River Mill Development Corporation
Mixed Use Development
Transportation Impact Study

Paradigm Transportation Solutions Limited
July 2020
190659

ptsl.com

Project Summary

Project Number
190659

July 2020

Client
River Mill Development Corporation
c/o Starward Homes
790 Shaver Road
Ancaster, On L9g 3k9
Ph: 519-123-4567

Client Contact
James Warren

Consultant Project Team
Jim Mallett, P.Eng., PTOE
Matthew Brouwer, P.Eng.
Adam Morrison, EIT

River Mill Development Corporation Mixed Use Development
Transportation Impact Study

Matthew Brouwer, P.Eng.

Disclaimer

This document has been prepared for the titled project or named part thereof (the "project") and except for approval and commenting municipalities and agencies in their review and approval of this project, should not be relied upon or used for any other project without an independent check being carried out as to its suitability and prior written authorization of Paradigm Transportation Solutions Limited being obtained. Paradigm Transportation Solutions Limited accepts no responsibility or liability for the consequence of this document being used for a purpose other than the project for which it was commissioned. Any person using or relying on the document for such other purpose agrees and will by such use or reliance be taken to confirm their agreement to indemnify Paradigm Transportation Solutions Limited for all loss or damage resulting there from. Paradigm Transportation Solutions Limited accepts no responsibility or liability for this document to any party other than the person by whom it was commissioned and the approval and commenting municipalities and agencies for the project.

To the extent that this report is based on information supplied by other parties, Paradigm Transportation Solutions Limited accepts no liability for any loss or damage suffered by the client, whether through contract or tort, stemming from any conclusions based on data supplied by parties other than Paradigm Transportation Solutions Limited and used by Paradigm Transportation Solutions Limited in preparing this report.

Paradigm Transportation Solutions Limited
5A-150 Pinebush Road
Cambridge ON N1R 8J8
p: 519.896.3163
www.ptsl.com

Executive Summary

Content

River Mill Development Corporation retained Paradigm Transportation Solutions Limited (Paradigm) to conduct this Transportation Impact Study (TIS) for a proposed mixed-use development located south of Maple Grove Road and east of Speedsville Road in Cambridge, Ontario. This report will serve as an analysis of Phases 3 to 6, building on the previous reports completed for this development.

This report analyzes existing traffic conditions, describes the proposed development, forecasts traffic to the full buildout of the development (2025), five years from the full buildout (2030), and recommends improvements to mitigate future traffic conditions.

Development Concept

As this is an ongoing development, Phases 1 and 2 of the development have been approved and are nearly completely occupied, except for the school. The remaining phases of the development, Phases 3 to 6, have the following proposed concept plan:

- **Phase 3:** 10.3 ha of developable mixed-use land, comprised of mid-rise multifamily housing units, general office building land and shopping centre land;
- **Phase 4:** 21 ha of developable medium density residential land, comprised of single-family detached units, low-rise multifamily housing units, and mid-rise multifamily housing units;
- **Phase 5:** 7.5 ha of developable residential land, comprised of single-family detached units; and
- **Phase 6:** 7.3 ha of developable employment land, comprised of general light industrial.

This development proposes approximately 314,300 ft^2 of industrial gross floor area (GFA), 2633 residential units, 36,200 ft^2 of office GFA and 56,500 ft^2 of commercial GFA. Access to the development is provided by three all-moves roads and one right-in right-out (RIRO) access to Speedsville Road, north of Equestrian into Block 22, and to Maple Grove Road via connections to the adjacent Phases 1 and 2.

Conclusions

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

- **Existing Traffic Operations:** Currently, all intersections within the study area operate at acceptable levels of service during the AM and PM peak hours, except for the eastbound movements at **Speedsville**

Road at Royal Oak Road which operate at a LOS F with a v/c greater than 1.0 during both peak hours;

- The development is forecast to generate 1156 and 1421 new trips during the AM and PM peak hours, respectively at full build out (2025);
- **Background Traffic Operations:** All intersections within the study area are forecast to operate within acceptable levels of service under the 2030 horizon, with no problem movements except for the eastbound movements at **Speedsville Road at Royal Oak Road** which operate at a LOS F with a v/c greater than 1.0 during the PM peak hour;
- **Total Traffic Operations:** All intersections within the study area are forecast to operate within acceptable levels of service under the 2030 horizon, similarly to the background conditions, with the following problem movements:
  - **Speedsville Road and Heroux Devtek Drive:** the eastbound shared movement is forecast to operate at LOS F during both peak hours and with a v/c greater than 1.0 during the PM peak hour. The westbound shared movement is forecast to operate at a LOS F with a v/c greater than 1.0 during both peak hours;
  - **Speedsville Road and Equestrian Way:** the westbound shared movement is forecast to operate at a LOS F with a v/c greater than 1.0 during both peak hours;
  - **Royal Oak Road and Speedsville Road:** similar to the background conditions, the eastbound shared movement is forecast to operate at a LOS F with a v/c greater than 1.0 during both peak hours; and
  - **Speedsville Road and Street B:** the westbound shared movement is forecast to operate at a LOS F with a v/c greater than 1.0 during both peak hours.
- **All Turns Access Scenario:** A potential all-turns access to Block 21 was analysed and showed poor levels-of-service. A signal was not found to be warranted at this potential access.
- **Auxiliary Left-Turn Lanes:** The following auxiliary turn lanes are warranted under the 2030 total traffic horizon:
  - **Speedsville Road and Royal Oak Road:** a northbound left-turn lane is warranted during both peak hours under existing volumes.
- **Traffic Signal Warrants:** The following intersections were analysed using the OTM Book 12 justification 7 traffic signal warrants:
  - **Speedsville Road and Heroux Devtek Drive:** A traffic signal is forecast to be warranted under the 2025 total traffic horizon
  - **Speedsville Road and Equestrian Way:** A traffic signal is forecast to be warranted under the 2025 total traffic horizon;

- **Royal Oak Road and Speedsville Road:** A traffic signal is not forecast to be warranted under the 2030 total traffic horizon; and
- **Speedsville Road and Street B:** A traffic signal is forecast to be warranted under the 2025 total traffic horizon.

- Using the ROW Screening Tool for roundabouts, roundabout were determined to be a feasible method of traffic control and that Intersection Control Studies should be conducted at the intersections where a signal is warranted.

Recommendation

Based on the findings of this study, it is recommended that the development be approved with the following:

- Based on the findings of this study, it is recommended that either traffic control signals or roundabouts be installed, due to the site generated traffic, at the intersections of:
  - Speedsville Road and Heroux Devtek Drive;
  - Speedsville Road and Equestrian Way; and
  - Speedsville Road and Street B.
- **Intersection Control Study** is to be conducted for each of the two intersections noted above to determine if roundabouts would be a more appropriate method of improvement; and
- The following intersection improvements be constructed, unless a roundabout is the preferred method of traffic control as a result of the intersection control study:
  - **Speedsville Road and Heroux Devtek Drive:** Upgrade the two-way stop control to a traffic control signal, and add eastbound, westbound, northbound, and southbound left-turn lanes;
  - **Speedsville Road and Equestrian Way:** Upgrade the two-way stop control to a traffic control signal, and add westbound and southbound left-turn lanes;
  - **Speedsville Road and Royal Oak Road:** Add an eastbound left-turn lane and an auxiliary northbound left-turn lane with a storage length of 80 metres; and
  - **Speedsville Road and Street B:** Upgrade the two-way stop control to a traffic control signal and add westbound and southbound left-turn lanes.

Contents

Appendices

Figures

Tables

1 Introduction

1.1 Overview

River Mill Development Corporation retained Paradigm Transportation Solutions Limited (Paradigm) to conduct this Transportation Impact Study (TIS) for a proposed mixed-use development located south of Maple Grove Road and east of Speedsville Road in Cambridge, Ontario.

Figure 1.1 details the location of the subject development.

This report will serve as an analysis of Phases 3 to 6, building on the previous reports completed for this development. The scope of the study includes:

- Assessment of the current traffic and site conditions within the study area;
- Estimates of background traffic to the full buildout of the development (2025) and five years from the full buildout (2030);
- Estimates of additional traffic generated by the subject site;
- Analyses of the impact of the future traffic on the surrounding road network; and
- Recommendations necessary to mitigate the site generated traffic in a satisfactory manner.

This study has been prepared in accordance with the requirements detailed by the Region of Waterloo (ROW) Transportation Impact Study Guidelines[1] and the study scope has been confirmed with ROW staff.

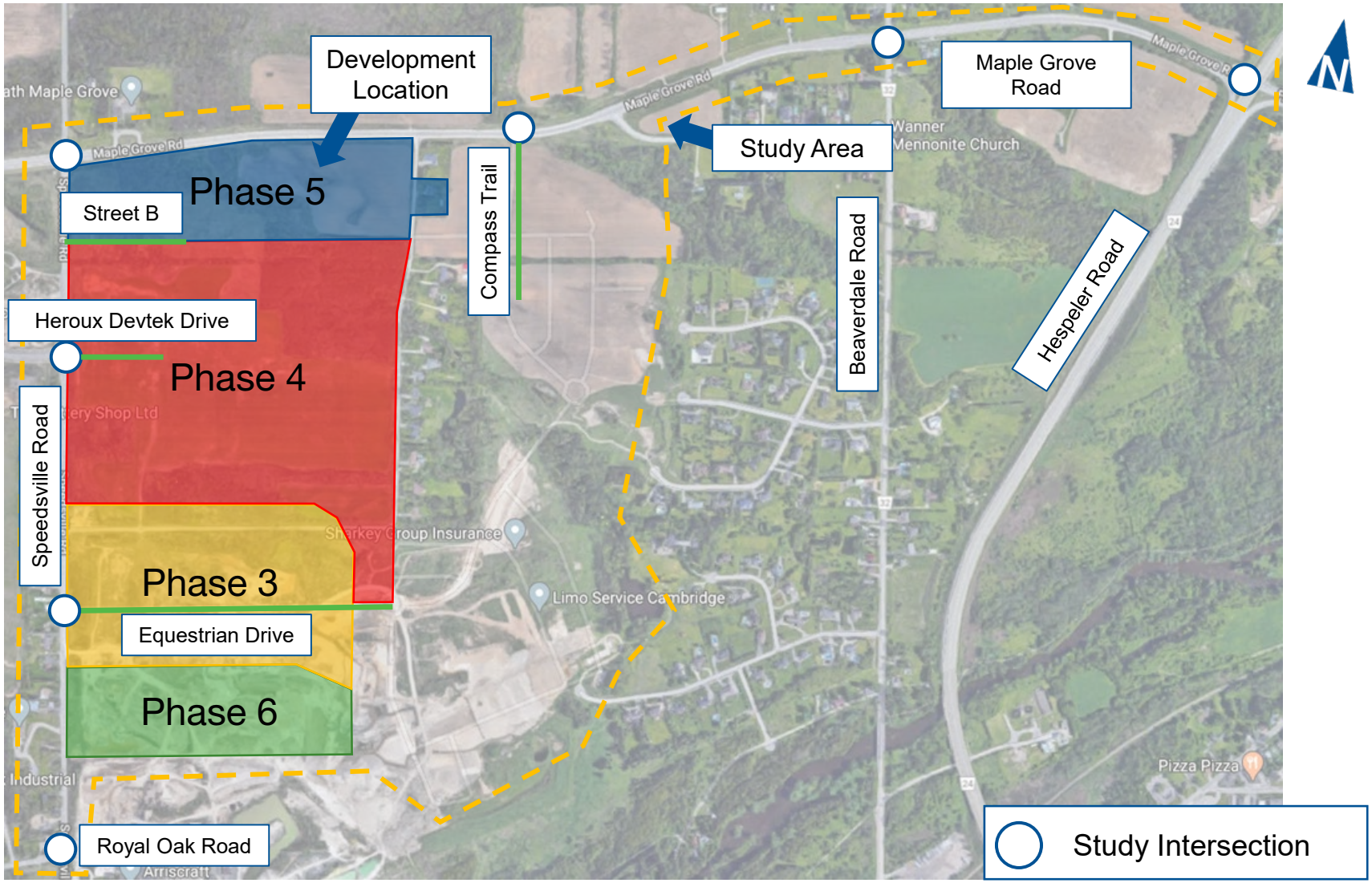
The study will focus on the following intersections:

- Maple Grove Road and Speedsville Road;
- Maple Grove Road and Compass Trail;
- Maple Grove Road and Beaverdale Road;
- Maple Grove Road / Fisher Mills Road and Hespeler Road;
- Speedsville Road and Heroux Devtek Drive;
- Speedsville Road and Equestrian Way;
- Speedsville Road and Royal Oak Road; and
- Speedsville Road and Street B.

[1] Transportation Impact Study Guidelines, *Region of Waterloo*, 2014.

As per the request of ROW staff, there will be no analysis of the intersections on Maple Grove Road as there is an ongoing environmental assessment (EA).

Appendix A contains the pre-study conference form from the pre-study conference held with the Region of Waterloo and City of Cambridge staff.



paradigm TRANSPORTATION SOLUTIONS LIMITED

Development Site Plan

River Mill Development
190659

Figure 1.1

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 Road Network

The study-area roadways include:

- **Maple Grove Road** a regional road which travels east-west, has a 2-lane cross-section within the study area and a posted speed limit of 70 km/hr;
- **Speedsville Road** an arterial road which travels north-south, has a 2-lane cross-section within the study area and a posted speed limit of 50 km/hr;
- **Compass Trail** a collector road which travels north-south, has a 2-lane cross-section within the study area and a posted speed limit of 50 km/hr;
- **Beaverdale Road** a collector road which travels north-south, has a 2-lane cross-section within the study area and a posted speed limit of 50 km/hr;
- **Hespeler Road** a regional road which travels north-south, has a 4-lane cross-section within the study area and a posted speed limit of 80 km/hr;
- **Fisher Mills Road** an arterial road which east-west, has a 2-lane cross-section within the study area and a posted speed limit of 50 km/hr;
- **Heroux Devtek Drive** a local road which travels east-west, has a 2-lane cross-section within the study area and an assumed speed limit of 50 km/hr;
- **Equestrian Way** a local road which travels east-west, has a 2-lane cross-section within the study area and an assumed speed limit of 50 km/hr; and
- **Royal Oak Road** travels north-south, has a 2-lane cross-section within the study area and a posted speed limit of 50 km/hr.

The study area is primarily bordered by residential and industrial areas.

The following intersections within the study area are signalized:

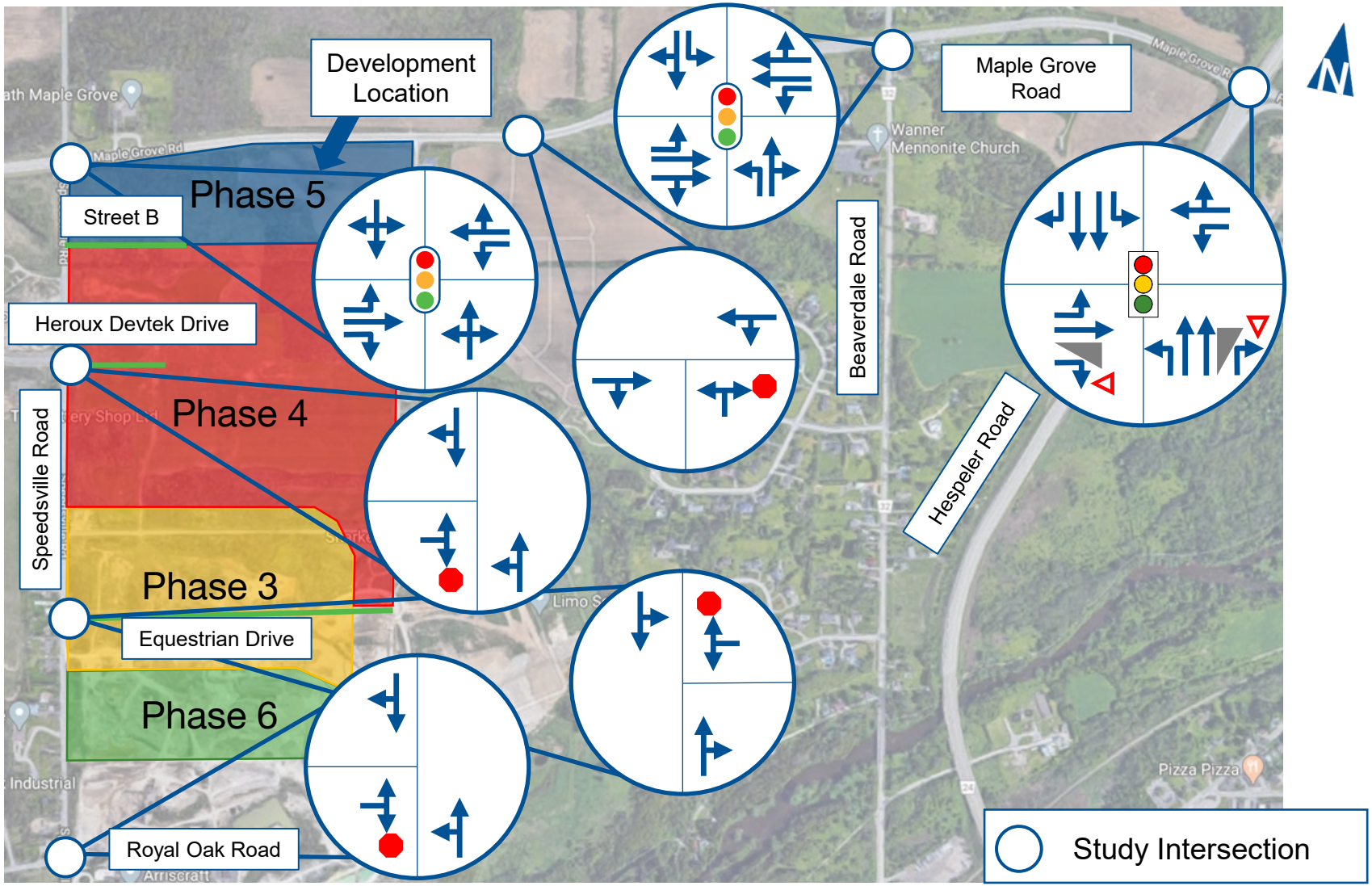
- Maple Grove Road and Speedsville Road;
- Maple Grove Road and Beaverdale Road; and

- Maple Grove Road / Fisher Mills Road and Hespeler Road.

The following intersections within the study area are unsignalized:

- Maple Grove Road and Compass Trail;
- Speedsville Road and Heroux Devtek Drive;
- Speedsville Road and Equestrian Way;
- Speedsville Road and Royal Oak Road; and
- Speedsville Road and Street B.

Figure 2.1 displays existing lane configurations and traffic controls of intersections within the study area.



paradigm TRANSPORTATION SOLUTIONS LIMITED

Existing Lane Configurations and Traffic Control

River Mill Development
190659

Figure 2.1

2.2 Transit Network

Grand River Transit currently operates one route in the study area with the nearest stop located on Maple Grove Road at Compass trail, the north end of the development, but it is only an eastbound stop. The nearest multidirectional stops are approximately one kilometer west of the development on Maple Grove Road at Boxwood Drive. **Route 203** services southern Kitchener and the north half of Cambridge along Highway 401, Maple Grove Road and Franklin Boulevard, with major stops at Conestoga College and Cambridge Centre Station. This route operates on 30-minute headways Monday-Saturday and 60-minute headways on Sunday / Holidays.

Figure 2.2 displays the map of the existing transit network around the subject site.

2.3 Cycling and Pedestrian Facilities

Most streets within the study area provide no sidewalks on either side of the street. However, Heroux Devtek Drive, Equestrian Way and Compass Trail provide sidewalks on both sides of the street. All other roads have no dedicated pedestrian facilities either side of the road.

There are cycling facilities within the study area in the form of paved shoulders on Maple Grove Road, Royal Oak Road Speedsville Road and Hespeler Road.

Figure 2.3 displays the map of the existing cycling network around the subject site.

2.4 Traffic Volumes

In January 2020, Paradigm collected study area peak hour intersection turning movement data using Miovision cameras.

Figure 2.4 and **Figure 2.5** illustrates the existing AM and PM peak hour traffic volumes, respectively. **Appendix B** contains the existing count data.

paradigm TRANSPORTATION SOLUTIONS LIMITED

Existing Transit Network

River Mill Development
190659

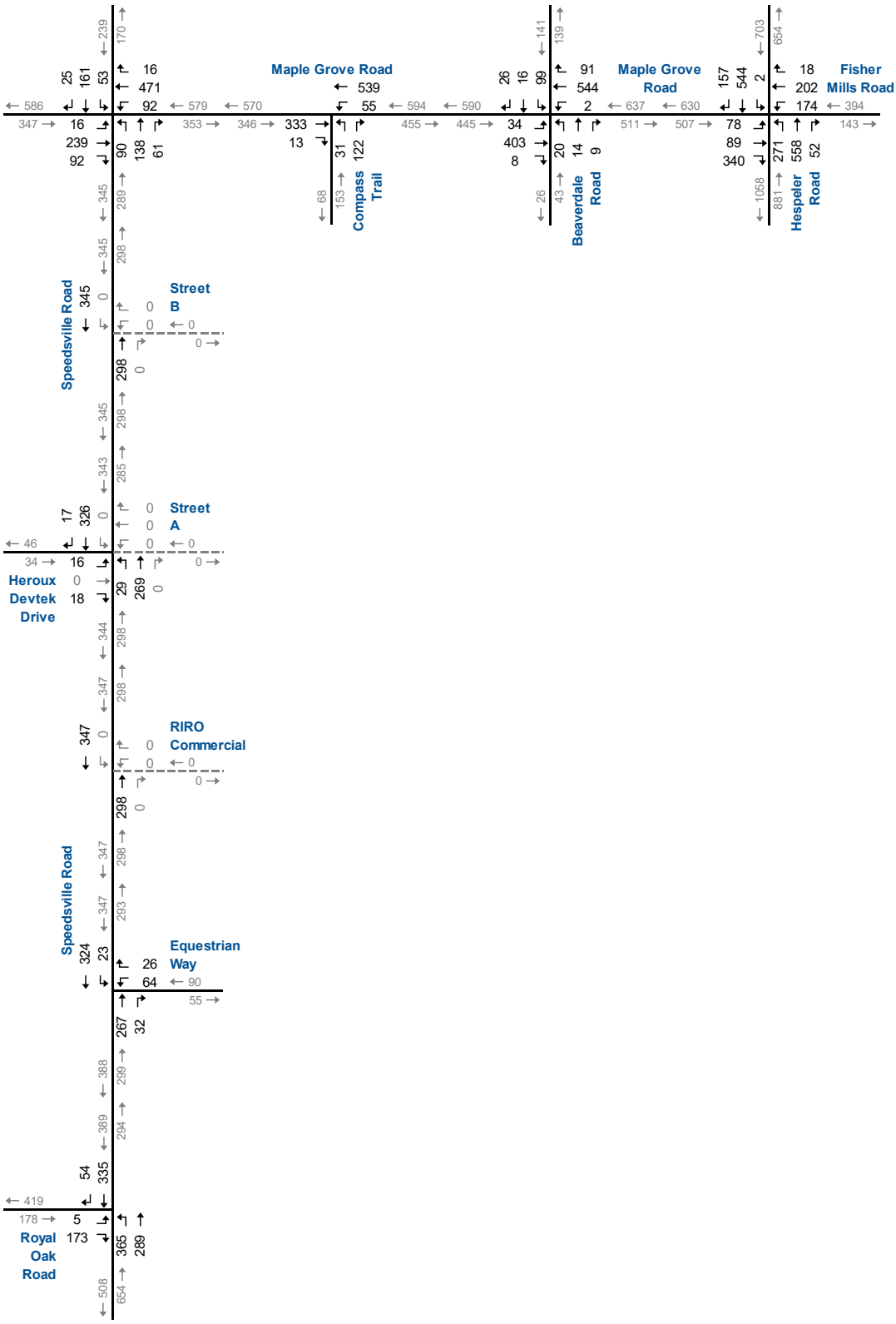
Figure 2.2

paradigm TRANSPORTATION SOLUTIONS LIMITED

Existing Trail Network

River Mill Development
190659

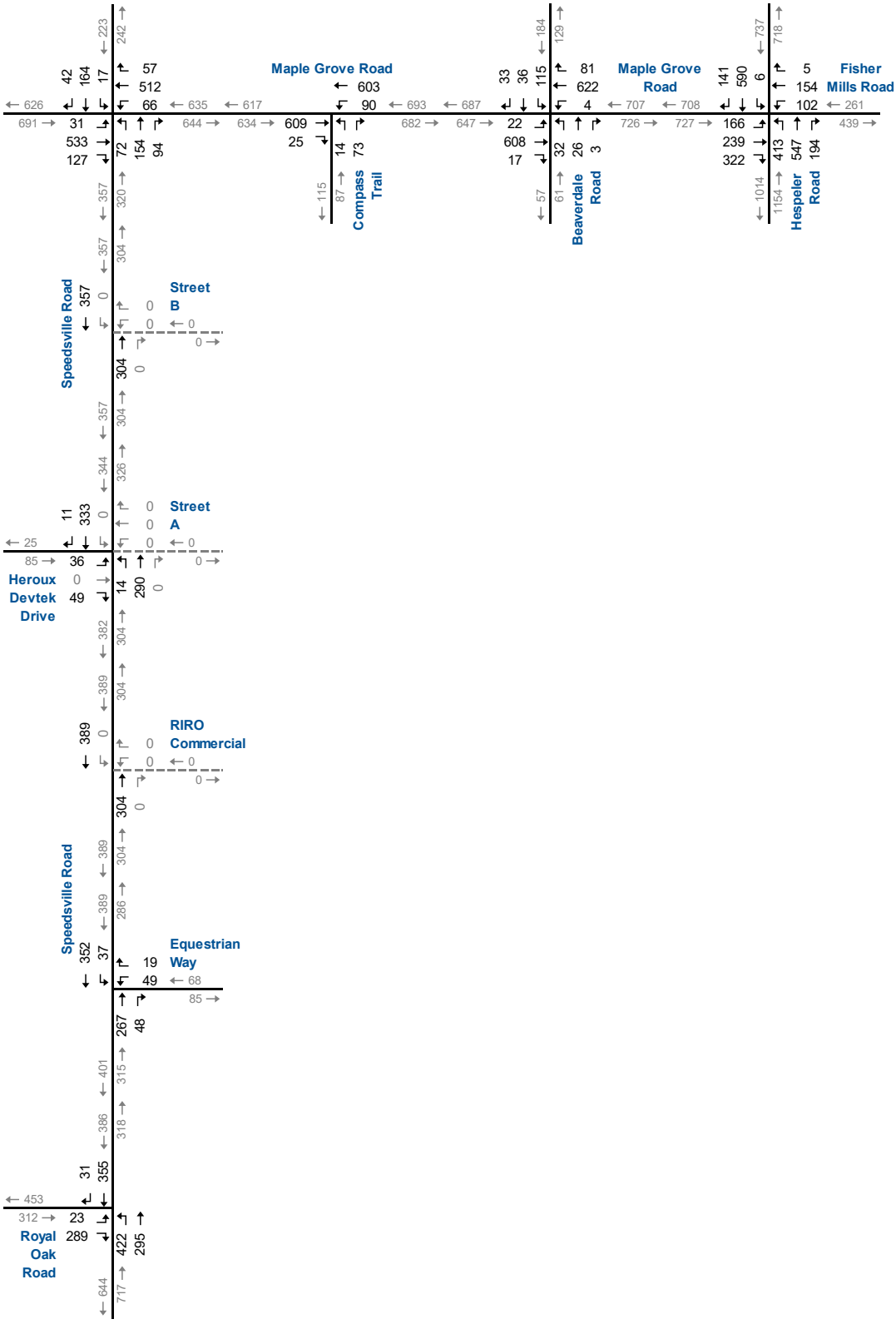
Figure 2.3



Existing Traffic Volumes – AM Peak Hour

River Mill Development
190659

Figure 2.4



Existing Traffic Volumes – PM Peak Hour

River Mill Development
190659

Figure 2.5

2.5 Traffic Operations

The operations of the intersections in the study area were evaluated using the existing lane configurations, traffic controls and the existing traffic peak hour volumes.

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

The level of service conditions on the existing road network have been assessed using Synchro 9. The criteria, as defined by the ROW[2], for identifying “critical” intersections are:

- overall LOS E or F (i.e. average control delay per vehicle greater than 55 seconds) for signalized intersections; and
- overall LOS E or F (i.e. average control delay per vehicle greater than 35 seconds) for unsignalized intersections.

As well, the criteria for identifying individual “critical” movements are:

- the average control delay for individual movements is greater that 55 seconds;
- estimated 95th percentile queue length for an exclusive movement exceeds the available storage space;
- estimated 95th percentile queue length for an individual movement will block an existing access;
- exclusive turning lanes are inaccessible because of queue lengths in adjacent through lanes; and
- poor quality of service for non-auto modes.

As per the request of ROW staff, there will be no LOS analysis of the intersections on Maple Grove Road as there is an ongoing EA.

Table 2.1 summarizes the level of service and other performance results. All study area intersections are currently operating with acceptable level of service and delays except for the eastbound movements at **Speedsville**

[2] Transportation Impact Study Guidelines, *Region of Waterloo*, July 2014

Road at Royal Oak Road which operate at a LOS F with a v/c greater than 1.0 during both peak hours.

Appendix C contains the detailed Synchro reports.

TABLE 2.1: BASE YEAR TRAFFIC OPERATIONS

Analysis Period	Intersection	Control Type	MOE	Direction / Movement / Approach																Overall
				Eastbound				Westbound				Northbound				Southbound				
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
AM Peak Hour	1: Speedsville Road & Heroux Devtek Drive	TWSC	LOS	B		>	**B**					<	A		**A**		A	>	**A**	
			Delay	13		>	**13**					<	1		**1**		0	>	**0**	
			V/C	0.07		>						<	0.03				0.00	>		
			Q	2		>						<	1				0	>		
	2: Speedsville Road & Equestrian Way	TWSC	LOS					B		>	**B**		A	>	**A**	<	A		**A**	
			Delay					14		>	**14**		0	>	**0**	<	1		**1**	
			V/C					0.19		>			0.00	>		<	0.02			
			Q					5		>			0	>		<	1			
	3: Royal Oak Road & Speedsville Road	TWSC	LOS	B		>	**B**					<	A		**A**		A	>	**A**	
			Delay	14		>	**14**					<	5		**5**		0	>	**0**	
			V/C	0.31		>						<	0.31				0.00	>		
			Q	10		>						<	10				0	>		
PM Peak Hour	1: Speedsville Road & Heroux Devtek Drive	TWSC	LOS	B		>	**B**					<	A		**A**		A	>	**A**	
			Delay	13		>	**13**					<	0		**0**		0	>	**0**	
			V/C	0.16		>						<	0.01				0.00	>		
			Q	4		>						<	0				0	>		
	2: Speedsville Road & Equestrian Way	TWSC	LOS					B		>	**B**		A	>	**A**	<	A		**A**	
			Delay					15		>	**15**		0	>	**0**	<	1		**1**	
			V/C					0.15		>			0.00	>		<	0.03			
			Q					4		>			0	>		<	1			
	3: Royal Oak Road & Speedsville Road	TWSC	LOS	D		>	**D**					<	A		**A**		A	>	**A**	
			Delay	33		>	**33**					<	6		**6**		0	>	**0**	
			V/C	0.73		>						<	0.36				0.00	>		
			Q	43		>						<	12				0	>		

MOE - Measure of Effectiveness
LOS - Level of Service
Delay - Average Delay per Vehicle in Seconds
Q - 95th Percentile Queue Length (m)
TCS - Traffic Control Signal
TWSC - Two-Way Stop Control
AWSC - All-Way Stop Control
RBT - Roundabout

3 Development Concept

3.1 Development Description

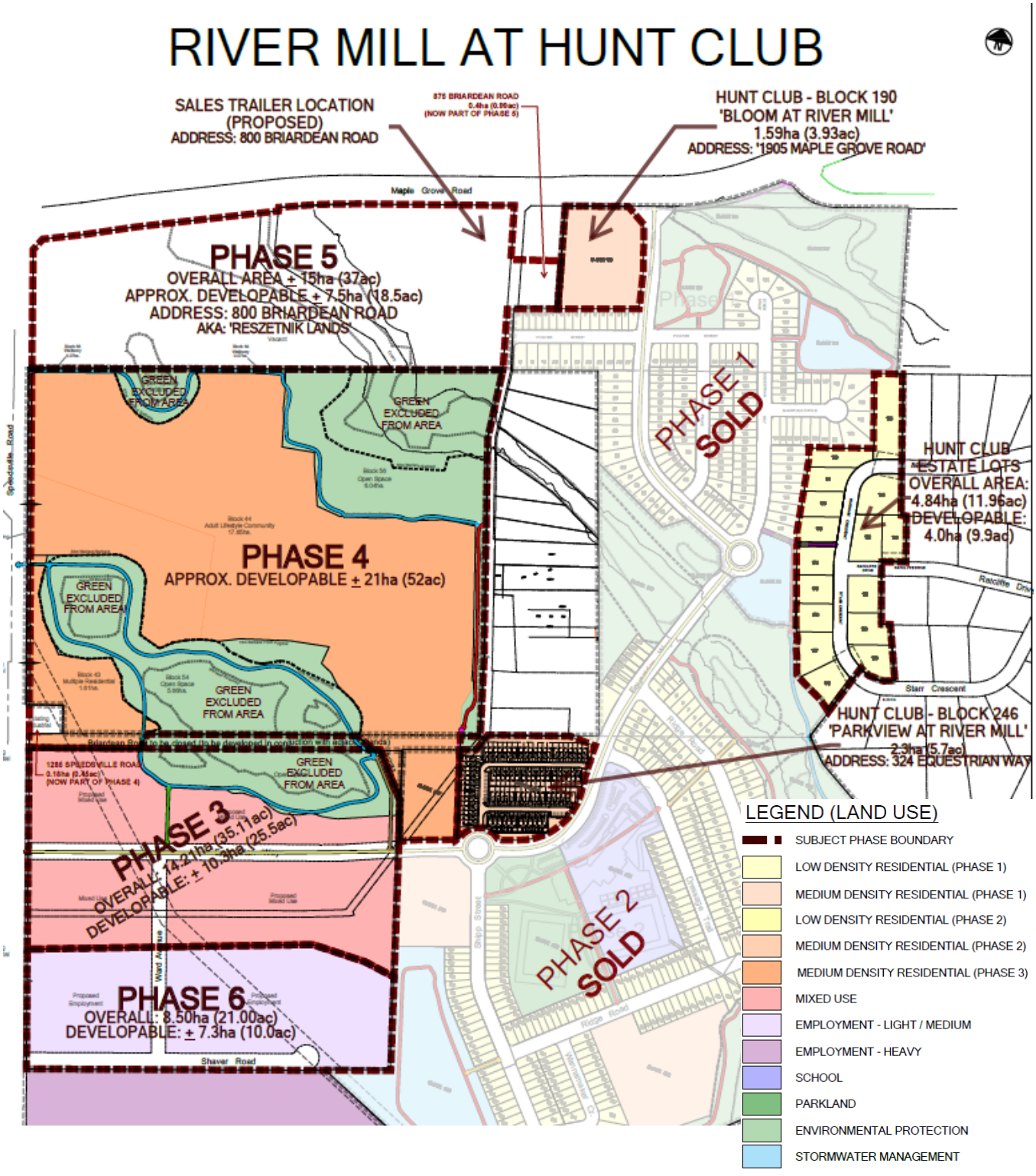
As this is an ongoing development, Phases 1 and 2 of the development have been approved and are nearly completely occupied, except for the school. The remaining phases of the development, Phases 3 to 6, have the following proposed concept plan:

- **Phase 3:** 10.3 ha of developable mixed-use land, comprised of mid-rise multifamily housing units, general office building land and shopping centre land;
- **Phase 4:** 21 ha of developable medium density residential land, comprised of single-family detached units, low-rise multifamily housing units, and mid-rise multifamily housing units;
- **Phase 5:** 7.5 ha of developable residential land, comprised of single-family detached units; and
- **Phase 6:** 7.3 ha of developable employment land, comprised of general light industrial.

This development proposes approximately 314,300 ft^2 of industrial gross floor area (GFA), 2633 residential units, 36,200 ft^2 of office GFA and 56,500 ft^2 of commercial GFA. Access to the development is provided by three all-moves roads and one right-in right-out (RIRO) access to Speedsville Road, north of Equestrian into Block 22, and to Maple Grove Road via connections to the adjacent Phases 1 and 2.

Figure 3.1 illustrates the proposed concept block plan.

Figure 3.2 details the residential layout for the proposed concept block plan.

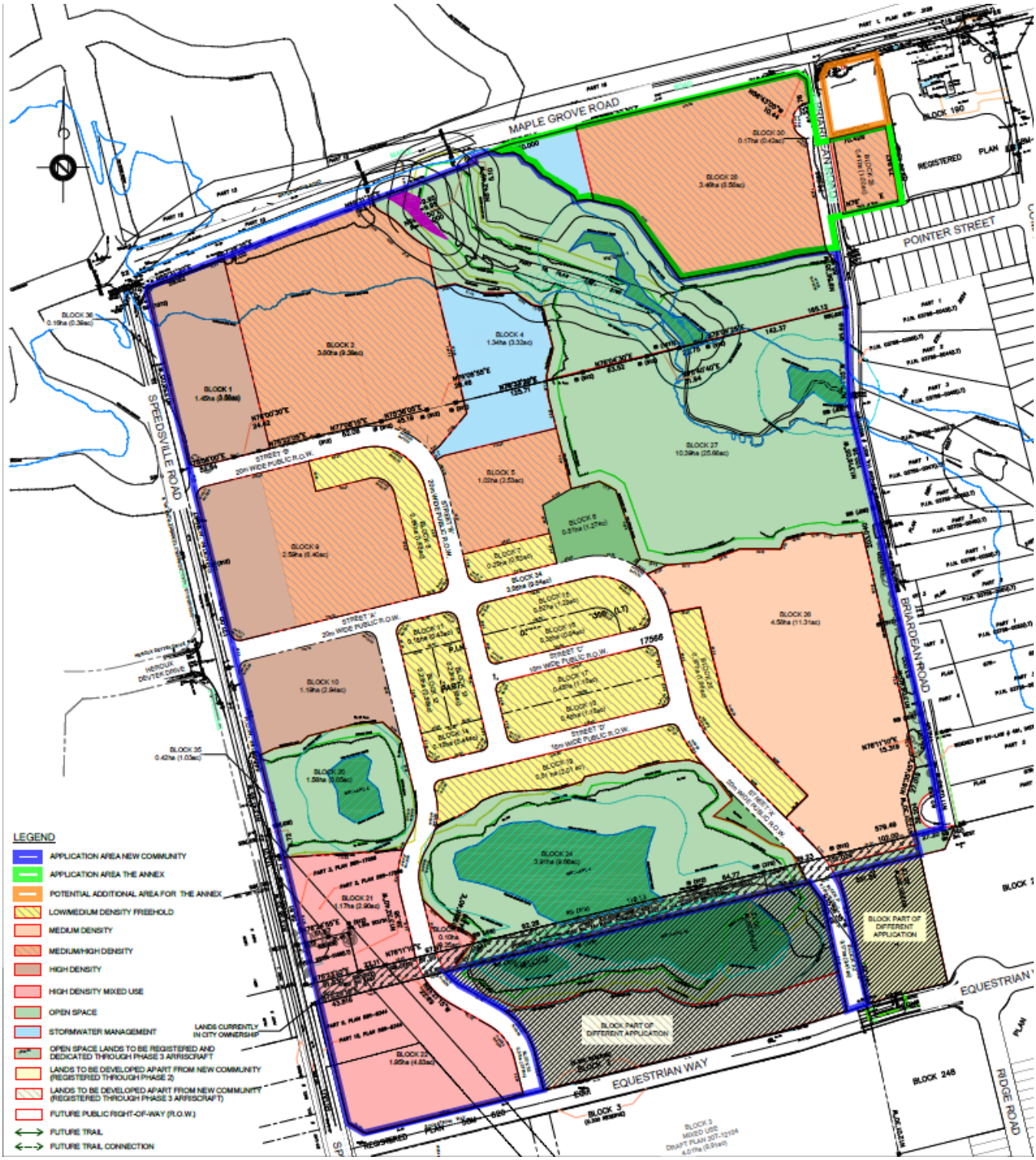


paradigm TRANSPORTATION SOLUTIONS LIMITED

Development Concept Block Plan

River Mill
Development
190659

Figure 3.1



Development Concept Block Plan – Residential Layout

River Mill Development
190659

Figure 3.2

3.2 Development Traffic Estimates

The Institute of Transportation Engineers (ITE) Trip Generation[3] rates corresponding to Land Use Code (LUC) 110 (General Light Industrial), 210 (Single-Family Detached Housing), 220 (Multifamily Housing (Low-Rise)), 221 (Multifamily Housing (Mid-Rise)), 710 (General Office Building) and 820 (Shopping Center) were used to estimate the trip generation for the development.

Table 3.1 summarizes the site's estimated trip generation with the future expansion including internal capture, and passby trips. The subject site is estimated to generate 1156 AM peak hour vehicle trips and 1421 PM peak hour vehicle trips.

TABLE 3.1: ESTIMATED TRIP GENERATION

Land Use Code	Units	AM Peak Hour				PM Peak Hour			
		Rate	In	Out	Total	Rate	In	Out	Total
110: General Light Industrial	314.3 1000 Sq. ft	(1)	92	12	104	(2)	11	71	82
210: Single-Family Detached Housing	158 Units	(3)	29	88	117	(4)	99	58	157
220: Multifamily Housing (Low-Rise)	472 Units	(5)	48	160	208	(6)	148	87	235
221: Multifamily Housing (Mid-Rise)	2003 Units	(7)	168	478	646	(8)	386	401	787
710: General Office Building	36.2 1000 Sq. ft	(9)	52	8	60	(10)	7	36	43
820: Shopping Center	56.5 1000 Sq. ft	0.94	33	20	53	3.81	103	112	215
Subtotal Trips			***422***	***766***	***1188***		***754***	***765***	***1519***
Internal Capture			*16*	*16*	*32*		*17*	*17*	*34*
Pass-by Trips: 820		*0%*	*0*	*0*	*0*	*34%*	*32*	*32*	*64*
Total Net Trips			***406***	***750***	***1156***		***705***	***716***	***1421***

Functions:

(1) Ln(Trips) = 0.74Ln(X)+0.39 *(2) Ln(Trips) = 0.69Ln(X)+0.43*
(3) Trips = 0.71(X)+4.8 *(4) Ln(Trips) = 0.96Ln(X)+0.20*
(5) Ln(Trips) = 0.95Ln(X)-0.51 *(6) Ln(Trips) = 0.89Ln(X)-0.02*
(7) Ln(Trips) = 0.98Ln(X)-0.98 *(8) Ln(Trips) = 0.96Ln(X)-0.63*
(9) Trips = 0.94(X)+26.49 *(10) Ln(Trips) = 0.95Ln(X)+0.36*

Table 3.2 summarizes the percentage of each LUC in each phase, and the associated trips with each phase in the AM and PM peak hour.

[3] Trip Generation Manual 10th Edition Institute of Transportation Engineers Washington DC 2017

TABLE 3.2: PERCENT TRIPS PER PHASE

Phase	ITE Code						Total Peak Hour Trips	
	110	210	220	221	710	820	AM	PM
3	0%	0%	0%	38%	100%	100%	335	469
4	0%	52%	100%	62%	0%	0%	662	796
5	0%	48%	0%	0%	0%	0%	55	74
6	100%	0%	0%	0%	0%	0%	104	82
Total	***100%***	***100%***	***100%***	***100%***	***100%***	***100%***	***1156***	***1421***

Table 3.3 summarizes the estimated trip distribution. The distribution is based on the Transportation Tomorrow Survey (TTS) used in the previous River Mill Development Phase 2[4] letter. **Figure 3.2, Figure 3.3,** and **Figure 3.4** illustrates the assignment of the site-generated traffic and passby trips to the study area road network during the AM and PM peak hour, respectively.

TABLE 3.3: ESTIMATED TRIP DISTRIBUTION

Direction	Route	Distribution
North	Beaverdale Road	2%
	Hespeler Road	9%
	Speedsville Road	5%
South	Beaverdale Road	7%
	Hespeler Road	4%
	Speedsville Road	48%
East	Fischer Mills Road	4%
West	Maple Grove Road	18%
	Royal Oak Road	3%
Total		***100%***

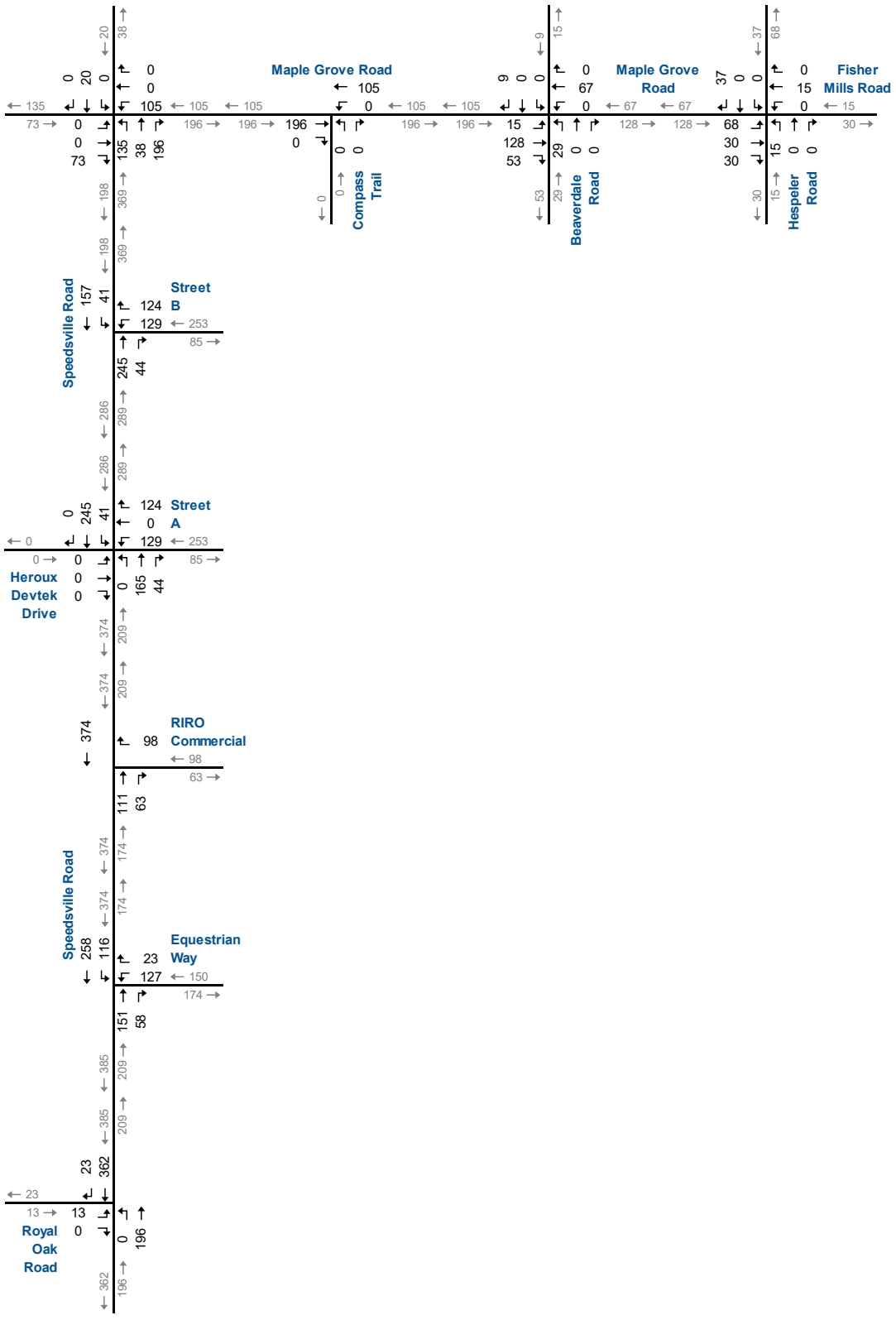
3.3 Transportation Demand Management

Transportation Demand Management (TDM) are measures that developments can undertake to support and encourage non-auto forms of transportation. The Region of Waterloo has developed a TDM checklist as part of their Parking Management program, which is used to assess whether developments are TDM supportive.

