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Watson Pit
311804 Highway 6, Mount Forest, ON
Transportation Impact Study

Paradigm Transportation Solutions Limited

October 2023
230289

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Project Summary

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Client
Teeswater Concrete Ltd.

Client Contact
Aaron Armstrong

Watson Pit
311804 Highway 6, Mount Forest, ON
Transportation Impact Study

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Executive Summary

Content

Paradigm Transportation Solutions Limited (Paradigm) has been retained to conduct this Transportation Impact Study (TIS) for a proposed aggregate extraction pit located at 311804 Highway 6 in the Municipality of West Grey, Grey County.

This report includes an analysis of existing traffic conditions; a description of the proposed operations; traffic forecasts for the assumed opening date (2024), five years (2029) and ten years (2034) from opening date; and assessment of traffic impacts with recommendations to accommodate the proposed development as appropriate.

Proposed Pit Operations

The proposed operations will include an aggregate pit and related infrastructure for extraction purposes.

Teeswater Concrete Ltd. is proposing an aggregate pit and related infrastructure for extraction operations on the southwest corner of Highway 6 and Grey Road 9. Vehicle access is proposed via an all-moves connection to Grey Road 9, approximately 300 metres from Highway 6.

The proposed aggregate extraction will consist of the following activities:

- Removal of the aggregate by a front-end loader;
- Crushing and / or screening of the aggregate material;
- Piling the crushed and / or screened material into stockpiles; and
- Transfer of stockpiled material into trucks by front-end loader.

For the purposes of this study, operations are assumed to begin by 2024. The actual starting date of operations has not yet been determined.

Conclusions

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

- **Existing Traffic Conditions:** The intersection of Highway 6 and Grey Road 9 is operating with acceptable levels of service.

- **Aggregate Pit:**
  - **Trip Generation:** The operations are forecast to generate 26 AM peak hour trips and 26 PM peak hour trips, including 20 truck trips and 6 employee trips during each peak hour.
  - **Site Access Location:** The location of the site access on Grey Road 9 has a clear line of sight in either direction. As per MTO requirements, the site access should be relocated an additional 100 metres west of the proposed location to provide 400 metres of separation from Highway 6.
- **Background Traffic Conditions:** The intersection of Highway 6 and Grey Road 9 is forecast to operate with acceptable levels of service under 2024, 2029 and 2034 traffic conditions.
- **Total Traffic Conditions:** The intersection of Highway 6 and Grey Road 9, and the proposed site access on Grey Road 9 are forecast to operate with acceptable levels of service under 2024, 2029 and 2034 traffic conditions.
- **Remedial Measures:**
  - **Signal Warrants:** Traffic control signals are not warranted at either Highway 6 and Grey Road 9 or the site access on Grey Road 9 under future traffic conditions.
  - **Left-Turn Lanes:**
    - The existing northbound left-turn lane storage of 100 metres on Highway 6 at Grey Road 9 exceeds the warranted storage of 15 metres under 2024, 2029 and 2034 background and total traffic conditions.
    - A westbound left-turn lane is not warranted on Grey Road 9 and the proposed site access under total traffic conditions.

Recommendations

Based on the findings of this study, it is recommended that the site access on Grey Road 9 be located 400 metres west of Highway 6 and the operations be considered for approval.

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Appendices

Figures

Tables

1 Introduction

1.1 Overview

Paradigm Transportation Solutions Limited has been retained to conduct this Transportation Impact Study (TIS) for a proposed aggregate extraction pit located at 311804 Highway 6 in the Municipality of West Grey, Grey County. **Figure 1.1** illustrates the location of the subject lands.

1.2 Purpose and Scope

The purpose of this report is to identify and assess the potential traffic impact resulting from the proposed extraction pit. The scope of the study, developed in consultation with Grey County and Ministry of Transportation (MTO) staff via e-mail in August 2023, includes:

- Assessment of the current traffic and site conditions within the study area;
- Estimates of background traffic growth for opening year (2024), and five (2029) and ten years (2034) from opening year;
- Estimates of additional traffic generated by the proposed aggregate operations;
- Analyses of the impact of future traffic on the surrounding road network, including the following study area intersections:
  - Highway 6 and Grey Road 9; and
  - Proposed site access on Grey Road 9.
- 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 Ministry of Transportation Traffic Impact Study Guidelines[1].

[1] Ministry of Transportation, General Guidelines for the Preparation of Traffic Impact Studies, March 2023.

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Location of Subject Lands

311804 Highway 6 Mount Forest, ON TIS
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Figure 1.1

2 Existing Conditions

2.1 Existing Roadways

The main roadways near the subject site considered in assessing the traffic impacts of the development include:

- **Highway 6** is a north-south provincial highway[2] with a two-lane rural cross section and a posted speed limit of 80 km/h.
- **Grey Road 9** is an east-west county road with a two-lane rural cross section and a posted speed limit of 80 km/h.

Figure 2.1 illustrates the existing lane configuration and traffic control at the intersection of Grey Road 9 and Highway 6.

2.2 Traffic Volumes

Turning movement counts were collected by Paradigm on 6 June 2023 using Miovision technology at the existing study area intersection.

Figure 2.2 illustrates the existing AM (7:30 – 8:30 AM) and PM (4:00 – 5:00 PM) weekday peak hour traffic volumes.

Appendix A contains the detailed traffic counts for the intersection of Highway 6 and Grey Road 9.

[2] Grey County, *The County of Grey Official Plan*, May 2023.

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Existing Lane Configuration and Traffic Control

311804 Highway 6 Mount Forest, ON TIS
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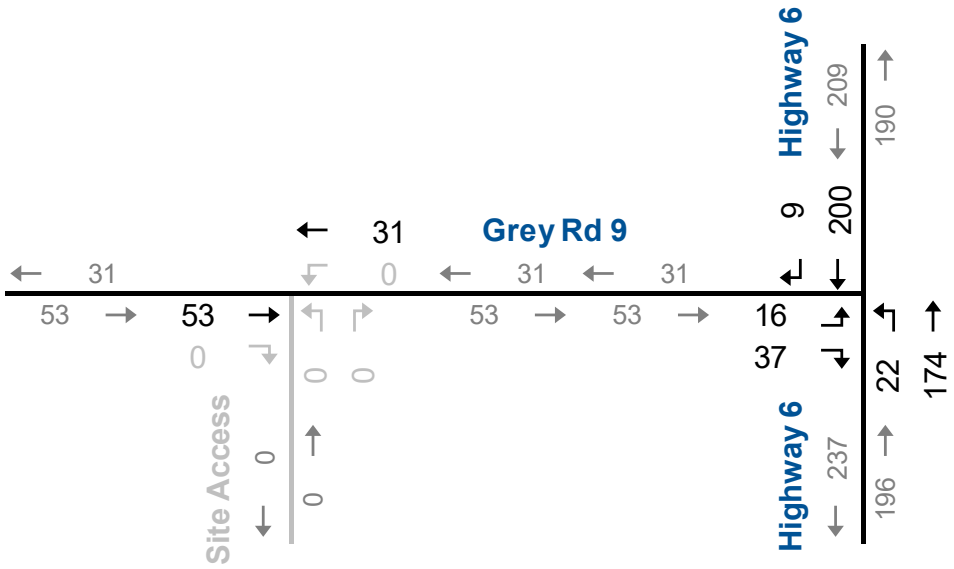
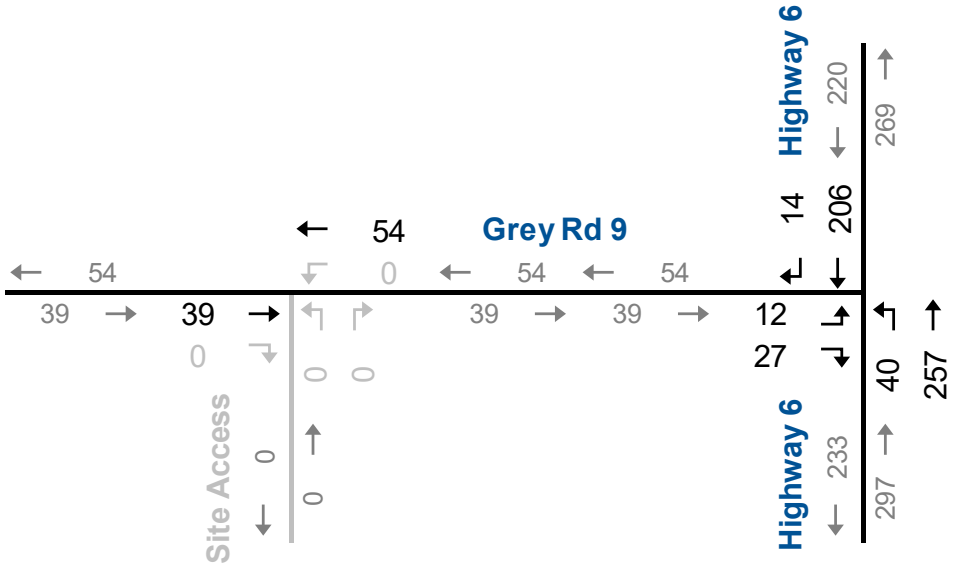
Figure 2.1

AM Peak Hour



PM Peak Hour



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Existing Traffic Volumes

311804 Highway 6 Mount Forest, ON TIS
230289

Figure 2.2

2.3 Traffic Operations

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

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

The operations at the study area intersections have been assessed using Synchro 11 and HCM 6th Edition methodology. As identified in MTO TIS guidelines, movements at signalized intersections are considered critical with a volume/capacity (v/c) ratio greater than 0.85. For the purpose of this report, movements at unsignalized intersections are considered critical with LOS E or worse.

Table 2.1 summarizes the results of the intersection operational analysis under existing conditions, including the AM and PM peak hour LOS, v/c ratios, and 95th percentile queues.

The results indicate that the intersection of Highway 6 and Grey Road 9 are operating with acceptable levels of service, and with no problem movements.

Appendix B contains the detailed Synchro 11 reports.

TABLE 2.1: EXISTING 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	Highway 6 & Grey Rd 9	TWSC	LOS	B		>	**B**					A	A		**A**		A	>	**A**	
			Delay	11		>	**11**					8	0		**1**		0	>	**0**	
			V/C	0.09		>						0.02	0.00				0.00	>		
			Q	2		>						1	0				0	>		
			Stor.	-		>						100	-				-	>		
			Avail.	-		>						99	-				-	>		
PM Peak Hour	Highway 6 & Grey Rd 9	TWSC	LOS	B		>	**B**					A	A		**A**		A	>	**A**	
			Delay	11		>	**11**					8	0		**1**		0	>	**0**	
			V/C	0.07		>						0.03	0.00				0.00	>		
			Q	2		>						1	0				0	>		
			Stor.	-		>						100	-				-	>		
			Avail.	-		>						99	-				-	>		

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

3 Proposed Operations

3.1 Description of Operations

Teeswater Concrete Ltd. is proposing an aggregate pit and related infrastructure for extraction operations on the southwest corner of Highway 6 and Grey Road 9. Vehicle access is proposed via an all-moves connection to Grey Road 9, approximately 300 metres from Highway 6.

For the purposes of this study, operations are assumed to begin by 2024. The actual starting date of operations has not yet been determined.

Figure 3.1 shows the concept plan.

3.2 Site Access

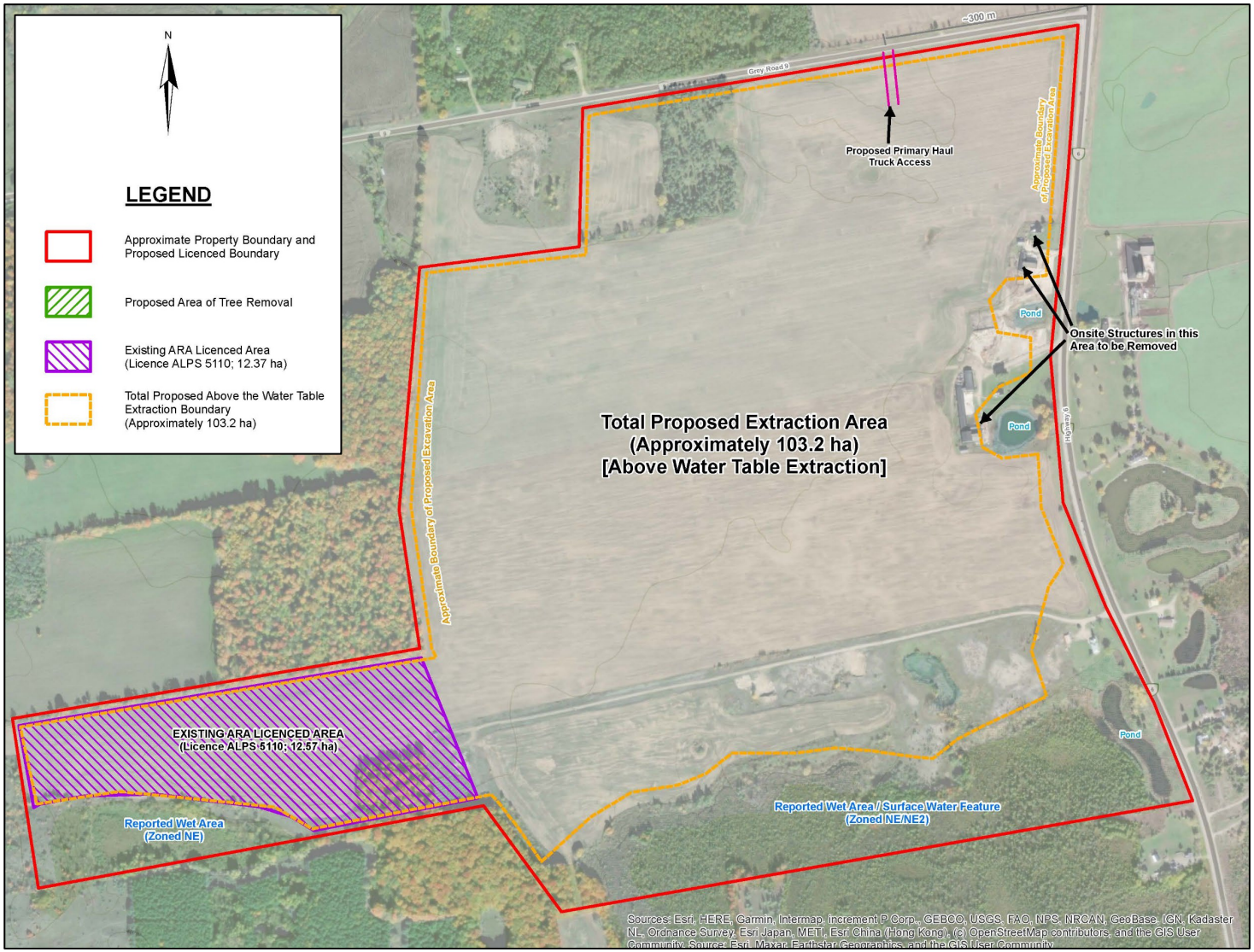
A field investigation was conducted on 5 June 2023 to review sight distance at the proposed access location on Grey Road 9. According to the Transportation Association of Canada's Geometric Design Guide for Canadian Roads[3] (TAC Guide), Intersection Sight Distance for a vehicle turning right from stop for a design speed of 100 km/h is 185 metres. For a vehicle turning left from stop, it is 210 metres. It was determined that a clear line of sight is available in either direction along Grey Road 9 from the proposed driveway location.

Additionally, MTO staff have identified a requirement of 400 metres from a provincial highway to the proposed access. It is therefore recommended that the vehicle access on Grey Road 9 be relocated 100 metres west of the proposed location. Intersection sight distance would also be met at this location.

Stopping sight distance for a design speed of 100 km/h is 185 metres, according to the TAC Guide[4]. Both locations would meet this distance.

[3] Transportation Association of Canada, "Intersections" chap. 9 in Geometric Design Guide for Canadian Roads, (Ottawa: TAC, 2017), 68,71.

[4] Transportation Association of Canada, "Design Controls, Classification and Consistency" chap. 2 in Geometric Design Guide for Canadian Roads, (Ottawa: TAC, 2017), 38.



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Concept Plan

311804 Highway 6 Mount Forest, ON T1S
230289

Figure 3.1

3.3 Trip Generation

The highest period of traffic activity on the study area road network generally occurs between 7:30 and 8:30 in the AM and 4:00 and 5:00 in the PM. The trips generated by the aggregate operation were estimated for the AM and PM peak hours based on the following information related to the operations of the facility:

- **Licensed Extraction Rate:** The maximum amount of tonnage applied for in the aggregate license is 750,000 tonnes annually. This number represents the maximum amount of material that can be removed from the site on a yearly basis. However, as expressed by the pit operator, the average extraction rate is expected to be 500,000 tonnes annually. For the purpose of this report and to assess the maximum impacts, it is conservatively assumed that the allowed maximum of 750,000 tonnes will be extracted annually.
- **Pit Operations:** The operational plan for the pit notes that the trucks will be loaded between 6:00 AM and 6:00 PM Monday to Friday, and between 7:00 AM and 3:00 PM on Saturdays. Realities of market forces and weather have shown that this activity can be sustained for about 250 full operating days per year.
- **Vehicle Size:** The truck traffic generated by the site is directly related to the payload of the haulage vehicles, which is estimated to be 35 tonnes per truck. Trucks used to haul materials from the site are expected to be a combination of tri-axle dump trucks, dump trucks with pups, and tractor trailers.

Table 3.1 illustrates the estimated daily average and peak hour trip generation at the aggregate pit. The average extraction per day (750,000 tonnes over 250 days) is 3000 tonnes per day. The property owner indicates that the daily extraction may run as high as 4000 tonnes per day in the summer months.

