



10125 Oxbow Drive Komoka Transportation Impact Study

Paradigm Transportation Solutions Limited

July 2020
200272

Project Summary



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Client

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10125 Oxbow Drive, Komoka 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 residential development located in the village of Komoka, Municipality of Middlesex Centre, County of Middlesex.

This TIS includes an analysis of existing traffic conditions, a description of the proposed development, traffic forecasts for a five-year horizon from the estimated date of development build-out (2029), and any recommendations required to improve future traffic conditions.

Development Concept

The subject site is located on the south side of Oxbow Drive (#10125) in the village of Komoka, Municipality of Middlesex Centre, County of Middlesex.

The proposed site redevelopment consists of 50 single family dwellings and 8 townhouse units. Vehicle access is proposed by the southerly extension of Union Avenue into the subject site and a proposed driveway to Oxbow Drive via Street 'A' to the west. Build-out of the site is anticipated to occur by Year 2024.

Conclusions

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

- ▶ **Existing Traffic:** The study area intersections are operating with acceptable levels of service during the weekday AM and PM peak hours. No critical movements are occurring at the study area intersections.
- ▶ **Trip Generation:** The site's trip generation is estimated to be approximately 44 AM peak hour vehicle trips and 58 PM peak hour vehicle trips.
- ▶ **Background Traffic:** The study area intersections are forecast to continue to operate with acceptable levels of service during the weekday AM and PM peak hours. No critical movements are forecast to occur at the study area intersections.
- ▶ **Total Traffic:** The study area intersections are forecast to continue to operate with acceptable levels of service during the weekday AM and PM peak hours. No critical movements are forecast to occur at the study area intersections.



- ▶ **Left-Turn Lanes:** Left-turn lanes are not warranted at study area intersections under forecast total conditions.

Recommendations

Based on the findings of this study, it is recommended that the subject development be approved without any external transportation related improvements.



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1 Introduction

1.1 Overview

Paradigm Transportation Solutions Limited (Paradigm) has been retained to conduct this Transportation Impact Study (TIA) for a proposed residential development located in the village of Komoka, Municipality of Middlesex Centre, County of Middlesex. **Figure 1.1** illustrates the location of the subject site.

1.2 Purpose and Scope

The purpose of the study is to:

- ▶ Determine and assess the current study area traffic conditions;
- ▶ Forecast the additional traffic generated by the proposed development;
- ▶ Analyze the impacts of this additional traffic on the study area street network; and
- ▶ Recommend any necessary remedial measures required to mitigate these impacts.

The study scope developed in consultation with the Municipality of Middlesex Centre and the County of Middlesex via e-mail in June 2020 is aimed at evaluating the anticipated traffic impact of the proposed development and includes:

- ▶ AM and PM peak hour traffic conditions analyses for existing (2020), 2029 background (without development) and 2029 total (with development) planning horizons;
- ▶ Adjacent street network assessments at the intersections of:
 - Komoka Road and Oxbow Drive;
 - Oxbow Drive and Union Avenue;
 - Glendon Drive and Komoka Road; and
 - Oxbow Drive and proposed Street 'A'.
- ▶ Recommendations to mitigate anticipated traffic impacts, if required, at the above locations and the site accesses.





2 Existing Conditions

2.1 Road Network

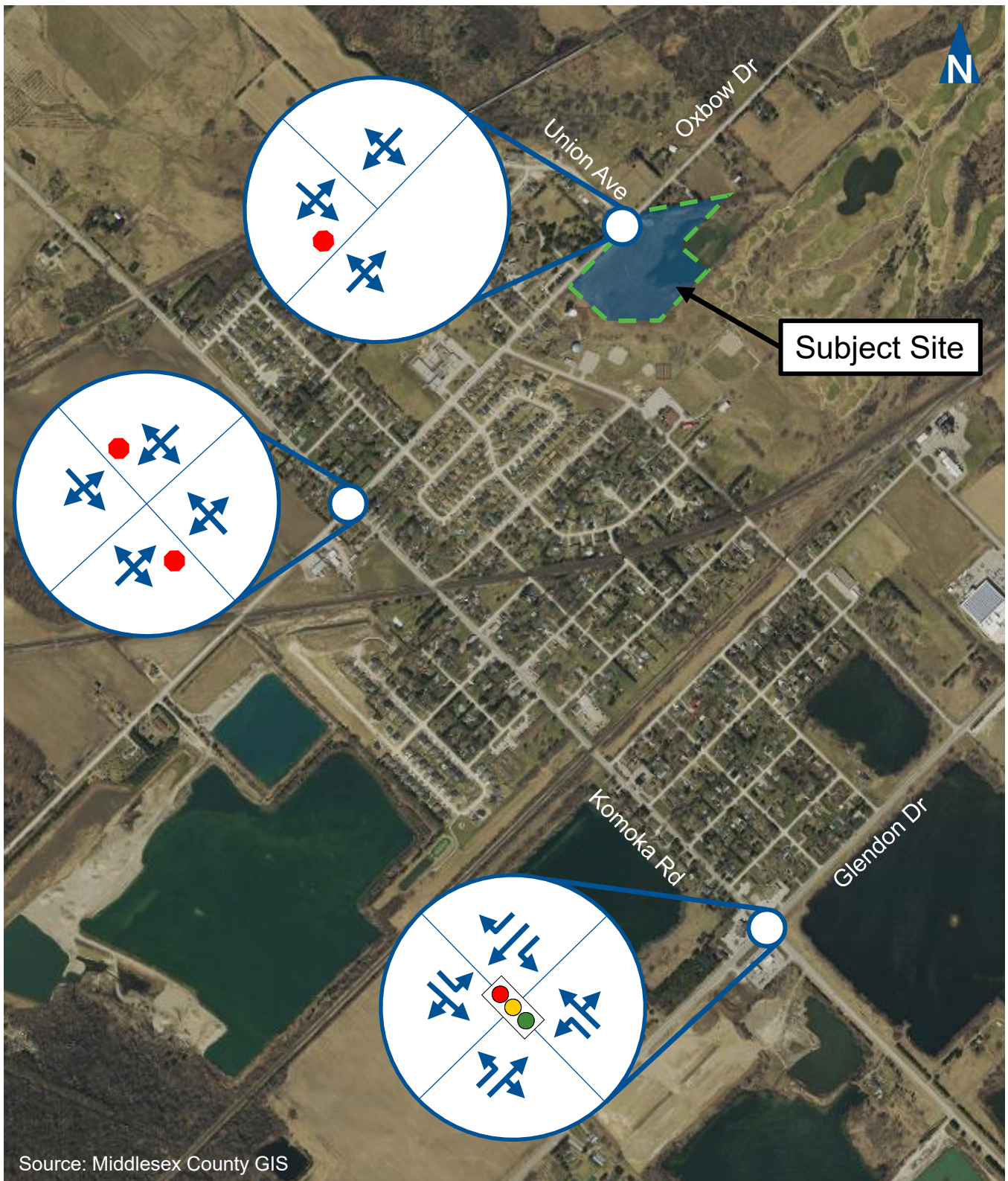
The roadways of interest within the study area include:

- ▶ **Glendon Drive (County Road 14)** is an east/west arterial road¹ under the jurisdiction of the County of Middlesex. The road has a two-lane rural cross-section and a posted speed limit of 50 km/h. Sidewalks are only provided at the intersection of Komoka Road. The intersection with Komoka Road is signalized;
- ▶ **Komoka Road (County Road 16)** is a north/south collector road under the jurisdiction of the County of Middlesex. The road has a two-lane urban cross-section between Simcoe Avenue and Glendon Drive, and a rural cross-section to the north. There is a posted speed limit of 50 km/h and a sidewalk is present on the east side of the road between Glendon Drive and Oxbow Drive. The intersection with Oxbow Drive is unsignalized with stop control on Oxbow Drive;
- ▶ **Oxbow Drive** is an east/west local road under the jurisdiction of the Municipality of Middlesex Centre. The road has a two-lane rural cross-section and a posted speed limit of 50 km/h. Sidewalks are present on both sides of the road between Komoka Road and Valleyview Drive, and are provided on the north side of the road to the east. The intersection with Union Avenue is unsignalized with stop control on Union Avenue; and
- ▶ **Union Avenue** is a north/south local road under the jurisdiction of the Municipality of Middlesex Centre. The road has a two-lane urban cross-section and a posted speed limit of 50 km/h. Sidewalks are present on the west side of the road near Oxbow Drive.

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

¹ https://www.middlesex.ca/sites/default/files/documents/2015_MC_Road_map.pdf





2.2 Transit Service

There is currently no transit service available within the study area.

2.3 Traffic Volumes

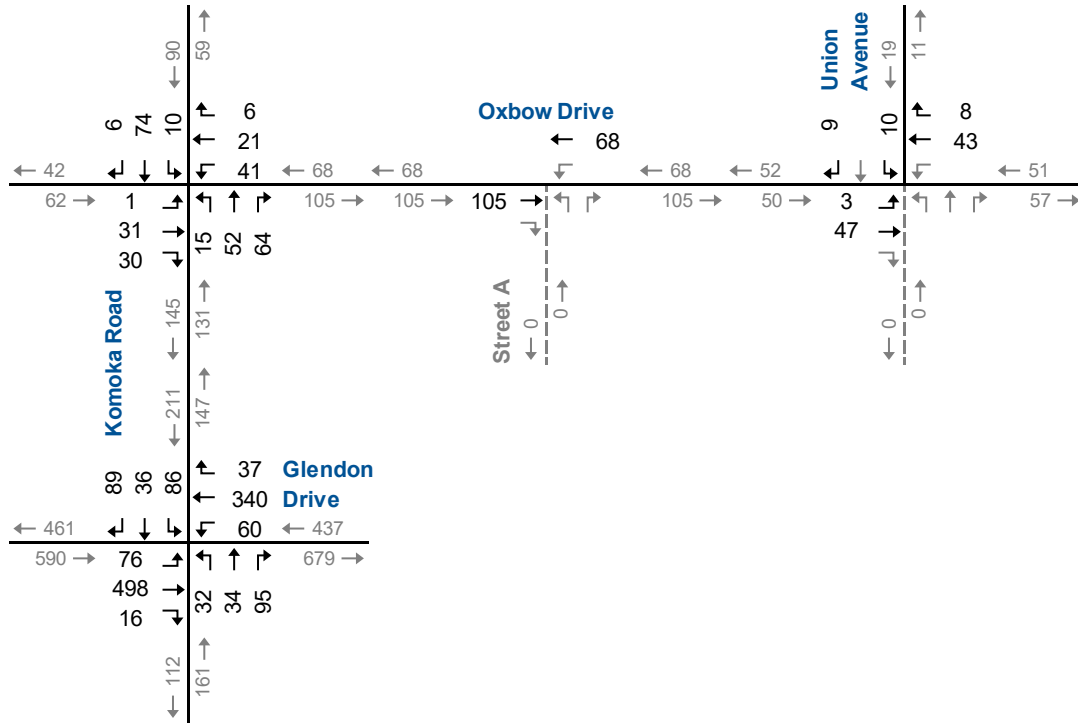
Table 2.1 summarizes the location and date of the existing turning movement count (TMC) data collected by Paradigm. **Figure 2.2** and **Figure 2.3** illustrate the existing AM and PM weekday peak hour turning movement count volumes. **Appendix A** contains the turning movement data.

TABLE 2.1: EXISTING COUNT DATA SUMMARY

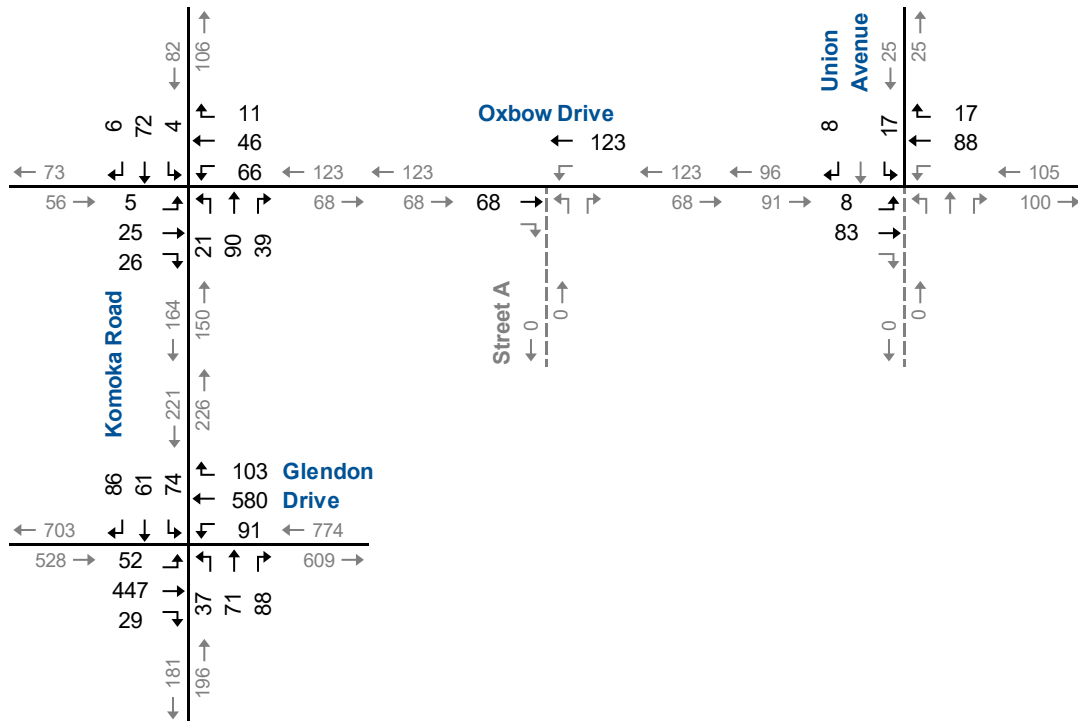
Location	Date
Komoka Rd & Oxbow Dr	13 Sept 2018
Komoka Rd & Glendon Dr	13 Sept 2018
Oxbow Dr & Union Ave	25 June 2020



AM Peak Hour



PM Peak Hour



2.4 Traffic Operations

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

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

The operations of intersections in the study area were evaluated with the existing turning movement volumes using Synchro 9.

The intersection analysis considered two separate measures of performance:

- ▶ The volume to capacity ratio for each intersection; and
- ▶ The LOS for each turning movement (LOS is based on the average control delay per vehicle).

Table 2.2 summarizes the existing intersection operations. The entries in the table indicating the AM and PM peak hour level of service (LOS), volume to capacity ratios (V/C), and 95th percentile queues experienced.

All intersections are estimated to be operating within acceptable levels, with no specific problem movements under existing traffic conditions.

Appendix B contains the detailed Synchro 9 reports.



TABLE 2.2: EXISTING 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	Komoka Road & Oxbow Drive	TWSC	LOS Delay V/C 95th	< 8 < 0.09 < 0	B 10 > 0.09 > 0	> 0	B 10 > 0	< 8 < 0.12 < 0	B 11 > 0.12 > 0	> 0	B 11 > 0	A 8 0.01 0	A 0 0.00 0	A 0 0.00 0	A 1 > 0.01 0	A 8 0.00 0	A 0 0.00 0	A 1 > 0		
	Oxbow Drive & Union Avenue	TWSC	LOS Delay V/C 95th	A 7 0.00 0	A 0 0.00 0	- - -	A 0 > -	- - -	A 0 0.00 0	A 0 0.00 0	A 0 > -					A 9 0.02 0	- - -	> > >	A 9 >	
	Glendon Drive & Komoka Road	TCS	LOS Delay V/C 95th	A 8 0.16 9	B 10 0.51 54	> 0	A 10 > 0	A 8 0.17 8	A 8 0.34 32	A 2 0.05 3	A 8 > 0	B 14 0.09 8	A 7 0.23 14	> 0	A 8 > 0	B 15 0.22 18	A 7 0.22 13	> 0	B 10 > 0	A 9 >
PM Peak Hour	Komoka Road & Oxbow Drive	TWSC	LOS Delay V/C 95th	< 8 < 0.08 < 0	B 10 > 0.08 > 0	> 0	B 10 > 0	< 8 < 0.21 < 1	B 12 > 0.21 > 1	> 0	B 12 > 0	A 8 0.02 0	A 0 0.00 0	A 0 0.00 0	A 1 > 0.00 0	A 8 0.00 0	A 0 0.00 0	A 0 > 0		
	Oxbow Drive & Union Avenue	TWSC	LOS Delay V/C 95th	A 8 0.01 0	A 0 0.00 0	- - -	A 1 > -	- - -	A 0 0.00 0	A 0 0.00 0	A 0 > -					A 10 0.03 0	- - -	> > >	A 10 >	
	Glendon Drive & Komoka Road	TCS	LOS Delay V/C 95th	A 8 0.20 7	A 10 0.53 46	> 0	A 10 > 0	A 9 0.26 11	B 12 0.63 62	A 2 0.12 5	B 10 > 0	B 16 0.10 10	B 11 0.30 22	> 0	B 12 > 0	B 17 0.21 17	A 9 0.28 19	> 0	B 12 > 0	B 11 >

TWSC - Two-Way Stop Control

TCS - Traffic Control Signal

RBT - Roundabout

MOE - Measure of Effectiveness

LOS - Level of Service

V/C - Volume to Capacity Ratio

Avail. - Available Storage (m)

> - Shared Right-Turn Lane

< - Shared Left-Turn Lane



3 Development Concept

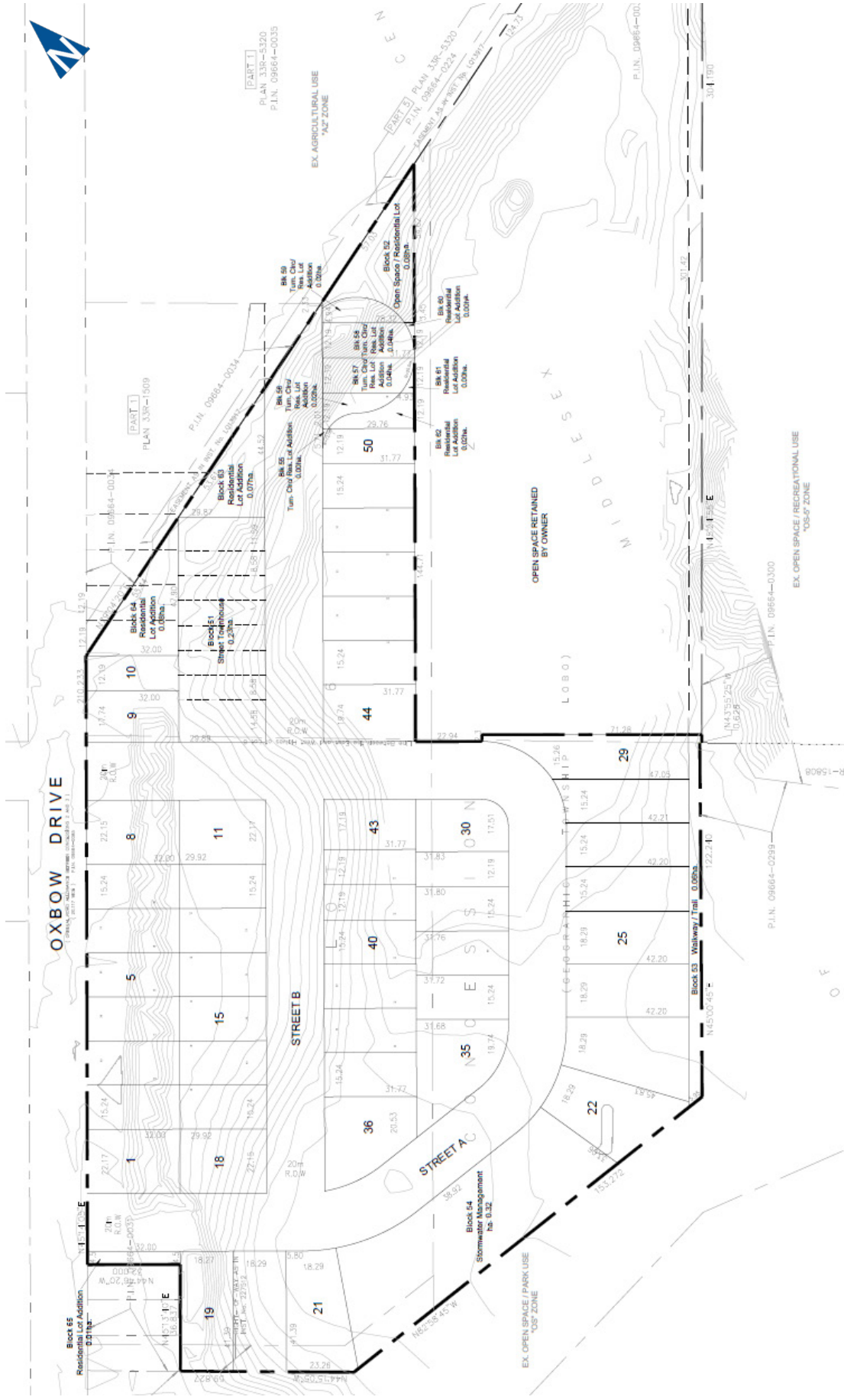
3.1 Description

The subject site is located on the south side of Oxbow Drive (#10125) in the village of Komoka, Municipality of Middlesex Centre, County of Middlesex.

The proposed site redevelopment consists of 50 single family dwellings and 8 townhouse units. Vehicle access is proposed by the southerly extension of Union Avenue into the subject site and a proposed driveway to Oxbow Drive via Street 'A' to the west. Build-out of the site is anticipated to occur by Year 2024.

Figure 3.1 illustrate the proposed site plan.





Proposed Site Plan

Figure 3.1

3.2 Trip Generation

The Institute of Transportation Engineers (ITE) Trip Generation² methods are used to estimate the site trip generation. The following Land Use Codes (LUC) were used to estimate the site trip generation using regression equations:

- ▶ LUC 210 – Single Family Housing; and
- ▶ LUC 220 – Multifamily Housing (Low Rise).

Due to the lack of public transit options and as the development only consists of residential dwellings, no trip reductions were applied for other modes of transportation.

The subject site is forecast to generate approximately 44 and 58 vehicle trips during the AM and PM peak hours, respectively. **Table 3.1** summarizes the estimated trip generation.

