS		A	A	A								
Approach Delay (s)	0.0	6.3	9.4	9.8								
Approach LOS		A	A	A								
Intersection Summary												
Average Delay			8.0									
Intersection Capacity Utilization		20.4%									A	
Analysis Period (min)			15									
ICU Level of Service A												

Lanes, Volumes, Timings

10: Jacob Cressman Dr & Michael Myers Rd

Total (2028)

AM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	0	2	7	3	2	0	0	66	1	0	206	0
Future Volume (vph)	0	2	7	3	2	0	0	66	1	0	206	0
Ideal Flow (vphpl)	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.895						0.998				
Flt Protected					0.971							
Satd. Flow (prot)	0	1387	0	0	1505	0	0	1547	0	0	1550	0
Flt Permitted					0.971							
Satd. Flow (perm)	0	1387	0	0	1505	0	0	1547	0	0	1550	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		94.5			86.8			341.5			105.5	
Travel Time (s)		6.8			6.2			24.6			7.6	
Confl. Peds. (#/hr)			4	4								
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	0	2	7	3	2	0	0	66	1	0	206	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	9	0	0	5	0	0	67	0	0	206	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 24.5%

ICU Level of Service A

Analysis Period (min) 15

HCM Unsignalized Intersection Capacity Analysis

10: Jacob Cressman Dr & Michael Myers Rd

Total (2028)

AM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (veh/h)	0	2	7	3	2	0	0	66	1	0	206	0
Future Volume (Veh/h)	0	2	7	3	2	0	0	66	1	0	206	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	2	7	3	2	0	0	66	1	0	206	0
Pedestrians								4				
Lane Width (m)								3.6				
Walking Speed (m/s)								1.2				
Percent Blockage								0				
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	2			13			120	18	10	48	21	2
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	2			13			120	18	10	48	21	2
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	92	100	100	76	100
cM capacity (veh/h)	1634			1613			698	876	1074	899	872	1088
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	9	5	67	206								
Volume Left	0	3	0	0								
Volume Right	7	0	1	0								
cSH	1634	1613	878	872								
Volume to Capacity	0.00	0.00	0.08	0.24								
Queue Length 95th (m)	0.0	0.0	2.0	7.3								
Control Delay (s)	0.0	4.3	9.4	10.4								
Lane LOS		A	A	B								
Approach Delay (s)	0.0	4.3	9.4	10.4								
Approach LOS		A	B									

Intersection Summary

Average Delay 9.7

Intersection Capacity Utilization 24.5% ICU Level of Service A

Analysis Period (min) 15

Lanes, Volumes, Timings

1: Foundry St/Livingston Blvd & Snyder's Rd

Total (2028)

PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↰		↰	↰	↰	↰	↰	↰	↰	↰	↰
Traffic Volume (vph)	14	151	110	24	268	235	193	255	43	100	121	34
Future Volume (vph)	14	151	110	24	268	235	193	255	43	100	121	34
Ideal Flow (vphpl)	1775	1650	1650	1550	1550	1550	1775	1650	1650	1775	1650	1650
Storage Length (m)	35.0		0.0	0.0		0.0	50.0		0.0	35.0		0.0
Storage Lanes	1		0	0		0	1		0	1		0
Taper Length (m)	40.0			7.5			25.0			35.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	0.99			0.98		0.99	0.99		0.99	0.99	
Frt		0.937			0.940			0.978				0.967
Flt Protected	0.950				0.998		0.950			0.950		
Satd. Flow (prot)	1686	1497	0	0	1422	0	1686	1605	0	1686	1586	0
Flt Permitted	0.468				0.983		0.621			0.433		
Satd. Flow (perm)	825	1497	0	0	1400	0	1097	1605	0	760	1586	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		44			69			10			16	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		299.0			280.1			388.3			251.4	
Travel Time (s)		21.5			20.2			28.0			18.1	
Confl. Peds. (#/hr)	10		10	10		10	4		12	12		4
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	1%	3%	5%	1%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	14	151	110	24	268	235	193	255	43	100	121	34
Shared Lane Traffic (%)												
Lane Group Flow (vph)	14	261	0	0	527	0	193	298	0	100	155	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Right	Left	Left	Right	
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.09	1.20	1.20	1.29	1.29	1.29	1.09	1.20	1.20	1.09	1.20	1.20
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		4		3	8			2			6	
Permitted Phases	4			8			2			6		
Minimum Split (s)	42.1	42.1		14.1	42.1		48.1	48.1		48.1	48.1	
Total Split (s)	42.1	42.1		17.1	59.2		38.1	38.1		38.1	38.1	
Total Split (%)	43.3%	43.3%		17.6%	60.8%		39.2%	39.2%		39.2%	39.2%	
Maximum Green (s)	35.0	35.0		8.0	52.1		30.0	30.0		30.0	30.0	
Yellow Time (s)	4.1	4.1		4.1	4.1		4.1	4.1		4.1	4.1	
All-Red Time (s)	3.0	3.0		5.0	3.0		4.0	4.0		4.0	4.0	
Lost Time Adjust (s)	-3.1	-3.1			-3.1		-4.1	-4.1		-4.1	-4.1	
Total Lost Time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Walk Time (s)	15.0	15.0			15.0		20.0	20.0		20.0	20.0	
Flash Dont Walk (s)	20.0	20.0			20.0		10.0	10.0		10.0	10.0	
Pedestrian Calls (#/hr)	0	0			0		0	0		0	0	

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Lanes, Volumes, Timings

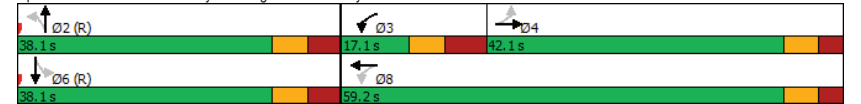
1: Foundry St/Livingston Blvd & Snyder's Rd

Total (2028)

PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Act Effct Green (s)	38.1	38.1			55.2		34.1	34.1		34.1	34.1	
Actuated g/C Ratio	0.39	0.39			0.57		0.35	0.35		0.35	0.35	
v/c Ratio	0.04	0.43			0.64		0.50	0.52		0.38	0.27	
Control Delay	19.0	20.3			16.4		30.5	28.3		28.9	21.9	
Queue Delay	0.0	0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay	19.0	20.3			16.4		30.5	28.3		28.9	21.9	
LOS	B	C			B		C	C		C	C	
Approach Delay		20.3			16.4			29.2			24.6	
Approach LOS		C			B			C			C	
Intersection Summary												
Area Type:	Other											
Cycle Length:	97.3											
Actuated Cycle Length:	97.3											
Offset:	0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green											
Natural Cycle:	105											
Control Type:	Pretimed											
Maximum v/c Ratio:	0.64											
Intersection Signal Delay:	22.5											
Intersection Capacity Utilization	107.3%											
Analysis Period (min)	15											
ICU Level of Service	G											

Splits and Phases: 1: Foundry St/Livingston Blvd & Snyder's Rd

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PTSL (200068)Synchro 9 Report
Page 2

Queues

1: Foundry St/Livingston Blvd & Snyder's Rd

Total (2028)

PM Peak Hour

	←	→	←	←	↑	↘	↓
Lane Group	EBL	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	14	261	527	193	298	100	155
v/c Ratio	0.04	0.43	0.64	0.50	0.52	0.38	0.27
Control Delay	19.0	20.3	16.4	30.5	28.3	28.9	21.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	19.0	20.3	16.4	30.5	28.3	28.9	21.9
Queue Length 50th (m)	1.7	30.4	57.0	29.8	44.9	14.7	19.3
Queue Length 95th (m)	5.8	52.7	92.6	52.3	71.4	m29.5	m35.2
Internal Link Dist (m)		275.0	256.1		364.3		227.4
Turn Bay Length (m)	35.0			50.0		35.0	
Base Capacity (vph)	323	612	827	384	568	266	566
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.04	0.43	0.64	0.50	0.52	0.38	0.27

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

1: Foundry St/Livingston Blvd & Snyder's Rd

Total (2028)