TABLE 3.1: TRIP GENERATION ESTIMATES

Measure	Units	Input	Calculation
Annual Rate of Extraction	tonnes/year	750,000	-
Operating Days during Peak Demand	days/year	250	-
Average Extraction per Day	tonnes/day	4,000	-
Average Payload per Truck	tonnes/truck	35	-
Average Number of Trucks per day	trucks/day	-	114
Operating Hours per day	hours	12	-
Average Number of Trucks per hour	trucks/hour	-	10
Peak Hour Entering Volume	trucks/hour	-	10
Peak Hour Exiting Volume	trucks/hour	-	10
Employees per peak hour	employees/hour	6	

In addition to trucks entering and exiting the site, Teeswater Concrete Ltd. has indicated that 6 employees are expected for the morning and afternoon trips.

3.4 Development Trip Distribution and Assignment

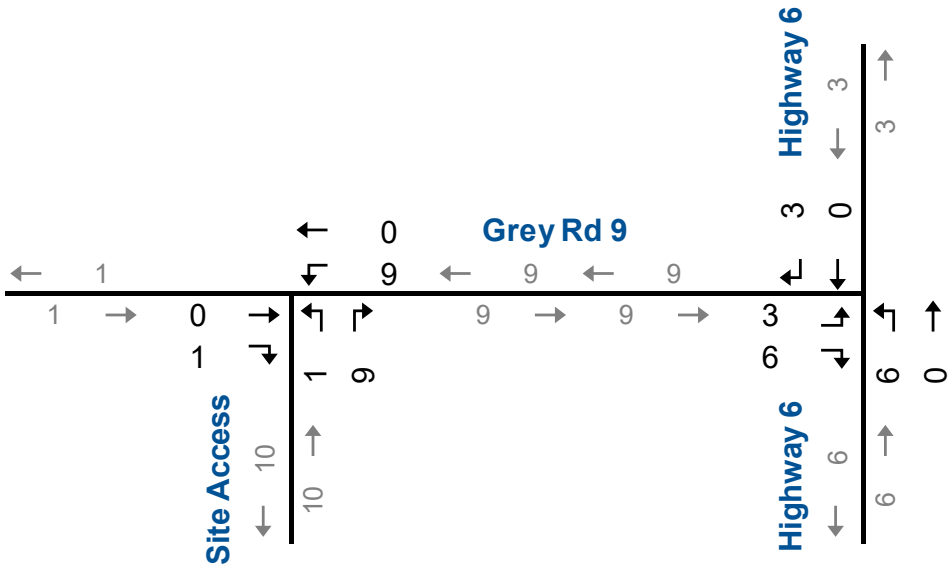
The likely distribution of trips on Grey Road 9 has been provided from Teeswater Concrete Ltd. Approximately 10% of trucks will travel west via Grey Road 9 and 90% east on Grey Road 9 towards Highway 6.

The likely distribution of truck traffic on Highway 6 has been determined based on existing traffic volumes at the intersection of Grey Road 9 and Highway 6, approximately 70% south via Highway 6 and 30% north.

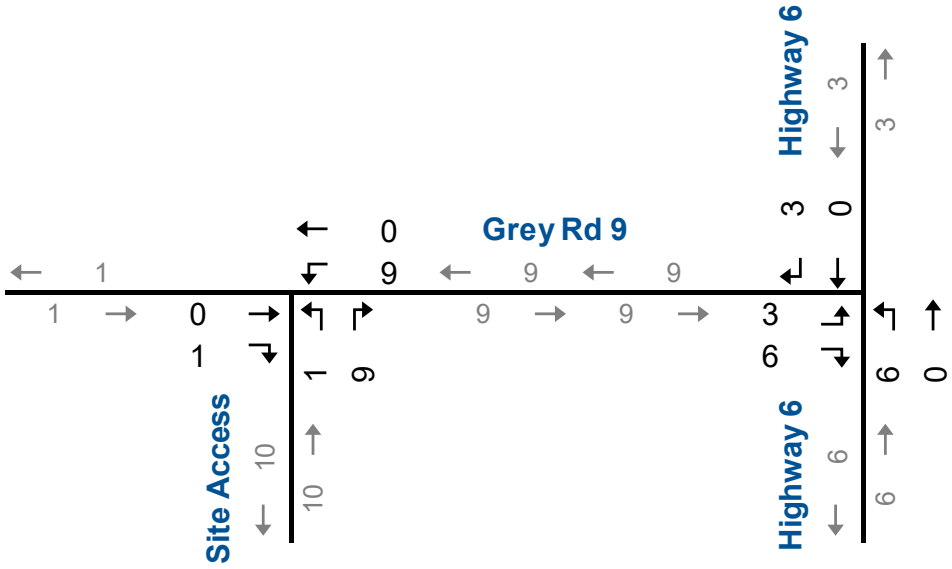
The same distribution has been used for employee trips.

Figure 3.2a and **Figure 3.2b** illustrate the site-generated traffic volumes for trucks and employees, respectively.

AM Peak Hour



PM Peak Hour



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Site Generated Traffic Volumes Trucks

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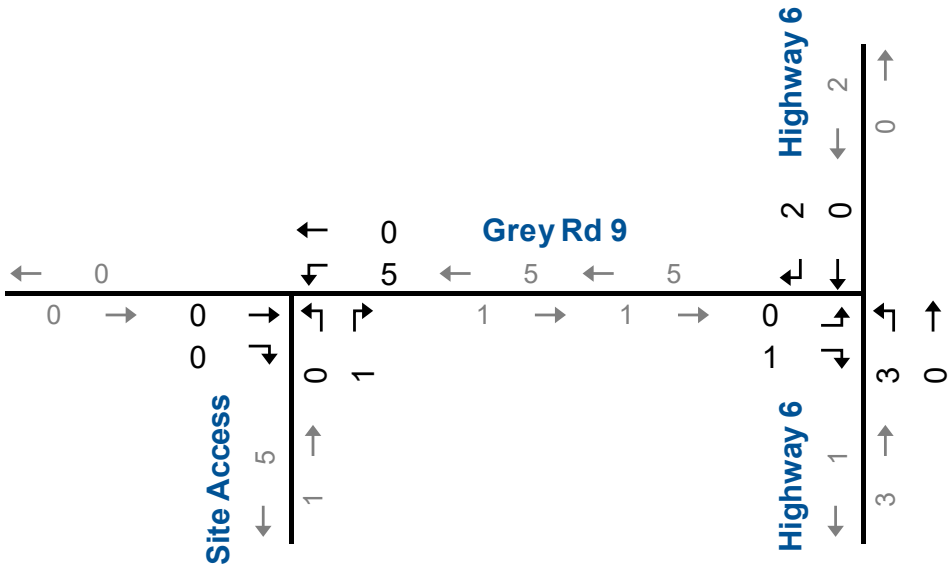
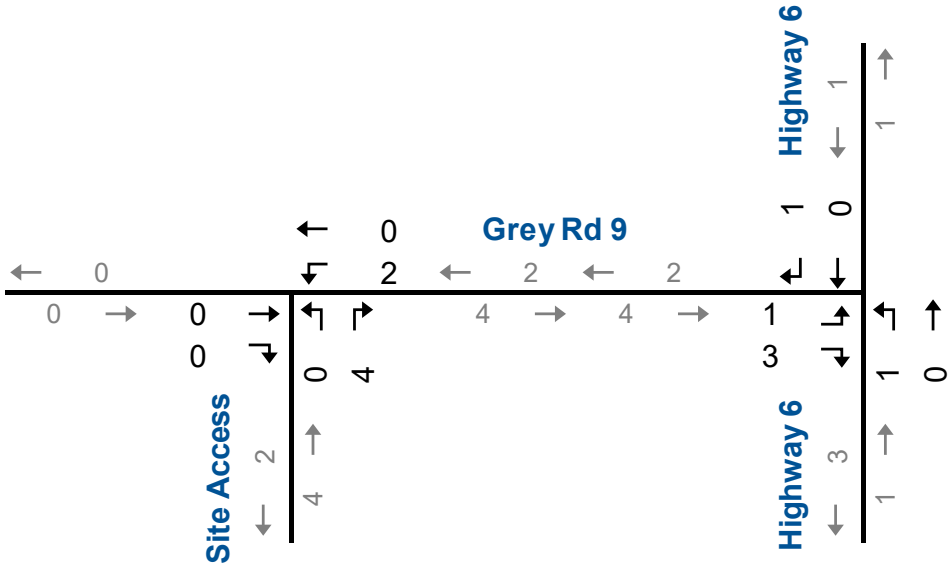
Figure 3.2a

AM Peak Hour



PM Peak Hour



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Site Generated Traffic Volumes Employees

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Figure 3.2b

4 Evaluation of Future Traffic Conditions

The assessment of future traffic conditions in this section includes estimates of future background and total traffic volumes, and the analyses for the 2024, 2029, and 2034 horizon years.

4.1 Background Traffic Forecasts

To derive the 2024, 2029 and 2034 generalized background traffic volumes, a growth rate of 1% was applied to the existing roadway traffic volumes. This growth rate was confirmed with MTO and Grey County during the pre-study consultation and is conservative when compared to Average Annual Daily Traffic (AADT) volumes on Highway 6 between 2015 and 2019[5] which indicate a growth rate of 0.48%.

4.2 2024 Horizon

4.2.1 2024 Background Traffic

Figure 4.1 illustrates the 2024 background traffic volumes, including road traffic growth.

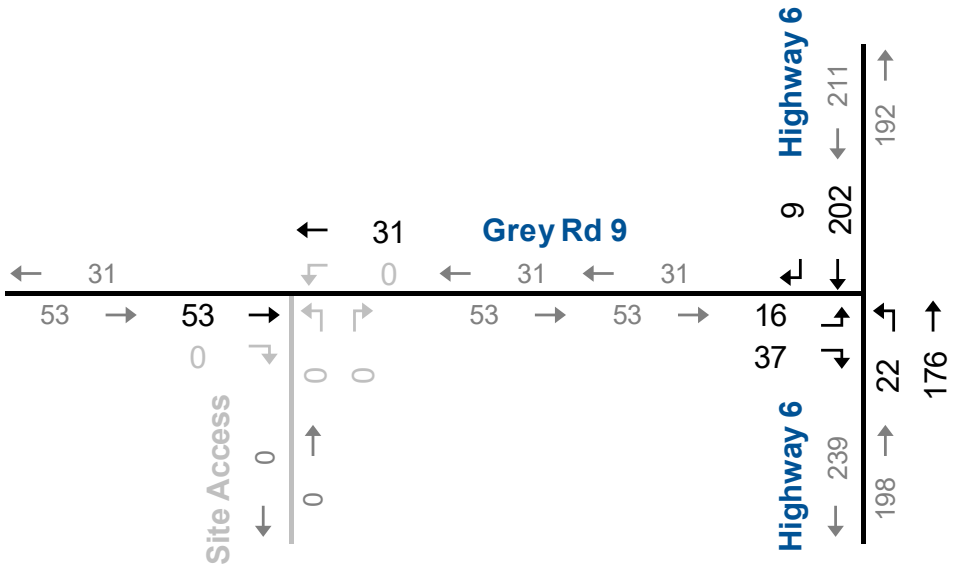
The 2024 background traffic volumes have been analyzed using the same methodology as under existing traffic conditions.

Table 4.1 summarizes the results of the 2024 background traffic operations, indicating that the intersection of Highway 6 and Grey Road 9 is forecast to operate with acceptable levels of service during the AM and PM peak hours.

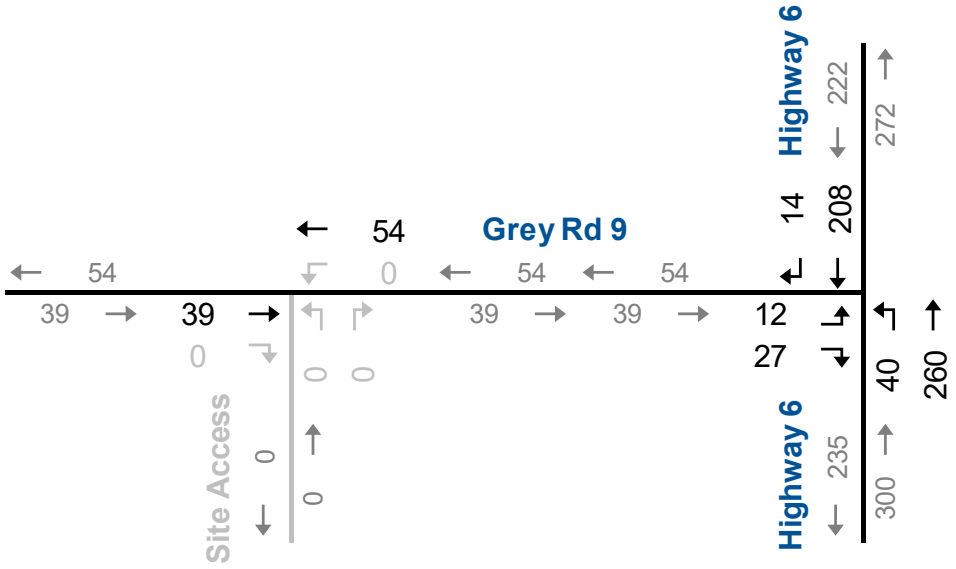
Appendix C contains the supporting detailed Synchro 11 reports.

[5] Ministry of Transportation, *Provincial Highways Traffic Volumes 1988-2019*, Page 110.

AM Peak Hour



PM Peak Hour



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2024 Background Traffic Volumes

311804 Highway 6 Mount Forest, ON TIS
230289

Figure 4.1

TABLE 4.1: 2024 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	Highway 6 & Grey Rd 9	TWSC	LOS	B		>	**B**					A	A		**A**		A	>	**A**	
			Delay	11		>	**11**					8	0		**1**		0	>	**0**	
			V/C	0.09		>						0.02	0.00				0.00	>		
			Q	2		>						1	0				0	>		
			Stor.	-		>						100	-				-	>		
			Avail.	-		>						99	-				-	>		
PM Peak Hour	Highway 6 & Grey Rd 9	TWSC	LOS	B		>	**B**					A	A		**A**		A	>	**A**	
			Delay	11		>	**11**					8	0		**1**		0	>	**0**	
			V/C	0.07		>						0.03	0.00				0.00	>		
			Q	2		>						1	0				0	>		
			Stor.	-		>						100	-				-	>		
			Avail.	-		>						99	-				-	>		

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

4.2.2 2024 Total Traffic

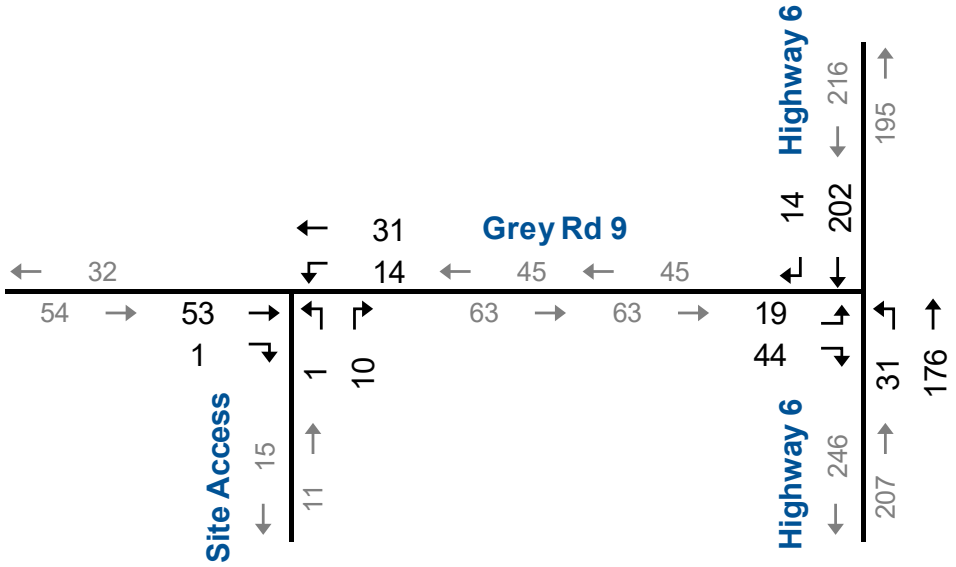
Figure 4.2 illustrates the 2024 total traffic volumes, including trips generated by the proposed development.

The 2024 total traffic volumes have been analyzed using the same methodology as under existing and background traffic conditions. The heavy vehicle percentages have been increased in the Synchro model to account for an increase in trucks due to the aggregate pit.

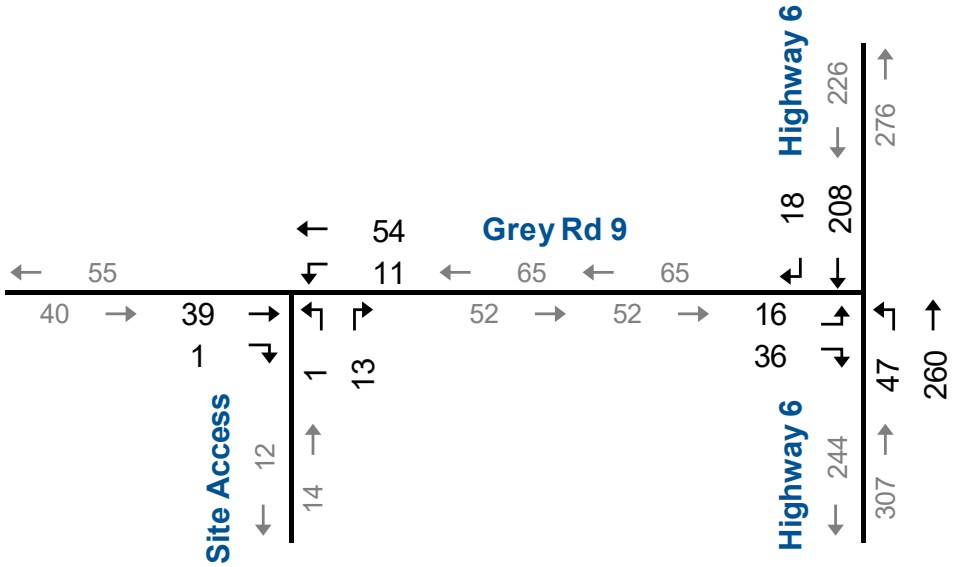
Table 4.2 summarizes the results of the 2024 total traffic operations, indicating that the study area intersections are forecast to operate with acceptable levels of service during the AM and PM peak hours.