TABLE 3.1: SITE GENERATED TRAFFIC

Land Use Code	# of Units		Formula or Rate	AM Peak Hour				PM Peak Hour			
				Rate per Unit	In	Out	Total	Rate per Unit	In	Out	Total
210: Single Family Housing	50	Units	Formula	0.81	10	30	40	1.04	33	19	52
220: Multifamily Housing (Low Rise)	8	Units	Formula	0.54	1	3	4	0.78	4	2	6
Total Net Trips					11	33	44		37	21	58

Given that the proposed development and the village of Komoka primarily consists of residential dwellings, the trip assignment and distribution was based on existing travel patterns in the study area. **Table 3.2** summarizes the estimated trip distribution for site generated traffic.

TABLE 3.2: ESTIMATED TRIP DISTRIBUTION

Distribution	AM	PM
North	5%	5%
West	35%	20%
East	45%	55%
South	15%	20%

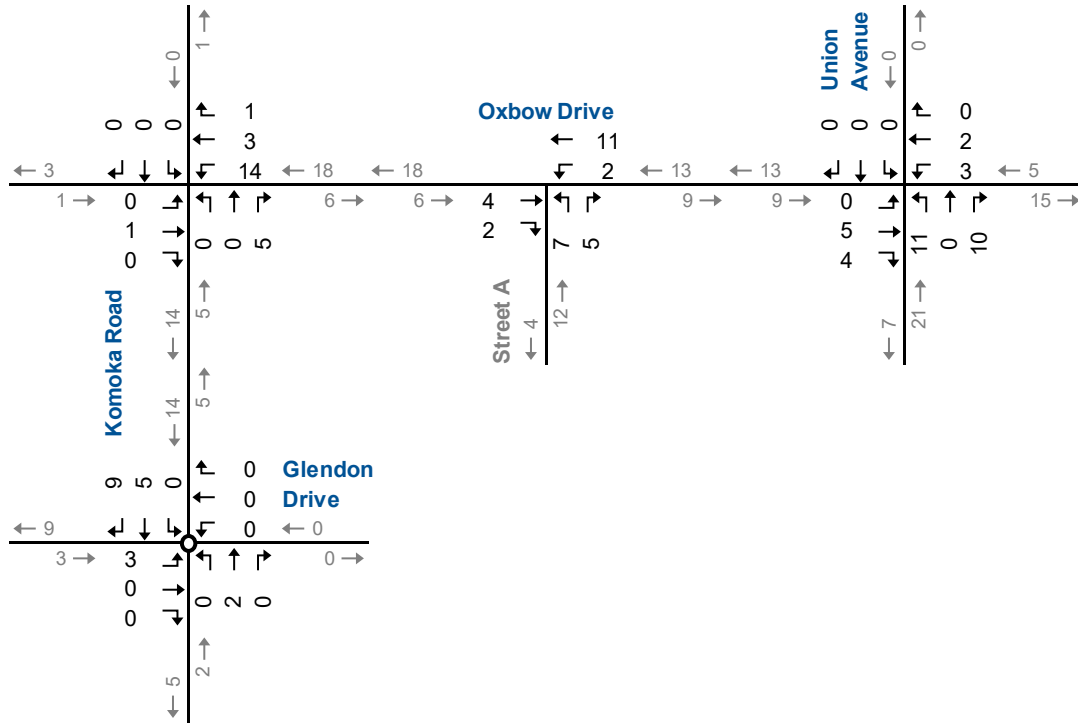
² *Trip Generation Tenth Edition*, Institute of Transportation Engineers, Washington D.C., 2017



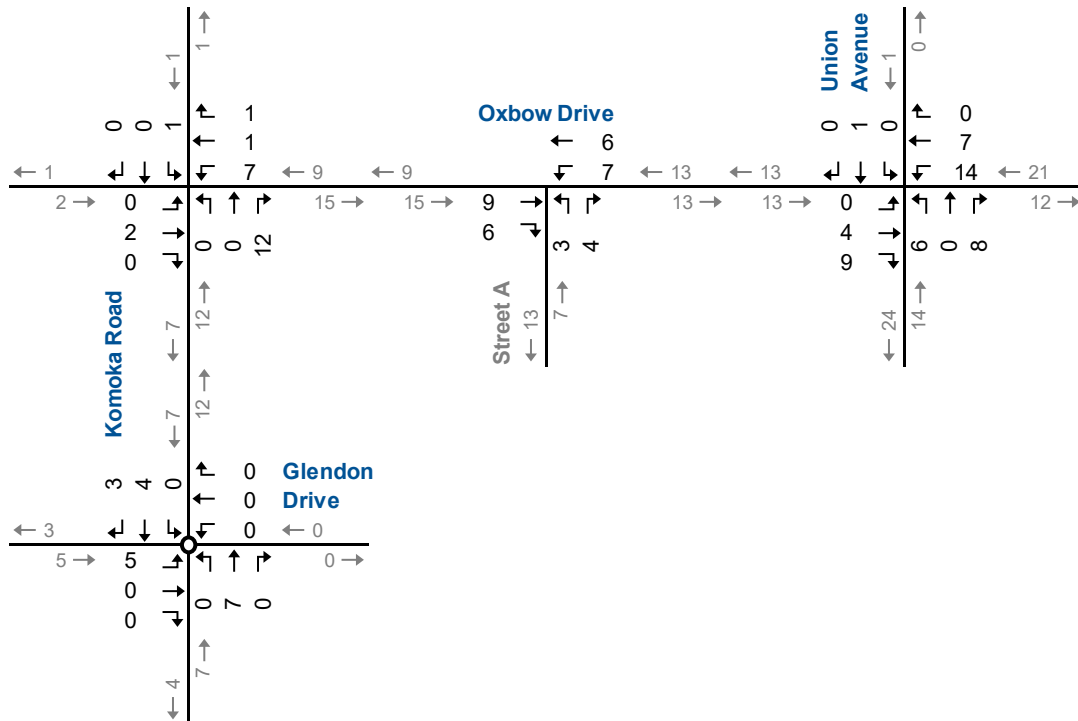
Figure 3.2 illustrates the site-generated traffic volumes for the AM and PM peak hours.



AM Peak Hour



PM Peak Hour



4 Future Traffic Conditions

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

- ▶ Future background traffic estimates;
- ▶ Level of service analysis for background traffic (pre-development);
- ▶ Future total traffic estimates; and
- ▶ Level of service analysis for total traffic (post-development).

4.1 Forecast Traffic

A five-year horizon (Year 2029) following the expected build-out of the site has been assessed. The likely future traffic volumes near the subject site are estimated to consist of:

- ▶ Increased non-site traffic (generalized background traffic growth);
- ▶ Traffic generated by nearby in-stream developments; and
- ▶ Traffic generated by the proposed development.

4.1.1 Background Traffic

The non-site traffic increase is the generalized traffic growth in the Municipality of Middlesex Centre. The generalized growth is anticipated to follow the average increase in population within the area. The County of Middlesex confirmed a growth rate of 2% per annum to forecast the background traffic.

4.1.2 Other Developments

During pre-study consultations, Paradigm requested information from known development applications within the Municipality of Middlesex Centre. The development at 9904 Oxbow Drive³ was identified, and the development traffic information was added to the general background traffic volumes. **Figure 4.1** illustrates the 2029 background traffic volumes for the AM and PM peak hours. **Appendix C** contains the detailed traffic forecast for the 9904 Oxbow Drive development.

³ 9904 Oxbow Drive, Komoka TIS, Paradigm Transportation Solutions Limited, April 2019.



Figure 4.2 illustrates the 2029 total traffic forecasts for the AM and PM peak hours, which is the combination of the forecast background traffic volumes and the site generated traffic volumes.

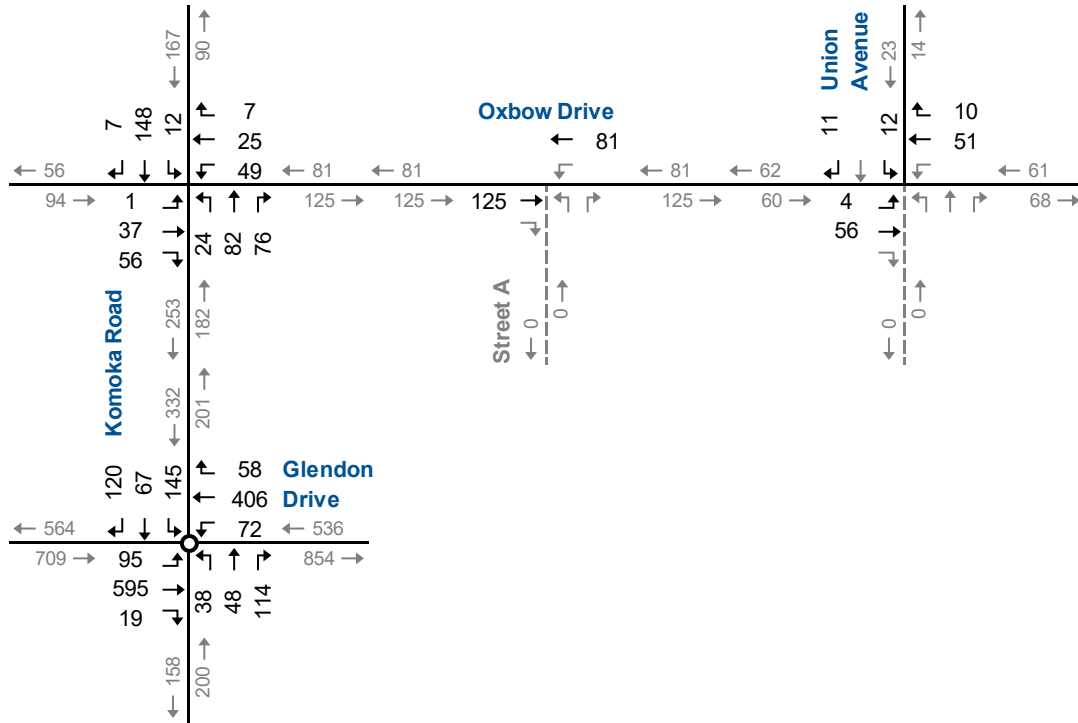
4.1.3 Future Glendon Road and Komoka Road Intersection Configuration

Currently, the signalized intersection of Komoka Road and Glendon Drive has left-turn lanes on all intersection legs, separated through and right turn lanes on the east leg, and shared through-right lanes on all other legs as shown in **Figure 2.1**. The Glendon Drive Environmental Assessment (EA)⁴ recommends implementing a roundabout at this intersection and widening the east and west legs to accommodate four through lanes within the next five to ten years. As the study was prepared in 2018, it was assumed that the noted roundabout would be implemented by 2029, and is included in the analysis of this study.

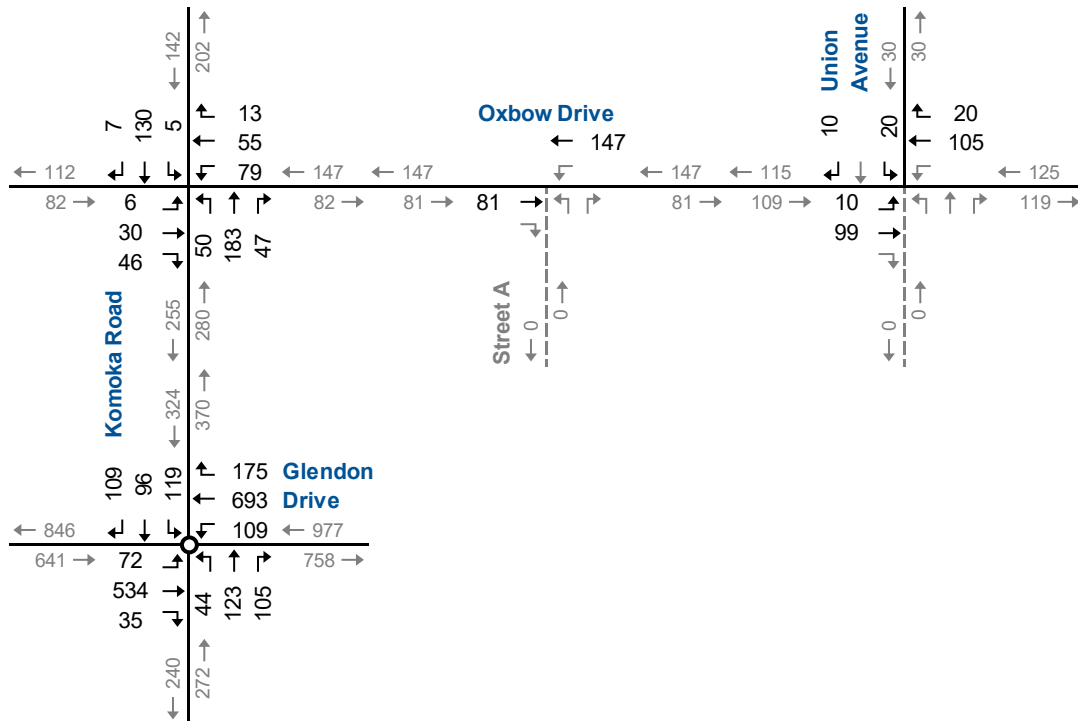
⁴ *Glendon Drive Streetscape Schedule C Municipal Class Environmental Assessment Report*, Stantec Consulting Limited, August 2018



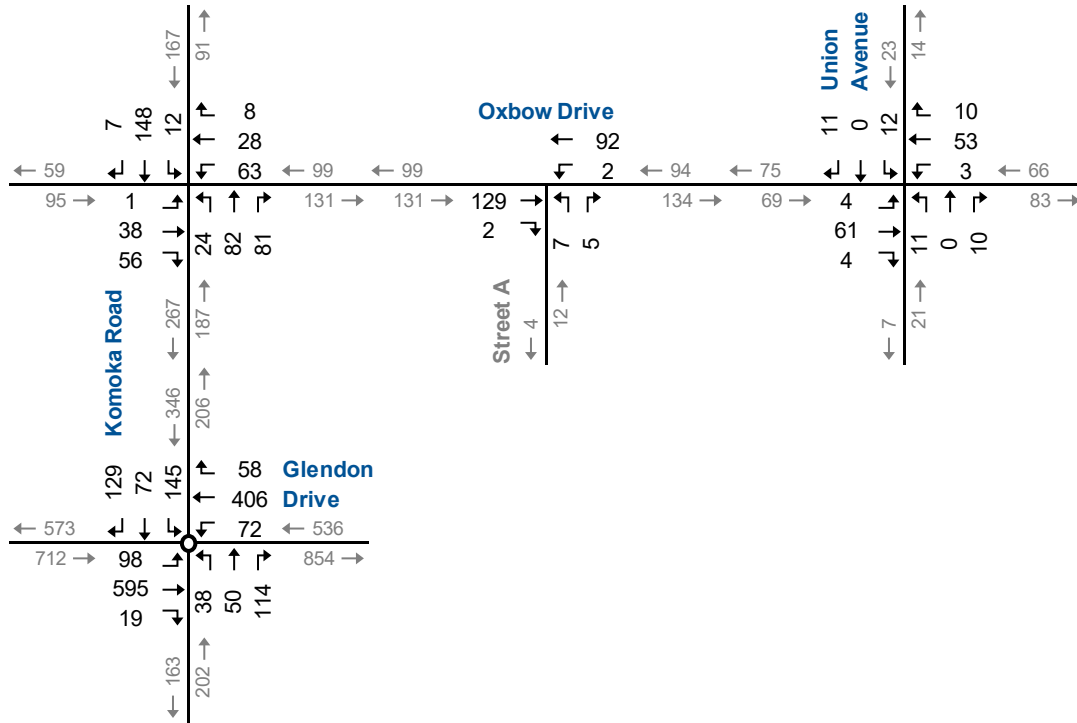
AM Peak Hour



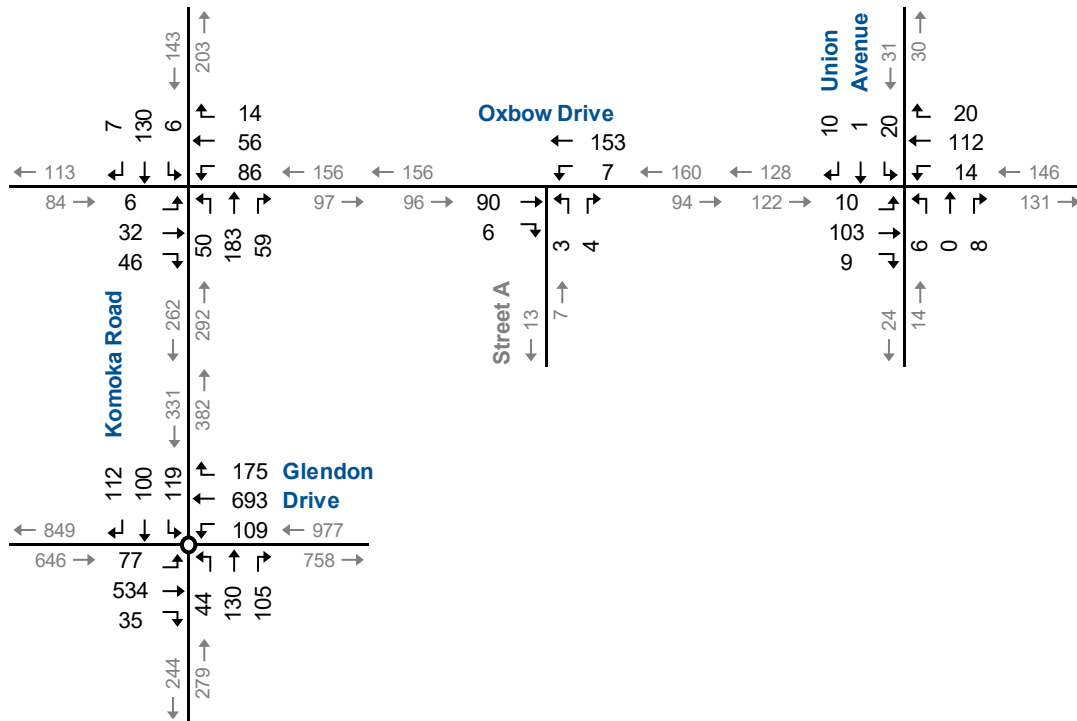
PM Peak Hour



AM Peak Hour



PM Peak Hour



4.2 Forecast Traffic Operations

4.2.1 Background Traffic Operations

The traffic operations of the study area intersections have been assessed using Synchro 9 and Arcady roundabout analysis software. As previously noted, it was assumed that the proposed roundabout at the Komoka Road and Glendon Drive intersection has been implemented but no other traffic control improvements are assumed.

Table 4.1 summarizes the level of service conditions for the AM and PM peak hours. No critical movements are forecast to occur at the study area intersections and no changes to the existing lane configuration or traffic control are recommended.

Appendix D contains the detailed Synchro 9 and Arcady reports.

4.2.2 Total Traffic Operations

The study area intersection operations analyses followed the same methodology and lane configuration used for background conditions.

Table 4.2 summarizes the level of service conditions for the AM and PM peak hours. No critical movements are forecast to occur at the study area intersections and no changes to the existing lane configuration or traffic control are recommended.

Appendix E contains the detailed Synchro 9 and Arcady reports.



TABLE 4.1: BACKGROUND TRAFFIC OPERATIONS

Analysis Period	Intersection	Control Type	MOE	Direction / Movement / Approach																
				Eastbound				Westbound				Northbound				Southbound				OVERALL
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
AM Peak Hour	Komoka Road & Oxbow Drive	TWSC	LOS Delay V/C 95th	< 8 < 0.15 < 1	B 12 > >	> 12	< 8 < 0.18 < 1	B 14 > >	> 14	A 8 0.02 0	A 0 0.00 0	A 0 0.00 0	A 1 > >	A 8 0.01 0	A 0 0.00 0	A 0 0.00 0	A 1 > >			
	Oxbow Drive & Union Avenue	TWSC	LOS Delay V/C 95th	A 7 0.00 0	A 0 0.00 0	- - -	A 0 > >	A 0 0.00 0	A 0 0.00 0					A 9 0.03 0	- - -	> > >	A 9 > >			
	Glendon Drive & Komoka Road	RBT	LOS Delay V/C 95th	< 8 < 0.37 < 8	A 3 > >	> 0	< 8 < 0.28 < 8	A 2 > >	> 0	< 7 0.29 8	A 7 > >	> 0	< 6 0.37 8	A 6 > >	> 0	> 0	A 0 > >	A 4		
PM Peak Hour	Komoka Road & Oxbow Drive	TWSC	LOS Delay V/C 95th	< 8 < 0.08 < 0	B 10 > >	> 10	< 8 < 0.21 < 1	B 12 > >	> 12	A 8 0.02 0	A 0 0.00 0	A 0 0.00 0	A 1 > >	A 8 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 > >			
	Oxbow Drive & Union Avenue	TWSC	LOS Delay V/C 95th	A 8 0.01 0	A 0 0.00 0	- - -	A 1 > >	A 0 0.00 0	A 0 0.00 0					A 10 0.03 0	- - -	> > >	A 10 > >			
	Glendon Drive & Komoka Road	RBT	LOS Delay V/C 95th	< 8 < 0.34 < 8	A 3 > >	> 0	< 8 < 0.49 < 8	A 3 > >	> 0	< 6 0.33 8	A 6 > >	> 0	< 8 0.43 8	A 8 > >	> 0	> 0	A 0 > >	A 4		

TWSC - Two-Way Stop Control

TCS - Traffic Control Signal

RBT - Roundabout

MOE - Measure of Effectiveness

LOS - Level of Service

V/C - Volume to Capacity Ratio

Avail. - Available Storage (m)

> - Shared Right-Turn Lane

< - Shared Left-Turn Lane



TABLE 4.2: 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	Komoka Road & Oxbow Drive	TWSC	LOS Delay V/C 95th	< < < <	B 12 0.16 1	> > > >	B 12	< < < <	B 14 0.22 1	> > > >	B 14	A 8 0.02 0	A 0 0.00 0	A 0 0.00 0	A 1	A 8 0.01 0	A 0 0.00 0	A 0 0.00 0	A 1	
	Oxbow Drive & Union Avenue	TWSC	LOS Delay V/C 95th	A 7 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0	A 7 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0	< < < <	A 9 0.03 0	> > > >	A 9	< < < <	A 9 0.03 0	> > > >	A 9	
	Glendon Drive & Komoka Road	RBT	LOS Delay V/C 95th	< < < <	A 3 0.38 8	> > > >	A 0	< < < <	A 2 0.28 8	> > > >	A 0	< < < <	A 7 0.29 8	> > > >	A 0	< < < <	A 6 0.39 8	> > > >	A 0	A 4
	Oxbow Drive & Street 'A'	TWSC	LOS Delay V/C 95th	- - - -	A 0 0.00 0	A 0 0.00 0	A 0	A 8 0.00 0	A 0 0.00 0	- - - -	A 0	A 10 0.02 0	- - - -	> > > >	A 10					
PM Peak Hour	Komoka Road & Oxbow Drive	TWSC	LOS Delay V/C 95th	< < < <	B 12 0.15 1	> > > >	B 12	< < < <	C 19 0.39 2	> > > >	C 19	A 8 0.04 0	A 0 0.00 0	A 0 0.00 0	A 1	A 8 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0	
	Oxbow Drive & Union Avenue	TWSC	LOS Delay V/C 95th	A 8 0.01 0	A 0 0.00 0	A 0 0.00 0	A 1	A 8 0.01 0	A 0 0.00 0	A 0 0.00 0	A 1	< < < <	A 10 0.02 0	> > > >	A 10	< < < <	B 11 0.05 0	> > > >	B 11	
	Glendon Drive & Komoka Road	RBT	LOS Delay V/C 95th	< < < <	A 3 0.34 8	> > > >	A 0	< < < <	A 3 0.49 8	> > > >	A 0	< < < <	A 6 0.34 8	> > > >	A 0	< < < <	A 8 0.44 8	> > > >	A 0	A 4
	Oxbow Drive & Street 'A'	TWSC	LOS Delay V/C 95th	- - - -	A 0 0.00 0	A 0 0.00 0	A 0	A 7 0.01 0	A 0 0.00 0	- - - -	A 0	A 9 0.01 0	- - - -	> > > >	A 9					

TWSC - Two-Way Stop Control

TCS - Traffic Control Signal

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MOE - Measure of Effectiveness

LOS - Level of Service

V/C - Volume to Capacity Ratio

Avail. - Available Storage (m)

> - Shared Right-Turn Lane

< - Shared Left-Turn Lane



5 Remedial Measures

5.1 Left-turn Lanes

The Ministry of Transportation's Design Supplement to the Transportation Association of Canada (TAC) Geometric Design Guide for Canadian Roads⁵ provides guidance on the assessment of and/or need for auxiliary left-turn lanes at unsignalized intersections. The warrant nomograph is used to determine if a left-turn lane is needed based on the following criteria:

- ▶ Design speed of the road (posted speed + 10 km/h);
- ▶ Advancing Volume;
- ▶ Opposing Volume; and
- ▶ Percent of advancing vehicles performing a left-turn maneuver.