PM Peak Hour

	←	→	↘	↙	←	↘	↙	↑	↘	↙	↓	↘
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↙	↘			↘	↙	↙	↘		↙	↘	↙
Traffic Volume (vph)	14	151	110	24	268	235	193	255	43	100	121	34
Future Volume (vph)	14	151	110	24	268	235	193	255	43	100	121	34
Ideal Flow (vphpl)	1775	1650	1650	1550	1550	1550	1775	1650	1650	1775	1650	1650
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.99			0.99		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	0.99	1.00			1.00		0.99	1.00		0.99	1.00	
Frt	1.00	0.94			0.94		1.00	0.98		1.00	0.97	
Flt Protected	0.95	1.00			1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1675	1496			1421		1678	1605		1668	1586	
Flt Permitted	0.47	1.00			0.98		0.62	1.00		0.43	1.00	
Satd. Flow (perm)	826	1496			1400		1096	1605		761	1586	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	14	151	110	24	268	235	193	255	43	100	121	34
RTOR Reduction (vph)	0	27	0	0	30	0	0	6	0	0	10	0
Lane Group Flow (vph)	14	234	0	0	497	0	193	292	0	100	145	0
Confl. Peds. (#/hr)	10		10	10		10	4		12	12		4
Heavy Vehicles (%)	0%	1%	3%	5%	1%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		4		3	8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	35.0	35.0			52.1		30.0	30.0		30.0	30.0	
Effective Green, g (s)	38.1	38.1			55.2		34.1	34.1		34.1	34.1	
Actuated g/C Ratio	0.39	0.39			0.57		0.35	0.35		0.35	0.35	
Clearance Time (s)	7.1	7.1			7.1		8.1	8.1		8.1	8.1	
Lane Grp Cap (vph)	323	585			796		384	562		266	555	
v/s Ratio Prot		0.16			c0.07			c0.18			0.09	
v/s Ratio Perm	0.02				c0.28		0.18			0.13		
v/c Ratio	0.04	0.40			0.62		0.50	0.52		0.38	0.26	
Uniform Delay, d1	18.3	21.4			14.1		24.9	25.1		23.6	22.6	
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.3	2.0			3.7		4.6	3.4		4.0	1.1	
Delay (s)	18.6	23.4			17.8		29.6	28.5		27.8	23.7	
Level of Service	B	C			B		C	C		C	C	
Approach Delay (s)		23.2			17.8			28.9			25.3	
Approach LOS		C			B			C			C	

Intersection Summary

HCM 2000 Control Delay	23.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	97.3	Sum of lost time (s)	17.1
Intersection Capacity Utilization	107.3%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
2: Snyder's Rd & Livingston Blvd

Total (2028)
PM Peak Hour

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	140	279	392	103	42	103
Future Volume (vph)	140	279	392	103	42	103
Ideal Flow (vphpl)	1650	1650	1650	1650	1765	1765
Storage Length (m)	50.0			0.0	0.0	0.0
Storage Lanes	1			0	1	0
Taper Length (m)	35.0				7.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt			0.972		0.904	
Flt Protected	0.950				0.986	
Satd. Flow (prot)	1568	1634	1604	0	1573	0
Flt Permitted	0.950				0.986	
Satd. Flow (perm)	1568	1634	1604	0	1573	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		342.5	299.0		251.5	
Travel Time (s)		24.7	21.5		18.1	
Confl. Peds. (#/hr)	12			12	1	2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	1%	0%	0%	0%	0%
Adj. Flow (vph)	140	279	392	103	42	103
Shared Lane Traffic (%)						
Lane Group Flow (vph)	140	279	495	0	145	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.6	3.6		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.20	1.20	1.20	1.20	1.10	1.10
Turning Speed (k/h)	25			15	25	15
Sign Control		Free	Free		Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	59.9%			ICU Level of Service B		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
2: Snyder's Rd & Livingston Blvd

Total (2028)
PM Peak Hour

	EBL	EBT	WBT	WBR	SBL	SBR
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔
Traffic Volume (veh/h)	140	279	392	103	42	103
Future Volume (Veh/h)	140	279	392	103	42	103
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	140	279	392	103	42	103
Pedestrians		2	1		12	
Lane Width (m)		3.6	3.6		3.6	
Walking Speed (m/s)		1.2	1.2		1.2	
Percent Blockage		0	0		1	
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)			299			
pX, platoon unblocked	0.96				0.96	0.96
vC, conflicting volume	507				1016	458
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	468				997	417
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	87				81	83
cM capacity (veh/h)	1052				225	609
Direction, Lane #	EB 1	EB 2	WB 1	SB 1		
Volume Total	140	279	495	145		
Volume Left	140	0	0	42		
Volume Right	0	0	103	103		
cSH	1052	1700	1700	408		
Volume to Capacity	0.13	0.16	0.29	0.36		
Queue Length 95th (m)	3.7	0.0	0.0	12.6		
Control Delay (s)	8.9	0.0	0.0	18.6		
Lane LOS	A			C		
Approach Delay (s)	3.0		0.0	18.6		
Approach LOS				C		
Intersection Summary						
Average Delay			3.7			
Intersection Capacity Utilization			59.9%		ICU Level of Service	B
Analysis Period (min)			15			

Lanes, Volumes, Timings

3: Christian St/Street One & Snyder's Rd

Total (2028)

PM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	47	358	3	3	445	77	5	0	3	36	0	48
Future Volume (vph)	47	358	3	3	445	77	5	0	3	36	0	48
Ideal Flow (vphpl)	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.999			0.980			0.949			0.923	
Flt Protected		0.994						0.970			0.979	
Satd. Flow (prot)	0	1513	0	0	1506	0	0	1427	0	0	1401	0
Flt Permitted		0.994						0.970			0.979	
Satd. Flow (perm)	0	1513	0	0	1506	0	0	1427	0	0	1401	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		587.8			342.5			168.2			124.8	
Travel Time (s)		42.3			24.7			12.1			9.0	
Confl. Peds. (#/hr)			5	5								
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	2%	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	47	358	3	3	445	77	5	0	3	36	0	48
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	408	0	0	525	0	0	8	0	0	84	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 77.7%

ICU Level of Service D

Analysis Period (min) 15

HCM Unsignalized Intersection Capacity Analysis

3: Christian St/Street One & Snyder's Rd

Total (2028)

PM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (veh/h)	47	358	3	3	445	77	5	0	3	36	0	48
Future Volume (Veh/h)	47	358	3	3	445	77	5	0	3	36	0	48
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	47	358	3	3	445	77	5	0	3	36	0	48
Pedestrians								5				
Lane Width (m)								3.6				
Walking Speed (m/s)								1.2				
Percent Blockage								0				
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	522			366			996	986	364	946	950	484
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	522			366			996	986	364	946	950	484
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	96			100			97	100	100	85	100	92
cM capacity (veh/h)	1055			1199			198	237	682	233	249	587
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	408	525	8	84								
Volume Left	47	3	5	36								
Volume Right	3	77	3	48								
cSH	1055	1199	270	356								
Volume to Capacity	0.04	0.00	0.03	0.24								
Queue Length 95th (m)	1.1	0.1	0.7	7.2								
Control Delay (s)	1.4	0.1	18.8	18.2								
Lane LOS	A	A	C	C								
Approach Delay (s)	1.4	0.1	18.8	18.2								
Approach LOS		C		C								

Intersection Summary

Average Delay 2.2

Intersection Capacity Utilization 77.7% ICU Level of Service D

Analysis Period (min) 15

Lanes, Volumes, Timings
4: Livingston Blvd & Wagler Ave

Total (2028)
PM Peak Hour

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	9	34	72	334	169	5
Future Volume (vph)	9	34	72	334	169	5
Ideal Flow (vphpl)	1765	1765	1650	1650	1650	1650
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.893				0.996	
Flt Protected	0.990			0.991		
Satd. Flow (prot)	1560	0	0	1635	1628	0
Flt Permitted	0.990			0.991		
Satd. Flow (perm)	1560	0	0	1635	1628	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	297.7			251.4	141.5	
Travel Time (s)	21.4			18.1	10.2	
Confl. Peds. (#/hr)		1	27			27
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	0%	1%	0%
Adj. Flow (vph)	9	34	72	334	169	5
Shared Lane Traffic (%)						
Lane Group Flow (vph)	43	0	0	406	174	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			3.6	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.10	1.10	1.20	1.20	1.20	1.20
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	50.7%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
4: Livingston Blvd & Wagler Ave

Total (2028)
PM Peak Hour

	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	W			W	W	
Traffic Volume (veh/h)	9	34	72	334	169	5
Future Volume (Veh/h)	9	34	72	334	169	5
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	9	34	72	334	169	5
Pedestrians	27			1		
Lane Width (m)	3.6			3.6		
Walking Speed (m/s)	1.2			1.2		
Percent Blockage	2			0		
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)				251		
pX, platoon unblocked	0.99					
vC, conflicting volume	676	200	201			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	665	200	201			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	98	96	95			
cM capacity (veh/h)	391	827	1352			
Direction, Lane #						
Volume Total	43	406	174			
Volume Left	9	72	0			
Volume Right	34	0	5			
cSH	670	1352	1700			
Volume to Capacity	0.06	0.05	0.10			
Queue Length 95th (m)	1.6	1.3	0.0			
Control Delay (s)	10.7	1.8	0.0			
Lane LOS	B	A				
Approach Delay (s)	10.7	1.8	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay		1.9				
Intersection Capacity Utilization		50.7%		ICU Level of Service	A	
Analysis Period (min)		15				