As the proposed development is not within 800 metres of a rapid transit station or apart of the urban growth corridor, and is primarily residential in nature, the TDM measures for the development should focus on providing

[4] Phase 2 Analysis River Mill Development Corporation, Cambridge, *Paradigm Transportation Solutions Limited, 2016*

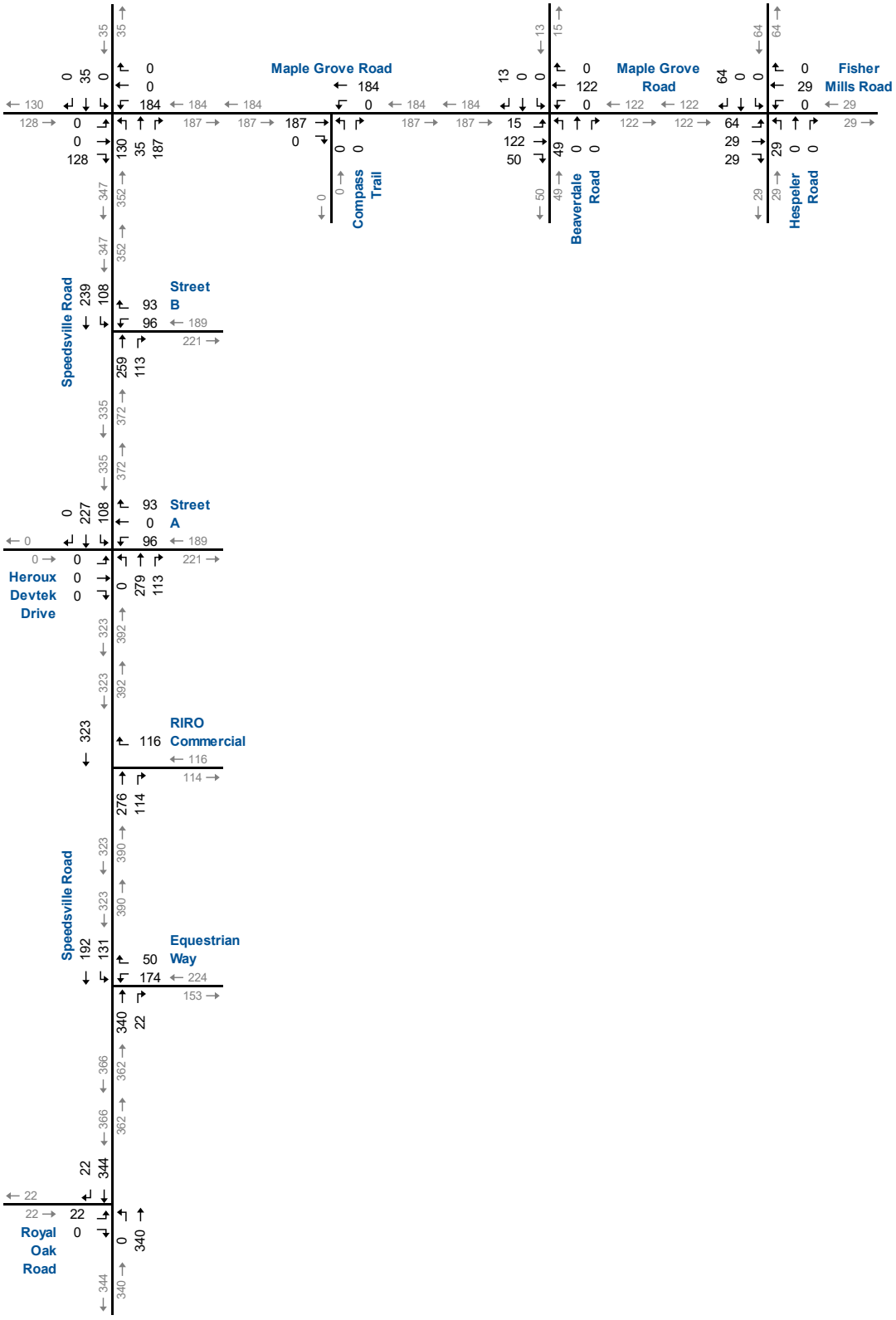
convenient and continuous access for active transportation modes as well as ensuring transit service is incorporated into the subject property.



Site Generated Traffic Volumes – AM Peak Hour

River Mill Development
190659

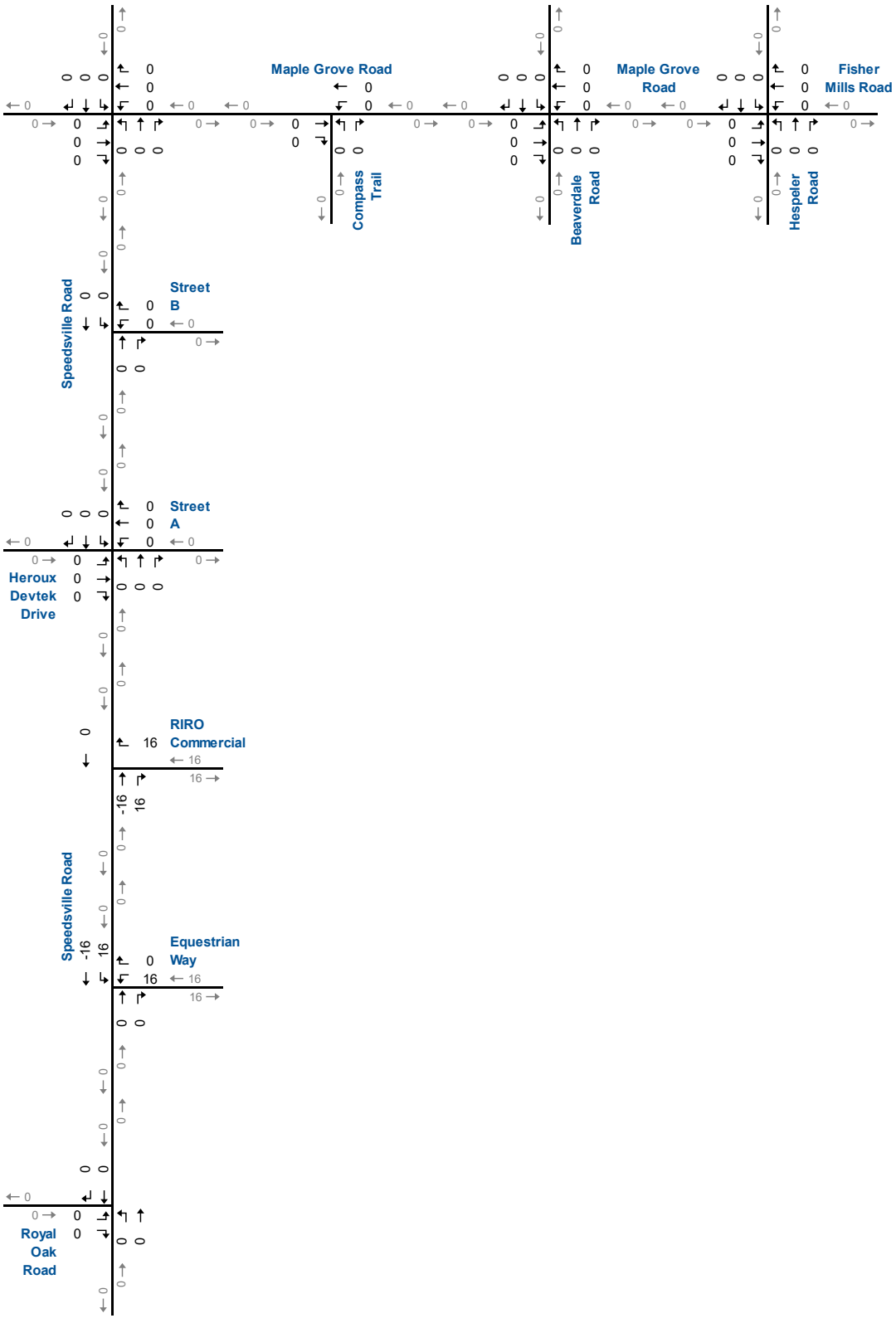
Figure 3.3



Site Generated Traffic Volumes – PM Peak Hour

River Mill Development
190659

Figure 3.4



Passby Traffic Volumes – PM Peak Hour

River Mill Development
190659

Figure 3.5

4 Evaluation of Future Traffic Conditions

Future traffic conditions assessed include estimates of future background and total traffic analysis for the full build-out year (2025) and the five-year horizon (2030) from the date of the TIS. The future traffic volumes near the development will likely consist of increased non-site traffic volumes (background traffic), and the traffic forecast to be generated by the proposed development.

As per the request of ROW staff, there will be no forecasting of background (and therefore total future) traffic for the intersections on Maple Grove Road as there is an ongoing EA.

4.1 Background Traffic Forecasts

4.1.1 General Background Growth

The future general background traffic volumes within the study area result from applying a growth rate of 2.0% compounded per annum to the base year (2020) traffic volumes. This growth rate was confirmed with Region staff during pre-study consultation.

4.1.2 Background Developments

During pre-study consultation, ROW staff identified that the already approved Phase 1 and Phase 2 of the River Mill Development that will potentially increase traffic volumes within the study area at the future horizon years. A survey of the completion of the Phases 1 and 2 was performed and it was found that Phase 1 is complete and occupied, and Phase 2 residential is complete (with approximately 5% of houses still to be occupied) and the school remains to be built. Traffic from the completed portions of Phases 1 and 2 are therefore included in the existing counts. The remainder of the trips to be generated by Phases 1 and 2 were taken from the trip assignment values from the previous River Mill Development TIS and included in the Background traffic forecasts. **Figure 4.1** illustrates the locations of the other area developments with respect to the subject site.

4.2 2025 Background Traffic

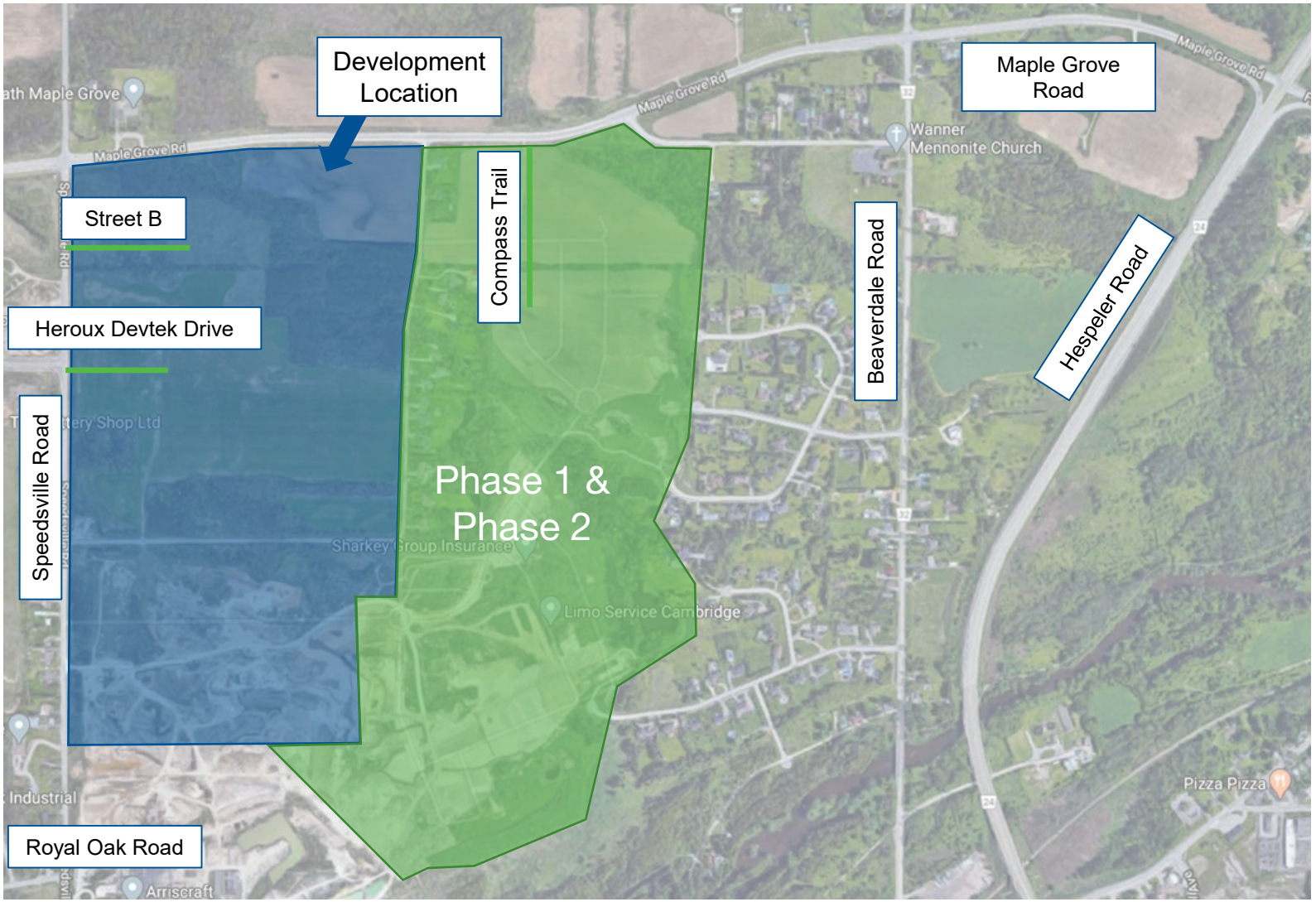
Figure 4.2 displays the 2025 background traffic volumes for the weekday AM and PM peak hours. These volumes are a combination of the generalized background growth and the traffic generated by the other developments.

4.2.1 Background Traffic Operations

Based on the estimated 2025 background traffic volumes, LOS analyses have been conducted using Synchro 9 and Arcady for the weekday AM and PM peak hour conditions for the intersections in the study area.

Table 4.1 summarize the results of the analysis indicating the LOS, volume to capacity ratios (v/c) and 95th percentile queues experienced at the study area intersections. All observed intersections have acceptable operational values except for the eastbound movements at **Speedsville Road at Royal Oak Road** which operate at a LOS F with a v/c greater than 1.0 during the PM peak hour.

Appendix E includes the detailed Synchro 9 reports.



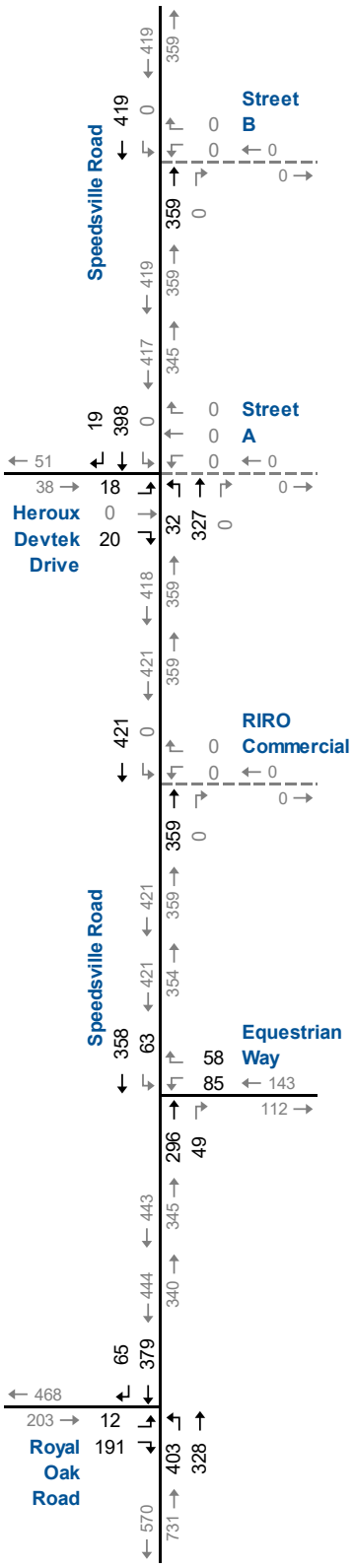
paradigm TRANSPORTATION SOLUTIONS LIMITED

Other Area Development

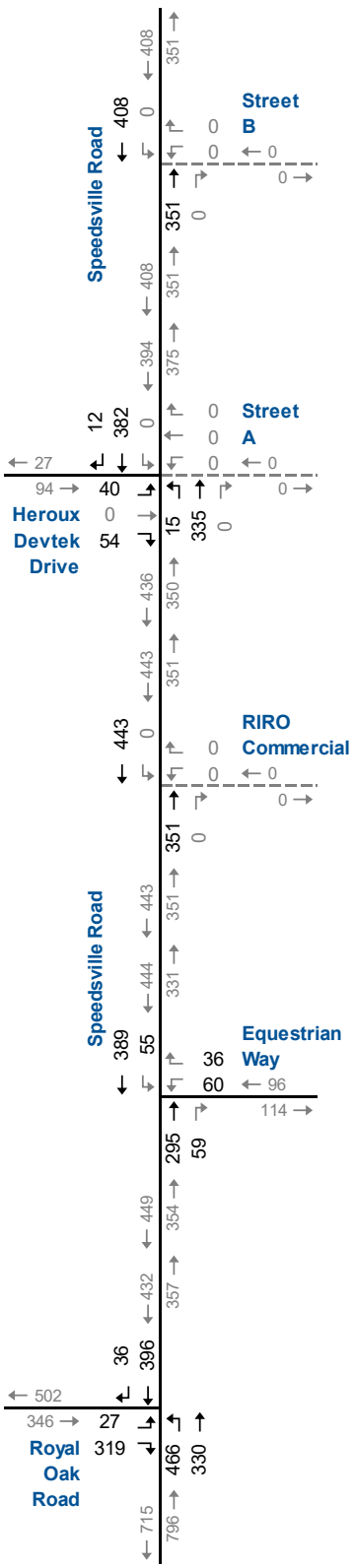
River Mill Development
190659

Figure 4.1

AM Peak Hour



PM Peak Hour



paradigm TRANSPORTATION SOLUTIONS LIMITED

2025 Background Traffic Volumes

River Mill Development
190659

Figure 4.2

TABLE 4.1: 2025 BACKGROUND TRAFFIC OPERATIONS

Analysis Period	Intersection	Control Type	MOE	Direction / Movement / Approach																Overall
				Eastbound				Westbound				Northbound				Southbound				
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
AM Peak Hour	1: Speedsville Road & Heroux Devtek Drive	TWSC	LOS	B		>	**B**					<	A		**A**		A	>	**A**	
			Delay	15		>	**15**					<	1		**1**		0	>	**0**	
			V/C	0.09		>						<	0.03				0.00	>		
			Q	2		>						<	1				0	>		
	2: Speedsville Road & Equestrian Way	TWSC	LOS					C		>	**C**		A	>	**A**	<	A		**A**	
			Delay					18		>	**18**		0	>	**0**	<	1		**1**	
			V/C					0.34		>			0.00	>		<	0.06			
			Q					11		>			0	>		<	2			
	3: Royal Oak Road & Speedsville Road	TWSC	LOS	C		>	**C**					<	A		**A**		A	>	**A**	
			Delay	22		>	**22**					<	6		**6**		0	>	**0**	
			V/C	0.49		>						<	0.36				0.00	>		
			Q	20		>						<	13				0	>		
PM Peak Hour	1: Speedsville Road & Heroux Devtek Drive	TWSC	LOS	B		>	**B**					<	A		**A**		A	>	**A**	
			Delay	14		>	**14**					<	0		**0**		0	>	**0**	
			V/C	0.19		>						<	0.02				0.00	>		
			Q	5		>						<	0				0	>		
	2: Speedsville Road & Equestrian Way	TWSC	LOS					C		>	**C**		A	>	**A**	<	A		**A**	
			Delay					17		>	**17**		0	>	**0**	<	1		**1**	
			V/C					0.24		>			0.00	>		<	0.05			
			Q					7		>			0	>		<	1			
	3: Royal Oak Road & Speedsville Road	TWSC	LOS	F		>	**F**					<	A		**A**		A	>	**A**	
			Delay	87		>	**87**					<	6		**6**		0	>	**0**	
			V/C	1.01		>						<	0.41				0.00	>		
			Q	87		>						<	15				0	>		

MOE - Measure of Effectiveness
LOS - Level of Service
Delay - Average Delay per Vehicle in Seconds

Q - 95th Percentile Queue Length (m)
TCS - Traffic Control Signal
TWSC - Two-Way Stop Control

AWSC - All-Way Stop Control
RBT - Roundabout

4.3 2025 Total Traffic

Figure 4.3 displays the 2025 total traffic volumes which is the combination of the background traffic and development traffic, for the AM and PM peak hours.

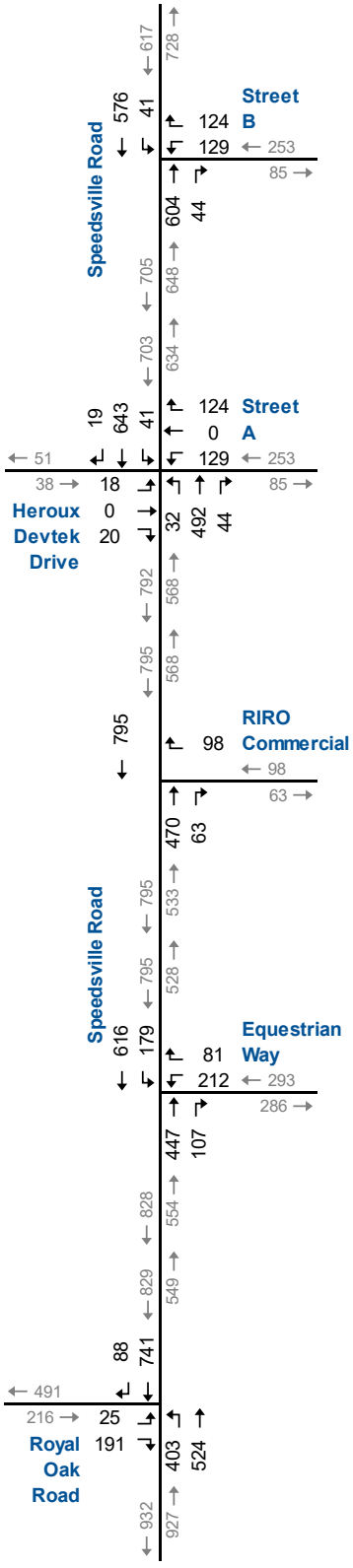
4.3.1 Total Traffic Operations

Table 4.2 summarizes the LOS analysis, for the total traffic conditions using Synchro 9 and Arcady, respectively**.** All observed intersections have acceptable operational values except for the following critical movements:

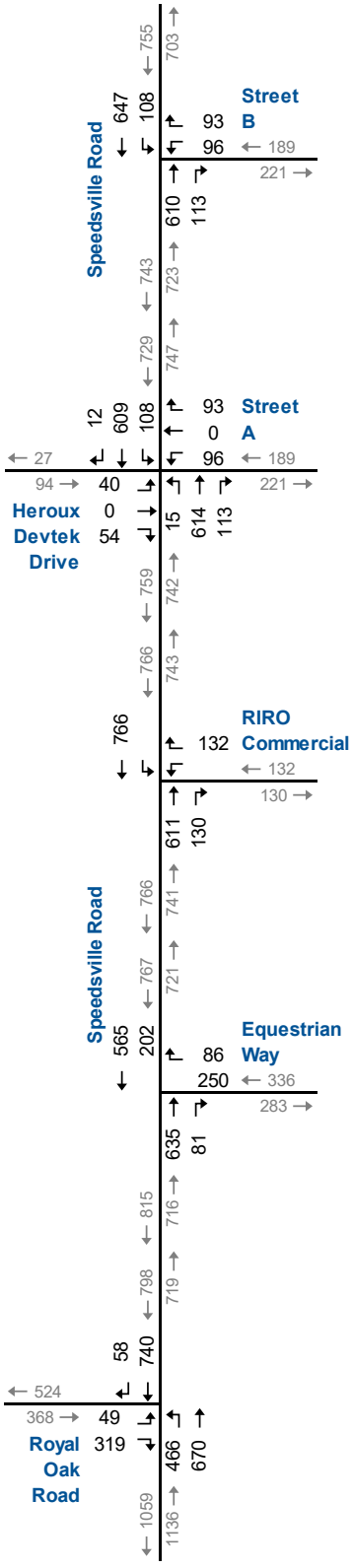
- **Speedsville Road and Heroux Devtek Drive:** the eastbound shared movement is forecast to operate at a LOS E and a LOS F during the AM and PM peak hour, respectively. The westbound shared movement is forecast to operate at a LOS F with a v/c greater than 1.0 during both peak hours;
- **Speedsville Road and Equestrian Way:** the westbound shared movement is forecast to operate at a LOS F with a v/c greater than 1.0 during both peak hours;
- **Royal Oak Road and Speedsville Road:** similar to the background conditions, the eastbound shared movement is forecast to operate at a LOS F with a v/c greater than 1.0 during both peak hours; and
- **Speedsville Road and Street B:** the westbound shared movement is forecast to operate at a LOS F with a v/c greater than 1.0 during both peak hours.

Appendix F includes the detailed Synchro 9 reports.

AM Peak Hour



PM Peak Hour



paradigm TRANSPORTATION SOLUTIONS LIMITED

2025 Total Traffic Volumes

River Mill Development
190659

Figure 4.3

TABLE 4.2: 2025 TOTAL TRAFFIC OPERATIONS

Analysis Period	Intersection	Control Type	MOE	Direction / Movement / Approach																Overall
				Eastbound				Westbound				Northbound				Southbound				
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
AM Peak Hour	1: Speedsville Road & Heroux Devtek Drive	TWSC	LOS	<	E	>	E	<	F	>	F	<	A	>	A	<	A	>	A	
			Delay	<	43	>	43	<	226	>	226	<	1	>	1	<	1	>	1	
			V/C	<	0.29	>		<	1.33	>		<	0.04	>		<	0.04	>		
			Q	<	8	>		<	108	>		<	1	>		<	1	>		
	2: Speedsville Road & Equestrian Way	TWSC	LOS					F		>	F		A	>	A	<	A		A	
			Delay					668		>	668		0	>	0	<	2		2	
			V/C					2.31		>			0.00	>		<	0.19			
			Q					188		>			0	>		<	5			
	3: Royal Oak Road & Speedsville Road	TWSC	LOS	F		>	F					<	A		A		A	>	A	
			Delay	677		>	677					<	6		6		0	>	0	
			V/C	2.27		>						<	0.50				0.00	>		
			Q	145		>						<	22				0	>		
	4: Speedsville Road & Street B	TWSC	LOS					F		>	F		A	>	A	<	A		A	
			Delay					105		>	105		0	>	0	<	1		1	
			V/C					1.02		>			0.00	>		<	0.04			
			Q					75		>			0	>		<	1			
	5: Speedsville Road & RIRO Commercial	TWSC	LOS							B	B		A	>	A		A		A	
			Delay							13	13		0	>	0		0		0	
			V/C							0.17			0.00	>			0.00			
			Q							1			0	>			0			
PM Peak Hour	1: Speedsville Road & Heroux Devtek Drive	TWSC	LOS	<	F	>	F	<	F	>	F	<	A	>	A	<	A	>	A	
			Delay	<	104	>	104	<	365	>	365	<	0	>	0	<	1	>	1	
			V/C	<	0.80	>		<	1.59	>		<	0.02	>		<	0.12	>		
			Q	<	35	>		<	104	>		<	3	>		<	1	>		
	2: Speedsville Road & Equestrian Way	TWSC	LOS					F		>	F		A	>	A	<	A		A	
			Delay					1253		>	1253		0	>	0	<	3		3	
			V/C					3.57		>			0.00	>		<	0.23			
			Q					255		>			0	>		<	7			
	3: Royal Oak Road & Speedsville Road	TWSC	LOS	F		>	F					<	A		A		A	>	A	
			Delay	5734		>	5734					<	6		6		0	>	0	
			V/C	13.14		>						<	0.56				0.00	>		
			Q	341		>						<	26				0	>		
	4: Speedsville Road & Street B	TWSC	LOS					F		>	F		A	>	A	<	A		A	
			Delay					162		>	162		0	>	0	<	1		1	
			V/C					1.13		>			0.00	>		<	0.12			
			Q					74		>			0	>		<	3			
	5: Speedsville Road & RIRO Commercial	TWSC	LOS							C	C		A	>	A		A		A	
			Delay							16	16		0	>	0		0		0	
			V/C							0.29			0.00	>			0.00			
			Q							1			0	>			0			

4.4 2030 Background Traffic

Figure 4.4 displays the 2030 background traffic volumes for the weekday AM and PM peak hours. These volumes are a combination of the generalized background growth and the traffic generated by the other developments.

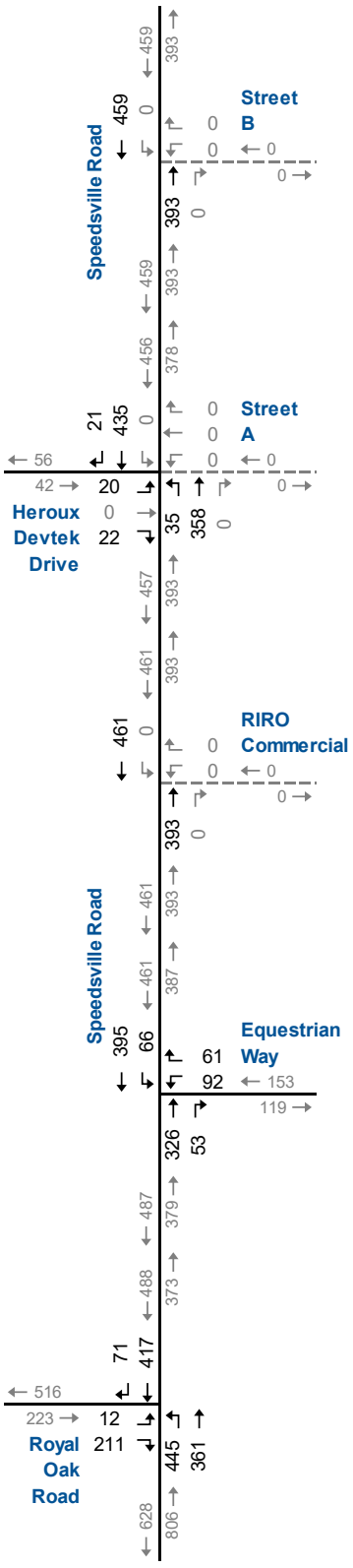
4.4.1 Background Traffic Operations

Based on the estimated 2030 background traffic volumes, LOS analyses have been conducted using Synchro 9 and Arcady for the weekday AM and PM peak hour conditions for the intersections in the study area.

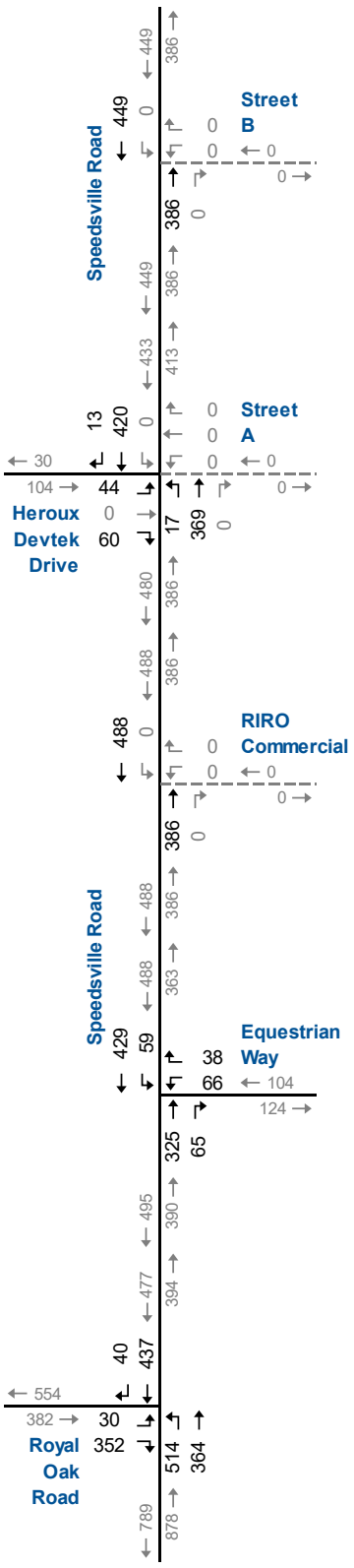
Table 4.3 summarize the results of the analysis indicating the LOS, volume to capacity ratios (v/c) and 95th percentile queues experienced at the study area intersections. All observed intersections have acceptable operational values except for the eastbound movements at **Speedsville Road at Royal Oak Road** which operate at a LOS F with a v/c greater than 1.0 during the PM peak hour.

Appendix G includes the detailed Synchro 9 reports.

AM Peak Hour



PM Peak Hour



2030 Background Traffic Volumes

River Mill Development
190659

Figure 4.4

TABLE 4.3: 2030 BACKGROUND TRAFFIC OPERATIONS

Analysis Period	Intersection	Control Type	MOE	Direction / Movement / Approach																Overall
				Eastbound				Westbound				Northbound				Southbound				
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
AM Peak Hour	1: Speedsville Road & Heroux Devtek Drive	TWSC	LOS	C		>	**C**					<	A		**A**		A	>	**A**	
			Delay	16		>	**16**					<	1		**1**		0	>	**0**	
			V/C	0.11		>						<	0.03				0.00	>		
			Q	3		>						<	1				0	>		
	2: Speedsville Road & Equestrian Way	TWSC	LOS					C		>	**C**		A	>	**A**	<	A		**A**	
			Delay					21		>	**21**		0	>	**0**	<	1		**1**	
			V/C					0.40		>			0.00	>		<	0.06			
			Q					14		>			0	>		<	2			
	3: Royal Oak Road & Speedsville Road	TWSC	LOS	D		>	**D**					<	A		**A**		A	>	**A**	
			Delay	30		>	**30**					<	6		**6**		0	>	**0**	
			V/C	0.62		>						<	0.41				0.00	>		
			Q	30		>						<	16				0	>		
PM Peak Hour	1: Speedsville Road & Heroux Devtek Drive	TWSC	LOS	C		>	**C**					<	A		**A**		A	>	**A**	
			Delay	15		>	**15**					<	0		**0**		0	>	**0**	
			V/C	0.23		>						<	0.02				0.00	>		
			Q	7		>						<	1				0	>		
	2: Speedsville Road & Equestrian Way	TWSC	LOS					C		>	**C**		A	>	**A**	<	A		**A**	
			Delay					19		>	**19**		0	>	**0**	<	1		**1**	
			V/C					0.28		>			0.00	>		<	0.05			
			Q					9		>			0	>		<	2			
	3: Royal Oak Road & Speedsville Road	TWSC	LOS	F		>	**F**					<	A		**A**		A	>	**A**	
			Delay	264		>	**264**					<	7		**7**		0	>	**0**	
			V/C	1.46		>						<	0.47				0.00	>		
			Q	163		>						<	20				0	>		

MOE - Measure of Effectiveness
LOS - Level of Service
Delay - Average Delay per Vehicle in Seconds

Q - 95th Percentile Queue Length (m)
TCS - Traffic Control Signal
TWSC - Two-Way Stop Control

AWSC - All-Way Stop Control
RBT - Roundabout

4.5 2030 Total Traffic

Figure 4.5 displays the 2030 total traffic volumes which is the combination of the background traffic and development traffic, for the AM and PM peak hours.

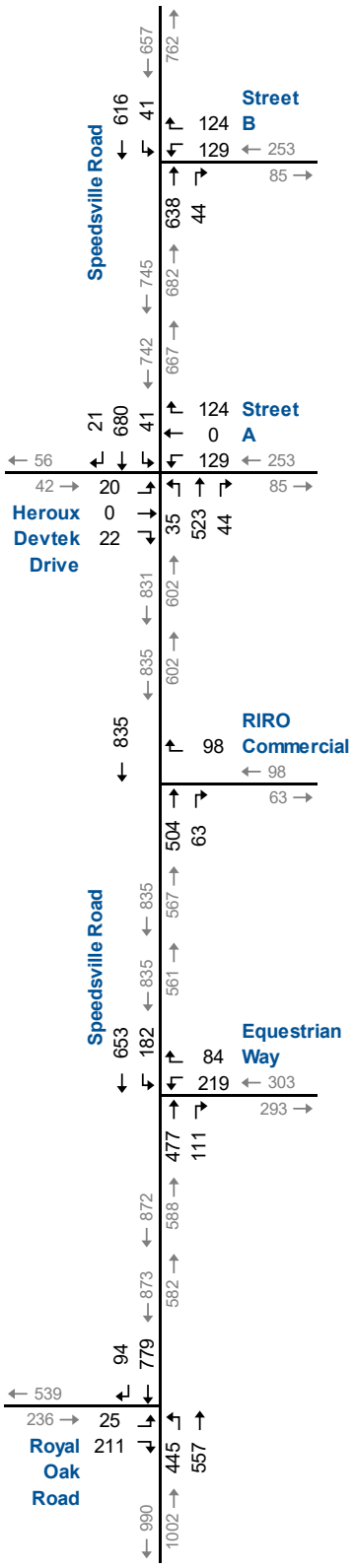
4.5.1 Total Traffic Operations

Table 4.4 summarizes the LOS analysis, for the total traffic conditions**.** All observed intersections have acceptable operational values except for the following critical movements:

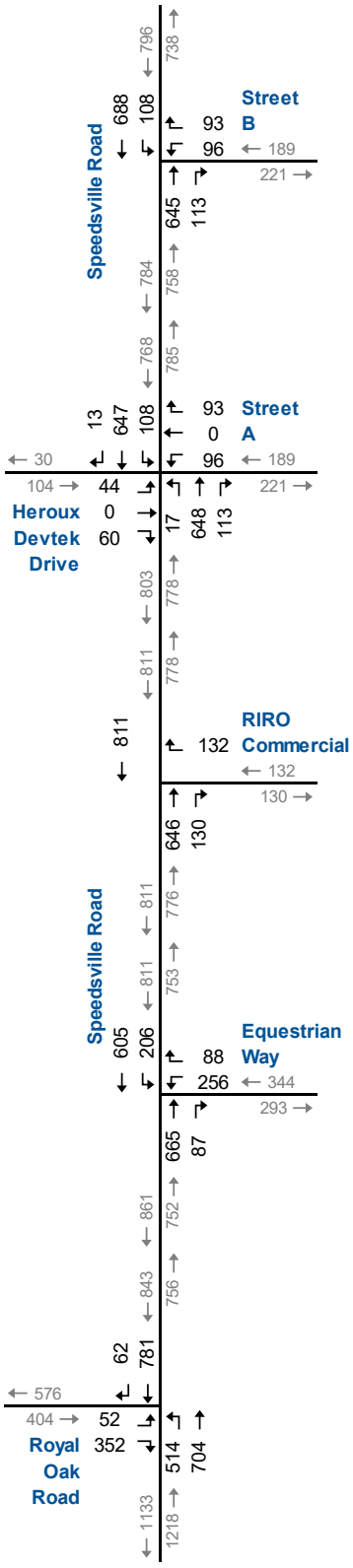
- **Speedsville Road and Heroux Devtek Drive:** the eastbound shared movement is forecast to operate at LOS F during both peak hours and with a v/c greater than 1.0 during the PM peak hour. The westbound shared movement is forecast to operate at a LOS F with a v/c great than 1.0 during both peak hours;
- **Speedsville Road and Equestrian Way:** the westbound shared movement is forecast to operate at a LOS F with a v/c greater than 1.0 during both peak hours;
- **Royal Oak Road and Speedsville Road:** similar to the background conditions, the eastbound shared movement is forecast to operate at a LOS F with a v/c greater than 1.0 during both peak hours; and
- **Speedsville Road and Street B:** the westbound shared movement is forecast to operate at a LOS F with a v/c greater than 1.0 during both peak hours.

Appendix H includes the detailed Synchro 9 reports.

AM Peak Hour



PM Peak Hour



paradigm TRANSPORTATION SOLUTIONS LIMITED

2030 Total Traffic Volumes

River Mill Development
190659

Figure 4.5

TABLE 4.4: 2030 TOTAL TRAFFIC OPERATIONS

Analysis Period	Intersection	Control Type	MOE	Direction / Movement / Approach																Overall
				Eastbound				Westbound				Northbound				Southbound				
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
AM Peak Hour	1: Speedsville Road & Heroux Devtek Drive	TWSC	LOS	<	F	>	F	<	F	>	F	<	A	>	A	<	A	>	A	
			Delay	<	52	>	52	<	302	>	302	<	1	>	1	<	1	>	1	
			V/C	<	0.36	>		<	1.50	>		<	0.04	>		<	0.04	>		
			Q	<	11	>		<	122	>		<	1	>		<	1	>		
	2: Speedsville Road & Equestrian Way	TWSC	LOS					F		>	F		A	>	A	<	A		A	
			Delay					853		>	853		0	>	0	<	2		2	
			V/C					2.71		>			0.00	>		<	0.20			
			Q					209		>			0	>		<	5			
	3: Royal Oak Road & Speedsville Road	TWSC	LOS	F		>	F					<	A		A		A	>	A	
			Delay	1838		>	1838					<	7		7		0	>	0	
			V/C	4.72		>						<	0.58				0.00	>		
			Q	200		>						<	28				0	>		
	4: Speedsville Road & Street B	TWSC	LOS					F		>	F		A	>	A	<	A		A	
			Delay					138		>	138		0	>	0	<	1		1	
			V/C					1.11		>			0.00	>		<	0.05			
			Q					86		>			0	>		<	1			
	5: Speedsville Road & RIRO Commercial	TWSC	LOS							B	B		A	>	A		A		A	
			Delay							13	13		0	>	0		0		0	
			V/C							0.18			0.00	>			0.00			
			Q							1			0	>			0			
PM Peak Hour	1: Speedsville Road & Heroux Devtek Drive	TWSC	LOS	<	F	>	F	<	F	>	F	<	A	>	A	<	A	>	A	
			Delay	<	176	>	176	<	498	>	498	<	0	>	0	<	1	>	1	
			V/C	<	1.03	>		<	1.87	>		<	0.02	>		<	0.13	>		
			Q	<	48	>		<	117	>		<	3	>		<	1	>		
	2: Speedsville Road & Equestrian Way	TWSC	LOS					F		>	F		A	>	A	<	A		A	
			Delay					1542		>	1542		0	>	0	<	3		3	
			V/C					4.20		>			0.00	>		<	0.24			
			Q					272		>			0	>		<	7			
	3: Royal Oak Road & Speedsville Road	TWSC	LOS	F		>	F					<	A		A		A	>	A	
			Delay	98		>	98					<	7		7		0	>	0	
			V/C	1.06		>						<	0.64				0.00	>		
			Q	104		>						<	26				0	>		
	4: Speedsville Road & Street B	TWSC	LOS					F		>	F		A	>	A	<	A		A	
			Delay					214		>	214		0	>	0	<	1		1	
			V/C					1.25		>			0.00	>		<	0.13			
			Q					83		>			0	>		<	3			
	5: Speedsville Road & RIRO Commercial	TWSC	LOS							C	C		A	>	A		A		A	
			Delay							17	17		0	>	0		0		0	
			V/C							0.31			0.00	>			0.00			
			Q							1			0	>			0			

MOE - Measure of Effectiveness
LOS - Level of Service
Delay - Average Delay per Vehicle in Seconds
Q - 95th Percentile Queue Length (m)
TCS - Traffic Control Signal
TWSC - Two-Way Stop Control
AWSC - All-Way Stop Control
RBT - Roundabout

4.6 All-Turns Access Scenario

An all-turns access is being considered to access Block 21 from Speedsville Road, in addition to the right-in-right-out (RIRO) access. This all-turns access would be located north of the RIRO access.

An analysis of this access show that the traffic operations of the westbound (exiting) movements are forecast to be poor during both the AM and PM peak hours at the 2030 horizon:

- AM Peak Hour: LOS F, Average Delay = 95.6 seconds, V/C = 0.923
- PM Peak Hour: LOS F, Average Delay = 493.9 seconds, V/C = 1.905

Despite the poor delays, a signal would not be warranted at this access.

Appendix I includes the detailed Synchro reports for this analysis and **Appendix J** includes the Signal Warrant worksheet.

5 Remedial Measures

5.1 Signal Warrants

A signal warrant, using the OTM Book 12 Justification 7[5], was analyzed for the following intersections under the 2025 and 2030 total traffic conditions:

- **Speedsville Road and Heroux Devtek Drive:** A signal is justified under the 2025 total horizon, fulfilling Warrant 1 to 119.6% and Warrant 2 to 141.5%;
- **Speedsville Road and Equestrian Way:** A signal is justified under the 2025 total horizon, fulfilling Warrant 2 to 147.5%;
- **Speedsville Road and Royal Oak Road:** A signal is not justified under the 2030 total horizon, fulfilling Warrant 1 to 88.9% and Warrant 2 to 38.5%; and
- **Speedsville Road and Street B:** A signal is justified under the 2025 total horizon fulfilling Warrant 2 to 143.9%.

Appendix J includes signal warrant worksheets**.**

5.2 Left-turn Lanes

The need for dedicated left turning lanes at unsignalized intersections within the study area was assessed using MTO procedures detailed in the Design Supplement for the TAC Guide[6]. With the posted speed limit of 70 km/h, standard practice considers a design speed of 80 km/h with the urban characteristics of the immediate area and the restricted flow of traffic.

At present, there is no northbound left-turn lane on **Speedsville Road at Royal Oak Road**. Under existing conditions, a northbound left-turn lane with 50 metres of storage is warranted. Under 2030 background conditions, the storage length warrant is forecast to increases to 80 metres.

The subject development does not add any northbound left-turn movements at this intersection, but does increase the approaching and opposing through movements, which impacts the left-turn lane analysis. At the 2030 total horizon, the storage length requirement is forecast to be 80 metres, as that is the highest that the nomograph recommends.

Therefore, a northbound left-turn is warranted at present, and the storage length is forecast to be at the maximum warranted length of 80 metres by the 2030 background horizon, regardless whether the subject development is built.

[5] OTM Book 12: Traffic Signals, *Ministry of Transportation of Ontario,* 2012
[6] Design Supplement for TAC Geometric Design Guide for Canadian Roads, *Ministry of Transportation of Ontario*, June 2017

Figure 5.1 displays the left-turn lane warrant nomographs for the **Speedsville Road at Royal Oak Road** intersection.

5.3 Intersection Improvements

To mitigate the operational issues of the intersections used under the 2030 total condition, the following improvements were assessed:

- **Speedsville Road and Heroux Devtek Drive:** Upgrade the two-way stop control to a traffic control signal, and add eastbound, westbound, northbound, and southbound left-turn lanes;
- **Speedsville Road and Equestrian Way:** Upgrade the two-way stop control to a traffic control signal, and add westbound and southbound left-turn lanes;
- **Speedsville Road and Royal Oak Road:** Add eastbound and northbound left-turn lanes; and
- **Speedsville Road and Street B:** Upgrade the two-way stop control to a traffic control signal and add westbound and southbound left-turn lanes.

Appendix K contains the detailed Synchro 9 reports.

Table 5.1 summarizes the operations of the above intersections with their associated improvement under the 2030 total traffic horizon.