The following minimum thresholds must be met for a left-turn lane to be assessed:

- ▶ Greater than 100 vehicles per hour (vph) opposing vehicles; and
- ▶ Greater than 2.5% of advancing vehicles making a left-turn maneuver, as the left-turning vehicle percentage is rounded to the nearest 5.0%.

The following movements exceeded the above thresholds and were analyzed using the nomographs for left-turn lanes on two-lane undivided highways at unsignalized intersections:

- ▶ Southbound left-turns on Komoka Road at Oxbow Drive;
- ▶ Westbound left-turns on Oxbow Drive at Street 'A';
- ▶ Eastbound left-turns on Oxbow Drive at Union Avenue; and
- ▶ Westbound left-turns on Oxbow Drive at Union Avenue.

The results indicate that left-turn lanes are not warranted at study area intersections. **Appendix F** contains the left-turn lane nomographs.

⁵ Transportation Association of Canada, *MTO Design Supplement for TAC Geometric Design Guide for Canadian Roads – Appendix 9A*, Ministry of Transportation of Ontario, 2017.



6 Conclusions and Recommendations

6.1 Conclusions

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

- ▶ **Existing Traffic:** The study area intersections are operating with acceptable levels of service during the weekday AM and PM peak hours. No critical movements are occurring at the study area intersections.
- ▶ **Trip Generation:** The site's trip generation is estimated to be approximately 44 AM peak hour vehicle trips and 58 PM peak hour vehicle trips.
- ▶ **Background Traffic:** The study area intersections are forecast to continue to operate with acceptable levels of service during the weekday AM and PM peak hours. No critical movements are forecast to occur at the study area intersections.
- ▶ **Total Traffic:** The study area intersections are forecast to continue to operate with acceptable levels of service during the weekday AM and PM peak hours. No critical movements are forecast to occur at the study area intersections.
- ▶ **Left-Turn Lanes:** Left-turn lanes are not warranted at study area intersections under forecast total conditions.

6.2 Recommendations

Based on the findings of this study, it is recommended that the subject development be approved without any external transportation related improvements.



Appendix A

Existing Data





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Count Name: Komoka Road & Oxbow Drive
Site Code:
Start Date: 09/13/2018
Page No: 1

Turning Movement Data

Start Time	Oxbow Drive Eastbound						Oxbow Drive Westbound						Komoka Road Northbound						Komoka Road Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
7:00 AM	2	5	8	0	0	15	3	6	1	0	1	10	1	5	13	0	0	19	1	16	0	0	0	17	61
7:15 AM	0	7	10	0	0	17	10	7	1	0	0	18	1	10	9	0	0	20	4	18	0	0	0	22	77
7:30 AM	0	4	3	0	0	7	9	7	0	0	0	16	1	11	17	0	0	29	2	23	0	0	0	25	77
7:45 AM	0	7	4	0	0	11	2	4	2	0	0	8	3	6	12	0	0	21	3	14	2	0	0	19	59
Hourly Total	2	23	25	0	0	50	24	24	4	0	1	52	6	32	51	0	0	89	10	71	2	0	0	83	274
8:00 AM	1	13	5	0	0	19	10	5	0	0	0	15	3	8	13	0	0	24	1	18	3	0	0	22	80
8:15 AM	0	5	3	0	0	8	7	4	1	0	0	12	4	19	16	0	0	39	3	18	1	0	0	22	81
8:30 AM	0	7	15	0	0	22	7	6	0	0	0	13	2	14	20	0	0	36	3	19	1	0	0	23	94
8:45 AM	0	6	7	0	0	13	17	6	5	1	1	29	6	11	15	0	1	32	3	19	1	0	0	23	97
Hourly Total	1	31	30	0	0	62	41	21	6	1	1	69	15	52	64	0	1	131	10	74	6	0	0	90	352
9:00 AM	2	5	5	0	0	12	18	5	3	0	0	26	3	6	12	0	0	21	0	10	1	0	0	11	70
9:15 AM	0	3	5	0	0	8	7	3	3	0	0	13	4	10	13	0	0	27	0	16	1	0	0	17	65
9:30 AM	0	3	6	0	0	9	8	2	1	0	0	11	3	12	12	0	0	27	0	13	1	0	0	14	61
9:45 AM	1	7	4	0	0	12	11	5	0	0	0	16	6	12	8	0	0	26	4	15	0	0	0	19	73
Hourly Total	3	18	20	0	0	41	44	15	7	0	0	66	16	40	45	0	0	101	4	54	3	0	0	61	269
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11:00 AM	0	1	2	0	0	3	7	8	2	0	1	17	3	6	6	0	0	15	1	12	0	0	0	13	48
11:15 AM	0	1	3	0	0	4	9	3	1	0	0	13	6	12	4	0	0	22	3	9	0	0	0	12	51
11:30 AM	0	4	5	0	0	9	15	1	0	0	0	16	3	17	15	0	0	35	1	12	1	0	0	14	74
11:45 AM	1	3	4	0	0	8	7	3	3	0	0	13	2	4	13	0	0	19	2	8	0	0	0	10	50
Hourly Total	1	9	14	0	0	24	38	15	6	0	1	59	14	39	38	0	0	91	7	41	1	0	0	49	223
12:00 PM	0	2	3	0	0	5	19	6	0	0	3	25	0	14	13	0	0	27	1	12	1	0	0	14	71
12:15 PM	1	3	3	0	0	7	15	4	2	0	0	21	3	15	5	0	1	23	1	9	1	0	0	11	62
12:30 PM	2	3	3	0	0	8	9	5	0	0	0	14	3	9	13	0	0	25	0	14	1	0	0	15	62
12:45 PM	0	7	3	0	0	10	16	6	0	0	0	22	7	10	8	0	0	25	0	11	2	0	1	13	70
Hourly Total	3	15	12	0	0	30	59	21	2	0	3	82	13	48	39	0	1	100	2	46	5	0	1	53	265
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3:00 PM	1	5	6	0	0	12	7	8	4	0	0	19	5	15	13	0	0	33	2	19	2	0	0	23	87
3:15 PM	1	3	4	0	0	8	12	11	2	0	1	25	5	11	18	0	0	34	1	8	0	0	0	9	76
3:30 PM	1	11	6	0	0	18	23	13	5	0	0	41	5	12	7	0	0	24	1	8	0	0	0	9	92
3:45 PM	0	7	4	0	0	11	11	19	0	0	0	30	1	23	10	0	0	34	3	14	2	0	0	19	94
Hourly Total	3	26	20	0	0	49	53	51	11	0	1	115	16	61	48	0	0	125	7	49	4	0	0	60	349
4:00 PM	1	7	8	0	0	16	13	12	2	0	0	27	5	23	11	0	0	39	1	19	1	0	0	21	103
4:15 PM	2	6	8	0	0	16	14	9	3	0	2	26	7	22	3	0	0	32	1	19	3	0	0	23	97
4:30 PM	1	7	4	0	0	12	19	12	3	0	3	34	5	22	8	0	0	35	2	18	1	0	0	21	102
4:45 PM	1	5	6	0	0	12	20	13	3	0	0	36	4	23	17	0	0	44	0	16	1	0	0	17	109
Hourly Total	5	25	26	0	0	56	66	46	11	0	5	123	21	90	39	0	0	150	4	72	6	0	0	82	411

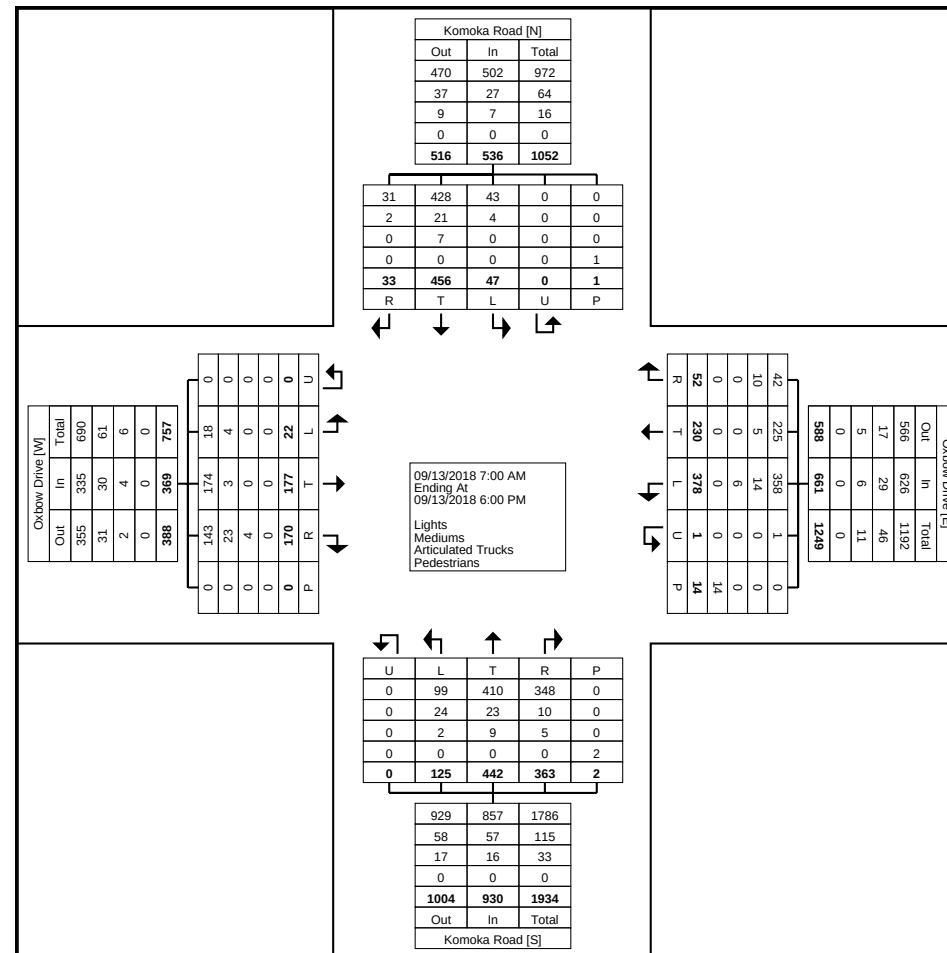
5:00 PM	1	11	6	0	0	18	15	11	1	0	0	27	7	22	12	0	0	41	2	14	0	0	0	16	102
5:15 PM	1	6	4	0	0	11	14	5	2	0	2	21	4	17	8	0	0	29	0	15	2	0	0	17	78
5:30 PM	2	9	8	0	0	19	10	15	1	0	0	26	11	19	10	0	0	40	0	9	1	0	0	10	95
5:45 PM	0	4	5	0	0	9	14	6	1	0	0	21	2	22	9	0	0	33	1	11	3	0	0	15	78
Hourly Total	4	30	23	0	0	57	53	37	5	0	2	95	24	80	39	0	0	143	3	49	6	0	0	58	353
Grand Total	22	177	170	0	0	369	378	230	52	1	14	661	125	442	363	0	2	930	47	456	33	0	1	536	2496
Approach %	6.0	48.0	46.1	0.0	-	-	57.2	34.8	7.9	0.2	-	-	13.4	47.5	39.0	0.0	-	-	8.8	85.1	6.2	0.0	-	-	-
Total %	0.9	7.1	6.8	0.0	-	14.8	15.1	9.2	2.1	0.0	-	26.5	5.0	17.7	14.5	0.0	-	37.3	1.9	18.3	1.3	0.0	-	21.5	-
Lights	18	174	143	0	-	335	358	225	42	1	-	626	99	410	348	0	-	857	43	428	31	0	-	502	2320
% Lights	81.8	98.3	84.1	-	-	90.8	94.7	97.8	80.8	100.0	-	94.7	79.2	92.8	95.9	-	-	92.2	91.5	93.9	93.9	-	-	93.7	92.9
Mediums	4	3	23	0	-	30	14	5	10	0	-	29	24	23	10	0	-	57	4	21	2	0	-	27	143
% Mediums	18.2	1.7	13.5	-	-	8.1	3.7	2.2	19.2	0.0	-	4.4	19.2	5.2	2.8	-	-	6.1	8.5	4.6	6.1	-	-	5.0	5.7
Articulated Trucks	0	0	4	0	-	4	6	0	0	0	-	6	2	9	5	0	-	16	0	7	0	0	-	7	33
% Articulated Trucks	0.0	0.0	2.4	-	-	1.1	1.6	0.0	0.0	0.0	-	0.9	1.6	2.0	1.4	-	-	1.7	0.0	1.5	0.0	-	-	1.3	1.3
Pedestrians	-	-	-	-	0	-	-	-	-	-	14	-	-	-	-	-	2	-	-	-	-	-	1	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-



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Count Name: Komoka Road & Oxbow Drive
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Start Date: 09/13/2018
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Turning Movement Data Plot



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Count Name: Komoka Road & Oxbow Drive
Site Code:
Start Date: 09/13/2018
Page No: 4

Turning Movement Peak Hour Data (8:00 AM)

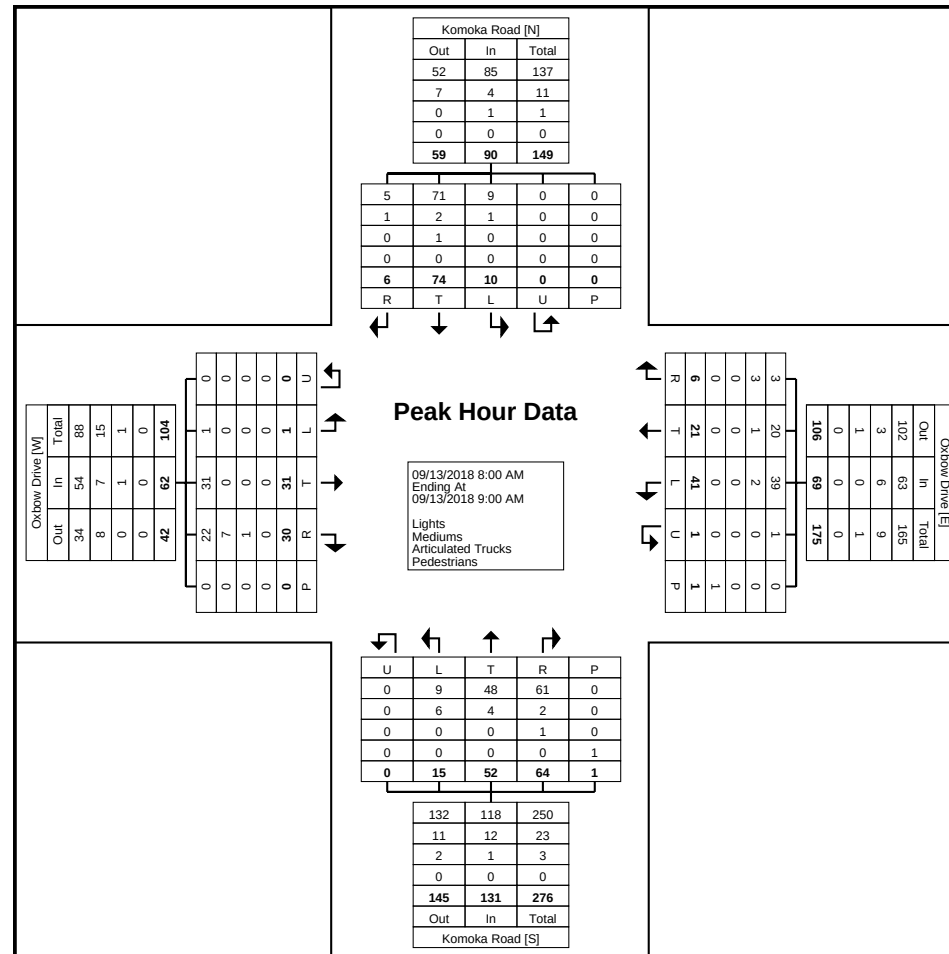
Start Time	Oxbow Drive Eastbound						Oxbow Drive Westbound						Komoka Road Northbound						Komoka Road Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
8:00 AM	1	13	5	0	0	19	10	5	0	0	0	15	3	8	13	0	0	24	1	18	3	0	0	22	80
8:15 AM	0	5	3	0	0	8	7	4	1	0	0	12	4	19	16	0	0	39	3	18	1	0	0	22	81
8:30 AM	0	7	15	0	0	22	7	6	0	0	0	13	2	14	20	0	0	36	3	19	1	0	0	23	94
8:45 AM	0	6	7	0	0	13	17	6	5	1	1	29	6	11	15	0	1	32	3	19	1	0	0	23	97
Total	1	31	30	0	0	62	41	21	6	1	1	69	15	52	64	0	1	131	10	74	6	0	0	90	352
Approach %	1.6	50.0	48.4	0.0	-	-	59.4	30.4	8.7	1.4	-	-	11.5	39.7	48.9	0.0	-	-	11.1	82.2	6.7	0.0	-	-	-
Total %	0.3	8.8	8.5	0.0	-	17.6	11.6	6.0	1.7	0.3	-	19.6	4.3	14.8	18.2	0.0	-	37.2	2.8	21.0	1.7	0.0	-	25.6	-
PHF	0.250	0.596	0.500	0.000	-	0.705	0.603	0.875	0.300	0.250	-	0.595	0.625	0.684	0.800	0.000	-	0.840	0.833	0.974	0.500	0.000	-	0.978	0.907
Lights	1	31	22	0	-	54	39	20	3	1	-	63	9	48	61	0	-	118	9	71	5	0	-	85	320
% Lights	100.0	100.0	73.3	-	-	87.1	95.1	95.2	50.0	100.0	-	91.3	60.0	92.3	95.3	-	-	90.1	90.0	95.9	83.3	-	-	94.4	90.9
Mediums	0	0	7	0	-	7	2	1	3	0	-	6	6	4	2	0	-	12	1	2	1	0	-	4	29
% Mediums	0.0	0.0	23.3	-	-	11.3	4.9	4.8	50.0	0.0	-	8.7	40.0	7.7	3.1	-	-	9.2	10.0	2.7	16.7	-	-	4.4	8.2
Articulated Trucks	0	0	1	0	-	1	0	0	0	0	-	0	0	0	1	0	-	1	0	1	0	0	-	1	3
% Articulated Trucks	0.0	0.0	3.3	-	-	1.6	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	1.6	-	-	0.8	0.0	1.4	0.0	-	-	1.1	0.9
Pedestrians	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	1	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-



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Count Name: Komoka Road & Oxbow Drive
Site Code:
Start Date: 09/13/2018
Page No: 5



Turning Movement Peak Hour Data Plot (8:00 AM)



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Count Name: Komoka Road & Oxbow Drive
Site Code:
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Turning Movement Peak Hour Data (12:00 PM)