Appendix D contains the supporting detailed Synchro 11 reports.

AM Peak Hour



PM Peak Hour



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2024 Total Traffic Volumes

311804 Highway 6 Mount Forest, ON TIS
230289

Figure 4.2

TABLE 4.2: 2024 TOTAL TRAFFIC OPERATIONS

Analysis Period	Intersection	Control Type	MOE	Direction/Movement/Approach																
				Eastbound				Westbound				Northbound				Southbound				Overall
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
AM Peak Hour	Site Access & Grey Rd 9	TWSC	LOS Delay V/C Q		A 0 0.00 0	> > > >	**A 0**	< < < <	A 8 0.01 0		**A 2**	A 10 0.02 0		> > > >	**A 10**					
	Highway 6 & Grey Rd 9	TWSC	LOS Delay V/C Q Stor. Avail.	B 11 0.11 3 - -		> > > > > >	**B 11**					A 8 0.03 1 100 99	A 0 0.00 0 - -		**A 1**		A 0 0.00 0 - -	> > > > > >	**A 0**	
PM Peak Hour	Site Access & Grey Rd 9	TWSC	LOS Delay V/C Q		A 0 0.00 0	> > > >	**A 0**	< < < <	A 8 0.01 0		**A 1**	A 9 0.02 1		> > > >	**A 9**					
	Highway 6 & Grey Rd 9	TWSC	LOS Delay V/C Q Stor. Avail.	B 12 0.10 2 - -		> > > > > >	**B 12**					A 8 0.04 1 100 99	A 0 0.00 0 - -		**A 1**		A 0 0.00 0 - -	> > > > > >	**A 0**	

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

4.3 2029 Horizon

4.3.1 2029 Background Traffic Operations

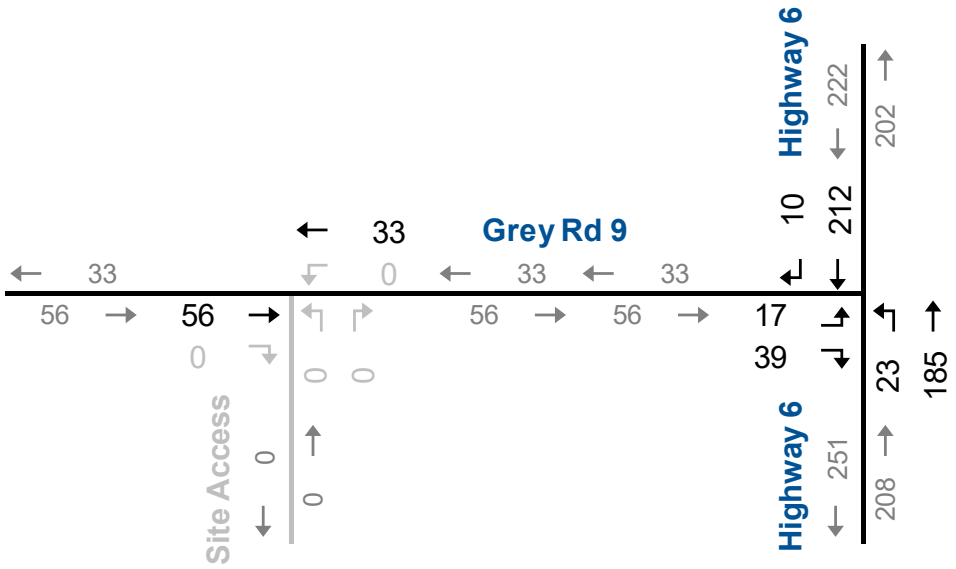
Figure 4.3 illustrates the 2029 background traffic volumes, including road traffic growth.

The 2029 background traffic volumes have been analyzed using the same methodology as under existing traffic conditions.

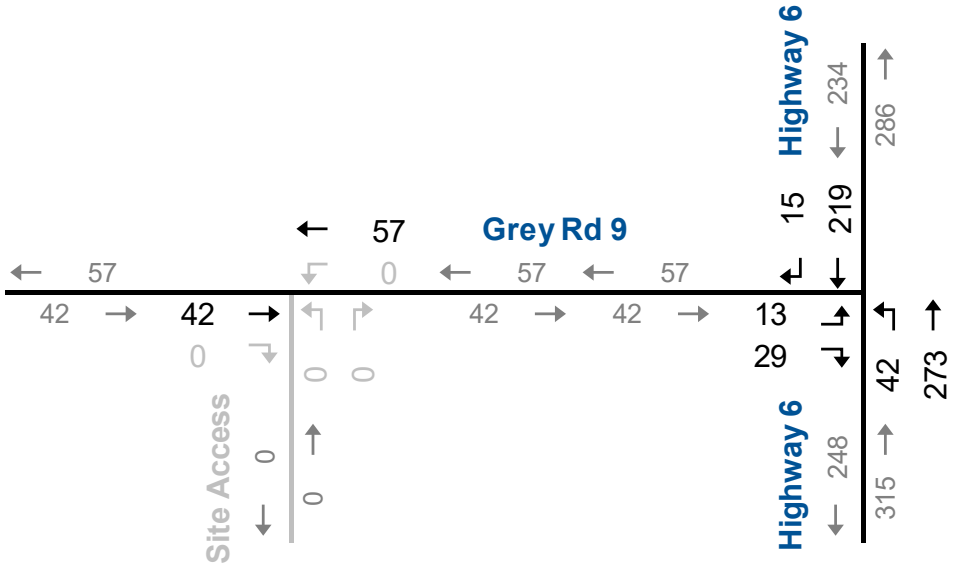
Table 4.3 summarizes the results of the 2029 background traffic operations, indicating that the intersection of Highway 6 and Grey Road 9 is forecast to operate with acceptable levels of service during the AM and PM peak hours.

Appendix E contains the supporting detailed Synchro 11 reports.

AM Peak Hour



PM Peak Hour



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2029 Background Traffic Volumes

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230289

Figure 4.3

TABLE 4.3: 2029 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	Highway 6 & Grey Rd 9	TWSC	LOS	B		>	**B**					A	A		**A**		A	>	**A**	
			Delay	11		>	**11**					8	0		**1**		0	>	**0**	
			V/C	0.10		>						0.02	0.00				0.00	>		
			Q	2		>						1	0				0	>		
			Stor.	-		>						100	-				-	>		
			Avail.	-		>						99	-				-	>		
PM Peak Hour	Highway 6 & Grey Rd 9	TWSC	LOS	B		>	**B**					A	A		**A**		A	>	**A**	
			Delay	12		>	**12**					8	0		**1**		0	>	**0**	
			V/C	0.08		>						0.04	0.00				0.00	>		
			Q	2		>						1	0				0	>		
			Stor.	-		>						100	-				-	>		
			Avail.	-		>						99	-				-	>		

MOE - Measure of Effectiveness
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Stor. - Existing Storage (m)
Avail. - Available Storage (m)
TWSC - Two-Way Stop Control
< / > - Shared with through movement

4.3.2 2029 Total Traffic Operations

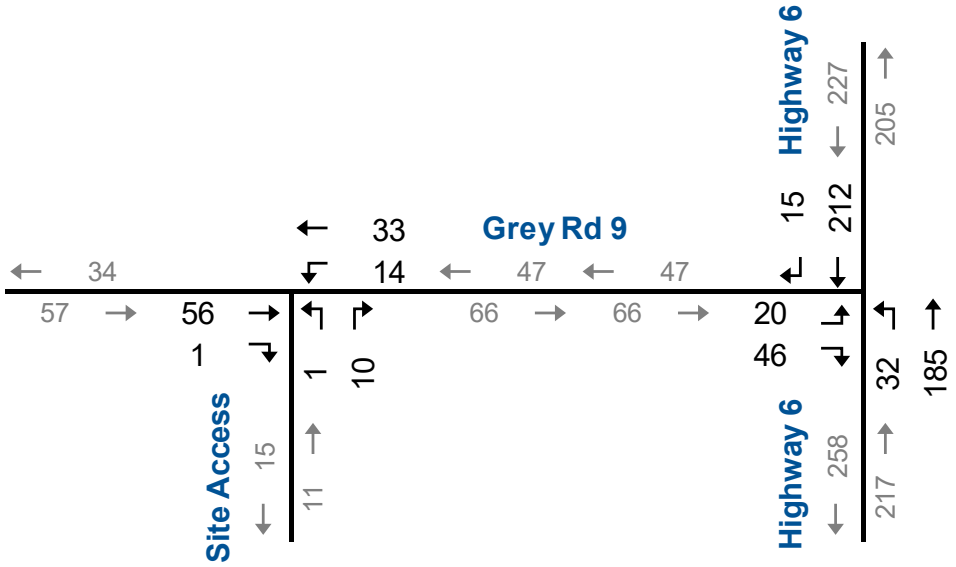
Figure 4.4 illustrates the 2029 total traffic volumes, including trips generated by the proposed development.

The 2029 total traffic volumes have been analyzed using the same methodology as under existing and background traffic conditions. The heavy vehicle percentages have been increased in the Synchro model to account for an increase in trucks due to the aggregate pit.

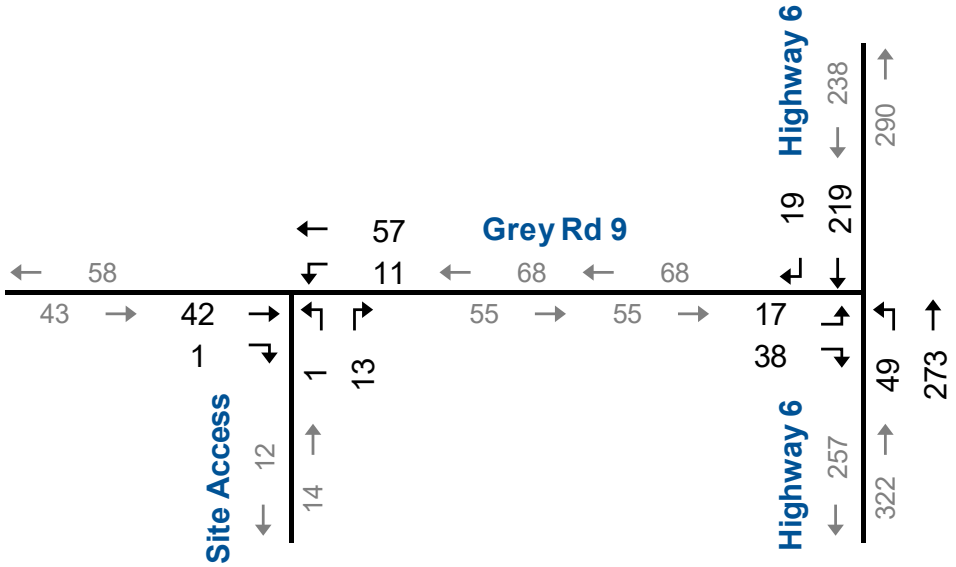
Table 4.4 summarizes the results of the 2029 total traffic operations, indicating that the study area intersections are forecast to operate with acceptable levels of service during the AM and PM peak hours.

Appendix F contains the supporting detailed Synchro 11 reports.

AM Peak Hour



PM Peak Hour



NTS

2029 Total Traffic Volumes

311804 Highway 6 Mount Forest, ON TIS
230289

Figure 4.4

TABLE 4.4: 2029 TOTAL TRAFFIC OPERATIONS

Analysis Period	Intersection	Control Type	MOE	Direction/Movement/Approach																
				Eastbound				Westbound				Northbound				Southbound				Overall
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
AM Peak Hour	Site Access & Grey Rd 9	TWSC	LOS Delay V/C Q		A 0 0.00 0	> > > >	**A 0**	< < < <	A 8 0.01 0		**A 2**	A 10 0.02 0		> > > >	**A 10**					
	Highway 6 & Grey Rd 9	TWSC	LOS Delay V/C Q Stor. Avail.	B 12 0.12 3 - -		> > > > > >	**B 12**					A 8 0.03 1 100 99	A 0 0.00 0 - -		**A 1**		A 0 0.00 0 - -	> > > > > >	**A 0**	
PM Peak Hour	Site Access & Grey Rd 9	TWSC	LOS Delay V/C Q		A 0 0.00 0	> > > >	**A 0**	< < < <	A 8 0.01 0		**A 1**	A 9 0.02 1		> > > >	**A 9**					
	Highway 6 & Grey Rd 9	TWSC	LOS Delay V/C Q Stor. Avail.	B 12 0.11 3 - -		> > > > > >	**B 12**					A 8 0.04 1 100 99	A 0 0.00 0 - -		**A 1**		A 0 0.00 0 - -	> > > > > >	**A 0**	

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

4.4 2034 Horizon

4.4.1 2034 Background Traffic Operations

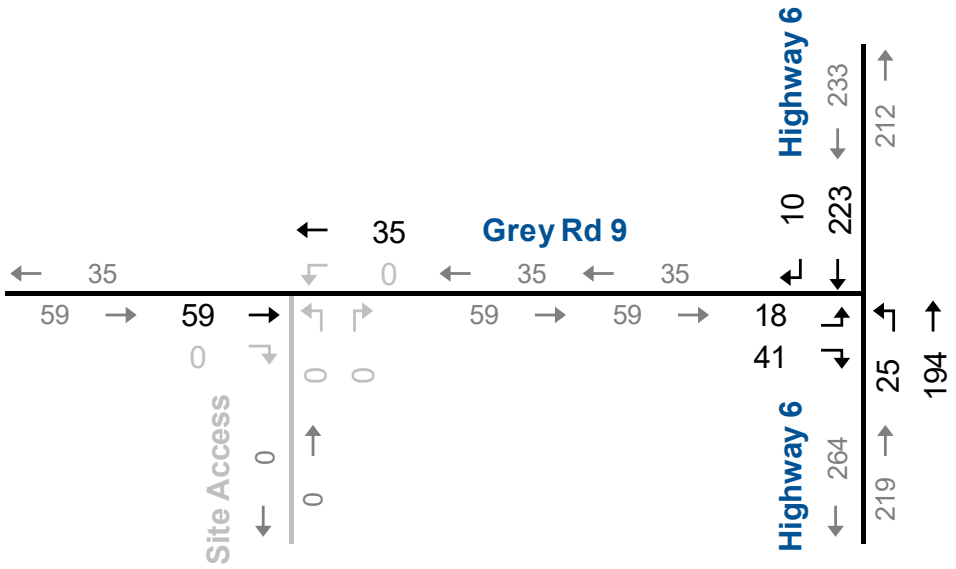
Figure 4.5 illustrates the 2034 background traffic volumes, including road traffic growth.

The 2034 background traffic volumes have been analyzed using the same methodology as under existing traffic conditions.

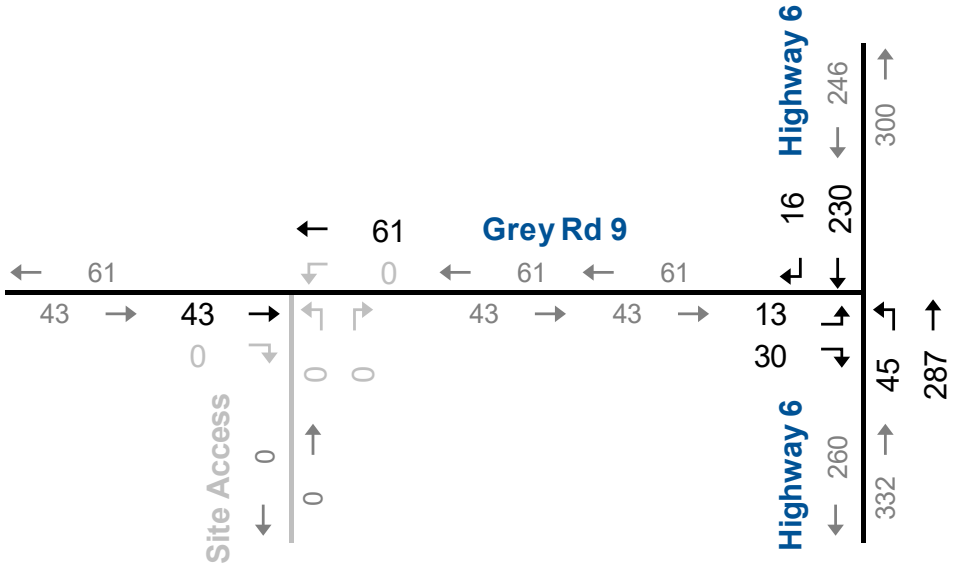
Table 4.5 summarizes the results of the 2034 background traffic operations, indicating that the intersection of Highway 6 and Grey Road 9 is forecast to operate with acceptable levels of service during the AM and PM peak hours.

Appendix G contains the supporting detailed Synchro 11 reports.