All observed intersections have acceptable operational values except for the eastbound left-turn movement at **Speedsville Road and Royal Oak Road** is forecast to operate at a LOS F with a v/c greater than 1.0 during both the peak hours. The eastbound right-turn movement is forecast to operate at a LOS F during the PM peak hour.

While this intersection does not meet the warrant for signalization, as per OTM Book 7, the intersection is greatly over capacity and a signal may be considered from an operational perspective. Additionally, the number of movements at this intersection are comparable to the other two intersections with signal warrants, the difference being that there are fewer minor street left-turning movements. If this were upgraded to a signalized intersection, it is forecast to operate adequately with the current lane geometry.

5.4 Roundabout Screening Tool

As multiple signal warrants were met, a screening tool was completed for the intersections of:

- Speedsville Road and Equestrian Way;
- Speedsville Road and Heroux Devtek Drive / Street A; and
- Speedsville Road and Street B.

The results show that a roundabout is a feasible method of traffic control at all intersections and an **Intersection Control Study** should be completed for each intersection.

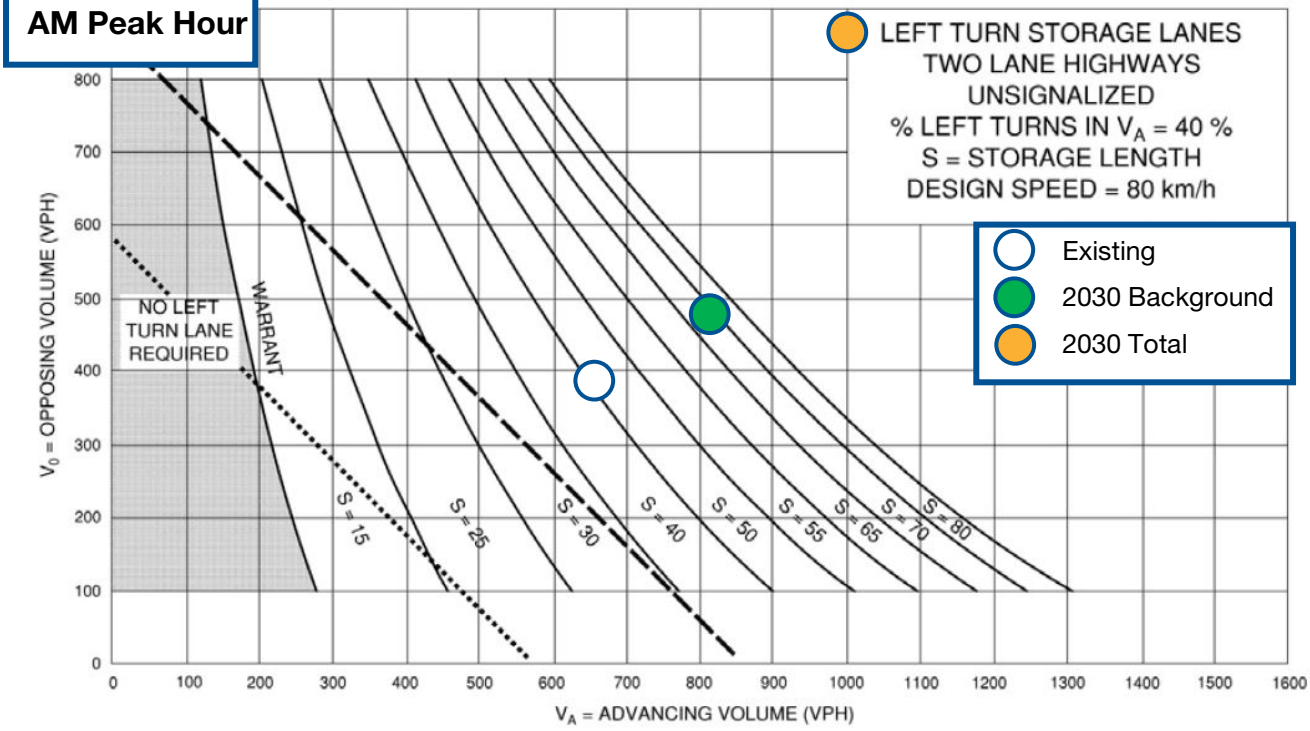
Appendix L contains the roundabout screening tools.

TABLE 5.1: 2030 TOTAL TRAFFIC OPERATIONS – WITH IMPROVEMENTS

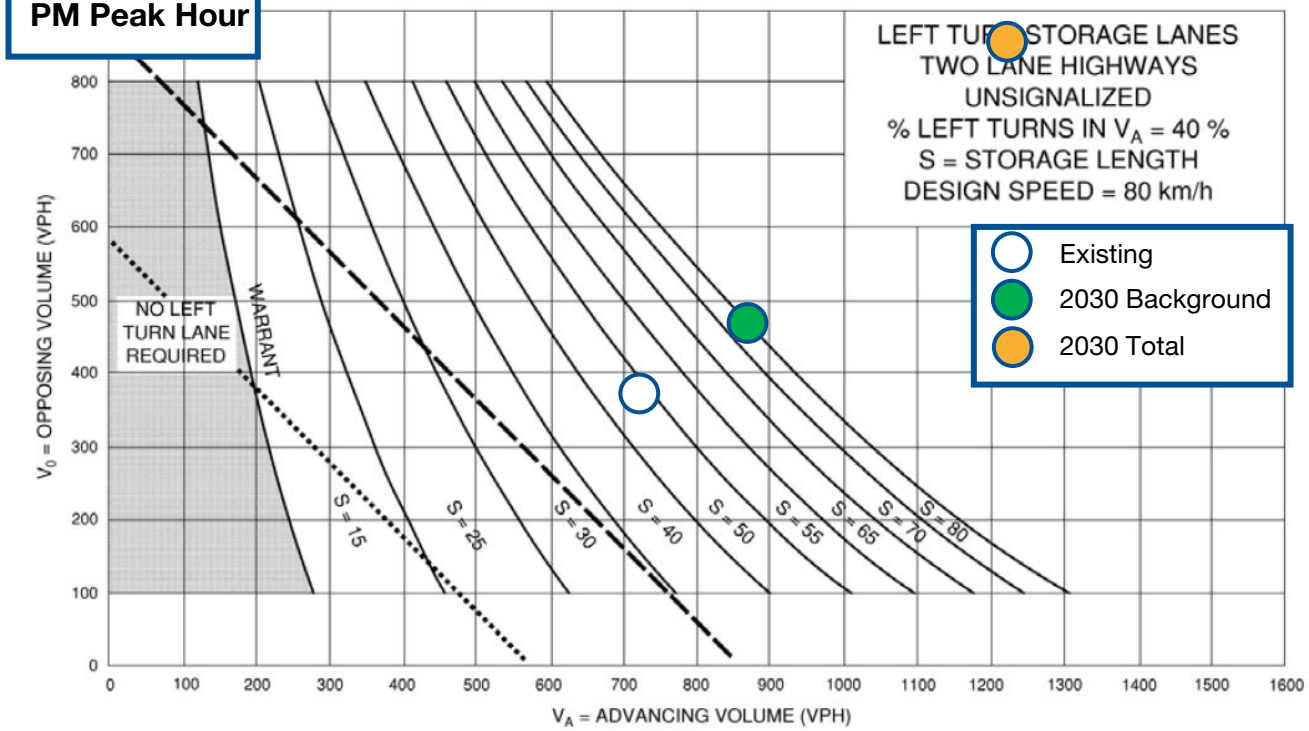
Analysis Period	Intersection	Control Type	MOE	Direction / Movement / Approach																
				Eastbound				Westbound				Northbound				Southbound				Overall
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
AM Peak Hour	1: Speedsville Road & Heroux Devtek Drive	TCS	LOS	C	A	>	B	D	A	>	C	A	A	>	A	A	A	>	A	A
			Delay	31	0	>	15	44	1	>	23	6	6	>	6	5	8	>	8	10
			V/C	0.15	0.05	>		0.60	0.21	>		0.09	0.42	>		0.08	0.53	>		
			Q	9	0	>		37	0	>		6	61	>		6	86	>		
	2: Speedsville Road & Equestrian Way	TCS	LOS					D		A	C		A	>	A	B	A		A	B
			Delay					40		9	31		7	>	7	11	8		9	12
			V/C					0.62		0.24			0.47	>		0.43	0.51			
			Q					57		12			507	>		237	610			
	3: Royal Oak Road & Speedsville Road	TWSC	LOS	F		D	F					C	A		A		A	>	A	
			Delay	712		27	100					16	0		7		0	>	0	
			V/C	1.47		0.57						0.58	0.00				0.00	>		
			Q	27		3						4	0				0	>		
	4: Speedsville Road & Street B	TCS	LOS					D		A	C		A	>	A	A	A		A	A
			Delay					37		10	24		7	>	7	5	6		6	9
			V/C					0.46		0.39			0.49	>		0.09	0.44			
			Q					36		14			71	>		6	61			
PM Peak Hour	1: Speedsville Road & Heroux Devtek Drive	TCS	LOS	C	A	>	B	C	A	>	B	B	B	>	B	C	B	>	B	B
			Delay	31	1	>	13	32	1	>	17	11	18	>	18	21	15	>	16	17
			V/C	0.19	0.13	>		0.40	0.16	>		0.07	0.68	>		0.44	0.58	>		
			Q	15	0	>		27	0	>		5	#173.9	>		#35.0	123	>		
	2: Speedsville Road & Equestrian Way	TCS	LOS					D		A	C		A	>	A	B	A		A	B
			Delay					44		8	35		9	>	9	15	7		9	14
			V/C					0.70		0.23			0.59	>		0.55	0.46			
			Q					69		12			695	>		308	488			
	3: Royal Oak Road & Speedsville Road	TWSC	LOS	F		F	F					C	A		A		A	>	A	
			Delay	2354		63	358					17	0		7		0	>	0	
			V/C	4.73		0.93						0.64	0.00				0.00	>		
			Q	58		10						5	0				0	>		
	4: Speedsville Road & Street B	TCS	LOS					D		B	C		A	>	A	A	A		A	A
			Delay					36		11	24		6	>	6	6	5		5	9
			V/C					0.38		0.34			0.52	>		0.23	0.46			
			Q					28		13			74	>		13	64			

MOE - Measure of Effectiveness
LOS - Level of Service
Delay - Average Delay per Vehicle in Seconds
Q - 95th Percentile Queue Length (m)
TCS - Traffic Control Signal
TWSC - Two-Way Stop Control
AWSC - All-Way Stop Control
RBT - Roundabout

AM Peak Hour



PM Peak Hour



paradigm TRANSPORTATION SOLUTIONS LIMITED

Northbound Left-Turn Lane Warrant, Speedsville Road & Royal Oak Road

River Mill Development
190659

Figure 5.1

6 Conclusions and Recommendations

6.1 Conclusions

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

- **Existing Traffic Operations:** Currently, all intersections within the study area operate at acceptable levels of service during the AM and PM peak hours, except for the eastbound movements at **Speedsville Road at Royal Oak Road** which operate at a LOS F with a v/c greater than 1.0 during both peak hours;
- The development is forecast to generate 1156 and 1421 new trips during the AM and PM peak hours, respectively at full build out (2025);
- **Background Traffic Operations:** All intersections within the study area are forecast to operate within acceptable levels of service under the 2030 horizon, with no problem movements except for the eastbound movements at **Speedsville Road at Royal Oak Road** which operate at a LOS F with a v/c greater than 1.0 during the PM peak hour;
- **Total Traffic Operations:** All intersections within the study area are forecast to operate within acceptable levels of service under the 2030 horizon, similarly to the background conditions, with the following problem movements:
  - **Speedsville Road and Heroux Devtek Drive:** the eastbound shared movement is forecast to operate at LOS F during both peak hours and with a v/c greater than 1.0 during the PM peak hour. The westbound shared movement is forecast to operate at a LOS F with a v/c greater than 1.0 during both peak hours;
  - **Speedsville Road and Equestrian Way:** the westbound shared movement is forecast to operate at a LOS F with a v/c greater than 1.0 during both peak hours;
  - **Royal Oak Road and Speedsville Road:** similar to the background conditions, the eastbound shared movement is forecast to operate at a LOS F with a v/c greater than 1.0 during both peak hours; and
  - **Speedsville Road and Street B:** the westbound shared movement is forecast to operate at a LOS F with a v/c greater than 1.0 during both peak hours.
- **All Turns Access Scenario:** A potential all-turns access to Block 21 was analysed and showed poor levels-of-service. A signal was not found to be warranted at this potential access.
- **Auxiliary Left-Turn Lanes:** The following auxiliary turn lanes are warranted under the 2030 total traffic horizon:

- **Speedsville Road and Royal Oak Road:** a northbound left-turn lane is warranted during both peak hours under existing volumes.

- **Traffic Signal Warrants:** The following intersections were analysed using the OTM Book 12 justification 7 traffic signal warrants:
  - **Speedsville Road and Heroux Devtek Drive:** A traffic signal is forecast to be warranted under the 2025 total traffic horizon
  - **Speedsville Road and Equestrian Way:** A traffic signal is forecast to be warranted under the 2025 total traffic horizon;
  - **Royal Oak Road and Speedsville Road:** A traffic signal is not forecast to be warranted under the 2030 total traffic horizon; and
  - **Speedsville Road and Street B:** A traffic signal is forecast to be warranted under the 2025 total traffic horizon.
- Using the ROW Screening Tool for roundabouts, roundabout were determined to be a feasible method of traffic control and that Intersection Control Studies should be conducted at the intersections where a signal is warranted.

6.2 Recommendations

Based on the findings of this study, it is recommended that the development be approved with the following:

- Based on the findings of this study, it is recommended that either traffic control signals or roundabouts be installed, due to the site generated traffic, at the intersections of:
  - Speedsville Road and Heroux Devtek Drive;
  - Speedsville Road and Equestrian Way; and
  - Speedsville Road and Street B.
- **Intersection Control Study** is to be conducted for each of the three intersections noted above to determine if roundabouts would be a more appropriate method of improvement; and
- The following intersection improvements be constructed, unless a roundabout is the preferred method of traffic control as a result of the intersection control study:
  - **Speedsville Road and Heroux Devtek Drive:** Upgrade the two-way stop control to a traffic control signal, and add eastbound, westbound, northbound, and southbound left-turn lanes;
  - **Speedsville Road and Equestrian Way:** Upgrade the two-way stop control to a traffic control signal, and add westbound and southbound left-turn lanes;
  - **Speedsville Road and Royal Oak Road:** Add an eastbound left-turn lane and an auxiliary northbound left-turn lane with a storage length of 80 metres; and

- **Speedsville Road and Street B:** Upgrade the two-way stop control to a traffic control signal and add westbound and southbound left-turn lanes.

Appendix A

Pre-Study Conference Form

River Mill at Hunt Club
PRE-STUDY CONFERENCE FORM

Item	Description	Details
ISSUES		
1	List any issues expected that may impact the content or recommendations of the subject Transportation Impact Study.	o o o o
INTRODUCTION		
2	Nature of application (Attach a drawing)	o Official Plan Amendment o Zoning Amendment o Site Plan Control Application o Plan of Subdivision o Community Plan o Other
3	TIS process, and relevant policies, procedures and approvals	o Guidelines for the preparation of Transportation Impact Studies in Support of Development Applications o Transportation Impact Studies Requirements for Capacity Analysis, Roundabouts, Turn Lanes o Safety Analysis Checklist o Policy and Procedures for Access onto Regional Roads
4	Public Meeting	o Not Required
CONTEXT		
5	Study intersections (Intersections to be analyzed) Note: the consultant is responsible to identify any further intersections impacted as the study progresses.	o Speedsville Road and Heroux Devtek Drive / Street A o Speedsville Road and Equestrian Way (unsignalized); o Speedsville Road and Royal Oak Road (unsignalized); and o Speedsville Road and Street B (proposed intersection).
6	Size and number of phases of development	o Phases 3 – 6: o 10.3ha mixed-use o 7.3ha light employment o 2633 Residential Units
7	Approved and pending approval development applications	o Phases 1 & 2 of River Mill Development (TIS completed by Paradigm November 2012 and subsequent update addendums)
8	Planned transportation system improvements	o Maple Grove Road EA – John Bailey at IBI is the contact
TRAVEL DEMAND		
9	Horizon years	o Full occupancy o 5 years after full occupancy

Item	Description	Details
10	Peak hour determination	o AM weekday peak hour of adjacent roadway o PM weekday peak hour of adjacent roadway
11	Background	o ROW travel demand forecasts – 2% Background growth rate
12	Trip generation	o ITE average rates o ITE fitted equation
13	Trip reductions (TDM, internal, pass-by)	o Transportation Demand Management Checklist o ITE internal capture reductions for mixed-use developments o ITE pass-by reductions
14	Trip distribution	o ITE trip distribution IN/OUT split o Travel Tomorrow Survey
15	Trip assignment	o Local traffic pattern o Site layout and access design
EVALUATION OF IMPACTS		
16	Traffic impact analysis (Use approved software)	o Unsignalized intersections o left turn warrant analysis o signal warrant analysis o Signalized intersections o LOS, v/c, delay, queuing o ROW saturation flow rates o Existing signal timings for existing conditions o Optimize signal timings for future conditions o Use existing cycle length to respect coordinated corridor o Queuing analysis o Roundabouts o Other…

Item	Description	Details
17	Roundabout feasibility (Use approved software)	o Initial screening o Intersection control study (10 year horizon)
18	Transit assessment	o Frequency and hours of service o Presence of bus stops o Reliability of service o Passenger loads o Travel time o Future Service
19	Pedestrian assessment	o Presence, connectivity, and width of sidewalks o Barriers and buffers from traffic o Crossing opportunities at intersections o Delay at intersections o Number of driveways and traffic volumes at the driveways o Presence of illumination o Future needs (desire lines / policy / accessibility / demand) o Other
20	Cycling assessment	o Presence of a dedicated facility o Network connectivity o Number and width of travel lanes adjacent to the route o Volume and speed of traffic o Percentage of trucks and buses encountered o Pavement condition o Presence of parking /showers/change rooms o Future needs (desire lines / policy / demand) o Other
21	Safety analysis	o Road safety review o Collision risk analysis o Access conflict evaluation
22	Site access and circulation	o Review sight distances at all new access points o Internal traffic controls o Loading facilities and access o Service/maintenance vehicle access o Emergency vehicle access
23	Submission format	o One hard copies of main report including appendices (other than analysis results/output e.g. Synchro reports) o Minimum one original hard copy must be sealed by a professional engineer o Electronic copy of complete report and all appendices o Electronic copy of operational analysis files (e.g. Synchro, Arcady o Electronic copy of all signal warrant calculation files o Other

Appendix B

Existing Count Data

Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

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

Count Name: Speedsville Road & Heroux Devtek Drive
Site Code:
Start Date: 01/28/2020

Turning Movement Data

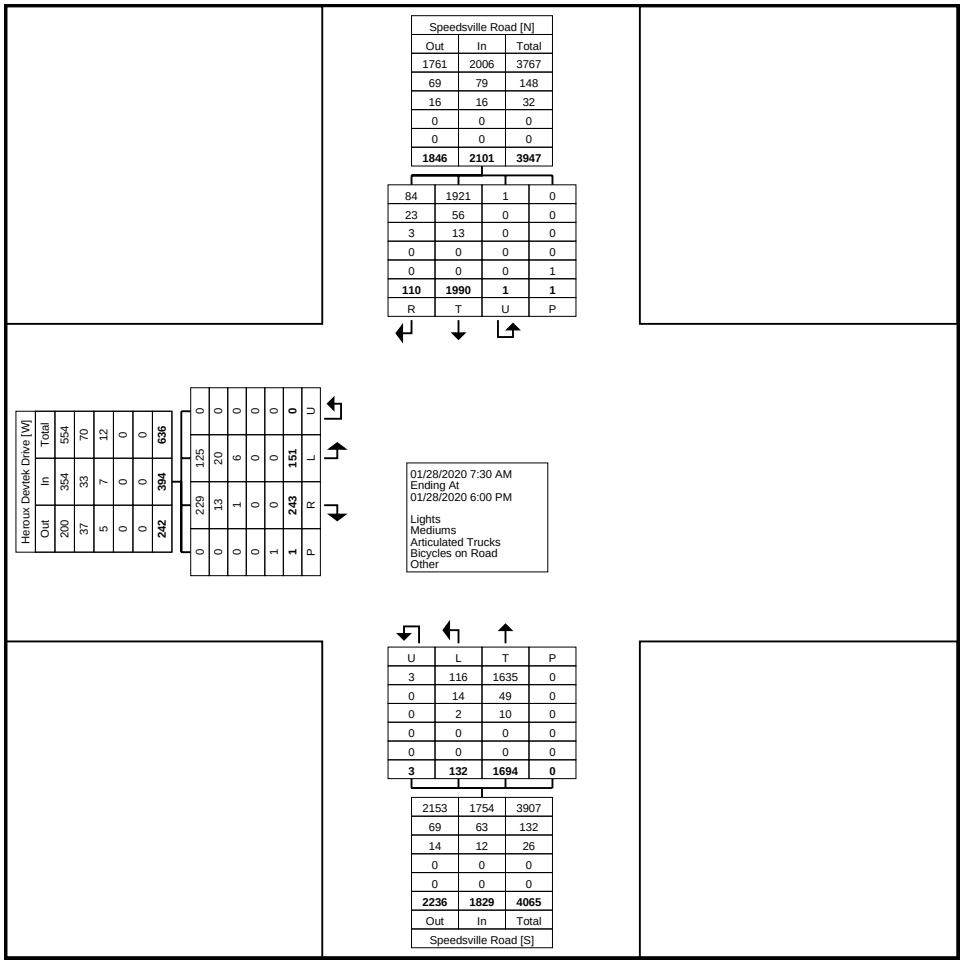
Start Time	Heroux Devtek Drive Eastbound					Speedsville Road Northbound					Speedsville Road Southbound					
	Left	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Int. Total
7:30 AM	3	7	0	0	10	8	93	0	0	101	79	1	0	0	80	191
7:45 AM	2	2	0	0	4	5	64	0	0	69	92	9	0	0	101	174
Hourly Total	5	9	0	0	14	13	157	0	0	170	171	10	0	0	181	365
8:00 AM	2	6	0	0	8	6	62	0	0	68	80	1	0	0	81	157
8:15 AM	9	3	0	0	12	10	50	0	0	60	75	6	0	0	81	153
8:30 AM	2	5	0	0	7	6	49	0	0	55	58	8	0	0	66	128
8:45 AM	3	2	0	0	5	5	63	1	0	69	57	6	0	0	63	137
Hourly Total	16	16	0	0	32	27	224	1	0	252	270	21	0	0	291	575
9:00 AM	1	5	0	0	6	5	36	0	0	41	47	3	0	0	50	97
9:15 AM	2	1	0	0	3	0	32	0	0	32	40	3	0	0	43	78
9:30 AM	2	6	0	0	8	3	29	0	0	32	33	1	0	0	34	74
9:45 AM	4	5	0	0	9	7	41	0	0	48	28	6	0	0	34	91
Hourly Total	9	17	0	0	26	15	138	0	0	153	148	13	0	0	161	340
10:00 AM	2	1	0	0	3	5	38	0	0	43	47	2	0	0	49	95
10:15 AM	0	3	0	1	3	1	32	0	0	33	32	2	0	0	34	70
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	2	4	0	1	6	6	70	0	0	76	79	4	0	0	83	165
12:00 PM	8	13	0	0	21	3	44	0	0	47	53	3	0	0	56	124
12:15 PM	3	4	0	0	7	4	52	0	0	56	48	3	0	0	51	114
12:30 PM	0	3	0	0	3	7	49	1	0	57	41	2	0	0	43	103
12:45 PM	3	4	0	0	7	8	42	0	0	50	57	3	0	0	60	117
Hourly Total	14	24	0	0	38	22	187	1	0	210	199	11	0	0	210	458
1:00 PM	2	7	0	0	9	5	51	0	0	56	38	2	0	0	40	105
1:15 PM	3	5	0	0	8	7	34	0	0	41	49	4	1	0	54	103
1:30 PM	0	4	0	0	4	1	45	0	0	46	52	3	0	1	55	105
1:45 PM	2	2	0	0	4	4	55	0	0	59	45	2	0	0	47	110
Hourly Total	7	18	0	0	25	17	185	0	0	202	184	11	1	1	196	423
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3:00 PM	3	34	0	0	37	2	51	0	0	53	91	1	0	0	92	182
3:15 PM	9	7	0	0	16	3	68	0	0	71	79	5	0	0	84	171
3:30 PM	15	16	0	0	31	3	56	0	0	59	91	5	0	0	96	186
3:45 PM	10	12	0	0	22	4	70	0	0	74	58	5	0	0	63	159
Hourly Total	37	69	0	0	106	12	245	0	0	257	319	16	0	0	335	698
4:00 PM	16	18	0	0	34	4	65	0	0	69	60	4	0	0	64	167
4:15 PM	4	8	0	0	12	3	74	0	0	77	78	4	0	0	82	171
4:30 PM	11	17	0	0	28	6	73	0	0	79	89	0	0	0	89	196

4:45 PM	9	8	0	0	17	2	69	0	0	71	67	3	0	0	70	158
Hourly Total	40	51	0	0	91	15	281	0	0	296	294	11	0	0	305	692
5:00 PM	12	16	0	0	28	3	74	0	0	77	99	4	0	0	103	208
5:15 PM	3	10	0	0	13	1	61	0	0	62	89	7	0	0	96	171
5:30 PM	6	6	0	0	12	0	41	0	0	41	74	1	0	0	75	128
5:45 PM	0	3	0	0	3	1	31	1	0	33	64	1	0	0	65	101
Hourly Total	21	35	0	0	56	5	207	1	0	213	326	13	0	0	339	608
Grand Total	151	243	0	1	394	132	1694	3	0	1829	1990	110	1	1	2101	4324
Approach %	38.3	61.7	0.0	-	-	7.2	92.6	0.2	-	-	94.7	5.2	0.0	-	-	-
Total %	3.5	5.6	0.0	-	9.1	3.1	39.2	0.1	-	42.3	46.0	2.5	0.0	-	48.6	-
Lights	125	229	0	-	354	116	1635	3	-	1754	1921	84	1	-	2006	4114
% Lights	82.8	94.2	-	-	89.8	87.9	96.5	100.0	-	95.9	96.5	76.4	100.0	-	95.5	95.1
Mediums	20	13	0	-	33	14	49	0	-	63	56	23	0	-	79	175
% Mediums	13.2	5.3	-	-	8.4	10.6	2.9	0.0	-	3.4	2.8	20.9	0.0	-	3.8	4.0
Articulated Trucks	6	1	0	-	7	2	10	0	-	12	13	3	0	-	16	35
% Articulated Trucks	4.0	0.4	-	-	1.8	1.5	0.6	0.0	-	0.7	0.7	2.7	0.0	-	0.8	0.8
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	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	0.0	-	-	-	-	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	1	-	-	-	-	0	-	-	-	-	1	-	-
% Pedestrians	-	-	-	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: Speedsville Road & Heroux Devtek Drive
Site Code:
Start Date: 01/28/2020



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: Speedsville Road & Heroux Devtek Drive
Site Code:
Start Date: 01/28/2020

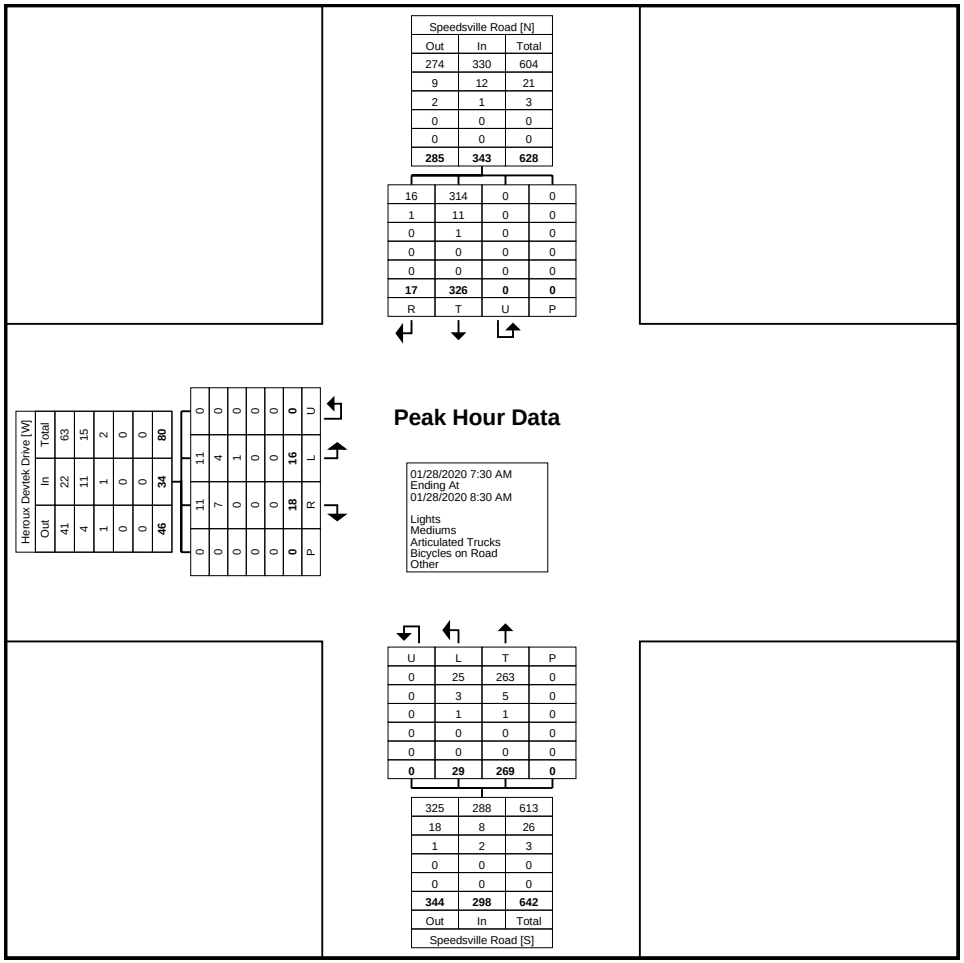
Turning Movement Peak Hour Data (7:30 AM)

Start Time	Heroux Devtek Drive Eastbound					Speedsville Road Northbound					Speedsville Road Southbound					
	Left	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Int. Total
7:30 AM	3	7	0	0	10	8	93	0	0	101	79	1	0	0	80	191
7:45 AM	2	2	0	0	4	5	64	0	0	69	92	9	0	0	101	174
8:00 AM	2	6	0	0	8	6	62	0	0	68	80	1	0	0	81	157
8:15 AM	9	3	0	0	12	10	50	0	0	60	75	6	0	0	81	153
Total	16	18	0	0	34	29	269	0	0	298	326	17	0	0	343	675
Approach %	47.1	52.9	0.0	-	-	9.7	90.3	0.0	-	-	95.0	5.0	0.0	-	-	-
Total %	2.4	2.7	0.0	-	5.0	4.3	39.9	0.0	-	44.1	48.3	2.5	0.0	-	50.8	-
PHF	0.444	0.643	0.000	-	0.708	0.725	0.723	0.000	-	0.738	0.886	0.472	0.000	-	0.849	0.884
Lights	11	11	0	-	22	25	263	0	-	288	314	16	0	-	330	640
% Lights	68.8	61.1	-	-	64.7	86.2	97.8	-	-	96.6	96.3	94.1	-	-	96.2	94.8
Mediums	4	7	0	-	11	3	5	0	-	8	11	1	0	-	12	31
% Mediums	25.0	38.9	-	-	32.4	10.3	1.9	-	-	2.7	3.4	5.9	-	-	3.5	4.6
Articulated Trucks	1	0	0	-	1	1	1	0	-	2	1	0	0	-	1	4
% Articulated Trucks	6.3	0.0	-	-	2.9	3.4	0.4	-	-	0.7	0.3	0.0	-	-	0.3	0.6
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	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

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

Count Name: Speedsville Road & Heroux
Devtek Drive
Site Code:
Start Date: 01/28/2020



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: Speedsville Road & Heroux Devtek Drive
Site Code:
Start Date: 01/28/2020

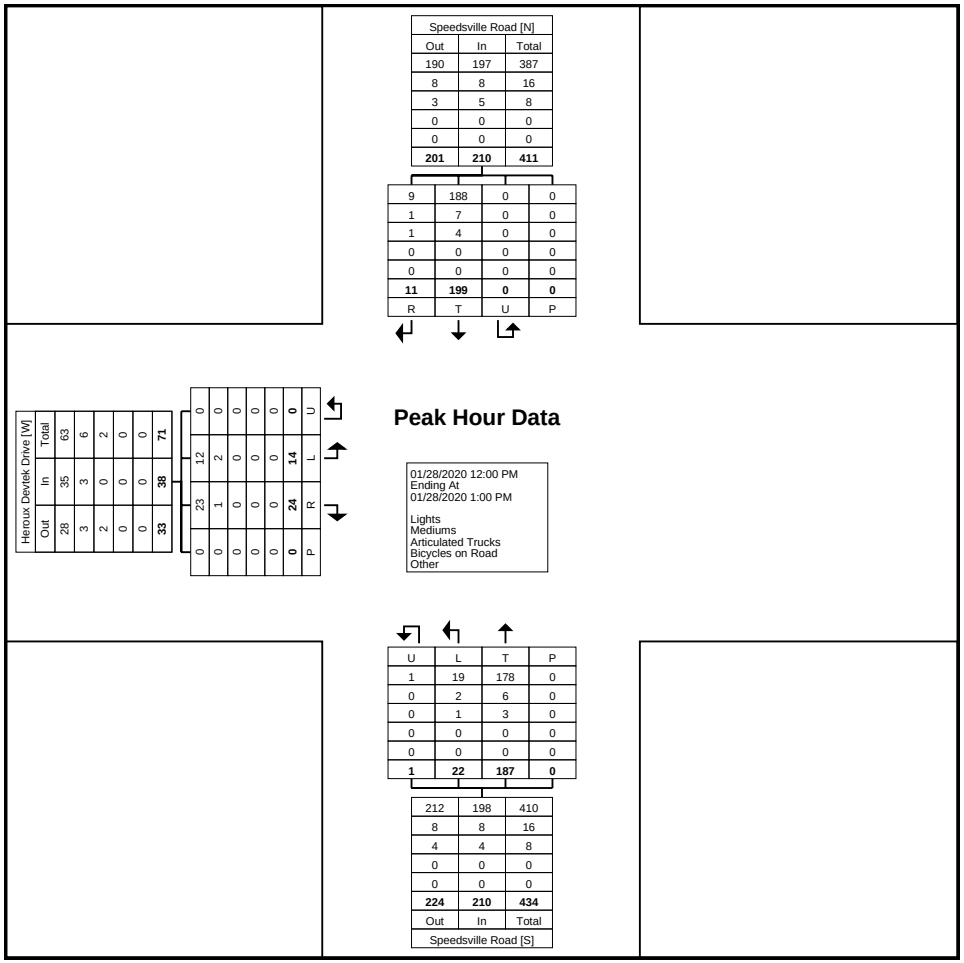
Turning Movement Peak Hour Data (12:00 PM)

Start Time	Heroux Devtek Drive Eastbound					Speedsville Road Northbound					Speedsville Road Southbound					
	Left	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Int. Total
12:00 PM	8	13	0	0	21	3	44	0	0	47	53	3	0	0	56	124
12:15 PM	3	4	0	0	7	4	52	0	0	56	48	3	0	0	51	114
12:30 PM	0	3	0	0	3	7	49	1	0	57	41	2	0	0	43	103
12:45 PM	3	4	0	0	7	8	42	0	0	50	57	3	0	0	60	117
Total	14	24	0	0	38	22	187	1	0	210	199	11	0	0	210	458
Approach %	36.8	63.2	0.0	-	-	10.5	89.0	0.5	-	-	94.8	5.2	0.0	-	-	-
Total %	3.1	5.2	0.0	-	8.3	4.8	40.8	0.2	-	45.9	43.4	2.4	0.0	-	45.9	-
PHF	0.438	0.462	0.000	-	0.452	0.688	0.899	0.250	-	0.921	0.873	0.917	0.000	-	0.875	0.923
Lights	12	23	0	-	35	19	178	1	-	198	188	9	0	-	197	430
% Lights	85.7	95.8	-	-	92.1	86.4	95.2	100.0	-	94.3	94.5	81.8	-	-	93.8	93.9
Mediums	2	1	0	-	3	2	6	0	-	8	7	1	0	-	8	19
% Mediums	14.3	4.2	-	-	7.9	9.1	3.2	0.0	-	3.8	3.5	9.1	-	-	3.8	4.1
Articulated Trucks	0	0	0	-	0	1	3	0	-	4	4	1	0	-	5	9
% Articulated Trucks	0.0	0.0	-	-	0.0	4.5	1.6	0.0	-	1.9	2.0	9.1	-	-	2.4	2.0
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	0.0
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

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

Count Name: Speedsville Road & Heroux
Devtek Drive
Site Code:
Start Date: 01/28/2020



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: Speedsville Road & Heroux Devtek Drive
Site Code:
Start Date: 01/28/2020

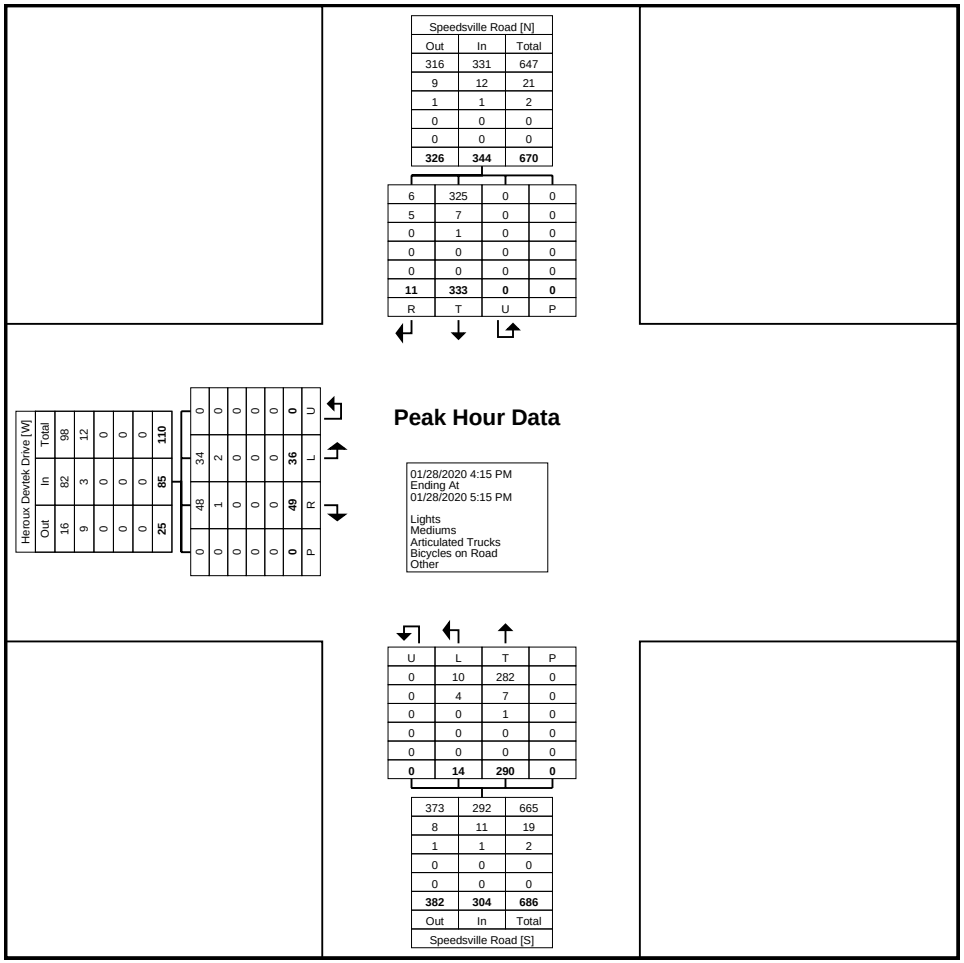
Turning Movement Peak Hour Data (4:15 PM)

Start Time	Heroux Devtek Drive Eastbound					Speedsville Road Northbound					Speedsville Road Southbound					
	Left	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Int. Total
4:15 PM	4	8	0	0	12	3	74	0	0	77	78	4	0	0	82	171
4:30 PM	11	17	0	0	28	6	73	0	0	79	89	0	0	0	89	196
4:45 PM	9	8	0	0	17	2	69	0	0	71	67	3	0	0	70	158
5:00 PM	12	16	0	0	28	3	74	0	0	77	99	4	0	0	103	208
Total	36	49	0	0	85	14	290	0	0	304	333	11	0	0	344	733
Approach %	42.4	57.6	0.0	-	-	4.6	95.4	0.0	-	-	96.8	3.2	0.0	-	-	-
Total %	4.9	6.7	0.0	-	11.6	1.9	39.6	0.0	-	41.5	45.4	1.5	0.0	-	46.9	-
PHF	0.750	0.721	0.000	-	0.759	0.583	0.980	0.000	-	0.962	0.841	0.688	0.000	-	0.835	0.881
Lights	34	48	0	-	82	10	282	0	-	292	325	6	0	-	331	705
% Lights	94.4	98.0	-	-	96.5	71.4	97.2	-	-	96.1	97.6	54.5	-	-	96.2	96.2
Mediums	2	1	0	-	3	4	7	0	-	11	7	5	0	-	12	26
% Mediums	5.6	2.0	-	-	3.5	28.6	2.4	-	-	3.6	2.1	45.5	-	-	3.5	3.5
Articulated Trucks	0	0	0	-	0	0	1	0	-	1	1	0	0	-	1	2
% Articulated Trucks	0.0	0.0	-	-	0.0	0.0	0.3	-	-	0.3	0.3	0.0	-	-	0.3	0.3
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	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

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

Count Name: Speedsville Road & Heroux
Devtek Drive
Site Code:
Start Date: 01/28/2020



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@ptsl.com

Count Name: Speedsville Road & Heroux Devtek Drive
Site Code:
Start Date: 01/28/2020

Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

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

Count Name: Speedsville Road & Equestrian Way
Site Code:
Start Date: 01/28/2020

Turning Movement Data

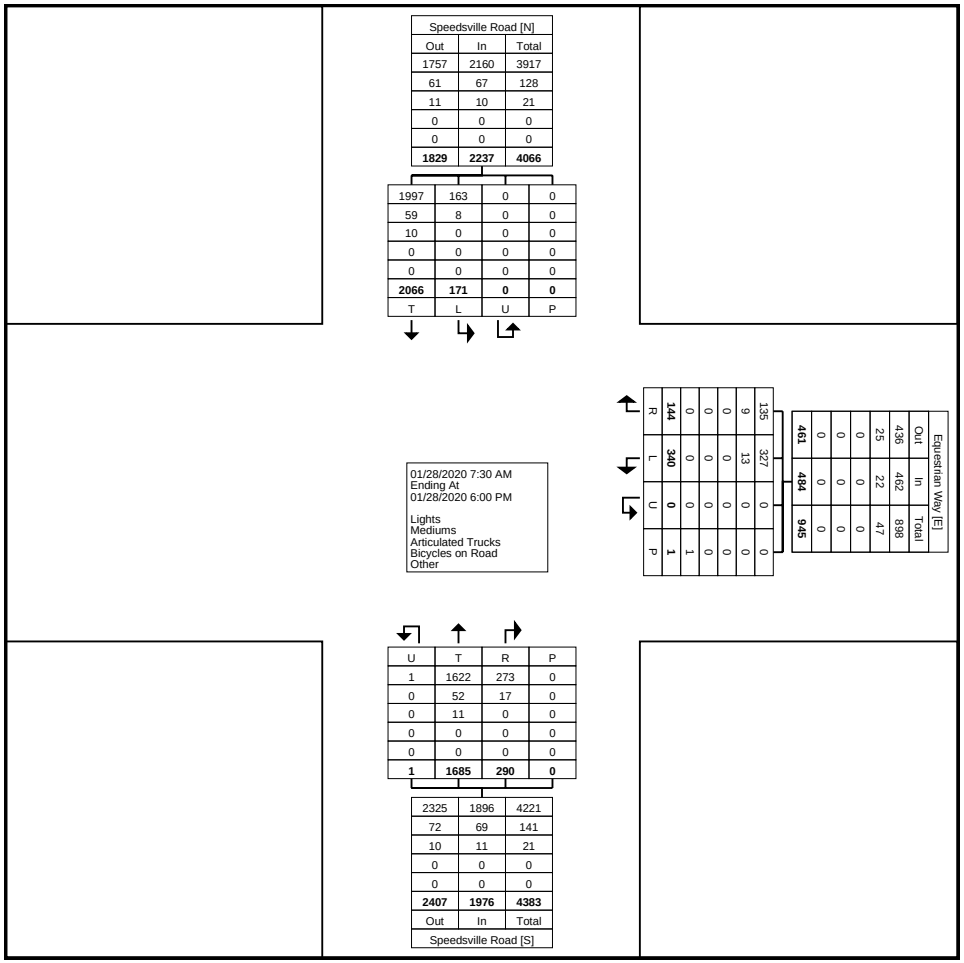
Start Time	Equestrian Way Westbound					Speedsville Road Northbound					Speedsville Road Southbound					
	Left	Right	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Int. Total
7:30 AM	16	10	0	0	26	86	7	0	0	93	4	84	0	0	88	207
7:45 AM	17	8	0	0	25	62	7	0	0	69	5	86	0	0	91	185
Hourly Total	33	18	0	0	51	148	14	0	0	162	9	170	0	0	179	392
8:00 AM	12	3	0	0	15	68	10	0	0	78	7	80	0	0	87	180
8:15 AM	19	5	0	0	24	51	8	0	0	59	7	74	0	0	81	164
8:30 AM	19	7	0	0	26	53	4	0	0	57	3	59	0	0	62	145
8:45 AM	8	8	0	0	16	59	7	0	0	66	5	57	0	0	62	144
Hourly Total	58	23	0	0	81	231	29	0	0	260	22	270	0	0	292	633
9:00 AM	15	4	0	0	19	39	6	0	0	45	7	42	0	0	49	113
9:15 AM	5	2	0	0	7	32	13	0	0	45	3	41	0	0	44	96
9:30 AM	8	2	0	0	10	28	8	0	0	36	2	36	0	0	38	84
9:45 AM	10	2	0	0	12	47	1	1	0	49	1	33	0	0	34	95
Hourly Total	38	10	0	0	48	146	28	1	0	175	13	152	0	0	165	388
10:00 AM	11	2	0	0	13	39	3	0	0	42	5	42	0	0	47	102
10:15 AM	5	1	0	0	6	32	4	0	0	36	3	31	0	0	34	76
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	16	3	0	0	19	71	7	0	0	78	8	73	0	0	81	178
12:00 PM	11	3	0	0	14	44	9	0	0	53	1	58	0	0	59	126
12:15 PM	6	4	0	0	10	51	7	0	0	58	8	50	0	0	58	126
12:30 PM	13	3	0	0	16	58	9	0	0	67	2	42	0	0	44	127
12:45 PM	8	2	0	0	10	45	7	0	0	52	5	53	0	0	58	120
Hourly Total	38	12	0	0	50	198	32	0	0	230	16	203	0	0	219	499
1:00 PM	8	3	0	0	11	55	4	0	0	59	3	46	0	0	49	119
1:15 PM	9	3	0	0	12	37	17	0	0	54	3	50	0	0	53	119
1:30 PM	17	3	0	1	20	42	7	0	0	49	3	54	0	0	57	126
1:45 PM	6	4	0	0	10	58	8	0	0	66	5	42	0	0	47	123
Hourly Total	40	13	0	1	53	192	36	0	0	228	14	192	0	0	206	487
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3:00 PM	7	2	0	0	9	51	9	0	0	60	2	121	0	0	123	192
3:15 PM	7	5	0	0	12	63	11	0	0	74	2	88	0	0	90	176
3:30 PM	8	8	0	0	16	54	16	0	0	70	10	97	0	0	107	193
3:45 PM	10	8	0	0	18	65	12	0	0	77	4	67	0	0	71	166
Hourly Total	32	23	0	0	55	233	48	0	0	281	18	373	0	0	391	727
4:00 PM	10	5	0	0	15	66	12	0	0	78	8	66	0	0	74	167
4:15 PM	7	11	0	0	18	66	9	0	0	75	8	82	0	0	90	183
4:30 PM	10	3	0	0	13	79	15	0	0	94	12	89	0	0	101	208