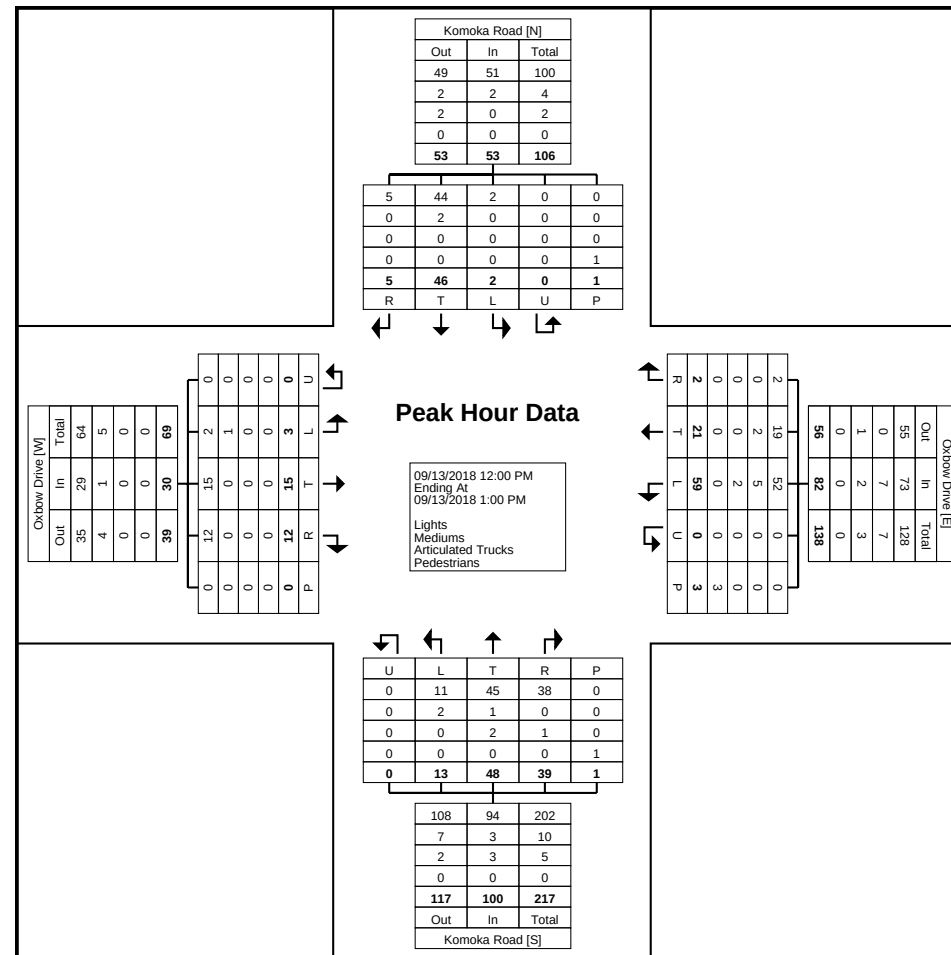
Start Time	Oxbow Drive Eastbound						Oxbow Drive Westbound						Komoka Road Northbound						Komoka Road Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
12:00 PM	0	2	3	0	0	5	19	6	0	0	3	25	0	14	13	0	0	27	1	12	1	0	0	14	71
12:15 PM	1	3	3	0	0	7	15	4	2	0	0	21	3	15	5	0	1	23	1	9	1	0	0	11	62
12:30 PM	2	3	3	0	0	8	9	5	0	0	0	14	3	9	13	0	0	25	0	14	1	0	0	15	62
12:45 PM	0	7	3	0	0	10	16	6	0	0	0	22	7	10	8	0	0	25	0	11	2	0	1	13	70
Total	3	15	12	0	0	30	59	21	2	0	3	82	13	48	39	0	1	100	2	46	5	0	1	53	265
Approach %	10.0	50.0	40.0	0.0	-	-	72.0	25.6	2.4	0.0	-	-	13.0	48.0	39.0	0.0	-	-	3.8	86.8	9.4	0.0	-	-	-
Total %	1.1	5.7	4.5	0.0	-	11.3	22.3	7.9	0.8	0.0	-	30.9	4.9	18.1	14.7	0.0	-	37.7	0.8	17.4	1.9	0.0	-	20.0	-
PHF	0.375	0.536	1.000	0.000	-	0.750	0.776	0.875	0.250	0.000	-	0.820	0.464	0.800	0.750	0.000	-	0.926	0.500	0.821	0.625	0.000	-	0.883	0.933
Lights	2	15	12	0	-	29	52	19	2	0	-	73	11	45	38	0	-	94	2	44	5	0	-	51	247
% Lights	66.7	100.0	100.0	-	-	96.7	88.1	90.5	100.0	-	-	89.0	84.6	93.8	97.4	-	-	94.0	100.0	95.7	100.0	-	-	96.2	93.2
Mediums	1	0	0	0	-	1	5	2	0	0	-	7	2	1	0	0	-	3	0	2	0	0	-	2	13
% Mediums	33.3	0.0	0.0	-	-	3.3	8.5	9.5	0.0	-	-	8.5	15.4	2.1	0.0	-	-	3.0	0.0	4.3	0.0	-	-	3.8	4.9
Articulated Trucks	0	0	0	0	-	0	2	0	0	0	-	2	0	2	1	0	-	3	0	0	0	0	-	0	5
% Articulated Trucks	0.0	0.0	0.0	-	-	0.0	3.4	0.0	0.0	-	-	2.4	0.0	4.2	2.6	-	-	3.0	0.0	0.0	0.0	-	-	0.0	1.9
Pedestrians	-	-	-	-	0	-	-	-	-	-	3	-	-	-	-	-	1	-	-	-	-	-	1	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-



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Count Name: Komoka Road & Oxbow Drive
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Start Date: 09/13/2018
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Turning Movement Peak Hour Data Plot (12:00 PM)

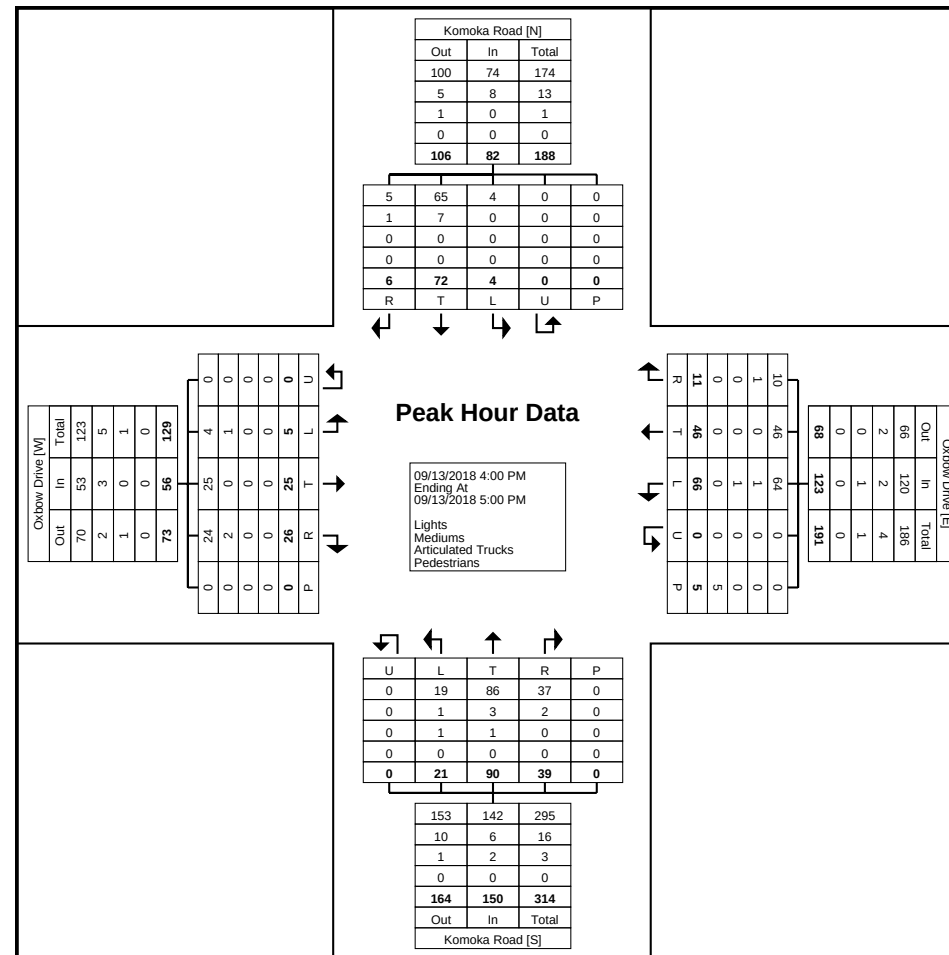
Start Time	Oxbow Drive Eastbound						Oxbow Drive Westbound						Komoka Road Northbound						Komoka Road Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
4:00 PM	1	7	8	0	0	16	13	12	2	0	0	27	5	23	11	0	0	39	1	19	1	0	0	21	103
4:15 PM	2	6	8	0	0	16	14	9	3	0	2	26	7	22	3	0	0	32	1	19	3	0	0	23	97
4:30 PM	1	7	4	0	0	12	19	12	3	0	3	34	5	22	8	0	0	35	2	18	1	0	0	21	102
4:45 PM	1	5	6	0	0	12	20	13	3	0	0	36	4	23	17	0	0	44	0	16	1	0	0	17	109
Total	5	25	26	0	0	56	66	46	11	0	5	123	21	90	39	0	0	150	4	72	6	0	0	82	411
Approach %	8.9	44.6	46.4	0.0	-	-	53.7	37.4	8.9	0.0	-	-	14.0	60.0	26.0	0.0	-	-	4.9	87.8	7.3	0.0	-	-	-
Total %	1.2	6.1	6.3	0.0	-	13.6	16.1	11.2	2.7	0.0	-	29.9	5.1	21.9	9.5	0.0	-	36.5	1.0	17.5	1.5	0.0	-	20.0	-
PHF	0.625	0.893	0.813	0.000	-	0.875	0.825	0.885	0.917	0.000	-	0.854	0.750	0.978	0.574	0.000	-	0.852	0.500	0.947	0.500	0.000	-	0.891	0.943
Lights	4	25	24	0	-	53	64	46	10	0	-	120	19	86	37	0	-	142	4	65	5	0	-	74	389
% Lights	80.0	100.0	92.3	-	-	94.6	97.0	100.0	90.9	-	-	97.6	90.5	95.6	94.9	-	-	94.7	100.0	90.3	83.3	-	-	90.2	94.6
Mediums	1	0	2	0	-	3	1	0	1	0	-	2	1	3	2	0	-	6	0	7	1	0	-	8	19
% Mediums	20.0	0.0	7.7	-	-	5.4	1.5	0.0	9.1	-	-	1.6	4.8	3.3	5.1	-	-	4.0	0.0	9.7	16.7	-	-	9.8	4.6
Articulated Trucks	0	0	0	0	-	0	1	0	0	0	-	1	1	1	0	0	-	2	0	0	0	0	-	0	3
% Articulated Trucks	0.0	0.0	0.0	-	-	0.0	1.5	0.0	0.0	-	-	0.8	4.8	1.1	0.0	-	-	1.3	0.0	0.0	0.0	-	-	0.0	0.7
Pedestrians	-	-	-	-	0	-	-	-	-	-	5	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-



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Site Code:
Start Date: 09/13/2018
Page No: 9





Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 cbowness@ptsl.com

Count Name: Komoka Road & Oxbow Drive
Site Code:
Start Date: 09/13/2018
Page No: 10



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

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

Count Name: Union Avenue & Oxbow Drive
Site Code: 200272
Start Date: 06/25/2020
Page No: 1

Turning Movement Data

Start Time	Oxbow Drive Eastbound					Oxbow Drive Westbound					Union Avenue Southbound					Int. Total
	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Left	Right	U-Turn	Peds	App. Total	
7:00 AM	0	9	0	0	9	4	0	0	0	4	3	0	0	0	3	16
7:15 AM	1	12	0	0	13	5	0	0	0	5	1	2	0	0	3	21
7:30 AM	0	10	0	0	10	13	0	0	0	13	6	1	0	0	7	30
7:45 AM	0	15	0	0	15	12	3	0	0	15	4	0	0	0	4	34
Hourly Total	1	46	0	0	47	34	3	0	0	37	14	3	0	0	17	101
8:00 AM	1	12	0	0	13	5	1	0	0	6	2	0	0	0	2	21
8:15 AM	0	13	0	0	13	12	0	0	0	12	1	0	0	0	1	26
8:30 AM	2	17	1	0	20	4	0	0	0	4	7	0	0	0	7	31
8:45 AM	0	10	0	0	10	10	1	0	0	11	6	2	0	0	8	29
Hourly Total	3	52	1	0	56	31	2	0	0	33	16	2	0	0	18	107
9:00 AM	2	7	0	0	9	11	1	0	0	12	2	3	0	1	5	26
9:15 AM	0	13	0	0	13	9	0	0	0	9	2	1	0	0	3	25
9:30 AM	1	14	0	0	15	13	1	0	1	14	4	2	0	0	6	35
9:45 AM	0	13	0	0	13	10	6	0	0	16	2	3	1	2	6	35
Hourly Total	3	47	0	0	50	43	8	0	1	51	10	9	1	3	20	121
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11:00 AM	3	16	0	0	19	14	2	0	0	16	2	1	0	0	3	38
11:15 AM	0	11	0	0	11	13	2	0	0	15	4	0	0	1	4	30
11:30 AM	0	23	0	0	23	9	2	0	0	11	2	0	0	0	2	36
11:45 AM	0	16	0	0	16	17	3	0	0	20	4	2	0	0	6	42
Hourly Total	3	66	0	0	69	53	9	0	0	62	12	3	0	1	15	146
12:00 PM	1	17	0	0	18	13	5	0	0	18	3	1	0	1	4	40
12:15 PM	0	29	0	0	29	12	1	0	0	13	4	1	0	0	5	47
12:30 PM	0	22	0	0	22	20	4	0	0	24	4	0	0	2	4	50
12:45 PM	1	24	0	0	25	13	3	0	3	16	3	1	0	1	4	45
Hourly Total	2	92	0	0	94	58	13	0	3	71	14	3	0	4	17	182
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3:00 PM	0	7	0	0	7	25	0	0	0	25	2	0	0	0	2	34
3:15 PM	2	20	0	0	22	19	2	0	0	21	2	0	0	0	2	45
3:30 PM	0	20	0	0	20	13	1	0	0	14	1	3	0	0	4	38
3:45 PM	2	22	0	0	24	22	4	0	0	26	3	2	0	0	5	55
Hourly Total	4	69	0	0	73	79	7	0	0	86	8	5	0	0	13	172
4:00 PM	2	21	0	0	23	28	3	0	0	31	5	1	0	0	6	60
4:15 PM	1	17	0	0	18	19	5	0	0	24	5	4	0	0	9	51
4:30 PM	3	23	0	0	26	19	5	0	0	24	4	1	0	0	5	55
4:45 PM	1	13	0	0	14	21	3	0	0	24	3	0	0	0	3	41

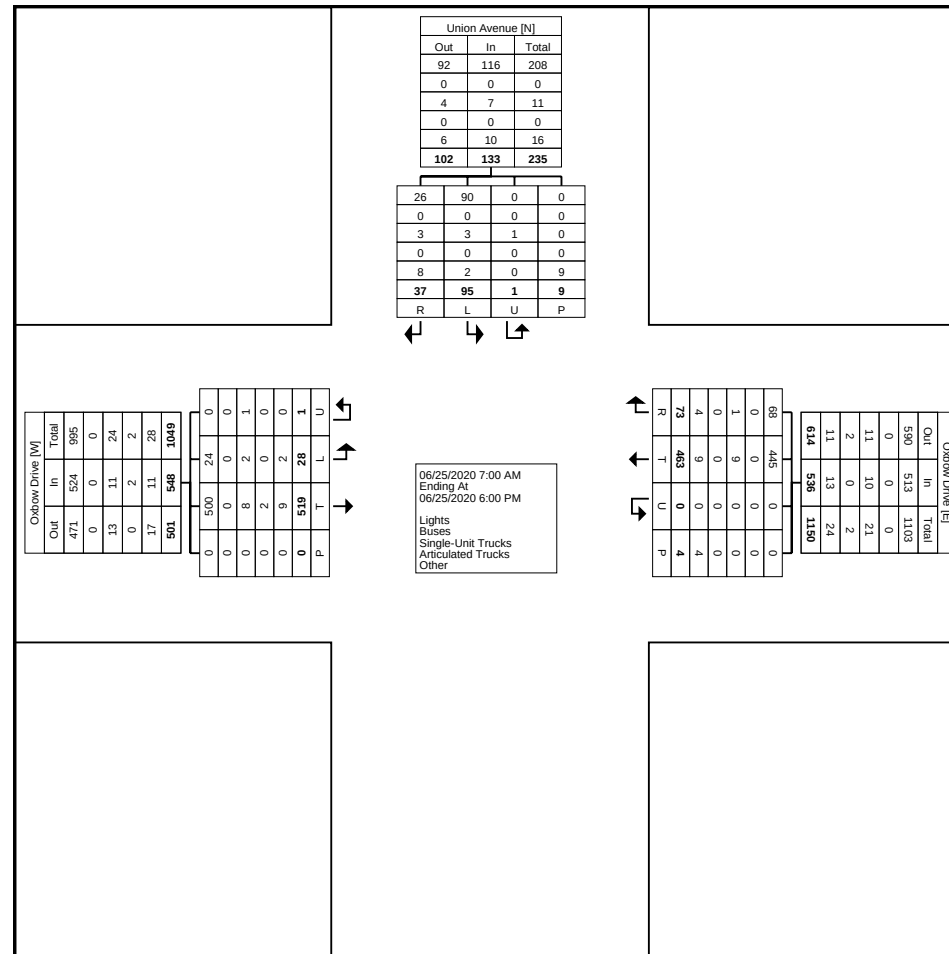
Hourly Total	7	74	0	0	81	87	16	0	0	103	17	6	0	0	23	207
5:00 PM	0	21	0	0	21	24	6	0	0	30	0	3	0	0	3	54
5:15 PM	0	17	0	0	17	17	2	0	0	19	0	1	0	1	1	37
5:30 PM	2	19	0	0	21	20	4	0	0	24	2	1	0	0	3	48
5:45 PM	3	16	0	0	19	17	3	0	0	20	2	1	0	0	3	42
Hourly Total	5	73	0	0	78	78	15	0	0	93	4	6	0	1	10	181
Grand Total	28	519	1	0	548	463	73	0	4	536	95	37	1	9	133	1217
Approach %	5.1	94.7	0.2	-	-	86.4	13.6	0.0	-	-	71.4	27.8	0.8	-	-	-
Total %	2.3	42.6	0.1	-	45.0	38.0	6.0	0.0	-	44.0	7.8	3.0	0.1	-	10.9	-
Lights	24	500	0	-	524	445	68	0	-	513	90	26	0	-	116	1153
% Lights	85.7	96.3	0.0	-	95.6	96.1	93.2	-	-	95.7	94.7	70.3	0.0	-	87.2	94.7
Buses	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Buses	0.0	0.0	0.0	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	0.0	0.0
Single-Unit Trucks	2	8	1	-	11	9	1	0	-	10	3	3	1	-	7	28
% Single-Unit Trucks	7.1	1.5	100.0	-	2.0	1.9	1.4	-	-	1.9	3.2	8.1	100.0	-	5.3	2.3
Articulated Trucks	0	2	0	-	2	0	0	0	-	0	0	0	0	-	0	2
% Articulated Trucks	0.0	0.4	0.0	-	0.4	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	0.0	0.2
Bicycles on Road	2	9	0	-	11	9	4	0	-	13	2	8	0	-	10	34
% Bicycles on Road	7.1	1.7	0.0	-	2.0	1.9	5.5	-	-	2.4	2.1	21.6	0.0	-	7.5	2.8
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	2	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	0.0	-	-	-	-	22.2	-	-
Pedestrians	-	-	-	0	-	-	-	-	4	-	-	-	-	7	-	-
% Pedestrians	-	-	-	-	-	-	-	-	100.0	-	-	-	-	77.8	-	-



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

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Count Name: Union Avenue & Oxbow Drive
Site Code: 200272
Start Date: 06/25/2020
Page No: 3





Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

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

Count Name: Union Avenue & Oxbow Drive
Site Code: 200272
Start Date: 06/25/2020
Page No: 4

Turning Movement Peak Hour Data (9:00 AM)