AM Peak Hour



PM Peak Hour



NTS

paradigm TRANSPORTATION SOLUTIONS LIMITED

2034 Background Traffic Volumes

311804 Highway 6 Mount Forest, ON TIS
230289

Figure 4.5

TABLE 4.5: 2034 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	Highway 6 & Grey Rd 9	TWSC	LOS	B		>	**B**					A	A		**A**		A	>	**A**	
			Delay	11		>	**11**					8	0		**1**		0	>	**0**	
			V/C	0.10		>						0.02	0.00				0.00	>		
			Q	2		>						1	0				0	>		
			Stor.	-		>						100	-				-	>		
			Avail.	-		>						99	-				-	>		
PM Peak Hour	Highway 6 & Grey Rd 9	TWSC	LOS	B		>	**B**					A	A		**A**		A	>	**A**	
			Delay	12		>	**12**					8	0		**1**		0	>	**0**	
			V/C	0.08		>						0.04	0.00				0.00	>		
			Q	2		>						1	0				0	>		
			Stor.	-		>						100	-				-	>		
			Avail.	-		>						99	-				-	>		

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

4.4.2 2034 Total Traffic Operations

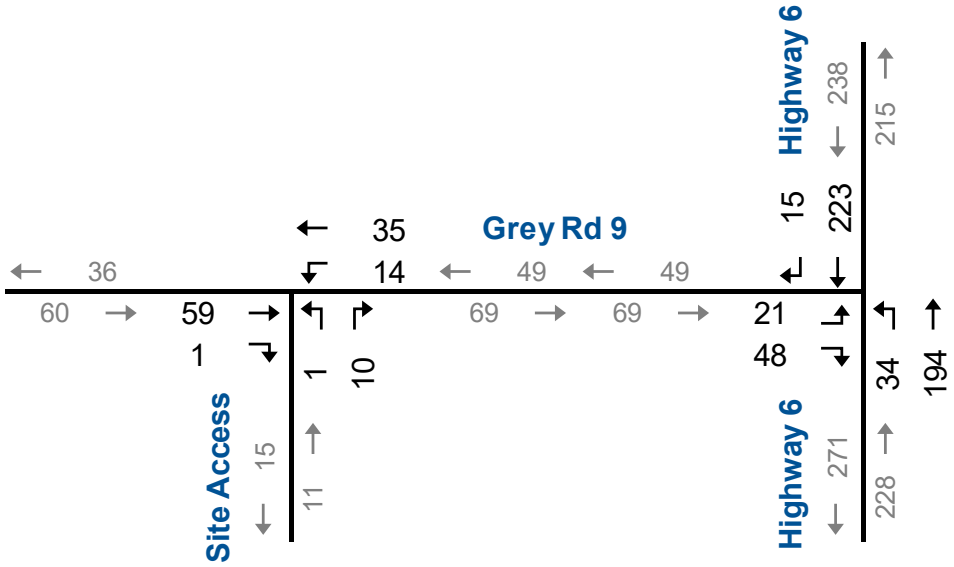
Figure 4.6 illustrates the 2034 total traffic volumes, including trips generated by the proposed development.

The 2034 total traffic volumes have been analyzed using the same methodology as under existing and background traffic conditions. The heavy vehicle percentages have been increased in the Synchro model to account for an increase in trucks due to the aggregate pit.

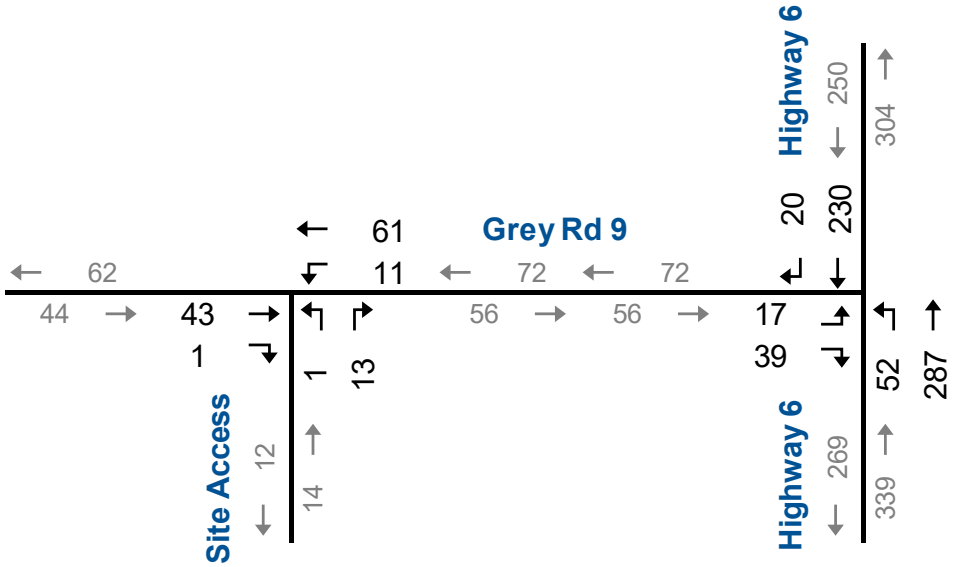
Table 4.6 summarizes the results of the 2034 total traffic operations, indicating that the study area intersections are forecast to operate with acceptable levels of service during the AM and PM peak hours.

Appendix H contains the supporting detailed Synchro 11 reports.

AM Peak Hour



PM Peak Hour



NTS

2034 Total Traffic Volumes

311804 Highway 6 Mount Forest, ON TIS
230289

Figure 4.6

TABLE 4.6: 2034 TOTAL TRAFFIC OPERATIONS

Analysis Period	Intersection	Control Type	MOE	Direction/Movement/Approach																
				Eastbound				Westbound				Northbound				Southbound				Overall
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
AM Peak Hour	Site Access & Grey Rd 9	TWSC	LOS Delay V/C Q		A 0 0.00 0	> > > >	**A 0**	< < < <	A 8 0.01 0		**A 2**	A 10 0.02 0		> > > >	**A 10**					
	Highway 6 & Grey Rd 9	TWSC	LOS Delay V/C Q Stor. Avail.	B 12 0.13 3 - -		> > > > > >	**B 12**					A 8 0.03 1 100 99	A 0 0.00 0 - -		**A 1**		A 0 0.00 0 - -	> > > > > >	**A 0**	
PM Peak Hour	Site Access & Grey Rd 9	TWSC	LOS Delay V/C Q		A 0 0.00 0	> > > >	**A 0**	< < < <	A 8 0.01 0		**A 1**	A 9 0.02 1		> > > >	**A 9**					
	Highway 6 & Grey Rd 9	TWSC	LOS Delay V/C Q Stor. Avail.	B 12 0.12 3 - -		> > > > > >	**B 12**					A 8 0.05 2 100 98	A 0 0.00 0 - -		**A 1**		A 0 0.00 0 - -	> > > > > >	**A 0**	

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

5 Remedial Measures

5.1 Signal Warrants

The intersections of Highway 6 and Grey Road 9 and the site access on Grey Road 9 have been assessed using the Ontario Traffic Manual (OTM) signal warrant guidelines[6] to determine if a change in traffic control is warranted.

As signal warrants do not account for the percentage of heavy vehicles, total traffic volumes have been converted to passenger car equivalents (PCE). Existing heavy vehicles on the roadway have been converted using a factor of 2 whereas trucks entering (empty) and exiting (loaded) have been converted using a factor of 1.5 and 2.5[7], respectively.

Based on the warrant analysis, traffic control signals are not warranted under forecast total traffic conditions.

Appendix I contains the warrant analysis worksheets.

5.2 Left-Turn Lanes

The Ministry of Transportation Design Supplement for the Transportation Association of Canada (TAC) Geometric Design Guide for Canadian Roads[8] provides guidance on the assessment and/or need for auxiliary left-turn lanes.

Warrants have been calculated for northbound left-turns at Highway 6 and Grey Road 9 and westbound left-turns at Grey Road 9 and the proposed site access. The warrants were calculated using the nomographs for left-turn lanes on a two-lane undivided highway at an unsignalized intersection with a design speed of 100 km/h (20 km/h over the posted speed limit).

The warrant nomographs do not account for the percentage of heavy vehicles; therefore, total traffic volumes have been converted to PCE's as discussed for the signal warrants above.

The warrant nomograph is used to determine if a left-turn lane is needed based on criteria such as design speed, advancing volume, opposing volume and percent of advancing vehicles performing a left-

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6 Ontario Ministry of Transportation, *Ontario Traffic Manual Book 12: Traffic Signals*, (Toronto: Queen's Printer for Ontario, 2012).

7 Institute of Transportation Engineers, *Canadian Capacity Guide*, February 2008.

8 *MTO Design Supplement for TAC Geometric Design Guide for Canadian Roads*, June 2017.

turn maneuver. A minimum threshold of greater than 100 vehicles per hour (vph) opposing vehicles are used in assessing the requirement of a left-turn lane. Based on this criterion, a westbound left-turn lane is not warranted on Grey Road 9 at the proposed site access.

The Highway 6 and Grey Road 9 traffic volumes meet the minimum threshold identified above. Based on warrant nomographs, a northbound left-turn lane with 15 metres of storage is warranted on Highway 6 at Grey Road 9 under 2024, 2029 and 2034 background and total traffic conditions. A northbound left-turn lane with 100 metres of storage is currently provided and exceeds the storage warranted.

Appendix J contains the warrant nomographs.

6 Conclusions and Recommendations

6.1 Conclusions

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

- **Existing Traffic Conditions:** The intersection of Highway 6 and Grey Road 9 is operating with acceptable levels of service.
- **Aggregate Pit:**
  - **Trip Generation:** The operations are forecast to generate 26 AM peak hour trips and 26 PM peak hour trips, including 20 truck trips and 6 employee trips during each peak hour.
  - **Site Access Location:** The location of the site access on Grey Road 9 has a clear line of sight in either direction. As per MTO requirements, the site access should be relocated an additional 100 metres west of the proposed location to provide 400 metres of separation from Highway 6.
- **Background Traffic Conditions:** The intersection of Highway 6 and Grey Road 9 is forecast to operate with acceptable levels of service under 2024, 2029 and 2034 traffic conditions.
- **Total Traffic Conditions:** The intersection of Highway 6 and Grey Road 9, and the proposed site access on Grey Road 9 are forecast to operate with acceptable levels of service under 2024, 2029 and 2034 traffic conditions.
- **Remedial Measures:**
  - **Signal Warrants:** Traffic control signals are not warranted at either Highway 6 and Grey Road 9 or the site access on Grey Road 9 under future traffic conditions.
  - **Left-Turn Lanes:**
    - The existing northbound left-turn lane storage of 100 metres on Highway 6 at Grey Road 9 exceeds the warranted storage of 15 metres under 2024, 2029 and 2034 background and total traffic conditions.
    - A westbound left-turn lane is not warranted on Grey Road 9 and the proposed site access under total traffic conditions.

6.2 Recommendations

Based on the findings of this study, it is recommended that the site access on Grey Road 9 be located 400 metres west of Highway 6 and the operations be considered for approval.

Appendix A

Existing Traffic Data

Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

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

Count Name: Highway 6 & Grey Road 9
Site Code: 230289
Start Date: 06/06/2023

Turning Movement Data

Start Time	Grey Road 9 Eastbound					Highway 6 Northbound					Highway 6 Southbound					
	Left	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Int. Total
7:00 AM	1	10	0	0	11	6	32	0	0	38	42	0	0	0	42	91
7:15 AM	9	3	0	0	12	3	40	0	0	43	39	1	0	0	40	95
7:30 AM	4	10	0	0	14	5	41	0	0	46	45	0	0	0	45	105
7:45 AM	3	12	0	0	15	9	52	0	0	61	64	6	0	0	70	146
Hourly Total	17	35	0	0	52	23	165	0	0	188	190	7	0	0	197	437
8:00 AM	6	5	0	0	11	4	34	0	0	38	40	3	0	0	43	92
8:15 AM	3	10	0	0	13	4	47	0	0	51	51	0	0	0	51	115
8:30 AM	4	9	0	0	13	0	32	0	0	32	47	3	0	0	50	95
8:45 AM	4	2	0	0	6	3	35	1	0	39	52	0	0	0	52	97
Hourly Total	17	26	0	0	43	11	148	1	0	160	190	6	0	0	196	399
9:00 AM	3	4	0	0	7	6	36	0	0	42	43	1	0	0	44	93
9:15 AM	3	6	0	0	9	9	46	0	0	55	46	2	0	0	48	112
9:30 AM	3	7	0	0	10	8	35	0	0	43	64	3	0	0	67	120
9:45 AM	2	7	0	0	9	5	40	0	0	45	44	1	0	0	45	99
Hourly Total	11	24	0	0	35	28	157	0	0	185	197	7	0	0	204	424
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11:30 AM	0	5	0	0	5	6	27	0	0	33	45	3	0	0	48	86
11:45 AM	3	8	0	0	11	5	43	0	0	48	48	4	0	0	52	111
Hourly Total	3	13	0	0	16	11	70	0	0	81	93	7	0	0	100	197
12:00 PM	0	6	0	0	6	12	41	0	0	53	46	0	0	0	46	105
12:15 PM	1	4	0	0	5	7	29	0	0	36	37	2	0	0	39	80
12:30 PM	3	5	0	0	8	4	48	0	0	52	43	2	0	0	45	105
12:45 PM	1	6	0	0	7	4	33	0	0	37	45	6	0	0	51	95
Hourly Total	5	21	0	0	26	27	151	0	0	178	171	10	0	0	181	385
1:00 PM	3	7	0	0	10	4	32	0	0	36	36	0	0	0	36	82
1:15 PM	1	8	0	0	9	7	40	0	0	47	39	5	0	0	44	100
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	4	15	0	0	19	11	72	0	0	83	75	5	0	0	80	182
3:00 PM	2	10	0	0	12	12	49	0	0	61	54	3	0	0	57	130
3:15 PM	1	4	0	0	5	11	65	0	0	76	57	3	0	0	60	141
3:30 PM	3	7	0	0	10	7	64	0	0	71	47	2	0	0	49	130
3:45 PM	3	5	0	0	8	6	68	0	0	74	41	1	0	0	42	124
Hourly Total	9	26	0	0	35	36	246	0	0	282	199	9	0	0	208	525
4:00 PM	2	9	0	0	11	8	67	0	0	75	42	4	0	0	46	132
4:15 PM	3	6	0	0	9	9	58	0	0	67	49	4	0	0	53	129
4:30 PM	2	4	0	0	6	13	73	0	0	86	46	6	0	0	52	144

4:45 PM	5	8	0	0	13	10	59	0	0	69	69	0	0	0	69	151
Hourly Total	12	27	0	0	39	40	257	0	0	297	206	14	0	0	220	556
5:00 PM	6	7	0	0	13	10	61	0	0	71	40	2	0	0	42	126
5:15 PM	3	7	0	0	10	11	58	0	0	69	44	1	0	0	45	124
5:30 PM	3	8	0	0	11	7	78	0	0	85	45	5	0	0	50	146
5:45 PM	4	8	0	0	12	5	55	0	0	60	41	4	0	0	45	117
Hourly Total	16	30	0	0	46	33	252	0	0	285	170	12	0	0	182	513
Grand Total	94	217	0	0	311	220	1518	1	0	1739	1491	77	0	0	1568	3618
Approach %	30.2	69.8	0.0	-	-	12.7	87.3	0.1	-	-	95.1	4.9	0.0	-	-	-
Total %	2.6	6.0	0.0	-	8.6	6.1	42.0	0.0	-	48.1	41.2	2.1	0.0	-	43.3	-
Motorcycles	0	1	0	-	1	3	17	0	-	20	17	0	0	-	17	38
% Motorcycles	0.0	0.5	-	-	0.3	1.4	1.1	0.0	-	1.2	1.1	0.0	-	-	1.1	1.1
Cars & Light Goods	84	185	0	-	269	190	1325	1	-	1516	1288	69	0	-	1357	3142
% Cars & Light Goods	89.4	85.3	-	-	86.5	86.4	87.3	100.0	-	87.2	86.4	89.6	-	-	86.5	86.8
Buses	0	1	0	-	1	2	7	0	-	9	10	0	0	-	10	20
% Buses	0.0	0.5	-	-	0.3	0.9	0.5	0.0	-	0.5	0.7	0.0	-	-	0.6	0.6
Single-Unit Trucks	7	21	0	-	28	16	76	0	-	92	84	7	0	-	91	211
% Single-Unit Trucks	7.4	9.7	-	-	9.0	7.3	5.0	0.0	-	5.3	5.6	9.1	-	-	5.8	5.8
Articulated Trucks	3	9	0	-	12	9	93	0	-	102	92	1	0	-	93	207
% Articulated Trucks	3.2	4.1	-	-	3.9	4.1	6.1	0.0	-	5.9	6.2	1.3	-	-	5.9	5.7
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
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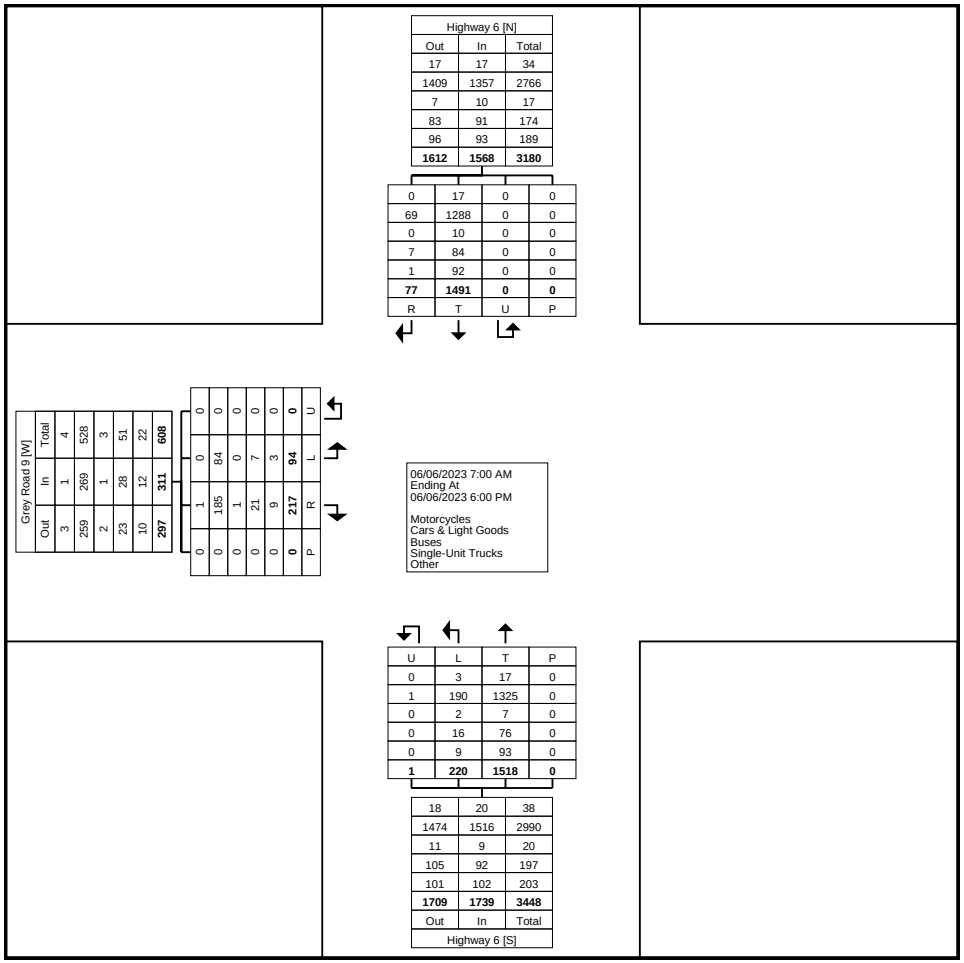
Start Date: 06/06/2023