4:45 PM	10	7	0	0	17	61	9	0	0	70	4	73	0	0	77	164
Hourly Total	37	26	0	0	63	272	45	0	0	317	32	310	0	0	342	722
5:00 PM	15	8	0	0	23	68	9	0	0	77	8	103	0	0	111	211
5:15 PM	14	1	0	0	15	59	15	0	0	74	13	87	0	0	100	189
5:30 PM	12	4	0	0	16	36	16	0	0	52	11	72	0	0	83	151
5:45 PM	7	3	0	0	10	31	11	0	0	42	7	61	0	0	68	120
Hourly Total	48	16	0	0	64	194	51	0	0	245	39	323	0	0	362	671
Grand Total	340	144	0	1	484	1685	290	1	0	1976	171	2066	0	0	2237	4697
Approach %	70.2	29.8	0.0	-	-	85.3	14.7	0.1	-	-	7.6	92.4	0.0	-	-	-
Total %	7.2	3.1	0.0	-	10.3	35.9	6.2	0.0	-	42.1	3.6	44.0	0.0	-	47.6	-
Lights	327	135	0	-	462	1622	273	1	-	1896	163	1997	0	-	2160	4518
% Lights	96.2	93.8	-	-	95.5	96.3	94.1	100.0	-	96.0	95.3	96.7	-	-	96.6	96.2
Mediums	13	9	0	-	22	52	17	0	-	69	8	59	0	-	67	158
% Mediums	3.8	6.3	-	-	4.5	3.1	5.9	0.0	-	3.5	4.7	2.9	-	-	3.0	3.4
Articulated Trucks	0	0	0	-	0	11	0	0	-	11	0	10	0	-	10	21
% Articulated Trucks	0.0	0.0	-	-	0.0	0.7	0.0	0.0	-	0.6	0.0	0.5	-	-	0.4	0.4
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	0.0
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	0.0	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	1	-	-	-	-	0	-	-	-	-	0	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	-

Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

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

Count Name: Speedsville Road & Equestrian Way
Site Code:
Start Date: 01/28/2020



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: Speedsville Road & Equestrian Way
Site Code:
Start Date: 01/28/2020

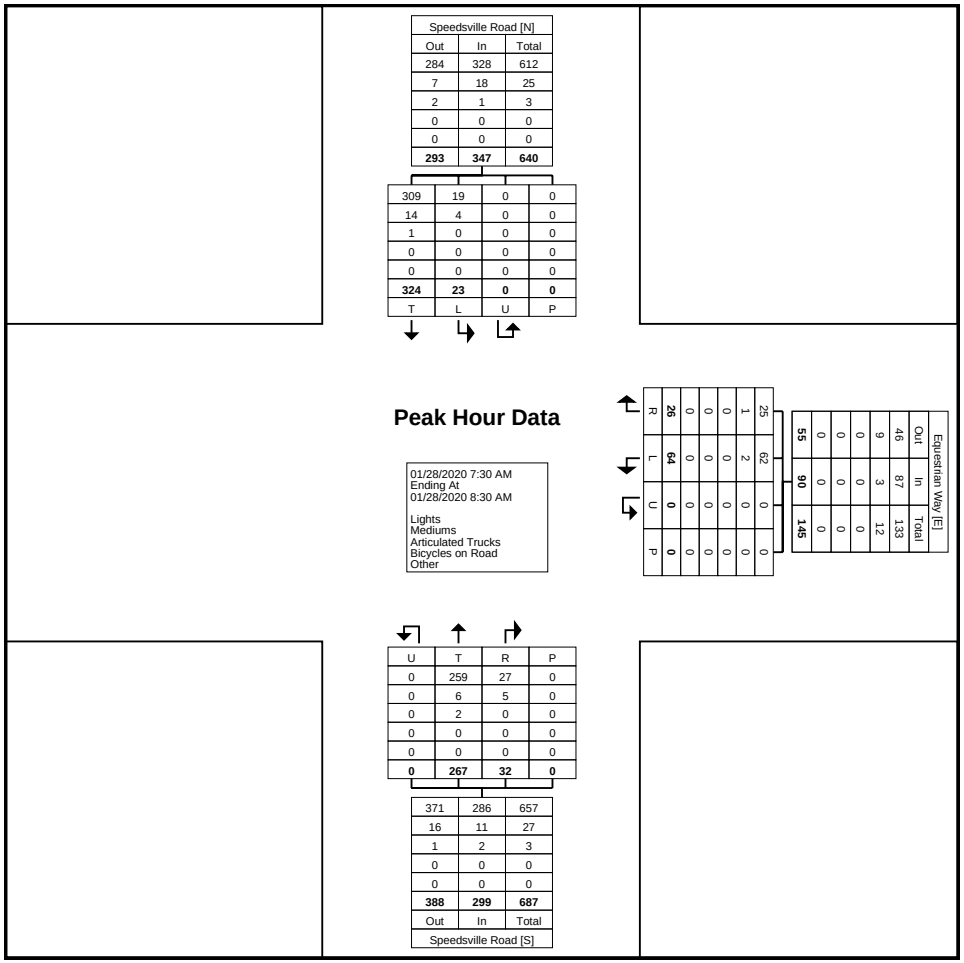
Turning Movement Peak Hour Data (7:30 AM)

Start Time	Equestrian Way Westbound					Speedsville Road Northbound					Speedsville Road Southbound					
	Left	Right	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Int. Total
7:30 AM	16	10	0	0	26	86	7	0	0	93	4	84	0	0	88	207
7:45 AM	17	8	0	0	25	62	7	0	0	69	5	86	0	0	91	185
8:00 AM	12	3	0	0	15	68	10	0	0	78	7	80	0	0	87	180
8:15 AM	19	5	0	0	24	51	8	0	0	59	7	74	0	0	81	164
Total	64	26	0	0	90	267	32	0	0	299	23	324	0	0	347	736
Approach %	71.1	28.9	0.0	-	-	89.3	10.7	0.0	-	-	6.6	93.4	0.0	-	-	-
Total %	8.7	3.5	0.0	-	12.2	36.3	4.3	0.0	-	40.6	3.1	44.0	0.0	-	47.1	-
PHF	0.842	0.650	0.000	-	0.865	0.776	0.800	0.000	-	0.804	0.821	0.942	0.000	-	0.953	0.889
Lights	62	25	0	-	87	259	27	0	-	286	19	309	0	-	328	701
% Lights	96.9	96.2	-	-	96.7	97.0	84.4	-	-	95.7	82.6	95.4	-	-	94.5	95.2
Mediums	2	1	0	-	3	6	5	0	-	11	4	14	0	-	18	32
% Mediums	3.1	3.8	-	-	3.3	2.2	15.6	-	-	3.7	17.4	4.3	-	-	5.2	4.3
Articulated Trucks	0	0	0	-	0	2	0	0	-	2	0	1	0	-	1	3
% Articulated Trucks	0.0	0.0	-	-	0.0	0.7	0.0	-	-	0.7	0.0	0.3	-	-	0.3	0.4
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	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

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

Count Name: Speedsville Road & Equestrian Way
Site Code:
Start Date: 01/28/2020



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: Speedsville Road & Equestrian Way
Site Code:
Start Date: 01/28/2020

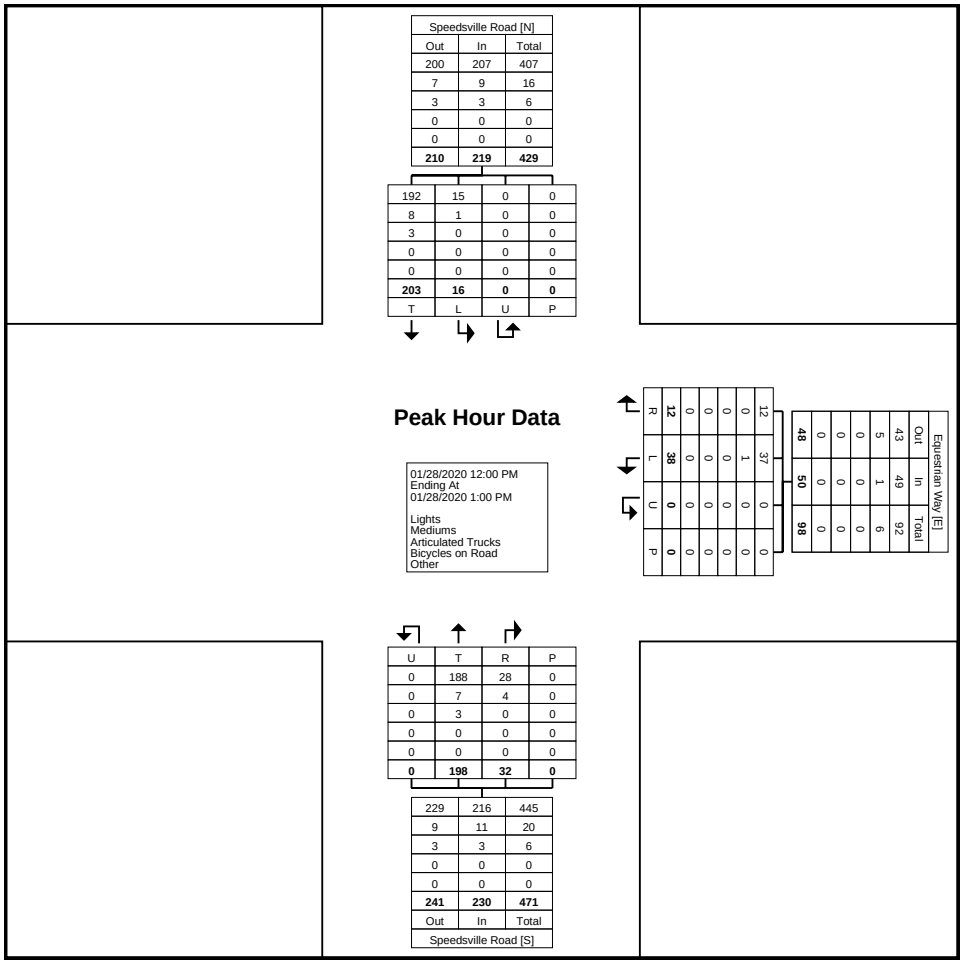
Turning Movement Peak Hour Data (12:00 PM)

Start Time	Equestrian Way Westbound					Speedsville Road Northbound					Speedsville Road Southbound					
	Left	Right	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Int. Total
12:00 PM	11	3	0	0	14	44	9	0	0	53	1	58	0	0	59	126
12:15 PM	6	4	0	0	10	51	7	0	0	58	8	50	0	0	58	126
12:30 PM	13	3	0	0	16	58	9	0	0	67	2	42	0	0	44	127
12:45 PM	8	2	0	0	10	45	7	0	0	52	5	53	0	0	58	120
Total	38	12	0	0	50	198	32	0	0	230	16	203	0	0	219	499
Approach %	76.0	24.0	0.0	-	-	86.1	13.9	0.0	-	-	7.3	92.7	0.0	-	-	-
Total %	7.6	2.4	0.0	-	10.0	39.7	6.4	0.0	-	46.1	3.2	40.7	0.0	-	43.9	-
PHF	0.731	0.750	0.000	-	0.781	0.853	0.889	0.000	-	0.858	0.500	0.875	0.000	-	0.928	0.982
Lights	37	12	0	-	49	188	28	0	-	216	15	192	0	-	207	472
% Lights	97.4	100.0	-	-	98.0	94.9	87.5	-	-	93.9	93.8	94.6	-	-	94.5	94.6
Mediums	1	0	0	-	1	7	4	0	-	11	1	8	0	-	9	21
% Mediums	2.6	0.0	-	-	2.0	3.5	12.5	-	-	4.8	6.3	3.9	-	-	4.1	4.2
Articulated Trucks	0	0	0	-	0	3	0	0	-	3	0	3	0	-	3	6
% Articulated Trucks	0.0	0.0	-	-	0.0	1.5	0.0	-	-	1.3	0.0	1.5	-	-	1.4	1.2
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	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

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

Count Name: Speedsville Road & Equestrian Way
Site Code:
Start Date: 01/28/2020



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: Speedsville Road & Equestrian Way
Site Code:
Start Date: 01/28/2020

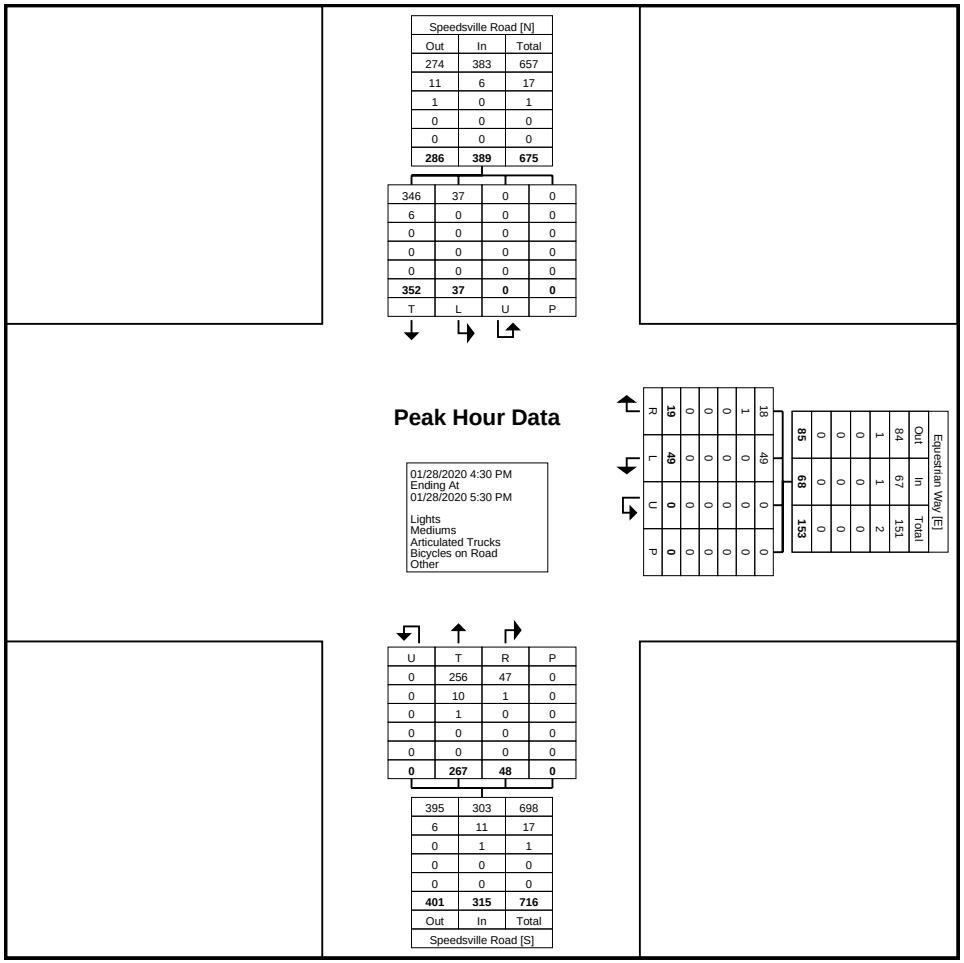
Turning Movement Peak Hour Data (4:30 PM)

Start Time	Equestrian Way Westbound					Speedsville Road Northbound					Speedsville Road Southbound					
	Left	Right	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Int. Total
4:30 PM	10	3	0	0	13	79	15	0	0	94	12	89	0	0	101	208
4:45 PM	10	7	0	0	17	61	9	0	0	70	4	73	0	0	77	164
5:00 PM	15	8	0	0	23	68	9	0	0	77	8	103	0	0	111	211
5:15 PM	14	1	0	0	15	59	15	0	0	74	13	87	0	0	100	189
Total	49	19	0	0	68	267	48	0	0	315	37	352	0	0	389	772
Approach %	72.1	27.9	0.0	-	-	84.8	15.2	0.0	-	-	9.5	90.5	0.0	-	-	-
Total %	6.3	2.5	0.0	-	8.8	34.6	6.2	0.0	-	40.8	4.8	45.6	0.0	-	50.4	-
PHF	0.817	0.594	0.000	-	0.739	0.845	0.800	0.000	-	0.838	0.712	0.854	0.000	-	0.876	0.915
Lights	49	18	0	-	67	256	47	0	-	303	37	346	0	-	383	753
% Lights	100.0	94.7	-	-	98.5	95.9	97.9	-	-	96.2	100.0	98.3	-	-	98.5	97.5
Mediums	0	1	0	-	1	10	1	0	-	11	0	6	0	-	6	18
% Mediums	0.0	5.3	-	-	1.5	3.7	2.1	-	-	3.5	0.0	1.7	-	-	1.5	2.3
Articulated Trucks	0	0	0	-	0	1	0	0	-	1	0	0	0	-	0	1
% Articulated Trucks	0.0	0.0	-	-	0.0	0.4	0.0	-	-	0.3	0.0	0.0	-	-	0.0	0.1
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	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

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

Count Name: Speedsville Road & Equestrian Way
Site Code:
Start Date: 01/28/2020



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@ptsl.com

Count Name: Speedsville Road & Equestrian Way
Site Code:
Start Date: 01/28/2020

Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

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

Count Name: Speedsville Road & Royal Oak Rad
Site Code:
Start Date: 01/28/2020

Turning Movement Data

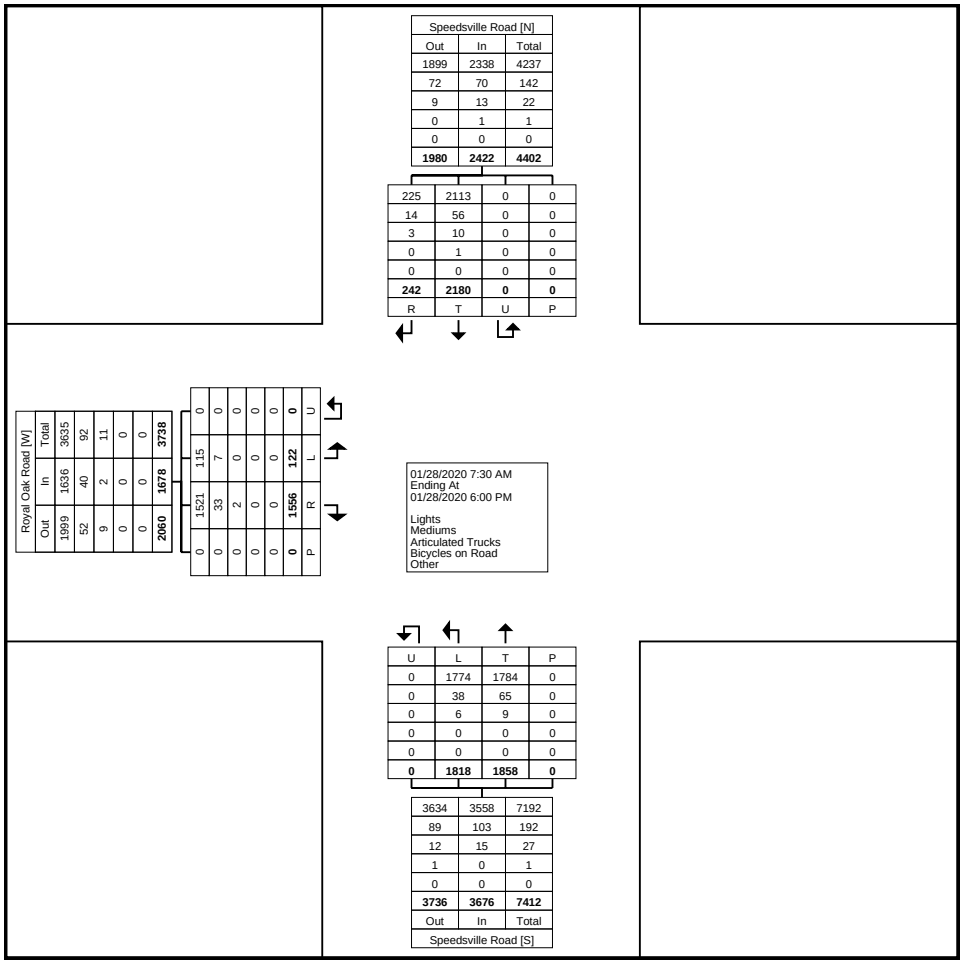
Start Time	Royal Oak Road Eastbound					Speedsville Road Northbound					Speedsville Road Southbound					
	Left	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Int. Total
7:30 AM	0	42	0	0	42	85	90	0	0	175	86	16	0	0	102	319
7:45 AM	3	51	0	0	54	131	68	0	0	199	83	21	0	0	104	357
Hourly Total	3	93	0	0	96	216	158	0	0	374	169	37	0	0	206	676
8:00 AM	1	45	0	0	46	80	75	0	0	155	85	7	0	0	92	293
8:15 AM	1	35	0	0	36	69	56	0	0	125	81	10	0	0	91	252
8:30 AM	2	25	0	0	27	48	57	0	0	105	66	14	0	0	80	212
8:45 AM	3	34	0	0	37	53	67	0	0	120	60	4	0	0	64	221
Hourly Total	7	139	0	0	146	250	255	0	0	505	292	35	0	0	327	978
9:00 AM	1	32	0	0	33	38	43	0	0	81	46	9	0	0	55	169
9:15 AM	6	26	0	0	32	32	38	0	0	70	47	3	0	0	50	152
9:30 AM	1	26	0	0	27	45	35	0	0	80	41	4	0	0	45	152
9:45 AM	1	25	0	0	26	39	49	0	0	88	40	3	0	0	43	157
Hourly Total	9	109	0	0	118	154	165	0	0	319	174	19	0	0	193	630
10:00 AM	0	34	0	0	34	18	41	0	0	59	46	4	0	0	50	143
10:15 AM	3	25	0	0	28	24	33	0	0	57	37	1	0	0	38	123
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	3	59	0	0	62	42	74	0	0	116	83	5	0	0	88	266
12:00 PM	9	49	0	0	58	27	44	0	0	71	65	4	0	0	69	198
12:15 PM	6	26	0	0	32	33	50	0	0	83	55	1	0	0	56	171
12:30 PM	2	29	0	0	31	57	68	0	0	125	46	9	0	0	55	211
12:45 PM	5	44	0	0	49	45	46	0	0	91	57	7	0	0	64	204
Hourly Total	22	148	0	0	170	162	208	0	0	370	223	21	0	0	244	784
1:00 PM	6	38	0	0	44	37	52	0	0	89	45	8	0	0	53	186
1:15 PM	3	35	0	0	38	30	49	0	0	79	47	7	0	0	54	171
1:30 PM	3	24	0	0	27	40	47	0	0	87	68	5	0	0	73	187
1:45 PM	3	33	0	0	36	42	64	0	0	106	43	5	0	0	48	190
Hourly Total	15	130	0	0	145	149	212	0	0	361	203	25	0	0	228	734
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3:00 PM	4	82	0	0	86	46	59	0	0	105	126	9	0	0	135	326
3:15 PM	12	89	0	0	101	54	61	0	0	115	93	3	0	0	96	312
3:30 PM	8	118	0	0	126	53	61	0	0	114	94	12	0	0	106	346
3:45 PM	5	61	0	0	66	40	75	0	0	115	67	12	0	0	79	260
Hourly Total	29	350	0	0	379	193	256	0	0	449	380	36	0	0	416	1244
4:00 PM	3	89	0	0	92	76	76	0	0	152	74	4	0	0	78	322
4:15 PM	4	77	0	0	81	98	68	0	0	166	82	7	0	0	89	336
4:30 PM	8	61	0	0	69	90	83	0	0	173	86	8	0	0	94	336

4:45 PM	6	61	0	0	67	114	67	0	0	181	82	6	0	0	88	336
Hourly Total	21	288	0	0	309	378	294	0	0	672	324	25	0	0	349	1330
5:00 PM	5	90	0	0	95	120	77	0	0	197	105	10	0	0	115	407
5:15 PM	4	58	0	0	62	85	71	0	0	156	95	12	0	0	107	325
5:30 PM	3	46	0	0	49	40	48	0	0	88	74	10	0	0	84	221
5:45 PM	1	46	0	0	47	29	40	0	0	69	58	7	0	0	65	181
Hourly Total	13	240	0	0	253	274	236	0	0	510	332	39	0	0	371	1134
Grand Total	122	1556	0	0	1678	1818	1858	0	0	3676	2180	242	0	0	2422	7776
Approach %	7.3	92.7	0.0	-	-	49.5	50.5	0.0	-	-	90.0	10.0	0.0	-	-	-
Total %	1.6	20.0	0.0	-	21.6	23.4	23.9	0.0	-	47.3	28.0	3.1	0.0	-	31.1	-
Lights	115	1521	0	-	1636	1774	1784	0	-	3558	2113	225	0	-	2338	7532
% Lights	94.3	97.8	-	-	97.5	97.6	96.0	-	-	96.8	96.9	93.0	-	-	96.5	96.9
Mediums	7	33	0	-	40	38	65	0	-	103	56	14	0	-	70	213
% Mediums	5.7	2.1	-	-	2.4	2.1	3.5	-	-	2.8	2.6	5.8	-	-	2.9	2.7
Articulated Trucks	0	2	0	-	2	6	9	0	-	15	10	3	0	-	13	30
% Articulated Trucks	0.0	0.1	-	-	0.1	0.3	0.5	-	-	0.4	0.5	1.2	-	-	0.5	0.4
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	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

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

Count Name: Speedsville Road & Royal Oak Rad
Site Code:
Start Date: 01/28/2020



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: Speedsville Road & Royal Oak Rad
Site Code:
Start Date: 01/28/2020

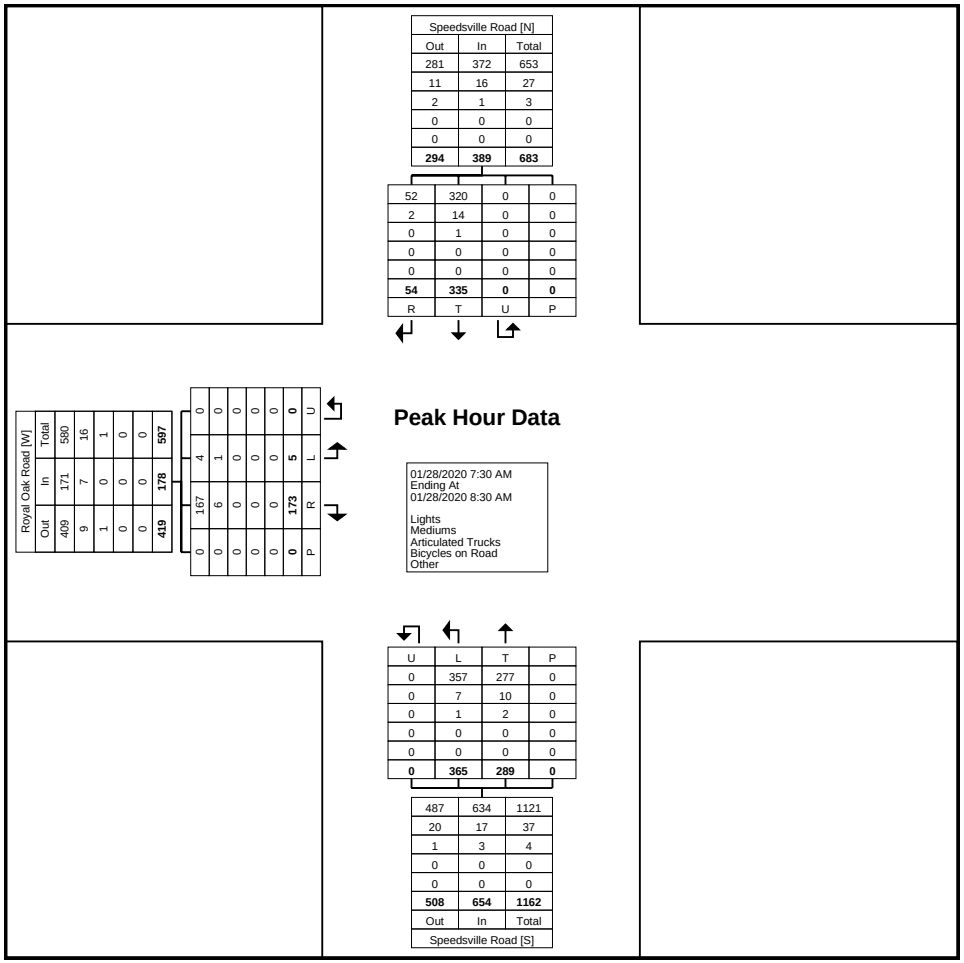
Turning Movement Peak Hour Data (7:30 AM)

Start Time	Royal Oak Road Eastbound					Speedsville Road Northbound					Speedsville Road Southbound					
	Left	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Int. Total
7:30 AM	0	42	0	0	42	85	90	0	0	175	86	16	0	0	102	319
7:45 AM	3	51	0	0	54	131	68	0	0	199	83	21	0	0	104	357
8:00 AM	1	45	0	0	46	80	75	0	0	155	85	7	0	0	92	293
8:15 AM	1	35	0	0	36	69	56	0	0	125	81	10	0	0	91	252
Total	5	173	0	0	178	365	289	0	0	654	335	54	0	0	389	1221
Approach %	2.8	97.2	0.0	-	-	55.8	44.2	0.0	-	-	86.1	13.9	0.0	-	-	-
Total %	0.4	14.2	0.0	-	14.6	29.9	23.7	0.0	-	53.6	27.4	4.4	0.0	-	31.9	-
PHF	0.417	0.848	0.000	-	0.824	0.697	0.803	0.000	-	0.822	0.974	0.643	0.000	-	0.935	0.855
Lights	4	167	0	-	171	357	277	0	-	634	320	52	0	-	372	1177
% Lights	80.0	96.5	-	-	96.1	97.8	95.8	-	-	96.9	95.5	96.3	-	-	95.6	96.4
Mediums	1	6	0	-	7	7	10	0	-	17	14	2	0	-	16	40
% Mediums	20.0	3.5	-	-	3.9	1.9	3.5	-	-	2.6	4.2	3.7	-	-	4.1	3.3
Articulated Trucks	0	0	0	-	0	1	2	0	-	3	1	0	0	-	1	4
% Articulated Trucks	0.0	0.0	-	-	0.0	0.3	0.7	-	-	0.5	0.3	0.0	-	-	0.3	0.3
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	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

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

Count Name: Speedsville Road & Royal Oak Rad
Site Code:
Start Date: 01/28/2020



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: Speedsville Road & Royal Oak Rad
Site Code:
Start Date: 01/28/2020

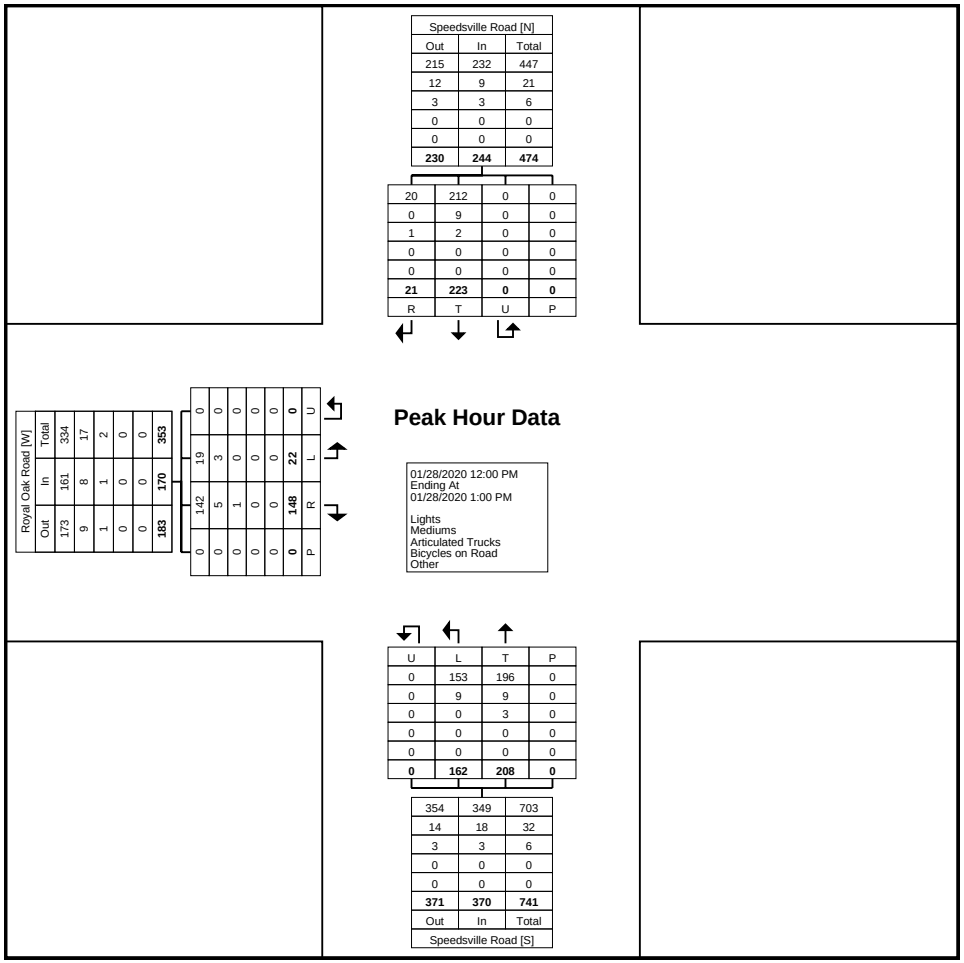
Turning Movement Peak Hour Data (12:00 PM)

Start Time	Royal Oak Road Eastbound					Speedsville Road Northbound					Speedsville Road Southbound					
	Left	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Int. Total
12:00 PM	9	49	0	0	58	27	44	0	0	71	65	4	0	0	69	198
12:15 PM	6	26	0	0	32	33	50	0	0	83	55	1	0	0	56	171
12:30 PM	2	29	0	0	31	57	68	0	0	125	46	9	0	0	55	211
12:45 PM	5	44	0	0	49	45	46	0	0	91	57	7	0	0	64	204
Total	22	148	0	0	170	162	208	0	0	370	223	21	0	0	244	784
Approach %	12.9	87.1	0.0	-	-	43.8	56.2	0.0	-	-	91.4	8.6	0.0	-	-	-
Total %	2.8	18.9	0.0	-	21.7	20.7	26.5	0.0	-	47.2	28.4	2.7	0.0	-	31.1	-
PHF	0.611	0.755	0.000	-	0.733	0.711	0.765	0.000	-	0.740	0.858	0.583	0.000	-	0.884	0.929
Lights	19	142	0	-	161	153	196	0	-	349	212	20	0	-	232	742
% Lights	86.4	95.9	-	-	94.7	94.4	94.2	-	-	94.3	95.1	95.2	-	-	95.1	94.6
Mediums	3	5	0	-	8	9	9	0	-	18	9	0	0	-	9	35
% Mediums	13.6	3.4	-	-	4.7	5.6	4.3	-	-	4.9	4.0	0.0	-	-	3.7	4.5
Articulated Trucks	0	1	0	-	1	0	3	0	-	3	2	1	0	-	3	7
% Articulated Trucks	0.0	0.7	-	-	0.6	0.0	1.4	-	-	0.8	0.9	4.8	-	-	1.2	0.9
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	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

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

Count Name: Speedsville Road & Royal Oak Rad
Site Code:
Start Date: 01/28/2020



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: Speedsville Road & Royal Oak Rad
Site Code:
Start Date: 01/28/2020

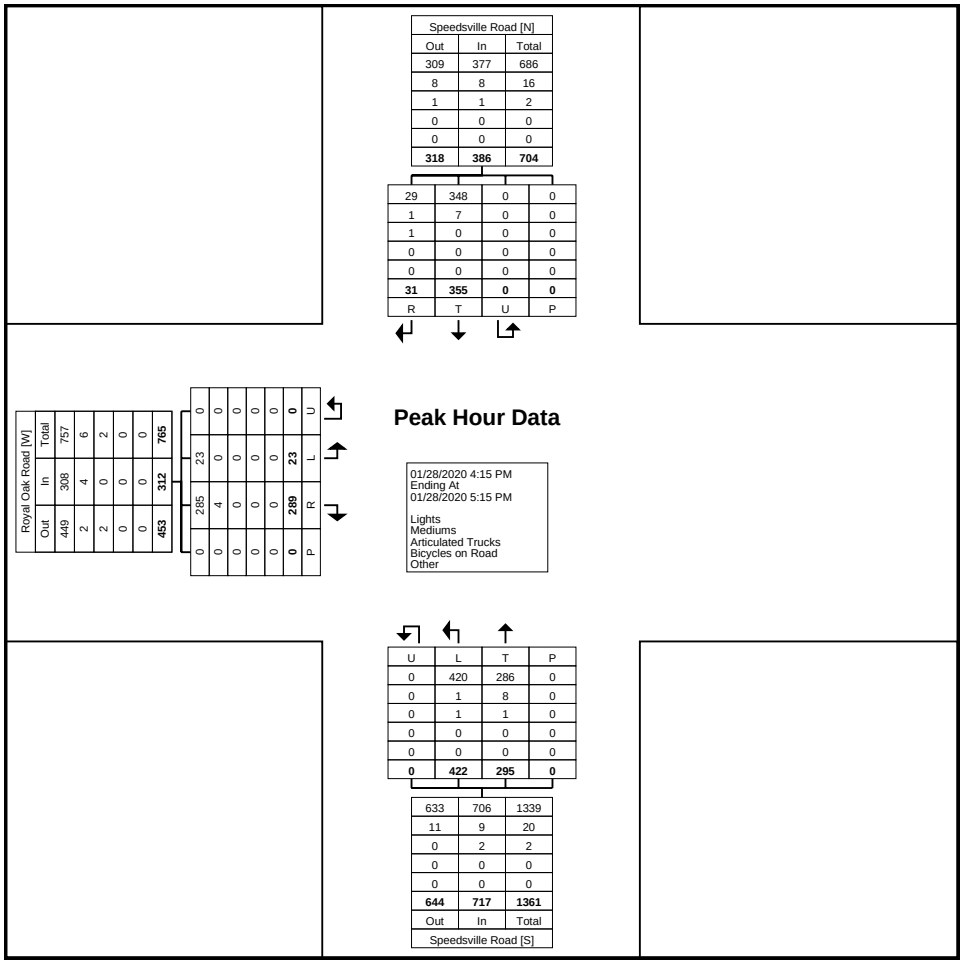
Turning Movement Peak Hour Data (4:15 PM)

Start Time	Royal Oak Road Eastbound					Speedsville Road Northbound					Speedsville Road Southbound					
	Left	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Int. Total
4:15 PM	4	77	0	0	81	98	68	0	0	166	82	7	0	0	89	336
4:30 PM	8	61	0	0	69	90	83	0	0	173	86	8	0	0	94	336
4:45 PM	6	61	0	0	67	114	67	0	0	181	82	6	0	0	88	336
5:00 PM	5	90	0	0	95	120	77	0	0	197	105	10	0	0	115	407
Total	23	289	0	0	312	422	295	0	0	717	355	31	0	0	386	1415
Approach %	7.4	92.6	0.0	-	-	58.9	41.1	0.0	-	-	92.0	8.0	0.0	-	-	-
Total %	1.6	20.4	0.0	-	22.0	29.8	20.8	0.0	-	50.7	25.1	2.2	0.0	-	27.3	-
PHF	0.719	0.803	0.000	-	0.821	0.879	0.889	0.000	-	0.910	0.845	0.775	0.000	-	0.839	0.869
Lights	23	285	0	-	308	420	286	0	-	706	348	29	0	-	377	1391
% Lights	100.0	98.6	-	-	98.7	99.5	96.9	-	-	98.5	98.0	93.5	-	-	97.7	98.3
Mediums	0	4	0	-	4	1	8	0	-	9	7	1	0	-	8	21
% Mediums	0.0	1.4	-	-	1.3	0.2	2.7	-	-	1.3	2.0	3.2	-	-	2.1	1.5
Articulated Trucks	0	0	0	-	0	1	1	0	-	2	0	1	0	-	1	3
% Articulated Trucks	0.0	0.0	-	-	0.0	0.2	0.3	-	-	0.3	0.0	3.2	-	-	0.3	0.2
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	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

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

Count Name: Speedsville Road & Royal Oak Rad
Site Code:
Start Date: 01/28/2020



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@ptsl.com

Count Name: Speedsville Road & Royal Oak Rad
Site Code:
Start Date: 01/28/2020

Appendix C

Existing Traffic Operations Reports

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	16	18	29	269	326	17
Future Volume (vph)	16	18	29	269	326	17
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.929				0.993	
Flt Protected	0.977			0.995		
Satd. Flow (prot)	1275	0	0	1832	1812	0
Flt Permitted	0.977			0.995		
Satd. Flow (perm)	1275	0	0	1832	1812	0
Link Speed (k/h)	50			70	70	
Link Distance (m)	125.8			579.0	379.3	
Travel Time (s)	9.1			29.8	19.5	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	31%	39%	14%	2%	4%	6%
Adj. Flow (vph)	16	18	29	269	326	17
Shared Lane Traffic (%)						
Lane Group Flow (vph)	34	0	0	298	343	0
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	47.3%	ICU Level of Service A	
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	16	18	29	269	326	17
Future Volume (Veh/h)	16	18	29	269	326	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)	16	18	29	269	326	17
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	662	334	343			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	662	334	343			
tC, single (s)	6.7	6.6	4.2			
tC, 2 stage (s)						
tF (s)	3.8	3.7	2.3			
p0 queue free %	96	97	97			
cM capacity (veh/h)	375	630	1152			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	34	298	343
Volume Left	16	29	0
Volume Right	18	0	17
cSH	478	1152	1700
Volume to Capacity	0.07	0.03	0.20
Queue Length 95th (m)	1.8	0.6	0.0
Control Delay (s)	13.1	1.0	0.0
Lane LOS	B	A	
Approach Delay (s)	13.1	1.0	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	1.1		
Intersection Capacity Utilization	47.3%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection	
Int Delay, s/veh	1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	16	18	29	269	326	17
Future Vol, veh/h	16	18	29	269	326	17
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	31	39	14	2	4	6
Mvmt Flow	16	18	29	269	326	17

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	662	335	343	0	-	0
Stage 1	335	-	-	-	-	-
Stage 2	327	-	-	-	-	-
Critical Hdwy	6.71	6.59	4.24	-	-	-
Critical Hdwy Stg 1	5.71	-	-	-	-	-
Critical Hdwy Stg 2	5.71	-	-	-	-	-
Follow-up Hdwy	3.779	3.651	2.326	-	-	-
Pot Cap-1 Maneuver	385	630	1152	-	-	-
Stage 1	664	-	-	-	-	-
Stage 2	670	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	373	630	1152	-	-	-
Mov Cap-2 Maneuver	373	-	-	-	-	-
Stage 1	644	-	-	-	-	-
Stage 2	670	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	13.1	0.8	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1152	-	476	-	-
HCM Lane V/C Ratio	0.025	-	0.071	-	-
HCM Control Delay (s)	8.2	0	13.1	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.2	-	-

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	64	26	267	32	23	324
Future Volume (vph)	64	26	267	32	23	324
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.961		0.986			
Flt Protected	0.966					0.997
Satd. Flow (prot)	1708	0	1795	0	0	1791
Flt Permitted	0.966					0.997
Satd. Flow (perm)	1708	0	1795	0	0	1791
Link Speed (k/h)	50		70			70
Link Distance (m)	208.2		398.1			579.0
Travel Time (s)	15.0		20.5			29.8
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	3%	4%	3%	16%	17%	5%
Adj. Flow (vph)	64	26	267	32	23	324
Shared Lane Traffic (%)						
Lane Group Flow (vph)	90	0	299	0	0	347
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 47.8%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	64	26	267	32	23	324
Future Volume (Veh/h)	64	26	267	32	23	324
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)	64	26	267	32	23	324
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	653	283			299	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	653	283			299	
tC, single (s)	6.4	6.2			4.3	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.4	
p0 queue free %	85	97			98	
cM capacity (veh/h)	422	751			1181	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	90	299	347
Volume Left	64	0	23
Volume Right	26	32	0
cSH	483	1700	1181
Volume to Capacity	0.19	0.18	0.02
Queue Length 95th (m)	5.4	0.0	0.5
Control Delay (s)	14.1	0.0	0.7
Lane LOS	B		A
Approach Delay (s)	14.1	0.0	0.7
Approach LOS	B		

Intersection Summary			
Average Delay		2.1	
Intersection Capacity Utilization		47.8%	ICU Level of Service A
Analysis Period (min)		15	

Intersection	
Int Delay, s/veh	2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	64	26	267	32	23	324
Future Vol, veh/h	64	26	267	32	23	324
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	3	4	3	16	17	5
Mvmt Flow	64	26	267	32	23	324

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	653	283	0	0	299	0
Stage 1	283	-	-	-	-	-
Stage 2	370	-	-	-	-	-
Critical Hdwy	6.43	6.24	-	-	4.27	-
Critical Hdwy Stg 1	5.43	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.527	3.336	-	-	2.353	-
Pot Cap-1 Maneuver	430	751	-	-	1181	-
Stage 1	763	-	-	-	-	-
Stage 2	696	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	420	751	-	-	1181	-
Mov Cap-2 Maneuver	420	-	-	-	-	-
Stage 1	763	-	-	-	-	-
Stage 2	679	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	14.2	0	0.5
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	481	1181	-
HCM Lane V/C Ratio	-	-	0.187	0.019	-
HCM Control Delay (s)	-	-	14.2	8.1	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.7	0.1	-

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	5	173	365	289	335	54
Future Volume (vph)	5	173	365	289	335	54
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.869				0.981	
Flt Protected	0.999			0.973		
Satd. Flow (prot)	1579	0	0	1797	1777	0
Flt Permitted	0.999			0.973		
Satd. Flow (perm)	1579	0	0	1797	1777	0
Link Speed (k/h)	50			70	70	
Link Distance (m)	315.5			184.8	398.1	
Travel Time (s)	22.7			9.5	20.5	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	20%	4%	2%	4%	5%	4%
Adj. Flow (vph)	5	173	365	289	335	54
Shared Lane Traffic (%)						
Lane Group Flow (vph)	178	0	0	654	389	0
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	77.3%	ICU Level of Service	D
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	5	173	365	289	335	54
Future Volume (Veh/h)	5	173	365	289	335	54
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	5	173	365	289	335	54
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1381	362	389			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1381	362	389			
tC, single (s)	6.6	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.7	3.3	2.2			
p0 queue free %	95	74	69			
cM capacity (veh/h)	100	678	1170			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	178	654	389
Volume Left	5	365	0
Volume Right	173	0	54
cSH	583	1170	1700
Volume to Capacity	0.31	0.31	0.23
Queue Length 95th (m)	10.3	10.7	0.0
Control Delay (s)	13.9	6.9	0.0
Lane LOS	B	A	
Approach Delay (s)	13.9	6.9	0.0
Approach LOS	B		

Intersection Summary					
Average Delay		5.7			
Intersection Capacity Utilization		77.3%	ICU Level of Service		D
Analysis Period (min)		15			