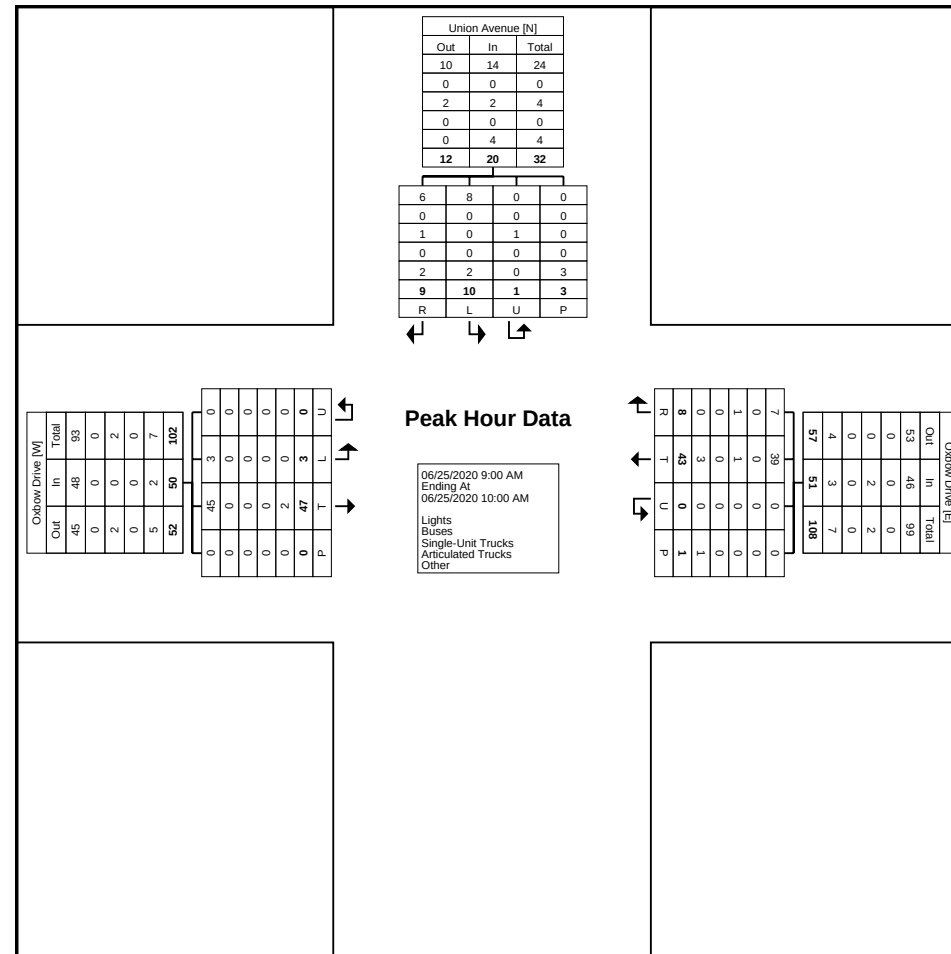
Start Time	Oxbow Drive Eastbound					Oxbow Drive Westbound					Union Avenue Southbound					Int. Total
	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Left	Right	U-Turn	Peds	App. Total	
9:00 AM	2	7	0	0	9	11	1	0	0	12	2	3	0	1	5	26
9:15 AM	0	13	0	0	13	9	0	0	0	9	2	1	0	0	3	25
9:30 AM	1	14	0	0	15	13	1	0	1	14	4	2	0	0	6	35
9:45 AM	0	13	0	0	13	10	6	0	0	16	2	3	1	2	6	35
Total	3	47	0	0	50	43	8	0	1	51	10	9	1	3	20	121
Approach %	6.0	94.0	0.0	-	-	84.3	15.7	0.0	-	-	50.0	45.0	5.0	-	-	-
Total %	2.5	38.8	0.0	-	41.3	35.5	6.6	0.0	-	42.1	8.3	7.4	0.8	-	16.5	-
PHF	0.375	0.839	0.000	-	0.833	0.827	0.333	0.000	-	0.797	0.625	0.750	0.250	-	0.833	0.864
Lights	3	45	0	-	48	39	7	0	-	46	8	6	0	-	14	108
% Lights	100.0	95.7	-	-	96.0	90.7	87.5	-	-	90.2	80.0	66.7	0.0	-	70.0	89.3
Buses	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Buses	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	0.0	0.0
Single-Unit Trucks	0	0	0	-	0	1	1	0	-	2	0	1	1	-	2	4
% Single-Unit Trucks	0.0	0.0	-	-	0.0	2.3	12.5	-	-	3.9	0.0	11.1	100.0	-	10.0	3.3
Articulated Trucks	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Articulated Trucks	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	0.0	0.0
Bicycles on Road	0	2	0	-	2	3	0	0	-	3	2	2	0	-	4	9
% Bicycles on Road	0.0	4.3	-	-	4.0	7.0	0.0	-	-	5.9	20.0	22.2	0.0	-	20.0	7.4
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	0.0	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	0	-	-	-	-	1	-	-	-	-	3	-	-
% Pedestrians	-	-	-	-	-	-	-	-	100.0	-	-	-	-	100.0	-	-



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

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

Count Name: Union Avenue & Oxbow Drive
Site Code: 200272
Start Date: 06/25/2020
Page No: 5



Turning Movement Peak Hour Data Plot (9:00 AM)



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

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

Count Name: Union Avenue & Oxbow Drive
Site Code: 200272
Start Date: 06/25/2020
Page No: 6

Turning Movement Peak Hour Data (12:00 PM)

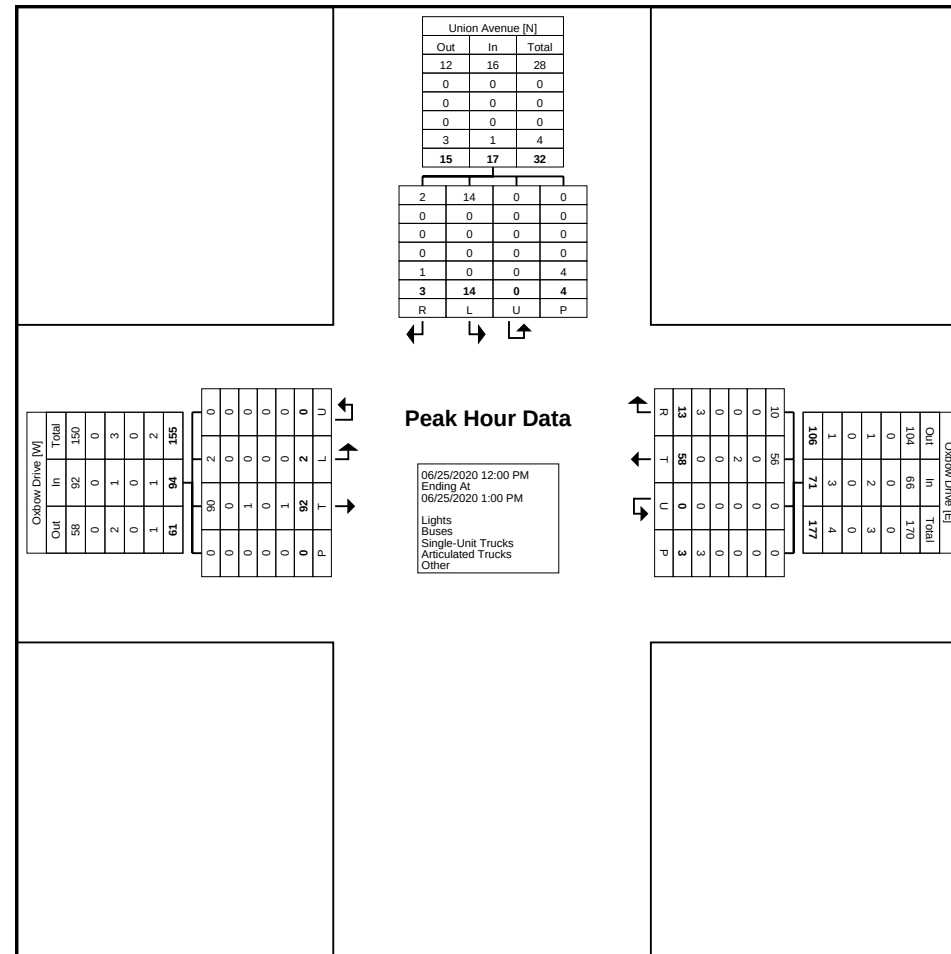
Start Time	Oxbow Drive Eastbound					Oxbow Drive Westbound					Union Avenue Southbound					Int. Total
	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Left	Right	U-Turn	Peds	App. Total	
12:00 PM	1	17	0	0	18	13	5	0	0	18	3	1	0	1	4	40
12:15 PM	0	29	0	0	29	12	1	0	0	13	4	1	0	0	5	47
12:30 PM	0	22	0	0	22	20	4	0	0	24	4	0	0	2	4	50
12:45 PM	1	24	0	0	25	13	3	0	3	16	3	1	0	1	4	45
Total	2	92	0	0	94	58	13	0	3	71	14	3	0	4	17	182
Approach %	2.1	97.9	0.0	-	-	81.7	18.3	0.0	-	-	82.4	17.6	0.0	-	-	-
Total %	1.1	50.5	0.0	-	51.6	31.9	7.1	0.0	-	39.0	7.7	1.6	0.0	-	9.3	-
PHF	0.500	0.793	0.000	-	0.810	0.725	0.650	0.000	-	0.740	0.875	0.750	0.000	-	0.850	0.910
Lights	2	90	0	-	92	56	10	0	-	66	14	2	0	-	16	174
% Lights	100.0	97.8	-	-	97.9	96.6	76.9	-	-	93.0	100.0	66.7	-	-	94.1	95.6
Buses	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Buses	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Single-Unit Trucks	0	1	0	-	1	2	0	0	-	2	0	0	0	-	0	3
% Single-Unit Trucks	0.0	1.1	-	-	1.1	3.4	0.0	-	-	2.8	0.0	0.0	-	-	0.0	1.6
Articulated Trucks	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Articulated Trucks	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Road	0	1	0	-	1	0	3	0	-	3	0	1	0	-	1	5
% Bicycles on Road	0.0	1.1	-	-	1.1	0.0	23.1	-	-	4.2	0.0	33.3	-	-	5.9	2.7
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	2	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	0.0	-	-	-	-	50.0	-	-
Pedestrians	-	-	-	0	-	-	-	-	3	-	-	-	-	2	-	-
% Pedestrians	-	-	-	-	-	-	-	-	100.0	-	-	-	-	50.0	-	-



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

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

Count Name: Union Avenue & Oxbow Drive
Site Code: 200272
Start Date: 06/25/2020
Page No: 7



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

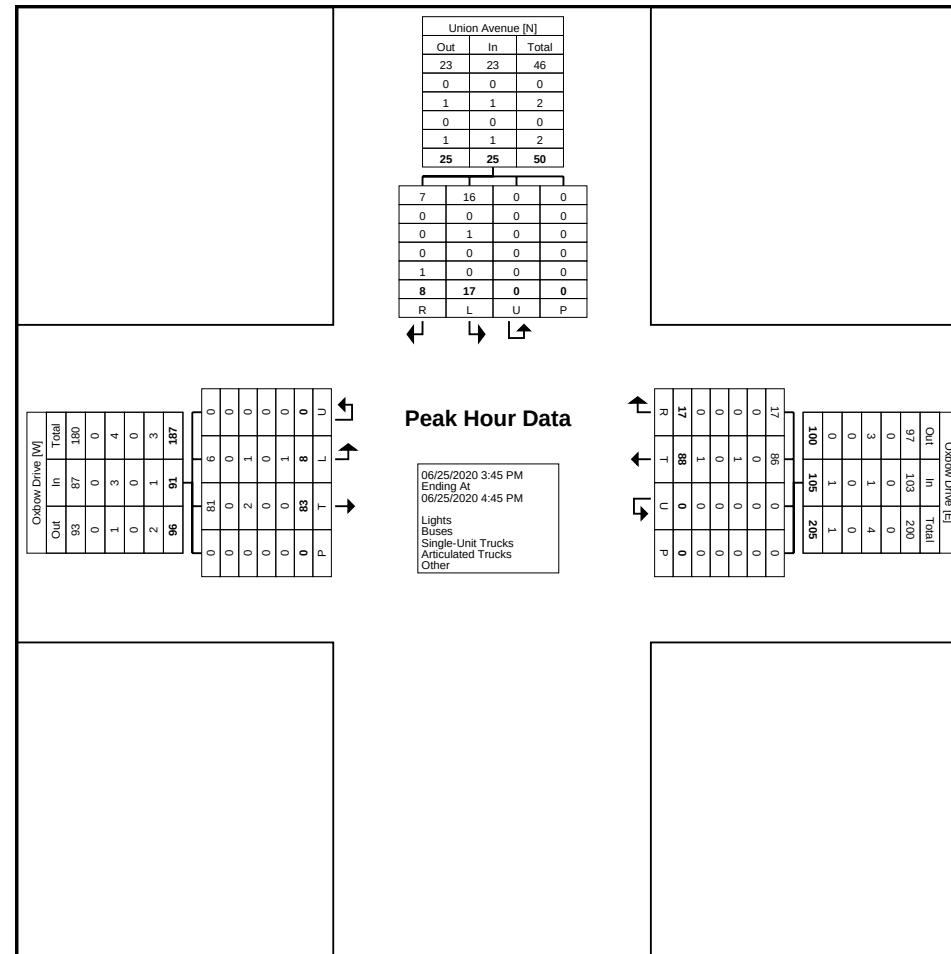
[illegible]



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

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

Count Name: Union Avenue & Oxbow Drive
Site Code: 200272
Start Date: 06/25/2020
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Turning Movement Peak Hour Data Plot (3:45 PM)



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

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

Count Name: Union Avenue & Oxbow Drive
Site Code: 200272
Start Date: 06/25/2020
Page No: 10



Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 cbowness@ptsl.com

Count Name: Komoka Road & Glendon Drive
Site Code:
Start Date: 09/13/2018
Page No: 1

Turning Movement Data

Start Time	Glendon Drive Eastbound						Glendon Drive Westbound						Komoka Road Northbound						Komoka Road Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
7:00 AM	12	99	6	0	0	117	5	64	4	0	0	73	3	7	18	0	0	28	24	7	15	0	0	46	264
7:15 AM	9	131	6	0	0	146	10	83	7	0	0	100	2	4	6	0	0	12	19	8	19	0	0	46	304
7:30 AM	17	136	2	0	0	155	11	85	11	0	0	107	9	10	29	0	0	48	24	10	28	0	0	62	372
7:45 AM	15	128	5	0	0	148	13	84	9	0	0	106	4	7	19	0	0	30	24	9	16	0	0	49	333
Hourly Total	53	494	19	0	0	566	39	316	31	0	0	386	18	28	72	0	0	118	91	34	78	0	0	203	1273
8:00 AM	20	111	5	0	0	136	12	77	6	0	0	95	13	4	26	0	0	43	17	9	20	0	0	46	320
8:15 AM	24	123	4	0	0	151	24	94	11	0	0	129	6	13	21	0	0	40	21	8	25	0	0	54	374
8:30 AM	15	103	6	0	0	124	19	75	9	0	0	103	10	19	12	0	0	41	25	8	21	0	0	54	322
8:45 AM	12	95	7	0	1	114	15	67	12	0	0	94	9	7	24	0	0	40	20	12	27	0	1	59	307
Hourly Total	71	432	22	0	1	525	70	313	38	0	0	421	38	43	83	0	0	164	83	37	93	0	1	213	1323
9:00 AM	14	88	2	0	1	104	10	67	8	0	0	85	4	5	8	0	0	17	18	12	17	0	0	47	253
9:15 AM	10	96	5	0	0	111	13	72	13	0	0	98	7	8	14	0	0	29	17	7	15	0	0	39	277
9:30 AM	20	90	2	0	0	112	4	74	4	0	1	82	5	4	23	0	0	32	16	6	22	0	0	44	270
9:45 AM	14	84	2	0	0	100	7	70	9	0	1	86	6	12	12	0	0	30	15	5	16	0	0	36	252
Hourly Total	58	358	11	0	1	427	34	283	34	0	2	351	22	29	57	0	0	108	66	30	70	0	0	166	1052
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11:00 AM	12	75	4	0	0	91	18	50	8	0	0	76	4	8	8	0	0	20	8	8	7	0	0	23	210
11:15 AM	15	71	2	0	0	88	11	59	14	0	1	84	6	4	11	0	0	21	9	8	6	0	2	23	216
11:30 AM	14	79	2	0	0	95	16	61	11	0	0	88	6	9	16	0	0	31	15	8	24	0	0	47	261
11:45 AM	11	70	3	0	0	84	15	67	11	0	0	93	10	10	11	0	0	31	7	10	8	0	0	25	233
Hourly Total	52	295	11	0	0	358	60	237	44	0	1	341	26	31	46	0	0	103	39	34	45	0	2	118	920
12:00 PM	8	80	3	0	2	91	10	55	9	0	0	74	4	14	18	0	0	36	11	11	19	0	2	41	242
12:15 PM	10	66	6	0	0	82	9	70	14	0	0	93	3	9	16	0	0	28	20	7	9	0	0	36	239
12:30 PM	8	81	7	0	0	96	20	89	11	0	0	120	4	6	17	0	0	27	11	11	15	0	0	37	280
12:45 PM	22	70	3	0	0	95	19	58	14	0	0	91	9	3	17	0	0	29	7	20	10	0	0	37	252
Hourly Total	48	297	19	0	2	364	58	272	48	0	0	378	20	32	68	0	0	120	49	49	53	0	2	151	1013
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3:00 PM	12	72	6	0	0	90	13	95	20	0	0	128	9	15	16	0	0	40	12	7	16	0	0	35	293
3:15 PM	12	82	1	0	0	95	23	93	20	0	0	136	6	9	9	0	0	24	24	4	10	0	0	38	293
3:30 PM	15	77	4	0	0	96	25	121	6	0	0	152	11	11	23	0	0	45	14	10	21	0	0	45	338
3:45 PM	16	95	5	0	0	116	17	116	24	0	0	157	5	17	21	0	0	43	20	7	12	0	1	39	355
Hourly Total	55	326	16	0	0	397	78	425	70	0	0	573	31	52	69	0	0	152	70	28	59	0	1	157	1279
4:00 PM	9	89	10	0	0	108	20	111	21	0	0	152	9	14	25	0	0	48	26	11	17	0	0	54	362
4:15 PM	19	94	11	0	0	124	22	142	24	0	0	188	10	19	20	0	0	49	21	10	22	0	0	53	414
4:30 PM	18	99	4	0	0	121	22	134	25	0	0	181	12	13	17	0	0	42	21	15	22	0	0	58	402
4:45 PM	12	123	8	0	0	143	22	157	28	0	0	207	4	18	17	0	0	39	18	14	23	0	0	55	444
Hourly Total	58	405	33	0	0	496	86	544	98	0	0	728	35	64	79	0	0	178	86	50	84	0	0	220	1622

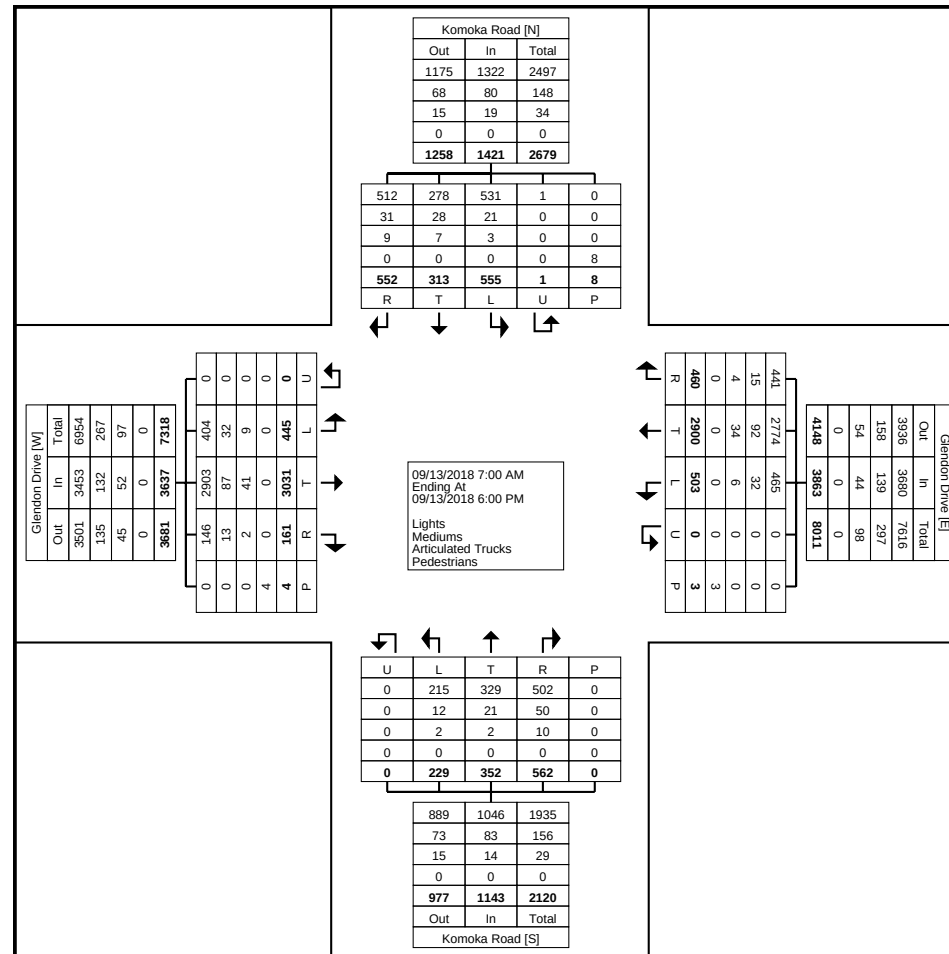
5:00 PM	9	112	11	0	0	132	21	140	32	0	0	193	10	24	27	0	0	61	24	20	21	0	0	65	451
5:15 PM	13	113	6	0	0	132	26	149	18	0	0	193	11	16	27	0	0	54	11	12	20	0	0	43	422
5:30 PM	16	113	8	0	0	137	13	120	22	0	0	155	10	14	19	0	0	43	21	11	13	1	2	46	381
5:45 PM	12	86	5	0	0	103	18	101	25	0	0	144	8	19	15	0	0	42	15	8	16	0	0	39	328
Hourly Total	50	424	30	0	0	504	78	510	97	0	0	685	39	73	88	0	0	200	71	51	70	1	2	193	1582
Grand Total	445	3031	161	0	4	3637	503	2900	460	0	3	3863	229	352	562	0	0	1143	555	313	552	1	8	1421	10064
Approach %	12.2	83.3	4.4	0.0	-	-	13.0	75.1	11.9	0.0	-	-	20.0	30.8	49.2	0.0	-	-	39.1	22.0	38.8	0.1	-	-	-
Total %	4.4	30.1	1.6	0.0	-	36.1	5.0	28.8	4.6	0.0	-	38.4	2.3	3.5	5.6	0.0	-	11.4	5.5	3.1	5.5	0.0	-	14.1	-
Lights	404	2903	146	0	-	3453	465	2774	441	0	-	3680	215	329	502	0	-	1046	531	278	512	1	-	1322	9501
% Lights	90.8	95.8	90.7	-	-	94.9	92.4	95.7	95.9	-	-	95.3	93.9	93.5	89.3	-	-	91.5	95.7	88.8	92.8	100.0	-	93.0	94.4
Mediums	32	87	13	0	-	132	32	92	15	0	-	139	12	21	50	0	-	83	21	28	31	0	-	80	434
% Mediums	7.2	2.9	8.1	-	-	3.6	6.4	3.2	3.3	-	-	3.6	5.2	6.0	8.9	-	-	7.3	3.8	8.9	5.6	0.0	-	5.6	4.3
Articulated Trucks	9	41	2	0	-	52	6	34	4	0	-	44	2	2	10	0	-	14	3	7	9	0	-	19	129
% Articulated Trucks	2.0	1.4	1.2	-	-	1.4	1.2	1.2	0.9	-	-	1.1	0.9	0.6	1.8	-	-	1.2	0.5	2.2	1.6	0.0	-	1.3	1.3
Pedestrians	-	-	-	-	4	-	-	-	-	-	3	-	-	-	-	-	0	-	-	-	-	-	8	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-