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: Highway 6 & Grey Road 9
Site Code: 230289
Start Date: 06/06/2023

Turning Movement Peak Hour Data (7:30 AM)

Start Time	Grey Road 9 Eastbound					Highway 6 Northbound					Highway 6 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	4	10	0	0	14	5	41	0	0	46	45	0	0	0	45	105
7:45 AM	3	12	0	0	15	9	52	0	0	61	64	6	0	0	70	146
8:00 AM	6	5	0	0	11	4	34	0	0	38	40	3	0	0	43	92
8:15 AM	3	10	0	0	13	4	47	0	0	51	51	0	0	0	51	115
Total	16	37	0	0	53	22	174	0	0	196	200	9	0	0	209	458
Approach %	30.2	69.8	0.0	-	-	11.2	88.8	0.0	-	-	95.7	4.3	0.0	-	-	-
Total %	3.5	8.1	0.0	-	11.6	4.8	38.0	0.0	-	42.8	43.7	2.0	0.0	-	45.6	-
PHF	0.667	0.771	0.000	-	0.883	0.611	0.837	0.000	-	0.803	0.781	0.375	0.000	-	0.746	0.784
Motorcycles	0	0	0	-	0	0	1	0	-	1	0	0	0	-	0	1
% Motorcycles	0.0	0.0	-	-	0.0	0.0	0.6	-	-	0.5	0.0	0.0	-	-	0.0	0.2
Cars & Light Goods	16	32	0	-	48	19	143	0	-	162	174	7	0	-	181	391
% Cars & Light Goods	100.0	86.5	-	-	90.6	86.4	82.2	-	-	82.7	87.0	77.8	-	-	86.6	85.4
Buses	0	1	0	-	1	0	1	0	-	1	2	0	0	-	2	4
% Buses	0.0	2.7	-	-	1.9	0.0	0.6	-	-	0.5	1.0	0.0	-	-	1.0	0.9
Single-Unit Trucks	0	3	0	-	3	2	16	0	-	18	12	2	0	-	14	35
% Single-Unit Trucks	0.0	8.1	-	-	5.7	9.1	9.2	-	-	9.2	6.0	22.2	-	-	6.7	7.6
Articulated Trucks	0	1	0	-	1	1	13	0	-	14	12	0	0	-	12	27
% Articulated Trucks	0.0	2.7	-	-	1.9	4.5	7.5	-	-	7.1	6.0	0.0	-	-	5.7	5.9
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
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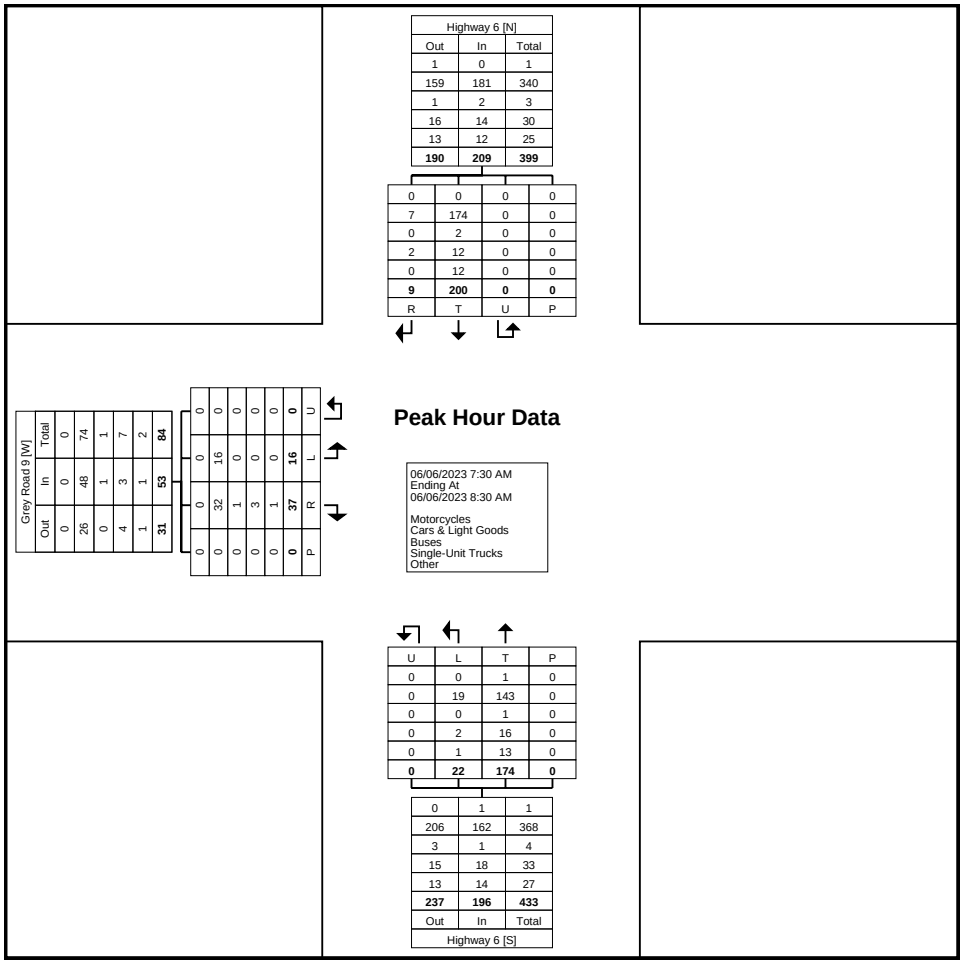
Count Name: Highway 6 & Grey Road 9
Site Code: 230289
Start Date: 06/06/2023



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: Highway 6 & Grey Road 9
Site Code: 230289
Start Date: 06/06/2023

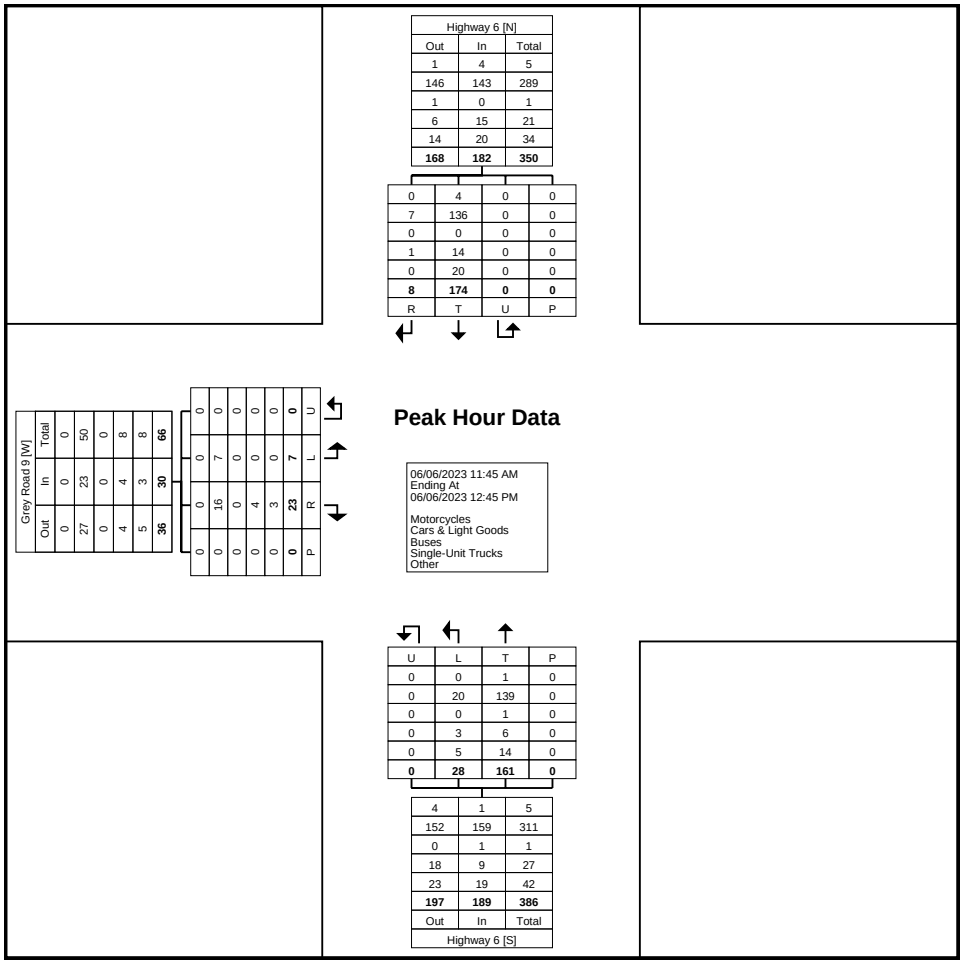
Turning Movement Peak Hour Data (11:45 AM)

Start Time	Grey Road 9 Eastbound					Highway 6 Northbound					Highway 6 Southbound					
	Left	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Int. Total
11:45 AM	3	8	0	0	11	5	43	0	0	48	48	4	0	0	52	111
12:00 PM	0	6	0	0	6	12	41	0	0	53	46	0	0	0	46	105
12:15 PM	1	4	0	0	5	7	29	0	0	36	37	2	0	0	39	80
12:30 PM	3	5	0	0	8	4	48	0	0	52	43	2	0	0	45	105
Total	7	23	0	0	30	28	161	0	0	189	174	8	0	0	182	401
Approach %	23.3	76.7	0.0	-	-	14.8	85.2	0.0	-	-	95.6	4.4	0.0	-	-	-
Total %	1.7	5.7	0.0	-	7.5	7.0	40.1	0.0	-	47.1	43.4	2.0	0.0	-	45.4	-
PHF	0.583	0.719	0.000	-	0.682	0.583	0.839	0.000	-	0.892	0.906	0.500	0.000	-	0.875	0.903
Motorcycles	0	0	0	-	0	0	1	0	-	1	4	0	0	-	4	5
% Motorcycles	0.0	0.0	-	-	0.0	0.0	0.6	-	-	0.5	2.3	0.0	-	-	2.2	1.2
Cars & Light Goods	7	16	0	-	23	20	139	0	-	159	136	7	0	-	143	325
% Cars & Light Goods	100.0	69.6	-	-	76.7	71.4	86.3	-	-	84.1	78.2	87.5	-	-	78.6	81.0
Buses	0	0	0	-	0	0	1	0	-	1	0	0	0	-	0	1
% Buses	0.0	0.0	-	-	0.0	0.0	0.6	-	-	0.5	0.0	0.0	-	-	0.0	0.2
Single-Unit Trucks	0	4	0	-	4	3	6	0	-	9	14	1	0	-	15	28
% Single-Unit Trucks	0.0	17.4	-	-	13.3	10.7	3.7	-	-	4.8	8.0	12.5	-	-	8.2	7.0
Articulated Trucks	0	3	0	-	3	5	14	0	-	19	20	0	0	-	20	42
% Articulated Trucks	0.0	13.0	-	-	10.0	17.9	8.7	-	-	10.1	11.5	0.0	-	-	11.0	10.5
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: Highway 6 & Grey Road 9
Site Code: 230289
Start Date: 06/06/2023



Turning Movement Peak Hour Data Plot (11:45 AM)

Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

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

Count Name: Highway 6 & Grey Road 9
Site Code: 230289
Start Date: 06/06/2023

Turning Movement Peak Hour Data (4:00 PM)

Start Time	Grey Road 9 Eastbound					Highway 6 Northbound					Highway 6 Southbound					
	Left	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Int. Total
4:00 PM	2	9	0	0	11	8	67	0	0	75	42	4	0	0	46	132
4:15 PM	3	6	0	0	9	9	58	0	0	67	49	4	0	0	53	129
4:30 PM	2	4	0	0	6	13	73	0	0	86	46	6	0	0	52	144
4:45 PM	5	8	0	0	13	10	59	0	0	69	69	0	0	0	69	151
Total	12	27	0	0	39	40	257	0	0	297	206	14	0	0	220	556
Approach %	30.8	69.2	0.0	-	-	13.5	86.5	0.0	-	-	93.6	6.4	0.0	-	-	-
Total %	2.2	4.9	0.0	-	7.0	7.2	46.2	0.0	-	53.4	37.1	2.5	0.0	-	39.6	-
PHF	0.600	0.750	0.000	-	0.750	0.769	0.880	0.000	-	0.863	0.746	0.583	0.000	-	0.797	0.921
Motorcycles	0	0	0	-	0	0	4	0	-	4	3	0	0	-	3	7
% Motorcycles	0.0	0.0	-	-	0.0	0.0	1.6	-	-	1.3	1.5	0.0	-	-	1.4	1.3
Cars & Light Goods	11	24	0	-	35	40	237	0	-	277	189	13	0	-	202	514
% Cars & Light Goods	91.7	88.9	-	-	89.7	100.0	92.2	-	-	93.3	91.7	92.9	-	-	91.8	92.4
Buses	0	0	0	-	0	0	0	0	-	0	2	0	0	-	2	2
% Buses	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	1.0	0.0	-	-	0.9	0.4
Single-Unit Trucks	0	2	0	-	2	0	9	0	-	9	5	1	0	-	6	17
% Single-Unit Trucks	0.0	7.4	-	-	5.1	0.0	3.5	-	-	3.0	2.4	7.1	-	-	2.7	3.1
Articulated Trucks	1	1	0	-	2	0	7	0	-	7	7	0	0	-	7	16
% Articulated Trucks	8.3	3.7	-	-	5.1	0.0	2.7	-	-	2.4	3.4	0.0	-	-	3.2	2.9
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

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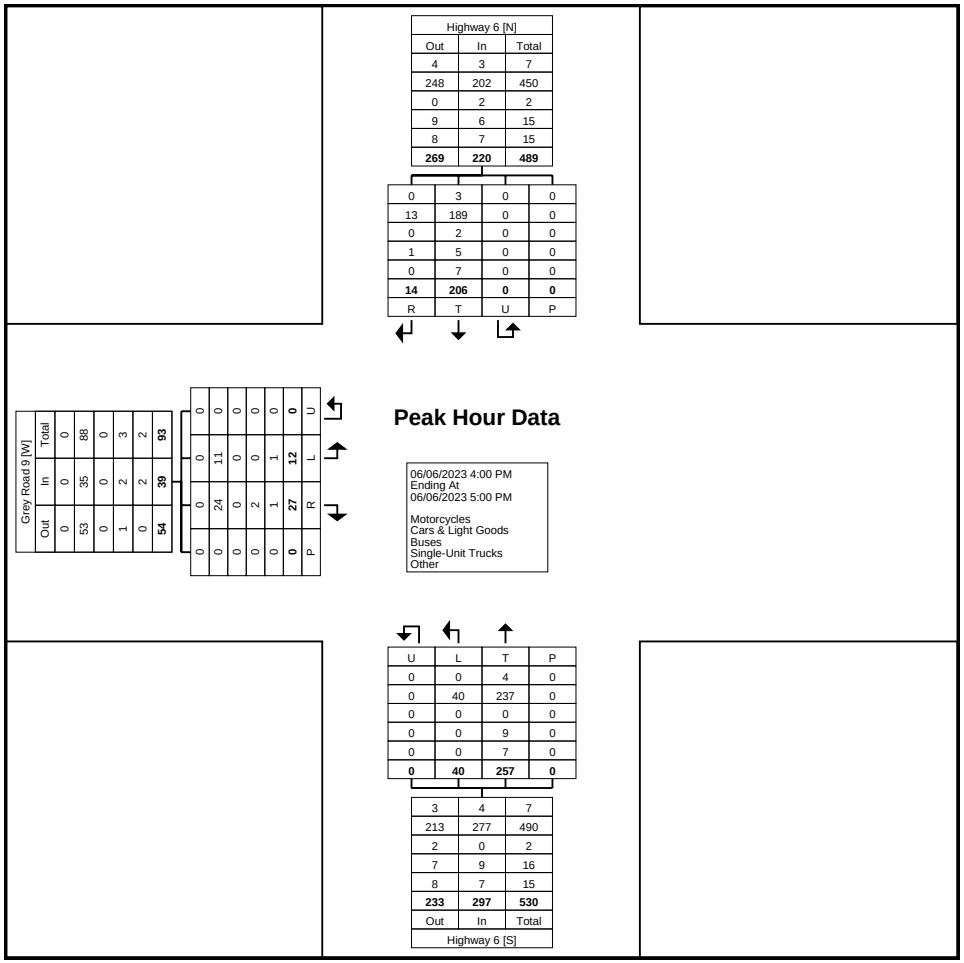
Count Name: Highway 6 & Grey Road 9
Site Code: 230289
Start Date: 06/06/2023