Intersection	
Int Delay, s/veh	4.9

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	5	173	365	289	335	54
Future Vol, veh/h	5	173	365	289	335	54
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	20	4	2	4	5	4
Mvmt Flow	5	173	365	289	335	54

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1381	362	389	0	-	0
Stage 1	362	-	-	-	-	-
Stage 2	1019	-	-	-	-	-
Critical Hdwy	6.6	6.24	4.12	-	-	-
Critical Hdwy Stg 1	5.6	-	-	-	-	-
Critical Hdwy Stg 2	5.6	-	-	-	-	-
Follow-up Hdwy	3.68	3.336	2.218	-	-	-
Pot Cap-1 Maneuver	145	678	1170	-	-	-
Stage 1	666	-	-	-	-	-
Stage 2	323	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	91	678	1170	-	-	-
Mov Cap-2 Maneuver	91	-	-	-	-	-
Stage 1	418	-	-	-	-	-
Stage 2	323	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	14.1	5.3	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1170	-	574	-	-
HCM Lane V/C Ratio	0.312	-	0.31	-	-
HCM Control Delay (s)	9.5	0	14.1	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	1.3	-	1.3	-	-

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	36	49	14	290	333	11
Future Volume (vph)	36	49	14	290	333	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.922				0.996	
Flt Protected	0.979			0.998		
Satd. Flow (prot)	1654	0	0	1820	1830	0
Flt Permitted	0.979			0.998		
Satd. Flow (perm)	1654	0	0	1820	1830	0
Link Speed (k/h)	50			70	70	
Link Distance (m)	125.8			579.0	379.3	
Travel Time (s)	9.1			29.8	19.5	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	6%	2%	29%	3%	2%	46%
Adj. Flow (vph)	36	49	14	290	333	11
Shared Lane Traffic (%)						
Lane Group Flow (vph)	85	0	0	304	344	0
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	38.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	36	49	14	290	333	11
Future Volume (Veh/h)	36	49	14	290	333	11
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)	36	49	14	290	333	11
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	656	338	344			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	656	338	344			
tC, single (s)	6.5	6.2	4.4			
tC, 2 stage (s)						
tF (s)	3.6	3.3	2.5			
p0 queue free %	91	93	99			
cM capacity (veh/h)	418	704	1079			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	85	304	344
Volume Left	36	14	0
Volume Right	49	0	11
cSH	546	1079	1700
Volume to Capacity	0.16	0.01	0.20
Queue Length 95th (m)	4.4	0.3	0.0
Control Delay (s)	12.8	0.5	0.0
Lane LOS	B	A	
Approach Delay (s)	12.8	0.5	0.0
Approach LOS	B		

Intersection Summary			
Average Delay		1.7	
Intersection Capacity Utilization		38.3%	ICU Level of Service A
Analysis Period (min)		15	

Intersection	
Int Delay, s/veh	1.7

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	36	49	14	290	333	11
Future Vol, veh/h	36	49	14	290	333	11
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	6	2	29	3	2	46
Mvmt Flow	36	49	14	290	333	11

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	657	339	344	0	-	0
Stage 1	339	-	-	-	-	-
Stage 2	318	-	-	-	-	-
Critical Hdwy	6.46	6.22	4.39	-	-	-
Critical Hdwy Stg 1	5.46	-	-	-	-	-
Critical Hdwy Stg 2	5.46	-	-	-	-	-
Follow-up Hdwy	3.554	3.318	2.461	-	-	-
Pot Cap-1 Maneuver	423	703	1079	-	-	-
Stage 1	713	-	-	-	-	-
Stage 2	729	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	417	703	1079	-	-	-
Mov Cap-2 Maneuver	417	-	-	-	-	-
Stage 1	702	-	-	-	-	-
Stage 2	729	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.8	0.4	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1079	-	545	-	-
HCM Lane V/C Ratio	0.013	-	0.156	-	-
HCM Control Delay (s)	8.4	0	12.8	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.5	-	-

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	49	19	267	48	37	352
Future Volume (vph)	49	19	267	48	37	352
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.962		0.979			
Flt Protected	0.965					0.995
Satd. Flow (prot)	1740	0	1794	0	0	1857
Flt Permitted	0.965					0.995
Satd. Flow (perm)	1740	0	1794	0	0	1857
Link Speed (k/h)	50		70			70
Link Distance (m)	208.2		398.1			579.0
Travel Time (s)	15.0		20.5			29.8
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	5%	4%	2%	0%	2%
Adj. Flow (vph)	49	19	267	48	37	352
Shared Lane Traffic (%)						
Lane Group Flow (vph)	68	0	315	0	0	389
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	51.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	49	19	267	48	37	352
Future Volume (Veh/h)	49	19	267	48	37	352
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)	49	19	267	48	37	352
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	717	291			315	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	717	291			315	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	87	97			97	
cM capacity (veh/h)	388	741			1257	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	68	315	389
Volume Left	49	0	37
Volume Right	19	48	0
cSH	447	1700	1257
Volume to Capacity	0.15	0.19	0.03
Queue Length 95th (m)	4.3	0.0	0.7
Control Delay (s)	14.5	0.0	1.0
Lane LOS	B		A
Approach Delay (s)	14.5	0.0	1.0
Approach LOS	B		

Intersection Summary			
Average Delay	1.8		
Intersection Capacity Utilization	51.4%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection	
Int Delay, s/veh	1.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	49	19	267	48	37	352
Future Vol, veh/h	49	19	267	48	37	352
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	0	5	4	2	0	2
Mvmt Flow	49	19	267	48	37	352

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	717	291	0	0	315	0
Stage 1	291	-	-	-	-	-
Stage 2	426	-	-	-	-	-
Critical Hdwy	6.4	6.25	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.345	-	-	2.2	-
Pot Cap-1 Maneuver	399	741	-	-	1257	-
Stage 1	763	-	-	-	-	-
Stage 2	663	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	384	741	-	-	1257	-
Mov Cap-2 Maneuver	384	-	-	-	-	-
Stage 1	763	-	-	-	-	-
Stage 2	638	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	14.6	0	0.8
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	444	1257	-
HCM Lane V/C Ratio	-	-	0.153	0.029	-
HCM Control Delay (s)	-	-	14.6	8	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.5	0.1	-

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	23	289	422	295	355	31
Future Volume (vph)	23	289	422	295	355	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.875				0.989	
Flt Protected	0.996			0.971		
Satd. Flow (prot)	1641	0	0	1822	1836	0
Flt Permitted	0.996			0.971		
Satd. Flow (perm)	1641	0	0	1822	1836	0
Link Speed (k/h)	50			70	70	
Link Distance (m)	315.5			184.8	398.1	
Travel Time (s)	22.7			9.5	20.5	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	1%	0%	3%	2%	6%
Adj. Flow (vph)	23	289	422	295	355	31
Shared Lane Traffic (%)						
Lane Group Flow (vph)	312	0	0	717	386	0
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	88.6%	ICU Level of Service	E
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	23	289	422	295	355	31
Future Volume (Veh/h)	23	289	422	295	355	31
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)	23	289	422	295	355	31
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1510	370	386			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1510	370	386			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	73	57	64			
cM capacity (veh/h)	86	677	1184			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	312	717	386
Volume Left	23	422	0
Volume Right	289	0	31
cSH	450	1184	1700
Volume to Capacity	0.69	0.36	0.23
Queue Length 95th (m)	41.7	13.1	0.0
Control Delay (s)	29.2	7.4	0.0
Lane LOS	D	A	
Approach Delay (s)	29.2	7.4	0.0
Approach LOS	D		

Intersection Summary			
Average Delay		10.2	
Intersection Capacity Utilization		88.6%	ICU Level of Service E
Analysis Period (min)		15	

Intersection	
Int Delay, s/veh	10.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	23	289	422	295	355	31
Future Vol, veh/h	23	289	422	295	355	31
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	0	1	0	3	2	6
Mvmt Flow	23	289	422	295	355	31

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1510	371	386	0	-	0
Stage 1	371	-	-	-	-	-
Stage 2	1139	-	-	-	-	-
Critical Hdwy	6.4	6.21	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.309	2.2	-	-	-
Pot Cap-1 Maneuver	134	677	1184	-	-	-
Stage 1	702	-	-	-	-	-
Stage 2	308	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	77	677	1184	-	-	-
Mov Cap-2 Maneuver	77	-	-	-	-	-
Stage 1	403	-	-	-	-	-
Stage 2	308	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	32.5	5.7	0
HCM LOS	D		

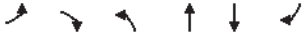
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1184	-	430	-	-
HCM Lane V/C Ratio	0.356	-	0.726	-	-
HCM Control Delay (s)	9.7	0	32.5	-	-
HCM Lane LOS	A	A	D	-	-
HCM 95th %tile Q(veh)	1.6	-	5.7	-	-

Appendix D

2025 Background Traffic Operations Reports

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	18	20	32	327	398	19
Future Volume (vph)	18	20	32	327	398	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.929				0.994	
Flt Protected	0.977			0.996		
Satd. Flow (prot)	1275	0	0	1836	1814	0
Flt Permitted	0.977			0.996		
Satd. Flow (perm)	1275	0	0	1836	1814	0
Link Speed (k/h)	50			70	70	
Link Distance (m)	125.8			579.0	379.3	
Travel Time (s)	9.1			29.8	19.5	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	31%	39%	14%	2%	4%	6%
Adj. Flow (vph)	18	20	32	327	398	19
Shared Lane Traffic (%)						
Lane Group Flow (vph)	38	0	0	359	417	0
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	53.8%	ICU Level of Service A	
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	18	20	32	327	398	19
Future Volume (Veh/h)	18	20	32	327	398	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)	18	20	32	327	398	19
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	798	408	417			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	798	408	417			
tC, single (s)	6.7	6.6	4.2			
tC, 2 stage (s)						
tF (s)	3.8	3.7	2.3			
p0 queue free %	94	96	97			
cM capacity (veh/h)	308	571	1080			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	38	359	417
Volume Left	18	32	0
Volume Right	20	0	19
cSH	407	1080	1700
Volume to Capacity	0.09	0.03	0.25
Queue Length 95th (m)	2.5	0.7	0.0
Control Delay (s)	14.8	1.0	0.0
Lane LOS	B	A	
Approach Delay (s)	14.8	1.0	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	1.1		
Intersection Capacity Utilization	53.8%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection	
Int Delay, s/veh	1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	18	20	32	327	398	19
Future Vol, veh/h	18	20	32	327	398	19
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	31	39	14	2	4	6
Mvmt Flow	18	20	32	327	398	19

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	799	408	417	0	-	0
Stage 1	408	-	-	-	-	-
Stage 2	391	-	-	-	-	-
Critical Hdwy	6.71	6.59	4.24	-	-	-
Critical Hdwy Stg 1	5.71	-	-	-	-	-
Critical Hdwy Stg 2	5.71	-	-	-	-	-
Follow-up Hdwy	3.779	3.651	2.326	-	-	-
Pot Cap-1 Maneuver	317	571	1080	-	-	-
Stage 1	613	-	-	-	-	-
Stage 2	625	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	306	571	1080	-	-	-
Mov Cap-2 Maneuver	306	-	-	-	-	-
Stage 1	591	-	-	-	-	-
Stage 2	625	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	14.8	0.8	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1080	-	405	-	-
HCM Lane V/C Ratio	0.03	-	0.094	-	-
HCM Control Delay (s)	8.4	0	14.8	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.3	-	-

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	85	58	296	49	63	358
Future Volume (vph)	85	58	296	49	63	358
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.945		0.981			
Flt Protected	0.971					0.993
Satd. Flow (prot)	1686	0	1778	0	0	1767
Flt Permitted	0.971					0.993
Satd. Flow (perm)	1686	0	1778	0	0	1767
Link Speed (k/h)	50		70			70
Link Distance (m)	208.2		398.1			579.0
Travel Time (s)	15.0		20.5			29.8
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	3%	4%	3%	16%	17%	5%
Adj. Flow (vph)	85	58	296	49	63	358
Shared Lane Traffic (%)						
Lane Group Flow (vph)	143	0	345	0	0	421
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 59.1%		ICU Level of Service B	
Analysis Period (min) 15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	85	58	296	49	63	358
Future Volume (Veh/h)	85	58	296	49	63	358
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)	85	58	296	49	63	358
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	804	320			345	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	804	320			345	
tC, single (s)	6.4	6.2			4.3	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.4	
p0 queue free %	74	92			94	
cM capacity (veh/h)	331	716			1135	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	143	345	421
Volume Left	85	0	63
Volume Right	58	49	0
cSH	423	1700	1135
Volume to Capacity	0.34	0.20	0.06
Queue Length 95th (m)	11.7	0.0	1.4
Control Delay (s)	17.8	0.0	1.8
Lane LOS	C		A
Approach Delay (s)	17.8	0.0	1.8
Approach LOS	C		

Intersection Summary			
Average Delay		3.6	
Intersection Capacity Utilization		59.1%	ICU Level of Service B
Analysis Period (min)		15	

Intersection	
Int Delay, s/veh	3.4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	85	58	296	49	63	358
Future Vol, veh/h	85	58	296	49	63	358
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	3	4	3	16	17	5
Mvmt Flow	85	58	296	49	63	358

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	805	321	0	0	345	0
Stage 1	321	-	-	-	-	-
Stage 2	484	-	-	-	-	-
Critical Hdwy	6.43	6.24	-	-	4.27	-
Critical Hdwy Stg 1	5.43	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.527	3.336	-	-	2.353	-
Pot Cap-1 Maneuver	350	715	-	-	1135	-
Stage 1	733	-	-	-	-	-
Stage 2	618	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	326	715	-	-	1135	-
Mov Cap-2 Maneuver	326	-	-	-	-	-
Stage 1	733	-	-	-	-	-
Stage 2	575	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	18	0	1.3
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	418	1135	-
HCM Lane V/C Ratio	-	-	0.342	0.056	-
HCM Control Delay (s)	-	-	18	8.4	0
HCM Lane LOS	-	-	C	A	A
HCM 95th %tile Q(veh)	-	-	1.5	0.2	-

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	12	191	403	328	379	65
Future Volume (vph)	12	191	403	328	379	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.873				0.980	
Flt Protected	0.997			0.973		
Satd. Flow (prot)	1576	0	0	1797	1776	0
Flt Permitted	0.997			0.973		
Satd. Flow (perm)	1576	0	0	1797	1776	0
Link Speed (k/h)	50			70	70	
Link Distance (m)	315.5			184.8	398.1	
Travel Time (s)	22.7			9.5	20.5	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	20%	4%	2%	4%	5%	4%
Adj. Flow (vph)	12	191	403	328	379	65
Shared Lane Traffic (%)						
Lane Group Flow (vph)	203	0	0	731	444	0
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	85.9%	ICU Level of Service	E
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	12	191	403	328	379	65
Future Volume (Veh/h)	12	191	403	328	379	65
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	12	191	403	328	379	65
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1546	412	444			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1546	412	444			
tC, single (s)	6.6	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.7	3.3	2.2			
p0 queue free %	84	70	64			
cM capacity (veh/h)	73	636	1116			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	203	731	444
Volume Left	12	403	0
Volume Right	191	0	65
cSH	437	1116	1700
Volume to Capacity	0.46	0.36	0.26
Queue Length 95th (m)	19.2	13.3	0.0
Control Delay (s)	20.2	7.5	0.0
Lane LOS	C	A	
Approach Delay (s)	20.2	7.5	0.0
Approach LOS	C		

Intersection Summary			
Average Delay	7.0		
Intersection Capacity Utilization	85.9%	ICU Level of Service	E
Analysis Period (min)	15		

Intersection	
Int Delay, s/veh	6.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	12	191	403	328	379	65
Future Vol, veh/h	12	191	403	328	379	65
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	20	4	2	4	5	4
Mvmt Flow	12	191	403	328	379	65

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1546	412	444	0	-	0
Stage 1	412	-	-	-	-	-
Stage 2	1134	-	-	-	-	-
Critical Hdwy	6.6	6.24	4.12	-	-	-
Critical Hdwy Stg 1	5.6	-	-	-	-	-
Critical Hdwy Stg 2	5.6	-	-	-	-	-
Follow-up Hdwy	3.68	3.336	2.218	-	-	-
Pot Cap-1 Maneuver	114	636	1116	-	-	-
Stage 1	631	-	-	-	-	-
Stage 2	283	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	64	636	1116	-	-	-
Mov Cap-2 Maneuver	64	-	-	-	-	-
Stage 1	352	-	-	-	-	-
Stage 2	283	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	21.6	5.5	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1116	-	416	-	-
HCM Lane V/C Ratio	0.361	-	0.488	-	-
HCM Control Delay (s)	10	0	21.6	-	-
HCM Lane LOS	B	A	C	-	-
HCM 95th %tile Q(veh)	1.7	-	2.6	-	-

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	40	54	15	335	382	12
Future Volume (vph)	40	54	15	335	382	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.922				0.996	
Flt Protected	0.979			0.998		
Satd. Flow (prot)	1654	0	0	1821	1831	0
Flt Permitted	0.979			0.998		
Satd. Flow (perm)	1654	0	0	1821	1831	0
Link Speed (k/h)	50			70	70	
Link Distance (m)	125.8			579.0	379.3	
Travel Time (s)	9.1			29.8	19.5	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	6%	2%	29%	3%	2%	46%
Adj. Flow (vph)	40	54	15	335	382	12
Shared Lane Traffic (%)						
Lane Group Flow (vph)	94	0	0	350	394	0
Sign Control	Stop			Free	Free	

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

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	40	54	15	335	382	12
Future Volume (Veh/h)	40	54	15	335	382	12
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	40	54	15	335	382	12
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	753	388	394			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	753	388	394			
tC, single (s)	6.5	6.2	4.4			
tC, 2 stage (s)						
tF (s)	3.6	3.3	2.5			
p0 queue free %	89	92	99			
cM capacity (veh/h)	366	660	1032			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	94	350	394
Volume Left	40	15	0
Volume Right	54	0	12
cSH	492	1032	1700
Volume to Capacity	0.19	0.01	0.23
Queue Length 95th (m)	5.6	0.4	0.0
Control Delay (s)	14.0	0.5	0.0
Lane LOS	B	A	
Approach Delay (s)	14.0	0.5	0.0
Approach LOS	B		

Intersection Summary			
Average Delay		1.8	
Intersection Capacity Utilization		42.0%	ICU Level of Service A
Analysis Period (min)		15	

Intersection	
Int Delay, s/veh	1.7

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	40	54	15	335	382	12
Future Vol, veh/h	40	54	15	335	382	12
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	6	2	29	3	2	46
Mvmt Flow	40	54	15	335	382	12

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	753	388	394	0	-	0
Stage 1	388	-	-	-	-	-
Stage 2	365	-	-	-	-	-
Critical Hdwy	6.46	6.22	4.39	-	-	-
Critical Hdwy Stg 1	5.46	-	-	-	-	-
Critical Hdwy Stg 2	5.46	-	-	-	-	-
Follow-up Hdwy	3.554	3.318	2.461	-	-	-
Pot Cap-1 Maneuver	372	660	1032	-	-	-
Stage 1	677	-	-	-	-	-
Stage 2	694	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	365	660	1032	-	-	-
Mov Cap-2 Maneuver	365	-	-	-	-	-
Stage 1	665	-	-	-	-	-
Stage 2	694	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	14.1	0.4	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1032	-	491	-	-
HCM Lane V/C Ratio	0.015	-	0.191	-	-
HCM Control Delay (s)	8.5	0	14.1	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.7	-	-

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	60	36	295	59	55	389
Future Volume (vph)	60	36	295	59	55	389
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.949		0.977			
Flt Protected	0.970					0.994
Satd. Flow (prot)	1717	0	1791	0	0	1856
Flt Permitted	0.970					0.994
Satd. Flow (perm)	1717	0	1791	0	0	1856
Link Speed (k/h)	50		70			70
Link Distance (m)	208.2		398.1			579.0
Travel Time (s)	15.0		20.5			29.8
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	5%	4%	2%	0%	2%
Adj. Flow (vph)	60	36	295	59	55	389
Shared Lane Traffic (%)						
Lane Group Flow (vph)	96	0	354	0	0	444
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	58.1%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	60	36	295	59	55	389
Future Volume (Veh/h)	60	36	295	59	55	389
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)	60	36	295	59	55	389
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	824	324			354	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	824	324			354	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	82	95			95	
cM capacity (veh/h)	330	710			1216	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	96	354	444
Volume Left	60	0	55
Volume Right	36	59	0
cSH	413	1700	1216
Volume to Capacity	0.23	0.21	0.05
Queue Length 95th (m)	7.1	0.0	1.1
Control Delay (s)	16.3	0.0	1.4
Lane LOS	C		A
Approach Delay (s)	16.3	0.0	1.4
Approach LOS	C		

Intersection Summary					
Average Delay		2.5			
Intersection Capacity Utilization		58.1%	ICU Level of Service		B
Analysis Period (min)		15			

Intersection	
Int Delay, s/veh	2.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	60	36	295	59	55	389
Future Vol, veh/h	60	36	295	59	55	389
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	0	5	4	2	0	2
Mvmt Flow	60	36	295	59	55	389

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	824	325	0	0	354	0
Stage 1	325	-	-	-	-	-
Stage 2	499	-	-	-	-	-
Critical Hdwy	6.4	6.25	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.345	-	-	2.2	-
Pot Cap-1 Maneuver	346	709	-	-	1216	-
Stage 1	737	-	-	-	-	-
Stage 2	614	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	326	709	-	-	1216	-
Mov Cap-2 Maneuver	326	-	-	-	-	-
Stage 1	737	-	-	-	-	-
Stage 2	578	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	16.5	0	1
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	409	1216	-
HCM Lane V/C Ratio	-	-	0.235	0.045	-
HCM Control Delay (s)	-	-	16.5	8.1	0
HCM Lane LOS	-	-	C	A	A
HCM 95th %tile Q(veh)	-	-	0.9	0.1	-

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	27	319	466	330	396	36
Future Volume (vph)	27	319	466	330	396	36
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.876				0.989	
Flt Protected	0.996			0.972		
Satd. Flow (prot)	1643	0	0	1824	1836	0
Flt Permitted	0.996			0.972		
Satd. Flow (perm)	1643	0	0	1824	1836	0
Link Speed (k/h)	50			70	70	
Link Distance (m)	315.5			184.8	398.1	
Travel Time (s)	22.7			9.5	20.5	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	1%	0%	3%	2%	6%
Adj. Flow (vph)	27	319	466	330	396	36
Shared Lane Traffic (%)						
Lane Group Flow (vph)	346	0	0	796	432	0
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	97.4%	ICU Level of Service	F
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	27	319	466	330	396	36
Future Volume (Veh/h)	27	319	466	330	396	36
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)	27	319	466	330	396	36
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1676	414	432			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1676	414	432			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	57	50	59			
cM capacity (veh/h)	63	640	1138			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	346	796	432
Volume Left	27	466	0
Volume Right	319	0	36
cSH	372	1138	1700
Volume to Capacity	0.93	0.41	0.25
Queue Length 95th (m)	79.0	16.2	0.0
Control Delay (s)	64.4	8.2	0.0
Lane LOS	F	A	
Approach Delay (s)	64.4	8.2	0.0
Approach LOS	F		

Intersection Summary			
Average Delay		18.3	
Intersection Capacity Utilization		97.4%	ICU Level of Service F
Analysis Period (min)		15	

Intersection	
Int Delay, s/veh	22.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	27	319	466	330	396	36
Future Vol, veh/h	27	319	466	330	396	36
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	0	1	0	3	2	6
Mvmt Flow	27	319	466	330	396	36

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1676	414	432	0	-	0
Stage 1	414	-	-	-	-	-
Stage 2	1262	-	-	-	-	-
Critical Hdwy	6.4	6.21	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.309	2.2	-	-	-
Pot Cap-1 Maneuver	106	640	1138	-	-	-
Stage 1	671	-	-	-	-	-
Stage 2	269	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	53	640	1138	-	-	-
Mov Cap-2 Maneuver	53	-	-	-	-	-
Stage 1	335	-	-	-	-	-
Stage 2	269	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	86.5	6.1	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1138	-	343	-	-
HCM Lane V/C Ratio	0.409	-	1.009	-	-
HCM Control Delay (s)	10.3	0	86.5	-	-
HCM Lane LOS	B	A	F	-	-
HCM 95th %tile Q(veh)	2	-	11.6	-	-

Appendix E

2025 Total Traffic Operations Reports

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	18	0	20	129	0	124	32	492	44	41	643	19
Future Volume (vph)	18	0	20	129	0	124	32	492	44	41	643	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
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
Frt		0.929			0.934			0.990			0.996	
Flt Protected		0.977			0.975			0.997			0.997	
Satd. Flow (prot)	0	1275	0	0	1730	0	0	1829	0	0	1817	0
Flt Permitted		0.977			0.975			0.997			0.997	
Satd. Flow (perm)	0	1275	0	0	1730	0	0	1829	0	0	1817	0
Link Speed (k/h)		50			50			70			70	
Link Distance (m)		125.8			109.3			435.9			185.4	
Travel Time (s)		9.1			7.9			22.4			9.5	
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 (%)	31%	0%	39%	0%	0%	0%	14%	2%	0%	0%	4%	6%
Adj. Flow (vph)	18	0	20	129	0	124	32	492	44	41	643	19
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	38	0	0	253	0	0	568	0	0	703	0
Sign Control		Stop			Stop			Free			Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	73.8%	ICU Level of Service	D
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	18	0	20	129	0	124	32	492	44	41	643	19
Future Volume (Veh/h)	18	0	20	129	0	124	32	492	44	41	643	19
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)	18	0	20	129	0	124	32	492	44	41	643	19
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1436	1334	652	1332	1322	514	662			536		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1436	1334	652	1332	1322	514	662			536		
tC, single (s)	7.4	6.5	6.6	7.1	6.5	6.2	4.2			4.1		
tC, 2 stage (s)												
tF (s)	3.8	4.0	3.7	3.5	4.0	3.3	2.3			2.2		
p0 queue free %	74	100	95	0	100	78	96			96		
cM capacity (veh/h)	71	144	408	119	146	564	872			1042		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	38	253	568	703
Volume Left	18	129	32	41
Volume Right	20	124	44	19
cSH	125	194	872	1042
Volume to Capacity	0.30	1.31	0.04	0.04
Queue Length 95th (m)	9.5	112.9	0.9	1.0
Control Delay (s)	45.9	217.2	1.0	1.0
Lane LOS	E	F	A	A
Approach Delay (s)	45.9	217.2	1.0	1.0
Approach LOS	E	F		

Intersection Summary					
Average Delay		37.1			
Intersection Capacity Utilization		73.8%	ICU Level of Service		D
Analysis Period (min)		15			

Intersection	
Int Delay, s/veh	38

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	18	0	20	129	0	124	32	492	44	41	643	19
Future Vol, veh/h	18	0	20	129	0	124	32	492	44	41	643	19
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	31	0	39	0	0	0	14	2	0	0	4	6
Mvmt Flow	18	0	20	129	0	124	32	492	44	41	643	19

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1375	1335	653	1323	1322	514	662	0	0	536	0	0
Stage 1	735	735	-	578	578	-	-	-	-	-	-	-
Stage 2	640	600	-	745	744	-	-	-	-	-	-	-
Critical Hdwy	7.41	6.5	6.59	7.1	6.5	6.2	4.24	-	-	4.1	-	-
Critical Hdwy Stg 1	6.41	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.41	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.779	4	3.651	3.5	4	3.3	2.326	-	-	2.2	-	-
Pot Cap-1 Maneuver	106	155	408	135	158	564	872	-	-	1042	-	-
Stage 1	369	428	-	505	504	-	-	-	-	-	-	-
Stage 2	419	493	-	409	424	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	76	138	408	~ 117	140	564	872	-	-	1042	-	-
Mov Cap-2 Maneuver	76	138	-	~ 117	140	-	-	-	-	-	-	-
Stage 1	349	401	-	478	477	-	-	-	-	-	-	-
Stage 2	310	467	-	365	398	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	42.6	225.6	0.5	0.5
HCM LOS	E	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	872	-	-	133	191	1042	-	-
HCM Lane V/C Ratio	0.037	-	-	0.286	1.325	0.039	-	-
HCM Control Delay (s)	9.3	0	-	42.6	225.6	8.6	0	-
HCM Lane LOS	A	A	-	E	F	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	1.1	14.4	0.1	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	212	81	447	107	179	616
Future Volume (vph)	212	81	447	107	179	616
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.963		0.974			
Flt Protected	0.965					0.989
Satd. Flow (prot)	1710	0	1754	0	0	1745
Flt Permitted	0.965					0.989
Satd. Flow (perm)	1710	0	1754	0	0	1745
Link Speed (k/h)	50		70			70
Link Distance (m)	208.2		398.1			143.1
Travel Time (s)	15.0		20.5			7.4
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	3%	4%	3%	16%	17%	5%
Adj. Flow (vph)	212	81	447	107	179	616
Shared Lane Traffic (%)						
Lane Group Flow (vph)	293	0	554	0	0	795
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 99.0%		ICU Level of Service F	
Analysis Period (min) 15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	212	81	447	107	179	616
Future Volume (Veh/h)	212	81	447	107	179	616
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)	212	81	447	107	179	616
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1474	500			554	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1474	500			554	
tC, single (s)	6.4	6.2			4.3	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.4	
p0 queue free %	0	86			81	
cM capacity (veh/h)	112	566			945	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	293	554	795
Volume Left	212	0	179
Volume Right	81	107	0
cSH	144	1700	945
Volume to Capacity	2.03	0.33	0.19
Queue Length 95th (m)	186.4	0.0	5.6
Control Delay (s)	538.4	0.0	4.4
Lane LOS	F		A
Approach Delay (s)	538.4	0.0	4.4
Approach LOS	F		

Intersection Summary			
Average Delay		98.2	
Intersection Capacity Utilization		99.0%	ICU Level of Service F
Analysis Period (min)		15	

Intersection	
Int Delay, s/veh	120.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	212	81	447	107	179	616
Future Vol, veh/h	212	81	447	107	179	616
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	3	4	3	16	17	5
Mvmt Flow	212	81	447	107	179	616

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1475	501	0	0	554	0
Stage 1	501	-	-	-	-	-
Stage 2	974	-	-	-	-	-
Critical Hdwy	6.43	6.24	-	-	4.27	-
Critical Hdwy Stg 1	5.43	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.527	3.336	-	-	2.353	-
Pot Cap-1 Maneuver	~ 138	566	-	-	945	-
Stage 1	607	-	-	-	-	-
Stage 2	365	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	~ 98	566	-	-	945	-
Mov Cap-2 Maneuver	~ 98	-	-	-	-	-
Stage 1	607	-	-	-	-	-
Stage 2	260	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	$ 667.9	0	2.2
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	127	945	-
HCM Lane V/C Ratio	-	-	2.307	0.189	-
HCM Control Delay (s)	-	-	$ 667.9	9.7	0
HCM Lane LOS	-	-	F	A	A
HCM 95th %tile Q(veh)	-	-	25.1	0.7	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	25	191	403	524	741	88
Future Volume (vph)	25	191	403	524	741	88
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.881				0.986	
Flt Protected	0.994			0.979		
Satd. Flow (prot)	1572	0	0	1804	1786	0
Flt Permitted	0.994			0.979		
Satd. Flow (perm)	1572	0	0	1804	1786	0
Link Speed (k/h)	50			70	70	
Link Distance (m)	315.5			184.8	398.1	
Travel Time (s)	22.7			9.5	20.5	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	20%	4%	2%	4%	5%	4%
Adj. Flow (vph)	25	191	403	524	741	88
Shared Lane Traffic (%)						
Lane Group Flow (vph)	216	0	0	927	829	0
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	117.4%	ICU Level of Service	H
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	25	191	403	524	741	88
Future Volume (Veh/h)	25	191	403	524	741	88
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	25	191	403	524	741	88
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	2115	785	829			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2115	785	829			
tC, single (s)	6.6	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.7	3.3	2.2			
p0 queue free %	0	51	50			
cM capacity (veh/h)	25	390	803			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	216	927	829
Volume Left	25	403	0
Volume Right	191	0	88
cSH	144	803	1700
Volume to Capacity	1.51	0.50	0.49
Queue Length 95th (m)	116.9	22.9	0.0
Control Delay (s)	316.7	11.8	0.0
Lane LOS	F	B	
Approach Delay (s)	316.7	11.8	0.0
Approach LOS	F		

Intersection Summary			
Average Delay	40.2		
Intersection Capacity Utilization	117.4%	ICU Level of Service	H
Analysis Period (min)	15		

Intersection	
Int Delay, s/veh	77

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	25	191	403	524	741	88
Future Vol, veh/h	25	191	403	524	741	88
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	20	4	2	4	5	4
Mvmt Flow	25	191	403	524	741	88

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	2115	785	829	0	-	0
Stage 1	785	-	-	-	-	-
Stage 2	1330	-	-	-	-	-
Critical Hdwy	6.6	6.24	4.12	-	-	-
Critical Hdwy Stg 1	5.6	-	-	-	-	-
Critical Hdwy Stg 2	5.6	-	-	-	-	-
Follow-up Hdwy	3.68	3.336	2.218	-	-	-
Pot Cap-1 Maneuver	49	390	803	-	-	-
Stage 1	420	-	-	-	-	-
Stage 2	226	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	~ 14	390	803	-	-	-
Mov Cap-2 Maneuver	~ 14	-	-	-	-	-
Stage 1	123	-	-	-	-	-
Stage 2	226	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	$ 677.2	6	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	803	-	95	-	-
HCM Lane V/C Ratio	0.502	-	2.274	-	-
HCM Control Delay (s)	13.9	0	$ 677.2	-	-
HCM Lane LOS	B	A	F	-	-
HCM 95th %tile Q(veh)	2.9	-	19.3	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	129	124	604	44	41	576
Future Volume (vph)	129	124	604	44	41	576
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.934		0.991			
Flt Protected	0.975					0.997
Satd. Flow (prot)	1696	0	1846	0	0	1857
Flt Permitted	0.975					0.997
Satd. Flow (perm)	1696	0	1846	0	0	1857
Link Speed (k/h)	50		70			70
Link Distance (m)	193.0		185.4			193.9
Travel Time (s)	13.9		9.5			10.0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	129	124	604	44	41	576
Shared Lane Traffic (%)						
Lane Group Flow (vph)	253	0	648	0	0	617
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 85.4%		ICU Level of Service E	
Analysis Period (min) 15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	129	124	604	44	41	576
Future Volume (Veh/h)	129	124	604	44	41	576
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)	129	124	604	44	41	576
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1284	626			648	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1284	626			648	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	26	74			96	
cM capacity (veh/h)	174	484			938	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	253	648	617
Volume Left	129	0	41
Volume Right	124	44	0
cSH	254	1700	938
Volume to Capacity	1.00	0.38	0.04
Queue Length 95th (m)	77.6	0.0	1.1
Control Delay (s)	98.5	0.0	1.2
Lane LOS	F		A
Approach Delay (s)	98.5	0.0	1.2
Approach LOS	F		

Intersection Summary			
Average Delay		16.9	
Intersection Capacity Utilization		85.4%	ICU Level of Service E
Analysis Period (min)		15	

Intersection	
Int Delay, s/veh	17.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	129	124	604	44	41	576
Future Vol, veh/h	129	124	604	44	41	576
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	129	124	604	44	41	576

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1284	626	0	0	648	0
Stage 1	626	-	-	-	-	-
Stage 2	658	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	182	484	-	-	938	-
Stage 1	533	-	-	-	-	-
Stage 2	515	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	170	484	-	-	938	-
Mov Cap-2 Maneuver	170	-	-	-	-	-
Stage 1	533	-	-	-	-	-
Stage 2	482	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	104.5	0	0.6
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	249	938	-
HCM Lane V/C Ratio	-	-	1.016	0.044	-
HCM Control Delay (s)	-	-	104.5	9	0
HCM Lane LOS	-	-	F	A	A
HCM 95th %tile Q(veh)	-	-	10	0.1	-

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	98	470	63	0	795
Future Volume (vph)	0	98	470	63	0	795
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.865	0.984			
Flt Protected						
Satd. Flow (prot)	0	1611	1833	0	0	1863
Flt Permitted						
Satd. Flow (perm)	0	1611	1833	0	0	1863
Link Speed (k/h)	50		70			70
Link Distance (m)	116.0		143.1			435.9
Travel Time (s)	8.4		7.4			22.4
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	98	470	63	0	795
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	98	533	0	0	795
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	45.2%	ICU Level of Service A	
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	98	470	63	0	795
Future Volume (Veh/h)	0	98	470	63	0	795
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	98	470	63	0	795
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1296	502			533	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1296	502			533	
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	83			100	
cM capacity (veh/h)	179	570			1035	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	98	533	795
Volume Left	0	0	0
Volume Right	98	63	0
cSH	570	1700	1700
Volume to Capacity	0.17	0.31	0.47
Queue Length 95th (m)	4.9	0.0	0.0
Control Delay (s)	12.6	0.0	0.0
Lane LOS	B		
Approach Delay (s)	12.6	0.0	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	0.9		
Intersection Capacity Utilization	45.2%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection	
Int Delay, s/veh	0.9

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	98	470	63	0	795
Future Vol, veh/h	0	98	470	63	0	795
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	98	470	63	0	795

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	502	0	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.22	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.318	-	-	-	-
Pot Cap-1 Maneuver	0	569	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	569	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	12.6	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBT
Capacity (veh/h)	-	- 569	-
HCM Lane V/C Ratio	-	- 0.172	-
HCM Control Delay (s)	-	- 12.6	-
HCM Lane LOS	-	- B	-
HCM 95th %tile Q(veh)	-	- 0.6	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	0	54	96	0	93	15	614	113	108	609	12
Future Volume (vph)	40	0	54	96	0	93	15	614	113	108	609	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
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
Frt		0.922			0.934			0.979			0.998	
Flt Protected		0.979			0.975			0.999			0.993	
Satd. Flow (prot)	0	1654	0	0	1730	0	0	1803	0	0	1838	0
Flt Permitted		0.979			0.975			0.999			0.993	
Satd. Flow (perm)	0	1654	0	0	1730	0	0	1803	0	0	1838	0
Link Speed (k/h)		50			50			70			70	
Link Distance (m)		125.8			110.5			441.7			180.7	
Travel Time (s)		9.1			8.0			22.7			9.3	
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 (%)	6%	0%	2%	0%	0%	0%	29%	3%	0%	0%	2%	46%
Adj. Flow (vph)	40	0	54	96	0	93	15	614	113	108	609	12
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	94	0	0	189	0	0	742	0	0	729	0
Sign Control		Stop			Stop			Free			Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	103.9%	ICU Level of Service G	
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Traffic Volume (veh/h)	40	0	54	96	0	93	15	614	113	108	609	12
Future Volume (Veh/h)	40	0	54	96	0	93	15	614	113	108	609	12
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)	40	0	54	96	0	93	15	614	113	108	609	12
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1624	1588	615	1586	1538	670	621			727		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1624	1588	615	1586	1538	670	621			727		
tC, single (s)	7.2	6.5	6.2	7.1	6.5	6.2	4.4			4.1		
tC, 2 stage (s)												
tF (s)	3.6	4.0	3.3	3.5	4.0	3.3	2.5			2.2		
p0 queue free %	30	100	89	0	100	80	98			88		
cM capacity (veh/h)	57	94	491	70	101	460	842			886		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	94	189	742	729
Volume Left	40	96	15	108
Volume Right	54	93	113	12
cSH	116	121	842	886
Volume to Capacity	0.81	1.57	0.02	0.12
Queue Length 95th (m)	37.6	109.6	0.4	3.3
Control Delay (s)	107.1	354.8	0.5	3.0
Lane LOS	F	F	A	A
Approach Delay (s)	107.1	354.8	0.5	3.0
Approach LOS	F	F		

Intersection Summary				
Average Delay			45.4	
Intersection Capacity Utilization			103.9%	ICU Level of Service G
Analysis Period (min)			15	

Intersection	
Int Delay, s/veh	45.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Traffic Vol, veh/h	40	0	54	96	0	93	15	614	113	108	609	12
Future Vol, veh/h	40	0	54	96	0	93	15	614	113	108	609	12
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	6	0	2	0	0	0	29	3	0	0	2	46
Mvmt Flow	40	0	54	96	0	93	15	614	113	108	609	12

Major/Minor	Minor2			Minor1				Major1			Major2	
Conflicting Flow All	1578	1588	615	1559	1538	671	621	0	0	727	0	0
Stage 1	831	831	-	701	701	-	-	-	-	-	-	-
Stage 2	747	757	-	858	837	-	-	-	-	-	-	-
Critical Hdwy	7.16	6.5	6.22	7.1	6.5	6.2	4.39	-	-	4.1	-	-
Critical Hdwy Stg 1	6.16	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.16	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.554	4	3.318	3.5	4	3.3	2.461	-	-	2.2	-	-
Pot Cap-1 Maneuver	87	109	491	~ 92	117	460	842	-	-	886	-	-
Stage 1	358	387	-	433	444	-	-	-	-	-	-	-
Stage 2	399	419	-	354	385	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	58	86	491	~ 69	92	460	842	-	-	886	-	-
Mov Cap-2 Maneuver	58	86	-	~ 69	92	-	-	-	-	-	-	-
Stage 1	347	315	-	420	430	-	-	-	-	-	-	-
Stage 2	308	406	-	256	313	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	103.9	$ 365.4	0.2	1.4
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	842	-	-	118	119	886	-	-
HCM Lane V/C Ratio	0.018	-	-	0.797	1.588	0.122	-	-
HCM Control Delay (s)	9.4	0	-	103.9	$ 365.4	9.6	0	-
HCM Lane LOS	A	A	-	F	F	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	4.6	13.9	0.4	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	250	86	635	81	202	565
Future Volume (vph)	250	86	635	81	202	565
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0		0.0	20.0	
Storage Lanes	1	0		0	0	
Taper Length (m)	0.0				80.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.965		0.985			
Flt Protected	0.964					0.987
Satd. Flow (prot)	1745	0	1803	0	0	1848
Flt Permitted	0.964					0.987
Satd. Flow (perm)	1745	0	1803	0	0	1848
Link Speed (k/h)	50		70			70
Link Distance (m)	208.2		398.1			137.3
Travel Time (s)	15.0		20.5			7.1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	5%	4%	2%	0%	2%
Adj. Flow (vph)	250	86	635	81	202	565
Shared Lane Traffic (%)						
Lane Group Flow (vph)	336	0	716	0	0	767
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	108.3%	ICU Level of Service	G
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	250	86	635	81	202	565
Future Volume (Veh/h)	250	86	635	81	202	565
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)	250	86	635	81	202	565
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1644	676			716	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1644	676			716	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	0	81			77	
cM capacity (veh/h)	86	449			894	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	336	716	767
Volume Left	250	0	202
Volume Right	86	81	0
cSH	108	1700	894
Volume to Capacity	3.11	0.42	0.23
Queue Length 95th (m)	Err	0.0	6.9
Control Delay (s)	Err	0.0	5.2
Lane LOS	F		A
Approach Delay (s)	Err	0.0	5.2
Approach LOS	F		

Intersection Summary			
Average Delay	1849.2		
Intersection Capacity Utilization	108.3%	ICU Level of Service	G
Analysis Period (min)	15		

Intersection	
Int Delay, s/veh	232.5

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	250	86	635	81	202	565
Future Vol, veh/h	250	86	635	81	202	565
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	0	5	4	2	0	2
Mvmt Flow	250	86	635	81	202	565

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1645	676	0	0	716	0
Stage 1	676	-	-	-	-	-
Stage 2	969	-	-	-	-	-
Critical Hdwy	6.4	6.25	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.345	-	-	2.2	-
Pot Cap-1 Maneuver	~ 111	448	-	-	894	-
Stage 1	509	-	-	-	-	-
Stage 2	371	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	~ 74	448	-	-	894	-
Mov Cap-2 Maneuver	~ 74	-	-	-	-	-
Stage 1	509	-	-	-	-	-
Stage 2	~ 249	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, $	1252.7	0	2.7
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	- 94	894	-
HCM Lane V/C Ratio	-	- 3.574	0.226	-
HCM Control Delay (s)	-	$ 1252.7	10.2	0
HCM Lane LOS	-	- F	B	A
HCM 95th %tile Q(veh)	-	- 34	0.9	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	49	319	466	670	740	58
Future Volume (vph)	49	319	466	670	740	58
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.883				0.990	
Flt Protected	0.993			0.980		
Satd. Flow (prot)	1652	0	0	1830	1839	0
Flt Permitted	0.993			0.980		
Satd. Flow (perm)	1652	0	0	1830	1839	0
Link Speed (k/h)	50			70	70	
Link Distance (m)	315.5			184.8	398.1	
Travel Time (s)	22.7			9.5	20.5	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	1%	0%	3%	2%	6%
Adj. Flow (vph)	49	319	466	670	740	58
Shared Lane Traffic (%)						
Lane Group Flow (vph)	368	0	0	1136	798	0
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	135.9%	ICU Level of Service	H
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	49	319	466	670	740	58
Future Volume (Veh/h)	49	319	466	670	740	58
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)	49	319	466	670	740	58
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	2371	769	798			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2371	769	798			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	0	21	44			
cM capacity (veh/h)	17	403	833			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	368	1136	798
Volume Left	49	466	0
Volume Right	319	0	58
cSH	101	833	1700
Volume to Capacity	3.65	0.56	0.47
Queue Length 95th (m)	Err	28.3	0.0
Control Delay (s)	Err	14.0	0.0
Lane LOS	F	B	
Approach Delay (s)	Err	14.0	0.0
Approach LOS	F		

Intersection Summary			
Average Delay	1605.4		
Intersection Capacity Utilization	135.9%	ICU Level of Service	H
Analysis Period (min)	15		

Intersection	
Int Delay, s/veh	919.5

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	49	319	466	670	740	58
Future Vol, veh/h	49	319	466	670	740	58
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	0	1	0	3	2	6
Mvmt Flow	49	319	466	670	740	58

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	2371	769	798	0	-	0
Stage 1	769	-	-	-	-	-
Stage 2	1602	-	-	-	-	-
Critical Hdwy	6.4	6.21	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.309	2.2	-	-	-
Pot Cap-1 Maneuver	~ 39	403	833	-	-	-
Stage 1	461	-	-	-	-	-
Stage 2	184	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	~ 4	403	833	-	-	-
Mov Cap-2 Maneuver	~ 4	-	-	-	-	-
Stage 1	50	-	-	-	-	-
Stage 2	184	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, $	5733.6	6	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	833	-	28	-	-
HCM Lane V/C Ratio	0.559	-	13.143	-	-
HCM Control Delay (s)	14.7	$	5733.6	-	-
HCM Lane LOS	B	A	F	-	-
HCM 95th %tile Q(veh)	3.5	-	45.5	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	96	93	610	113	108	647
Future Volume (vph)	96	93	610	113	108	647
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.934		0.979			
Flt Protected	0.975					0.993
Satd. Flow (prot)	1696	0	1824	0	0	1850
Flt Permitted	0.975					0.993
Satd. Flow (perm)	1696	0	1824	0	0	1850
Link Speed (k/h)	50		70			70
Link Distance (m)	171.9		180.7			198.6
Travel Time (s)	12.4		9.3			10.2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	96	93	610	113	108	647
Shared Lane Traffic (%)						
Lane Group Flow (vph)	189	0	723	0	0	755
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	100.0%	ICU Level of Service	G
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	96	93	610	113	108	647
Future Volume (Veh/h)	96	93	610	113	108	647
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)	96	93	610	113	108	647
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1530	666			723	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1530	666			723	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	15	80			88	
cM capacity (veh/h)	113	459			879	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	189	723	755
Volume Left	96	0	108
Volume Right	93	113	0
cSH	180	1700	879
Volume to Capacity	1.05	0.43	0.12
Queue Length 95th (m)	72.1	0.0	3.3
Control Delay (s)	134.7	0.0	3.0
Lane LOS	F		A
Approach Delay (s)	134.7	0.0	3.0
Approach LOS	F		