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Turning Movement Data Plot

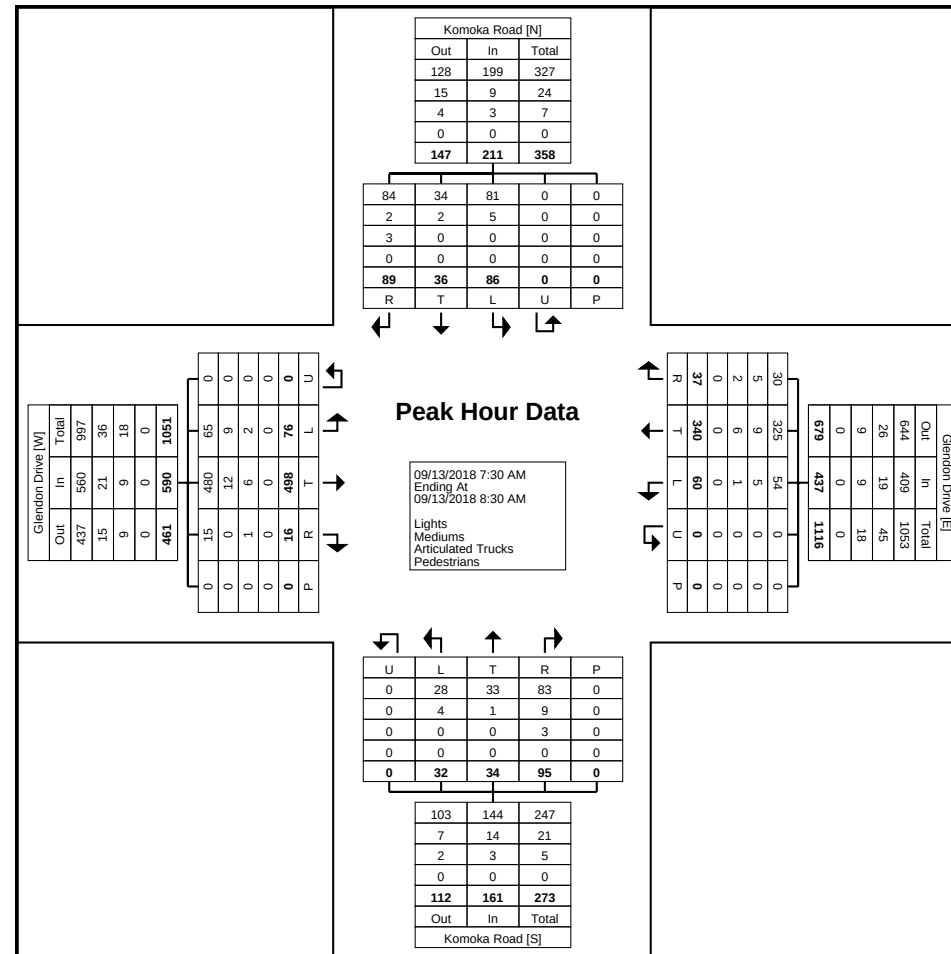
Start Time	Glendon Drive Eastbound						Glendon Drive Westbound						Komoka Road Northbound						Komoka Road Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
7:30 AM	17	136	2	0	0	155	11	85	11	0	0	107	9	10	29	0	0	48	24	10	28	0	0	62	372
7:45 AM	15	128	5	0	0	148	13	84	9	0	0	106	4	7	19	0	0	30	24	9	16	0	0	49	333
8:00 AM	20	111	5	0	0	136	12	77	6	0	0	95	13	4	26	0	0	43	17	9	20	0	0	46	320
8:15 AM	24	123	4	0	0	151	24	94	11	0	0	129	6	13	21	0	0	40	21	8	25	0	0	54	374
Total	76	498	16	0	0	590	60	340	37	0	0	437	32	34	95	0	0	161	86	36	89	0	0	211	1399
Approach %	12.9	84.4	2.7	0.0	-	-	13.7	77.8	8.5	0.0	-	-	19.9	21.1	59.0	0.0	-	-	40.8	17.1	42.2	0.0	-	-	-
Total %	5.4	35.6	1.1	0.0	-	42.2	4.3	24.3	2.6	0.0	-	31.2	2.3	2.4	6.8	0.0	-	11.5	6.1	2.6	6.4	0.0	-	15.1	-
PHF	0.792	0.915	0.800	0.000	-	0.952	0.625	0.904	0.841	0.000	-	0.847	0.615	0.654	0.819	0.000	-	0.839	0.896	0.900	0.795	0.000	-	0.851	0.935
Lights	65	480	15	0	-	560	54	325	30	0	-	409	28	33	83	0	-	144	81	34	84	0	-	199	1312
% Lights	85.5	96.4	93.8	-	-	94.9	90.0	95.6	81.1	-	-	93.6	87.5	97.1	87.4	-	-	89.4	94.2	94.4	94.4	-	-	94.3	93.8
Mediums	9	12	0	0	-	21	5	9	5	0	-	19	4	1	9	0	-	14	5	2	2	0	-	9	63
% Mediums	11.8	2.4	0.0	-	-	3.6	8.3	2.6	13.5	-	-	4.3	12.5	2.9	9.5	-	-	8.7	5.8	5.6	2.2	-	-	4.3	4.5
Articulated Trucks	2	6	1	0	-	9	1	6	2	0	-	9	0	0	3	0	-	3	0	0	3	0	-	3	24
% Articulated Trucks	2.6	1.2	6.3	-	-	1.5	1.7	1.8	5.4	-	-	2.1	0.0	0.0	3.2	-	-	1.9	0.0	0.0	3.4	-	-	1.4	1.7
Pedestrians	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



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Turning Movement Peak Hour Data (12:00 PM)

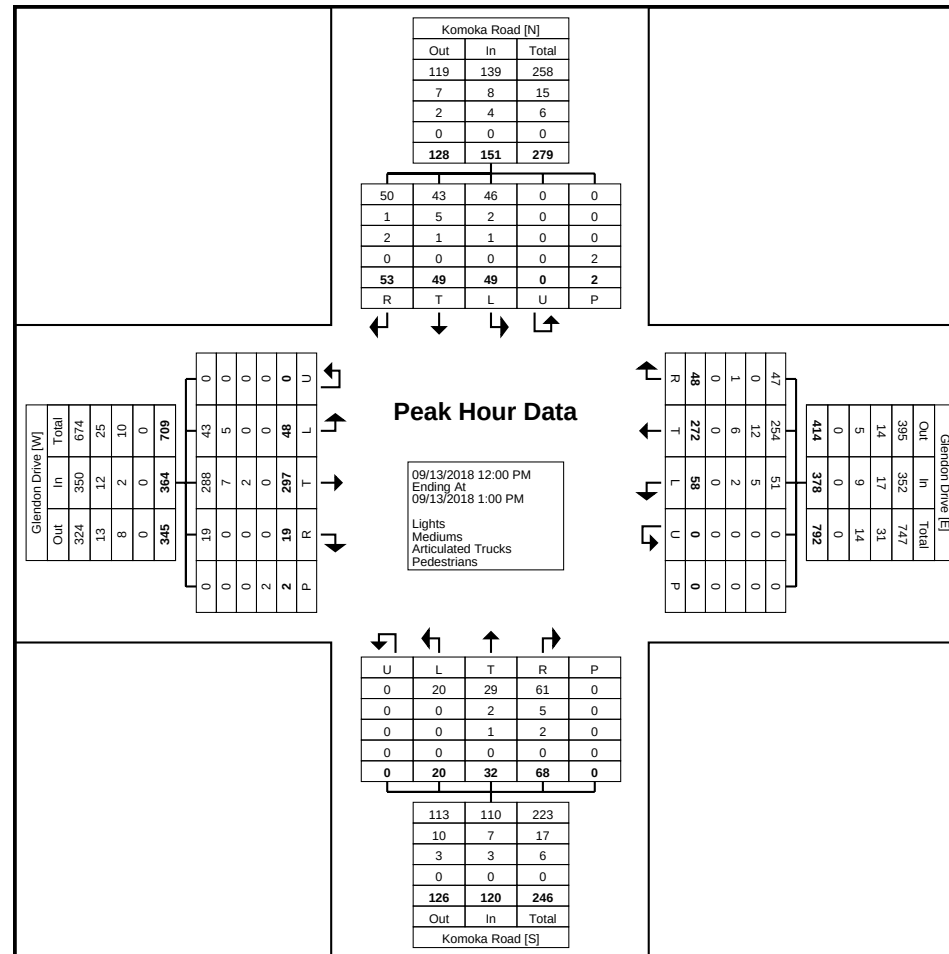
Start Time	Glendon Drive Eastbound						Glendon Drive Westbound						Komoka Road Northbound						Komoka Road Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
12:00 PM	8	80	3	0	2	91	10	55	9	0	0	74	4	14	18	0	0	36	11	11	19	0	2	41	242
12:15 PM	10	66	6	0	0	82	9	70	14	0	0	93	3	9	16	0	0	28	20	7	9	0	0	36	239
12:30 PM	8	81	7	0	0	96	20	89	11	0	0	120	4	6	17	0	0	27	11	11	15	0	0	37	280
12:45 PM	22	70	3	0	0	95	19	58	14	0	0	91	9	3	17	0	0	29	7	20	10	0	0	37	252
Total	48	297	19	0	2	364	58	272	48	0	0	378	20	32	68	0	0	120	49	49	53	0	2	151	1013
Approach %	13.2	81.6	5.2	0.0	-	-	15.3	72.0	12.7	0.0	-	-	16.7	26.7	56.7	0.0	-	-	32.5	32.5	35.1	0.0	-	-	-
Total %	4.7	29.3	1.9	0.0	-	35.9	5.7	26.9	4.7	0.0	-	37.3	2.0	3.2	6.7	0.0	-	11.8	4.8	4.8	5.2	0.0	-	14.9	-
PHF	0.545	0.917	0.679	0.000	-	0.948	0.725	0.764	0.857	0.000	-	0.788	0.556	0.571	0.944	0.000	-	0.833	0.613	0.613	0.697	0.000	-	0.921	0.904
Lights	43	288	19	0	-	350	51	254	47	0	-	352	20	29	61	0	-	110	46	43	50	0	-	139	951
% Lights	89.6	97.0	100.0	-	-	96.2	87.9	93.4	97.9	-	-	93.1	100.0	90.6	89.7	-	-	91.7	93.9	87.8	94.3	-	-	92.1	93.9
Mediums	5	7	0	0	-	12	5	12	0	0	-	17	0	2	5	0	-	7	2	5	1	0	-	8	44
% Mediums	10.4	2.4	0.0	-	-	3.3	8.6	4.4	0.0	-	-	4.5	0.0	6.3	7.4	-	-	5.8	4.1	10.2	1.9	-	-	5.3	4.3
Articulated Trucks	0	2	0	0	-	2	2	6	1	0	-	9	0	1	2	0	-	3	1	1	2	0	-	4	18
% Articulated Trucks	0.0	0.7	0.0	-	-	0.5	3.4	2.2	2.1	-	-	2.4	0.0	3.1	2.9	-	-	2.5	2.0	2.0	3.8	-	-	2.6	1.8
Pedestrians	-	-	-	-	2	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	2	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-



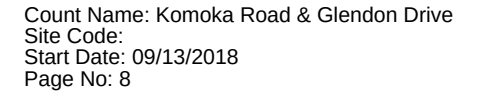
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Turning Movement Peak Hour Data Plot (12:00 PM)

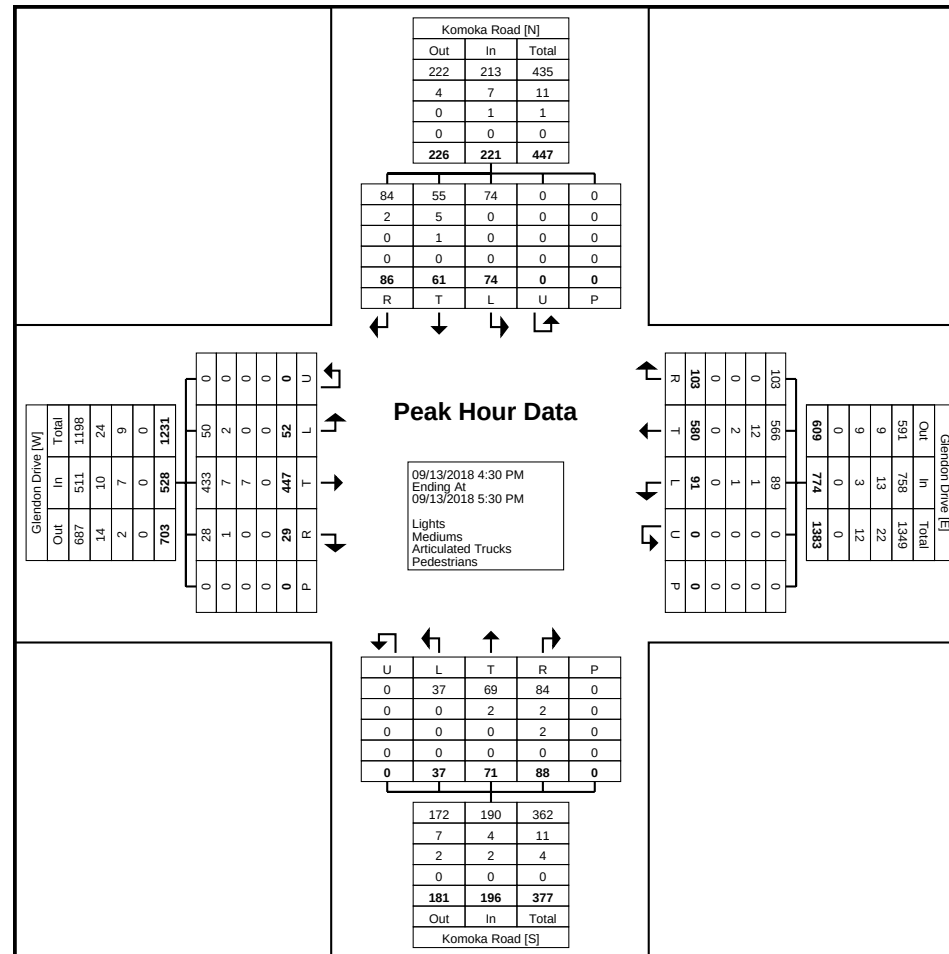




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Appendix B

Base Year Traffic Operations Reports



Lanes, Volumes, Timings
1: Komoka Road & Oxbow Drive

200272
Existing AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	1	31	30	41	21	6	15	52	64	10	74	6
Future Volume (vph)	1	31	30	41	21	6	15	52	64	10	74	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.934			0.987			0.934			0.990	
Flt Protected		0.999			0.971			0.994			0.994	
Satd. Flow (prot)	0	1550	0	0	1649	0	0	1584	0	0	1751	0
Flt Permitted		0.999			0.971			0.994			0.994	
Satd. Flow (perm)	0	1550	0	0	1649	0	0	1584	0	0	1751	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		192.1			753.9			1367.0			206.1	
Travel Time (s)		13.8			54.3			98.4			14.8	
Confl. Peds. (#/hr)			1	1					1	1		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	27%	5%	5%	50%	40%	8%	5%	10%	4%	17%
Adj. Flow (vph)	1	34	33	45	23	7	16	57	70	11	80	7
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	68	0	0	75	0	0	143	0	0	98	0
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	27.3%
Analysis Period (min)	15
ICU Level of Service A	

HCM 2010 TWSC
1: Komoka Road & Oxbow Drive

200272
Existing AM Peak Hour

Intersection

Int Delay, s/veh 4.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Vol, veh/h	1	31	30	41	21	6	15	52	64	10	74	6
Future Vol, veh/h	1	31	30	41	21	6	15	52	64	10	74	6
Conflicting Peds, #/hr	0	0	1	1	0	0	0	0	1	1	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	0	27	5	5	50	40	8	5	10	4	17
Mvmt Flow	1	34	33	45	23	7	16	57	70	11	80	7

Major/Minor	Minor2	Minor1	Major1	Major2
Conflicting Flow All	245	266	85	265
Stage 1	106	106	-	125
Stage 2	139	160	-	140
Critical Hdwy	7.1	6.5	6.47	7.15
Critical Hdwy Stg 1	6.1	5.5	-	6.15
Critical Hdwy Stg 2	6.1	5.5	-	6.15
Follow-up Hdwy	3.5	4	3.543	3.545
Pot Cap-1 Maneuver	713	643	909	682
Stage 1	905	811	-	872
Stage 2	869	769	-	856
Platoon blocked, %				
Mov Cap-1 Maneuver	677	629	908	619
Mov Cap-2 Maneuver	677	629	-	619
Stage 1	893	805	-	860
Stage 2	826	758	-	784

Approach	EB	WB	NB	SB
HCM Control Delay, s	10.4	11.3	0.9	0.8
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1301	-	-	740	643	1409	-
HCM Lane V/C Ratio	0.013	-	-	0.091	0.115	0.008	-
HCM Control Delay (s)	7.8	0	-	10.4	11.3	7.6	0
HCM Lane LOS	A	A	-	B	B	A	-
HCM 95th %tile Q(veh)	0	-	-	0.3	0.4	0	-

Lanes, Volumes, Timings
2: Oxbow Drive & Union Avenue

200272
Existing AM Peak Hour

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↗	↘		↖	↗
Traffic Volume (vph)	3	47	43	8	10	9
Future Volume (vph)	3	47	43	8	10	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt			0.978		0.936	
Flt Protected		0.997			0.974	
Satd. Flow (prot)	0	1873	1771	0	1628	0
Flt Permitted		0.997			0.974	
Satd. Flow (perm)	0	1873	1771	0	1628	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		156.3	219.4		163.7	
Travel Time (s)		11.3	15.8		11.8	
Confl. Peds. (#/hr)	1			1		1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	2%	13%	0%	11%
Adj. Flow (vph)	3	51	47	9	11	10
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	54	56	0	21	0
Sign Control		Free	Free		Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization 14.9%	ICU Level of Service A					
Analysis Period (min) 15						

HCM 2010 TWSC
2: Oxbow Drive & Union Avenue

200272
Existing AM Peak Hour

Intersection						
Int Delay, s/veh	1.6					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↗	↘		↖	↗
Traffic Vol, veh/h	3	47	43	8	10	9
Future Vol, veh/h	3	47	43	8	10	9
Conflicting Peds, #/hr	1	0	0	1	1	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	92	92	92	92	92	92
Heavy Vehicles, %	0	0	2	13	0	11
Mvmt Flow	3	51	47	9	11	10
Major/Minor						
Major1	Major2		Minor2			
Conflicting Flow All	57	0	-	0	111	53
Stage 1	-	-	-	-	53	-
Stage 2	-	-	-	-	58	-
Critical Hdwy	4.1	-	-	-	6.4	6.31
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.399
Pot Cap-1 Maneuver	1560	-	-	-	891	990
Stage 1	-	-	-	-	975	-
Stage 2	-	-	-	-	970	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	1559	-	-	-	887	989
Mov Cap-2 Maneuver	-	-	-	-	887	-
Stage 1	-	-	-	-	972	-
Stage 2	-	-	-	-	969	-
Approach						
EB	WB		SB			
HCM Control Delay, s	0.4	0	8.9			
HCM LOS			A			
Minor Lane/Major Mvmt						
EBL	EBT	WBT	WBR	SBLn1		
Capacity (veh/h)	1559	-	-	-	933	
HCM Lane V/C Ratio	0.002	-	-	-	0.022	
HCM Control Delay (s)	7.3	0	-	-	8.9	
HCM Lane LOS	A	A	-	-	A	
HCM 95th %tile Q(veh)	0	-	-	-	0.1	

Lanes, Volumes, Timings
3: Komoka Road & Glendon Drive

200272
Existing AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱	↲	↰	↱	↲	↰	↱	↲	↰	↱	↲
Traffic Volume (vph)	76	498	16	60	340	37	32	34	95	86	36	89
Future Volume (vph)	76	498	16	60	340	37	32	34	95	86	36	89
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	30.0		0.0	40.0		50.0	25.0		0.0	25.0		0.0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (m)	5.0			5.0			5.0			5.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.995				0.850		0.890			0.893	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1566	1797	0	1623	1807	1342	1580	1515	0	1684	1583	0
Flt Permitted	0.511			0.364			0.670			0.668		
Satd. Flow (perm)	842	1797	0	622	1807	1342	1114	1515	0	1184	1583	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		4				42		103			97	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		269.3			221.8			490.1			1367.0	
Travel Time (s)		19.4			16.0			35.3			98.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	14%	4%	6%	10%	4%	19%	13%	3%	13%	6%	6%	6%
Adj. Flow (vph)	83	541	17	65	370	40	35	37	103	93	39	97
Shared Lane Traffic (%)												
Lane Group Flow (vph)	83	558	0	65	370	40	35	140	0	93	136	0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Detector Phase	4	4		8	8	8	2	2		6	6	
Switch Phase												
Minimum Initial (s)	20.0	20.0		20.0	20.0	20.0	15.0	15.0		15.0	15.0	
Minimum Split (s)	26.0	26.0		26.0	26.0	26.0	21.0	21.0		21.0	21.0	
Total Split (s)	51.0	51.0		51.0	51.0	51.0	27.0	27.0		27.0	27.0	
Total Split (%)	65.4%	65.4%		65.4%	65.4%	65.4%	34.6%	34.6%		34.6%	34.6%	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0	-2.0	-2.0	-2.0		-2.0	-2.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Ped	Ped		Ped	Ped	Ped	None	None		None	None	
Act Effct Green (s)	29.6	29.6		29.6	29.6	29.6	17.3	17.3		17.3	17.3	
Actuated g/C Ratio	0.60	0.60		0.60	0.60	0.60	0.35	0.35		0.35	0.35	
v/c Ratio	0.16	0.51		0.17	0.34	0.05	0.09	0.23		0.22	0.22	
Control Delay	7.7	10.2		8.1	8.2	2.4	14.0	6.9		15.2	7.0	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	7.7	10.2		8.1	8.2	2.4	14.0	6.9		15.2	7.0	
LOS	A	B		A	A	A	B	A		B	A	
Approach Delay		9.9			7.7			8.3			10.3	
Approach LOS		A			A			A			B	
Queue Length 50th (m)	3.7	31.7		2.9	18.5	0.0	1.8	1.9		5.1	2.0	