Turning Movement Peak Hour Data Plot (4:00 PM)

Appendix B

Existing Traffic Operations Reports

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	16	37	22	174	200	9
Future Volume (vph)	16	37	22	174	200	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	100.0			0.0
Storage Lanes	1	0	1			0
Taper Length (m)	7.5		100.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.905				0.994	
Flt Protected	0.985		0.950			
Satd. Flow (prot)	1543	0	1583	1624	1666	0
Flt Permitted	0.985		0.950			
Satd. Flow (perm)	1543	0	1583	1624	1666	0
Link Speed (k/h)	80			80	80	
Link Distance (m)	516.7			360.0	304.4	
Travel Time (s)	23.3			16.2	13.7	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	0%	14%	14%	17%	13%	22%
Adj. Flow (vph)	18	42	25	198	227	10
Shared Lane Traffic (%)						
Lane Group Flow (vph)	60	0	25	198	237	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			3.6	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 27.7%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	1.6

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	16	37	22	174	200	9
Future Vol, veh/h	16	37	22	174	200	9
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	-	100	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	0	14	14	17	13	22
Mvmt Flow	18	42	25	198	227	10

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	480	232	237	0	-	0
Stage 1	232	-	-	-	-	-
Stage 2	248	-	-	-	-	-
Critical Hdwy	6.4	6.34	4.24	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.426	2.326	-	-	-
Pot Cap-1 Maneuver	548	778	1263	-	-	-
Stage 1	811	-	-	-	-	-
Stage 2	798	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	537	778	1263	-	-	-
Mov Cap-2 Maneuver	537	-	-	-	-	-
Stage 1	795	-	-	-	-	-
Stage 2	798	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.8	0.9	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1263	-	685	-	-
HCM Lane V/C Ratio	0.02	-	0.088	-	-
HCM Control Delay (s)	7.9	-	10.8	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.3	-	-

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	12	27	40	257	206	14
Future Volume (vph)	12	27	40	257	206	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	100.0			0.0
Storage Lanes	1	0	1			0
Taper Length (m)	7.5		100.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.907				0.991	
Flt Protected	0.985		0.950			
Satd. Flow (prot)	1542	0	1805	1792	1760	0
Flt Permitted	0.985		0.950			
Satd. Flow (perm)	1542	0	1805	1792	1760	0
Link Speed (k/h)	80			80	80	
Link Distance (m)	516.7			360.0	304.4	
Travel Time (s)	23.3			16.2	13.7	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	8%	11%	0%	6%	7%	7%
Adj. Flow (vph)	14	31	45	292	234	16
Shared Lane Traffic (%)						
Lane Group Flow (vph)	45	0	45	292	250	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			3.6	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	28.4%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection	
Int Delay, s/veh	1.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	12	27	40	257	206	14
Future Vol, veh/h	12	27	40	257	206	14
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	-	100	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	8	11	0	6	7	7
Mvmt Flow	14	31	45	292	234	16

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	624	242	250	0	-	0
Stage 1	242	-	-	-	-	-
Stage 2	382	-	-	-	-	-
Critical Hdwy	6.48	6.31	4.1	-	-	-
Critical Hdwy Stg 1	5.48	-	-	-	-	-
Critical Hdwy Stg 2	5.48	-	-	-	-	-
Follow-up Hdwy	3.572	3.399	2.2	-	-	-
Pot Cap-1 Maneuver	440	775	1327	-	-	-
Stage 1	784	-	-	-	-	-
Stage 2	677	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	425	775	1327	-	-	-
Mov Cap-2 Maneuver	425	-	-	-	-	-
Stage 1	757	-	-	-	-	-
Stage 2	677	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.3	1.1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1327	-	618	-	-
HCM Lane V/C Ratio	0.034	-	0.072	-	-
HCM Control Delay (s)	7.8	-	11.3	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.2	-	-

Appendix C

2024 Background Traffic Operations Reports

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	16	37	22	176	202	9
Future Volume (vph)	16	37	22	176	202	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	100.0			0.0
Storage Lanes	1	0	1			0
Taper Length (m)	7.5		100.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.905				0.994	
Flt Protected	0.985		0.950			
Satd. Flow (prot)	1543	0	1583	1624	1666	0
Flt Permitted	0.985		0.950			
Satd. Flow (perm)	1543	0	1583	1624	1666	0
Link Speed (k/h)	80			80	80	
Link Distance (m)	516.7			360.0	304.4	
Travel Time (s)	23.3			16.2	13.7	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	0%	14%	14%	17%	13%	22%
Adj. Flow (vph)	18	42	25	200	230	10
Shared Lane Traffic (%)						
Lane Group Flow (vph)	60	0	25	200	240	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			3.6	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	27.8%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection	
Int Delay, s/veh	1.6

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	16	37	22	176	202	9
Future Vol, veh/h	16	37	22	176	202	9
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	-	100	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	0	14	14	17	13	22
Mvmt Flow	18	42	25	200	230	10

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	485	235	240	0	-	0
Stage 1	235	-	-	-	-	-
Stage 2	250	-	-	-	-	-
Critical Hdwy	6.4	6.34	4.24	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.426	2.326	-	-	-
Pot Cap-1 Maneuver	545	775	1259	-	-	-
Stage 1	809	-	-	-	-	-
Stage 2	796	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	534	775	1259	-	-	-
Mov Cap-2 Maneuver	534	-	-	-	-	-
Stage 1	793	-	-	-	-	-
Stage 2	796	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.8	0.9	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1259	-	682	-	-
HCM Lane V/C Ratio	0.02	-	0.088	-	-
HCM Control Delay (s)	7.9	-	10.8	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.3	-	-

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	12	27	40	260	208	14
Future Volume (vph)	12	27	40	260	208	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	100.0			0.0
Storage Lanes	1	0	1			0
Taper Length (m)	7.5		100.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.907				0.991	
Flt Protected	0.985		0.950			
Satd. Flow (prot)	1542	0	1805	1792	1760	0
Flt Permitted	0.985		0.950			
Satd. Flow (perm)	1542	0	1805	1792	1760	0
Link Speed (k/h)	80			80	80	
Link Distance (m)	516.7			360.0	304.4	
Travel Time (s)	23.3			16.2	13.7	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	8%	11%	0%	6%	7%	7%
Adj. Flow (vph)	14	31	45	295	236	16
Shared Lane Traffic (%)						
Lane Group Flow (vph)	45	0	45	295	252	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			3.6	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	28.5%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection	
Int Delay, s/veh	1.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	12	27	40	260	208	14
Future Vol, veh/h	12	27	40	260	208	14
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	-	100	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	8	11	0	6	7	7
Mvmt Flow	14	31	45	295	236	16

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	629	244	252	0	-	0
Stage 1	244	-	-	-	-	-
Stage 2	385	-	-	-	-	-
Critical Hdwy	6.48	6.31	4.1	-	-	-
Critical Hdwy Stg 1	5.48	-	-	-	-	-
Critical Hdwy Stg 2	5.48	-	-	-	-	-
Follow-up Hdwy	3.572	3.399	2.2	-	-	-
Pot Cap-1 Maneuver	437	773	1325	-	-	-
Stage 1	783	-	-	-	-	-
Stage 2	675	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	422	773	1325	-	-	-
Mov Cap-2 Maneuver	422	-	-	-	-	-
Stage 1	756	-	-	-	-	-
Stage 2	675	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.3	1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1325	-	615	-	-
HCM Lane V/C Ratio	0.034	-	0.072	-	-
HCM Control Delay (s)	7.8	-	11.3	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.2	-	-

Appendix D

2024 Total Traffic Operations Reports

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	53	1	14	31	1	10
Future Volume (vph)	53	1	14	31	1	10
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	0.998				0.876	
Flt Protected				0.985	0.996	
Satd. Flow (prot)	1716	0	0	1428	869	0
Flt Permitted				0.985	0.996	
Satd. Flow (perm)	1716	0	0	1428	869	0
Link Speed (k/h)	80			80	50	
Link Distance (m)	137.9			378.8	133.5	
Travel Time (s)	6.2			17.0	9.6	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	9%	100%	64%	16%	100%	90%
Adj. Flow (vph)	60	1	16	35	1	11
Shared Lane Traffic (%)						
Lane Group Flow (vph)	61	0	0	51	12	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)		100	100		100	100
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	19.1%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection	
Int Delay, s/veh	2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	53	1	14	31	1	10
Future Vol, veh/h	53	1	14	31	1	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	9	100	64	16	100	90
Mvmt Flow	60	1	16	35	1	11

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	61	0	128	61
Stage 1	-	-	-	-	61	-
Stage 2	-	-	-	-	67	-
Critical Hdwy	-	-	4.74	-	7.4	7.1
Critical Hdwy Stg 1	-	-	-	-	6.4	-
Critical Hdwy Stg 2	-	-	-	-	6.4	-
Follow-up Hdwy	-	-	2.776	-	4.4	4.11
Pot Cap-1 Maneuver	-	-	1225	-	679	804
Stage 1	-	-	-	-	762	-
Stage 2	-	-	-	-	756	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1225	-	670	804
Mov Cap-2 Maneuver	-	-	-	-	670	-
Stage 1	-	-	-	-	762	-
Stage 2	-	-	-	-	746	-

Approach	EB	WB	NB
HCM Control Delay, s	0	2.5	9.6
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	790	-	-	1225	-
HCM Lane V/C Ratio	0.016	-	-	0.013	-
HCM Control Delay (s)	9.6	-	-	8	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	0	-

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	19	44	31	176	202	14
Future Volume (vph)	19	44	31	176	202	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	100.0			0.0
Storage Lanes	1	0	1			0
Taper Length (m)	7.5		100.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.906				0.991	
Flt Protected	0.985		0.950			
Satd. Flow (prot)	1387	0	1399	1624	1645	0
Flt Permitted	0.985		0.950			
Satd. Flow (perm)	1387	0	1399	1624	1645	0
Link Speed (k/h)	80			80	80	
Link Distance (m)	378.8			360.0	304.4	
Travel Time (s)	17.0			16.2	13.7	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	16%	25%	29%	17%	13%	36%
Adj. Flow (vph)	22	50	35	200	230	16
Shared Lane Traffic (%)						
Lane Group Flow (vph)	72	0	35	200	246	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			3.6	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	28.6%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection	
Int Delay, s/veh	2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	19	44	31	176	202	14
Future Vol, veh/h	19	44	31	176	202	14
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	-	100	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	16	25	29	17	13	36
Mvmt Flow	22	50	35	200	230	16

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	508	238	246	0	-	0
Stage 1	238	-	-	-	-	-
Stage 2	270	-	-	-	-	-
Critical Hdwy	6.56	6.45	4.39	-	-	-
Critical Hdwy Stg 1	5.56	-	-	-	-	-
Critical Hdwy Stg 2	5.56	-	-	-	-	-
Follow-up Hdwy	3.644	3.525	2.461	-	-	-
Pot Cap-1 Maneuver	501	747	1177	-	-	-
Stage 1	770	-	-	-	-	-
Stage 2	744	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	486	747	1177	-	-	-
Mov Cap-2 Maneuver	486	-	-	-	-	-
Stage 1	747	-	-	-	-	-
Stage 2	744	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.3	1.2	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1177	-	643	-	-
HCM Lane V/C Ratio	0.03	-	0.111	-	-
HCM Control Delay (s)	8.2	-	11.3	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.4	-	-

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	39	1	11	54	1	13
Future Volume (vph)	39	1	11	54	1	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	0.997				0.873	
Flt Protected				0.991	0.997	
Satd. Flow (prot)	1691	0	0	1622	967	0
Flt Permitted				0.991	0.997	
Satd. Flow (perm)	1691	0	0	1622	967	0
Link Speed (k/h)	80			80	50	
Link Distance (m)	137.9			378.8	133.5	
Travel Time (s)	6.2			17.0	9.6	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	10%	100%	82%	2%	100%	69%
Adj. Flow (vph)	44	1	13	61	1	15
Shared Lane Traffic (%)						
Lane Group Flow (vph)	45	0	0	74	16	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)		15	25		25	15
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	20.1%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection	
Int Delay, s/veh	1.9

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	39	1	11	54	1	13
Future Vol, veh/h	39	1	11	54	1	13
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	10	100	82	2	100	69
Mvmt Flow	44	1	13	61	1	15

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	45	0	132	45
Stage 1	-	-	-	-	45	-
Stage 2	-	-	-	-	87	-
Critical Hdwy	-	-	4.92	-	7.4	6.89
Critical Hdwy Stg 1	-	-	-	-	6.4	-
Critical Hdwy Stg 2	-	-	-	-	6.4	-
Follow-up Hdwy	-	-	2.938	-	4.4	3.921
Pot Cap-1 Maneuver	-	-	1174	-	675	863
Stage 1	-	-	-	-	776	-
Stage 2	-	-	-	-	739	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1174	-	668	863
Mov Cap-2 Maneuver	-	-	-	-	668	-
Stage 1	-	-	-	-	776	-
Stage 2	-	-	-	-	731	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.4	9.3
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	845	-	-	1174	-
HCM Lane V/C Ratio	0.019	-	-	0.011	-
HCM Control Delay (s)	9.3	-	-	8.1	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	16	36	47	260	208	18
Future Volume (vph)	16	36	47	260	208	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	100.0			0.0
Storage Lanes	1	0	1			0
Taper Length (m)	7.5		100.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.906				0.989	
Flt Protected	0.985		0.950			
Satd. Flow (prot)	1356	0	1597	1792	1737	0
Flt Permitted	0.985		0.950			
Satd. Flow (perm)	1356	0	1597	1792	1737	0
Link Speed (k/h)	80			80	80	
Link Distance (m)	378.8			360.0	304.4	
Travel Time (s)	17.0			16.2	13.7	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	25%	25%	13%	6%	7%	22%
Adj. Flow (vph)	18	41	53	295	236	20
Shared Lane Traffic (%)						
Lane Group Flow (vph)	59	0	53	295	256	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			3.6	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	28.7%	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	16	36	47	260	208	18
Future Vol, veh/h	16	36	47	260	208	18
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	-	100	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	25	25	13	6	7	22
Mvmt Flow	18	41	53	295	236	20

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	647	246	256	0	-	0
Stage 1	246	-	-	-	-	-
Stage 2	401	-	-	-	-	-
Critical Hdwy	6.65	6.45	4.23	-	-	-
Critical Hdwy Stg 1	5.65	-	-	-	-	-
Critical Hdwy Stg 2	5.65	-	-	-	-	-
Follow-up Hdwy	3.725	3.525	2.317	-	-	-
Pot Cap-1 Maneuver	401	740	1247	-	-	-
Stage 1	744	-	-	-	-	-
Stage 2	629	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	384	740	1247	-	-	-
Mov Cap-2 Maneuver	384	-	-	-	-	-
Stage 1	712	-	-	-	-	-
Stage 2	629	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12	1.2	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1247	-	576	-	-
HCM Lane V/C Ratio	0.043	-	0.103	-	-
HCM Control Delay (s)	8	-	12	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.3	-	-

Appendix E

2029 Background Traffic Operations Reports

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	17	39	23	185	212	10
Future Volume (vph)	17	39	23	185	212	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	100.0			0.0
Storage Lanes	1	0	1			0
Taper Length (m)	7.5		100.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.906				0.994	
Flt Protected	0.985		0.950			
Satd. Flow (prot)	1545	0	1583	1624	1666	0
Flt Permitted	0.985		0.950			
Satd. Flow (perm)	1545	0	1583	1624	1666	0
Link Speed (k/h)	80			80	80	
Link Distance (m)	516.7			360.0	304.4	
Travel Time (s)	23.3			16.2	13.7	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	0%	14%	14%	17%	13%	22%
Adj. Flow (vph)	19	44	26	210	241	11
Shared Lane Traffic (%)						
Lane Group Flow (vph)	63	0	26	210	252	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			3.6	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	28.4%	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	17	39	23	185	212	10
Future Vol, veh/h	17	39	23	185	212	10
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	-	100	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	0	14	14	17	13	22
Mvmt Flow	19	44	26	210	241	11

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	509	247	252	0	-	0
Stage 1	247	-	-	-	-	-
Stage 2	262	-	-	-	-	-
Critical Hdwy	6.4	6.34	4.24	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.426	2.326	-	-	-
Pot Cap-1 Maneuver	528	763	1246	-	-	-
Stage 1	799	-	-	-	-	-
Stage 2	786	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	517	763	1246	-	-	-
Mov Cap-2 Maneuver	517	-	-	-	-	-
Stage 1	782	-	-	-	-	-
Stage 2	786	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11	0.9	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1246	-	667	-	-
HCM Lane V/C Ratio	0.021	-	0.095	-	-
HCM Control Delay (s)	8	-	11	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.3	-	-

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	13	29	42	273	219	15
Future Volume (vph)	13	29	42	273	219	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	100.0			0.0
Storage Lanes	1	0	1			0
Taper Length (m)	7.5		100.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.907				0.991	
Flt Protected	0.985		0.950			
Satd. Flow (prot)	1542	0	1805	1792	1760	0
Flt Permitted	0.985		0.950			
Satd. Flow (perm)	1542	0	1805	1792	1760	0
Link Speed (k/h)	80			80	80	
Link Distance (m)	516.7			360.0	304.4	
Travel Time (s)	23.3			16.2	13.7	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	8%	11%	0%	6%	7%	7%
Adj. Flow (vph)	15	33	48	310	249	17
Shared Lane Traffic (%)						
Lane Group Flow (vph)	48	0	48	310	266	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			3.6	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 29.1%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	1.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	13	29	42	273	219	15
Future Vol, veh/h	13	29	42	273	219	15
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	-	100	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	8	11	0	6	7	7
Mvmt Flow	15	33	48	310	249	17

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	664	258	266	0	-	0
Stage 1	258	-	-	-	-	-
Stage 2	406	-	-	-	-	-
Critical Hdwy	6.48	6.31	4.1	-	-	-
Critical Hdwy Stg 1	5.48	-	-	-	-	-
Critical Hdwy Stg 2	5.48	-	-	-	-	-
Follow-up Hdwy	3.572	3.399	2.2	-	-	-
Pot Cap-1 Maneuver	416	759	1310	-	-	-
Stage 1	771	-	-	-	-	-
Stage 2	660	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	401	759	1310	-	-	-
Mov Cap-2 Maneuver	401	-	-	-	-	-
Stage 1	742	-	-	-	-	-
Stage 2	660	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.6	1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1310	-	595	-	-
HCM Lane V/C Ratio	0.036	-	0.08	-	-
HCM Control Delay (s)	7.9	-	11.6	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.3	-	-

Appendix F

2029 Total Traffic Operations Reports

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	56	1	14	33	1	10
Future Volume (vph)	56	1	14	33	1	10
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	0.998				0.876	
Flt Protected				0.985	0.996	
Satd. Flow (prot)	1718	0	0	1445	869	0
Flt Permitted				0.985	0.996	
Satd. Flow (perm)	1718	0	0	1445	869	0
Link Speed (k/h)	80			80	50	
Link Distance (m)	137.9			378.8	133.5	
Travel Time (s)	6.2			17.0	9.6	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	9%	100%	64%	15%	100%	90%
Adj. Flow (vph)	64	1	16	38	1	11
Shared Lane Traffic (%)						
Lane Group Flow (vph)	65	0	0	54	12	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)		100	100		100	100
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	19.2%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection	
Int Delay, s/veh	1.9

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	56	1	14	33	1	10
Future Vol, veh/h	56	1	14	33	1	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	9	100	64	15	100	90
Mvmt Flow	64	1	16	38	1	11

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	65	0	135	65
Stage 1	-	-	-	-	65	-
Stage 2	-	-	-	-	70	-
Critical Hdwy	-	-	4.74	-	7.4	7.1
Critical Hdwy Stg 1	-	-	-	-	6.4	-
Critical Hdwy Stg 2	-	-	-	-	6.4	-
Follow-up Hdwy	-	-	2.776	-	4.4	4.11
Pot Cap-1 Maneuver	-	-	1221	-	672	799
Stage 1	-	-	-	-	758	-
Stage 2	-	-	-	-	754	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1221	-	663	799
Mov Cap-2 Maneuver	-	-	-	-	663	-
Stage 1	-	-	-	-	758	-
Stage 2	-	-	-	-	744	-

Approach	EB	WB	NB
HCM Control Delay, s	0	2.4	9.7
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	784	-	-	1221	-
HCM Lane V/C Ratio	0.016	-	-	0.013	-
HCM Control Delay (s)	9.7	-	-	8	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	0	-

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	20	46	32	185	212	15
Future Volume (vph)	20	46	32	185	212	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	100.0			0.0
Storage Lanes	1	0	1			0
Taper Length (m)	7.5		100.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.906				0.991	
Flt Protected	0.985		0.950			
Satd. Flow (prot)	1399	0	1410	1624	1647	0
Flt Permitted	0.985		0.950			
Satd. Flow (perm)	1399	0	1410	1624	1647	0
Link Speed (k/h)	80			80	80	
Link Distance (m)	378.8			360.0	304.4	
Travel Time (s)	17.0			16.2	13.7	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	15%	24%	28%	17%	13%	33%
Adj. Flow (vph)	23	52	36	210	241	17
Shared Lane Traffic (%)						
Lane Group Flow (vph)	75	0	36	210	258	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			3.6	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	29.3%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection	
Int Delay, s/veh	2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	20	46	32	185	212	15
Future Vol, veh/h	20	46	32	185	212	15
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	-	100	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	15	24	28	17	13	33
Mvmt Flow	23	52	36	210	241	17

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	532	250	258	0	-	0
Stage 1	250	-	-	-	-	-
Stage 2	282	-	-	-	-	-
Critical Hdwy	6.55	6.44	4.38	-	-	-
Critical Hdwy Stg 1	5.55	-	-	-	-	-
Critical Hdwy Stg 2	5.55	-	-	-	-	-
Follow-up Hdwy	3.635	3.516	2.452	-	-	-
Pot Cap-1 Maneuver	486	738	1170	-	-	-
Stage 1	762	-	-	-	-	-
Stage 2	737	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	471	738	1170	-	-	-
Mov Cap-2 Maneuver	471	-	-	-	-	-
Stage 1	738	-	-	-	-	-
Stage 2	737	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.5	1.2	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1170	-	630	-	-
HCM Lane V/C Ratio	0.031	-	0.119	-	-
HCM Control Delay (s)	8.2	-	11.5	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.4	-	-

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	42	1	11	57	1	13
Future Volume (vph)	42	1	11	57	1	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	0.997				0.873	
Flt Protected				0.992	0.997	
Satd. Flow (prot)	1694	0	0	1634	967	0
Flt Permitted				0.992	0.997	
Satd. Flow (perm)	1694	0	0	1634	967	0
Link Speed (k/h)	80			80	50	
Link Distance (m)	137.9			378.8	133.5	
Travel Time (s)	6.2			17.0	9.6	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	10%	100%	82%	2%	100%	69%
Adj. Flow (vph)	48	1	13	65	1	15
Shared Lane Traffic (%)						
Lane Group Flow (vph)	49	0	0	78	16	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)		15	25		25	15
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	20.3%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection	
Int Delay, s/veh	1.8

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	42	1	11	57	1	13
Future Vol, veh/h	42	1	11	57	1	13
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	10	100	82	2	100	69
Mvmt Flow	48	1	13	65	1	15

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	49	0	140	49
Stage 1	-	-	-	-	49	-
Stage 2	-	-	-	-	91	-
Critical Hdwy	-	-	4.92	-	7.4	6.89
Critical Hdwy Stg 1	-	-	-	-	6.4	-
Critical Hdwy Stg 2	-	-	-	-	6.4	-
Follow-up Hdwy	-	-	2.938	-	4.4	3.921
Pot Cap-1 Maneuver	-	-	1169	-	668	858
Stage 1	-	-	-	-	773	-
Stage 2	-	-	-	-	735	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1169	-	660	858
Mov Cap-2 Maneuver	-	-	-	-	660	-
Stage 1	-	-	-	-	773	-
Stage 2	-	-	-	-	726	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.3	9.4
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	840	-	-	1169	-
HCM Lane V/C Ratio	0.019	-	-	0.011	-
HCM Control Delay (s)	9.4	-	-	8.1	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	17	38	49	273	219	19
Future Volume (vph)	17	38	49	273	219	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	100.0			0.0
Storage Lanes	1	0	1			0
Taper Length (m)	7.5		100.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.906				0.989	
Flt Protected	0.985		0.950			
Satd. Flow (prot)	1367	0	1612	1792	1738	0
Flt Permitted	0.985		0.950			
Satd. Flow (perm)	1367	0	1612	1792	1738	0
Link Speed (k/h)	80			80	80	
Link Distance (m)	378.8			360.0	304.4	
Travel Time (s)	17.0			16.2	13.7	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	24%	24%	12%	6%	7%	21%
Adj. Flow (vph)	19	43	56	310	249	22
Shared Lane Traffic (%)						
Lane Group Flow (vph)	62	0	56	310	271	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			3.6	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	29.3%	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	17	38	49	273	219	19
Future Vol, veh/h	17	38	49	273	219	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	-	100	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	24	24	12	6	7	21
Mvmt Flow	19	43	56	310	249	22

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	682	260	271	0	-	0
Stage 1	260	-	-	-	-	-
Stage 2	422	-	-	-	-	-
Critical Hdwy	6.64	6.44	4.22	-	-	-
Critical Hdwy Stg 1	5.64	-	-	-	-	-
Critical Hdwy Stg 2	5.64	-	-	-	-	-
Follow-up Hdwy	3.716	3.516	2.308	-	-	-
Pot Cap-1 Maneuver	384	728	1237	-	-	-
Stage 1	735	-	-	-	-	-
Stage 2	617	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	367	728	1237	-	-	-
Mov Cap-2 Maneuver	367	-	-	-	-	-
Stage 1	702	-	-	-	-	-
Stage 2	617	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.3	1.2	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1237	-	558	-	-
HCM Lane V/C Ratio	0.045	-	0.112	-	-
HCM Control Delay (s)	8	-	12.3	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.4	-	-

Appendix G

2034 Background Traffic Operations Reports

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	18	41	25	194	223	10
Future Volume (vph)	18	41	25	194	223	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	100.0			0.0
Storage Lanes	1	0	1			0
Taper Length (m)	7.5		100.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.905				0.994	
Flt Protected	0.985		0.950			
Satd. Flow (prot)	1542	0	1583	1624	1666	0
Flt Permitted	0.985		0.950			
Satd. Flow (perm)	1542	0	1583	1624	1666	0
Link Speed (k/h)	80			80	80	
Link Distance (m)	516.7			360.0	304.4	
Travel Time (s)	23.3			16.2	13.7	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	0%	14%	14%	17%	13%	22%
Adj. Flow (vph)	20	47	28	220	253	11
Shared Lane Traffic (%)						
Lane Group Flow (vph)	67	0	28	220	264	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			3.6	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 29.2%		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	18	41	25	194	223	10
Future Vol, veh/h	18	41	25	194	223	10
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	-	100	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	0	14	14	17	13	22
Mvmt Flow	20	47	28	220	253	11

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	535	259	264	0	-	0
Stage 1	259	-	-	-	-	-
Stage 2	276	-	-	-	-	-
Critical Hdwy	6.4	6.34	4.24	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.426	2.326	-	-	-
Pot Cap-1 Maneuver	510	751	1234	-	-	-
Stage 1	789	-	-	-	-	-
Stage 2	775	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	498	751	1234	-	-	-
Mov Cap-2 Maneuver	498	-	-	-	-	-
Stage 1	771	-	-	-	-	-
Stage 2	775	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.2	0.9	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1234	-	650	-	-
HCM Lane V/C Ratio	0.023	-	0.103	-	-
HCM Control Delay (s)	8	-	11.2	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.3	-	-

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	13	30	45	287	230	16
Future Volume (vph)	13	30	45	287	230	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	100.0			0.0
Storage Lanes	1	0	1			0
Taper Length (m)	7.5		100.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.906				0.991	
Flt Protected	0.985		0.950			
Satd. Flow (prot)	1540	0	1805	1792	1760	0
Flt Permitted	0.985		0.950			
Satd. Flow (perm)	1540	0	1805	1792	1760	0
Link Speed (k/h)	80			80	80	
Link Distance (m)	516.7			360.0	304.4	
Travel Time (s)	23.3			16.2	13.7	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	8%	11%	0%	6%	7%	7%
Adj. Flow (vph)	15	34	51	326	261	18
Shared Lane Traffic (%)						
Lane Group Flow (vph)	49	0	51	326	279	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			3.6	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	29.7%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection	
Int Delay, s/veh	1.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	13	30	45	287	230	16
Future Vol, veh/h	13	30	45	287	230	16
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	-	100	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	8	11	0	6	7	7
Mvmt Flow	15	34	51	326	261	18

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	698	270	279	0	-	0
Stage 1	270	-	-	-	-	-
Stage 2	428	-	-	-	-	-
Critical Hdwy	6.48	6.31	4.1	-	-	-
Critical Hdwy Stg 1	5.48	-	-	-	-	-
Critical Hdwy Stg 2	5.48	-	-	-	-	-
Follow-up Hdwy	3.572	3.399	2.2	-	-	-
Pot Cap-1 Maneuver	398	747	1295	-	-	-
Stage 1	762	-	-	-	-	-
Stage 2	645	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	382	747	1295	-	-	-
Mov Cap-2 Maneuver	382	-	-	-	-	-
Stage 1	732	-	-	-	-	-
Stage 2	645	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.8	1.1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1295	-	580	-	-
HCM Lane V/C Ratio	0.039	-	0.084	-	-
HCM Control Delay (s)	7.9	-	11.8	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.3	-	-

Appendix H

2034 Total Traffic Operations Reports

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	59	1	14	35	1	10
Future Volume (vph)	59	1	14	35	1	10
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	0.998				0.876	
Flt Protected				0.986	0.996	
Satd. Flow (prot)	1734	0	0	1436	869	0
Flt Permitted				0.986	0.996	
Satd. Flow (perm)	1734	0	0	1436	869	0
Link Speed (k/h)	80			80	50	
Link Distance (m)	137.9			378.8	133.5	
Travel Time (s)	6.2			17.0	9.6	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	8%	100%	64%	17%	100%	90%
Adj. Flow (vph)	67	1	16	40	1	11
Shared Lane Traffic (%)						
Lane Group Flow (vph)	68	0	0	56	12	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)		100	100		100	100
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	19.3%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection	
Int Delay, s/veh	1.8

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	59	1	14	35	1	10
Future Vol, veh/h	59	1	14	35	1	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	8	100	64	17	100	90
Mvmt Flow	67	1	16	40	1	11

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	68	0	140	68
Stage 1	-	-	-	-	68	-
Stage 2	-	-	-	-	72	-
Critical Hdwy	-	-	4.74	-	7.4	7.1
Critical Hdwy Stg 1	-	-	-	-	6.4	-
Critical Hdwy Stg 2	-	-	-	-	6.4	-
Follow-up Hdwy	-	-	2.776	-	4.4	4.11
Pot Cap-1 Maneuver	-	-	1217	-	668	796
Stage 1	-	-	-	-	756	-
Stage 2	-	-	-	-	752	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1217	-	659	796
Mov Cap-2 Maneuver	-	-	-	-	659	-
Stage 1	-	-	-	-	756	-
Stage 2	-	-	-	-	742	-

Approach	EB	WB	NB
HCM Control Delay, s	0	2.3	9.7
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	781	-	-	1217	-
HCM Lane V/C Ratio	0.016	-	-	0.013	-
HCM Control Delay (s)	9.7	-	-	8	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	0	-

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	21	48	34	194	223	15
Future Volume (vph)	21	48	34	194	223	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	100.0			0.0
Storage Lanes	1	0	1			0
Taper Length (m)	7.5		100.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.906				0.991	
Flt Protected	0.985		0.950			
Satd. Flow (prot)	1394	0	1433	1624	1648	0
Flt Permitted	0.985		0.950			
Satd. Flow (perm)	1394	0	1433	1624	1648	0
Link Speed (k/h)	80			80	80	
Link Distance (m)	378.8			360.0	304.4	
Travel Time (s)	17.0			16.2	13.7	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	14%	25%	26%	17%	13%	33%
Adj. Flow (vph)	24	55	39	220	253	17
Shared Lane Traffic (%)						
Lane Group Flow (vph)	79	0	39	220	270	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			3.6	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	30.1%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection	
Int Delay, s/veh	2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	21	48	34	194	223	15
Future Vol, veh/h	21	48	34	194	223	15
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	-	100	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	14	25	26	17	13	33
Mvmt Flow	24	55	39	220	253	17

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	560	262	270	0	-	0
Stage 1	262	-	-	-	-	-
Stage 2	298	-	-	-	-	-
Critical Hdwy	6.54	6.45	4.36	-	-	-
Critical Hdwy Stg 1	5.54	-	-	-	-	-
Critical Hdwy Stg 2	5.54	-	-	-	-	-
Follow-up Hdwy	3.626	3.525	2.434	-	-	-
Pot Cap-1 Maneuver	470	724	1167	-	-	-
Stage 1	755	-	-	-	-	-
Stage 2	727	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	454	724	1167	-	-	-
Mov Cap-2 Maneuver	454	-	-	-	-	-
Stage 1	730	-	-	-	-	-
Stage 2	727	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.7	1.2	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1167	-	613	-	-
HCM Lane V/C Ratio	0.033	-	0.128	-	-
HCM Control Delay (s)	8.2	-	11.7	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.4	-	-

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	43	1	11	61	1	13
Future Volume (vph)	43	1	11	61	1	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	0.997				0.873	
Flt Protected				0.992	0.997	
Satd. Flow (prot)	1709	0	0	1643	967	0
Flt Permitted				0.992	0.997	
Satd. Flow (perm)	1709	0	0	1643	967	0
Link Speed (k/h)	80			80	50	
Link Distance (m)	137.9			378.8	133.5	
Travel Time (s)	6.2			17.0	9.6	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	9%	100%	82%	2%	100%	69%
Adj. Flow (vph)	49	1	13	69	1	15
Shared Lane Traffic (%)						
Lane Group Flow (vph)	50	0	0	82	16	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)		15	25		25	15
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 20.5%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	1.7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	43	1	11	61	1	13
Future Vol, veh/h	43	1	11	61	1	13
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	9	100	82	2	100	69
Mvmt Flow	49	1	13	69	1	15

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	50	0	145	50
Stage 1	-	-	-	-	50	-
Stage 2	-	-	-	-	95	-
Critical Hdwy	-	-	4.92	-	7.4	6.89
Critical Hdwy Stg 1	-	-	-	-	6.4	-
Critical Hdwy Stg 2	-	-	-	-	6.4	-
Follow-up Hdwy	-	-	2.938	-	4.4	3.921
Pot Cap-1 Maneuver	-	-	1168	-	663	857
Stage 1	-	-	-	-	772	-
Stage 2	-	-	-	-	732	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1168	-	655	857
Mov Cap-2 Maneuver	-	-	-	-	655	-
Stage 1	-	-	-	-	772	-
Stage 2	-	-	-	-	723	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.2	9.4
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	839	-	-	1168	-
HCM Lane V/C Ratio	0.019	-	-	0.011	-
HCM Control Delay (s)	9.4	-	-	8.1	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	17	39	52	287	230	20
Future Volume (vph)	17	39	52	287	230	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	100.0			0.0
Storage Lanes	1	0	1			0
Taper Length (m)	7.5		100.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.906				0.989	
Flt Protected	0.985		0.950			
Satd. Flow (prot)	1375	0	1612	1792	1739	0
Flt Permitted	0.985		0.950			
Satd. Flow (perm)	1375	0	1612	1792	1739	0
Link Speed (k/h)	80			80	80	
Link Distance (m)	378.8			360.0	304.4	
Travel Time (s)	17.0			16.2	13.7	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	24%	23%	12%	6%	7%	20%
Adj. Flow (vph)	19	44	59	326	261	23
Shared Lane Traffic (%)						
Lane Group Flow (vph)	63	0	59	326	284	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			3.6	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 30.0%		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	17	39	52	287	230	20
Future Vol, veh/h	17	39	52	287	230	20
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	-	100	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	24	23	12	6	7	20
Mvmt Flow	19	44	59	326	261	23

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	717	273	284	0	-	0
Stage 1	273	-	-	-	-	-
Stage 2	444	-	-	-	-	-
Critical Hdwy	6.64	6.43	4.22	-	-	-
Critical Hdwy Stg 1	5.64	-	-	-	-	-
Critical Hdwy Stg 2	5.64	-	-	-	-	-
Follow-up Hdwy	3.716	3.507	2.308	-	-	-
Pot Cap-1 Maneuver	365	718	1223	-	-	-
Stage 1	725	-	-	-	-	-
Stage 2	602	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	347	718	1223	-	-	-
Mov Cap-2 Maneuver	347	-	-	-	-	-
Stage 1	690	-	-	-	-	-
Stage 2	602	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.5	1.2	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1223	-	542	-	-
HCM Lane V/C Ratio	0.048	-	0.117	-	-
HCM Control Delay (s)	8.1	-	12.5	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0.2	-	0.4	-	-

Appendix I

Signal Warrants

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

Horizon Year: 2034 Total
Region/City/Township: MTO / Grey County

Major Street: Highway 6
Minor Street: Grey Road 9

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						
	Highway 6						Grey Road 9						
	Northbound			Southbound			Eastbound			Westbound			Peds
Time Period	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	Crossing
AM Peak Hour	40	221			247	19	26		61				
PM Peak Hour	55	301			243	23	23		51				
verage Hourly Volum	24	131	0	0	123	11	12	0	28	0	0	0	0

Warrant	AHV
1A - All	328
1B - Minor	40
2A - Major	287
2B - Cross	12

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	328
					% Fulfilled	68.2%

	Approach Lanes	1		2 or more		Average Hourly Volume
1B	Flow Conditions	Free	Restricted	Free	Restricted	
		X				
	Minor Street Approaches	180	255	180	255	40
					% Fulfilled	22.4%

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	287
					% Fulfilled	59.8%

	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	12
					% Fulfilled	24.5%

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

Horizon Year: 2034 Total
Region/City/Township: Grey County

Major Street: Grey Road 9
Minor Street: Site Access

North/South?: N

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

PM Forecast Only? N

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

	Major Street						Minor Street						
	Grey Road 9						Site Access						
	Eastbound			Westbound			Northbound			Southbound			Peds
Time Period	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	Crossing
AM Peak Hour		63	2	19	39		3		24				
PM Peak Hour		47	2	16	62		3		27				
verage Hourly Volum	0	28	1	9	25	0	2	0	13	0	0	0	0

Warrant	AHV
1A - All	77
1B - Minor	14
2A - Major	63
2B - Cross	2

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	77
					% Fulfilled	16.0%

	Approach Lanes	1		2 or more		Average Hourly Volume
1B	Flow Conditions	Free	Restricted	Free	Restricted	
		X				
	Minor Street Approaches	180	255	180	255	14
					% Fulfilled	7.9%

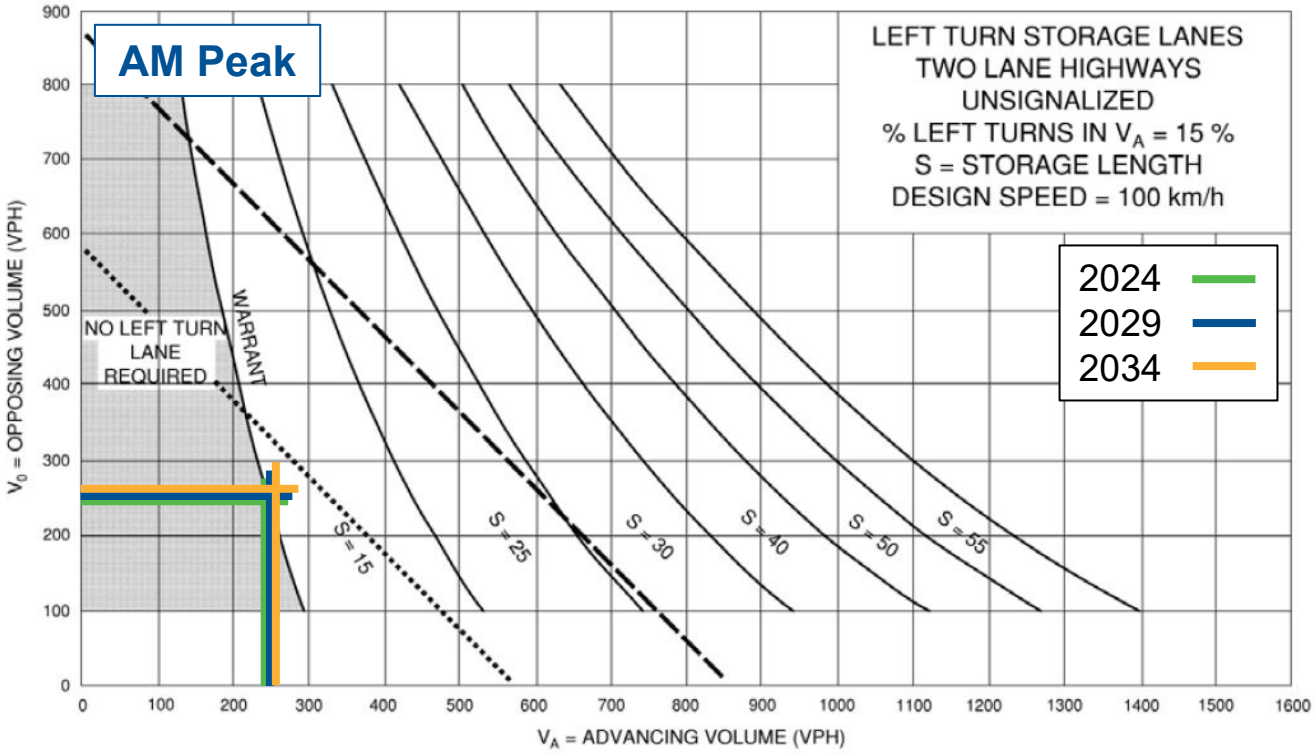
Warrant 2 - Delay To Cross Traffic

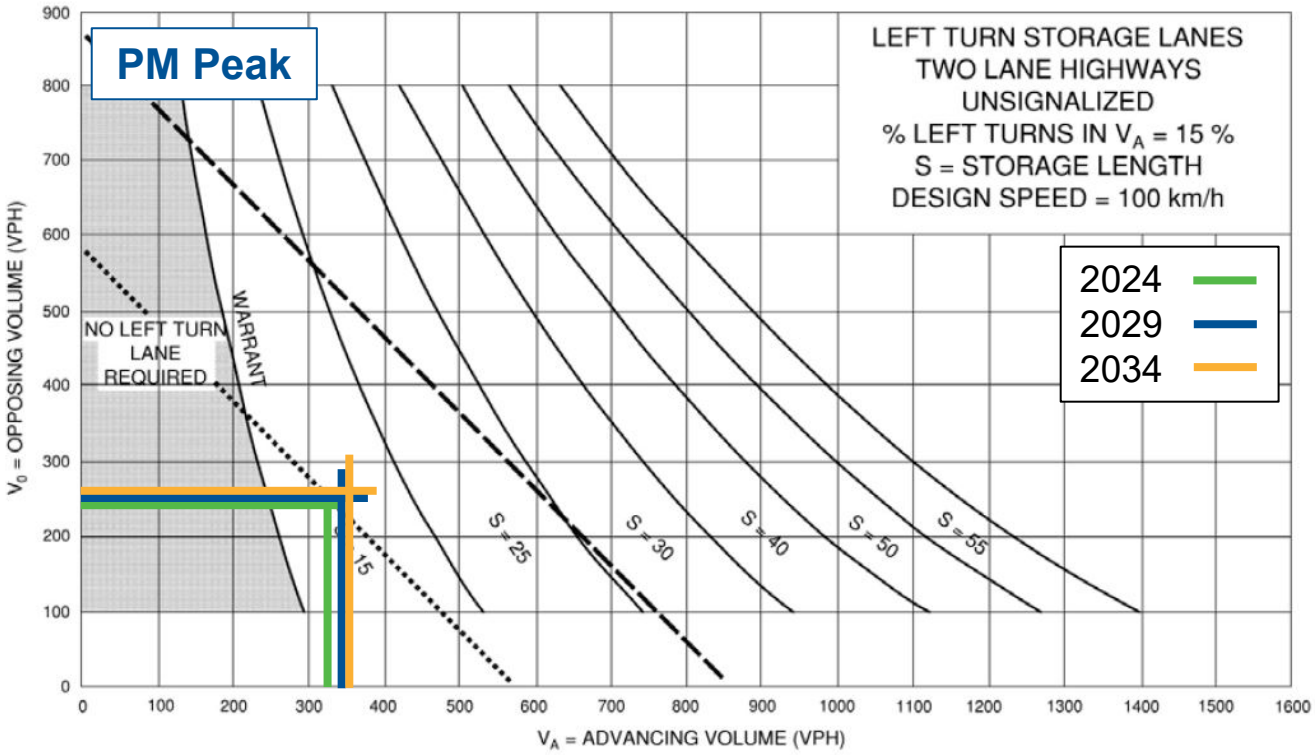
	Approach Lanes	1		2 or more		Average Hourly Volume
2A	Flow Conditions	Free	Restricted	Free	Restricted	
		X				
	Major Street Approaches	480	720	600	900	63
					% Fulfilled	13.0%

	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	2
					% Fulfilled	3.0%

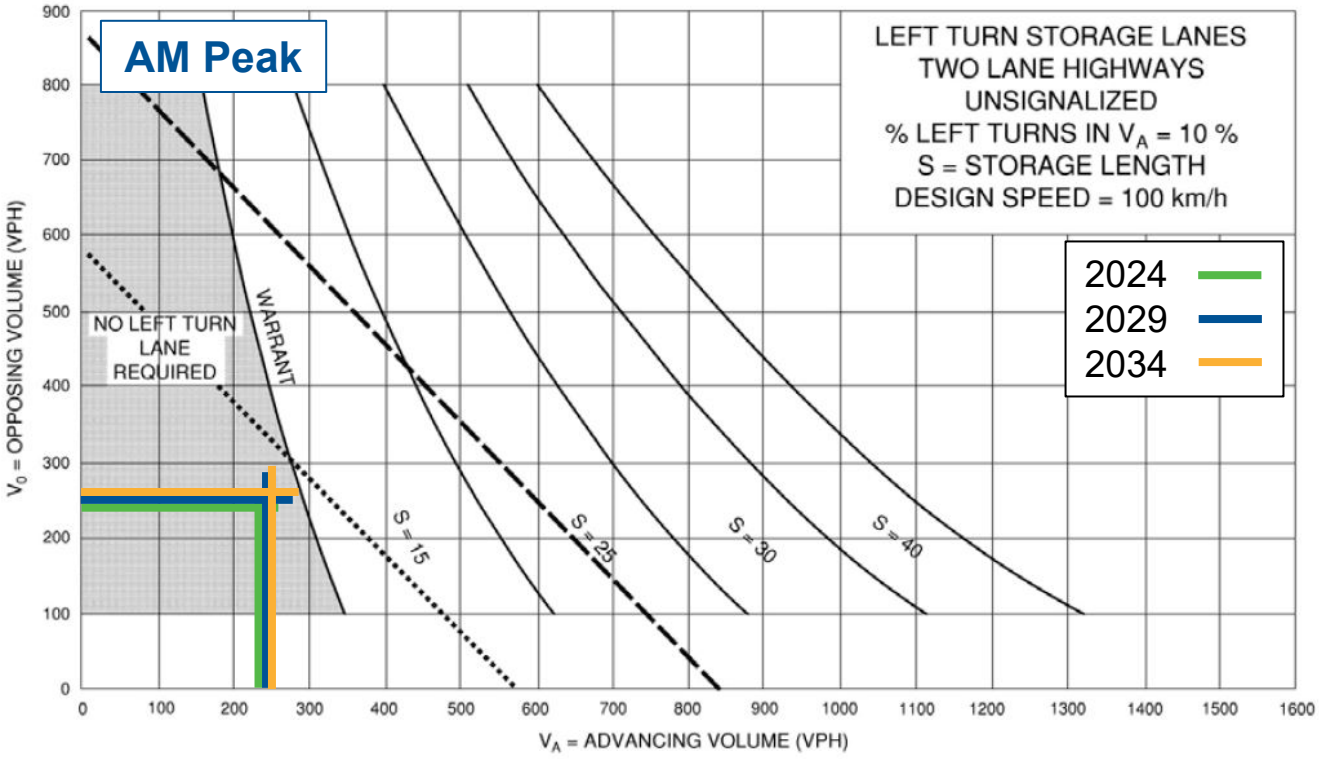
Appendix J

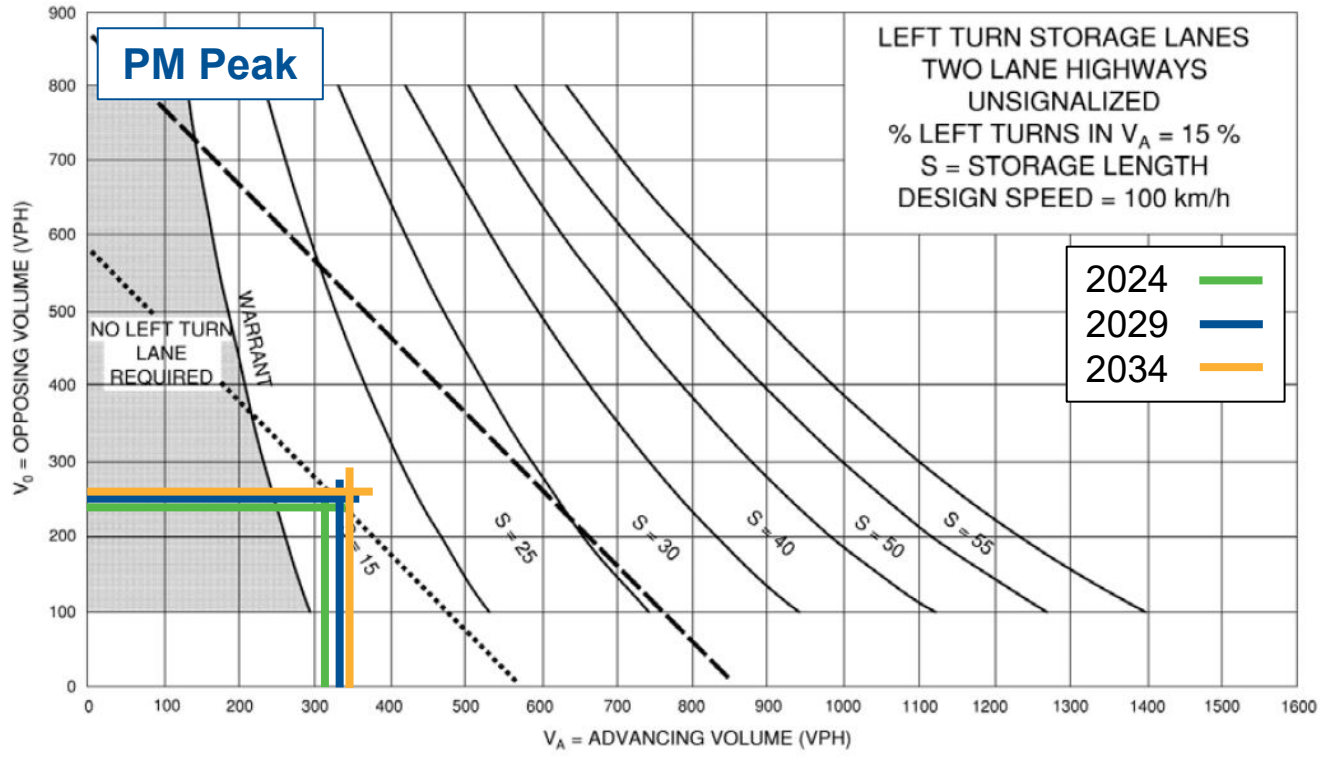
Left-Turn Lane Warrants





Northbound Left-Turn Lane Warrants
Highway 6 & Grey Road 9
Total Traffic





Northbound Left-Turn Lane Warrants
Highway 6 & Grey Road 9
Background Traffic