Intersection Summary				
Average Delay		16.6		
Intersection Capacity Utilization		100.0%	ICU Level of Service	G
Analysis Period (min)		15		

Intersection	
Int Delay, s/veh	19

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	96	93	610	113	108	647
Future Vol, veh/h	96	93	610	113	108	647
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	96	93	610	113	108	647

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1530	667	0	0	723	0
Stage 1	667	-	-	-	-	-
Stage 2	863	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	129	459	-	-	879	-
Stage 1	510	-	-	-	-	-
Stage 2	413	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	104	459	-	-	879	-
Mov Cap-2 Maneuver	104	-	-	-	-	-
Stage 1	510	-	-	-	-	-
Stage 2	334	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	162.4	0	1.4
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	168	879	-
HCM Lane V/C Ratio	-	-	1.125	0.123	-
HCM Control Delay (s)	-	-	162.4	9.7	0
HCM Lane LOS	-	-	F	A	A
HCM 95th %tile Q(veh)	-	-	9.8	0.4	-

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	132	611	130	0	766
Future Volume (vph)	0	132	611	130	0	766
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.865	0.976			
Flt Protected						
Satd. Flow (prot)	0	1611	1818	0	0	1863
Flt Permitted						
Satd. Flow (perm)	0	1611	1818	0	0	1863
Link Speed (k/h)	50		70			70
Link Distance (m)	144.8		137.3			441.7
Travel Time (s)	10.4		7.1			22.7
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	132	611	130	0	766
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	132	741	0	0	766
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 54.9%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	132	611	130	0	766
Future Volume (Veh/h)	0	132	611	130	0	766
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	132	611	130	0	766
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1442	676			741	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1442	676			741	
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	71			100	
cM capacity (veh/h)	146	453			866	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	132	741	766
Volume Left	0	0	0
Volume Right	132	130	0
cSH	453	1700	1700
Volume to Capacity	0.29	0.44	0.45
Queue Length 95th (m)	9.6	0.0	0.0
Control Delay (s)	16.2	0.0	0.0
Lane LOS	C		
Approach Delay (s)	16.2	0.0	0.0
Approach LOS	C		

Intersection Summary			
Average Delay	1.3		
Intersection Capacity Utilization	54.9%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection	
Int Delay, s/veh	1.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	132	611	130	0	766
Future Vol, veh/h	0	132	611	130	0	766
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	132	611	130	0	766

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	676	0	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.22	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.318	-	-	-	-
Pot Cap-1 Maneuver	0	453	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	453	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	16.2	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT
Capacity (veh/h)	-	-	453	-
HCM Lane V/C Ratio	-	-	0.291	-
HCM Control Delay (s)	-	-	16.2	-
HCM Lane LOS	-	-	C	-
HCM 95th %tile Q(veh)	-	-	1.2	-

Appendix F

2030 Background Traffic Operations Reports

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	20	22	35	358	435	21
Future Volume (vph)	20	22	35	358	435	21
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.929				0.994	
Flt Protected	0.977			0.996		
Satd. Flow (prot)	1276	0	0	1836	1814	0
Flt Permitted	0.977			0.996		
Satd. Flow (perm)	1276	0	0	1836	1814	0
Link Speed (k/h)	50			70	70	
Link Distance (m)	125.8			579.0	379.3	
Travel Time (s)	9.1			29.8	19.5	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	31%	39%	14%	2%	4%	6%
Adj. Flow (vph)	20	22	35	358	435	21
Shared Lane Traffic (%)						
Lane Group Flow (vph)	42	0	0	393	456	0
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	57.9%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	20	22	35	358	435	21
Future Volume (Veh/h)	20	22	35	358	435	21
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	20	22	35	358	435	21
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	874	446	456			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	874	446	456			
tC, single (s)	6.7	6.6	4.2			
tC, 2 stage (s)						
tF (s)	3.8	3.7	2.3			
p0 queue free %	93	96	97			
cM capacity (veh/h)	276	542	1044			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	42	393	456
Volume Left	20	35	0
Volume Right	22	0	21
cSH	372	1044	1700
Volume to Capacity	0.11	0.03	0.27
Queue Length 95th (m)	3.0	0.8	0.0
Control Delay (s)	15.9	1.1	0.0
Lane LOS	C	A	
Approach Delay (s)	15.9	1.1	0.0
Approach LOS	C		

Intersection Summary				
Average Delay	1.2			
Intersection Capacity Utilization	57.9%	ICU Level of Service		B
Analysis Period (min)	15			

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	20	22	35	358	435	21
Future Vol, veh/h	20	22	35	358	435	21
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	31	39	14	2	4	6
Mvmt Flow	20	22	35	358	435	21

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	874	446	456	0	-	0
Stage 1	446	-	-	-	-	-
Stage 2	428	-	-	-	-	-
Critical Hdwy	6.71	6.59	4.24	-	-	-
Critical Hdwy Stg 1	5.71	-	-	-	-	-
Critical Hdwy Stg 2	5.71	-	-	-	-	-
Follow-up Hdwy	3.779	3.651	2.326	-	-	-
Pot Cap-1 Maneuver	285	542	1044	-	-	-
Stage 1	588	-	-	-	-	-
Stage 2	600	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	273	542	1044	-	-	-
Mov Cap-2 Maneuver	273	-	-	-	-	-
Stage 1	563	-	-	-	-	-
Stage 2	600	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	16	0.8	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1044	-	369	-	-
HCM Lane V/C Ratio	0.034	-	0.114	-	-
HCM Control Delay (s)	8.6	0	16	-	-
HCM Lane LOS	A	A	C	-	-
HCM 95th %tile Q(veh)	0.1	-	0.4	-	-

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	92	61	326	53	66	395
Future Volume (vph)	92	61	326	53	66	395
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.946		0.981			
Flt Protected	0.971					0.993
Satd. Flow (prot)	1688	0	1778	0	0	1768
Flt Permitted	0.971					0.993
Satd. Flow (perm)	1688	0	1778	0	0	1768
Link Speed (k/h)	50		70			70
Link Distance (m)	208.2		398.1			579.0
Travel Time (s)	15.0		20.5			29.8
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	3%	4%	3%	16%	17%	5%
Adj. Flow (vph)	92	61	326	53	66	395
Shared Lane Traffic (%)						
Lane Group Flow (vph)	153	0	379	0	0	461
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 63.6%		ICU Level of Service B	
Analysis Period (min) 15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	92	61	326	53	66	395
Future Volume (Veh/h)	92	61	326	53	66	395
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)	92	61	326	53	66	395
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	880	352			379	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	880	352			379	
tC, single (s)	6.4	6.2			4.3	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.4	
p0 queue free %	69	91			94	
cM capacity (veh/h)	298	687			1102	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	153	379	461
Volume Left	92	0	66
Volume Right	61	53	0
cSH	384	1700	1102
Volume to Capacity	0.40	0.22	0.06
Queue Length 95th (m)	14.9	0.0	1.5
Control Delay (s)	20.4	0.0	1.8
Lane LOS	C		A
Approach Delay (s)	20.4	0.0	1.8
Approach LOS	C		

Intersection Summary			
Average Delay	4.0		
Intersection Capacity Utilization	63.6%	ICU Level of Service	B
Analysis Period (min)	15		

Intersection	
Int Delay, s/veh	3.8

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	92	61	326	53	66	395
Future Vol, veh/h	92	61	326	53	66	395
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	3	4	3	16	17	5
Mvmt Flow	92	61	326	53	66	395

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	880	353	0	0	379	0
Stage 1	353	-	-	-	-	-
Stage 2	527	-	-	-	-	-
Critical Hdwy	6.43	6.24	-	-	4.27	-
Critical Hdwy Stg 1	5.43	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.527	3.336	-	-	2.353	-
Pot Cap-1 Maneuver	316	686	-	-	1102	-
Stage 1	709	-	-	-	-	-
Stage 2	590	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	292	686	-	-	1102	-
Mov Cap-2 Maneuver	292	-	-	-	-	-
Stage 1	709	-	-	-	-	-
Stage 2	545	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	20.8	0	1.2
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	379	1102	-
HCM Lane V/C Ratio	-	-	0.404	0.06	-
HCM Control Delay (s)	-	-	20.8	8.5	0
HCM Lane LOS	-	-	C	A	A
HCM 95th %tile Q(veh)	-	-	1.9	0.2	-

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	12	211	445	361	417	71
Future Volume (vph)	12	211	445	361	417	71
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.872				0.980	
Flt Protected	0.997			0.973		
Satd. Flow (prot)	1575	0	0	1797	1776	0
Flt Permitted	0.997			0.973		
Satd. Flow (perm)	1575	0	0	1797	1776	0
Link Speed (k/h)	50			70	70	
Link Distance (m)	315.5			184.8	398.1	
Travel Time (s)	22.7			9.5	20.5	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	20%	4%	2%	4%	5%	4%
Adj. Flow (vph)	12	211	445	361	417	71
Shared Lane Traffic (%)						
Lane Group Flow (vph)	223	0	0	806	488	0
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	93.6%	ICU Level of Service	F
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	12	211	445	361	417	71
Future Volume (Veh/h)	12	211	445	361	417	71
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)	12	211	445	361	417	71
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1704	452	488			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1704	452	488			
tC, single (s)	6.6	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.7	3.3	2.2			
p0 queue free %	77	65	59			
cM capacity (veh/h)	53	603	1075			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	223	806	488
Volume Left	12	445	0
Volume Right	211	0	71
cSH	388	1075	1700
Volume to Capacity	0.58	0.41	0.29
Queue Length 95th (m)	27.8	16.5	0.0
Control Delay (s)	26.1	8.4	0.0
Lane LOS	D	A	
Approach Delay (s)	26.1	8.4	0.0
Approach LOS	D		

Intersection Summary				
Average Delay	8.3			
Intersection Capacity Utilization	93.6%	ICU Level of Service		F
Analysis Period (min)	15			

Intersection	
Int Delay, s/veh	7.6

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	12	211	445	361	417	71
Future Vol, veh/h	12	211	445	361	417	71
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	20	4	2	4	5	4
Mvmt Flow	12	211	445	361	417	71

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1704	453	488	0	-	0
Stage 1	453	-	-	-	-	-
Stage 2	1251	-	-	-	-	-
Critical Hdwy	6.6	6.24	4.12	-	-	-
Critical Hdwy Stg 1	5.6	-	-	-	-	-
Critical Hdwy Stg 2	5.6	-	-	-	-	-
Follow-up Hdwy	3.68	3.336	2.218	-	-	-
Pot Cap-1 Maneuver	91	603	1075	-	-	-
Stage 1	604	-	-	-	-	-
Stage 2	248	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	44	603	1075	-	-	-
Mov Cap-2 Maneuver	44	-	-	-	-	-
Stage 1	291	-	-	-	-	-
Stage 2	248	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	30.3	5.9	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1075	-	358	-	-
HCM Lane V/C Ratio	0.414	-	0.623	-	-
HCM Control Delay (s)	10.7	0	30.3	-	-
HCM Lane LOS	B	A	D	-	-
HCM 95th %tile Q(veh)	2.1	-	4	-	-

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	44	60	17	369	420	13
Future Volume (vph)	44	60	17	369	420	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.922				0.996	
Flt Protected	0.979			0.998		
Satd. Flow (prot)	1654	0	0	1821	1832	0
Flt Permitted	0.979			0.998		
Satd. Flow (perm)	1654	0	0	1821	1832	0
Link Speed (k/h)	50			70	70	
Link Distance (m)	125.8			579.0	379.3	
Travel Time (s)	9.1			29.8	19.5	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	6%	2%	29%	3%	2%	46%
Adj. Flow (vph)	44	60	17	369	420	13
Shared Lane Traffic (%)						
Lane Group Flow (vph)	104	0	0	386	433	0
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	46.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	44	60	17	369	420	13
Future Volume (Veh/h)	44	60	17	369	420	13
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)	44	60	17	369	420	13
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	830	426	433			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	830	426	433			
tC, single (s)	6.5	6.2	4.4			
tC, 2 stage (s)						
tF (s)	3.6	3.3	2.5			
p0 queue free %	87	90	98			
cM capacity (veh/h)	329	628	997			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	104	386	433
Volume Left	44	17	0
Volume Right	60	0	13
cSH	454	997	1700
Volume to Capacity	0.23	0.02	0.25
Queue Length 95th (m)	7.0	0.4	0.0
Control Delay (s)	15.3	0.6	0.0
Lane LOS	C	A	
Approach Delay (s)	15.3	0.6	0.0
Approach LOS	C		

Intersection Summary				
Average Delay		2.0		
Intersection Capacity Utilization		46.0%	ICU Level of Service	A
Analysis Period (min)		15		

Intersection	
Int Delay, s/veh	1.9

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	44	60	17	369	420	13
Future Vol, veh/h	44	60	17	369	420	13
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	6	2	29	3	2	46
Mvmt Flow	44	60	17	369	420	13

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	830	427	433	0	-	0
Stage 1	427	-	-	-	-	-
Stage 2	403	-	-	-	-	-
Critical Hdwy	6.46	6.22	4.39	-	-	-
Critical Hdwy Stg 1	5.46	-	-	-	-	-
Critical Hdwy Stg 2	5.46	-	-	-	-	-
Follow-up Hdwy	3.554	3.318	2.461	-	-	-
Pot Cap-1 Maneuver	335	628	997	-	-	-
Stage 1	650	-	-	-	-	-
Stage 2	666	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	328	628	997	-	-	-
Mov Cap-2 Maneuver	328	-	-	-	-	-
Stage 1	636	-	-	-	-	-
Stage 2	666	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	15.3	0.4	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	997	-	453	-	-
HCM Lane V/C Ratio	0.017	-	0.23	-	-
HCM Control Delay (s)	8.7	0	15.3	-	-
HCM Lane LOS	A	A	C	-	-
HCM 95th %tile Q(veh)	0.1	-	0.9	-	-

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	66	38	325	65	59	429
Future Volume (vph)	66	38	325	65	59	429
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.951		0.977			
Flt Protected	0.969					0.994
Satd. Flow (prot)	1719	0	1791	0	0	1856
Flt Permitted	0.969					0.994
Satd. Flow (perm)	1719	0	1791	0	0	1856
Link Speed (k/h)	50		70			70
Link Distance (m)	208.2		398.1			579.0
Travel Time (s)	15.0		20.5			29.8
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	5%	4%	2%	0%	2%
Adj. Flow (vph)	66	38	325	65	59	429
Shared Lane Traffic (%)						
Lane Group Flow (vph)	104	0	390	0	0	488
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	62.9%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	66	38	325	65	59	429
Future Volume (Veh/h)	66	38	325	65	59	429
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)	66	38	325	65	59	429
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	904	358			390	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	904	358			390	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	78	94			95	
cM capacity (veh/h)	294	680			1180	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	104	390	488
Volume Left	66	0	59
Volume Right	38	65	0
cSH	371	1700	1180
Volume to Capacity	0.28	0.23	0.05
Queue Length 95th (m)	9.0	0.0	1.3
Control Delay (s)	18.4	0.0	1.5
Lane LOS	C		A
Approach Delay (s)	18.4	0.0	1.5
Approach LOS	C		

Intersection Summary			
Average Delay	2.7		
Intersection Capacity Utilization	62.9%	ICU Level of Service	B
Analysis Period (min)	15		

Intersection	
Int Delay, s/veh	2.5

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	66	38	325	65	59	429
Future Vol, veh/h	66	38	325	65	59	429
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	0	5	4	2	0	2
Mvmt Flow	66	38	325	65	59	429

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	905	358	0	0	390	0
Stage 1	358	-	-	-	-	-
Stage 2	547	-	-	-	-	-
Critical Hdwy	6.4	6.25	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.345	-	-	2.2	-
Pot Cap-1 Maneuver	309	680	-	-	1180	-
Stage 1	712	-	-	-	-	-
Stage 2	584	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	289	680	-	-	1180	-
Mov Cap-2 Maneuver	289	-	-	-	-	-
Stage 1	712	-	-	-	-	-
Stage 2	545	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	18.7	0	1
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	366	1180	-
HCM Lane V/C Ratio	-	-	0.284	0.05	-
HCM Control Delay (s)	-	-	18.7	8.2	0
HCM Lane LOS	-	-	C	A	A
HCM 95th %tile Q(veh)	-	-	1.2	0.2	-

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	30	352	514	364	437	40
Future Volume (vph)	30	352	514	364	437	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.876				0.989	
Flt Protected	0.996			0.972		
Satd. Flow (prot)	1643	0	0	1824	1836	0
Flt Permitted	0.996			0.972		
Satd. Flow (perm)	1643	0	0	1824	1836	0
Link Speed (k/h)	50			70	70	
Link Distance (m)	315.5			184.8	398.1	
Travel Time (s)	22.7			9.5	20.5	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	1%	0%	3%	2%	6%
Adj. Flow (vph)	30	352	514	364	437	40
Shared Lane Traffic (%)						
Lane Group Flow (vph)	382	0	0	878	477	0
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	106.5%	ICU Level of Service	G
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	30	352	514	364	437	40
Future Volume (Veh/h)	30	352	514	364	437	40
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	30	352	514	364	437	40
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1849	457	477			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1849	457	477			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	32	42	53			
cM capacity (veh/h)	44	606	1096			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	382	878	477
Volume Left	30	514	0
Volume Right	352	0	40
cSH	302	1096	1700
Volume to Capacity	1.26	0.47	0.28
Queue Length 95th (m)	143.5	20.5	0.0
Control Delay (s)	177.6	9.3	0.0
Lane LOS	F	A	
Approach Delay (s)	177.6	9.3	0.0
Approach LOS	F		

Intersection Summary			
Average Delay		43.8	
Intersection Capacity Utilization		106.5%	ICU Level of Service G
Analysis Period (min)		15	

Intersection	
Int Delay, s/veh	61.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	30	352	514	364	437	40
Future Vol, veh/h	30	352	514	364	437	40
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	0	1	0	3	2	6
Mvmt Flow	30	352	514	364	437	40

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1849	457	477	0	-	0
Stage 1	457	-	-	-	-	-
Stage 2	1392	-	-	-	-	-
Critical Hdwy	6.4	6.21	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.309	2.2	-	-	-
Pot Cap-1 Maneuver	83	606	1096	-	-	-
Stage 1	642	-	-	-	-	-
Stage 2	233	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	34	606	1096	-	-	-
Mov Cap-2 Maneuver	34	-	-	-	-	-
Stage 1	265	-	-	-	-	-
Stage 2	233	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	264.4	6.5	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1096	-	261	-	-
HCM Lane V/C Ratio	0.469	-	1.464	-	-
HCM Control Delay (s)	11.2	0	264.4	-	-
HCM Lane LOS	B	A	F	-	-
HCM 95th %tile Q(veh)	2.6	-	21.7	-	-

Appendix G

2030 Total Traffic Operations Reports

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	0	22	129	0	124	35	523	44	41	680	21
Future Volume (vph)	20	0	22	129	0	124	35	523	44	41	680	21
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
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
Frt		0.929			0.934			0.990			0.996	
Flt Protected		0.977			0.975			0.997			0.997	
Satd. Flow (prot)	0	1276	0	0	1730	0	0	1829	0	0	1817	0
Flt Permitted		0.977			0.975			0.997			0.997	
Satd. Flow (perm)	0	1276	0	0	1730	0	0	1829	0	0	1817	0
Link Speed (k/h)		50			50			70			70	
Link Distance (m)		125.8			109.3			435.9			185.4	
Travel Time (s)		9.1			7.9			22.4			9.5	
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 (%)	31%	0%	39%	0%	0%	0%	14%	2%	0%	0%	4%	6%
Adj. Flow (vph)	20	0	22	129	0	124	35	523	44	41	680	21
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	42	0	0	253	0	0	602	0	0	742	0
Sign Control		Stop			Stop			Free			Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	75.6%	ICU Level of Service	D
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	0	22	129	0	124	35	523	44	41	680	21
Future Volume (Veh/h)	20	0	22	129	0	124	35	523	44	41	680	21
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)	20	0	22	129	0	124	35	523	44	41	680	21
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1512	1410	690	1410	1398	545	701			567		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1512	1410	690	1410	1398	545	701			567		
tC, single (s)	7.4	6.5	6.6	7.1	6.5	6.2	4.2			4.1		
tC, 2 stage (s)												
tF (s)	3.8	4.0	3.7	3.5	4.0	3.3	2.3			2.2		
p0 queue free %	67	100	94	0	100	77	96			96		
cM capacity (veh/h)	61	129	387	104	131	542	843			1015		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	42	253	602	742
Volume Left	20	129	35	41
Volume Right	22	124	44	21
cSH	110	172	843	1015
Volume to Capacity	0.38	1.47	0.04	0.04
Queue Length 95th (m)	12.6	128.4	1.0	1.0
Control Delay (s)	56.9	290.6	1.1	1.0
Lane LOS	F	F	A	A
Approach Delay (s)	56.9	290.6	1.1	1.0
Approach LOS	F	F		

Intersection Summary					
Average Delay		47.2			
Intersection Capacity Utilization		75.6%	ICU Level of Service		D
Analysis Period (min)		15			

Intersection	
Int Delay, s/veh	48.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	20	0	22	129	0	124	35	523	44	41	680	21
Future Vol, veh/h	20	0	22	129	0	124	35	523	44	41	680	21
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	31	0	39	0	0	0	14	2	0	0	4	6
Mvmt Flow	20	0	22	129	0	124	35	523	44	41	680	21

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1450	1410	691	1399	1398	545	701	0	0	567	0	0
Stage 1	773	773	-	615	615	-	-	-	-	-	-	-
Stage 2	677	637	-	784	783	-	-	-	-	-	-	-
Critical Hdwy	7.41	6.5	6.59	7.1	6.5	6.2	4.24	-	-	4.1	-	-
Critical Hdwy Stg 1	6.41	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.41	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.779	4	3.651	3.5	4	3.3	2.326	-	-	2.2	-	-
Pot Cap-1 Maneuver	94	140	387	~ 119	142	542	843	-	-	1015	-	-
Stage 1	351	412	-	482	485	-	-	-	-	-	-	-
Stage 2	399	475	-	389	407	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	66	123	387	~ 102	125	542	843	-	-	1015	-	-
Mov Cap-2 Maneuver	66	123	-	~ 102	125	-	-	-	-	-	-	-
Stage 1	330	385	-	453	455	-	-	-	-	-	-	-
Stage 2	289	446	-	343	380	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	52.1	$ 302	0.5	0.5
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	843	-	-	117	169	1015	-	-
HCM Lane V/C Ratio	0.042	-	-	0.359	1.497	0.04	-	-
HCM Control Delay (s)	9.5	0	-	52.1	$ 302	8.7	0	-
HCM Lane LOS	A	A	-	F	F	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	1.5	16.3	0.1	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	219	84	477	111	182	653
Future Volume (vph)	219	84	477	111	182	653
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.963		0.975			
Flt Protected	0.965					0.989
Satd. Flow (prot)	1710	0	1757	0	0	1746
Flt Permitted	0.965					0.989
Satd. Flow (perm)	1710	0	1757	0	0	1746
Link Speed (k/h)	50		70			70
Link Distance (m)	208.2		398.1			143.1
Travel Time (s)	15.0		20.5			7.4
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	3%	4%	3%	16%	17%	5%
Adj. Flow (vph)	219	84	477	111	182	653
Shared Lane Traffic (%)						
Lane Group Flow (vph)	303	0	588	0	0	835
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 103.5%		ICU Level of Service G	
Analysis Period (min) 15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	219	84	477	111	182	653
Future Volume (Veh/h)	219	84	477	111	182	653
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)	219	84	477	111	182	653
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1550	532			588	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1550	532			588	
tC, single (s)	6.4	6.2			4.3	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.4	
p0 queue free %	0	85			80	
cM capacity (veh/h)	100	543			917	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	303	588	835
Volume Left	219	0	182
Volume Right	84	111	0
cSH	129	1700	917
Volume to Capacity	2.35	0.35	0.20
Queue Length 95th (m)	208.7	0.0	5.9
Control Delay (s)	684.0	0.0	4.6
Lane LOS	F		A
Approach Delay (s)	684.0	0.0	4.6
Approach LOS	F		

Intersection Summary			
Average Delay	122.3		
Intersection Capacity Utilization	103.5%	ICU Level of Service	G
Analysis Period (min)	15		

Intersection	
Int Delay, s/veh	150.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	219	84	477	111	182	653
Future Vol, veh/h	219	84	477	111	182	653
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	3	4	3	16	17	5
Mvmt Flow	219	84	477	111	182	653

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1550	533	0	0	588	0
Stage 1	533	-	-	-	-	-
Stage 2	1017	-	-	-	-	-
Critical Hdwy	6.43	6.24	-	-	4.27	-
Critical Hdwy Stg 1	5.43	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.527	3.336	-	-	2.353	-
Pot Cap-1 Maneuver	~ 125	543	-	-	917	-
Stage 1	586	-	-	-	-	-
Stage 2	348	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	~ 86	543	-	-	917	-
Mov Cap-2 Maneuver	~ 86	-	-	-	-	-
Stage 1	586	-	-	-	-	-
Stage 2	240	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	$ 852.5	0	2.2
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	112	917	-
HCM Lane V/C Ratio	-	-	2.705	0.198	-
HCM Control Delay (s)	-	-	$ 852.5	9.9	0
HCM Lane LOS	-	-	F	A	A
HCM 95th %tile Q(veh)	-	-	27.9	0.7	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	25	211	445	557	779	94
Future Volume (vph)	25	211	445	557	779	94
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.879				0.985	
Flt Protected	0.995			0.978		
Satd. Flow (prot)	1572	0	0	1802	1784	0
Flt Permitted	0.995			0.978		
Satd. Flow (perm)	1572	0	0	1802	1784	0
Link Speed (k/h)	50			70	70	
Link Distance (m)	315.5			184.8	398.1	
Travel Time (s)	22.7			9.5	20.5	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	20%	4%	2%	4%	5%	4%
Adj. Flow (vph)	25	211	445	557	779	94
Shared Lane Traffic (%)						
Lane Group Flow (vph)	236	0	0	1002	873	0
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	125.1%	ICU Level of Service	H
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	25	211	445	557	779	94
Future Volume (Veh/h)	25	211	445	557	779	94
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	25	211	445	557	779	94
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	2273	826	873			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2273	826	873			
tC, single (s)	6.6	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.7	3.3	2.2			
p0 queue free %	0	43	42			
cM capacity (veh/h)	17	369	773			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	236	1002	873
Volume Left	25	445	0
Volume Right	211	0	94
cSH	113	773	1700
Volume to Capacity	2.08	0.58	0.51
Queue Length 95th (m)	158.4	29.9	0.0
Control Delay (s)	578.4	14.5	0.0
Lane LOS	F	B	
Approach Delay (s)	578.4	14.5	0.0
Approach LOS	F		

Intersection Summary				
Average Delay	71.6			
Intersection Capacity Utilization	125.1%	ICU Level of Service	H	
Analysis Period (min)	15			

Intersection	
Int Delay, s/veh	208.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	25	211	445	557	779	94
Future Vol, veh/h	25	211	445	557	779	94
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	20	4	2	4	5	4
Mvmt Flow	25	211	445	557	779	94

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	2273	826	873	0	-	0
Stage 1	826	-	-	-	-	-
Stage 2	1447	-	-	-	-	-
Critical Hdwy	6.6	6.24	4.12	-	-	-
Critical Hdwy Stg 1	5.6	-	-	-	-	-
Critical Hdwy Stg 2	5.6	-	-	-	-	-
Follow-up Hdwy	3.68	3.336	2.218	-	-	-
Pot Cap-1 Maneuver	39	369	773	-	-	-
Stage 1	401	-	-	-	-	-
Stage 2	197	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	~ 6	369	773	-	-	-
Mov Cap-2 Maneuver	~ 6	-	-	-	-	-
Stage 1	67	-	-	-	-	-
Stage 2	197	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, $	1837.8	7	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	773	-	50	-	-
HCM Lane V/C Ratio	0.576	-	4.72	-	-
HCM Control Delay (s)	15.8	$	1837.8	-	-
HCM Lane LOS	C	A	F	-	-
HCM 95th %tile Q(veh)	3.7	-	26.6	-	-

Notes
~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	129	124	638	44	41	616
Future Volume (vph)	129	124	638	44	41	616
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.934		0.991			
Flt Protected	0.975					0.997
Satd. Flow (prot)	1696	0	1846	0	0	1857
Flt Permitted	0.975					0.997
Satd. Flow (perm)	1696	0	1846	0	0	1857
Link Speed (k/h)	50		70			70
Link Distance (m)	193.0		185.4			193.9
Travel Time (s)	13.9		9.5			10.0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	129	124	638	44	41	616
Shared Lane Traffic (%)						
Lane Group Flow (vph)	253	0	682	0	0	657
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 87.5%		ICU Level of Service E	
Analysis Period (min) 15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	129	124	638	44	41	616
Future Volume (Veh/h)	129	124	638	44	41	616
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)	129	124	638	44	41	616
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1358	660			682	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1358	660			682	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	18	73			95	
cM capacity (veh/h)	157	463			911	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	253	682	657
Volume Left	129	0	41
Volume Right	124	44	0
cSH	232	1700	911
Volume to Capacity	1.09	0.40	0.05
Queue Length 95th (m)	89.2	0.0	1.1
Control Delay (s)	130.7	0.0	1.2
Lane LOS	F		A
Approach Delay (s)	130.7	0.0	1.2
Approach LOS	F		

Intersection Summary			
Average Delay		21.3	
Intersection Capacity Utilization		87.5%	ICU Level of Service E
Analysis Period (min)		15	

Intersection	
Int Delay, s/veh	22.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	129	124	638	44	41	616
Future Vol, veh/h	129	124	638	44	41	616
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	129	124	638	44	41	616

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1358	660	0	0	682	0
Stage 1	660	-	-	-	-	-
Stage 2	698	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	164	463	-	-	911	-
Stage 1	514	-	-	-	-	-
Stage 2	494	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	153	463	-	-	911	-
Mov Cap-2 Maneuver	153	-	-	-	-	-
Stage 1	514	-	-	-	-	-
Stage 2	460	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	137.6	0	0.6
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	228	911	-
HCM Lane V/C Ratio	-	-	1.11	0.045	-
HCM Control Delay (s)	-	-	137.6	9.1	0
HCM Lane LOS	-	-	F	A	A
HCM 95th %tile Q(veh)	-	-	11.4	0.1	-

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	98	504	63	0	835
Future Volume (vph)	0	98	504	63	0	835
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.865	0.985			
Flt Protected						
Satd. Flow (prot)	0	1611	1835	0	0	1863
Flt Permitted						
Satd. Flow (perm)	0	1611	1835	0	0	1863
Link Speed (k/h)	50		70			70
Link Distance (m)	116.0		143.1			435.9
Travel Time (s)	8.4		7.4			22.4
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	98	504	63	0	835
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	98	567	0	0	835
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	47.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	98	504	63	0	835
Future Volume (Veh/h)	0	98	504	63	0	835
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	98	504	63	0	835
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1370	536			567	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1370	536			567	
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	82			100	
cM capacity (veh/h)	161	545			1005	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	98	567	835
Volume Left	0	0	0
Volume Right	98	63	0
cSH	545	1700	1700
Volume to Capacity	0.18	0.33	0.49
Queue Length 95th (m)	5.2	0.0	0.0
Control Delay (s)	13.0	0.0	0.0
Lane LOS	B		
Approach Delay (s)	13.0	0.0	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	0.9		
Intersection Capacity Utilization	47.3%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection	
Int Delay, s/veh	0.8

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	98	504	63	0	835
Future Vol, veh/h	0	98	504	63	0	835
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	98	504	63	0	835

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	536	0	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.22	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.318	-	-	-	-
Pot Cap-1 Maneuver	0	545	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	545	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	13	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT
Capacity (veh/h)	-	-	545	-
HCM Lane V/C Ratio	-	-	0.18	-
HCM Control Delay (s)	-	-	13	-
HCM Lane LOS	-	-	B	-
HCM 95th %tile Q(veh)	-	-	0.7	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	44	0	60	96	0	93	17	648	113	108	647	13
Future Volume (vph)	44	0	60	96	0	93	17	648	113	108	647	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
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
Frt		0.922			0.934			0.980			0.998	
Flt Protected		0.979			0.975			0.999			0.993	
Satd. Flow (prot)	0	1654	0	0	1730	0	0	1804	0	0	1838	0
Flt Permitted		0.979			0.975			0.999			0.993	
Satd. Flow (perm)	0	1654	0	0	1730	0	0	1804	0	0	1838	0
Link Speed (k/h)		50			50			70			70	
Link Distance (m)		125.8			110.5			441.7			180.7	
Travel Time (s)		9.1			8.0			22.7			9.3	
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 (%)	6%	0%	2%	0%	0%	0%	29%	3%	0%	0%	2%	46%
Adj. Flow (vph)	44	0	60	96	0	93	17	648	113	108	647	13
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	104	0	0	189	0	0	778	0	0	768	0
Sign Control		Stop			Stop			Free			Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	107.9%	ICU Level of Service	G
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Traffic Volume (veh/h)	44	0	60	96	0	93	17	648	113	108	647	13
Future Volume (Veh/h)	44	0	60	96	0	93	17	648	113	108	647	13
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)	44	0	60	96	0	93	17	648	113	108	647	13
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1701	1664	654	1668	1614	704	660			761		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1701	1664	654	1668	1614	704	660			761		
tC, single (s)	7.2	6.5	6.2	7.1	6.5	6.2	4.4			4.1		
tC, 2 stage (s)												
tF (s)	3.6	4.0	3.3	3.5	4.0	3.3	2.5			2.2		
p0 queue free %	12	100	87	0	100	79	98			87		
cM capacity (veh/h)	50	84	467	60	90	440	813			860		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	104	189	778	768
Volume Left	44	96	17	108
Volume Right	60	93	113	13
cSH	103	104	813	860
Volume to Capacity	1.01	1.81	0.02	0.13
Queue Length 95th (m)	50.6	121.8	0.5	3.4
Control Delay (s)	169.1	469.2	0.6	3.1
Lane LOS	F	F	A	A
Approach Delay (s)	169.1	469.2	0.6	3.1
Approach LOS	F	F		

Intersection Summary				
Average Delay		59.3		
Intersection Capacity Utilization		107.9%	ICU Level of Service	G
Analysis Period (min)		15		

Intersection	
Int Delay, s/veh	61.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Traffic Vol, veh/h	44	0	60	96	0	93	17	648	113	108	647	13
Future Vol, veh/h	44	0	60	96	0	93	17	648	113	108	647	13
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	6	0	2	0	0	0	29	3	0	0	2	46
Mvmt Flow	44	0	60	96	0	93	17	648	113	108	647	13

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1655	1665	654	1639	1615	705	660	0	0	761	0	0
Stage 1	870	870	-	739	739	-	-	-	-	-	-	-
Stage 2	785	795	-	900	876	-	-	-	-	-	-	-
Critical Hdwy	7.16	6.5	6.22	7.1	6.5	6.2	4.39	-	-	4.1	-	-
Critical Hdwy Stg 1	6.16	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.16	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.554	4	3.318	3.5	4	3.3	2.461	-	-	2.2	-	-
Pot Cap-1 Maneuver	76	98	467	~ 81	105	440	813	-	-	860	-	-
Stage 1	341	372	-	412	427	-	-	-	-	-	-	-
Stage 2	380	402	-	336	369	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	49	76	467	~ 58	81	440	813	-	-	860	-	-
Mov Cap-2 Maneuver	49	76	-	~ 58	81	-	-	-	-	-	-	-
Stage 1	328	298	-	397	411	-	-	-	-	-	-	-
Stage 2	289	387	-	235	296	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	176	$ 498.3	0.2	1.4
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	813	-	-	101	101	860	-	-
HCM Lane V/C Ratio	0.021	-	-	1.03	1.871	0.126	-	-
HCM Control Delay (s)	9.5	0	-	176$	498.3	9.8	0	-
HCM Lane LOS	A	A	-	F	F	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	6.4	15.6	0.4	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	256	88	665	87	206	605
Future Volume (vph)	256	88	665	87	206	605
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0		0.0	20.0	
Storage Lanes	1	0		0	0	
Taper Length (m)	0.0				80.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.965		0.984			
Flt Protected	0.964					0.987
Satd. Flow (prot)	1745	0	1802	0	0	1848
Flt Permitted	0.964					0.987
Satd. Flow (perm)	1745	0	1802	0	0	1848
Link Speed (k/h)	50		70			70
Link Distance (m)	208.2		398.1			137.3
Travel Time (s)	15.0		20.5			7.1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	5%	4%	2%	0%	2%
Adj. Flow (vph)	256	88	665	87	206	605
Shared Lane Traffic (%)						
Lane Group Flow (vph)	344	0	752	0	0	811
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	113.1%	ICU Level of Service	H
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	256	88	665	87	206	605
Future Volume (Veh/h)	256	88	665	87	206	605
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)	256	88	665	87	206	605
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1726	708			752	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1726	708			752	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	0	80			76	
cM capacity (veh/h)	75	429			867	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	344	752	811
Volume Left	256	0	206
Volume Right	88	87	0
cSH	95	1700	867
Volume to Capacity	3.61	0.44	0.24
Queue Length 95th (m)	Err	0.0	7.4
Control Delay (s)	Err	0.0	5.5
Lane LOS	F		A
Approach Delay (s)	Err	0.0	5.5
Approach LOS	F		

Intersection Summary				
Average Delay	1806.1			
Intersection Capacity Utilization	113.1%	ICU Level of Service		H
Analysis Period (min)	15			

Intersection	
Int Delay, s/veh	279.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	256	88	665	87	206	605
Future Vol, veh/h	256	88	665	87	206	605
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	0	5	4	2	0	2
Mvmt Flow	256	88	665	87	206	605

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1726	709	0	0	752	0
Stage 1	709	-	-	-	-	-
Stage 2	1017	-	-	-	-	-
Critical Hdwy	6.4	6.25	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.345	-	-	2.2	-
Pot Cap-1 Maneuver	~ 99	429	-	-	867	-
Stage 1	491	-	-	-	-	-
Stage 2	352	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	~ 64	429	-	-	867	-
Mov Cap-2 Maneuver	~ 64	-	-	-	-	-
Stage 1	491	-	-	-	-	-
Stage 2	~ 226	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, $	1542.2	0	2.7
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	82	867	-
HCM Lane V/C Ratio	-	-	4.195	0.238	-
HCM Control Delay (s)	-	-	$ 1542.2	10.4	0
HCM Lane LOS	-	-	F	B	A
HCM 95th %tile Q(veh)	-	-	36.3	0.9	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	52	352	514	704	781	62
Future Volume (vph)	52	352	514	704	781	62
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.882				0.990	
Flt Protected	0.994			0.979		
Satd. Flow (prot)	1651	0	0	1828	1839	0
Flt Permitted	0.994			0.979		
Satd. Flow (perm)	1651	0	0	1828	1839	0
Link Speed (k/h)	50			70	70	
Link Distance (m)	315.5			184.8	398.1	
Travel Time (s)	22.7			9.5	20.5	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	1%	0%	3%	2%	6%
Adj. Flow (vph)	52	352	514	704	781	62
Shared Lane Traffic (%)						
Lane Group Flow (vph)	404	0	0	1218	843	0
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	145.0%	ICU Level of Service	H
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	52	352	514	704	781	62
Future Volume (Veh/h)	52	352	514	704	781	62
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)	52	352	514	704	781	62
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	2544	812	843			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2544	812	843			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	0	7	36			
cM capacity (veh/h)	11	380	802			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	404	1218	843
Volume Left	52	514	0
Volume Right	352	0	62
cSH	71	802	1700
Volume to Capacity	5.73	0.64	0.50
Queue Length 95th (m)	Err	37.9	0.0
Control Delay (s)	Err	17.2	0.0
Lane LOS	F	C	
Approach Delay (s)	Err	17.2	0.0
Approach LOS	F		

Intersection Summary			
Average Delay	1647.3		
Intersection Capacity Utilization	145.0%	ICU Level of Service	H
Analysis Period (min)	15		

Intersection	
Int Delay, s/veh	19.5

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	52	352	514	704	781	62
Future Vol, veh/h	52	352	514	704	781	62
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	0	1	0	3	2	6
Mvmt Flow	52	352	514	704	781	62

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	2544	812	843	0	-	0
Stage 1	812	-	-	-	-	-
Stage 2	1732	-	-	-	-	-
Critical Hdwy	6.4	6.21	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.309	2.2	-	-	-
Pot Cap-1 Maneuver	~ 30	380	802	-	-	-
Stage 1	440	-	-	-	-	-
Stage 2	158	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	0	380	802	-	-	-
Mov Cap-2 Maneuver	0	-	-	-	-	-
Stage 1	0	-	-	-	-	-
Stage 2	158	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	97.5	7.2	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	802	-	380	-	-
HCM Lane V/C Ratio	0.641	-	1.063	-	-
HCM Control Delay (s)	17.1	0	97.5	-	-
HCM Lane LOS	C	A	F	-	-
HCM 95th %tile Q(veh)	4.7	-	13.9	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	96	93	645	113	108	688
Future Volume (vph)	96	93	645	113	108	688
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.934		0.980			
Flt Protected	0.975					0.993
Satd. Flow (prot)	1696	0	1825	0	0	1850
Flt Permitted	0.975					0.993
Satd. Flow (perm)	1696	0	1825	0	0	1850
Link Speed (k/h)	50		70			70
Link Distance (m)	171.9		180.7			198.6
Travel Time (s)	12.4		9.3			10.2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	96	93	645	113	108	688
Shared Lane Traffic (%)						
Lane Group Flow (vph)	189	0	758	0	0	796
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	104.0%	ICU Level of Service	G
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	96	93	645	113	108	688
Future Volume (Veh/h)	96	93	645	113	108	688
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)	96	93	645	113	108	688
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1606	702			758	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1606	702			758	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	5	79			87	
cM capacity (veh/h)	101	438			853	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	189	758	796
Volume Left	96	0	108
Volume Right	93	113	0
cSH	163	1700	853
Volume to Capacity	1.16	0.45	0.13
Queue Length 95th (m)	81.8	0.0	3.5
Control Delay (s)	177.0	0.0	3.1
Lane LOS	F		A
Approach Delay (s)	177.0	0.0	3.1
Approach LOS	F		

Intersection Summary				
Average Delay		20.6		
Intersection Capacity Utilization		104.0%	ICU Level of Service	G
Analysis Period (min)		15		

Intersection	
Int Delay, s/veh	23.8

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	96	93	645	113	108	688
Future Vol, veh/h	96	93	645	113	108	688
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	96	93	645	113	108	688

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1606	702	0	0	758	0
Stage 1	702	-	-	-	-	-
Stage 2	904	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	116	438	-	-	853	-
Stage 1	491	-	-	-	-	-
Stage 2	395	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	~ 92	438	-	-	853	-
Mov Cap-2 Maneuver	~ 92	-	-	-	-	-
Stage 1	491	-	-	-	-	-
Stage 2	314	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	214.4	0	1.3
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	151	853	-
HCM Lane V/C Ratio	-	-	1.252	0.127	-
HCM Control Delay (s)	-	-	214.4	9.8	0
HCM Lane LOS	-	-	F	A	A
HCM 95th %tile Q(veh)	-	-	11.1	0.4	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	132	646	130	0	811
Future Volume (vph)	0	132	646	130	0	811
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.865	0.977			
Flt Protected						
Satd. Flow (prot)	0	1611	1820	0	0	1863
Flt Permitted						
Satd. Flow (perm)	0	1611	1820	0	0	1863
Link Speed (k/h)	50		70			70
Link Distance (m)	144.8		137.3			441.7
Travel Time (s)	10.4		7.1			22.7
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	132	646	130	0	811
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	132	776	0	0	811
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 56.7%		ICU Level of Service B	
Analysis Period (min) 15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	132	646	130	0	811
Future Volume (Veh/h)	0	132	646	130	0	811
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	132	646	130	0	811
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1522	711			776	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1522	711			776	
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	70			100	
cM capacity (veh/h)	130	433			840	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	132	776	811
Volume Left	0	0	0
Volume Right	132	130	0
cSH	433	1700	1700
Volume to Capacity	0.30	0.46	0.48
Queue Length 95th (m)	10.2	0.0	0.0
Control Delay (s)	16.9	0.0	0.0
Lane LOS	C		
Approach Delay (s)	16.9	0.0	0.0
Approach LOS	C		

Intersection Summary			
Average Delay	1.3		
Intersection Capacity Utilization	56.7%	ICU Level of Service	B
Analysis Period (min)	15		

Intersection	
Int Delay, s/veh	1.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	132	646	130	0	811
Future Vol, veh/h	0	132	646	130	0	811
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	132	646	130	0	811

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	711	0	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.22	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.318	-	-	-	-
Pot Cap-1 Maneuver	0	433	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	433	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	16.9	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT
Capacity (veh/h)	-	-	433	-
HCM Lane V/C Ratio	-	-	0.305	-
HCM Control Delay (s)	-	-	16.9	-
HCM Lane LOS	-	-	C	-
HCM 95th %tile Q(veh)	-	-	1.3	-

Appendix H

2030 Total Traffic Operations Reports (All-Turns Access Scenario)

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	0	22	129	0	124	35	523	44	41	677	21
Future Volume (vph)	20	0	22	129	0	124	35	523	44	41	677	21
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
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
Frt		0.929			0.934			0.990			0.996	
Flt Protected		0.977			0.975			0.997			0.997	
Satd. Flow (prot)	0	1276	0	0	1730	0	0	1829	0	0	1817	0
Flt Permitted		0.977			0.975			0.997			0.997	
Satd. Flow (perm)	0	1276	0	0	1730	0	0	1829	0	0	1817	0
Link Speed (k/h)		50			50			70			70	
Link Distance (m)		125.8			109.3			336.2			185.4	
Travel Time (s)		9.1			7.9			17.3			9.5	
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 (%)	31%	0%	39%	0%	0%	0%	14%	2%	0%	0%	4%	6%
Adj. Flow (vph)	20	0	22	129	0	124	35	523	44	41	677	21
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	42	0	0	253	0	0	602	0	0	739	0
Sign Control		Stop			Stop			Free			Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	75.4%	ICU Level of Service	D
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	0	22	129	0	124	35	523	44	41	677	21
Future Volume (Veh/h)	20	0	22	129	0	124	35	523	44	41	677	21
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)	20	0	22	129	0	124	35	523	44	41	677	21
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1508	1406	688	1406	1395	545	698			567		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1508	1406	688	1406	1395	545	698			567		
tC, single (s)	7.4	6.5	6.6	7.1	6.5	6.2	4.2			4.1		
tC, 2 stage (s)												
tF (s)	3.8	4.0	3.7	3.5	4.0	3.3	2.3			2.2		
p0 queue free %	68	100	94	0	100	77	96			96		
cM capacity (veh/h)	62	129	389	104	131	542	845			1015		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	42	253	602	739
Volume Left	20	129	35	41
Volume Right	22	124	44	21
cSH	110	173	845	1015
Volume to Capacity	0.38	1.47	0.04	0.04
Queue Length 95th (m)	12.5	127.8	1.0	1.0
Control Delay (s)	56.5	287.7	1.1	1.0
Lane LOS	F	F	A	A
Approach Delay (s)	56.5	287.7	1.1	1.0
Approach LOS	F	F		

Intersection Summary				
Average Delay		46.8		
Intersection Capacity Utilization		75.4%	ICU Level of Service	D
Analysis Period (min)		15		