Lanes, Volumes, Timings
5: Livingston Blvd & Wagler Ave

Total (2028)
PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	32	34	3	51	8	93	114	11	0	79	7
Future Volume (vph)	1	32	34	3	51	8	93	114	11	0	79	7
Ideal Flow (vphpl)	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.931			0.983			0.993			0.989	
Flt Protected		0.999			0.998			0.979				
Satd. Flow (prot)	0	1442	0	0	1521	0	0	1491	0	0	1533	0
Flt Permitted		0.999			0.998			0.979				
Satd. Flow (perm)	0	1442	0	0	1521	0	0	1491	0	0	1533	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		158.5			297.7			251.5			116.3	
Travel Time (s)		11.4			21.4			18.1			8.4	
Confl. Peds. (#/hr)	3		2	2		3	2		4	4		2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	2%	0%	0%	0%	0%
Adj. Flow (vph)	1	32	34	3	51	8	93	114	11	0	79	7
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	67	0	0	62	0	0	218	0	0	86	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	34.6%											
Analysis Period (min)	15											
ICU Level of Service A												

HCM Unsignalized Intersection Capacity Analysis
5: Livingston Blvd & Wagler Ave

Total (2028)
PM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (veh/h)	1	32	34	3	51	8	93	114	11	0	79	7
Future Volume (Veh/h)	1	32	34	3	51	8	93	114	11	0	79	7
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	1	32	34	3	51	8	93	114	11	0	79	7
Pedestrians		2			4			2			3	
Lane Width (m)		3.6			3.6			3.6			3.6	
Walking Speed (m/s)		1.2			1.2			1.2			1.2	
Percent Blockage		0			0			0			0	
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	426	400	86	444	398	126	88			129		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	426	400	86	444	398	126	88			129		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	94	97	99	90	99	94			100		
cM capacity (veh/h)	469	506	974	458	507	924	1518			1464		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	67	62	218	86								
Volume Left	1	3	93	0								
Volume Right	34	8	11	7								
cSH	668	536	1518	1464								
Volume to Capacity	0.10	0.12	0.06	0.00								
Queue Length 95th (m)	2.7	3.1	1.6	0.0								
Control Delay (s)	11.0	12.6	3.5	0.0								
Lane LOS	B	B	A									
Approach Delay (s)	11.0	12.6	3.5	0.0								
Approach LOS	B	B										
Intersection Summary												
Average Delay			5.3									
Intersection Capacity Utilization			34.6%									
Analysis Period (min)			15									
ICU Level of Service A												

Lanes, Volumes, Timings

6: McFadyen St/Hunsberger Dr & Wagler Ave

Total (2028)

PM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔	↔			↔		↔	↔	
Traffic Volume (vph)	0	29	0	3	57	57	0	23	2	23	19	0
Future Volume (vph)	0	29	0	3	57	57	0	23	2	23	19	0
Ideal Flow (vphpl)	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt					0.934			0.989				
Flt Protected					0.999						0.973	
Satd. Flow (prot)	0	1550	0	0	1446	0	0	1533	0	0	1508	0
Flt Permitted					0.999						0.973	
Satd. Flow (perm)	0	1550	0	0	1446	0	0	1533	0	0	1508	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		140.6			158.5			76.5			91.6	
Travel Time (s)		10.1			11.4			5.5			6.6	
Confl. Peds. (#/hr)						2			2	2		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	0	29	0	3	57	57	0	23	2	23	19	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	29	0	0	117	0	0	25	0	0	42	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 27.5%

ICU Level of Service A

Analysis Period (min) 15

HCM Unsignalized Intersection Capacity Analysis

6: McFadyen St/Hunsberger Dr & Wagler Ave

Total (2028)

PM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔	↔			↔		↔	↔	
Traffic Volume (veh/h)	0	29	0	3	57	57	0	23	2	23	19	0
Future Volume (Veh/h)	0	29	0	3	57	57	0	23	2	23	19	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	29	0	3	57	57	0	23	2	23	19	0
Pedestrians					2						2	
Lane Width (m)					3.6						3.6	
Walking Speed (m/s)					1.2						1.2	
Percent Blockage					0						0	
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	176	92	19	106	91	28	19			27		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	176	92	19	106	91	28	19			27		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	96	100	100	93	95	100			99		
cM capacity (veh/h)	696	789	1065	842	790	1049	1611			1597		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	29	117	25	42								
Volume Left	0	3	0	23								
Volume Right	0	57	2	0								
cSH	789	900	1611	1597								
Volume to Capacity	0.04	0.13	0.00	0.01								
Queue Length 95th (m)	0.9	3.6	0.0	0.4								
Control Delay (s)	9.7	9.6	0.0	4.0								
Lane LOS	A	A		A								
Approach Delay (s)	9.7	9.6	0.0	4.0								
Approach LOS	A	A										

Intersection Summary

Average Delay 7.4

Intersection Capacity Utilization 27.5% ICU Level of Service A

Analysis Period (min) 15

Lanes, Volumes, Timings

7: Livingston Blvd & Isaac Shantz Dr

Total (2028)

PM Peak Hour

						
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	28	83	176	140	72	28
Future Volume (vph)	28	83	176	140	72	28
Ideal Flow (vphpl)	1650	1650	1650	1650	1765	1765
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt			0.940		0.962	
Flt Protected		0.988			0.965	
Satd. Flow (prot)	0	1630	1551	0	1639	0
Flt Permitted		0.988			0.965	
Satd. Flow (perm)	0	1630	1551	0	1639	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		37.8	84.0		90.3	
Travel Time (s)		2.7	6.0		6.5	
Conf. Peds. (#/hr)	6			6	4	1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	28	83	176	140	72	28
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	111	316	0	100	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.20	1.20	1.20	1.20	1.10	1.10
Turning Speed (k/h)	25			15	25	15
Sign Control		Free	Free		Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	44.0%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis

7: Livingston Blvd & Isaac Shantz Dr

Total (2028)

PM Peak Hour

	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↗	↘		↖	↗
Traffic Volume (veh/h)	28	83	176	140	72	28
Future Volume (Veh/h)	28	83	176	140	72	28
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	28	83	176	140	72	28
Pedestrians		1	4		6	
Lane Width (m)		3.6	3.6		3.6	
Walking Speed (m/s)		1.2	1.2		1.2	
Percent Blockage		0	0		1	
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	322				395	253
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	322				395	253
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	98				88	96
cM capacity (veh/h)	1243				595	786
Direction, Lane #						
Volume Total	111	316	100			
Volume Left	28	0	72			
Volume Right	0	140	28			
cSH	1243	1700	638			
Volume to Capacity	0.02	0.19	0.16			
Queue Length 95th (m)	0.6	0.0	4.4			
Control Delay (s)	2.1	0.0	11.7			
Lane LOS	A		B			
Approach Delay (s)	2.1	0.0	11.7			
Approach LOS			B			
Intersection Summary						
Average Delay			2.7			
Intersection Capacity Utilization			44.0%		ICU Level of Service	A
Analysis Period (min)			15			

Lanes, Volumes, Timings
8: Livingston Blvd & Jacob Cressman Dr

Total (2028)
PM Peak Hour

						
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	69	43	33	151	60	60
Future Volume (vph)	69	43	33	151	60	60
Ideal Flow (vphpl)	1650	1650	1650	1650	1765	1765
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt			0.889		0.932	
Flt Protected		0.970			0.976	
Satd. Flow (prot)	0	1600	1467	0	1606	0
Flt Permitted		0.970			0.976	
Satd. Flow (perm)	0	1600	1467	0	1606	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		46.4	52.4		52.9	
Travel Time (s)		3.3	3.8		3.8	
Confl. Peds. (#/hr)	4			4	7	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	69	43	33	151	60	60
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	112	184	0	120	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.20	1.20	1.20	1.20	1.10	1.10
Turning Speed (k/h)	25			15	25	15
Sign Control		Free	Free		Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	37.6%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
8: Livingston Blvd & Jacob Cressman Dr