Lanes, Volumes, Timings
3: Komoka Road & Glendon Drive

200272
Existing AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (m)	9.1	53.7		8.0	31.7	2.8	8.3	13.5		17.6	13.4	
Internal Link Dist (m)		245.3			197.8			466.1			1343.0	
Turn Bay Length (m)	30.0			40.0		50.0	25.0			25.0		
Base Capacity (vph)	795	1697		587	1707	1270	530	775		564	805	
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	
Reduced v/c Ratio	0.10	0.33		0.11	0.22	0.03	0.07	0.18		0.16	0.17	

Intersection Summary

Area Type: Other

Cycle Length: 78

Actuated Cycle Length: 49

Natural Cycle: 50

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.51

Intersection Signal Delay: 9.1

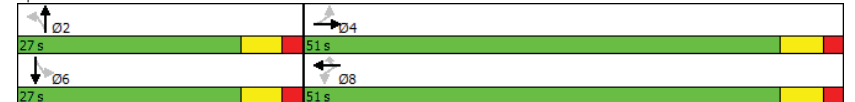
Intersection LOS: A

Intersection Capacity Utilization 82.2%

ICU Level of Service E

Analysis Period (min) 15

Splits and Phases: 3: Komoka Road & Glendon Drive



Lanes, Volumes, Timings
1: Komoka Road & Oxbow Drive

200272
Existing PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	25	26	66	46	11	21	90	39	4	72	6
Future Volume (vph)	5	25	26	66	46	11	21	90	39	4	72	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.937			0.988			0.965			0.989	
Flt Protected		0.996			0.974			0.993			0.998	
Satd. Flow (prot)	0	1664	0	0	1765	0	0	1713	0	0	1684	0
Flt Permitted		0.996			0.974			0.993			0.998	
Satd. Flow (perm)	0	1664	0	0	1765	0	0	1713	0	0	1684	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		192.1			753.9			1367.0			206.1	
Travel Time (s)		13.8			54.3			98.4			14.8	
Confl. Peds. (#/hr)									5	5		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	20%	0%	8%	3%	0%	9%	10%	4%	5%	0%	10%	17%
Adj. Flow (vph)	5	27	28	72	50	12	23	98	42	4	78	7
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	60	0	0	134	0	0	163	0	0	89	0
Sign Control		Stop			Stop			Free			Free	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	35.2%						ICU Level of Service A					
Analysis Period (min)	15											

HCM 2010 TWSC
1: Komoka Road & Oxbow Drive

200272
Existing PM Peak Hour

Intersection												
Int Delay, s/veh	5.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	25	26	66	46	11	21	90	39	4	72	6
Future Vol, veh/h	5	25	26	66	46	11	21	90	39	4	72	6
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	5	5	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	20	0	8	3	0	9	10	4	5	0	10	17
Mvmt Flow	5	27	28	72	50	12	23	98	42	4	78	7

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	286	281	82	287	263	124	85	0	0	145	0	0
Stage 1	90	90	-	170	170	-	-	-	-	-	-	-
Stage 2	196	191	-	117	93	-	-	-	-	-	-	-
Critical Hdwy	7.3	6.5	6.28	7.13	6.5	6.29	4.2	-	-	4.1	-	-
Critical Hdwy Stg 1	6.3	5.5	-	6.13	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.3	5.5	-	6.13	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.68	4	3.372	3.527	4	3.381	2.29	-	-	2.2	-	-
Pot Cap-1 Maneuver	632	631	961	663	646	908	1462	-	-	1450	-	-
Stage 1	875	824	-	830	762	-	-	-	-	-	-	-
Stage 2	766	746	-	885	822	-	-	-	-	-	-	-
Platoon blocked, %												
Mov Cap-1 Maneuver	577	616	961	610	630	904	1462	-	-	1444	-	-
Mov Cap-2 Maneuver	577	616	-	610	630	-	-	-	-	-	-	-
Stage 1	860	822	-	813	746	-	-	-	-	-	-	-
Stage 2	693	730	-	828	820	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	10.3	12.2	1.1	0.4
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1462	-	-	734	636	1444	-	-
HCM Lane V/C Ratio	0.016	-	-	0.083	0.21	0.003	-	-
HCM Control Delay (s)	7.5	0	-	10.3	12.2	7.5	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.3	0.8	0	-	-

Lanes, Volumes, Timings
2: Oxbow Drive & Union Avenue

200272
Existing PM Peak Hour

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	8	83	88	17	17	8
Future Volume (vph)	8	83	88	17	17	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt			0.979		0.955	
Flt Protected			0.995		0.968	
Satd. Flow (prot)	0	1815	1824	0	1670	0
Flt Permitted			0.995		0.968	
Satd. Flow (perm)	0	1815	1824	0	1670	0
Link Speed (k/h)			50		50	
Link Distance (m)			156.3		163.7	
Travel Time (s)			11.3		11.8	
Confl. Peds. (#/hr)	1			1		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	13%	2%	1%	0%	6%	0%
Adj. Flow (vph)	9	90	96	18	18	9
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	99	114	0	27	0
Sign Control	Free		Free		Stop	

Intersection Summary	
Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	21.0%
ICU Level of Service A	
Analysis Period (min)	15

HCM 2010 TWSC
2: Oxbow Drive & Union Avenue

200272
Existing PM Peak Hour

Intersection						
Int Delay, s/veh	1.4					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	8	83	88	17	17	8
Future Vol, veh/h	8	83	88	17	17	8
Conflicting Peds, #/hr	1	0	0	1	1	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	92	92	92	92	92	92
Heavy Vehicles, %	13	2	1	0	6	0
Mvmt Flow	9	90	96	18	18	9
Major/Minor	Major1	Major2	Minor2			
Conflicting Flow All	115	0	-	0	215	106
Stage 1	-	-	-	-	106	-
Stage 2	-	-	-	-	109	-
Critical Hdwy	4.23	-	-	-	6.46	6.2
Critical Hdwy Stg 1	-	-	-	-	5.46	-
Critical Hdwy Stg 2	-	-	-	-	5.46	-
Follow-up Hdwy	2.317	-	-	-	3.554	3.3
Pot Cap-1 Maneuver	1408	-	-	-	764	954
Stage 1	-	-	-	-	908	-
Stage 2	-	-	-	-	906	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	1407	-	-	-	757	953
Mov Cap-2 Maneuver	-	-	-	-	757	-
Stage 1	-	-	-	-	901	-
Stage 2	-	-	-	-	905	-
Approach	EB	WB		SB		
HCM Control Delay, s	0.7	0		9.6		
HCM LOS	A					
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1407	-	-	-	810	
HCM Lane V/C Ratio	0.006	-	-	-	0.034	
HCM Control Delay (s)	7.6	0	-	-	9.6	
HCM Lane LOS	A	A	-	-	A	
HCM 95th %tile Q(veh)	0	-	-	-	0.1	

Lanes, Volumes, Timings
3: Komoka Road & Glendon Drive

200272
Existing PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	52	447	29	91	580	103	37	71	88	74	61	86
Future Volume (vph)	52	447	29	91	580	103	37	71	88	74	61	86
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	30.0		0.0	40.0		50.0	25.0		0.0	25.0		0.0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (m)	5.0			5.0			5.0			5.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.991					0.850		0.917			0.912	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1716	1808	0	1750	1842	1597	1785	1655	0	1785	1627	0
Flt Permitted	0.290			0.375			0.656			0.646		
Satd. Flow (perm)	524	1808	0	691	1842	1597	1233	1655	0	1214	1627	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		8				112		82			92	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		269.3			221.8			490.1			1367.0	
Travel Time (s)		19.4			16.0			35.3			98.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	3%	3%	2%	2%	0%	0%	3%	5%	0%	10%	2%
Adj. Flow (vph)	57	486	32	99	630	112	40	77	96	80	66	93
Shared Lane Traffic (%)												
Lane Group Flow (vph)	57	518	0	99	630	112	40	173	0	80	159	0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Detector Phase	4	4		8	8	8	2	2		6	6	
Switch Phase												
Minimum Initial (s)	20.0	20.0		20.0	20.0	20.0	15.0	15.0		15.0	15.0	
Minimum Split (s)	26.0	26.0		26.0	26.0	26.0	21.0	21.0		21.0	21.0	
Total Split (s)	51.0	51.0		51.0	51.0	51.0	27.0	27.0		27.0	27.0	
Total Split (%)	65.4%	65.4%		65.4%	65.4%	65.4%	34.6%	34.6%		34.6%	34.6%	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0	-2.0	-2.0	-2.0		-2.0	-2.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Ped	Ped		Ped	Ped	Ped	None	None		None	None	
Act Effct Green (s)	30.0	30.0		30.0	30.0	30.0	17.2	17.2		17.2	17.2	
Actuated g/C Ratio	0.54	0.54		0.54	0.54	0.54	0.31	0.31		0.31	0.31	
v/c Ratio	0.20	0.53		0.26	0.63	0.12	0.10	0.30		0.21	0.28	
Control Delay	8.2	10.0		8.7	12.0	1.7	16.3	10.7		17.3	9.3	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	8.2	10.0		8.7	12.0	1.7	16.3	10.7		17.3	9.3	
LOS	A	B		A	B	A	B	B		B	A	
Approach Delay		9.9			10.2			11.7			12.0	
Approach LOS		A			B			B			B	
Queue Length 50th (m)	2.6	28.1		4.6	37.9	0.0	2.4	5.6		5.0	4.1	

Lanes, Volumes, Timings
3: Komoka Road & Glendon Drive

200272
Existing PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (m)	7.2	46.4		11.1	61.8	4.5	10.1	22.1		17.3	18.8	
Internal Link Dist (m)		245.3			197.8			466.1			1343.0	
Turn Bay Length (m)	30.0			40.0		50.0	25.0			25.0		
Base Capacity (vph)	450	1556		594	1584	1389	518	744		511	738	
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	
Reduced v/c Ratio	0.13	0.33		0.17	0.40	0.08	0.08	0.23		0.16	0.22	

Intersection Summary

Area Type: Other

Cycle Length: 78

Actuated Cycle Length: 55.3

Natural Cycle: 50

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.63

Intersection Signal Delay: 10.5

Intersection LOS: B

Intersection Capacity Utilization 85.5%

ICU Level of Service E

Analysis Period (min) 15

Splits and Phases: 3: Komoka Road & Glendon Drive

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Lanes, Volumes, Timings
4: Street A & Oxbow Drive

200272
Existing PM Peak Hour

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↩			↩	↩	
Traffic Volume (vph)	68	0	0	123	0	0
Future Volume (vph)	68	0	0	123	0	0
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

Flt Protected

Satd. Flow (prot)

Flt Permitted

Satd. Flow (perm)

Link Speed (k/h)

Link Distance (m)

Travel Time (s)

Peak Hour Factor

Adj. Flow (vph)

Shared Lane Traffic (%)

Lane Group Flow (vph)

Sign Control

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 9.8%

ICU Level of Service A

Analysis Period (min) 15

HCM 2010 TWSC
4: Street A & Oxbow Drive

200272
Existing PM Peak Hour

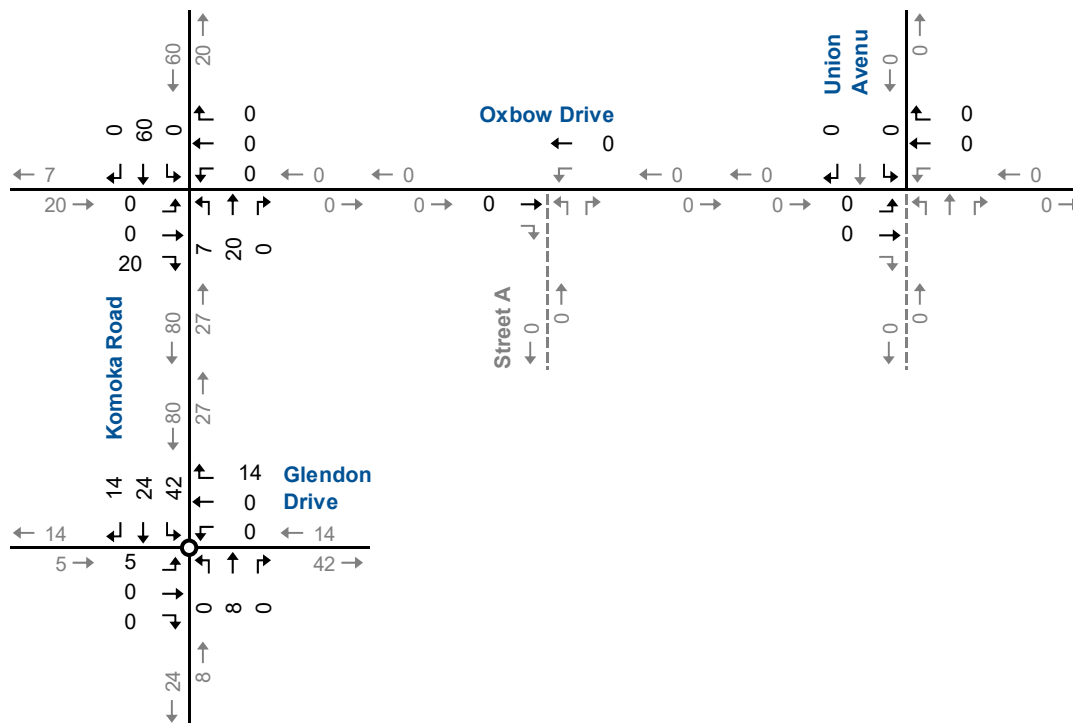
Intersection						
Int Delay, s/veh	0					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	68	0	0	123	0	0
Future Vol, veh/h	68	0	0	123	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	74	0	0	134	0	0
Major/Minor	Major1	Major2	Minor1			
Conflicting Flow All	0	0	74	0	208	74
Stage 1	-	-	-	-	74	-
Stage 2	-	-	-	-	134	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1526	-	780	988
Stage 1	-	-	-	-	949	-
Stage 2	-	-	-	-	892	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1526	-	780	988
Mov Cap-2 Maneuver	-	-	-	-	780	-
Stage 1	-	-	-	-	949	-
Stage 2	-	-	-	-	892	-
Approach	EB	WB		NB		
HCM Control Delay, s	0	0		0		
HCM LOS				A		
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	-	-	-	1526	-	
HCM Lane V/C Ratio	-	-	-	-	-	
HCM Control Delay (s)	0	-	-	0	-	
HCM Lane LOS	A	-	-	A	-	
HCM 95th %tile Q(veh)	-	-	-	0	-	

Appendix C

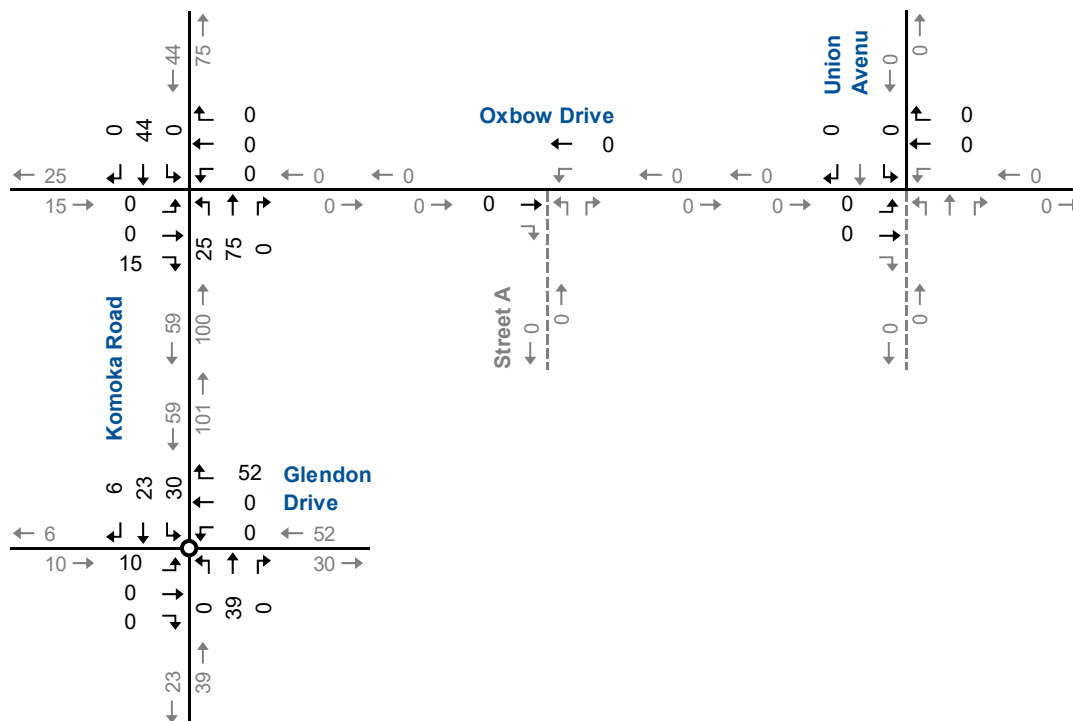
Background Development Traffic Forecasts



AM Peak Hour



PM Peak Hour



Appendix D

Year 2029 Background Traffic Operations Reports



Lanes, Volumes, Timings
1: Komoka Road & Oxbow Drive

200272
2029 Background AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	1	37	55	48	25	7	24	81	76	11	148	7
Future Volume (vph)	1	37	55	48	25	7	24	81	76	11	148	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.920			0.988			0.943			0.994	
Flt Protected					0.971			0.993			0.997	
Satd. Flow (prot)	0	1490	0	0	1652	0	0	1586	0	0	1774	0
Flt Permitted					0.971			0.993			0.997	
Satd. Flow (perm)	0	1490	0	0	1652	0	0	1586	0	0	1774	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		192.1			753.9			1367.0			206.1	
Travel Time (s)		13.8			54.3			98.4			14.8	
Confl. Peds. (#/hr)			1	1					1	1		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	27%	5%	5%	50%	40%	8%	5%	10%	4%	17%
Adj. Flow (vph)	1	40	60	52	27	8	26	88	83	12	161	8
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	101	0	0	87	0	0	197	0	0	181	0
Sign Control		Stop			Stop			Free			Free	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	34.5%											
ICU Level of Service A												
Analysis Period (min)	15											

HCM 2010 TWSC
1: Komoka Road & Oxbow Drive

200272
2029 Background AM Peak Hour

Intersection												
Int Delay, s/veh	4.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Vol, veh/h	1	37	55	48	25	7	24	81	76	11	148	7
Future Vol, veh/h	1	37	55	48	25	7	24	81	76	11	148	7
Conflicting Peds, #/hr	0	0	1	1	0	0	0	0	1	1	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	0	27	5	5	50	40	8	5	10	4	17
Mvmt Flow	1	40	60	52	27	8	26	88	83	12	161	8
Major/Minor	Minor2	Minor1			Major1			Major2				
Conflicting Flow All	388	413	166	423	376	131	169	0	0	172	0	0
Stage 1	189	189	-	183	183	-	-	-	-	-	-	-
Stage 2	199	224	-	240	193	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.47	7.15	6.55	6.7	4.5	-	-	4.2	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.15	5.55	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.15	5.55	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.543	3.545	4.045	3.75	2.56	-	-	2.29	-	-
Pot Cap-1 Maneuver	574	532	817	536	551	805	1208	-	-	1358	-	-
Stage 1	817	748	-	812	743	-	-	-	-	-	-	-
Stage 2	807	722	-	757	735	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	533	513	816	455	532	804	1208	-	-	1357	-	-
Mov Cap-2 Maneuver	533	513	-	455	532	-	-	-	-	-	-	-
Stage 1	797	741	-	792	724	-	-	-	-	-	-	-
Stage 2	751	704	-	656	728	-	-	-	-	-	-	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	11.5			13.8			1.1			0.5		
HCM LOS	B			B								
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR				
Capacity (veh/h)	1208	-	-	658	496	1357	-	-				
HCM Lane V/C Ratio	0.022	-	-	0.154	0.175	0.009	-	-				
HCM Control Delay (s)	8	0	-	11.5	13.8	7.7	0	-				
HCM Lane LOS	A	A	-	B	B	A	A	-				
HCM 95th %tile Q(veh)	0.1	-	-	0.5	0.6	0	-	-				

Lanes, Volumes, Timings
2: Oxbow Drive & Union Avenue

200272
2029 Background AM Peak Hour

						
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	3	56	51	9	11	10
Future Volume (vph)	3	56	51	9	11	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
Ped Bike Factor						
Frt			0.979		0.935	
Flt Protected		0.998			0.975	
Satd. Flow (prot)	0	1875	1774	0	1627	0
Flt Permitted		0.998			0.975	
Satd. Flow (perm)	0	1875	1774	0	1627	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		156.3	219.4		163.7	
Travel Time (s)		11.3	15.8		11.8	
Confl. Peds. (#/hr)	1			1		1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	2%	13%	0%	11%
Adj. Flow (vph)	3	61	55	10	12	11
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	64	65	0	23	0
Sign Control		Free	Free		Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	15.4%			ICU Level of Service A		
Analysis Period (min)	15					

HCM 2010 TWSC
2: Oxbow Drive & Union Avenue

200272
2029 Background AM Peak Hour

Intersection						
Int Delay, s/veh	1.5					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↗	↘		↖	↗
Traffic Vol, veh/h	3	56	51	9	11	10
Future Vol, veh/h	3	56	51	9	11	10
Conflicting Peds, #/hr	1	0	0	1	1	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	92	92	92	92	92	92
Heavy Vehicles, %	0	0	2	13	0	11
Mvmt Flow	3	61	55	10	12	11
Major/Minor						
Major1	Major2		Minor2			
Conflicting Flow All	66	0	-	0	129	61
Stage 1	-	-	-	-	61	-
Stage 2	-	-	-	-	68	-
Critical Hdwy	4.1	-	-	-	6.4	6.31
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.399
Pot Cap-1 Maneuver	1549	-	-	-	870	979
Stage 1	-	-	-	-	967	-
Stage 2	-	-	-	-	960	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	1548	-	-	-	867	978
Mov Cap-2 Maneuver	-	-	-	-	867	-
Stage 1	-	-	-	-	964	-
Stage 2	-	-	-	-	959	-
Approach						
EB	WB		SB			
HCM Control Delay, s	0.4	0	9			
HCM LOS			A			
Minor Lane/Major Mvmt						
EBL	EBT	WBT	WBR	SBLn1		
Capacity (veh/h)	1548	-	-	-	917	
HCM Lane V/C Ratio	0.002	-	-	-	0.025	
HCM Control Delay (s)	7.3	0	-	-	9	
HCM Lane LOS	A	A	-	-	A	
HCM 95th %tile Q(veh)	0	-	-	-	0.1	

Lanes, Volumes, Timings
1: Komoka Road & Oxbow Drive

200272
Existing PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	5	25	26	66	46	11	21	90	39	4	72	6
Future Volume (vph)	5	25	26	66	46	11	21	90	39	4	72	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.937			0.988			0.965			0.989	
Flt Protected		0.996			0.974			0.993			0.998	
Satd. Flow (prot)	0	1664	0	0	1765	0	0	1713	0	0	1684	0
Flt Permitted		0.996			0.974			0.993			0.998	
Satd. Flow (perm)	0	1664	0	0	1765	0	0	1713	0	0	1684	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		192.1			753.9			1367.0			206.1	
Travel Time (s)		13.8			54.3			98.4			14.8	
Confl. Peds. (#/hr)								5	5			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	20%	0%	8%	3%	0%	9%	10%	4%	5%	0%	10%	17%
Adj. Flow (vph)	5	27	28	72	50	12	23	98	42	4	78	7
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	60	0	0	134	0	0	163	0	0	89	0
Sign Control		Stop			Stop			Free			Free	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	35.2%											
ICU Level of Service A												
Analysis Period (min)	15											

HCM 2010 TWSC
1: Komoka Road & Oxbow Drive

200272
Existing PM Peak Hour

Intersection																
Int Delay, s/veh	5.5															
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR				
Lane Configurations		↔			↔			↔			↔					
Traffic Vol, veh/h	5	25	26	66	46	11	21	90	39	4	72	6				
Future Vol, veh/h	5	25	26	66	46	11	21	90	39	4	72	6				
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	5	5	0	0				
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free				
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None				
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-				
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-				
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-				
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92				
Heavy Vehicles, %	20	0	8	3	0	9	10	4	5	0	10	17				
Mvmt Flow	5	27	28	72	50	12	23	98	42	4	78	7				
Major/Minor	Minor2		Minor1		Major1		Major2									
Conflicting Flow All	286	281	82	287	263	124	85	0	0	145	0	0				
Stage 1	90	90	-	170	170	-	-	-	-	-	-	-				
Stage 2	196	191	-	117	93	-	-	-	-	-	-	-				
Critical Hdwy	7.3	6.5	6.28	7.13	6.5	6.29	4.2	-	-	4.1	-	-				
Critical Hdwy Stg 1	6.3	5.5	-	6.13	5.5	-	-	-	-	-	-	-				
Critical Hdwy Stg 2	6.3	5.5	-	6.13	5.5	-	-	-	-	-	-	-				
Follow-up Hdwy	3.68	4	3.372	3.527	4	3.381	2.29	-	-	2.2	-	-				
Pot Cap-1 Maneuver	632	631	961	663	646	908	1462	-	-	1450	-	-				
Stage 1	875	824	-	830	762	-	-	-	-	-	-	-				
Stage 2	766	746	-	885	822	-	-	-	-	-	-	-				
Platoon blocked, %								-	-	-	-	-				
Mov Cap-1 Maneuver	577	616	961	610	630	904	1462	-	-	1444	-	-				
Mov Cap-2 Maneuver	577	616	-	610	630	-	-	-	-	-	-	-				
Stage 1	860	822	-	813	746	-	-	-	-	-	-	-				
Stage 2	693	730	-	828	820	-	-	-	-	-	-	-				
Approach	EB		WB		NB		SB									
HCM Control Delay, s	10.3		12.2		1.1		0.4									
HCM LOS	B		B													
Minor Lane/Major Mvmt	NBL		NBT		NBR		EBLn1WBLn1		SBL		SBT		SBR			
Capacity (veh/h)	1462		-		-		734		636		1444		-		-	
HCM Lane V/C Ratio	0.016		-		-		0.083		0.21		0.003		-		-	
HCM Control Delay (s)	7.5		0		-		10.3		12.2		7.5		0		-	
HCM Lane LOS	A		A		-		B		B		A		A		-	
HCM 95th %tile Q(veh)	0		-		-		0.3		0.8		0		-		-	

Lanes, Volumes, Timings
2: Oxbow Drive & Union Avenue

200272
Existing PM Peak Hour

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	8	83	88	17	17	8
Future Volume (vph)	8	83	88	17	17	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt			0.979		0.955	
Flt Protected		0.995			0.968	
Satd. Flow (prot)	0	1815	1824	0	1670	0
Flt Permitted		0.995			0.968	
Satd. Flow (perm)	0	1815	1824	0	1670	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		156.3	219.4		163.7	
Travel Time (s)		11.3	15.8		11.8	
Confl. Peds. (#/hr)	1			1		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	13%	2%	1%	0%	6%	0%
Adj. Flow (vph)	9	90	96	18	18	9
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	99	114	0	27	0
Sign Control		Free	Free		Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization 21.0%	ICU Level of Service A					
Analysis Period (min)	15					

HCM 2010 TWSC
2: Oxbow Drive & Union Avenue

200272
Existing PM Peak Hour

Intersection						
Int Delay, s/veh	1.4					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	8	83	88	17	17	8
Future Vol, veh/h	8	83	88	17	17	8
Conflicting Peds, #/hr	1	0	0	1	1	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	92	92	92	92	92	92
Heavy Vehicles, %	13	2	1	0	6	0
Mvmt Flow	9	90	96	18	18	9
Major/Minor						
Major1	Major2		Minor2			
Conflicting Flow All	115	0	-	0	215	106
Stage 1	-	-	-	-	106	-
Stage 2	-	-	-	-	109	-
Critical Hdwy	4.23	-	-	-	6.46	6.2
Critical Hdwy Stg 1	-	-	-	-	5.46	-
Critical Hdwy Stg 2	-	-	-	-	5.46	-
Follow-up Hdwy	2.317	-	-	-	3.554	3.3
Pot Cap-1 Maneuver	1408	-	-	-	764	954
Stage 1	-	-	-	-	908	-
Stage 2	-	-	-	-	906	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	1407	-	-	-	757	953
Mov Cap-2 Maneuver	-	-	-	-	757	-
Stage 1	-	-	-	-	901	-
Stage 2	-	-	-	-	905	-
Approach						
EB	WB		SB			
HCM Control Delay, s	0.7		0		9.6	
HCM LOS					A	
Minor Lane/Major Mvmt						
EBL	EBT	WBT	WBR	SBLn1		
Capacity (veh/h)	1407	-	-	-	810	
HCM Lane V/C Ratio	0.006	-	-	-	0.034	
HCM Control Delay (s)	7.6	0	-	-	9.6	
HCM Lane LOS	A	A	-	-	A	
HCM 95th %tile Q(veh)	0	-	-	-	0.1	

Appendix E

Year 2029 Total Traffic Operations Reports



Lanes, Volumes, Timings
1: Komoka Road & Oxbow Drive

200272
2029 Total AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	1	38	55	62	28	8	24	81	81	11	148	7
Future Volume (vph)	1	38	55	62	28	8	24	81	81	11	148	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.921			0.989			0.941			0.994	
Flt Protected					0.969			0.994			0.997	
Satd. Flow (prot)	0	1493	0	0	1655	0	0	1586	0	0	1774	0
Flt Permitted					0.969			0.994			0.997	
Satd. Flow (perm)	0	1493	0	0	1655	0	0	1586	0	0	1774	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		192.1			753.9			1367.0			206.1	
Travel Time (s)		13.8			54.3			98.4			14.8	
Confl. Peds. (#/hr)			1	1				1	1			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	27%	5%	5%	50%	40%	8%	5%	10%	4%	17%
Adj. Flow (vph)	1	41	60	67	30	9	26	88	88	12	161	8
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	102	0	0	106	0	0	202	0	0	181	0
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization 35.8%	ICU Level of Service A
Analysis Period (min)	15

HCM 2010 TWSC
1: Komoka Road & Oxbow Drive

200272
2029 Total AM Peak Hour

Intersection

Int Delay, s/veh 5.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Vol, veh/h	1	38	55	62	28	8	24	81	81	11	148	7
Future Vol, veh/h	1	38	55	62	28	8	24	81	81	11	148	7
Conflicting Peds, #/hr	0	0	1	1	0	0	0	0	1	1	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	0	27	5	5	50	40	8	5	10	4	17
Mvmt Flow	1	41	60	67	30	9	26	88	88	12	161	8

Major/Minor	Minor2	Minor1	Major1	Major2
Conflicting Flow All	393	418	166	426
Stage 1	189	189	-	185
Stage 2	204	229	-	241
Critical Hdwy	7.1	6.5	6.47	7.15
Critical Hdwy Stg 1	6.1	5.5	-	6.15
Critical Hdwy Stg 2	6.1	5.5	-	6.15
Follow-up Hdwy	3.5	4	3.543	3.545
Pot Cap-1 Maneuver	570	529	817	534
Stage 1	817	748	-	810
Stage 2	803	718	-	756
Platoon blocked, %				
Mov Cap-1 Maneuver	526	510	816	452
Mov Cap-2 Maneuver	526	510	-	452
Stage 1	797	741	-	790
Stage 2	743	700	-	654

Approach	EB	WB	NB	SB
HCM Control Delay, s	11.5	14.4	1	0.5
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1208	-	-	654	490	1351	-
HCM Lane V/C Ratio	0.022	-	-	0.156	0.217	0.009	-
HCM Control Delay (s)	8	0	-	11.5	14.4	7.7	0
HCM Lane LOS	A	A	-	B	B	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.6	0.8	0	-

Lanes, Volumes, Timings
2: Union Avenue & Oxbow Drive

200272
2029 Total AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	3	61	4	3	53	9	11	0	10	11	0	10
Future Volume (vph)	3	61	4	3	53	9	11	0	10	11	0	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.993			0.981			0.935			0.935	
Flt Protected		0.998			0.998			0.975			0.975	
Satd. Flow (prot)	0	1860	0	0	1776	0	0	1679	0	0	1627	0
Flt Permitted		0.998			0.998			0.975			0.975	
Satd. Flow (perm)	0	1860	0	0	1776	0	0	1679	0	0	1627	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		156.3			219.4			156.3			163.7	
Travel Time (s)		11.3			15.8			11.3			11.8	
Confl. Peds. (#/hr)	1					1			1	1		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	2%	2%	2%	13%	2%	2%	2%	0%	2%	11%
Adj. Flow (vph)	3	66	4	3	58	10	12	0	11	12	0	11
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	73	0	0	71	0	0	23	0	0	23	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type: Other
Control Type: Unsignalized
Intersection Capacity Utilization 15.1%
ICU Level of Service A
Analysis Period (min) 15

HCM 2010 TWSC
2: Union Avenue & Oxbow Drive

200272
2029 Total AM Peak Hour

Intersection

Int Delay, s/veh	2.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Vol, veh/h	3	61	4	3	53	9	11	0	10	11	0	10
Future Vol, veh/h	3	61	4	3	53	9	11	0	10	11	0	10
Conflicting Peds, #/hr	1	0	0	0	0	1	0	0	1	1	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	0	2	2	13	2	2	2	2	0	2	11
Mvmt Flow	3	66	4	3	58	10	12	0	11	12	0	11

Major/Minor	Major1		Major2		Minor1		Minor2					
Conflicting Flow All	69	0	0	70	0	0	149	149	69	151	146	64
Stage 1	-	-	-	-	-	74	74	-	70	70	-	-
Stage 2	-	-	-	-	-	75	75	-	81	76	-	-
Critical Hdwy	4.1	-	-	4.12	-	-	7.12	6.52	6.22	7.1	6.52	6.31
Critical Hdwy Stg 1	-	-	-	-	-	6.12	5.52	-	6.1	5.52	-	-
Critical Hdwy Stg 2	-	-	-	-	-	6.12	5.52	-	6.1	5.52	-	-
Follow-up Hdwy	2.2	-	-	2.218	-	-	3.518	4.018	3.318	3.5	4.018	3.399
Pot Cap-1 Maneuver	1545	-	-	1531	-	-	819	743	994	821	745	976
Stage 1	-	-	-	-	-	935	833	-	945	837	-	-
Stage 2	-	-	-	-	-	934	833	-	932	832	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1544	-	-	1531	-	-	808	739	993	808	741	975
Mov Cap-2 Maneuver	-	-	-	-	-	808	739	-	808	741	-	-
Stage 1	-	-	-	-	-	933	831	-	942	834	-	-
Stage 2	-	-	-	-	-	922	831	-	919	830	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	0.3		0.3		9.2		9.2	
HCM LOS					A		A	

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	887	1544	-	-	1531	-	-	880
HCM Lane V/C Ratio	0.026	0.002	-	-	0.002	-	-	0.026
HCM Control Delay (s)	9.2	7.3	0	-	7.4	0	-	9.2
HCM Lane LOS	A	A	A	-	A	A	-	A
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-	0.1

Lanes, Volumes, Timings
4: Street A & Oxbow Drive

200272
2029 Total AM Peak Hour

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔			↔	↔	
Traffic Volume (vph)	129	2	2	92	7	5
Future Volume (vph)	129	2	2	92	7	5
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				0.948	
Flt Protected				0.999	0.970	
Satd. Flow (prot)	1838	0	0	1840	1694	0
Flt Permitted				0.999	0.970	
Satd. Flow (perm)	1838	0	0	1840	1694	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	753.9			156.3	136.8	
Travel Time (s)	54.3			11.3	9.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	140	2	2	100	8	5
Shared Lane Traffic (%)						
Lane Group Flow (vph)	142	0	0	102	13	0
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type: Other
Control Type: Unsignalized
Intersection Capacity Utilization 16.9%
Analysis Period (min) 15

HCM 2010 TWSC
4: Street A & Oxbow Drive

200272
2029 Total AM Peak Hour

Intersection

Int Delay, s/veh 0.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔			↔	↔	
Traffic Vol, veh/h	129	2	2	92	7	5
Future Vol, veh/h	129	2	2	92	7	5
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	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	140	2	2	100	8	5

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	142
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	-	4.12
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	-	2.218
Pot Cap-1 Maneuver	-	-	1441
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	-	1441
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	9.6
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	803	-	-	1441	-
HCM Lane V/C Ratio	0.016	-	-	0.002	-
HCM Control Delay (s)	9.6	-	-	7.5	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Lanes, Volumes, Timings
1: Komoka Road & Oxbow Drive

200272
2029 Total PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	5	31	45	85	55	14	50	182	58	5	130	7
Future Volume (vph)	5	31	45	85	55	14	50	182	58	5	130	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.925			0.988			0.973			0.993	
Flt Protected		0.997			0.973			0.992			0.998	
Satd. Flow (prot)	0	1641	0	0	1763	0	0	1723	0	0	1692	0
Flt Permitted		0.997			0.973			0.992			0.998	
Satd. Flow (perm)	0	1641	0	0	1763	0	0	1723	0	0	1692	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		192.1			753.9			1367.0			206.1	
Travel Time (s)		13.8			54.3			98.4			14.8	
Confl. Peds. (#/hr)								5	5			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	20%	0%	8%	3%	0%	9%	10%	4%	5%	0%	10%	17%
Adj. Flow (vph)	5	34	49	92	60	15	54	198	63	5	141	8
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	88	0	0	167	0	0	315	0	0	154	0
Sign Control		Stop			Stop			Free			Free	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	48.6%											
ICU Level of Service A												
Analysis Period (min)	15											

HCM 2010 TWSC
1: Komoka Road & Oxbow Drive

200272
2029 Total PM Peak Hour

Intersection												
Int Delay, s/veh	6.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Vol, veh/h	5	31	45	85	55	14	50	182	58	5	130	7
Future Vol, veh/h	5	31	45	85	55	14	50	182	58	5	130	7
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	5	5	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	20	0	8	3	0	9	10	4	5	0	10	17
Mvmt Flow	5	34	49	92	60	15	54	198	63	5	141	8
Major/Minor	Minor2		Minor1		Major1			Major2				
Conflicting Flow All	530	529	145	540	502	235	149	0	0	266	0	0
Stage 1	155	155	-	343	343	-	-	-	-	-	-	-
Stage 2	375	374	-	197	159	-	-	-	-	-	-	-
Critical Hdwy	7.3	6.5	6.28	7.13	6.5	6.29	4.2	-	-	4.1	-	-
Critical Hdwy Stg 1	6.3	5.5	-	6.13	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.3	5.5	-	6.13	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.68	4	3.372	3.527	4	3.381	2.29	-	-	2.2	-	-
Pot Cap-1 Maneuver	433	458	887	451	474	787	1385	-	-	1310	-	-
Stage 1	806	773	-	670	641	-	-	-	-	-	-	-
Stage 2	611	621	-	803	770	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	367	433	887	384	448	784	1385	-	-	1304	-	-
Mov Cap-2 Maneuver	367	433	-	384	448	-	-	-	-	-	-	-
Stage 1	769	770	-	637	609	-	-	-	-	-	-	-
Stage 2	515	590	-	723	767	-	-	-	-	-	-	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	12.1			18.9			1.3			0.3		
HCM LOS	B			C								
Minor Lane/Major Mvmt	NBL		NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR				
Capacity (veh/h)	1385		-	-	596	425	1304	-				
HCM Lane V/C Ratio	0.039		-	-	0.148	0.394	0.004	-				
HCM Control Delay (s)	7.7		0	-	12.1	18.9	7.8	0				
HCM Lane LOS	A		A	-	B	C	A	A				
HCM 95th %tile Q(veh)	0.1		-	-	0.5	1.8	0	-				

Lanes, Volumes, Timings
2: Union Avenue & Oxbow Drive

200272
2029 Total PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	9	103	9	14	112	20	6	0	8	20	1	9
Future Volume (vph)	9	103	9	14	112	20	6	0	8	20	1	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.990			0.981			0.924			0.959	
Flt Protected		0.996			0.995			0.979			0.968	
Satd. Flow (prot)	0	1802	0	0	1817	0	0	1666	0	0	1676	0
Flt Permitted		0.996			0.995			0.979			0.968	
Satd. Flow (perm)	0	1802	0	0	1817	0	0	1666	0	0	1676	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		156.3			219.4			100.1			163.7	
Travel Time (s)		11.3			15.8			7.2			11.8	
Confl. Peds. (#/hr)	1					1				1		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	13%	2%	2%	2%	1%	0%	2%	2%	2%	6%	2%	0%
Adj. Flow (vph)	10	112	10	15	122	22	7	0	9	22	1	10
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	132	0	0	159	0	0	16	0	0	33	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type: Other
Control Type: Unsignalized
Intersection Capacity Utilization 21.1%
Analysis Period (min) 15

HCM 2010 TWSC
2: Union Avenue & Oxbow Drive

200272
2029 Total PM Peak Hour

Intersection												
Int Delay, s/veh	2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Vol, veh/h	9	103	9	14	112	20	6	0	8	20	1	9
Future Vol, veh/h	9	103	9	14	112	20	6	0	8	20	1	9
Conflicting Peds, #/hr	1	0	0	0	0	1	0	0	0	1	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	13	2	2	2	1	0	2	2	2	6	2	0
Mvmt Flow	10	112	10	15	122	22	7	0	9	22	1	10

Major/Minor	Major1		Major2		Minor1		Minor2					
Conflicting Flow All	145	0	0	122	0	0	306	312	118	307	306	134
Stage 1	-	-	-	-	-	-	137	137	-	164	164	-
Stage 2	-	-	-	-	-	-	169	175	-	143	142	-
Critical Hdwy	4.23	-	-	4.12	-	-	7.12	6.52	6.22	7.16	6.52	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.16	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.16	5.52	-
Follow-up Hdwy	2.317	-	-	2.218	-	-	3.518	4.018	3.318	3.554	4.018	3.3
Pot Cap-1 Maneuver	1372	-	-	1465	-	-	646	603	934	638	608	920
Stage 1	-	-	-	-	-	-	866	783	-	829	762	-
Stage 2	-	-	-	-	-	-	833	754	-	850	779	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1371	-	-	1465	-	-	629	591	933	622	596	919
Mov Cap-2 Maneuver	-	-	-	-	-	-	629	591	-	622	596	-
Stage 1	-	-	-	-	-	-	859	777	-	822	753	-
Stage 2	-	-	-	-	-	-	814	745	-	835	773	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.6	0.7	9.8	10.5
HCM LOS			A	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	773	1371	-	-	1465	-	-	688
HCM Lane V/C Ratio	0.02	0.007	-	-	0.01	-	-	0.047
HCM Control Delay (s)	9.8	7.6	0	-	7.5	0	-	10.5
HCM Lane LOS	A	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-	0.1

Lanes, Volumes, Timings
4: Street A & Oxbow Drive

200272
2029 Total PM Peak Hour

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔			↔	↔	
Traffic Volume (vph)	90	6	7	152	3	4
Future Volume (vph)	90	6	7	152	3	4
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	0.991			0.923		
Flt Protected				0.998	0.979	
Satd. Flow (prot)	1825	0	0	1838	1665	0
Flt Permitted				0.998	0.979	
Satd. Flow (perm)	1825	0	0	1838	1665	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	753.9			156.3	136.8	
Travel Time (s)	54.3			11.3	9.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	98	7	8	165	3	4
Shared Lane Traffic (%)						
Lane Group Flow (vph)	105	0	0	173	7	0
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type: Other
Control Type: Unsignalized
Intersection Capacity Utilization 23.7%
Analysis Period (min) 15

HCM 2010 TWSC
4: Street A & Oxbow Drive

200272
2029 Total PM Peak Hour

Intersection						
Int Delay, s/veh	0.4					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔			↔	↔	
Traffic Vol, veh/h	90	6	7	152	3	4
Future Vol, veh/h	90	6	7	152	3	4
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	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	98	7	8	165	3	4

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	105
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	-	4.12
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	-	2.218
Pot Cap-1 Maneuver	-	-	1486
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	-	1486
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.3	9.4
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	827	-	-	1486	-
HCM Lane V/C Ratio	0.009	-	-	0.005	-
HCM Control Delay (s)	9.4	-	-	7.4	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	0	-

Appendix F

Left-Turn Lane Warrants