Intersection	
Int Delay, s/veh	47.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	20	0	22	129	0	124	35	523	44	41	677	21
Future Vol, veh/h	20	0	22	129	0	124	35	523	44	41	677	21
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	31	0	39	0	0	0	14	2	0	0	4	6
Mvmt Flow	20	0	22	129	0	124	35	523	44	41	677	21

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1447	1407	688	1396	1395	545	698	0	0	567	0	0
Stage 1	770	770	-	615	615	-	-	-	-	-	-	-
Stage 2	677	637	-	781	780	-	-	-	-	-	-	-
Critical Hdwy	7.41	6.5	6.59	7.1	6.5	6.2	4.24	-	-	4.1	-	-
Critical Hdwy Stg 1	6.41	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.41	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.779	4	3.651	3.5	4	3.3	2.326	-	-	2.2	-	-
Pot Cap-1 Maneuver	94	140	389	~ 120	143	542	845	-	-	1015	-	-
Stage 1	353	413	-	482	485	-	-	-	-	-	-	-
Stage 2	399	475	-	391	409	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	66	123	389	~ 103	125	542	845	-	-	1015	-	-
Mov Cap-2 Maneuver	66	123	-	~ 103	125	-	-	-	-	-	-	-
Stage 1	331	386	-	453	455	-	-	-	-	-	-	-
Stage 2	289	446	-	345	382	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	52.1	294.1	0.5	0.5
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	845	-	-	117	171	1015	-	-
HCM Lane V/C Ratio	0.041	-	-	0.359	1.48	0.04	-	-
HCM Control Delay (s)	9.4	0	-	52.1	294.1	8.7	0	-
HCM Lane LOS	A	A	-	F	F	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	1.5	16.1	0.1	-	-

Notes
~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↕		↕			↕
Traffic Volume (vph)	116	84	478	111	122	755
Future Volume (vph)	116	84	478	111	122	755
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.943		0.975			
Flt Protected	0.972					0.993
Satd. Flow (prot)	1684	0	1757	0	0	1769
Flt Permitted	0.972					0.993
Satd. Flow (perm)	1684	0	1757	0	0	1769
Link Speed (k/h)	50		70			70
Link Distance (m)	208.2		398.1			143.1
Travel Time (s)	15.0		20.5			7.4
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	3%	4%	3%	16%	17%	5%
Adj. Flow (vph)	116	84	478	111	122	755
Shared Lane Traffic (%)						
Lane Group Flow (vph)	200	0	589	0	0	877
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	100.0%	ICU Level of Service	F
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	116	84	478	111	122	755
Future Volume (Veh/h)	116	84	478	111	122	755
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)	116	84	478	111	122	755
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1532	534			589	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1532	534			589	
tC, single (s)	6.4	6.2			4.3	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.4	
p0 queue free %	0	85			87	
cM capacity (veh/h)	111	543			917	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	200	589	877
Volume Left	116	0	122
Volume Right	84	111	0
cSH	166	1700	917
Volume to Capacity	1.20	0.35	0.13
Queue Length 95th (m)	88.2	0.0	3.7
Control Delay (s)	189.8	0.0	3.3
Lane LOS	F		A
Approach Delay (s)	189.8	0.0	3.3
Approach LOS	F		

Intersection Summary			
Average Delay	24.5		
Intersection Capacity Utilization	100.0%	ICU Level of Service	F
Analysis Period (min)	15		

Intersection	
Int Delay, s/veh	29.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	116	84	478	111	122	755
Future Vol, veh/h	116	84	478	111	122	755
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	3	4	3	16	17	5
Mvmt Flow	116	84	478	111	122	755

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1533	534	0	0	589	0
Stage 1	534	-	-	-	-	-
Stage 2	999	-	-	-	-	-
Critical Hdwy	6.43	6.24	-	-	4.27	-
Critical Hdwy Stg 1	5.43	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.527	3.336	-	-	2.353	-
Pot Cap-1 Maneuver	128	542	-	-	917	-
Stage 1	586	-	-	-	-	-
Stage 2	355	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	~ 99	542	-	-	917	-
Mov Cap-2 Maneuver	~ 99	-	-	-	-	-
Stage 1	586	-	-	-	-	-
Stage 2	274	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	241.6	0	1.3
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	151	917	-
HCM Lane V/C Ratio	-	-	1.325	0.133	-
HCM Control Delay (s)	-	-	241.6	9.5	0
HCM Lane LOS	-	-	F	A	A
HCM 95th %tile Q(veh)	-	-	12.2	0.5	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	25	211	445	558	778	94
Future Volume (vph)	25	211	445	558	778	94
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.879				0.985	
Flt Protected	0.995			0.978		
Satd. Flow (prot)	1572	0	0	1802	1784	0
Flt Permitted	0.995			0.978		
Satd. Flow (perm)	1572	0	0	1802	1784	0
Link Speed (k/h)	50			70	70	
Link Distance (m)	315.5			184.8	398.1	
Travel Time (s)	22.7			9.5	20.5	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	20%	4%	2%	4%	5%	4%
Adj. Flow (vph)	25	211	445	558	778	94
Shared Lane Traffic (%)						
Lane Group Flow (vph)	236	0	0	1003	872	0
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	125.1%	ICU Level of Service	H
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	25	211	445	558	778	94
Future Volume (Veh/h)	25	211	445	558	778	94
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	25	211	445	558	778	94
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	2273	825	872			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2273	825	872			
tC, single (s)	6.6	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.7	3.3	2.2			
p0 queue free %	0	43	42			
cM capacity (veh/h)	17	369	773			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	236	1003	872
Volume Left	25	445	0
Volume Right	211	0	94
cSH	114	773	1700
Volume to Capacity	2.08	0.58	0.51
Queue Length 95th (m)	158.3	29.8	0.0
Control Delay (s)	577.2	14.5	0.0
Lane LOS	F	B	
Approach Delay (s)	577.2	14.5	0.0
Approach LOS	F		

Intersection Summary				
Average Delay	71.4			
Intersection Capacity Utilization	125.1%	ICU Level of Service		H
Analysis Period (min)	15			

Intersection	
Int Delay, s/veh	208.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	25	211	445	558	778	94
Future Vol, veh/h	25	211	445	558	778	94
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	20	4	2	4	5	4
Mvmt Flow	25	211	445	558	778	94

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	2273	825	872	0	-	0
Stage 1	825	-	-	-	-	-
Stage 2	1448	-	-	-	-	-
Critical Hdwy	6.6	6.24	4.12	-	-	-
Critical Hdwy Stg 1	5.6	-	-	-	-	-
Critical Hdwy Stg 2	5.6	-	-	-	-	-
Follow-up Hdwy	3.68	3.336	2.218	-	-	-
Pot Cap-1 Maneuver	39	369	773	-	-	-
Stage 1	401	-	-	-	-	-
Stage 2	197	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	~ 6	369	773	-	-	-
Mov Cap-2 Maneuver	~ 6	-	-	-	-	-
Stage 1	67	-	-	-	-	-
Stage 2	197	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, $	1837.8	7	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	773	-	50	-	-
HCM Lane V/C Ratio	0.576	-	4.72	-	-
HCM Control Delay (s)	15.8	$	1837.8	-	-
HCM Lane LOS	C	A	F	-	-
HCM 95th %tile Q(veh)	3.7	-	26.6	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	129	124	638	44	41	613
Future Volume (vph)	129	124	638	44	41	613
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.934		0.991			
Flt Protected	0.975					0.997
Satd. Flow (prot)	1696	0	1846	0	0	1857
Flt Permitted	0.975					0.997
Satd. Flow (perm)	1696	0	1846	0	0	1857
Link Speed (k/h)	50		70			70
Link Distance (m)	193.0		185.4			193.9
Travel Time (s)	13.9		9.5			10.0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	129	124	638	44	41	613
Shared Lane Traffic (%)						
Lane Group Flow (vph)	253	0	682	0	0	654
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 87.3%		ICU Level of Service E	
Analysis Period (min) 15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	129	124	638	44	41	613
Future Volume (Veh/h)	129	124	638	44	41	613
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)	129	124	638	44	41	613
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1355	660			682	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1355	660			682	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	18	73			95	
cM capacity (veh/h)	157	463			911	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	253	682	654
Volume Left	129	0	41
Volume Right	124	44	0
cSH	233	1700	911
Volume to Capacity	1.09	0.40	0.05
Queue Length 95th (m)	88.8	0.0	1.1
Control Delay (s)	129.5	0.0	1.2
Lane LOS	F		A
Approach Delay (s)	129.5	0.0	1.2
Approach LOS	F		

Intersection Summary			
Average Delay		21.1	
Intersection Capacity Utilization		87.3%	ICU Level of Service E
Analysis Period (min)		15	

Intersection	
Int Delay, s/veh	21.9

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	129	124	638	44	41	613
Future Vol, veh/h	129	124	638	44	41	613
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	129	124	638	44	41	613

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1355	660	0	0	682	0
Stage 1	660	-	-	-	-	-
Stage 2	695	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	165	463	-	-	911	-
Stage 1	514	-	-	-	-	-
Stage 2	495	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	154	463	-	-	911	-
Mov Cap-2 Maneuver	154	-	-	-	-	-
Stage 1	514	-	-	-	-	-
Stage 2	461	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	135.8	0	0.6
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	229	911	-
HCM Lane V/C Ratio	-	-	1.105	0.045	-
HCM Control Delay (s)	-	-	135.8	9.1	0
HCM Lane LOS	-	-	F	A	A
HCM 95th %tile Q(veh)	-	-	11.4	0.1	-

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	102	77	525	51	57	775
Future Volume (vph)	102	77	525	51	57	775
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.942		0.988			
Flt Protected	0.972					0.997
Satd. Flow (prot)	1706	0	1840	0	0	1857
Flt Permitted	0.972					0.997
Satd. Flow (perm)	1706	0	1840	0	0	1857
Link Speed (k/h)	50		70			70
Link Distance (m)	137.9		99.7			336.2
Travel Time (s)	9.9		5.1			17.3
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	102	77	525	51	57	775
Shared Lane Traffic (%)						
Lane Group Flow (vph)	179	0	576	0	0	832
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	95.0%	ICU Level of Service	F
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	102	77	525	51	57	775
Future Volume (Veh/h)	102	77	525	51	57	775
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)	102	77	525	51	57	775
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1440	550			576	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1440	550			576	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	26	86			94	
cM capacity (veh/h)	138	534			997	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	179	576	832
Volume Left	102	0	57
Volume Right	77	51	0
cSH	203	1700	997
Volume to Capacity	0.88	0.34	0.06
Queue Length 95th (m)	54.8	0.0	1.5
Control Delay (s)	84.6	0.0	1.5
Lane LOS	F		A
Approach Delay (s)	84.6	0.0	1.5
Approach LOS	F		

Intersection Summary			
Average Delay	10.3		
Intersection Capacity Utilization	95.0%	ICU Level of Service	F
Analysis Period (min)	15		

Intersection	
Int Delay, s/veh	11.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	102	77	525	51	57	775
Future Vol, veh/h	102	77	525	51	57	775
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	102	77	525	51	57	775

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1440	551	0	0	576	0
Stage 1	551	-	-	-	-	-
Stage 2	889	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	146	534	-	-	997	-
Stage 1	577	-	-	-	-	-
Stage 2	402	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	131	534	-	-	997	-
Mov Cap-2 Maneuver	131	-	-	-	-	-
Stage 1	577	-	-	-	-	-
Stage 2	362	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	95.6	0	0.6
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	194	997	-
HCM Lane V/C Ratio	-	-	0.923	0.057	-
HCM Control Delay (s)	-	-	95.6	8.8	0
HCM Lane LOS	-	-	F	A	A
HCM 95th %tile Q(veh)	-	-	7.3	0.2	-

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	21	555	13	0	877
Future Volume (vph)	0	21	555	13	0	877
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.865	0.997			
Flt Protected						
Satd. Flow (prot)	0	1611	1857	0	0	1863
Flt Permitted						
Satd. Flow (perm)	0	1611	1857	0	0	1863
Link Speed (k/h)	50		70			70
Link Distance (m)	116.0		143.1			99.7
Travel Time (s)	8.4		7.4			5.1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	21	555	13	0	877
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	21	568	0	0	877
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	49.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	21	555	13	0	877
Future Volume (Veh/h)	0	21	555	13	0	877
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	21	555	13	0	877
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1438	562			568	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1438	562			568	
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	96			100	
cM capacity (veh/h)	147	527			1004	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	21	568	877
Volume Left	0	0	0
Volume Right	21	13	0
cSH	527	1700	1700
Volume to Capacity	0.04	0.33	0.52
Queue Length 95th (m)	1.0	0.0	0.0
Control Delay (s)	12.1	0.0	0.0
Lane LOS	B		
Approach Delay (s)	12.1	0.0	0.0
Approach LOS	B		

Intersection Summary			
Average Delay		0.2	
Intersection Capacity Utilization		49.5%	ICU Level of Service A
Analysis Period (min)		15	

Intersection	
Int Delay, s/veh	0.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	21	555	13	0	877
Future Vol, veh/h	0	21	555	13	0	877
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	21	555	13	0	877

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	562	0	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.22	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.318	-	-	-	-
Pot Cap-1 Maneuver	0	526	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	526	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	12.1	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT
Capacity (veh/h)	-	-	526	-
HCM Lane V/C Ratio	-	-	0.04	-
HCM Control Delay (s)	-	-	12.1	-
HCM Lane LOS	-	-	B	-
HCM 95th %tile Q(veh)	-	-	0.1	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	44	0	60	96	0	93	17	647	113	108	647	13
Future Volume (vph)	44	0	60	96	0	93	17	647	113	108	647	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
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
Frt		0.922			0.934			0.980			0.998	
Flt Protected		0.979			0.975			0.999			0.993	
Satd. Flow (prot)	0	1654	0	0	1730	0	0	1804	0	0	1838	0
Flt Permitted		0.979			0.975			0.999			0.993	
Satd. Flow (perm)	0	1654	0	0	1730	0	0	1804	0	0	1838	0
Link Speed (k/h)		50			50			70			70	
Link Distance (m)		125.8			110.5			337.2			180.7	
Travel Time (s)		9.1			8.0			17.3			9.3	
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 (%)	6%	0%	2%	0%	0%	0%	29%	3%	0%	0%	2%	46%
Adj. Flow (vph)	44	0	60	96	0	93	17	647	113	108	647	13
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	104	0	0	189	0	0	777	0	0	768	0
Sign Control		Stop			Stop			Free			Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	107.9%	ICU Level of Service G	
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	44	0	60	96	0	93	17	647	113	108	647	13
Future Volume (Veh/h)	44	0	60	96	0	93	17	647	113	108	647	13
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)	44	0	60	96	0	93	17	647	113	108	647	13
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1700	1664	654	1667	1614	704	660			760		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1700	1664	654	1667	1614	704	660			760		
tC, single (s)	7.2	6.5	6.2	7.1	6.5	6.2	4.4			4.1		
tC, 2 stage (s)												
tF (s)	3.6	4.0	3.3	3.5	4.0	3.3	2.5			2.2		
p0 queue free %	12	100	87	0	100	79	98			87		
cM capacity (veh/h)	50	84	467	60	90	441	813			861		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	104	189	777	768
Volume Left	44	96	17	108
Volume Right	60	93	113	13
cSH	103	105	813	861
Volume to Capacity	1.01	1.81	0.02	0.13
Queue Length 95th (m)	50.5	121.7	0.5	3.4
Control Delay (s)	168.4	467.7	0.6	3.1
Lane LOS	F	F	A	A
Approach Delay (s)	168.4	467.7	0.6	3.1
Approach LOS	F	F		

Intersection Summary					
Average Delay		59.2			
Intersection Capacity Utilization		107.9%	ICU Level of Service	G	
Analysis Period (min)		15			

Intersection	
Int Delay, s/veh	61.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	44	0	60	96	0	93	17	647	113	108	647	13
Future Vol, veh/h	44	0	60	96	0	93	17	647	113	108	647	13
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	6	0	2	0	0	0	29	3	0	0	2	46
Mvmt Flow	44	0	60	96	0	93	17	647	113	108	647	13

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1654	1664	654	1638	1614	704	660	0	0	760	0	0
Stage 1	870	870	-	738	738	-	-	-	-	-	-	-
Stage 2	784	794	-	900	876	-	-	-	-	-	-	-
Critical Hdwy	7.16	6.5	6.22	7.1	6.5	6.2	4.39	-	-	4.1	-	-
Critical Hdwy Stg 1	6.16	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.16	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.554	4	3.318	3.5	4	3.3	2.461	-	-	2.2	-	-
Pot Cap-1 Maneuver	77	98	467	~ 81	105	440	813	-	-	861	-	-
Stage 1	341	372	-	413	427	-	-	-	-	-	-	-
Stage 2	380	403	-	336	369	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	50	76	467	~ 58	81	440	813	-	-	861	-	-
Mov Cap-2 Maneuver	50	76	-	~ 58	81	-	-	-	-	-	-	-
Stage 1	328	298	-	398	411	-	-	-	-	-	-	-
Stage 2	289	388	-	235	296	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	168.2	$ 498.3	0.2	1.4
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	813	-	-	103	101	861	-	-
HCM Lane V/C Ratio	0.021	-	-	1.01	1.871	0.125	-	-
HCM Control Delay (s)	9.5	0	-	168.2	$ 498.3	9.8	0	-
HCM Lane LOS	A	A	-	F	F	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	6.3	15.6	0.4	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	119	88	664	87	81	739
Future Volume (vph)	119	88	664	87	81	739
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0		0.0	20.0	
Storage Lanes	1	0		0	0	
Taper Length (m)	0.0				80.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.943		0.984			
Flt Protected	0.972					0.995
Satd. Flow (prot)	1705	0	1802	0	0	1857
Flt Permitted	0.972					0.995
Satd. Flow (perm)	1705	0	1802	0	0	1857
Link Speed (k/h)	50		70			70
Link Distance (m)	208.2		398.1			137.3
Travel Time (s)	15.0		20.5			7.1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	5%	4%	2%	0%	2%
Adj. Flow (vph)	119	88	664	87	81	739
Shared Lane Traffic (%)						
Lane Group Flow (vph)	207	0	751	0	0	820
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	105.6%	ICU Level of Service	G
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	119	88	664	87	81	739
Future Volume (Veh/h)	119	88	664	87	81	739
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)	119	88	664	87	81	739
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1608	708			751	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1608	708			751	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	0	80			91	
cM capacity (veh/h)	106	430			868	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	207	751	820
Volume Left	119	0	81
Volume Right	88	87	0
cSH	156	1700	868
Volume to Capacity	1.33	0.44	0.09
Queue Length 95th (m)	100.8	0.0	2.5
Control Delay (s)	241.8	0.0	2.4
Lane LOS	F		A
Approach Delay (s)	241.8	0.0	2.4
Approach LOS	F		

Intersection Summary			
Average Delay		29.3	
Intersection Capacity Utilization		105.6%	ICU Level of Service G
Analysis Period (min)		15	

Intersection	
Int Delay, s/veh	33.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	119	88	664	87	81	739
Future Vol, veh/h	119	88	664	87	81	739
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	0	5	4	2	0	2
Mvmt Flow	119	88	664	87	81	739

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1609	708	0	0	751	0
Stage 1	708	-	-	-	-	-
Stage 2	901	-	-	-	-	-
Critical Hdwy	6.4	6.25	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.345	-	-	2.2	-
Pot Cap-1 Maneuver	~ 116	430	-	-	868	-
Stage 1	492	-	-	-	-	-
Stage 2	400	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	~ 98	430	-	-	868	-
Mov Cap-2 Maneuver	~ 98	-	-	-	-	-
Stage 1	492	-	-	-	-	-
Stage 2	337	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	280.4	0	0.9
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	146	868	-
HCM Lane V/C Ratio	-	-	1.418	0.093	-
HCM Control Delay (s)	-	-	280.4	9.6	0
HCM Lane LOS	-	-	F	A	A
HCM 95th %tile Q(veh)	-	-	13.4	0.3	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	51	352	514	704	778	62
Future Volume (vph)	51	352	514	704	778	62
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.882				0.990	
Flt Protected	0.994			0.979		
Satd. Flow (prot)	1651	0	0	1828	1839	0
Flt Permitted	0.994			0.979		
Satd. Flow (perm)	1651	0	0	1828	1839	0
Link Speed (k/h)	50			70	70	
Link Distance (m)	315.5			184.8	398.1	
Travel Time (s)	22.7			9.5	20.5	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	1%	0%	3%	2%	6%
Adj. Flow (vph)	51	352	514	704	778	62
Shared Lane Traffic (%)						
Lane Group Flow (vph)	403	0	0	1218	840	0
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	144.8%	ICU Level of Service	H
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	51	352	514	704	778	62
Future Volume (Veh/h)	51	352	514	704	778	62
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)	51	352	514	704	778	62
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	2541	809	840			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2541	809	840			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	0	8	36			
cM capacity (veh/h)	11	382	804			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	403	1218	840
Volume Left	51	514	0
Volume Right	352	0	62
cSH	72	804	1700
Volume to Capacity	5.59	0.64	0.49
Queue Length 95th (m)	Err	37.7	0.0
Control Delay (s)	Err	17.1	0.0
Lane LOS	F	C	
Approach Delay (s)	Err	17.1	0.0
Approach LOS	F		

Intersection Summary				
Average Delay	1645.8			
Intersection Capacity Utilization	144.8%	ICU Level of Service		H
Analysis Period (min)	15			

Intersection	
Int Delay, s/veh	19.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	51	352	514	704	778	62
Future Vol, veh/h	51	352	514	704	778	62
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	0	1	0	3	2	6
Mvmt Flow	51	352	514	704	778	62

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	2541	809	840	0	-	0
Stage 1	809	-	-	-	-	-
Stage 2	1732	-	-	-	-	-
Critical Hdwy	6.4	6.21	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.309	2.2	-	-	-
Pot Cap-1 Maneuver	~ 30	382	804	-	-	-
Stage 1	441	-	-	-	-	-
Stage 2	158	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	0	382	804	-	-	-
Mov Cap-2 Maneuver	0	-	-	-	-	-
Stage 1	0	-	-	-	-	-
Stage 2	158	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	94.8	7.2	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	804	-	382	-	-
HCM Lane V/C Ratio	0.639	-	1.055	-	-
HCM Control Delay (s)	17.1	0	94.8	-	-
HCM Lane LOS	C	A	F	-	-
HCM 95th %tile Q(veh)	4.7	-	13.7	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	96	93	644	113	108	688
Future Volume (vph)	96	93	644	113	108	688
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.934		0.980			
Flt Protected	0.975					0.993
Satd. Flow (prot)	1696	0	1825	0	0	1850
Flt Permitted	0.975					0.993
Satd. Flow (perm)	1696	0	1825	0	0	1850
Link Speed (k/h)	50		70			70
Link Distance (m)	171.9		180.7			198.6
Travel Time (s)	12.4		9.3			10.2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	96	93	644	113	108	688
Shared Lane Traffic (%)						
Lane Group Flow (vph)	189	0	757	0	0	796
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 104.0%		ICU Level of Service G	
Analysis Period (min) 15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	96	93	644	113	108	688
Future Volume (Veh/h)	96	93	644	113	108	688
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)	96	93	644	113	108	688
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1604	700			757	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1604	700			757	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	5	79			87	
cM capacity (veh/h)	101	439			854	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	189	757	796
Volume Left	96	0	108
Volume Right	93	113	0
cSH	163	1700	854
Volume to Capacity	1.16	0.45	0.13
Queue Length 95th (m)	81.6	0.0	3.5
Control Delay (s)	176.3	0.0	3.1
Lane LOS	F		A
Approach Delay (s)	176.3	0.0	3.1
Approach LOS	F		

Intersection Summary			
Average Delay		20.6	
Intersection Capacity Utilization		104.0%	ICU Level of Service G
Analysis Period (min)		15	

Intersection	
Int Delay, s/veh	23.9

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	96	93	644	113	108	688
Future Vol, veh/h	96	93	644	113	108	688
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	96	93	644	113	108	688

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1605	701	0	0	757	0
Stage 1	701	-	-	-	-	-
Stage 2	904	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	116	439	-	-	854	-
Stage 1	492	-	-	-	-	-
Stage 2	395	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	~ 92	439	-	-	854	-
Mov Cap-2 Maneuver	~ 92	-	-	-	-	-
Stage 1	492	-	-	-	-	-
Stage 2	314	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	214.4	0	1.3
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	151	854	-
HCM Lane V/C Ratio	-	-	1.252	0.126	-
HCM Control Delay (s)	-	-	214.4	9.8	0
HCM Lane LOS	-	-	F	A	A
HCM 95th %tile Q(veh)	-	-	11.1	0.4	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	134	106	671	104	125	686
Future Volume (vph)	134	106	671	104	125	686
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.940		0.982			
Flt Protected	0.973					0.992
Satd. Flow (prot)	1704	0	1829	0	0	1848
Flt Permitted	0.973					0.992
Satd. Flow (perm)	1704	0	1829	0	0	1848
Link Speed (k/h)	50		70			70
Link Distance (m)	148.8		104.5			337.2
Travel Time (s)	10.7		5.4			17.3
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	134	106	671	104	125	686
Shared Lane Traffic (%)						
Lane Group Flow (vph)	240	0	775	0	0	811
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 108.6%		ICU Level of Service G	
Analysis Period (min) 15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	134	106	671	104	125	686
Future Volume (Veh/h)	134	106	671	104	125	686
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)	134	106	671	104	125	686
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1659	723			775	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1659	723			775	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	0	75			85	
cM capacity (veh/h)	91	426			841	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	240	775	811
Volume Left	134	0	125
Volume Right	106	104	0
cSH	140	1700	841
Volume to Capacity	1.72	0.46	0.15
Queue Length 95th (m)	141.0	0.0	4.2
Control Delay (s)	405.7	0.0	3.7
Lane LOS	F		A
Approach Delay (s)	405.7	0.0	3.7
Approach LOS	F		

Intersection Summary			
Average Delay	55.0		
Intersection Capacity Utilization	108.6%	ICU Level of Service	G
Analysis Period (min)	15		

Intersection	
Int Delay, s/veh	65.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	134	106	671	104	125	686
Future Vol, veh/h	134	106	671	104	125	686
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	134	106	671	104	125	686

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1659	723	0	0	775	0
Stage 1	723	-	-	-	-	-
Stage 2	936	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	~ 107	426	-	-	841	-
Stage 1	481	-	-	-	-	-
Stage 2	382	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	~ 81	426	-	-	841	-
Mov Cap-2 Maneuver	~ 81	-	-	-	-	-
Stage 1	481	-	-	-	-	-
Stage 2	290	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	$ 493.9	0	1.5
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	126	841	-
HCM Lane V/C Ratio	-	-	1.905	0.149	-
HCM Control Delay (s)	-	-	$ 493.9	10	0
HCM Lane LOS	-	-	F	B	A
HCM 95th %tile Q(veh)	-	-	19	0.5	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	25	750	25	0	820
Future Volume (vph)	0	25	750	25	0	820
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.865	0.996			
Flt Protected						
Satd. Flow (prot)	0	1611	1855	0	0	1863
Flt Permitted						
Satd. Flow (perm)	0	1611	1855	0	0	1863
Link Speed (k/h)	50		70			70
Link Distance (m)	144.8		137.3			104.5
Travel Time (s)	10.4		7.1			5.4
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	25	750	25	0	820
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	25	775	0	0	820
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	51.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	25	750	25	0	820
Future Volume (Veh/h)	0	25	750	25	0	820
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	25	750	25	0	820
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1582	762			775	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1582	762			775	
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	94			100	
cM capacity (veh/h)	120	405			841	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	25	775	820
Volume Left	0	0	0
Volume Right	25	25	0
cSH	405	1700	1700
Volume to Capacity	0.06	0.46	0.48
Queue Length 95th (m)	1.6	0.0	0.0
Control Delay (s)	14.5	0.0	0.0
Lane LOS	B		
Approach Delay (s)	14.5	0.0	0.0
Approach LOS	B		

Intersection Summary			
Average Delay		0.2	
Intersection Capacity Utilization		51.0%	ICU Level of Service A
Analysis Period (min)		15	

Intersection	
Int Delay, s/veh	0.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	25	750	25	0	820
Future Vol, veh/h	0	25	750	25	0	820
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	25	750	25	0	820

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	763	0	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.22	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.318	-	-	-	-
Pot Cap-1 Maneuver	0	404	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	404	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	14.5	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT
Capacity (veh/h)	-	-	404	-
HCM Lane V/C Ratio	-	-	0.062	-
HCM Control Delay (s)	-	-	14.5	-
HCM Lane LOS	-	-	B	-
HCM 95th %tile Q(veh)	-	-	0.2	-

Appendix I

OTM Book 7 Signal Warrants

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

Horizon Year: 2025
Region/City/Township: Cambridge

Major Street: Speedsville Road
Minor Street: Heroux Devtek Drive / Street A
North/South?: Y

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	Yes	Justification for existing intersections with forecast traffic

	Major Street						Minor Street						
	Speedsville Road						Heroux Devtek Drive / Street A						
	Northbound			Southbound			Eastbound			Westbound			Peds Crossing
Time Period	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	Main Road
AM Peak Hour	32	492	44	41	643	19	18	0	20	129	0	124	0
PM Peak Hour	15	614	113	108	609	12	40	0	54	96	0	93	0
Average Hourly Volume	12	277	39	37	313	8	15	0	19	56	0	54	0

Warrant	AHV
1A - All	829
1B - Minor	144
2A - Major	686
2B - Cross	71

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	829
					% Fulfilled	172.7%

1B	Approach Lanes	1		2 or more		Average Hourly Volume
	Flow Conditions	Free	Restricted	Free	Restricted	
		X				
	Minor Street Approaches	120	170	120	170	144
					% Fulfilled	119.6%

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	686
					% Fulfilled	142.8%

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	71
					% Fulfilled	141.5%

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

Horizon Year: 2025
Region/City/Township: Cambridge

Major Street: Speedsville Road
Minor Street: Street B
North/South?: Y

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	Yes	Justification for existing intersections with forecast traffic

	Major Street						Minor Street						
	Speedsville Road						Street B						
	Northbound			Southbound			Eastbound			Westbound			Peds Crossing
Time Period	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	Main Road
AM Peak Hour	0	569	55	53	565	0	0	0	0	165	0	158	0
PM Peak Hour	0	585	144	138	654	0	0	0	0	123	0	119	0
Average Hourly Volume	0	289	50	48	305	0	0	0	0	72	0	69	0

Warrant	AHV
1A - All	832
1B - Minor	141
2A - Major	691
2B - Cross	72

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	832
					% Fulfilled	173.3%
1B	Approach Lanes	1		2 or more		Average Hourly Volume
	Flow Conditions	Free	Restricted	Free	Restricted	
		X				
	Minor Street Approaches	180	255	180	255	141
					% Fulfilled	78.5%

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	691
					% Fulfilled	143.9%
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	72
					% Fulfilled	144.0%

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

Horizon Year: 2025
Region/City/Township: Cambridge

Major Street: Speedsville Road
Minor Street: Equestrian Way
North/South?: Y

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	Yes	Justification for existing intersections with forecast traffic

	Major Street Speedsville Road						Minor Street Equestrian Way						
	Northbound			Southbound			Eastbound			Westbound			Peds Crossing
Time Period	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	Main Road
AM Peak Hour	0	447	107	179	616	0	0	0	0	212	0	81	0
PM Peak Hour	0	635	81	202	565	0	0	0	0	250	0	86	0
Average Hourly Volume	0	271	47	95	295	0	0	0	0	116	0	42	0

Warrant	AHV
1A - All	865
1B - Minor	157
2A - Major	708
2B - Cross	116

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	865
					% Fulfilled	180.3%
1B	Approach Lanes	1		2 or more		Average Hourly Volume
	Flow Conditions	Free	Restricted	Free	Restricted	
		X				
	Minor Street Approaches	180	255	180	255	157
					% Fulfilled	87.4%

Warrant 2 - Delay To Cross Traffic

2A	Approach Lanes	1		2 or more		Average Hourly Volume
	Flow Conditions	Free	Restricted	Free	Restricted	
		X				
	Major Street Approaches	480	720	600	900	708
					% Fulfilled	147.5%
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	116
					% Fulfilled	231.0%

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

Horizon Year: 2025
Region/City/Township: Cambridge

Major Street: Speedsville Road
Minor Street: Royal Oak Road
North/South?: Y

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

	Major Street Speedsville Road						Minor Street Royal Oak Road						
	Northbound			Southbound			Eastbound			Westbound			Peds Crossing
Time Period	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	Main Road
AM Peak Hour	403	524	0	0	741	88	25	0	191	0	0	0	0
PM Peak Hour	466	670	0	0	740	58	49	0	319	0	0	0	0
Average Hourly Volume	217	299	0	0	370	37	19	0	128	0	0	0	0

Warrant	AHV
1A - All	1069
1B - Minor	146
2A - Major	923
2B - Cross	19

Warrant 1 - Minimum Vehicular Volume

		1		2 or more		Average Hourly Volume
1A	Approach Lanes					
	Flow Conditions	Free	Restricted	Free	Restricted	
		X				
	All Approaches	480	720	600	900	1069
					% Fulfilled	222.6%

		1		2 or more		Average Hourly Volume
1B	Approach Lanes					
	Flow Conditions	Free	Restricted	Free	Restricted	
		X				
	Minor Street Approaches	180	255	180	255	146
					% Fulfilled	81.1%

Warrant 2 - Delay To Cross Traffic

		1		2 or more		Average Hourly Volume
2A	Approach Lanes					
	Flow Conditions	Free	Restricted	Free	Restricted	
		X				
	Major Street Approaches	480	720	600	900	923
					% Fulfilled	192.2%

		1		2 or more		Average Hourly Volume
2B	Approach Lanes					
	Flow Conditions	Free	Restricted	Free	Restricted	
		X				
	Traffic Crossing Major Street	50	75	50	75	19
					% Fulfilled	37.0%

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

Horizon Year: 2030
Region/City/Township: Cambridge

Major Street: Speedsville Road
Minor Street: Heroux Devtek Drive / Street A
North/South?: Y

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	Yes	Justification for existing intersections with forecast traffic

	Major Street						Minor Street						
	Speedsville Road						Heroux Devtek Drive / Street A						
	Northbound			Southbound			Eastbound			Westbound			Peds Crossing
Time Period	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	Main Road
AM Peak Hour	35	523	44	41	680	21	20	0	22	129	0	124	0
PM Peak Hour	17	648	113	108	647	13	44	0	60	96	0	93	0
Average Hourly Volume	13	293	39	37	332	9	16	0	21	56	0	54	0

Warrant	AHV
1A - All	870
1B - Minor	147
2A - Major	723
2B - Cross	72

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	870
					% Fulfilled	181.1%
1B	Approach Lanes	1		2 or more		Average Hourly Volume
	Flow Conditions	Free	Restricted	Free	Restricted	
		X				
	Minor Street Approaches	180	255	180	255	147
					% Fulfilled	81.7%

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	723
					% Fulfilled	150.5%
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	72
					% Fulfilled	144.5%

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

Horizon Year: 2030
Region/City/Township: Cambridge

Major Street: Speedsville Road
Minor Street: Street B
North/South?: Y

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	Yes	Justification for existing intersections with forecast traffic

	Major Street						Minor Street						
	Speedsville Road						Street B						
	Northbound			Southbound			Eastbound			Westbound			Peds Crossing
Time Period	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	Main Road
AM Peak Hour	0	603	55	53	605	0	0	0	0	165	0	158	0
PM Peak Hour	0	620	144	138	695	0	0	0	0	123	0	119	0
Average Hourly Volume	0	306	50	48	325	0	0	0	0	72	0	69	0

Warrant	AHV
1A - All	870
1B - Minor	141
2A - Major	728
2B - Cross	72

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	870
					% Fulfilled	181.1%

1B	Approach Lanes	1		2 or more		Average Hourly Volume
	Flow Conditions	Free	Restricted	Free	Restricted	
		X				
	Minor Street Approaches	180	255	180	255	141
					% Fulfilled	78.5%

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	728
					% Fulfilled	151.7%

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	72
					% Fulfilled	144.0%

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

Horizon Year: 2030
Region/City/Township: Cambridge

Major Street: Speedsville Road
Minor Street: Equestrian Way
North/South?: Y

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

PM Forecast Only? N

Warrant Results		
150% Satisfied	Yes	Justification for new intersections with forecast traffic
120% Satisfied	Yes	Justification for existing intersections with forecast traffic

	Major Street Speedsville Road						Minor Street Equestrian Way						
	Northbound			Southbound			Eastbound			Westbound			Peds Crossing
Time Period	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	Main Road
AM Peak Hour	0	477	111	182	653	0	0	0	0	219	0	84	0
PM Peak Hour	0	665	87	206	605	0	0	0	0	256	0	88	0
Average Hourly Volume	0	286	50	97	315	0	0	0	0	119	0	43	0

Warrant	AHV
1A - All	908
1B - Minor	162
2A - Major	747
2B - Cross	119

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	908
					% Fulfilled	189.2%
1B	Approach Lanes	1		2 or more		Average Hourly Volume
	Flow Conditions	Free	Restricted	Free	Restricted	
		X				
	Minor Street Approaches	180	255	180	255	162
					% Fulfilled	89.9%

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	747
					% Fulfilled	155.5%
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	119
					% Fulfilled	237.5%

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

Horizon Year: 2030
Region/City/Township: Cambridge

Major Street: Speedsville Road
Minor Street: Royal Oak Road
North/South?: Y

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

	Major Street Speedsville Road						Minor Street Royal Oak Road						
	Northbound			Southbound			Eastbound			Westbound			Peds Crossing
Time Period	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	Main Road
AM Peak Hour	445	557	0	0	779	94	25	0	211	0	0	0	0
PM Peak Hour	514	704	0	0	781	62	52	0	352	0	0	0	0
Average Hourly Volume	240	315	0	0	390	39	19	0	141	0	0	0	0

Warrant	AHV
1A - All	1144
1B - Minor	160
2A - Major	984
2B - Cross	19

Warrant 1 - Minimum Vehicular Volume

	Approach Lanes	1		2 or more		Average Hourly Volume
1A	Flow Conditions	Free	Restricted	Free	Restricted	
		X				
	All Approaches	480	720	600	900	1144
					% Fulfilled	238.3%

	Approach Lanes	1		2 or more		Average Hourly Volume
1B	Flow Conditions	Free	Restricted	Free	Restricted	
		X				
	Minor Street Approaches	180	255	180	255	160
					% Fulfilled	88.9%

Warrant 2 - Delay To Cross Traffic

	Approach Lanes	1		2 or more		Average Hourly Volume
2A	Flow Conditions	Free	Restricted	Free	Restricted	
		X				
	Major Street Approaches	480	720	600	900	984
					% Fulfilled	205.0%

	Approach Lanes	1		2 or more		Average Hourly Volume
2B	Flow Conditions	Free	Restricted	Free	Restricted	
		X				
	Traffic Crossing Major Street	50	75	50	75	19
					% Fulfilled	38.5%

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

Horizon Year: 2030 (All-Turns Access Scenario)
Region/City/Township: Cambridge

Major Street: Speedsville Road
Minor Street: Block E All-Turns Access
North/South?: Y

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

	Major Street						Minor Street						
	Speedsville Road						Block E All-Turns Access						
	Northbound			Southbound			Eastbound			Westbound			Peds Crossing
Time Period	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	Main Road
AM Peak Hour	0	536	35	41	782	0	0	0	0	101	0	77	0
PM Peak Hour	0	678	103	124	694	0	0	0	0	123	0	95	0
Average Hourly Volume	0	304	35	41	369	0	0	0	0	56	0	43	0

Warrant	AHV
1A - All	847
1B - Minor	99
2A - Major	748
2B - Cross	56

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	847
					% Fulfilled	176.5%
1B	Approach Lanes	1		2 or more		Average Hourly Volume
	Flow Conditions	Free	Restricted	Free	Restricted	
		X				
	Minor Street Approaches	180	255	180	255	99
					% Fulfilled	55.0%

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	748
					% Fulfilled	155.9%
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	56
					% Fulfilled	112.0%

Appendix J

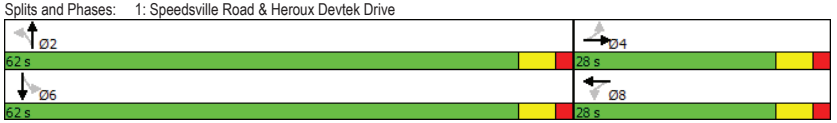
2030 Total Traffic with Improvements Operations Reports

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	0	22	129	0	124	35	523	44	41	680	21
Future Volume (vph)	20	0	22	129	0	124	35	523	44	41	680	21
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
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
Frt		0.850			0.850			0.988			0.996	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1378	1162	0	1805	1615	0	1583	1843	0	1805	1819	0
Flt Permitted	0.619			0.743			0.327			0.402		
Satd. Flow (perm)	898	1162	0	1412	1615	0	545	1843	0	764	1819	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		277			382			9			3	
Link Speed (k/h)		50			50			70			70	
Link Distance (m)		125.8			109.3			435.9			185.4	
Travel Time (s)		9.1			7.9			22.4			9.5	
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 (%)	31%	0%	39%	0%	0%	0%	14%	2%	0%	0%	4%	6%
Adj. Flow (vph)	20	0	22	129	0	124	35	523	44	41	680	21
Shared Lane Traffic (%)												
Lane Group Flow (vph)	20	22	0	129	124	0	35	567	0	41	701	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	24.0	24.0		24.0	24.0		24.0	24.0		24.0	24.0	
Total Split (s)	28.0	28.0		28.0	28.0		62.0	62.0		62.0	62.0	
Total Split (%)	31.1%	31.1%		31.1%	31.1%		68.9%	68.9%		68.9%	68.9%	
Maximum Green (s)	22.0	22.0		22.0	22.0		56.0	56.0		56.0	56.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	-2.0		0.0	-2.0		0.0	-2.0		0.0	-2.0	
Total Lost Time (s)	6.0	4.0		6.0	4.0		6.0	4.0		6.0	4.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Max	Max		Max	Max	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	12.8	14.8		12.8	14.8		58.9	60.9		58.9	60.9	
Actuated g/C Ratio	0.15	0.18		0.15	0.18		0.70	0.73		0.70	0.73	
v/c Ratio	0.15	0.05		0.60	0.21		0.09	0.42		0.08	0.53	
Control Delay	31.1	0.2		43.7	0.8		5.7	6.2		5.3	7.5	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.4	
Total Delay	31.1	0.2		43.7	0.8		5.7	6.2		5.3	7.9	
LOS	C	A		D	A		A	A		A	A	
Approach Delay		14.9			22.7			6.1			7.8	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		B			C			A			A	
Queue Length 50th (m)	2.8	0.0		19.6	0.0		1.5	29.5		1.8	41.7	
Queue Length 95th (m)	8.9	0.0		36.9	0.0		5.7	60.7		6.1	85.8	
Internal Link Dist (m)		101.8			85.3			411.9			161.4	
Turn Bay Length (m)												
Base Capacity (vph)	236	531		371	735		383	1342		537	1323	
Starvation Cap Reductn	0	0		0	0		0	0		0	233	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.08	0.04		0.35	0.17		0.09	0.42		0.08	0.64	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 83.8			
Natural Cycle: 60			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.60			
Intersection Signal Delay: 9.7		Intersection LOS: A	
Intersection Capacity Utilization 58.9%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 1: Speedsville Road & Heroux Devtek Drive

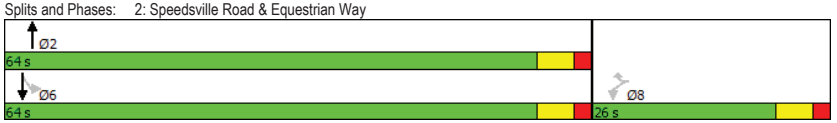


Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	219	84	477	111	182	653
Future Volume (vph)	219	84	477	111	182	653
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850	0.975			
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1752	1553	1757	0	1543	1810
Flt Permitted	0.950				0.380	
Satd. Flow (perm)	1752	1553	1757	0	617	1810
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		84	28			
Link Speed (k/h)	50		70			70
Link Distance (m)	208.2		398.1			143.1
Travel Time (s)	15.0		20.5			7.4
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	3%	4%	3%	16%	17%	5%
Adj. Flow (vph)	219	84	477	111	182	653
Shared Lane Traffic (%)						
Lane Group Flow (vph)	219	84	588	0	182	653
Turn Type	Perm	Perm	NA		Perm	NA
Protected Phases			2			6
Permitted Phases	8	8			6	
Detector Phase	8	8	2		6	6
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0		5.0	5.0
Minimum Split (s)	24.0	24.0	24.0		24.0	24.0
Total Split (s)	26.0	26.0	64.0		64.0	64.0
Total Split (%)	28.9%	28.9%	71.1%		71.1%	71.1%
Maximum Green (s)	20.0	20.0	58.0		58.0	58.0
Yellow Time (s)	4.0	4.0	4.0		4.0	4.0
All-Red Time (s)	2.0	2.0	2.0		2.0	2.0
Lost Time Adjust (s)	-2.0	0.0	-2.0		0.0	-2.0
Total Lost Time (s)	4.0	6.0	4.0		6.0	4.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	None	None	Max		Max	Max
Walk Time (s)	7.0	7.0	7.0		7.0	7.0
Flash Dont Walk (s)	11.0	11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)	0	0	0		0	0
Act Effct Green (s)	17.6	15.6	61.9		59.9	61.9
Actuated g/C Ratio	0.20	0.18	0.71		0.68	0.71
v/c Ratio	0.62	0.24	0.47		0.43	0.51
Control Delay	39.6	8.8	7.3		11.0	8.2
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	39.6	8.8	7.3		11.0	8.2
LOS	D	A	A		B	A
Approach Delay	31.1		7.3			8.8

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Approach LOS	C		A			A
Queue Length 50th (m)	34.5	0.0	36.5		12.5	45.1
Queue Length 95th (m)	57.3	11.5	67.6		31.6	81.3
Internal Link Dist (m)	184.2		374.1			119.1
Turn Bay Length (m)						
Base Capacity (vph)	441	420	1251		422	1280
Starvation Cap Reductn	0	0	0		0	0
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.50	0.20	0.47		0.43	0.51

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 87.5			
Natural Cycle: 60			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.62			
Intersection Signal Delay: 12.2		Intersection LOS: B	
Intersection Capacity Utilization 65.7%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 2: Speedsville Road & Equestrian Way



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	25	211	445	557	779	94
Future Volume (vph)	25	211	445	557	779	94
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	80.0	0.0	85.0			0.0
Storage Lanes	1	1	1			0
Taper Length (m)	30.0		30.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850			0.985	
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1504	1553	1770	1827	1784	0
Flt Permitted	0.950		0.950			
Satd. Flow (perm)	1504	1553	1770	1827	1784	0
Link Speed (k/h)	50			70	70	
Link Distance (m)	315.5			184.8	398.1	
Travel Time (s)	22.7			9.5	20.5	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	20%	4%	2%	4%	5%	4%
Adj. Flow (vph)	25	211	445	557	779	94
Shared Lane Traffic (%)						
Lane Group Flow (vph)	25	211	445	557	873	0
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	84.7%	ICU Level of Service	E
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	25	211	445	557	779	94
Future Volume (Veh/h)	25	211	445	557	779	94
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	25	211	445	557	779	94
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)					398	
pX, platoon unblocked	0.74	0.74	0.74			
vC, conflicting volume	2273	826	873			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2550	585	649			
tC, single (s)	6.6	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.7	3.3	2.2			
p0 queue free %	0	44	36			
cM capacity (veh/h)	7	374	690			