Total (2028)
PM Peak Hour

	EBL	EBT	WBT	WBR	SBL	SBR
Movement						
Lane Configurations		↔	↔		↔	
Traffic Volume (veh/h)	69	43	33	151	60	60
Future Volume (Veh/h)	69	43	33	151	60	60
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	69	43	33	151	60	60
Pedestrians			7		4	
Lane Width (m)			3.6		3.6	
Walking Speed (m/s)			1.2		1.2	
Percent Blockage			1		0	
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	188				300	112
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	188				300	112
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	95				91	94
cM capacity (veh/h)	1394				655	943
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	112	184	120			
Volume Left	69	0	60			
Volume Right	0	151	60			
cSH	1394	1700	773			
Volume to Capacity	0.05	0.11	0.16			
Queue Length 95th (m)	1.2	0.0	4.4			
Control Delay (s)	4.9	0.0	10.5			
Lane LOS	A		B			
Approach Delay (s)	4.9	0.0	10.5			
Approach LOS			B			
Intersection Summary						
Average Delay			4.4			
Intersection Capacity Utilization			37.6%		ICU Level of Service	A
Analysis Period (min)			15			

Lanes, Volumes, Timings
9: Isaac Shantz Dr & Kropf Dr

Total (2028)
PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	3	8	0	0	1	39	17	0	22	0
Future Volume (vph)	0	0	3	8	0	0	1	39	17	0	22	0
Ideal Flow (vphpl)	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.865						0.960				
Flt Protected					0.950			0.999				
Satd. Flow (prot)	0	1341	0	0	1472	0	0	1487	0	0	1550	0
Flt Permitted					0.950			0.999				
Satd. Flow (perm)	0	1341	0	0	1472	0	0	1487	0	0	1550	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		82.2			95.1			387.0			130.8	
Travel Time (s)		5.9			6.8			27.9			9.4	
Confl. Peds. (#/hr)			6	6					3			
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	0	0	3	8	0	0	1	39	17	0	22	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	3	0	0	8	0	0	57	0	0	22	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Free			Free			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	19.6%											
Analysis Period (min)	15											
ICU Level of Service A												

HCM Unsignalized Intersection Capacity Analysis
9: Isaac Shantz Dr & Kropf Dr

Total (2028)
PM Peak Hour

	↖	→	↗	↖	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (veh/h)	0	0	3	8	0	0	1	39	17	0	22	0
Future Volume (Veh/h)	0	0	3	8	0	0	1	39	17	0	22	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	0	3	8	0	0	1	39	17	0	22	0
Pedestrians					3			6				
Lane Width (m)					3.6			3.6				
Walking Speed (m/s)					1.2			1.2				
Percent Blockage					0			1				
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	0			9			34	24	10	57	25	0
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	0			9			34	24	10	57	25	0
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	95	98	100	97	100
cM capacity (veh/h)	1636			1616			946	865	1068	889	864	1091
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	3	8	57	22								
Volume Left	0	8	1	0								
Volume Right	3	0	17	0								
cSH	1636	1616	919	864								
Volume to Capacity	0.00	0.00	0.06	0.03								
Queue Length 95th (m)	0.0	0.1	1.6	0.6								
Control Delay (s)	0.0	7.2	9.2	9.3								
Lane LOS		A	A	A								
Approach Delay (s)	0.0	7.2	9.2	9.3								
Approach LOS		A	A	A								
Intersection Summary												
Average Delay			8.7									
Intersection Capacity Utilization			19.6%									
Analysis Period (min)			15									
ICU Level of Service A												

Lanes, Volumes, Timings

10: Jacob Cressman Dr & Michael Myers Rd

Total (2028)

PM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	0	2	3	1	7	0	6	152	2	0	90	0
Future Volume (vph)	0	2	3	1	7	0	6	152	2	0	90	0
Ideal Flow (vphpl)	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.919						0.998				
Flt Protected					0.994			0.998				
Satd. Flow (prot)	0	1424	0	0	1541	0	0	1544	0	0	1550	0
Flt Permitted					0.994			0.998				
Satd. Flow (perm)	0	1424	0	0	1541	0	0	1544	0	0	1550	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		94.5			86.8			341.5			108.5	
Travel Time (s)		6.8			6.2			24.6			7.8	
Confl. Peds. (#/hr)			13	13								
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	0	2	3	1	7	0	6	152	2	0	90	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	5	0	0	8	0	0	160	0	0	90	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 29.4%

ICU Level of Service A

Analysis Period (min) 15

HCM Unsignalized Intersection Capacity Analysis

10: Jacob Cressman Dr & Michael Myers Rd

Total (2028)

PM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (veh/h)	0	2	3	1	7	0	6	152	2	0	90	0
Future Volume (Veh/h)	0	2	3	1	7	0	6	152	2	0	90	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	2	3	1	7	0	6	152	2	0	90	0
Pedestrians								13				
Lane Width (m)								3.6				
Walking Speed (m/s)								1.2				
Percent Blockage								1				
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	7			18			70	26	16	90	27	7
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	7			18			70	26	16	90	27	7
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			99	82	100	100	90	100
cM capacity (veh/h)	1627			1595			835	862	1057	769	860	1081
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	5	8	160	90								
Volume Left	0	1	6	0								
Volume Right	3	0	2	0								
cSH	1627	1595	863	860								
Volume to Capacity	0.00	0.00	0.19	0.10								
Queue Length 95th (m)	0.0	0.0	5.4	2.8								
Control Delay (s)	0.0	0.9	10.1	9.7								
Lane LOS		A	B	A								
Approach Delay (s)	0.0	0.9	10.1	9.7								
Approach LOS			B	A								

Intersection Summary

Average Delay 9.5

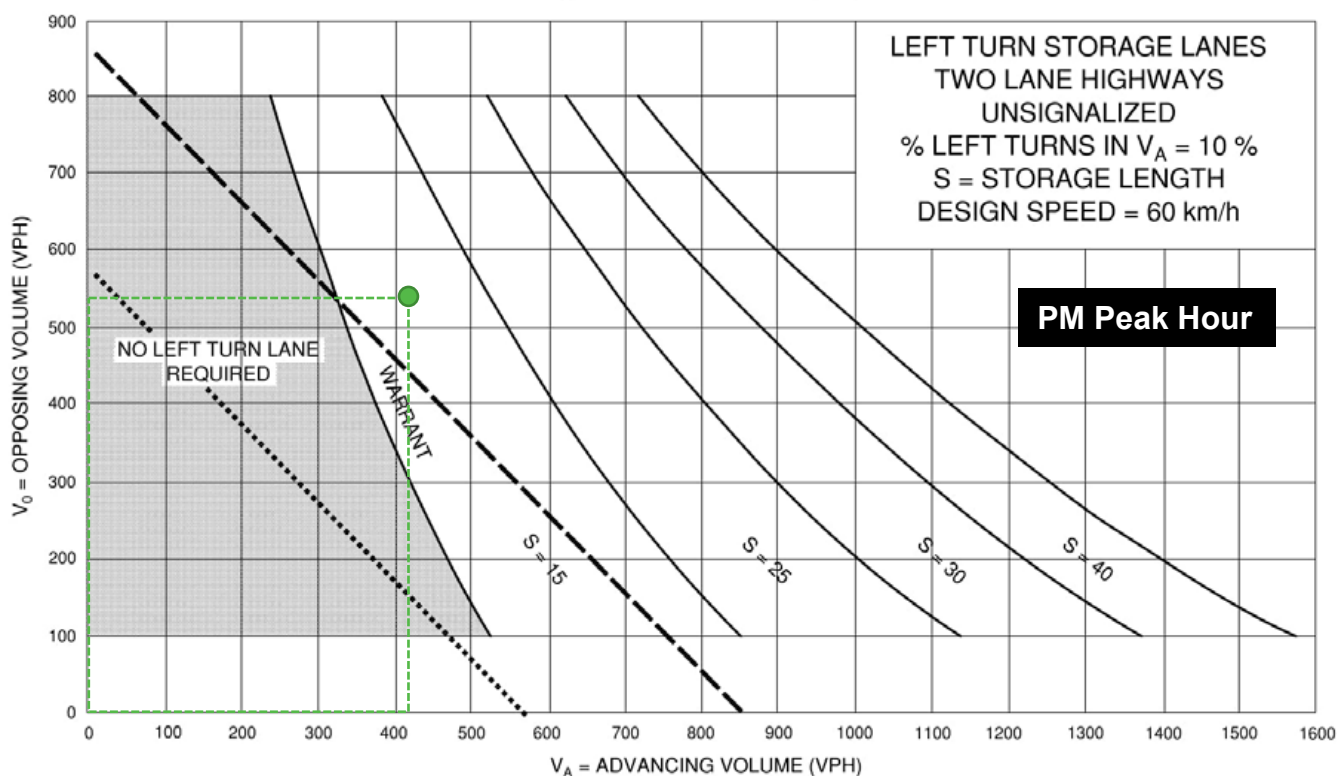
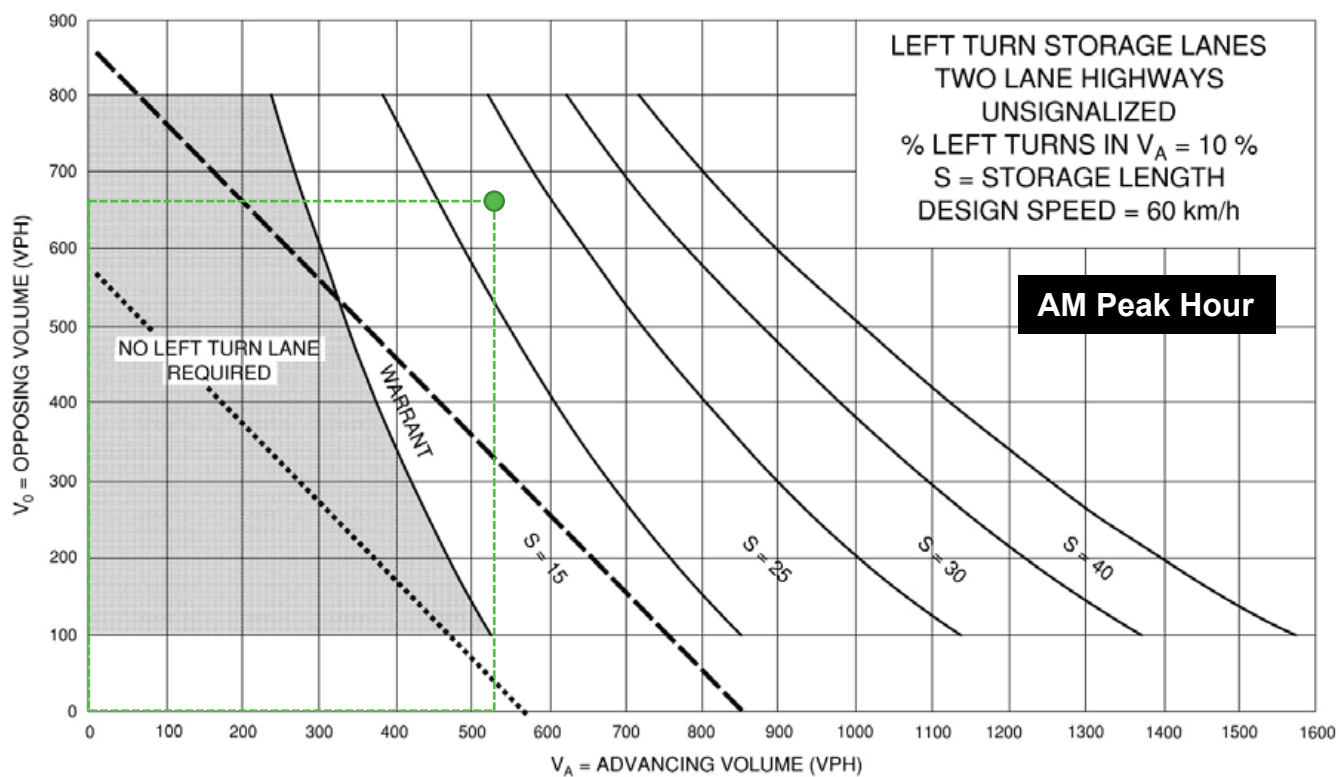
Intersection Capacity Utilization 29.4% ICU Level of Service A

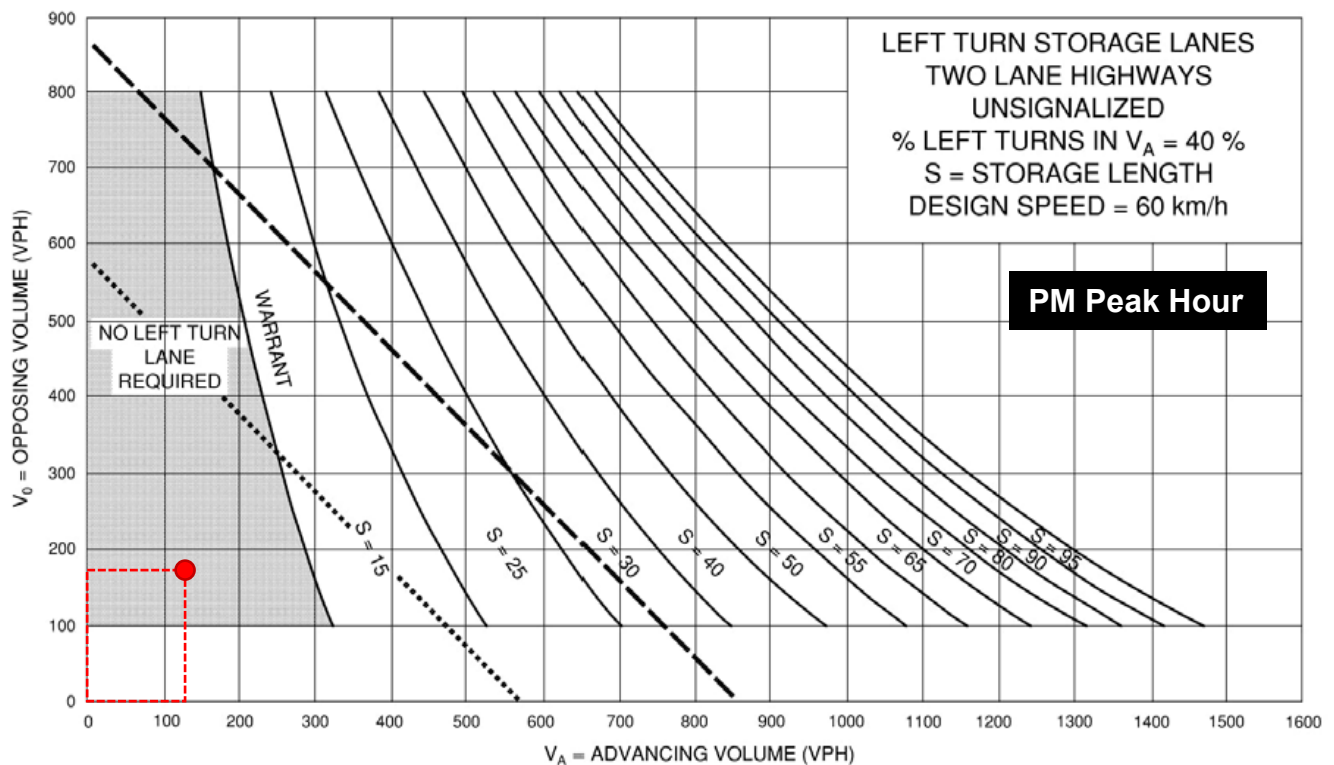
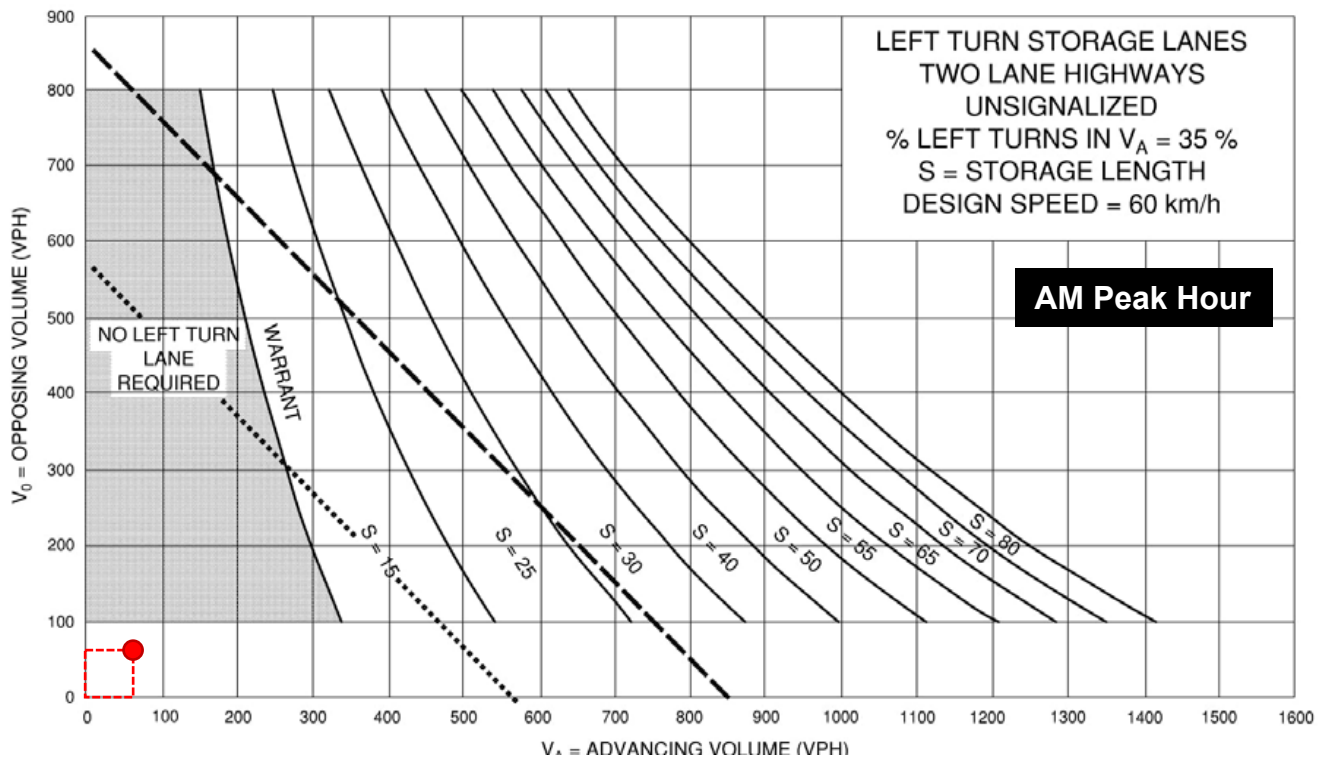
Analysis Period (min) 15

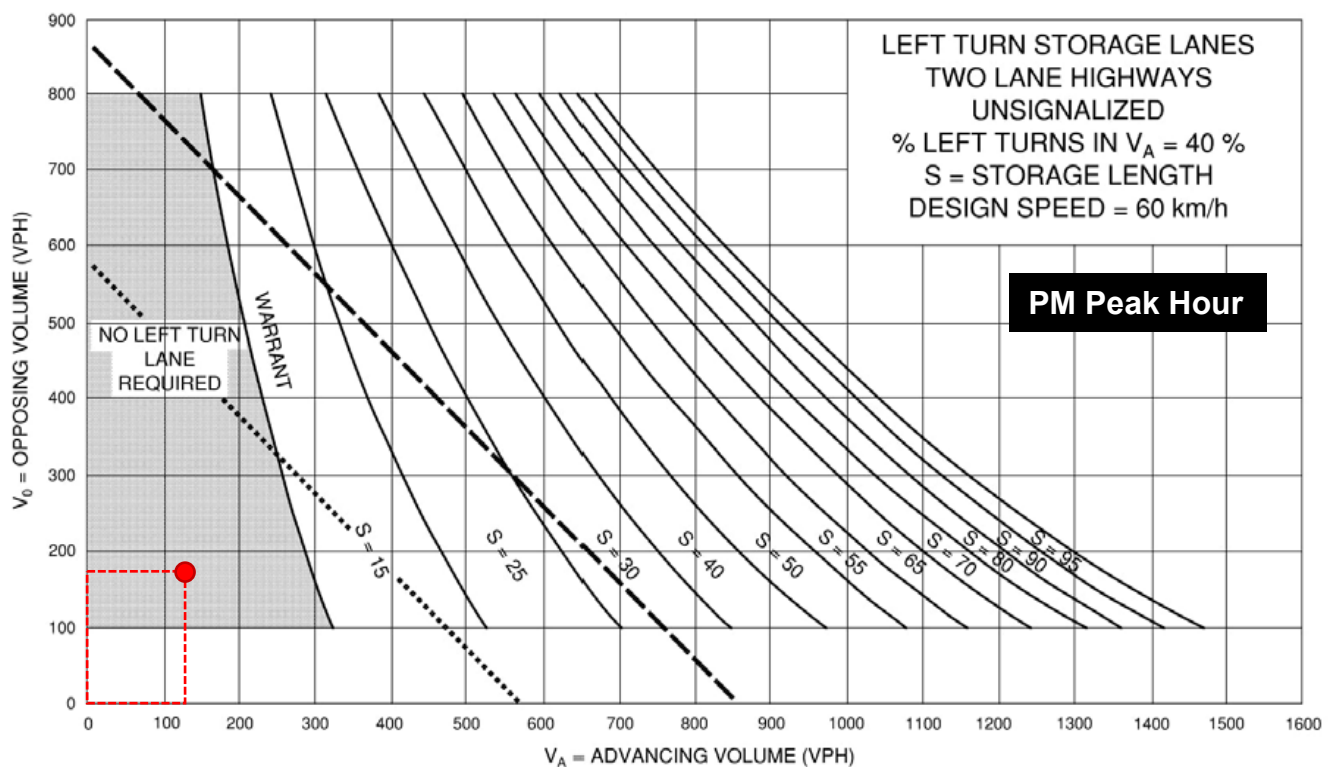
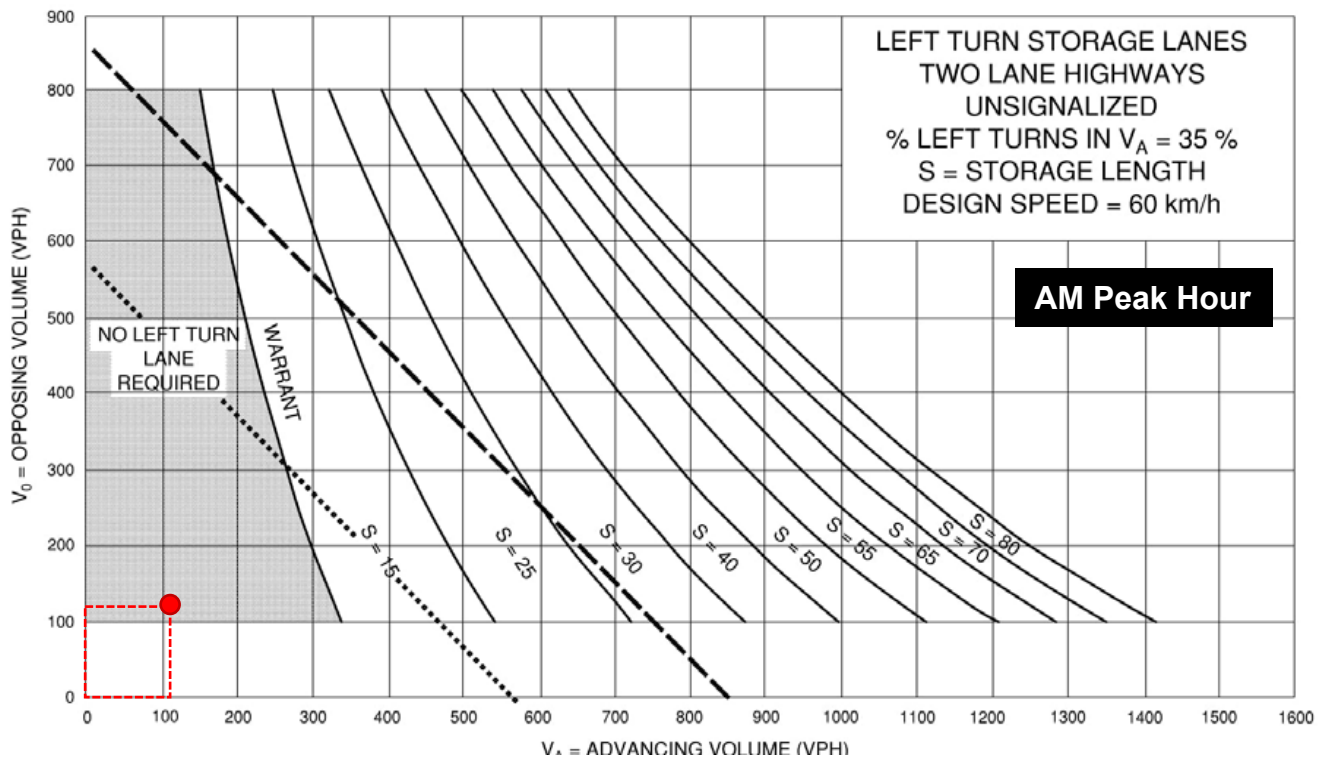
Appendix G

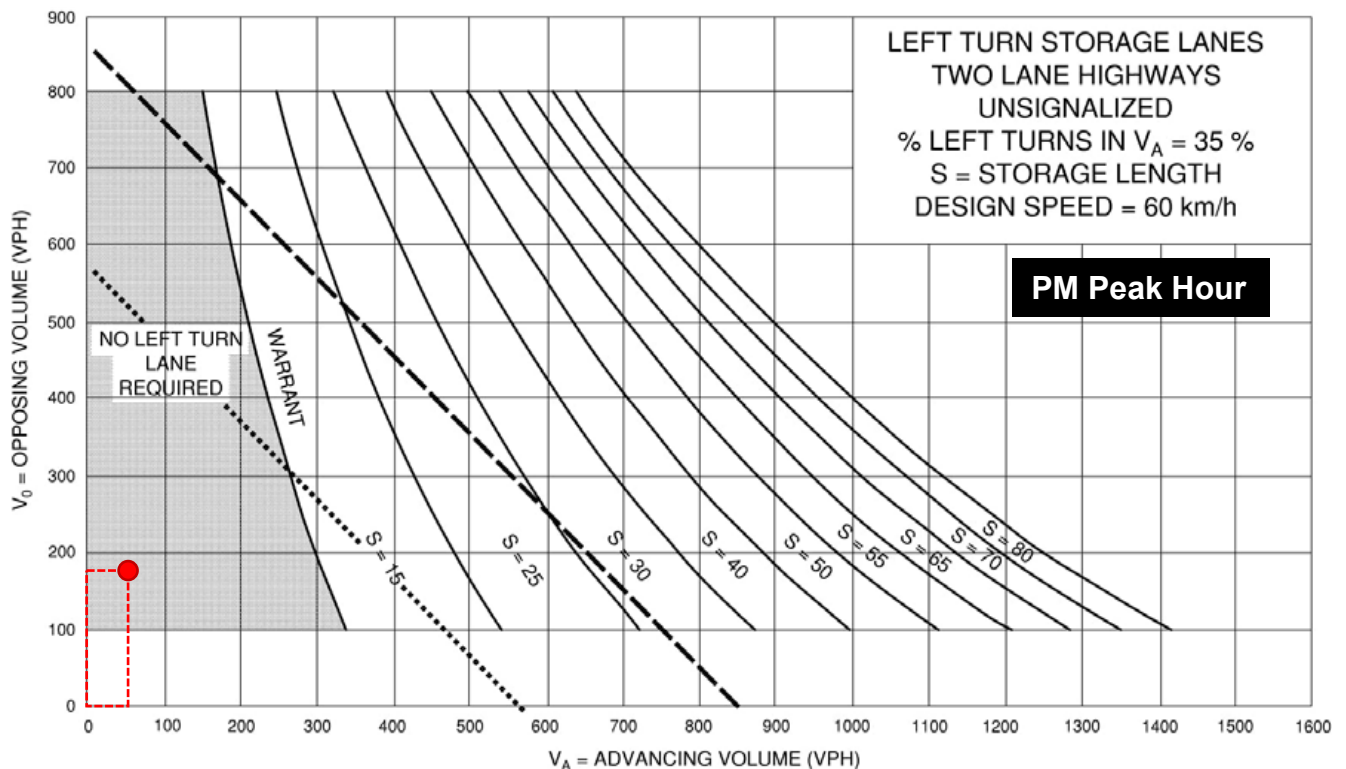
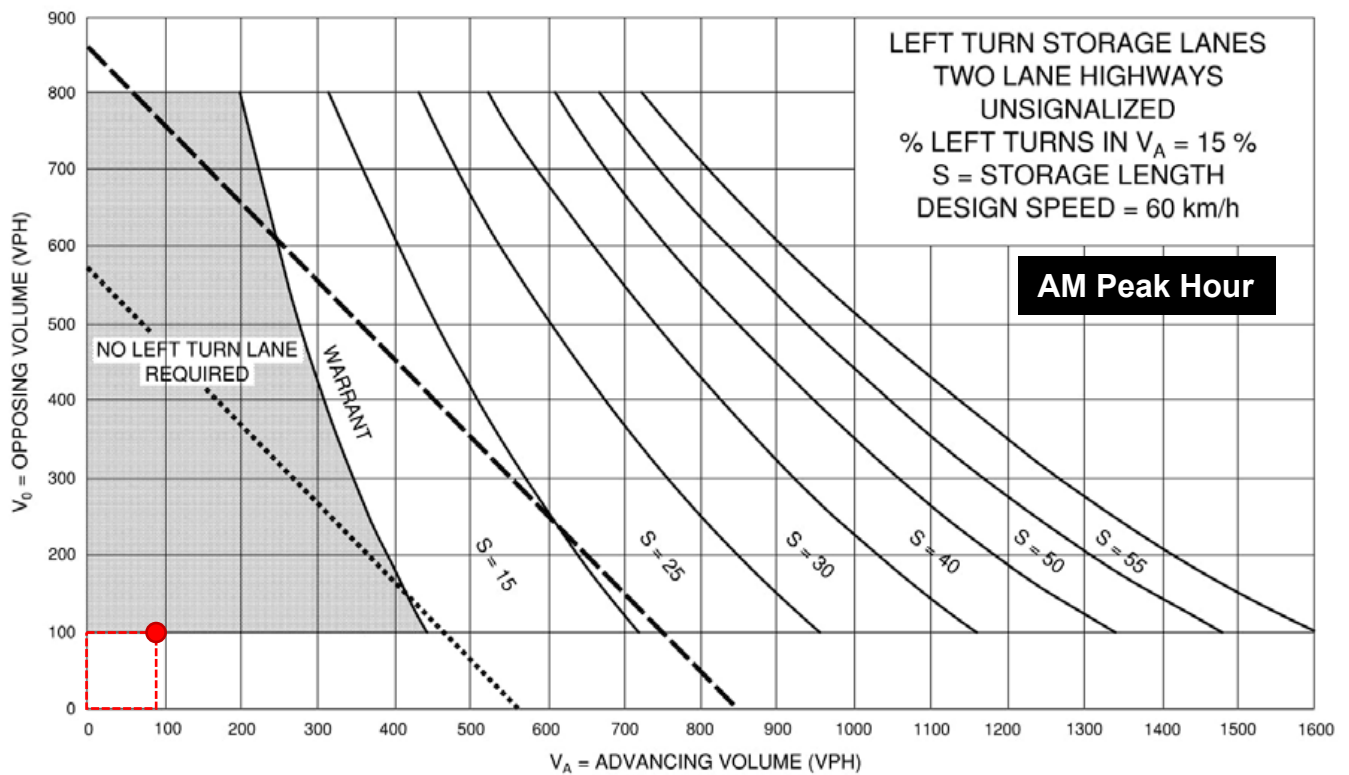
Left-Turn Lane Warrant Nomographs

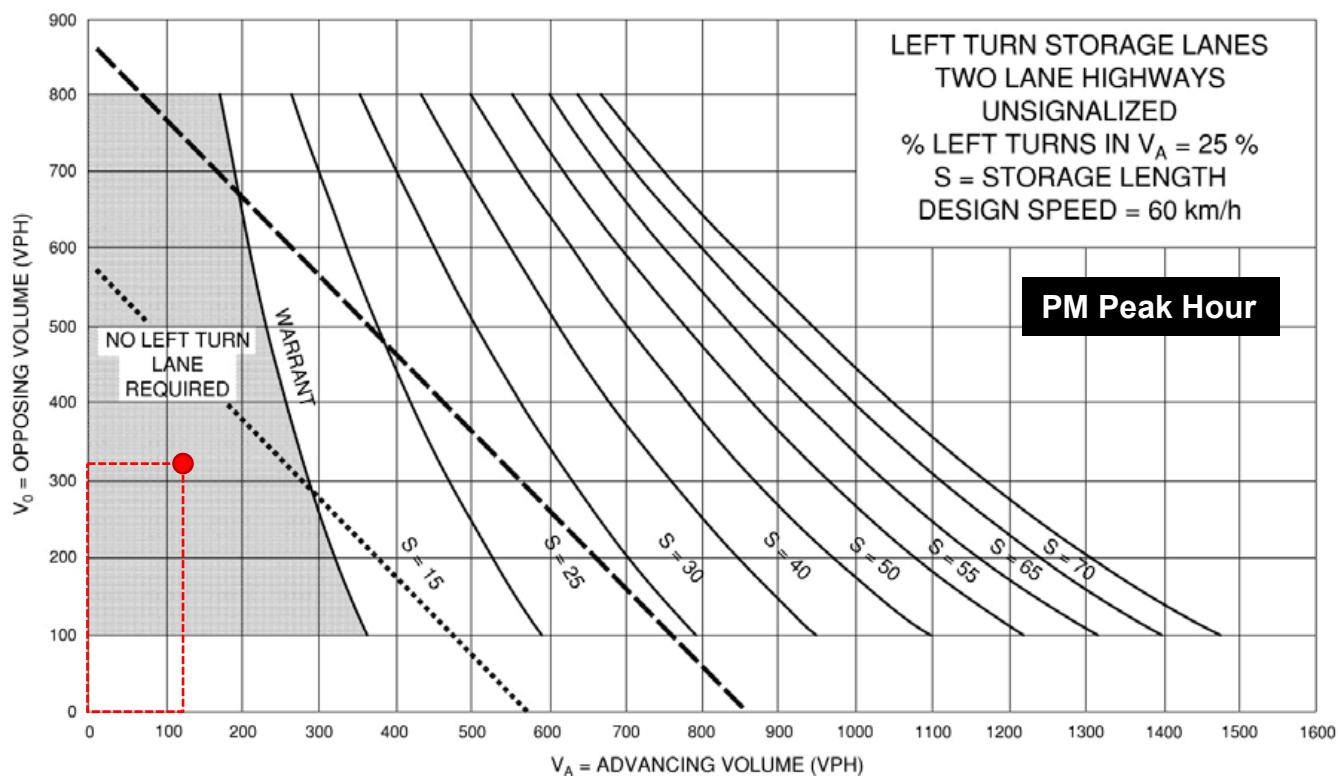
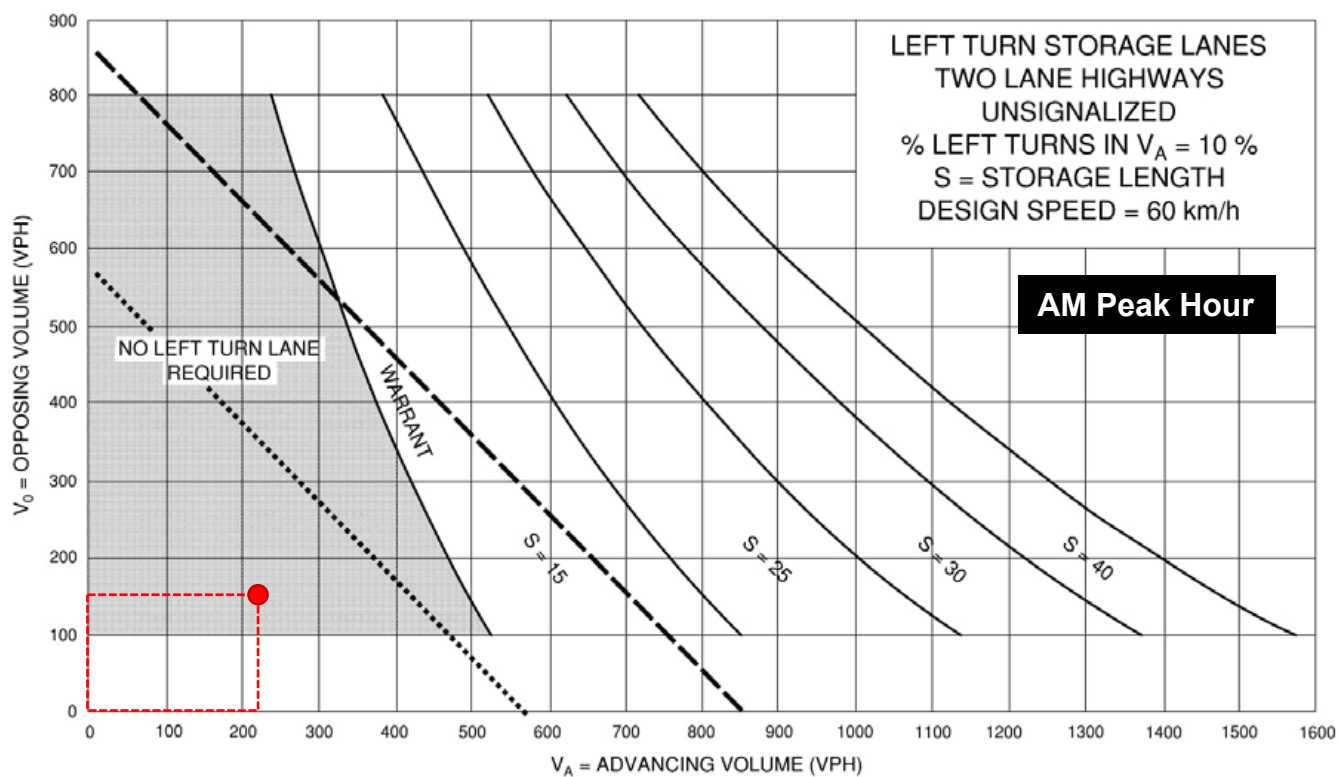












Appendix H

Traffic Signal Warrants



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



Horizon Year: Total (2028)
Region/City/Township: Baden, Region of Waterloo

Major Street: Snyder's Road West
Minor Street: Christain Street

North/South?: N

Number of Approach Lanes: 1
Tee Intersection?: N
Flow Conditions: Free

PM Forecast Only? N

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

Time Period	Major Street						Minor Street						Peds Crossing Main Road
	Snyder's Road West						Christain Street						
	Eastbound			Westbound			Northbound			Southbound			
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
AM Peak Hour	53	474	0	1	608	44	5	0	1	91	0	95	10
PM Peak Hour	47	358	3	3	445	77	5	0	3	36	0	48	10
Average Hourly Volume	25	208	1	1	263	30	3	0	1	32	0	36	5

Warrant	AHV
1A - All	599
1B - Minor	71
2A - Major	528
2B - Cross	39

Warrant 1 - Minimum Vehicular Volume

1A	Approach Lanes	1		2 or more		Average Hourly Volume
	Flow Conditions	Free	Restricted	Free	Restricted	
		X				
	All Approaches	480	720	600	900	
% Fulfilled						124.8%

1B	Approach Lanes	1		2 or more		Average Hourly Volume
	Flow Conditions	Free	Restricted	Free	Restricted	
		X				
	Minor Street Approaches	120	170	120	170	
% Fulfilled						59.2%

Warrant 2 - Delay To Cross Traffic

2A	Approach Lanes	1		2 or more		Average Hourly Volume
	Flow Conditions	Free	Restricted	Free	Restricted	
		X				
	Major Street Approaches	480	720	600	900	
% Fulfilled						110.1%

2B	Approach Lanes	1		2 or more		Average Hourly Volume
	Flow Conditions	Free	Restricted	Free	Restricted	
		X				
	Traffic Crossing Major Street	50	75	50	75	
% Fulfilled						78.5%

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



Horizon Year: Total (2028)
Region/City/Township: Baden, Region of Waterloo

Major Street: Snyder's Road West
Minor Street: Livingston Blvd (West)

North/South?: N

Number of Approach Lanes: 1
Tee Intersection?: Y
Flow Conditions: Free

PM Forecast Only? N

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

Time Period	Major Street Snyder's Road West						Minor Street Livingston Blvd (West)						Peds Crossing Main Road
	Eastbound			Westbound			Northbound			Southbound			
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
AM Peak Hour	98	458			430	39				103		219	0
PM Peak Hour	140	279			392	103				42		103	0
Average Hourly Volume	60	184	0	0	206	36	0	0	0	36	0	81	0

Warrant	AHV
1A - All	602
1B - Minor	117
2A - Major	485
2B - Cross	36

Warrant 1 - Minimum Vehicular Volume

1A	Approach Lanes	1		2 or more		Average Hourly Volume
	Flow Conditions	Free	Restricted	Free	Restricted	
		X				
1B	All Approaches	480	720	600	900	602
		% Fulfilled				125.3%
	Approach Lanes	1		2 or more		Average Hourly Volume
	Flow Conditions	Free	Restricted	Free	Restricted	
		X				
	Minor Street Approaches	180	255	180	255	117
		% Fulfilled				64.9%

Warrant 2 - Delay To Cross Traffic

2A	Approach Lanes	1		2 or more		Average Hourly Volume
	Flow Conditions	Free	Restricted	Free	Restricted	
		X				
	Major Street Approaches	480	720	600	900	485
		% Fulfilled				101.0%
2B	Approach Lanes	1		2 or more		Average Hourly Volume
	Flow Conditions	Free	Restricted	Free	Restricted	
		X				
	Traffic Crossing Major Street	50	75	50	75	36
		% Fulfilled				72.5%