Direction, Lane #	EB 1	EB 2	NB 1	NB 2	SB 1
Volume Total	25	211	445	557	873
Volume Left	25	0	445	0	0
Volume Right	0	211	0	0	94
cSH	7	374	690	1700	1700
Volume to Capacity	3.72	0.56	0.64	0.33	0.51
Queue Length 95th (m)	Err	26.7	37.7	0.0	0.0
Control Delay (s)	Err	26.4	19.2	0.0	0.0
Lane LOS	F	D	C		
Approach Delay (s)	1082.8		8.5		0.0
Approach LOS	F				

Intersection Summary				
Average Delay	125.1			
Intersection Capacity Utilization	84.7%	ICU Level of Service		E
Analysis Period (min)	15			

Intersection	
Int Delay, s/veh	14.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	25	211	445	557	779	94
Future Vol, veh/h	25	211	445	557	779	94
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	800	0	850	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	20	4	2	4	5	4
Mvmt Flow	25	211	445	557	779	94

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	2273	826	873	0	-	0
Stage 1	826	-	-	-	-	-
Stage 2	1447	-	-	-	-	-
Critical Hdwy	6.6	6.24	4.12	-	-	-
Critical Hdwy Stg 1	5.6	-	-	-	-	-
Critical Hdwy Stg 2	5.6	-	-	-	-	-
Follow-up Hdwy	3.68	3.336	2.218	-	-	-
Pot Cap-1 Maneuver	39	369	773	-	-	-
Stage 1	401	-	-	-	-	-
Stage 2	197	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	~ 17	369	773	-	-	-
Mov Cap-2 Maneuver	~ 17	-	-	-	-	-
Stage 1	170	-	-	-	-	-
Stage 2	197	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	99.5	7	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	773	-	17	369	-	-
HCM Lane V/C Ratio	0.576	-	1.471	0.572	-	-
HCM Control Delay (s)	15.8	-	$ 711.7	27	-	-
HCM Lane LOS	C	-	F	D	-	-
HCM 95th %tile Q(veh)	3.7	-	3.6	3.4	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	129	124	638	44	41	616
Future Volume (vph)	129	124	638	44	41	616
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850	0.991			
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1770	1583	1846	0	1770	1863
Flt Permitted	0.950				0.346	
Satd. Flow (perm)	1770	1583	1846	0	645	1863
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		124	8			
Link Speed (k/h)	50		70			70
Link Distance (m)	193.0		185.4			193.9
Travel Time (s)	13.9		9.5			10.0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	129	124	638	44	41	616
Shared Lane Traffic (%)						
Lane Group Flow (vph)	129	124	682	0	41	616
Turn Type	Perm	Perm	NA		Perm	NA
Protected Phases			2			6
Permitted Phases	8	8			6	
Detector Phase	8	8	2		6	6
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0		5.0	5.0
Minimum Split (s)	24.0	24.0	24.0		24.0	24.0
Total Split (s)	26.0	26.0	64.0		64.0	64.0
Total Split (%)	28.9%	28.9%	71.1%		71.1%	71.1%
Maximum Green (s)	20.0	20.0	58.0		58.0	58.0
Yellow Time (s)	4.0	4.0	4.0		4.0	4.0
All-Red Time (s)	2.0	2.0	2.0		2.0	2.0
Lost Time Adjust (s)	-2.0	0.0	-2.0		0.0	-2.0
Total Lost Time (s)	4.0	6.0	4.0		6.0	4.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	None	None	Max		Max	Max
Walk Time (s)	7.0	7.0	7.0		7.0	7.0
Flash Dont Walk (s)	11.0	11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)	0	0	0		0	0
Act Effct Green (s)	13.4	11.4	63.1		61.1	63.1
Actuated g/C Ratio	0.16	0.13	0.75		0.72	0.75
v/c Ratio	0.46	0.39	0.49		0.09	0.44
Control Delay	36.6	9.9	6.2		4.8	5.7
Queue Delay	0.0	0.0	0.4		0.0	0.0
Total Delay	36.6	9.9	6.6		4.8	5.7
LOS	D	A	A		A	A
Approach Delay	23.5		6.6			5.6
Approach LOS	C		A			A

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Queue Length 50th (m)	19.2	0.0	35.8		1.7	31.0
Queue Length 95th (m)	35.5	14.4	70.7		5.6	60.6
Internal Link Dist (m)	169.0		161.4			169.9
Turn Bay Length (m)						
Base Capacity (vph)	462	470	1380		466	1390
Starvation Cap Reductn	0	0	278		0	0
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.28	0.26	0.62		0.09	0.44

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 84.5			
Natural Cycle: 55			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.49			
Intersection Signal Delay: 8.9		Intersection LOS: A	
Intersection Capacity Utilization 52.3%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 4: Speedsville Road & Street B

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	98	504	63	0	835
Future Volume (vph)	0	98	504	63	0	835
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.865	0.985			
Flt Protected						
Satd. Flow (prot)	0	1611	1835	0	0	1863
Flt Permitted						
Satd. Flow (perm)	0	1611	1835	0	0	1863
Link Speed (k/h)	50		70			70
Link Distance (m)	116.0		143.1			435.9
Travel Time (s)	8.4		7.4			22.4
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	98	504	63	0	835
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	98	567	0	0	835
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 47.3%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	98	504	63	0	835
Future Volume (Veh/h)	0	98	504	63	0	835
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	98	504	63	0	835
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)			143			
pX, platoon unblocked	0.87	0.87			0.87	
vC, conflicting volume	1370	536			567	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1351	393			429	
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	83			100	
cM capacity (veh/h)	144	571			985	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	98	567	835
Volume Left	0	0	0
Volume Right	98	63	0
cSH	571	1700	1700
Volume to Capacity	0.17	0.33	0.49
Queue Length 95th (m)	4.9	0.0	0.0
Control Delay (s)	12.6	0.0	0.0
Lane LOS	B		
Approach Delay (s)	12.6	0.0	0.0
Approach LOS	B		

Intersection Summary			
Average Delay		0.8	
Intersection Capacity Utilization		47.3%	ICU Level of Service A
Analysis Period (min)		15	

Intersection	
Int Delay, s/veh	0.8

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	98	504	63	0	835
Future Vol, veh/h	0	98	504	63	0	835
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	98	504	63	0	835

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	536	0	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.22	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.318	-	-	-	-
Pot Cap-1 Maneuver	0	545	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	545	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	13	0	0
HCM LOS	B		

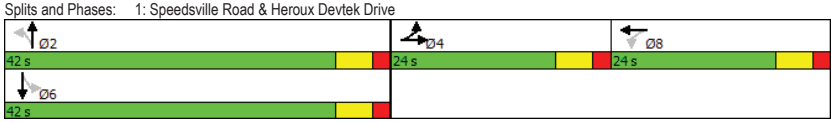
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT
Capacity (veh/h)	-	-	545	-
HCM Lane V/C Ratio	-	-	0.18	-
HCM Control Delay (s)	-	-	13	-
HCM Lane LOS	-	-	B	-
HCM 95th %tile Q(veh)	-	-	0.7	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	44	0	60	96	0	93	17	648	113	108	647	13
Future Volume (vph)	44	0	60	96	0	93	17	648	113	108	647	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
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
Frt		0.850			0.850			0.978			0.997	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1703	1583	0	1805	1615	0	1399	1812	0	1805	1842	0
Flt Permitted	0.950			0.718			0.278			0.211		
Satd. Flow (perm)	1703	1583	0	1364	1615	0	409	1812	0	401	1842	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		306			379			12			1	
Link Speed (k/h)		50			50			70			70	
Link Distance (m)		125.8			110.5			441.7			180.7	
Travel Time (s)		9.1			8.0			22.7			9.3	
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 (%)	6%	0%	2%	0%	0%	0%	29%	3%	0%	0%	2%	46%
Adj. Flow (vph)	44	0	60	96	0	93	17	648	113	108	647	13
Shared Lane Traffic (%)												
Lane Group Flow (vph)	44	60	0	96	93	0	17	761	0	108	660	0
Turn Type	Split	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	4	4			8			2			6	
Permitted Phases				8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	24.0	24.0		24.0	24.0		24.0	24.0		24.0	24.0	
Total Split (s)	24.0	24.0		24.0	24.0		42.0	42.0		42.0	42.0	
Total Split (%)	26.7%	26.7%		26.7%	26.7%		46.7%	46.7%		46.7%	46.7%	
Maximum Green (s)	18.0	18.0		18.0	18.0		36.0	36.0		36.0	36.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0		-2.0	-2.0		-2.0	-2.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Max	Max		Max	Max	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	9.4	9.4		12.3	12.3		43.2	43.2		43.2	43.2	
Actuated g/C Ratio	0.13	0.13		0.18	0.18		0.62	0.62		0.62	0.62	
v/c Ratio	0.19	0.13		0.40	0.16		0.07	0.68		0.44	0.58	
Control Delay	31.0	0.6		32.1	0.6		11.2	18.4		21.0	15.4	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	31.0	0.6		32.1	0.6		11.2	18.4		21.0	15.4	
LOS	C	A		C	A		B	B		C	B	
Approach Delay		13.4			16.6			18.2			16.2	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		B			B			B			B	
Queue Length 50th (m)	5.6	0.0		12.2	0.0		1.1	78.7		9.0	62.8	
Queue Length 95th (m)	15.4	0.0		26.6	0.0		5.2	#173.9		#35.0	123.3	
Internal Link Dist (m)		101.8			86.5			417.7			156.7	
Turn Bay Length (m)												
Base Capacity (vph)	491	674		393	735		251	1118		246	1133	
Starvation Cap Reductn	0	0		0	0		0	0		0	13	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.09	0.09		0.24	0.13		0.07	0.68		0.44	0.59	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 70.2			
Natural Cycle: 100			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.68			
Intersection Signal Delay: 16.9		Intersection LOS: B	
Intersection Capacity Utilization 68.9%		ICU Level of Service C	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 1: Speedsville Road & Heroux Devtek Drive

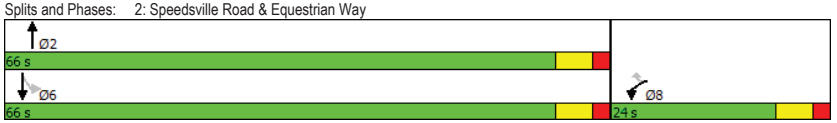


Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	256	88	665	87	206	605
Future Volume (vph)	256	88	665	87	206	605
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0		0.0	20.0	
Storage Lanes	1	1		0	1	
Taper Length (m)	0.0				80.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850	0.984			
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1805	1538	1802	0	1805	1863
Flt Permitted	0.950				0.289	
Satd. Flow (perm)	1805	1538	1802	0	549	1863
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		88	17			
Link Speed (k/h)	50		70			70
Link Distance (m)	208.2		398.1			137.3
Travel Time (s)	15.0		20.5			7.1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	5%	4%	2%	0%	2%
Adj. Flow (vph)	256	88	665	87	206	605
Shared Lane Traffic (%)						
Lane Group Flow (vph)	256	88	752	0	206	605
Turn Type	Prot	Perm	NA		Perm	NA
Protected Phases	8		2			6
Permitted Phases		8			6	
Detector Phase	8	8	2		6	6
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0		5.0	5.0
Minimum Split (s)	24.0	24.0	24.0		24.0	24.0
Total Split (s)	24.0	24.0	66.0		66.0	66.0
Total Split (%)	26.7%	26.7%	73.3%		73.3%	73.3%
Maximum Green (s)	18.0	18.0	60.0		60.0	60.0
Yellow Time (s)	4.0	4.0	4.0		4.0	4.0
All-Red Time (s)	2.0	2.0	2.0		2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0		0.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0		6.0	4.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	None	None	Max		Max	Max
Walk Time (s)	7.0	7.0	7.0		7.0	7.0
Flash Dont Walk (s)	11.0	11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)	0	0	0		0	0
Act Effct Green (s)	18.0	18.0	63.0		61.0	63.0
Actuated g/C Ratio	0.20	0.20	0.71		0.69	0.71
v/c Ratio	0.70	0.23	0.59		0.55	0.46
Control Delay	43.9	8.4	9.0		14.5	7.3
Queue Delay	0.0	0.0	0.0		0.0	0.0

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Total Delay	43.9	8.4	9.0		14.5	7.3
LOS	D	A	A		B	A
Approach Delay	34.8		9.0			9.2
Approach LOS	C		A			A
Queue Length 50th (m)	42.4	0.0	60.9		17.5	43.5
Queue Length 95th (m)	68.5	11.9	92.6		41.0	65.0
Internal Link Dist (m)	184.2		374.1			113.3
Turn Bay Length (m)					20.0	
Base Capacity (vph)	405	413	1280		376	1318
Starvation Cap Reductn	0	0	0		0	0
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.63	0.21	0.59		0.55	0.46

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 89			
Natural Cycle: 70			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.70			
Intersection Signal Delay: 13.7		Intersection LOS: B	
Intersection Capacity Utilization 77.5%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 2: Speedsville Road & Equestrian Way



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	52	352	514	704	781	62
Future Volume (vph)	52	352	514	704	781	62
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	80.0	0.0	80.0			0.0
Storage Lanes	1	1	1			0
Taper Length (m)	30.0		30.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850			0.990	
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1805	1599	1805	1845	1839	0
Flt Permitted	0.950		0.950			
Satd. Flow (perm)	1805	1599	1805	1845	1839	0
Link Speed (k/h)	50			70	70	
Link Distance (m)	315.5			184.8	398.1	
Travel Time (s)	22.7			9.5	20.5	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	1%	0%	3%	2%	6%
Adj. Flow (vph)	52	352	514	704	781	62
Shared Lane Traffic (%)						
Lane Group Flow (vph)	52	352	514	704	843	0
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	86.7%	ICU Level of Service	E
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	52	352	514	704	781	62
Future Volume (Veh/h)	52	352	514	704	781	62
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)	52	352	514	704	781	62
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)					398	
pX, platoon unblocked	0.85	0.85	0.85			
vC, conflicting volume	2544	812	843			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2723	694	730			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	0	7	32			
cM capacity (veh/h)	6	379	754			

Direction, Lane #	EB 1	EB 2	NB 1	NB 2	SB 1
Volume Total	52	352	514	704	843
Volume Left	52	0	514	0	0
Volume Right	0	352	0	0	62
cSH	6	379	754	1700	1700
Volume to Capacity	8.27	0.93	0.68	0.41	0.50
Queue Length 95th (m)	Err	79.2	43.5	0.0	0.0
Control Delay (s)	Err	63.2	19.4	0.0	0.0
Lane LOS	F	F	C		
Approach Delay (s)	1342.1		8.2		0.0
Approach LOS	F				

Intersection Summary				
Average Delay	224.0			
Intersection Capacity Utilization	86.7%	ICU Level of Service		E
Analysis Period (min)	15			

Intersection	
Int Delay, s/veh	62.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	52	352	514	704	781	62
Future Vol, veh/h	52	352	514	704	781	62
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	800	0	800	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	0	1	0	3	2	6
Mvmt Flow	52	352	514	704	781	62

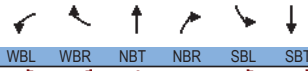
Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	2544	812	843	0	-	0
Stage 1	812	-	-	-	-	-
Stage 2	1732	-	-	-	-	-
Critical Hdwy	6.4	6.21	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.309	2.2	-	-	-
Pot Cap-1 Maneuver	~ 30	380	802	-	-	-
Stage 1	440	-	-	-	-	-
Stage 2	158	-	-	-	-	-
Platoon blocked, %					-	-
Mov Cap-1 Maneuver	~ 11	380	802	-	-	-
Mov Cap-2 Maneuver	~ 11	-	-	-	-	-
Stage 1	158	-	-	-	-	-
Stage 2	158	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	$ 357.8	7.2	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	802	-	11	380	-	-
HCM Lane V/C Ratio	0.641	-	4.727	0.926	-	-
HCM Control Delay (s)	17.1	-	$ 2353.9	62.9	-	-
HCM Lane LOS	C	-	F	F	-	-
HCM 95th %tile Q(veh)	4.7	-	7.7	9.9	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	96	93	645	113	108	688
Future Volume (vph)	96	93	645	113	108	688
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850	0.980			
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1770	1583	1825	0	1770	1863
Flt Permitted	0.950				0.321	
Satd. Flow (perm)	1770	1583	1825	0	598	1863
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		93	21			
Link Speed (k/h)	50		70			70
Link Distance (m)	171.9		180.7			198.6
Travel Time (s)	12.4		9.3			10.2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	96	93	645	113	108	688
Shared Lane Traffic (%)						
Lane Group Flow (vph)	96	93	758	0	108	688
Turn Type	Perm	Perm	NA		Perm	NA
Protected Phases			2			6
Permitted Phases	8	8			6	
Detector Phase	8	8	2		6	6
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0		5.0	5.0
Minimum Split (s)	24.0	24.0	24.0		24.0	24.0
Total Split (s)	26.0	26.0	64.0		64.0	64.0
Total Split (%)	28.9%	28.9%	71.1%		71.1%	71.1%
Maximum Green (s)	20.0	20.0	58.0		58.0	58.0
Yellow Time (s)	4.0	4.0	4.0		4.0	4.0
All-Red Time (s)	2.0	2.0	2.0		2.0	2.0
Lost Time Adjust (s)	-2.0	0.0	-2.0		0.0	-2.0
Total Lost Time (s)	4.0	6.0	4.0		6.0	4.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	None	None	Max		Max	Max
Walk Time (s)	7.0	7.0	7.0		7.0	7.0
Flash Dont Walk (s)	11.0	11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)	0	0	0		0	0
Act Effct Green (s)	11.7	9.7	65.3		63.7	65.3
Actuated g/C Ratio	0.14	0.12	0.80		0.78	0.80
v/c Ratio	0.38	0.34	0.52		0.23	0.46
Control Delay	35.5	11.2	5.6		5.5	5.1
Queue Delay	0.0	0.0	0.4		0.0	0.0
Total Delay	35.5	11.2	6.0		5.5	5.1
LOS	D	B	A		A	A
Approach Delay	23.5		6.0			5.1
Approach LOS	C		A			A

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Queue Length 50th (m)	14.0	0.0	37.8		4.6	33.1
Queue Length 95th (m)	27.9	12.6	74.4		12.8	63.8
Internal Link Dist (m)	147.9		156.7			174.6
Turn Bay Length (m)						
Base Capacity (vph)	477	458	1463		466	1489
Starvation Cap Reductn	0	0	276		0	0
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.20	0.20	0.64		0.23	0.46

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 81.7			
Natural Cycle: 60			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.52			
Intersection Signal Delay: 7.5		Intersection LOS: A	
Intersection Capacity Utilization 63.8%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 4: Speedsville Road & Street B

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	132	646	130	0	811
Future Volume (vph)	0	132	646	130	0	811
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.865	0.977			
Flt Protected						
Satd. Flow (prot)	0	1611	1820	0	0	1863
Flt Permitted						
Satd. Flow (perm)	0	1611	1820	0	0	1863
Link Speed (k/h)	50		70			70
Link Distance (m)	144.8		137.3			441.7
Travel Time (s)	10.4		7.1			22.7
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	132	646	130	0	811
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	132	776	0	0	811
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 56.7%		ICU Level of Service B	
Analysis Period (min) 15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	132	646	130	0	811
Future Volume (Veh/h)	0	132	646	130	0	811
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	132	646	130	0	811
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)			137			
pX, platoon unblocked	0.79	0.79			0.79	
vC, conflicting volume	1522	711			776	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1528	501			583	
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	71			100	
cM capacity (veh/h)	102	450			783	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	132	776	811
Volume Left	0	0	0
Volume Right	132	130	0
cSH	450	1700	1700
Volume to Capacity	0.29	0.46	0.48
Queue Length 95th (m)	9.7	0.0	0.0
Control Delay (s)	16.3	0.0	0.0
Lane LOS	C		
Approach Delay (s)	16.3	0.0	0.0
Approach LOS	C		

Intersection Summary			
Average Delay		1.3	
Intersection Capacity Utilization		56.7%	ICU Level of Service B
Analysis Period (min)		15	

Intersection	
Int Delay, s/veh	1.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	132	646	130	0	811
Future Vol, veh/h	0	132	646	130	0	811
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	132	646	130	0	811

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	711	0	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.22	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.318	-	-	-	-
Pot Cap-1 Maneuver	0	433	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	433	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	16.9	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT
Capacity (veh/h)	-	-	433	-
HCM Lane V/C Ratio	-	-	0.305	-
HCM Control Delay (s)	-	-	16.9	-
HCM Lane LOS	-	-	C	-
HCM 95th %tile Q(veh)	-	-	1.3	-

Appendix K

Region of Waterloo Roundabout Screening Tools

Region of Waterloo
Roundabout Feasibility Initial Screening Tool

June 2020

File
190659

Project
River Mill Development

Based On
Region of Waterloo
Roundabout Feasibility
Initial Screening Tool 1.0
23 May 2012

The intent of this screening tool is to provide a relatively quick assessment of the feasibility of a modern roundabout at a particular intersection in comparison to other appropriate forms of traffic control or road improvements including auxiliary lanes, traffic control signals, four-way stops, etc. The intended outcome of this tool is to proved enough information to assist staff in deciding whether or not to proceed to an Intersection Control Study to further investigate in more detail the feasibility of a roundabout.

1) Project Name / File Number

- River Mill Development TIS

2) Intersection Locations

(Street/Road Names, distance from major intersection, etc.)

- Speedsville Road & Equestrian Way
- Nearest major intersection: Speedsville Road and Maple Grove Road, approximately 850 metres to the north.

3) Brief Description of Intersection

(Number of legs, lanes on each leg, total AADT, AADT on each road, etc. Attach or sketch diagram showing existing and horizon-year turning movements)

- Three legs
- 2030 forecast AADT approximately 17860 based on 2030 total PM peak hour forecasts

4) What operation problems are being experienced at this location?

- None. Essentially a new intersection.

5) Is it a new intersection or is it a retrofit of an existing intersection?

If existing, what is the existing traffic control?

- Existing two-way stop control.

6) Is the intersection in the vicinity of a railroad crossing or another intersection?

If so, how close and what type of traffic control exists at the adjacent intersection? Will queues be a problem?

- Nearest existing intersection is Speedville Road and Royal Oak Drive, approximately 475 metres to the south.
- Queueing not expected to be a problem.

7) Would the intersection be located within a coordinated signal system?

- No.

8) Would the intersection be located on a Preferred Roundabout Corridor?

- Potentially yes, as a roundabout is planned at Maple Grove and Speedsville, but no roundabouts currently exist nearby in this corridor.

9) Is the intersection located within a corridor that is scheduled for improvements in the 10 Year Transportation Capital Program?

What is the ultimate cross-section of the approach roads?

- No improvements planned.

10) What is the collision history of the intersection over the past five years?

Is there a collision problem that needs to be addressed?

- New intersection

11) Are person with disabilities or horse and buggies frequent users of this intersection?

- Not expected to be.

12) What traditional road improvements are proposed for this intersection?

(eg. Traffic signals, all-way stop, auxiliary lanes, etc.) Please attach a sketch of the traditional road improvements.

- Traffic Signals (also assuming left-turn lanes on Speedville)

13) If traffic control signals are being considered, are the traffic signal warrants met for the horizon year?

- Signal are warranted.

14) What size of roundabout is being considered for this intersection?

- 40 m ICD single-lane

15) 20-Year Life Cycle Cost Estimate

10-Year AADT: 13390

Non-injury Social Collision Cost: $5000

Injury Social Collision Cost: $82,000

Fatal Social Collision Cost: $13,600,000

Discount Rate (i): 6%

20 Year Life-Cycle Cost Comparison		
Cost Item	**Other Traffic Control**	**Roundabout**
Implementation Cost	$600,000 (traffic signals w/ main street LT lanes)	$700,000
Injury Collision Cost (Present Value)	$1,885,609	$559,587
Total Life Cycle Cost	**$2,485,609**	**$1,259,587**

Conclusions and Recommendations

- Roundabout cost is less than signalization
- Proceed to Intersection Control Study

INTERSECTION CONTROL STUDIES
SAFETY ASSESSMENT METHODOLOGY

Region of Waterloo

Last Rev Nov 2018

Scenario: 2030 Total Traffic Horizon

Major Road: Speedsville Road

Minor Road: Equestrian Way

Major Road Direction:	North / South
Urban or Rural:	Rural
Proposed Control:	Signalized
Proposed Config.	3-Leg Intersection

LT Lanes Proposed (non roundabout):		RT Lanes Proposed (non roundabout):	
Major	1 Approach	Major	No RT Lanes
Minor	1 Approach	Minor	No RT Lanes

Is there going to be any fully protected left-turn phasing?	NO
Number of approaches with FPLTP:	N/A
Is the proposed intersection "new" or is it existing:	EXISTING
Does control and number of approaches remain the same:	NO
Will the proposed intersection have illumination:	YES

NOTE: No collision history required

5-Year Total Collisions: N/A

5-Year PDO Collisions: N/A

Proposed Multi-Lane or Single Lane RA? SINGLE LANE ROUNDABOUT

Major Road (mid-block) 10-Year Horizon AADT: 16,100

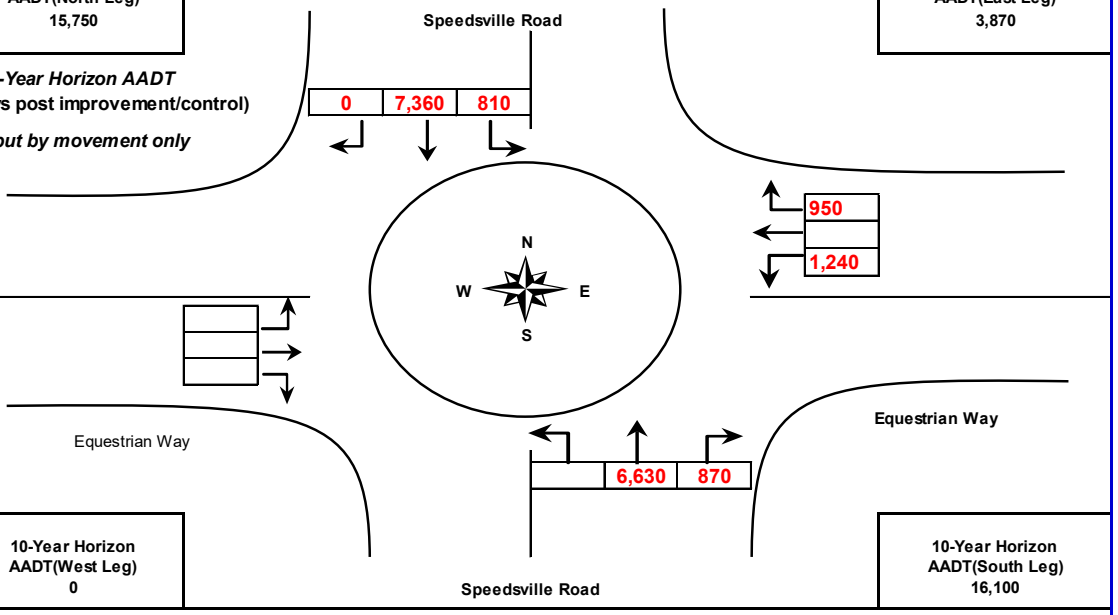
Minor Road (mid-block) 10-Year Horizon AADT: 3,870

10-Year Horizon AADT(North Leg) 15,750

10-Year Horizon AADT(East Leg) 3,870

***10-Year Horizon AADT (10ys post improvement/control)**

***Input by movement only**



10-Year Horizon AADT(West Leg) 0

10-Year Horizon AADT(South Leg) 16,100

Direct Capital Costs

Fatal = $1,656,500

Injury = $60,500

PDO = $5,000

Discount Rate = 0.06

20-Year Present Value Collision Costs (DIRECT CAPITAL COSTS)

Collisions by Severity	Total	PDO	Injury	Fatal
Signalized	$1,885,609.17	$224,810.46	$1,394,799.77	$265,998.94
Roundabout	$559,586.71	$238,686.28	$320,900.44	$0.00

Region of Waterloo

INTERSECTION CONTROL STUDIES
SAFETY ASSESSMENT METHODOLOGY (HSM)

Last Rev Nov 2018

Scenario: 2030 Total Traffic Horizon

Major Road: Speedsville Road
Minor Road: Equestrian Way

Major Road Direction: North / South

Urban or Rural: Rural

Proposed Control: Signalized

Proposed Config. 3-Leg Intersection

Roundabout Conflicts: 7670

5-Year Total Collisions: N/A

5-Year PDO Collisions: N/A

Estimated **ANNUAL (1-YEAR ONLY)** Collisions				
Future Expected Collisions by Severity	**Total**	**PDO**	**Injury**	**Fatal**
Signalized	**5.94**	**3.92**	**2.01**	**0.01**
Roundabout	**4.62**	**4.16**	**0.46**	**0.00**

TOTAL CRASH COEFFICIENTS USED IN CALCULATION						Fatal/Inj. Ratio	Collision Factor
Control	Intersection Config	Intercept	AADTmaj	AADTmin	Overdispersion		
Signalized	3-Leg Intersection	**-5.13**	**0.6**	**0.2**	**N/A**	**0.007**	**n/a**

PDO CRASH COEFFICIENTS USED IN CALCULATION						Fatal/Inj. Ratio	Collision Factor
Control	Intersection Config	Intercept	AADTmaj	AADTmin	Overdispersion		
Signalized	3-Leg Intersection	**-5.13**	**0.6**	**0.2**	**N/A**	**0.007**	**0.66**

Collision Modification Factors (cmf's)	Left Turn Lane	Right Turn Lane	Calibration Factor	Empirical Bays Weighting	
			0.64	Total	PDO
				N/A	**N/A**
	Illumination	Protected LT Phasing			
	0.90	**1.00**			

Comments:

Region of Waterloo
Roundabout Feasibility Initial Screening Tool

June 2020

File
190659

Project
River Mill Development

Based On
Region of Waterloo
Roundabout Feasibility
Initial Screening Tool 1.0
23 May 2012

The intent of this screening tool is to provide a relatively quick assessment of the feasibility of a modern roundabout at a particular intersection in comparison to other appropriate forms of traffic control or road improvements including auxiliary lanes, traffic control signals, four-way stops, etc. The intended outcome of this tool is to proved enough information to assist staff in deciding whether or not to proceed to an Intersection Control Study to further investigate in more detail the feasibility of a roundabout.

1) Project Name / File Number

- River Mill Development TIS

2) Intersection Locations

(Street/Road Names, distance from major intersection, etc.)

- Speedsville Road & Heroux Devtek Drive / Street A
- Nearest major intersection: Speedsville Road and Maple Grove Road, approximately 360 metres to the north.

3) Brief Description of Intersection

(Number of legs, lanes on each leg, total AADT, AADT on each road, etc. Attach or sketch diagram showing existing and horizon-year turning movements)

- Four legs
- 2030 forecast AADT approximately 18084 based on 2030 total PM peak hour forecasts

4) What operation problems are being experienced at this location?

- None.

5) Is it a new intersection or is it a retrofit of an existing intersection?

If existing, what is the existing traffic control?

- Stop control at existing 3-legged intersection

6) Is the intersection in the vicinity of a railroad crossing or another intersection?

If so, how close and what type of traffic control exists at the adjacent intersection? Will queues be a problem?

- Approximately 180 metres south of new intersection Speedville Road and Street B.
- Queueing not expected to be a problem.

7) Would the intersection be located within a coordinated signal system?

- No.

8) Would the intersection be located on a Preferred Roundabout Corridor?

- Potentially yes, as a roundabout is planned at Maple Grove and Speedsville, but no roundabouts currently exist nearby in this corridor.

9) Is the intersection located within a corridor that is scheduled for improvements in the 10 Year Transportation Capital Program?

What is the ultimate cross-section of the approach roads?

- No improvements planned.

10) What is the collision history of the intersection over the past five years?

Is there a collision problem that needs to be addressed?

- New fourth leg being added to intersection, so past collision rates not being used.

11) Are person with disabilities or horse and buggies frequent users of this intersection?

- Not expected to be.

12) What traditional road improvements are proposed for this intersection?

(eg. Traffic signals, all-way stop, auxiliary lanes, etc.) Please attach a sketch of the traditional road improvements.

- Traffic Signals (also assuming left-turn lanes on Speedville)

13) If traffic control signals are being considered, are the traffic signal warrants met for the horizon year?

- Signal are warranted.

14) What size of roundabout is being considered for this intersection?

- 40 m ICD single-lane

15) 20-Year Life Cycle Cost Estimate

10-Year AADT: 13390

Non-injury Social Collision Cost: $5000

Injury Social Collision Cost: $82,000

Fatal Social Collision Cost: $13,600,000

Discount Rate (i): 6%

20 Year Life-Cycle Cost Comparison		
Cost Item	**Other Traffic Control**	**Roundabout**
Implementation Cost	$600,000 (traffic signals w/ main street LT lanes)	$700,000
Injury Collision Cost (Present Value)	$1,251,122	$664,123
Total Life Cycle Cost	**$1,851,122**	**$1,364,123**

Conclusions and Recommendations

- Roundabout cost is less than signalization
- Proceed to Intersection Control Study

INTERSECTION CONTROL STUDIES
SAFETY ASSESSMENT METHODOLOGY

Region of Waterloo

Last Rev Nov 2018

Scenario: 2030 Total Traffic Horizon

Major Road: Speedsville Road

Minor Road: Heroux Devtek / Street A

Major Road Direction:	North / South
Urban or Rural:	Rural
Proposed Control:	Signalized
Proposed Config.	4-Leg Intersection

LT Lanes Proposed (non roundabout):		RT Lanes Proposed (non roundabout):	
Major	1 Approach	Major	No RT Lanes
Minor	1 Approach	Minor	No RT Lanes

Is there going to be any fully protected left-turn phasing?	NO
Number of approaches with FPLTP:	N/A

Is the proposed intersection "new" or is it existing:	EXISTING
Does control and number of approaches remain the same:	NO
Will the proposed intersection have illumination:	YES

NOTE: No collision history required

5-Year Total Collisions: N/A

5-Year PDO Collisions: N/A

Proposed Multi-Lane or Single Lane RA? SINGLE LANE ROUNDABOUT

Major Road (mid-block) 10-Year Horizon AADT: 15,830

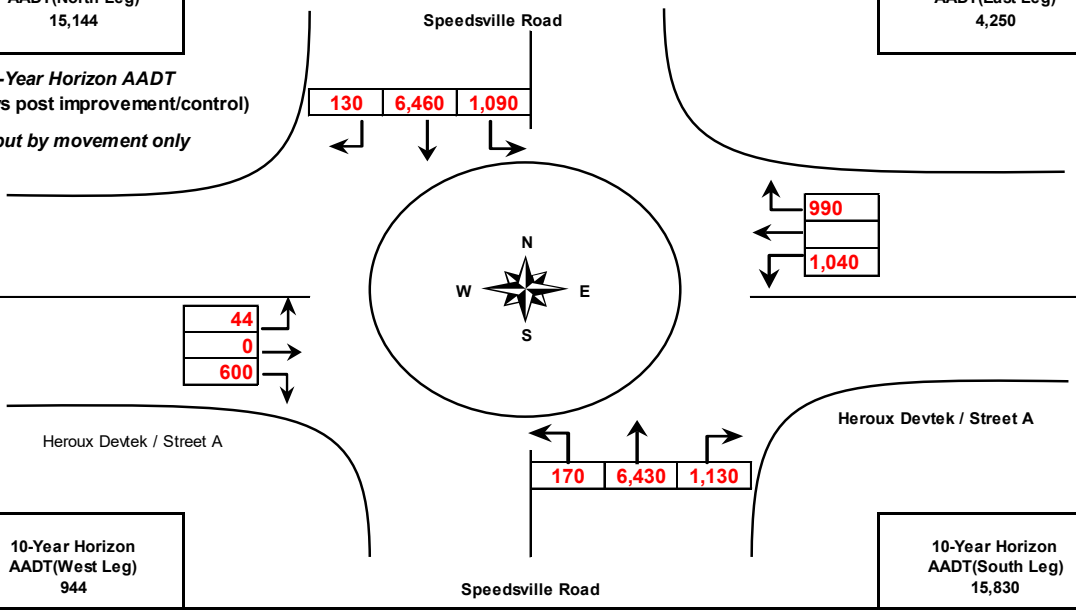
Minor Road (mid-block) 10-Year Horizon AADT: 4,250

10-Year Horizon AADT(North Leg) 15,144

10-Year Horizon AADT(East Leg) 4,250

** 10-Year Horizon AADT (10ys post improvement/control)*

** Input by movement only*



10-Year Horizon AADT(West Leg) 944

10-Year Horizon AADT(South Leg) 15,830

Direct Capital Costs

Fatal = $1,656,500

Injury = $60,500

PDO = $5,000

Discount Rate = 0.06

20-Year Present Value Collision Costs (DIRECT CAPITAL COSTS)

Collisions by Severity	Total	PDO	Injury	Fatal
Signalized	$1,251,121.80	$150,255.97	$929,866.51	$170,999.32
Roundabout	$664,112.76	$283,270.85	$380,841.91	$0.00

INTERSECTION CONTROL STUDIES
SAFETY ASSESSMENT METHODOLOGY (HSM)

Region of Waterloo

Last Rev Nov 2018

Scenario:	**2030 Total Traffic Horizon**	**Major Road:**	**Speedsville Road**
		Minor Road:	**Heroux Devtek / Street A**
Major Road Direction:	North / South	**Roundabout Conflicts:**	**9464**
Urban or Rural:	Rural		
Proposed Control:	Signalized	**5-Year Total Collisions:**	**N/A**
Proposed Config.	4-Leg Intersection	**5-Year PDO Collisions:**	**N/A**

Estimated **ANNUAL (1-YEAR ONLY)** Collisions				
Future Expected Collisions by Severity	**Total**	**PDO**	**Injury**	**Fatal**
Signalized	**3.97**	**2.62**	**1.34**	**0.01**
Roundabout	**5.49**	**4.94**	**0.55**	**0.00**

TOTAL CRASH COEFFICIENTS USED IN CALCULATION						Fatal/Inj. Ratio	Collision Factor
Control	Intersection Config	Intercept	AADTmaj	AADTmin	Overdispersion		
Signalized	4-Leg Intersection	**-5.13**	**0.6**	**0.2**	**N/A**	**0.007**	**n/a**

PDO CRASH COEFFICIENTS USED IN CALCULATION						Fatal/Inj. Ratio	Collision Factor
Control	Intersection Config	Intercept	AADTmaj	AADTmin	Overdispersion		
Signalized	4-Leg Intersection	**-5.13**	**0.6**	**0.2**	**N/A**	**0.007**	**0.66**

	Left Turn Lane	Right Turn Lane	Calibration Factor	Empirical Bays Weighting	
				Total	PDO
Collision Modification Factors (cmf's)	**0.67**		**0.64**	**N/A**	**N/A**
	Illumination	Protected LT Phasing			
	0.89	**1.00**			

Comments:

Region of Waterloo
Roundabout Feasibility Initial Screening Tool

June 2020

File
190659

Project
River Mill Development

Based On
Region of Waterloo
Roundabout Feasibility
Initial Screening Tool 1.0
23 May 2012

The intent of this screening tool is to provide a relatively quick assessment of the feasibility of a modern roundabout at a particular intersection in comparison to other appropriate forms of traffic control or road improvements including auxiliary lanes, traffic control signals, four-way stops, etc. The intended outcome of this tool is to proved enough information to assist staff in deciding whether or not to proceed to an Intersection Control Study to further investigate in more detail the feasibility of a roundabout.

1) Project Name / File Number

- River Mill Development TIS

2) Intersection Locations

(Street/Road Names, distance from major intersection, etc.)

- Speedsville Road & Street B
- Nearest major intersection: Speedsville Road and Maple Grove Road, approximately 180 metres to the north.

3) Brief Description of Intersection

(Number of legs, lanes on each leg, total AADT, AADT on each road, etc. Attach or sketch diagram showing existing and horizon-year turning movements)

- Three legs
- 2030 forecast AADT approximately 17440 based on 2030 total PM peak hour forecasts

4) What operation problems are being experienced at this location?

- None. New intersection.

5) Is it a new intersection or is it a retrofit of an existing intersection?

If existing, what is the existing traffic control?

- New intersection

6) Is the intersection in the vicinity of a railroad crossing or another intersection?

If so, how close and what type of traffic control exists at the adjacent intersection? Will queues be a problem?

- Approximately equidistance between Maple Grove Road and Heroux Devtek Drive on Speedville Road, approximately 180 metre to the north and south.
- Queueing not expected to be a problem.

7) Would the intersection be located within a coordinated signal system?

- No.

8) Would the intersection be located on a Preferred Roundabout Corridor?

- Potentially yes, as a roundabout is planned at Maple Grove and Speedsville, but no roundabouts currently exist nearby in this corridor.

9) Is the intersection located within a corridor that is scheduled for improvements in the 10 Year Transportation Capital Program?

What is the ultimate cross-section of the approach roads?

- No improvements planned.

10) What is the collision history of the intersection over the past five years?

Is there a collision problem that needs to be addressed?

- New intersection

11) Are person with disabilities or horse and buggies frequent users of this intersection?

- Not expected to be.

12) What traditional road improvements are proposed for this intersection?

(eg. Traffic signals, all-way stop, auxiliary lanes, etc.) Please attach a sketch of the traditional road improvements.

- Traffic Signals (also assuming left-turn lanes on Speedville)

13) If traffic control signals are being considered, are the traffic signal warrants met for the horizon year?

- Signal are warranted.

14) What size of roundabout is being considered for this intersection?

- 40 m ICD single-lane

15) 20-Year Life Cycle Cost Estimate

10-Year AADT: 13390

Non-injury Social Collision Cost: $5000

Injury Social Collision Cost: $82,000

Fatal Social Collision Cost: $13,600,000

Discount Rate (i): 6%

20 Year Life-Cycle Cost Comparison		
Cost Item	**Other Traffic Control**	**Roundabout**
Implementation Cost	$600,000 (traffic signals w/ main street LT lanes)	$700,000
Injury Collision Cost (Present Value)	$1,861,924	$506,083
Total Life Cycle Cost	**$2,461,924**	**$1,206,083**

Conclusions and Recommendations

- Roundabout cost is less than signalization
- Proceed to Intersection Control Study

INTERSECTION CONTROL STUDIES
SAFETY ASSESSMENT METHODOLOGY

Region of Waterloo

Last Rev Nov 2018

Scenario: 2030 Total Traffic Horizon

Major Road: Speedsville Road

Minor Road: Street B

Major Road Direction:	North / South
Urban or Rural:	Rural
Proposed Control:	Signalized
Proposed Config.	3-Leg Intersection

LT Lanes Proposed (non roundabout):		RT Lanes Proposed (non roundabout):	
Major	1 Approach	Major	No RT Lanes
Minor	1 Approach	Minor	No RT Lanes

Is there going to be any fully protected left-turn phasing?	NO
Number of approaches with FPLTP:	N/A

Is the proposed intersection "new" or is it existing:	NEW
Does control and number of approaches remain the same:	NO
Will the proposed intersection have illumination:	YES

NOTE: No collision history required

5-Year Total Collisions: N/A

5-Year PDO Collisions: N/A

Proposed Multi-Lane or Single Lane RA? SINGLE LANE ROUNDABOUT

Major Road (mid-block) 10-Year Horizon AADT: 15,430

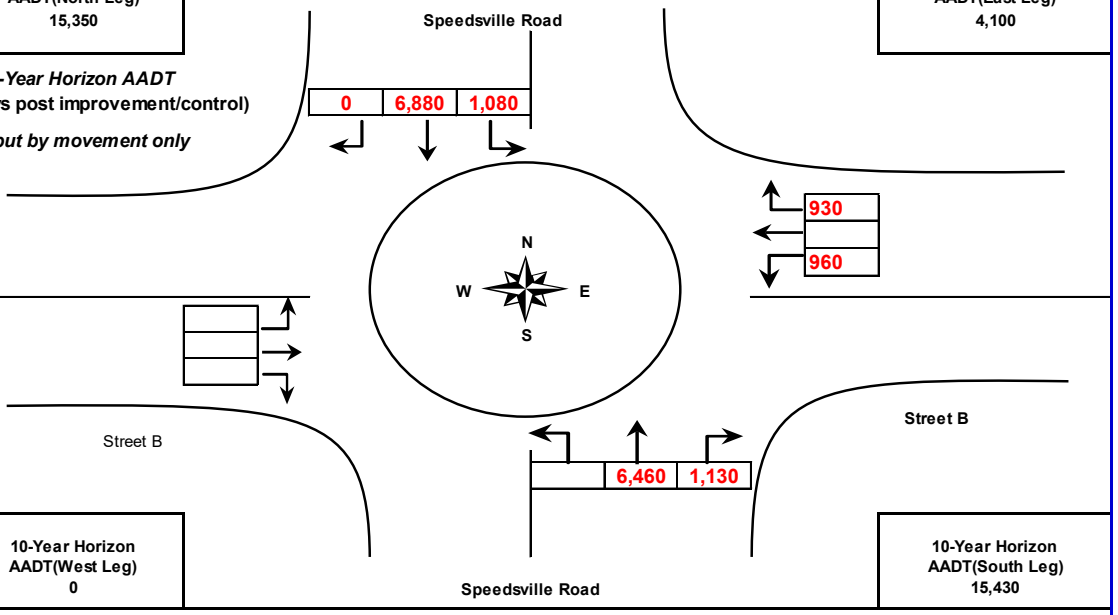
Minor Road (mid-block) 10-Year Horizon AADT: 4,100

10-Year Horizon AADT(North Leg) 15,350

10-Year Horizon AADT(East Leg) 4,100

***10-Year Horizon AADT (10ys post improvement/control)**

***Input by movement only**



10-Year Horizon AADT(West Leg) 0

10-Year Horizon AADT(South Leg) 15,430

Direct Capital Costs

Fatal = $1,656,500

Injury = $60,500

PDO = $5,000

Discount Rate = 0.06

20-Year Present Value Collision Costs (DIRECT CAPITAL COSTS)

Collisions by Severity	Total	PDO	Injury	Fatal
Signalized	$1,861,923.78	$221,942.98	$1,373,981.86	$265,998.94
Roundabout	$506,083.39	$215,864.95	$290,218.44	$0.00

Region of Waterloo

INTERSECTION CONTROL STUDIES
SAFETY ASSESSMENT METHODOLOGY (HSM)

Last Rev Nov 2018

Scenario: 2030 Total Traffic Horizon

Major Road: Speedsville Road
Minor Road: Street B

Major Road Direction: North / South

Urban or Rural: Rural

Proposed Control: Signalized

Proposed Config. 3-Leg Intersection

Roundabout Conflicts: 6780

5-Year Total Collisions: N/A

5-Year PDO Collisions: N/A

Estimated **ANNUAL (1-YEAR ONLY)** Collisions				
Future Expected Collisions by Severity	**Total**	**PDO**	**Injury**	**Fatal**
Signalized	**5.86**	**3.87**	**1.98**	**0.01**
Roundabout	**4.18**	**3.76**	**0.42**	**0.00**

TOTAL CRASH COEFFICIENTS USED IN CALCULATION						Fatal/Inj. Ratio	Collision Factor
Control	Intersection Config	Intercept	AADTmaj	AADTmin	Overdispersion		
Signalized	3-Leg Intersection	**-5.13**	**0.6**	**0.2**	**N/A**	**0.007**	**n/a**

PDO CRASH COEFFICIENTS USED IN CALCULATION						Fatal/Inj. Ratio	Collision Factor
Control	Intersection Config	Intercept	AADTmaj	AADTmin	Overdispersion		
Signalized	3-Leg Intersection	**-5.13**	**0.6**	**0.2**	**N/A**	**0.007**	**0.66**

Collision Modification Factors (cmf's)	Left Turn Lane	Right Turn Lane	Calibration Factor	Empirical Bays Weighting	
			0.64	Total	PDO
				N/A	**N/A**
	Illumination	Protected LT Phasing			
	0.90	**1.00**			

Comments: