

TRANSPORTATION IMPACT STUDY

UPPER'S LANE

CITY OF THOROLD

PREPARED FOR:

PARKBRIDGE LIFESTYLE COMMUNITIES

PREPARED BY:

**C.F. CROZIER & ASSOCIATES INC.
2800 HIGH POINT DRIVE, SUITE 100
MILTON, ON L9T 6P4**

FEBRUARY 2024

CFCA FILE NO. 1046-6664

The material in this report reflects best judgment in light of the information available at the time of preparation. Any use which a third party makes of this report, or any reliance on or decisions made based on it, are the responsibilities of such third parties. C.F. Crozier & Associates Inc. accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.



Revision Number	Date	Comments
Rev.1	February 2024	Issued for 1 st Submission

Executive Summary

Parkbridge Lifestyle Communities has retained C.F. Crozier & Associates Inc. (Crozier) to prepare a Transportation Impact Study (TIS) for a residential development located at Upper's Lane in the City of Thorold, in support of the Zoning By-Law Amendment and Draft Plan of Subdivision. This plan is a part of the Rolling Meadows Secondary Plan.

The analysis undertaken herein was completed using the Draft Plan of Subdivision prepared by Bousfields Inc., on January 3, 2024. Any minor changes to the Draft Plan are not expected to materially affect the conclusions set out within this report. This TIS assesses the operations of the study intersections listed within the report in the Future Background (without the inclusion of site traffic) and Future Total (with the inclusion of site traffic) conditions in the year of 2023, the buildout year of 2026, five years from buildout (2031) and ten years from buildout (2036).

The elements envisioned for this development include 17 singles, 23 bungalow townhouses, 47 on street townhouses and 516 units of residential development which results into a total of 603 units.

Additionally, three main accesses via new local roads are proposed, one via Upper's Lane, one via Venture Way, and the second via the Future Road (which is projected to extend to Venture Way).

Under 2023 conditions, the intersections operate with a Level of service of "C" or better, except for the intersection of Davis Road and Upper's Lane. The intersection operates with a Level of Service of "E" in the p.m. peak hour. This is found to be common for intersections which have stop controls on the minor approaches, as such as this case. There is free flow in the north and south direction on the major roadway (Davis Road), however the control delay of 43.5 seconds is a result of vehicles waiting on the minor approaches to complete turns at the intersection.

Under 2026, 2031 and 2036 future background conditions, the intersections are expected to operate similar to the 2023 conditions, as most of the intersections are expected to operate with a Level of "C" or better. The stop-controlled intersection of Thorold Townline Road at Beaverdams Road is expected to operate with a Level of Service of "D" in the p.m. peak hour, and with a control delay of 25.3 seconds in the 2036 horizon year due to the growth in traffic. The intersection of Davis Road and Upper's Lane is expected to continue with failing operations throughout the future background conditions.

The subject development is expected to generate 241 and 307 two-way trips during the weekday a.m. and p.m. peak hour, respectively.

The future background conditions are not expected to change under the future total conditions, other than slight increases in control delay and volume-to-capacity ratios. The intersection of Thorold Townline Road at Beaverdams Road is expected to operate with a Level of Service of "E" in the p.m. peak hour, with a volume-to-capacity ratio of 0.88. This result is expected as this intersection is projected to operate with a Level of Service of "D" in the 2036 horizon year under future background conditions. The increasingly accumulated delay in traffic on the minor street results in the Level of Service of "E" in the p.m. peak hour.

It is recommended to convert the stop control intersection of Davis Road and Upper's Lane into a signalized intersection to improve the results of the operations. Per the Ontario Traffic Manual Justifications 4-7, a signal is not warranted, using the 2036 future total projected volumes. However, per the Ontario Traffic Manual Justifications 1-3, a signal is justified. As a signalized intersection, it is expected to operate with a Level of Service of A and B, in the a.m. and p.m. peak hours respectively. This is an improvement from the expected Level of Service of "F".

The intersection of Thorold Townline Road and Beaverdams Road is expected to operate with Levels of Service of "D" and "E" and to improve these results, it is recommended to signalize this intersection. However, a signal is not warranted at this intersection per the Ontario Traffic Manual Justification 7. Synchro 11 was used to find the results of the operations at this intersection in the 2036 future conditions, if signalized. If this recommendation is applied, the intersection is expected to operate with a Level of Service of "B" in the a.m. and p.m. peak hours.

The analysis undertaken herein was prepared using the most recent Draft Plan of Subdivision available at the time of writing this report. Any minor changes to the plan are not expected to materially affect the conclusions contained within this report.

The intersections meet the relevant TAC GDGCR requirements of the sightline analysis. To further improve the sight distances, it is recommended to avoid the usage of larger landscaping plants such as trees at the intersections.

To help facilitate emergency access, the development construction should be phased in three (3) phases with Streets 'A' and 'B' completed in the first two (2) phases and private roads built as needed to always ensure multiple routes for emergency vehicles. A preliminary phasing plan has been completed by Bousfields Inc. and is subject to change through detailed design.

For the Transportation Demand Management plan, strategies were recommended to result in more efficient use of transportation modes. They included the accessibility of bike facilities, and use of sustainable transportation modes.

Therefore, the Draft Plan of Subdivision application can be supported from a transportation perspective given that the surrounding road network can accommodate the increase in traffic volumes attributable to the proposed development with the improvements recommended in the background scenario.

TABLE OF CONTENTS

1.0	INTRODUCTION	1
1.1	Development Land.....	1
1.2	Development Proposal	1
2.0	EXISTING CONDITIONS.....	2
2.1	Roadways.....	2
2.2	Study Intersections	3
2.3	Existing Pedestrian Facilities.....	4
2.4	Existing Transit Facilities	4
2.5	Traffic Data	4
2.6	Traffic Modelling	5
2.7	2023 Intersection Operations	6
3.0	FUTURE BACKGROUND CONDITIONS.....	7
3.1	Future Changes	7
3.2	Study Horizons.....	7
3.3	Background Developments	7
4.0	SITE GENERATED TRAFFIC	11
4.1	ITE Trip Generation.....	11
4.2	Trip Distribution and Assignment	11
5.0	FUTURE TOTAL CONDITIONS.....	12
5.1	Intersection Operations	12
6.0	COMPARISON OF FUTURE BACKGROUND AND FUTURE TOTAL RESULTS	16
6.1	Recommendations.....	17
7.0	FUTURE VENTURE WAY EXTENSION TO THOROLD TOWNLINE ROAD	17
8.0	SITE ACCESS SAFETY REVIEW	19
8.1	Sightline Review.....	19
8.2	Emergency Access Review/Phasing	20
9.0	TRANSPORTATION DEMAND MANAGEMENT (TDM) MEASURES.....	21
9.1	Existing TDM Measures.....	21
9.2	Site Specific TDM Opportunities	21
10.0	CONCLUSION	22

LIST OF TABLES

Table 1: Transit Service

Table 2: Intersection Peak Hours

Table 3: Roundabout Geometry

Table 4: 2023 Existing Conditions

Table 5: 2026 Future Background Conditions

Table 6: 2031 Future Background Conditions

Table 7: 2036 Future Background Conditions

Table 8: ITE Trip Generation for the Proposed Development

Table 9: Trip Distribution for Passenger Vehicles

Table 10: 2026 Future Total Conditions

Table 11: 2031 Future Total Conditions

Table 12: 2036 Future Total Conditions

Table 13: Comparison of 2036 Future Background and Future Total Conditions

Table 14: Recommendation Results

Table 15: 2036 Future Total Scenario 2 Conditions

Table 16: Sight Distance Analysis

LIST OF APPENDICES

Appendix A: Correspondence

Appendix B: Relevant Maps

Appendix C: Existing Transit

Appendix D: Traffic Data

Appendix E: Level of Service Definitions

Appendix F: Synchro Analysis Worksheets

Appendix G: ITE Trip Generation 11th Edition

Appendix H: Transportation Tomorrow Survey Data

Appendix I: Recommendations

Appendix J: TAC Excerpts

LIST OF FIGURES

- Figure 1:** Draft Plan
- Figure 2:** 2023 Conditions
- Figure 3:** 2026 Future Background Conditions
- Figure 4:** 2031 Future Background Conditions
- Figure 5:** 2036 Future Background Conditions
- Figure 6:** Trip Distribution
- Figure 7:** Trip Assignment
- Figure 8:** 2026 Future Total Conditions
- Figure 9:** 2031 Future Total Conditions
- Figure 10:** 2036 Future Total Conditions
- Figure 11:** 2036 Future Total Conditions – Scenario 2

1.0 Introduction

Parkbridge has retained C.F. Crozier & Associates Inc. (Crozier) to prepare a Transportation Impact Study (TIS) for a residential development located at Upper's Lane in the City of Thorold, in support of the Zoning By-Law Amendment and Draft Plan of Subdivision. This plan is a part of the Rolling Meadows Secondary Plan, a master planned community in Niagara Region. A TIS has already been submitted for Phase 1, the Upper's Grove subdivision, therefore this TIS is focused on Phase 2, the Upper's Lane development only.

The purpose of the Transportation Impact Study is to evaluate the impacts of the proposed development on the surrounding road network and recommend transportation-related mitigation measures, if required.

A Terms of Reference (ToR) encompassing the scope of the Transportation Impact Study was circulated to the City, Region and the Ministry of Transportation Ontario (MTO) on April 17, 2023. Through email response, MTO clarified that the site is not within the MTO controlled area. Niagara Region responded to the terms of reference on May 2, 2023, however the City of Thorold has not responded. Correspondence is included in **Appendix A**.

1.1 Development Land

The subject lands cover an area of approximately 39.87 ha and currently consist of fields and a treed section. The property is bounded by Upper's Lane to the south, fields and residential to the west, hydro fields to the north and vacant lands to the east. The lands are currently zoned Future Development (FD) and Environmental Protection 2 (EP2).

1.2 Development Proposal

Based on the Draft Plan by Bousfields Inc., (January 3, 2024) provided, the elements envisioned for this development include:

- An approximate total of 603 residential units (17 singles, 23 bungalow townhouses, 47 on street townhouses and 516 units of residential development)
- Proposed local road Street A, Street B and Street C

Figure 1 displays the proposed Draft Plan.

2.0 Existing Conditions

The following intersections were reviewed as part of the study area (per confirmation with the Regional staff):

- Upper's Lane and Thorold Townline Road (Regional Road 70)
- Upper's Lane and Davis Road (Highway 58)
- Barker Parkway and Davis Road (Highway 58)
- Barker Parkway and Venture Way
- Lundy's Lane and Barker Parkway
- Lundy's Lane and Thorold Townline Road
- Thorold Townline Road and Beaverdams Road
- Proposed Street 'A' (Venture Way) and Thorold Townline Road (Regional Road 70)
- Upper's Lane and Proposed Street 'C'

The following section provides a description of the study area from a transportation context, as well as a traffic operations analysis of the study road network.

2.1 Roadways

Beaverdams Road is a minor arterial under the jurisdiction of the Region of Niagara. It runs in an east-west direction consisting of two travel lanes one in each direction. The roadway has a posted speed limit of 80 km/h. Beaverdams Road has paved shoulders on both sides of the roadway.

Thorold Townline Road is a minor arterial under the jurisdiction of the Region of Niagara, under the name of Highway 70. However, herein, this roadway will only be referred to as Thorold Townline Road. It runs in a north-south direction consisting of two travel lanes, one in each direction. The roadway has a posted speed limit of 80 km/h. This roadway has paved shoulders on both sides.

Lundy's Lane is a Class 4 - Major Highway under the jurisdiction of the MTO, under the name of Highway 20. However, herein, this roadway will only be referred to as Lundy's Lane. It runs in an east-west direction consisting of two travel lanes, one in each direction. The roadway has a posted speed limit of 80 km/h. This roadway has paved shoulders on both sides.

Davis Road is a Class 4 - Major Highway under the jurisdiction of the MTO, under the name of Highway 58. However, herein, this roadway will only be referred to as Davis Road. It runs in an east-west direction consisting of two travel lanes, one in each direction. The roadway has a posted speed limit of 80 km/h. This roadway has paved shoulders on both sides.

Upper's Lane is a local road under the jurisdiction of the City of Thorold. It runs in an east-west direction consisting of two travel lanes, one in each direction. The roadway has an assumed speed limit of 50 km/h. In future conditions Upper's lane is to be extended to connect Davis Road and Thorold Townline Road.

Barker Parkway is a local neighbourhood road under the jurisdiction of the City of Thorold. It runs in an east-west direction consisting of two travel lanes, one in each direction. The roadway has an assumed speed limit of 50 km/h.

Venture Way is a local neighbourhood road under the jurisdiction of the City of Thorold. It runs in the east-west direction consisting of two travel lanes, one in each direction. In future conditions Upper's lane is to be extended to connect Davis Road and Thorold Townline Road.

Appendix B contains excerpts from the Official Plan.

2.2 Study Intersections

The study intersections discussed below are a part of the road network surrounding the site. The intersections are described below with characteristics such as speed, and other design elements. The section is split into existing intersections and future intersections.

2.2.1 Existing Intersections

The intersection of **Davis Road and Barker Parkway** is currently operating as a three-legged minor stop-controlled intersection. Davis Road is the major roadway which moves in the north and south direction and has dedicated left and right turn lanes on the north and south approaches, respectively. Barker Parkway is the minor roadway, as well as the stop controlled east approach of the intersection, with a median in the middle which stretches to the intersection of Barker Parkway and Honeycrisp Way.

The intersection of **Davis Road and Upper's Lane** is currently operating as a stop-controlled intersection, with the stop controls only placed on the minor roadway, which in this case is Upper's Lane. The east approach of this intersection is Upper's Lane, and the west approach is Allanburg Road, which has a channelized right turn lane. The north approach of the intersection has dedicated left and right turn lanes, while the south approach of the intersection has one dedicated left turn storage lane.

Barker Parkway and Lundy's Lane is a three-legged roundabout, with Lundy's Lane moving in the east-west direction and Barker Parkway as the north approach of this intersection.

The signalized intersection of **Lundy's Lane and Thorold Townline Road** has Lundy's Lane moving in the east-west direction and Thorold Townline Road moving in the north-south direction. There are crosswalks at all the approaches, as well as dedicated left-turn lanes. The west approach has one dedicated right-turn lane.

Thorold Townline Road and Upper's Lane is currently operating as a three-legged minor stop-controlled intersection. Thorold Townline Road moves in the north-south direction, while the stop control is placed on the east approach, also the minor roadway (Upper's Lane).

The intersection of **Beaverdam Road and Thorold Townline Road** currently operates as all-way stop controlled. Thorold Townline Road moves in the north-south direction, while Beaverdam Road moves in the east-west direction.

Barker Parkway and Venture Way is an all-way stop controlled intersection. Barker Parkway is assumed to move in the north-south direction while Venture Way is expected to move in the east-west direction.

2.2.2 Future Intersections

As mentioned previously, Thorold Townline Road and Upper's Lane is currently operating as a three-legged minor stop-controlled intersection. However, this is subjected to change as Upper's Lane is expected to extend to connect with Thorold Townline Road which will continue to move the north-south direction, and Upper's Lane will continue moving in the east-west direction.

Upper's Lane and Proposed Street 'C' is an intersection which will allow access to the residential units. Upper's Lane moves in the east-west direction, while the proposed street to move in the north-south direction.

The other access into the site would be through the intersection of Venture Way. Venture Way becomes Street A and will continue along to connect with Thorold Townline Road.

2.3 Existing Pedestrian Facilities

Due to the developing lands, there are limited pedestrian facilities currently. As infrastructure is expected to be developed, this will inherently improve the pedestrian facilities. Currently, there are pedestrian cross walks at the signalized intersection of Lundy's Lane and Thorold Townline Road.

2.4 Existing Transit Facilities

The site is served by the Niagara Region transit which is displayed in **Table 1**. A map of the transit route may be found in **Appendix C**. The bus route below has a total of 5 stops, beginning at Allanburg Road and ending at Thorold Towpath Terminal.

Table 1: Transit Service

Route	Stop Location	Route Number and Direction	Service Times		Frequency (mins)
			Weekdays	Weekends	
Thorold South	Barber Parkway at Sunset Way And Davis Road at Allanburg Road	322 (North-South)	6:30 -18:30	6:30 – 18:30	30

TransCab is Niagara Region Transit's on demand transit service available in an area of West St. Catharines, a place without the provision of bus services. The TransCab operates similar to a cab service, with vehicles picking up and dropping off passengers in designated zones.

2.5 Traffic Data

Traffic count data was collected for the site from a specialty traffic counting firm, Spectrum Traffic Inc. Data was collected for the study intersections on May 11, 2023, over four (4) hour periods in the a.m. time frame and p.m. time frames. **Table 2** summarizes the peak hours found at each intersection.

Table 2: Intersection Peak Hours

Intersection	Peak Hours	
	A.M. Peak Hour	P.M. Peak Hour
Davis Road and Barker Parkway	7:30 – 8:30	4:30 – 5:30
Davis Road and Upper's Lane	7:30 – 8:30	4:30 - 5:30
Lundy's Lane and Barker Parkway	7:45 – 8:45	4:45 – 5:45
Lundy's Lane and Thorold Townline Road	7:45 – 8:45	4:45 – 5:45
Thorold Townline Road and Upper's Lane	8:15 – 9:15	4:30 – 5:30
Thorold Townline Road and Beaverdams Road	7:45 – 8:45	4:30 – 5:30
Barker Parkway and Venture Way	7:15 – 8:15	4:15 – 5:15

The Region of Niagara provided the signal timing plan for the intersection of Townline Road at Lundy's Lane. The plan is dated March 28, 2018.

Traffic Data is found in **Appendix D**.

2.6 Traffic Modelling

2.6.1 Intersection Modelling

The assessment of intersections is based on the method outlined in the "Highway Capacity Manual, 2010" using Synchro 11 modeling software. Intersections are assessed using a Level of Service metric, with ranges of delay assigned a letter from "A" to "F". For example, if the Level of Service "A" means free flow conditions with unimpeded maneuverability, and Level of Service F means extremely low low-speed vehicle maneuverability, and high delay.

For stop-controlled intersections, a Level of Service "A" or "B" would typically be measured during off-peak hours when lesser traffic volumes are on the roadways resulting in no or minor delays for vehicles travelling through these intersections. Levels of Service "C" through "F" are often measured in the commuter peak hours when greater vehicle volumes cause longer wait times resulting in longer travel times. The Level of Service (LOS) definitions for signalized and stop control intersections is included in **Appendix E**.

2.6.2 Roundabout Modelling

The roundabout was designed and analyzed in ARCADY; a software utilized for determining the operations of a roundabout.

Roundabout analysis at the intersection of Lundy's Lane and Barker Parkway was completed based on the parameters shown below.

The ARCADY model using the ARCADY Junctions 8 analysis software was used to assess the operational performance of the intersection under the future horizon scenarios. The roundabout geometrics inputs used to calibrate the model are outlined in **Table 3**.

Table 3: Roundabout Geometry

Half-Width (m)	Entry Width (m)	Effective Flare Length (m)	Entry Radius (m)	Inscribed Circle Diameter (m)	Conflict (Entry) Angle (Deg)
4.5	14.61	30.36	28.0	45.6.0	50.32

The Level of Service (LOS) definitions for roundabouts is included in **Appendix E**.

2.7 2023 Intersection Operations

The 2023 existing conditions are illustrated in **Figure 2**. Levels of Service based on current operations are outlined in **Table 4**. **Appendix E** contains the Level of Service definitions and **Appendix F** contains the synchro analysis worksheets.

Table 4: 2023 Existing Conditions

Intersection	Control	Peak Hour	Level of Service ₁	Control Delay	Maximum v/c ratio ²	95 th Percentile Queue Length > Storage Lane Length
Davis Road and Barker Parkway	Stop-Controlled	A.M.	B	13.4	0.31 (WBLR)	None
		P.M.	C	15.9	0.29 (WBLR)	None
Davis Road and Upper's Lane	Stop-Controlled on Minor Roadway	A.M.	C	19.6	0.33 (WBLR)	None
		P.M.	E	43.2	0.60 (EB)	None
Lundy's Lane and Barker Parkway	Roundabout	A.M.	A	1.69	0.17 (EB)	None
		P.M.	A	1.78	0.23 (WB)	None
Lundy's Lane and Thorold Townline Road	Signalized	A.M.	B	18	0.66 (EBT)	None
		P.M.	C	20.2	0.77 (EBT)	None
Thorold Townline Road and Upper's Lane	Stop-Controlled	A.M.	A	9.2	0.11 (NBT)	None
		P.M.	A	9.3	0.12 (NBT)	None
Thorold Townline Road and Beaverdams Road	Stop-Controlled	A.M.	B	12.2	0.42 (WB)	None
		P.M.	B	14.9	0.51 (SB)	None
Barker Parkway and Venture Way	Stop-Controlled	A.M.	A	8.1	0.13 (NB)	None
		P.M.	B	8.2	0.18 (SB)	None
Upper's Lane and Proposed Street	Stop-Controlled	A.M.	B	14.3 s	0.24 (WBT)	None
		A.M.	B	14.3 s	0.24 (WBT)	None

Note 1: The Level of Service of a signalized intersection is based on the average control delay per vehicle. Existing Signal Timings provided by the Niagara Region were used.

Note 2: The critical v/c ratio is the maximum volume to capacity ratio (v/c ratio) for movements at the intersection. In addition, all v/c ratios greater than 0.85 are outlined and highlighted.

The results of the 2023 conditions displayed in the table above indicate that most of the intersections do not experience operational issues, as most intersections operate with a Level of Service of "C" or better in the a.m. and p.m. peak hours.

The intersection of Davis Road and Upper's Lane operates with a Level of Service of "E" in the p.m. peak hour. This is found to be common for intersections which have stop controls on the minor approaches, as such as this case. There is free flow in the north and south direction on the major roadway (Davis Road), however the control delay of 43.5 seconds is a result of vehicles waiting on the minor approaches to complete turns at the intersection.

3.0 Future Background Conditions

Future background conditions refer to traffic conditions incorporating expected growth, development and improvements within the surrounding intersections occurring within the study horizons, outside of the development proposal.

Future background traffic volumes for horizon years consist of the following components:

- Background traffic growth from outside the study area.
- Traffic expected to be generated by the planned developments in the area.

3.1 Future Changes

The future changes impacting the area surrounding the development include the extensions of Upper's Lane and Venture Street from Davis Road to Thorold Townline Road. The study was completed including these two changes.

As part of the plan to develop the community, sidewalks for pedestrian usage will be built along the local roads within the neighbourhood.

3.2 Study Horizons

Following confirmation with the Niagara Region, the build-out year of 2026, horizon years of 2031 (five years from build-out), and 2036 (ten years from build-out), were considered to be appropriate for analysis purposes.

3.3 Background Developments

Following confirmation with the Niagara Region, other background developments were not considered as part of the analysis.

3.3.1 Intersection Operations

Traffic operations at the study intersections were analyzed following addition of volumes from associated growth rates. **Table 5, Table 6 and Table 7** summarize the 2026, 2031, and 2036 future background Levels of Service, respectively. Detailed capacity analyses are included in **Appendix F**.

Figure 3, Figure 4, and Figure 5 display the project 2026, 2031, 2036 Future Background volumes, respectively.

Table 5: 2026 Future Background Conditions

Intersection	Control	Peak Hour	Level of Service ₁	Control Delay	Maximum v/c ratio ²	95 th Percentile Queue Length > Storage Lane Length
Davis Road and Barker Parkway	Stop-Controlled	A.M.	B	13.9	0.33 (WBLR)	None
		P.M.	C	16.9	0.29 (WBLR)	None
Davis Road and Upper's Lane	Stop-Controlled on Minor Roadway	A.M.	C	21.3	0.44 (EBT)	None
		P.M.	F	52.3	0.66 (EB)	None
Lundy's Lane and Barker Parkway	Roundabout	A.M.	A	1.74	0.19 (EB)	None
		P.M.	A	1.82	0.25 (WB)	None
Lundy's Lane and Thorold Townline Road	Signalized	A.M.	B	18.6	0.68 (EBT)	None
		P.M.	C	21.2	0.79 (EBT)	None
Thorold Townline Road and Upper's Lane	Stop-Controlled	A.M.	A	8.6	0.24 (NBT)	None
		P.M.	A	9.1	0.31 (SBT)	None
Thorold Townline Road and Beaverdams Road	Stop-Controlled	A.M.	B	13.1	0.46 (WB)	None
		P.M.	C	16.5	0.56 (SB)	None
Barker Parkway and Venture Way	Stop-Controlled	A.M.	A	8.1	0.15 (NB)	None
		P.M.	B	8.2	0.19 (SB)	None

Note 1: The Level of Service of a signalized intersection is based on the average control delay per vehicle (Synchro/ICU).
The Level of Service of a stop-controlled intersection is based on the delay associated with the critical minor road approach (HCM 2000).

Note 2: The critical v/c ratio is considered to be the maximum v/c ratio for movements at the intersection. In addition, all v/c ratios greater than 0.85 for through and shared turning movements, and 1.00 for exclusive turning movements are outlined and highlighted.

Table 6: 2031 Future Background Conditions

Intersection	Control	Peak Hour	Level of Service ₁	Control Delay	Maximum v/c ratio ²	95 th Percentile Queue Length > Storage Lane Length
Davis Road and Barker Parkway	Stop-Controlled	A.M.	B	14.8	0.35 (WBLR)	None
		P.M.	C	18.5	0.32 (WBLR)	None
Davis Road and Upper's Lane	Stop-Controlled on Minor Roadway	A.M.	C	23.7	0.48 (EBLR)	None
		P.M.	F	67.6	0.73 (EB)	None
Lundy's Lane and Barker Parkway	Roundabout	A.M.	A	1.75	0.20 (EB)	None
		P.M.	A	1.88	0.28 (WB)	None
Lundy's Lane and Thorold Townline Road	Stop-Controlled	A.M.	B	19.5	0.72 (EBT)	None
		P.M.	C	22.9	0.84 (EBT)	None
Thorold Townline Road and Upper's Lane	Signalized	A.M.	A	8.9	0.60 (EBT)	None
		P.M.	A	9.4	0.28 (SBT)	None
Thorold Townline Road and Beaverdams Road	Stop-Controlled	A.M.	B	14.6	0.51 (WB)	None
		P.M.	C	19.5	0.60 (EB)	None
Barker Parkway and Venture Way	Stop-Controlled	A.M.	A	8.2	0.16 (NB)	None
		P.M.	A	8.3	0.20 (SB)	None

Note 1: The Level of Service of a signalized intersection is based on the average control delay per vehicle (Synchro/ICU).
The Level of Service of a stop-controlled intersection is based on the delay associated with the critical minor road approach (HCM 2000).

Note 2: The critical v/c ratio is considered to be the maximum v/c ratio for movements at the intersection. In addition, all v/c ratios greater than 0.85 for through and shared turning movements, and 1.00 for exclusive turning movements are outlined and highlighted.

Table 7: 2036 Future Background Conditions

Intersection	Control	Peak Hour	Level of Service ₁	Control Delay	Maximum v/c ratio ²	95 th Percentile Queue Length > Storage Lane Length
Davis Road and Barker Parkway	Stop-Controlled	A.M.	C	15.8	0.37 (WBLR)	None
		P.M.	C	20.5	0.35 (WBLR)	None
Davis Road and Upper's Lane	Stop-Controlled on Minor Roadway	A.M.	D	27.2	0.53 (EB)	None
		P.M.	F	95.7	0.84 (WB)	None
Lundy's Lane and Barker Parkway	Roundabout	A.M.	A	1.79	0.22 (EB)	None
		P.M.	A	1.96	0.30 (WB)	None
Lundy's Lane and Thorold Townline Road	Signalized	A.M.	C	20.7	0.76 (EBT)	None
		P.M.	C	25.4	0.89 (EBT)	None
Thorold Townline Road and Upper's Lane	Stop-Controlled	A.M.	A	9.1	0.30 (NBT)	None
		P.M.	A	9.9	0.38 (SBT)	None
Thorold Townline Road and Beaverdams Road	Stop-Controlled	A.M.	C	17.2	0.59 (WB)	None
		P.M.	D	25.3	0.69 (EB)	None
Barker Parkway and Venture Way	Stop-Controlled	A.M.	A	8.2	0.18 (NB)	None
		P.M.	A	8.4	0.20 (NB)	None

Note 1: The Level of Service of a signalized intersection is based on the average control delay per vehicle (Synchro/ICU).
The Level of Service of a stop-controlled intersection is based on the delay associated with the critical minor road approach (HCM 2000).

Note 2: The critical v/c ratio is considered to be the maximum v/c ratio for movements at the intersection. In addition, all v/c ratios greater than 0.85 for through and shared turning movements, and 1.00 for exclusive turning movements are outlined and highlighted.

Most of the intersections are projected to operate with a Level of Service of "C" or better under each of the future background scenarios in the a.m. peak hour and the p.m. peak hour. Additionally, no queuing or capacity constraints are forecast at the roundabout.

The intersection of Davis Road and Upper's Lane is expected to operate with a Level of Service of "D" in the a.m. peak hour and a Level of Service of "F" in the p.m. peak hour. The volume-to-capacity ratio is expected to be 0.84 during the p.m. peak hour factor. Intersections with stop controls on minor roadways, such as this one typically shows these results. The north and southbound approaches have free flow traffic, while the traffic on the eastbound and westbound approaches must wait for clearance to complete turns, and this results to a higher control delay. This study intersection is recommended to be signalized in the future based on this result. The results of the recommendation are found in Section 5.3.

4.0 Site Generated Traffic

The proposed development will result in additional vehicles on the boundary road network that previously did not exist. The proposed development will also result in additional turning movements on the boundary road intersections.

4.1 ITE Trip Generation

The trip generation for the proposed development was forecasted using published data from the Institute of Transportation Engineers (ITE) Trip Generation Manual, 11th Edition. The ITE Trip Generation Manual is a compendium of industry collected trip generation data across North America for a variety of land uses and is used industry wide as a source for trip generation forecasts. The Land Use Category (LUC) 220 "Multi-Family Housing Low-Rise" was determined to be the most applicable land use. The forecasted weekday a.m. and p.m. trip generation for the site is outlined in **Table 8**.

Table 8: ITE Trip Generation for the Proposed Development

Type	Units	A.M. Peak Hour			P.M. Peak Hour		
		In	Out	2-Way	In	Out	2-Way
LUC 220 (Multi-Use Family Low-Rise)	603	58	183	241	193	114	307

The subject development is expected to generate 241 and 307 two-way trips during the weekday a.m. and p.m. peak hour, respectively.

Appendix G provides excerpts from the ITE Trip Generation Manual, 11th Edition.

4.2 Trip Distribution and Assignment

Data from Transportation Tomorrow Surveys (TTS) was used to estimate the peak hour trip distribution at the site, as confirmed with Niagara Region. Trip Distribution Data from Transportation Tomorrow Survey Results can be found in **Appendix H. Table 9** outlines the trip distribution for the proposed development divided into time and direction of travel.

Figure 6 and Figure 7 shows the trip distribution and trip assignment, respectively for the vehicles at the proposed development.

Table 9: Trip Distribution for Passenger Vehicles

Distribution	A.M.		P.M.	
	Inbound	Outbound	Inbound	Outbound
North	24%	22%	32%	16%
South	23%	25%	31%	30%
East	44%	43%	29%	46%
West	9%	10%	8%	58%

5.0 Future Total Conditions

The horizon years remain the same as the future background scenario. Future total traffic volumes for horizon years consist of the following components:

- Background traffic growth from outside the study area.
- Traffic expected to be generated by the planned developments in the area.
- Site generated traffic.

5.1 Intersection Operations

Traffic operations at the study intersections were analyzed with the addition of the site generated traffic to the future background traffic. The 2026, 2031 and 2036 future total traffic volumes are illustrated in **Figure 8, Figure 9, and Figure 10**, respectively.

Table 10, Table 11, and Table 12 outline the 2026, 2031 and 2036 future total traffic Levels of Service respectively. Detailed capacity analysis worksheets are included in **Appendix F**.

Table 10: 2026 Future Total Conditions

Intersection	Control	Peak Hour	Level of Service ₁	Control Delay	Maximum v/c ratio ²	95 th Percentile Queue Length > Storage Lane Length
Davis Road and Barker Parkway	Stop-Controlled	A.M.	C	15.0	0.39 (WBLR)	None
		P.M.	C	19.3	0.37 (WBLR)	None
Davis Road and Upper's Lane	Stop-Controlled on Minor Roadway	A.M.	D	27.4	0.51 (EBT)	None
		P.M.	F	226.2	1.23 (EB)	None
Lundy's Lane and Barker Parkway	Roundabout	A.M.	A	1.74	0.19 (EB)	None
		P.M.	A	1.84	0.26 (WB)	None
Lundy's Lane and Thorold Townline Road	Signalized	A.M.	B	19.4	0.71 (EBT)	None
		P.M.	C	23	0.81 (EBT)	None
Thorold Townline Road and Upper's Lane	Stop-Controlled	A.M.	A	9.6	0.37 (SBT)	None
		P.M.	B	10.4	0.42 (SBT)	None
Thorold Townline Road and Venture Street	Stop-Controlled	A.M.	A	7.5	0.37 (SBT)	None
		P.M.	A	7.7	0.09 (EBLR)	None
Thorold Townline Road and Beaverdams Road	Stop-Controlled	A.M.	C	15.0	0.49 (NB)	None
		P.M.	C	21.9	0.66 (SB)	None
Barker Parkway and Venture Way	Stop-Controlled	A.M.	A	8.8	0.27 (NB)	None
		P.M.	A	8.9	0.25 (SB)	None
Upper's Lane and Street C	Stop-Controlled	A.M.	A	7.4	0.07 (SBLR)	None
		P.M.	A	7.0	0.09 (EBLT)	None

Note 1: The Level of Service of a signalized intersection is based on the average control delay per vehicle (Synchro/ICU). The Level of Service of a stop-controlled intersection is based on the delay associated with the critical minor road approach (HCM 2000).

Note 2: The critical v/c ratio is considered to be the maximum v/c ratio for movements at the intersection. In addition, all v/c ratios greater than 0.85 for through and shared turning movements, and 1.00 for exclusive turning movements are outlined and highlighted.

Table 11: 2031 Future Total Conditions

Intersection	Control	Peak Hour	Level of Service ₁	Control Delay	Maximum v/c ratio ²	95 th Percentile Queue Length > Storage Lane Length
Davis Road and Barker Parkway	Stop-Controlled	A.M.	C	16.1	0.41 (WBLR)	None
		P.M.	C	21.5	0.40 (WBLR)	None
Davis Road and Upper's Lane	Stop-Controlled on Minor Roadway	A.M.	D	31.7	0.55 (EBLR)	None
		P.M.	F	320	1.44 (EBLR)	None
Lundy's Lane and Barker Parkway	Roundabout	A.M.	A	1.77	0.20 (WB)	None
		P.M.	A	1.90	0.28 (WB)	None
Lundy's Lane and Thorold Townline Road	Signalized	A.M.	C	20.5	0.75 (EBT)	None
		P.M.	C	24.9	0.85 (EBT)	None
Thorold Townline Road and Upper's Lane	Stop-Controlled	A.M.	A	9.9	0.40 (SBT)	None
		P.M.	A	9.4	0.28 (SBT)	None
Thorold Townline Road and Venture Street	Stop-Controlled	A.M.	A	7.5	0.43 (SBT)	None
		P.M.	A	6.9	0.07 (NBLT)	None
Thorold Townline Road and Beaverdams Road	Stop-Controlled	A.M.	C	17.3	0.58 (WB)	None
		P.M.	D	28.4	0.74 (SB)	None
Barker Parkway and Venture Way	Stop-Controlled	A.M.	A	9.0	0.28 (NB)	None
		P.M.	A	9.5	0.34 (SB)	None
Upper's Lane and Street C	Stop-Controlled	A.M.	A	7.4	0.07 (SBLR)	None
		P.M.	A	7.7	0.09 (EBLT)	None

Note 1: The Level of Service of a signalized intersection is based on the average control delay per vehicle (Synchro/ICU). The Level of Service of a stop-controlled intersection is based on the delay associated with the critical minor road approach (HCM 2000).

Note 2: The critical v/c ratio is considered to be the maximum v/c ratio for movements at the intersection. In addition, all v/c ratios greater than 0.85 for through and shared turning movements, and 1.00 for exclusive turning movements are outlined and highlighted.

Table 12: 2036 Future Total Conditions

Intersection	Control	Peak Hour	Level of Service ₁	Control Delay	Maximum v/c ratio ²	95 th Percentile Queue Length > Storage Lane Length
Davis Road and Barker Parkway	Stop-Controlled	A.M.	C	17.4	0.44 (WBLR)	None
		P.M.	C	24.5	0.44 (WBLR)	None
Davis Road and Upper's Lane	Stop-Controlled on Minor Roadway	A.M.	E	38.5	0.62 (WB)	None
		P.M.	F	478.6	1.87 (WB)	None
Lundy's Lane and Barker Parkway	Roundabout	A.M.	A	1.82	0.22 (EB)	None
		P.M.	B	1.95	0.31 (WB)	None
Lundy's Lane and Thorold Townline Road	Signalized	A.M.	C	21.8	0.78 (EBT)	None
		P.M.	C	27.9	0.90 (EBT)	None
Thorold Townline Road and Upper's Lane	Stop-Controlled	A.M.	B	10.3	0.42 (SBT)	None
		P.M.	B	11.6	0.49 (SBT)	None
Thorold Townline Road and Venture Street	Stop-Controlled	A.M.	A	7.5	0.43 (SBT)	None
		P.M.	A	7.7	0.07 (NBLT)	None
Thorold Townline Road and Beaverdams Road	Stop-Controlled	A.M.	C	20.9	0.66 (WB)	None
		P.M.	E	46.7	0.88 (SB)	None
Barker Street and Venture Way	Stop-Controlled	A.M.	A	9.1	0.30 (NB)	None
		P.M.	A	9.6	0.35 (SB)	None
Upper's Lane and Street C	Stop-Controlled	A.M.	A	7.4	0.07 (SBLR)	None
		P.M.	A	7.7	0.09 (EB)	None

Note 1: The Level of Service of a signalized intersection is based on the average control delay per vehicle (Synchro/ICU). The Level of Service of a stop-controlled intersection is based on the delay associated with the critical minor road approach (HCM 2000).

Note 2: The critical v/c ratio is considered to be the maximum v/c ratio for movements at the intersection. In addition, all v/c ratios greater than 0.85 for through and shared turning movements, and 1.00 for exclusive turning movements are outlined and highlighted.

Most of the intersections in the future total conditions are expected to operate with a Level of Service of "C" or better, with increasing control delay over the horizon years.

The intersection of Davis Road and Upper's Lane is expected to operate with failing conditions in both peak hour factors.

The stop-controlled intersection of Thorold Townline Road and Beaverdams Road is expected to operate with a Level of Service of "E." This intersection is approximately 665 metres and will be utilized to travel east. To improve the operations of this intersection, it is recommended to convert this stop control on minor approach intersection to a signalized intersection.

6.0 Comparison of Future Background and Future Total results

Table 13 compares the results found in the horizon year of 2036 future total conditions as well future background conditions.

Table 13: Comparison of 2036 Future Background and Future Total Conditions

Intersection	Peak Hour	Level of Service ¹	Control Delay	Maximum v/c ratio	Level of Service ¹	Control Delay	Maximum v/c ratio ²
		Future Background Conditions			Future Total Conditions		
Davis Road and Barker Parkway	A.M.	C	15.8	0.37 (WBLR)	C	17.4	0.44 (WBLR)
	P.M.	C	20.5	0.35 (WBLR)	C	24.5	0.44 (WBLR)
Davis Road and Upper's Lane	A.M.	D	27.2	0.53 (EB)	E	38.5	0.62 (WB)
	P.M.	F	95.7	0.84 (WB)	F	478.6	1.87 (WB)
Lundy's Lane and Barker Parkway	A.M.	A	1.79	0.22 (EB)	A	1.82	0.22 (EB)
	P.M.	A	1.96	0.30 (WB)	B	1.95	0.31 (WB)
Lundy's Lane and Thorold Townline Road	A.M.	C	20.7	0.76 (EBT)	C	21.8	0.78 (EBT)
	P.M.	C	25.4	0.89 (EBT)	C	27.9	0.90 (EBT)
Thorold Townline Road and Upper's Lane	A.M.	A	9.1	0.30 (NBT)	B	10.3	0.42 (SBT)
	P.M.	A	9.9	0.38 (SBT)	B	11.6	0.49 (SBT)
Thorold Townline Road and Beaverdams Road	A.M.	C	17.2	0.59 (WB)	C	20.9	0.66 (WB)
	P.M.	D	25.3	0.69 (EB)	E	46.7	0.88 (SB)
Barker Street and Venture Way	A.M.	A	9.1	0.30 (NB)	A	9.1	0.30 (NB)
	P.M.	A	9.6	0.35 (SB)	A	9.6	0.35 (SB)

Note 1: The Level of Service of a signalized intersection is based on the average control delay per vehicle (Synchro/ICU). The Level of Service of a stop-controlled intersection is based on the delay associated with the critical minor road approach (HCM 2000).

Note 2: The critical v/c ratio is considered to be the maximum v/c ratio for movements at the intersection. In addition, all v/c ratios greater than 0.85 for through and shared turning movements, and 1.00 for exclusive turning movements are outlined and highlighted.

The addition of site trips is not expected to change the results significantly, as the Levels of Service remain the same between the Future Background and Future Total conditions, for most of the peak hours.

The intersection of Thorold Townline Road and Beaverdams Road is expected to operate with a Level of Service of "E" in the p.m. peak hour in the 2036 future total conditions. This is not a significant change from the projected Level of Service of "D" in the 2036 future background conditions. To improve these results, signal optimization is recommended. This area is expected to grow and develop further to accommodate the extra traffic in new residential areas.

6.1 Recommendations

Most of the study network intersections are expected to operate sufficiently, with minimal control delays.

The intersection of Davis Road at Upper's Lane has operational issues in the 2023 conditions. It is expected to worsen with time with a projected Level of Service of "F" in the p.m. peak hour in the 2026 future background conditions, which does not include the site generated traffic. Per the Ontario Traffic Manual Justifications 4-7, a signal is not warranted, using the 2036 future total projected volumes. However, per the Ontario Traffic Manual Justifications 1-3, a signal is justified. Justifications 1 and 2 are based on minimum vehicular volume and delays to cross traffic, respectively, while Justification 3 is based on a combination of Justification 1 and 2. Generally, Justification 7 is utilized more to justify converting an intersection into a signalized one. As a signalized intersection, it is expected to operate with a Level of Service of A and B, in the a.m. and p.m. peak hours respectively. This is an improvement from the expected Level of Service of F. **Table 14** displays the results.

The intersection of Thorold Townline Road and Beaverdams Road is expected to operate with Levels of Service of "D" and "E" and to improve these results, it is recommended to signalize this intersection. However, Per the Ontario Traffic Manual Justification 7, a signal is not warranted. Synchro 11 was used for the signalized scenario using the 2036 future conditions. If signalized, the intersection is expected to operate with a Level of Service of "B" in the a.m. and p.m. peak hours. The table below displays the results if the intersection is optimized.

Table 14: Recommendation Results

Intersection	Control	Peak Hour	Level of Service ₁	Control Delay	Maximum v/c ratio ²	95 th Percentile Queue Length > Storage Lane Length
Davis Road and Upper's Lane	Signalized	A.M.	A	8.2	0.47 (NBT)	None
		P.M.	B	10.5	0.65 (NBT)	None
Thorold Townline Road and Beaverdams Road	Signalized	A.M.	B	11.5	0.58 (WB)	None
		P.M.	B	12.8	0.68 (SB)	None

As requested by Niagara Region, a left-turn warrant based on the MTO Design Supplement (April 2020) was completed for Street A. A designated left turn lane is not warranted for the proposed Street. **Appendix I** contains all relevant information on recommendations.

7.0 Future Venture Way Extension to Thorold Townline Road

While the above analysis was completed with both Venture Way and Upper's Lane fully constructed to Thorold Townline Road, there is a possibility that the extension of Venture Way isn't constructed before the development is built. As such, the development traffic was reassigned assuming the Venture Way extension was not constructed to Thorold Townline Road.

Table 15: 2036 Future Total Scenario 2 Conditions

Intersection	Control	Peak Hour	Level of Service ₁	Control Delay	Maximum v/c ratio ²	95 th Percentile Queue Length > Storage Lane Length
Davis Road and Barker Parkway	Stop-Controlled	A.M.	C	18.1	0.48 (WBLR)	None
		P.M.	D	26.0	0.45 (WBLR)	None
Davis Road and Upper's Lane	Stop-Controlled on Minor Roadway	A.M.	E	42.8	0.67 (WB)	None
		P.M.	F	338.0	1.48 (WB)	87.3 m > 63.3 m (WB)
Lundy's Lane and Barker Parkway	Roundabout	A.M.	A	1.82	0.22 (EB)	None
		P.M.	B	1.95	0.31 (WB)	None
Lundy's Lane and Thorold Townline Road	Signalized	A.M.	C	21.2	0.77 (EBT)	None
		P.M.	C	29.3	0.94 (EBT)	42.7 m > 30.0 m (NBL)
Thorold Townline Road and Upper's Lane	Stop-Controlled	A.M.	A	9.7	0.36 (NBTR)	None
		P.M.	A	10.0	0.39 (SBTL)	None
Thorold Townline Road and Beaverdams Road	Stop-Controlled	A.M.	C	20.5	0.65 (WB)	None
		P.M.	E	37.8	0.83 (SB)	None
Barker Street and Venture Way	Stop-Controlled	A.M.	B	11.7	0.48 (NB)	None
		P.M.	B	11.1	0.42 (SB)	None
Upper's Lane and Street C	Stop-Controlled	A.M.	A	7.4	0.04 (EBTL)	None
		P.M.	A	7.6	0.09 (EBTL)	None

Note 1: The Level of Service of a signalized intersection is based on the average control delay per vehicle (Synchro/ICU).
The Level of Service of a stop-controlled intersection is based on the delay associated with the critical minor road approach (HCM 2000).

Note 2: The critical v/c ratio is considered to be the maximum v/c ratio for movements at the intersection. In addition, all v/c ratios greater than 0.85 for through and shared turning movements, and 1.00 for exclusive turning movements are outlined and highlighted.

As seen in **Table 15**, the intersection of Davis Road and Barker Parkway is expected to have a higher delay with the increased traffic but does not go into a LOS of 'F' and it is not expected to be at capacity. As scenario did not include the recommendations as outlined in **Section 6.1**, both the Davis Road and Upper's Lane and the Thorold Townline Road and Beaverdams Road intersections are still expected to be experience significant delays. Based on the results with the recommended improvements, these intersections are expected to be able to handle this scenario with the recommended improvements. The Lundy's Lane and Barker Parkway roundabout has significant capacity and is not expected to be significantly affected by the increase of volume during this scenario.

8.0 Site Access Safety Review

According to the Draft Plan by Bousfields Inc., (January 3, 2024), there are three streets proposed within the subject development. Street A extends from Venture Way and continues to connect with the Future Road, east of the development, allowing access into the site from east as well as the west. Street B connects with Street A within the subject development and other residential developments. Street C allows access into the site from the south of the site, via Upper's Lane.

8.1 Sightline Review

The sightline review will be completed for the intersection at Street A at Street B as well as the intersection of Street C and Street Upper's Lane. However, as these streets are projected, the sightline analysis is completed based on the projected streets. Due to this, sightline figures have not been included in this report.

Table 16 displays the sightline results for the intersection at Street A at Street B as well as the intersection of Street C and Street Upper's Lane.

Given that the road network is under the jurisdiction of the City of Thorold, the sight distance analyses will be subject to the Transportation Association of Canada (TAC) Geometric Design Guide for Canadian Roads (GDGCR). Therefore, the TAC-GDGCR was consulted to conduct the safety review for the proposed Site Access.

A review of the available sight distance at the proposed site intersections was undertaken based on Transportation Association of Canada (TAC) Geometric Design Guide for Canadian Roads (June 2017). Streets in the City of Thorold are assumed to have speeds of 60 km/h with a design speed of 70 km/h. The local roads within the subject development are assumed to have a speed of 50 km/h, with a design speed of 60 km/h. Utilizing the equation provided by the TAC guideline 9.9.1 and the table provided in 9.9.5, the required sight distance of a passenger vehicle making a right-turn and a left-turn from stop are approximately 130 metres and 150 metres respectively for the design speed of 70 km/h. For the design speed of 50 km/h, the required sight distance of a passenger vehicle making a right-turn and a left-turn from stop are approximately 110 metres and 130 metres respectively.

Sight distance was measured from the site access using the following assumptions:

- A standard driver eye height of 1.08 m for a passenger car.
- A 4.4 m setback from the approximate extension of the outer curb to represent a vehicle waiting to exit the Site.

Intersection sight distance is calculated using Equation 9.9.1 from the Geometric Design Guide for Canadian Roads (June 2017):

$$ISD = 0.278 * V_{major} * tg$$

Where;

ISD = Intersection Sight Distance

V major = design speed of roadway (km/h)

tg = assumed time gap for vehicles to turn from stop onto roadway (s)

Table 16: Sight Distance Analysis

Feature	Street A/Venture Street and Street B	Street C and Street Upper's Lane
Access Type	Full-Movement	Full-Movement
Posted Speed Limit of Roadway	50 km/h	50 km/h
Assumed Design Speed	60 km/h	60 km/h
Base Time Gap	6.5 s (right) 7.5 s (left)	6.5 s (right) 7.5 s (left)
Grade of Roadway	Less than 3%	Less than 3%
Horizontal Alignment of Roadway	Straight	Straight
Required Sight Distance (right turn)	>110 m	>110 m
Available Sight Distance (right turn)	190 m	267 m
Required Sight Distance (left turn)	>130 m	>130 m
Available Sight Distance (left turn)	360 m	468 m
Minimum Sight Distances Satisfied?	YES	YES

The intersections meet the relevant TAC GDGCR requirements of the sightline analysis. To further improve the sight distances, it is recommended to avoid the usage of larger landscaping plants such as trees at the intersections. **Appendix J** contains excerpts from the TAC GDGCR Manual.

8.2 Emergency Access Review/Phasing

Maintaining emergency access throughout the development's construction is paramount. As such, it is important to identify and maintain routes into the development.

At the north end of the development, access for emergency vehicles can be through the use of Street A or using Street B. The private streets can be used in case of any blockages along Street 'A' to ensure that emergency vehicles move freely.

A preliminary phasing plan was prepared by Bousfields Inc. At this stage it is only preliminary and subject to change through detailed design. There are three (3) construction phases for the Upper's Lane development. Phase 1 of construction will include the construction Street A and B to ensure two points of ingress/egress are maintained. Additional local roads could be constructed parallel to Street B, increasing points of access for emergency vehicles. Phase 2 of construction occurs north of Street A, with additional local roads to be constructed. Finally, Phase 3 of construction occurs in the southwest corner of the development. This phase of construction will connect Street C to Street B and Uppers Lane, ensuring that access is maintained for emergency vehicles.

9.0 Transportation Demand Management (TDM) Measures

Transportation Demand Management (TDM) measures are recommended to promote alternative modes of transportation, such as transit and to encourage the use of non-auto transportation to reduce pollution, single-occupancy vehicle (SOV) trips, parking demand for the proposed development, and to improve community health. The following section outlines site specific TDM measures recommended for the proposed residential development.

9.1 Existing TDM Measures

9.1.1 Transit

As outlined in **Section 2**, two transit stops are provided near the Subject Property, Barker Parkway at Sunset Way and Davis Road at Allanburg Road.

City of Thorold transit services connect the Subject Property to the transit hub at Thorold Towpath Terminal. From there, residents can transfer to other buses to the rest of the Niagara Region. Niagara Region Transit has introduced a consolidated transit system in the Niagara Region. This initiative allows residents to transfer to other busses to the rest of the region.

For transfers between busses, Niagara Region Transit offers unlimited travel within a two-hour period for the completion of a one-way trip.

Niagara Region Transit also offers discounts for eligible riders and pre-paid passes via Transit App, a mobile fare payment app. Those who travel regularly by transit (i.e., commuters and students) can receive a discounted 10-ride-card or 31-day pass, while those below 17 years old or 65 and over, can receive a discounted single ticket, and a further discount on 10-ride-card's or 31-day passes when using Transit App. Additionally, the "U-Pass Add-On" allows Brock University students to purchase discounted monthly passes.

Finally, "TransCab" is Niagara Region Transit's on demand transit service available in an area of West St. Catharines, a place without the provision of bus services. The TransCab operates similar to a cab service, with vehicles picking up and dropping off passengers in designated zones. The drop off zone is programmed in the Transit App, but includes most bus stops west of Martindale Rd./Louth St. All these initiatives promote transit use and incentivize commuters to explore alternate methods of transportation.

9.1.2 Pedestrian

As part of the plan to develop the community, sidewalks for pedestrian usage will be built along the local roads within the neighbourhood. This will allow for a more walkable space and promote the usage of other modes of transportation.

9.2 Site Specific TDM Opportunities

9.2.1 Passes

To encourage residents to utilize transit, a 31-day Regional Pass is recommended to be provided with the purchase of an individual residential unit.

9.2.2 TDM Information Package

Upon occupancy, a TDM information package should be provided to residents.

TDM update and promotional material can be continuously distributed to residents via mailbox. Such measure is expected to increase awareness of available alternate travel modes and reduce the barriers to adopting more sustainable travel behavior. Such marketing allows prospective tenants to be aware of sustainable travel options.

Neighborhood commercial, retail, and institutional facilities should also be included in the marketing package to promote local businesses.

10.0 Conclusion

The findings and recommendations of our analysis are summarized as the following:

- Under 2023 conditions, the intersections operate with a Level of service of "C" or better, except for the intersection of Davis Road and Upper's Lane. The intersection operates with a Level of Service of "E" in the p.m. peak hour.
- Under 2026, 2031 and 2036 future background conditions, the intersections are expected to operate similar to the 2023 conditions, as most of the intersections are expected to operate with a Level of "C" or better. The stop-controlled intersection of Thorold Townline Road at Beaverdams Road is expected to operate with a Level of Service of "D" in the p.m. peak hour, and with a control delay of 25.3 seconds in the 2036 horizon year due to the growth in traffic. The intersection of Davis Road and Upper's Lane is expected to continue with failing operations throughout the future background conditions.
- The subject development is expected to generate 241 and 307 two-way trips during the weekday a.m. and p.m. peak hour, respectively.
- The future background conditions are not expected to change under the future total conditions, other than slight increases in control delay and volume-to-capacity ratios. The intersection of Thorold Townline Road at Beaverdams Road is expected to operate with a Level of Service of "E" in the p.m. peak hour, with a volume-to-capacity ratio of 0.88.
- It is recommended to convert the stop control intersection of Davis Road and Upper's Lane into a signalized intersection to improve the results of the operations. Per the Ontario Traffic Manual Justifications 4-7, a signal is not warranted, using the 2036 future total projected volumes.
- The intersection of Thorold Townline Road and Beaverdams Road is expected to operate with Levels of Service of "D" and "E" and to improve these results, it is recommended to signalize this intersection. If this recommendation is used, the intersection is expected to operate with a Level of Service of "B" in the a.m. and p.m. peak hours.
- The analysis undertaken herein was prepared using the most recent Draft Plan of Subdivision available at the time of writing this report. Any minor changes to the plan are not expected to materially affect the conclusions contained within this report.
- The intersections meet the relevant TAC GDGCR requirements of the sightline analysis,

To help facilitate emergency access, the development construction should be phased in three (3) phases with Streets 'A' and 'B' completed in the first two (2) phases and private roads built as needed to always ensure multiple routes for emergency vehicles.

- A preliminary phasing plan has been completed by Bousfields Inc. and is subject to change through detailed design.
- For the Transportation Demand Management plan, strategies were recommended to result in more efficient use of transportation modes. They included the accessibility of bike facilities, and use of sustainable transportation modes.
- Therefore, the Draft Plan of Subdivision application can be supported from a transportation perspective given that the surrounding road network can accommodate the increase in traffic volumes attributable to the proposed development.

In conclusion, the proposed development in the City of Thorold can be supported from a transportation operations, safety, and parking perspective. We trust that this review satisfies any transportation concerns associated with the Draft Plan for this development. Please feel free to contact the undersigned for any further information required.

Respectfully submitted,

C.F. CROZIER & ASSOCIATES INC.



Ian Lindley, M.A.Sc., P.Eng.
Project Engineer, Transportation

IL/ak/la/sa

C.F. CROZIER & ASSOCIATES INC.



R. Aaron Wignall, Associate
Senior Project Manager, Transportation

J:\1000\1046-Parkbridge Lifestyle\6664 -Parkbridge Thorold\Reports\2024.01.31 Transportation Impact Study FINAL.docx

APPENDIX A

Correspondence

From: Hiba Naqvi
Sent: May 19, 2023 2:21 PM
To: Shaira Ahmed
Subject: FW: Parkbridge Thorold Terms of Reference

Hiba Naqvi, EIT
Engineering Intern, Transportation
DID: 905.864.3679

From: Hiba Naqvi
Sent: Tuesday, April 25, 2023 3:34 PM
To: Dunsmore, Susan <Susan.Dunsmore@niagararegion.ca>
Cc: Aaron Wignall <awignall@cfcrozier.ca>; Development Planning Applications <devtplanningapplications@niagararegion.ca>; Ian Lindley <ilindley@cfcrozier.ca>
Subject: RE: Parkbridge Thorold Terms of Reference

Hello Susan,

Thank you so much for your response.

The proposed development does not provide an access to Thorold Townline Road and we feel the impacts from this development to the intersection of Thorold Townline Road and Beaverdams Road will be minor. Therefore, we would like to remove the intersection of Thorold Townline Road and Beaverdams Road as a study intersection from your requirements. Please advise if we can remove this intersection for the Regions Requirements.

Best,

From: Dunsmore, Susan <Susan.Dunsmore@niagararegion.ca>
Sent: April 24, 2023 4:28 PM
To: Hiba Naqvi <hnaqvi@cfcrozier.ca>
Cc: Aaron Wignall <awignall@cfcrozier.ca>; Development Planning Applications <devtplanningapplications@niagararegion.ca>
Subject: RE: Parkbridge Thorold Terms of Reference

Hello

Transportation planning has reviewed the terms of reference and have provided the following comments in red below. If Regional traffic data is required please use the

following link: <https://www.niagararegion.ca/living/roads/permits/traffic-data-requests.aspx>. If any improvements are required to any Regional infrastructure please include a functional design in the TIS.

If this site has not completed a preconsultation with the City of Thorold a preconsultation is to be completed prior finalization of the terms of reference, which may need to be updated based on all agencies comments.

Susan M. Dunsmore, P. Eng.
Manager, Development Engineering
Planning and Development Services

Phone: (905) 980-6000 or 1-800-263-7215 ext 3661
Address: 1815 Sir Isaac Brock Way, Thorold ON, L2V4T7



From: Hiba Naqvi <hnaqvi@cfcrozier.ca>
Sent: Monday, April 17, 2023 1:26 PM
To: Paul.Nunes@ontario.ca; Dunsmore, Susan <Susan.Dunsmore@niagararegion.ca>
Cc: Aaron Wignall <awignall@cfcrozier.ca>
Subject: Parkbridge Thorold Terms of Reference

CAUTION EXTERNAL EMAIL: This email originated from outside of the Niagara Region email system. Use caution when clicking links or opening attachments unless you recognize the sender and know the content is safe.

Hello,

C.F. Crozier and Associates (Crozier) has been retained by Parkbridge Lifestyle Communities Inc. to prepare a Transportation Impact Study (TIS) for a residential development located at Uppers Lane (PT TWP LOT 43 44 66 67 RP;59R6514 PARTS) in the City of Thorold, in support of the Zoning By-Law Amendment and Draft Plan of Subdivision.

According to the Concept Plan, the elements envisioned for this development include proposed 366 street townhouses, 90 bungalow townhouses and 132 single detached homes. Please see the attached concept plan for more details.

This letter and its attachment are intended to serve as the Terms of Reference (ToR) for the TIS to support the development application.

We are kindly requesting that you review the ToR and provide feedback regarding our scope of work and request for data. We apologize if you are not the appropriate person for correspondence. If you are not, could you please direct us to the appropriate contact?

Study Methodology for the Transportation Impact Study

The following intersections are proposed to be analyzed as part of the scope of the study:

- Uppers Lane and Thorold Townline Road (Regional Road 70)
- Uppers Lane and Davis Road (Highway 58)
- Thorold Townline Rd and Beaverdams Road – stop controlled
- Thorold Townline Rd and Lundy's Ln/Highway 20 – signalized
- Highway 20 and Barker Pkwy - roundabout
- Barker Parkway and Davis Road (Highway 58)
- Barker parkway and Venture Way
- Proposed Street 'A' (Venture Way) and Thorold Townline Road (Regional Road 70)
- Uppers Lane and Proposed Street 'L' and 'O'

We will consult specialty traffic counting firms we typically work with to obtain traffic data for the intersections listed above unless the City has data for these intersections. If the City's data is available and preferred, please let us know. **Please confirm the above noted intersections are sufficient for the study.**

Analysis Periods and Scenarios

The above intersections will be analyzed in the weekday A.M. and P.M. peak hours of current year (2023) as well as an opening horizon year of (2026), five (2031), and ten-years after full buildout (2036).

Please confirm if the two peak hour periods and the horizon years are sufficient for the analysis.

Confirmed

Background Developments

Please confirm if any background development should be included in the analysis. If there are developments that need to be considered, please provide the associated transportation impact studies that should be included in our analysis.

Roadway and Transit Improvements

Please provide us with the details on any roadway improvements planned within the study area network.

Traffic Growth

We kindly request a recommended growth rate applicable to traffic volumes in the study area, to sufficiently reflect future conditions in the horizon years. If a growth rate is not available, an industry standard of 2% is suggested to forecast future traffic growth at the intersections of the study. **Please confirm if this is acceptable. Confirmed**

Trip Generation and Distribution

Trip generation for the proposed development will be forecasted using the Trip Generation Manual, 11th Edition, prepared by the Institute of Transportation Engineers (ITE). Multifamily Housing Low-Rise (Land Use Code 220) will be used to calculate the trips. **Please confirm if this is acceptable. Confirmed**

Existing traffic and data from the 2016 Transportation Tomorrow Survey (TTS) will be used to determine the trip distribution for the A.M. and P.M. periods to the proposed development. **Please confirm if this is acceptable. Please consider also the existing traffic distribution.**

Analysis Procedures

Weekday A.M. and P.M. peak hours will be analyzed using Synchro 11.0 analysis software based on Highway Capacity Manual (HCM) procedures. **Please confirm if this acceptable. Confirmed**

Summary

We request the following information for inclusion in the study, along with any comments that arise with regards to the above Terms of Reference.

Please provide:

- Confirmation that the intersections of study are sufficient.
- Relevant growth rate(s) applicable to the roadways of study.
- Confirmation that the study horizon years are acceptable.
- Any relevant background developments and the associated traffic impact studies that are to be included in our analysis.
- Please provide details of any planned roadway or transit improvements in the surrounding study area within the horizon years, if there are any.

I hope the contents outlined in this email are acceptable. Again, if you are not the appropriate contact, we would appreciate being directed to the appropriate contact.

Should you have any questions or require any further information, please feel free to contact Aaron Wignall or myself.

Regards,

General Comments:

- The Consultant is to follow Niagara Region Guidelines for TIS (2012) for traffic analysis software settings, intersections capacity thresholds and other requirements.
- For the ideal saturation flows, there are currently new saturation flow rates that will be a part of the new TIS Guidelines. The Consultant can use either the below new saturation values or 1750 across the board for all movements.

Variable	Ideal Saturation Flow
T	1,629
L	1,504

LT	1,228
LL	2,194
R	1,351
RT	1,388
LTR	1,483

I hope the contents outlined in this email are acceptable. Again, if you are not the appropriate contact, we would appreciate being directed to the appropriate contact.

Should you have any questions or require any further information, please feel free to contact Aaron Wignall or myself.

Regards,

Hiba Naqvi, EIT
Engineering Intern, Transportation
2800 High Point Drive, Suite 100 | Milton, ON L9T 6P4
T: 905.875.0026



Crozier Connections: [!\[\]\(fa6f3af6bfa46c5d4a2d362681095beb_img.jpg\)](#) [!\[\]\(a9bc825d1a15412853cf9ebcbd72219d_img.jpg\)](#) [!\[\]\(855eb27d3d242e620031eb19ab2e732f_img.jpg\)](#) [!\[\]\(528d698dbdf3a7863b8ddb9bfdc0181d_img.jpg\)](#)

Read our latest news and announcements [here](#).

This email was sent on behalf of C.F. Crozier & Associates Inc. and may contain confidential and/or privileged information for the sole use of the intended recipient. If you have received this email in error, please contact the sender and delete all copies. Any review or distribution by anyone other than the intended recipient is strictly prohibited.

The Regional Municipality of Niagara Confidentiality Notice The information contained in this communication including any attachments may be confidential, is intended only for the use of the recipient(s) named above, and may be legally privileged. If the reader of this message is not the intended recipient, you are hereby notified that any dissemination, distribution, disclosure, or copying of this communication, or any of its contents, is strictly prohibited. If you have received this communication in error, please re-send this communication to the sender and permanently delete the original and any copy of it from your computer system. Thank you.

APPENDIX B

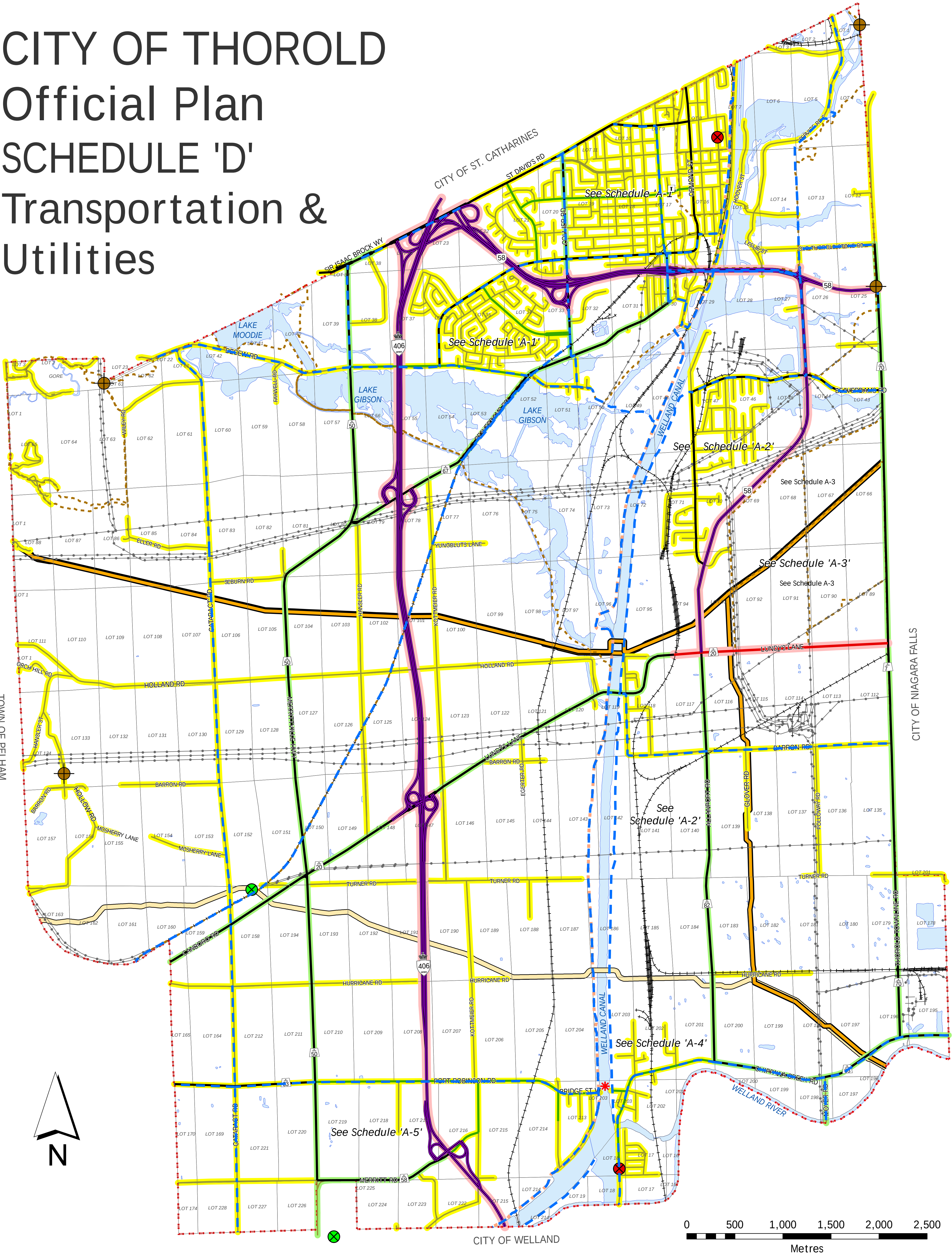
Relevant Maps

CITY OF THOROLD

Official Plan

SCHEDULE 'D'

Transportation & Utilities



Legend

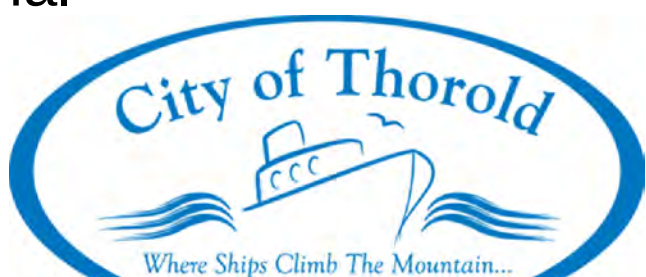
- Municipal Boundary
- Petroleum Well (Abandoned)
- Petroleum Well (Unknown)
- Trailhead
- Port Robinson Ferry
- Transit Hub
- Greater Niagara Circle Route
- Trail
- TransCanada Pipeline
- Enbridge Pipeline
- Railway
- Hydro Transmission Lines
- Niagara Region Bicycle Network

City of Thorold Road Classification

- Provincial Controlled Access Highway
- Highway
- Arterial
- Collector
- Local

Regional Municipality of Niagara Road Classification

- Provincial
- Regional
- Local



Adopted April 21, 2015

APPENDIX C

Existing Transit



Route 322 - Thorold South (Weekday & Saturday)

Outbound Schedule:

Schedules		
Depart Thorold Towpath Terminal	Niagara Falls Rd. & Allanburg Rd.	Arrive Allanburg Rd. & Hodgkins Ave.
-	6:23 a.m.	6:30 a.m.
6:45 a.m.	6:53 a.m.	7:00 a.m.
7:15 a.m.	7:23 a.m.	7:30 a.m.
7:45 a.m.	7:53 a.m.	8:00 a.m.
8:15 a.m.	8:23 a.m.	8:30 a.m.
and every 60 minutes until		
4:15 p.m.	4:23 p.m.	4:30 p.m.
5:15 p.m.	5:23 p.m.	5:30 p.m.
6:15 p.m.	6:23 p.m.	6:30 p.m.

Schedules and Routes

Regional

Niagara Falls

St. Catharines & Thorold

Welland

Riding with Niagara Region Transit

Plan your trip
(routes, stops and directions)

Download the
transit app

Inbound Schedule:

Schedules

Depart Allanburg Rd. & Hodgkins Ave.	Barker Pkwy. & Sunset Way	Arrive Thorold Towpath Terminal
6:30 a.m.	6:35 a.m.	6:43 a.m.
7:00 a.m.	7:05 a.m.	7:13 a.m.
7:30 a.m.	7:35 a.m.	7:43 a.m.
8:00 a.m.	8:05 a.m.	8:13 a.m.
8:30 a.m.	8:35 a.m.	8:43 a.m.
and every 60 minutes until		
4:30 p.m.	4:35 p.m.	4:43 p.m.
5:30 p.m.	5:35 p.m.	5:43 p.m.
6:30 p.m.	6:35 p.m.	6:43 p.m.



Niagara Transit Commission

The Niagara Transit Commission is responsible for the operation, management and maintenance of Niagara’s comprehensive regional transit system.

- Information**
- [Privacy Policy](#)
 - [Site Map](#)
 - [Accessibility](#)

Niagara Region Transit Office

📍 2012 First Street
Louth
St Catharines, ON
L2S 3V9

☎ **1-833-NRT-LINE**
(1-833-678-5463)

Social Media

🐦

APPENDIX D

Traffic Data



Turning Movement Count (6 . BARKER PARKWAY & DAVIS ROAD (HIGHWAY 58))

Start Time	N Approach HIGHWAY 58					E Approach BARKER PARKWAY					S Approach HIGHWAY 58					Int. Total (15 min)	Int. Total (1 hr)
	Thru N:S	Left N:E	UTurn N:N	Peds N:	Approach Total	Right E:N	Left E:S	UTurn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	UTurn S:S	Peds S:	Approach Total		
06:00:00	20	1	0	0	21	8	2	0	0	10	2	24	0	0	26	57	
06:15:00	38	5	0	0	43	16	0	0	0	16	1	45	1	0	47	106	
06:30:00	65	6	1	0	72	16	1	0	0	17	1	61	0	0	62	151	
06:45:00	74	6	0	0	80	12	3	0	0	15	0	37	0	0	37	132	446
07:00:00	40	10	0	0	50	20	2	0	0	22	2	51	0	0	53	125	514
07:15:00	39	10	0	0	49	17	4	0	0	21	5	71	0	0	76	146	554
07:30:00	51	11	0	0	62	34	6	0	0	40	8	84	0	0	92	194	597
07:45:00	59	9	0	0	68	32	7	0	0	39	2	66	0	0	68	175	640
08:00:00	56	15	0	0	71	42	4	0	0	46	4	61	0	0	65	182	697
08:15:00	47	10	0	0	57	24	3	0	0	27	2	67	0	0	69	153	704
08:30:00	53	14	0	0	67	42	4	1	0	47	5	67	0	0	72	186	696
08:45:00	42	8	0	0	50	34	4	0	0	38	8	68	0	0	76	164	685
09:00:00	44	19	0	0	63	24	4	0	0	28	0	57	0	0	57	148	651
09:15:00	44	19	0	0	63	16	5	0	0	21	1	45	0	0	46	130	628
09:30:00	37	9	0	0	46	21	5	0	0	26	8	55	0	0	63	135	577
09:45:00	31	13	0	0	44	11	3	0	0	14	2	57	0	0	59	117	530
BREAK																	
15:00:00	54	26	0	0	80	16	7	1	0	24	3	45	0	0	48	152	
15:15:00	62	32	0	0	94	21	3	0	0	24	7	51	0	0	58	176	
15:30:00	61	24	0	0	85	18	3	0	0	21	6	80	0	0	86	192	
15:45:00	73	22	0	0	95	21	4	0	0	25	2	56	1	0	59	179	699
16:00:00	60	22	0	0	82	22	7	0	0	29	7	103	0	0	110	221	768
16:15:00	72	33	0	0	105	27	6	0	0	33	3	70	0	0	73	211	803
16:30:00	76	35	0	0	111	21	8	0	0	29	5	90	0	0	95	235	846
16:45:00	88	38	0	0	126	15	3	0	0	18	3	75	0	0	78	222	889
17:00:00	70	31	0	0	101	23	8	0	0	31	5	87	0	0	92	224	892
17:15:00	88	30	0	0	118	21	1	0	0	22	4	70	0	0	74	214	895
17:30:00	67	27	0	0	94	21	9	0	0	30	4	61	0	0	65	189	849
17:45:00	57	34	0	0	91	19	3	0	0	22	4	63	0	0	67	180	807
18:00:00	52	23	0	0	75	19	6	0	0	25	6	37	0	0	43	143	726
18:15:00	61	27	0	0	88	15	2	0	0	17	4	45	0	0	49	154	666
18:30:00	41	17	0	0	58	19	3	0	0	22	6	57	0	0	63	143	620
18:45:00	52	20	1	0	73	20	7	0	0	27	6	45	0	0	51	151	591



Grand Total	1774	606	2	0	2382	687	137	2	0	826	126	1951	2	0	2079	5287	-
Approach%	74.5%	25.4%	0.1%		-	83.2%	16.6%	0.2%		-	6.1%	93.8%	0.1%		-	-	-
Totals %	33.6%	11.5%	0%		45.1%	13%	2.6%	0%		15.6%	2.4%	36.9%	0%		39.3%	-	-
Heavy	119	27	0		-	34	8	0		-	20	110	0		-	-	-
Heavy %	6.7%	4.5%	0%		-	4.9%	5.8%	0%		-	15.9%	5.6%	0%		-	-	-
Bicycles	-	-	-		-	-	-	-		-	-	-	-		-	-	-
Bicycle %	-	-	-		-	-	-	-		-	-	-	-		-	-	-



Peak Hour: 07:30 AM - 08:30 AM Weather: Clear Sky (8.9 °C)

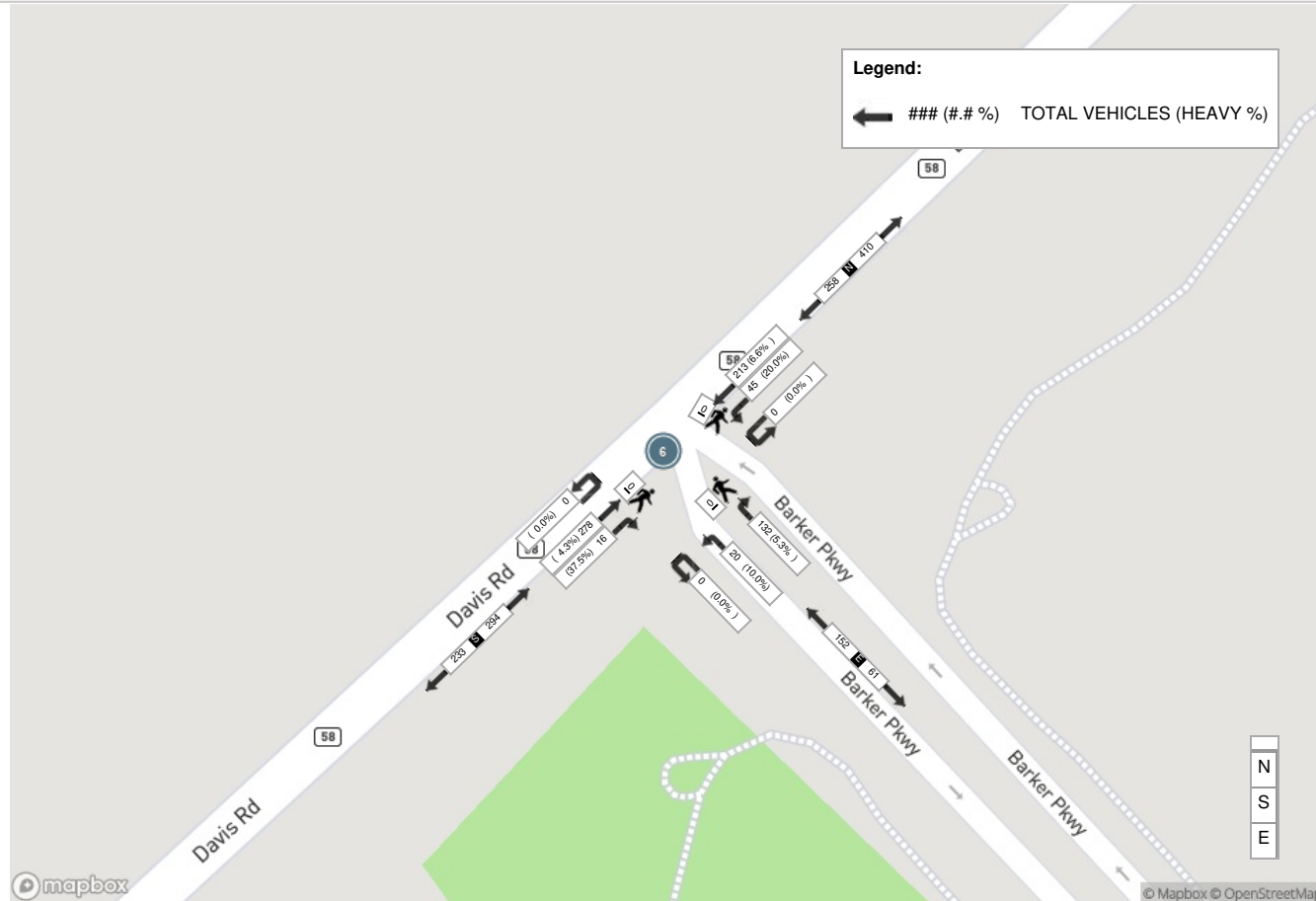
Start Time	N Approach HIGHWAY 58					E Approach BARKER PARKWAY					S Approach HIGHWAY 58					Int. Total (15 min)
	Thru	Left	UTurn	Peds	Approach Total	Right	Left	UTurn	Peds	Approach Total	Right	Thru	UTurn	Peds	Approach Total	
07:30:00	51	11	0	0	62	34	6	0	0	40	8	84	0	0	92	194
07:45:00	59	9	0	0	68	32	7	0	0	39	2	66	0	0	68	175
08:00:00	56	15	0	0	71	42	4	0	0	46	4	61	0	0	65	182
08:15:00	47	10	0	0	57	24	3	0	0	27	2	67	0	0	69	153
Grand Total	213	45	0	0	258	132	20	0	0	152	16	278	0	0	294	704
Approach%	82.6%	17.4%	0%		-	86.8%	13.2%	0%		-	5.4%	94.6%	0%		-	-
Totals %	30.3%	6.4%	0%		36.6%	18.8%	2.8%	0%		21.6%	2.3%	39.5%	0%		41.8%	-
PHF	0.9	0.75	0		0.91	0.79	0.71	0		0.83	0.5	0.83	0		0.8	-
Heavy	14	9	0		23	7	2	0		9	6	12	0		18	-
Heavy %	6.6%	20%	0%		8.9%	5.3%	10%	0%		5.9%	37.5%	4.3%	0%		6.1%	-
Lights	199	36	0		235	125	18	0		143	10	266	0		276	-
Lights %	93.4%	80%	0%		91.1%	94.7%	90%	0%		94.1%	62.5%	95.7%	0%		93.9%	-
Single-Unit Trucks	9	4	0		13	0	1	0		1	1	7	0		8	-
Single-Unit Trucks %	4.2%	8.9%	0%		5%	0%	5%	0%		0.7%	6.3%	2.5%	0%		2.7%	-
Buses	4	5	0		9	7	1	0		8	5	1	0		6	-
Buses %	1.9%	11.1%	0%		3.5%	5.3%	5%	0%		5.3%	31.3%	0.4%	0%		2%	-
Articulated Trucks	1	0	0		1	0	0	0		0	0	4	0		4	-
Articulated Trucks %	0.5%	0%	0%		0.4%	0%	0%	0%		0%	0%	1.4%	0%		1.4%	-
Bicycles on Road	0	0	0		0	0	0	0		0	0	0	0		0	-
Bicycles on Road %	0%	0%	0%		0%	0%	0%	0%		0%	0%	0%	0%		0%	-



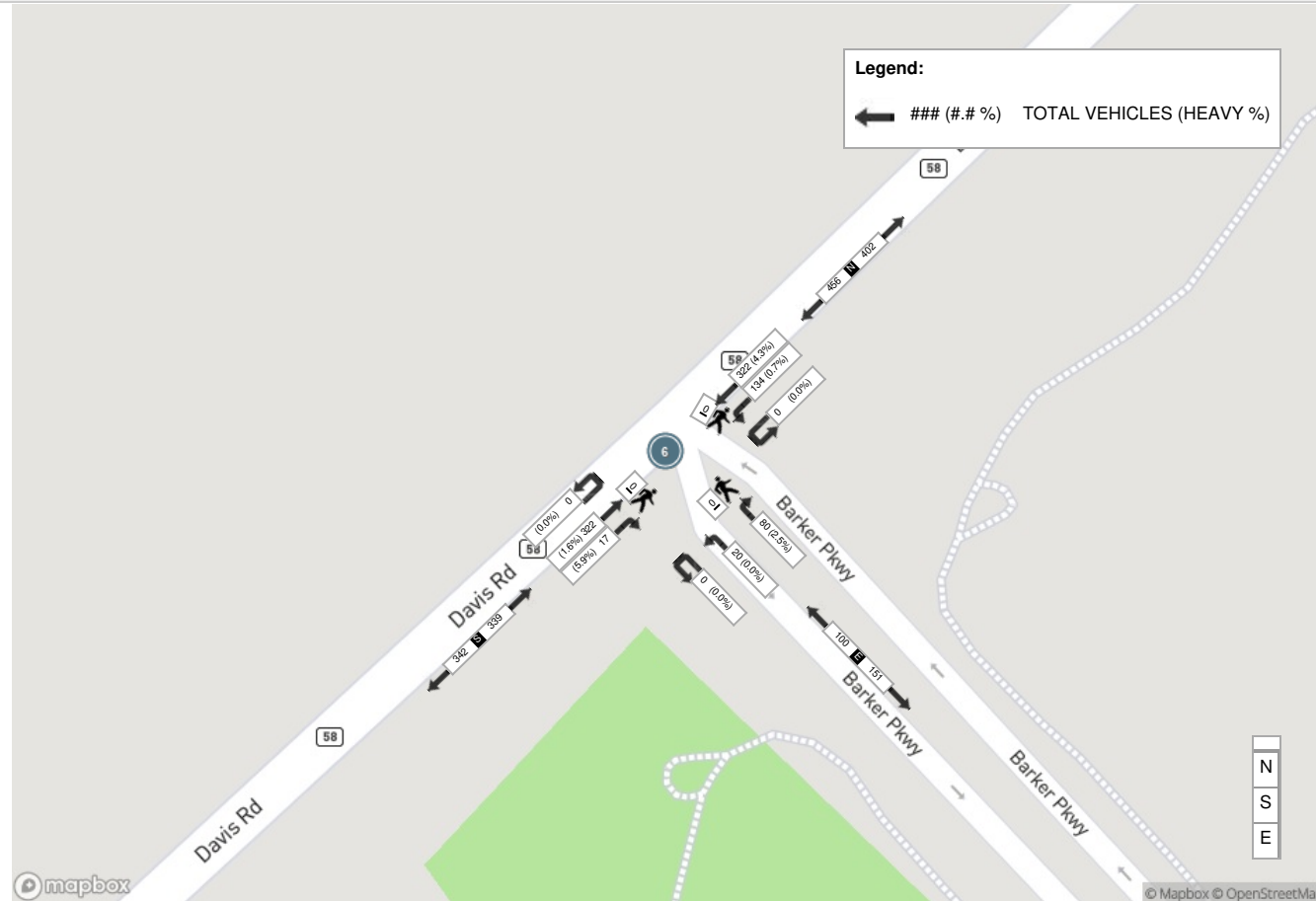
Peak Hour: 04:30 PM - 05:30 PM Weather: Broken Clouds (21.96 °C)

Start Time	N Approach HIGHWAY 58					E Approach BARKER PARKWAY					S Approach HIGHWAY 58					Int. Total (15 min)
	Thru	Left	UTurn	Peds	Approach Total	Right	Left	UTurn	Peds	Approach Total	Right	Thru	UTurn	Peds	Approach Total	
16:30:00	76	35	0	0	111	21	8	0	0	29	5	90	0	0	95	235
16:45:00	88	38	0	0	126	15	3	0	0	18	3	75	0	0	78	222
17:00:00	70	31	0	0	101	23	8	0	0	31	5	87	0	0	92	224
17:15:00	88	30	0	0	118	21	1	0	0	22	4	70	0	0	74	214
Grand Total	322	134	0	0	456	80	20	0	0	100	17	322	0	0	339	895
Approach%	70.6%	29.4%	0%		-	80%	20%	0%		-	5%	95%	0%		-	-
Totals %	36%	15%	0%		50.9%	8.9%	2.2%	0%		11.2%	1.9%	36%	0%		37.9%	-
PHF	0.91	0.88	0		0.9	0.87	0.63	0		0.81	0.85	0.89	0		0.89	-
Heavy	14	1	0		15	2	0	0		2	1	5	0		6	-
Heavy %	4.3%	0.7%	0%		3.3%	2.5%	0%	0%		2%	5.9%	1.6%	0%		1.8%	-
Lights	308	133	0		441	78	20	0		98	16	317	0		333	-
Lights %	95.7%	99.3%	0%		96.7%	97.5%	100%	0%		98%	94.1%	98.4%	0%		98.2%	-
Single-Unit Trucks	9	0	0		9	0	0	0		0	0	4	0		4	-
Single-Unit Trucks %	2.8%	0%	0%		2%	0%	0%	0%		0%	0%	1.2%	0%		1.2%	-
Buses	2	1	0		3	2	0	0		2	1	0	0		1	-
Buses %	0.6%	0.7%	0%		0.7%	2.5%	0%	0%		2%	5.9%	0%	0%		0.3%	-
Articulated Trucks	3	0	0		3	0	0	0		0	0	1	0		1	-
Articulated Trucks %	0.9%	0%	0%		0.7%	0%	0%	0%		0%	0%	0.3%	0%		0.3%	-
Bicycles on Road	0	0	0		0	0	0	0		0	0	0	0		0	-
Bicycles on Road %	0%	0%	0%		0%	0%	0%	0%		0%	0%	0%	0%		0%	-

Peak Hour: 07:30 AM - 08:30 AM Weather: Clear Sky (8.9 °C)



Peak Hour: 04:30 PM - 05:30 PM Weather: Broken Clouds (21.96 °C)





Turning Movement Count (7 . BARKER PARKWAY & VENTURE WAY)

Start Time	N Approach						E Approach						S Approach						W Approach						Int. Total (15 min)	Int. Total (1 hr)
	Right N:W	Thru N:S	Left N:E	UTurn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	Left E:S	UTurn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	Left S:W	UTurn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	Left W:N	UTurn W:W	Peds W:	Approach Total		
06:00:00	0	1	0	0	0	1	0	0	0	0	0	0	0	5	0	0	0	5	0	0	1	0	0	1	7	
06:15:00	1	1	1	0	0	3	1	0	0	0	0	1	0	5	0	0	0	5	0	0	3	0	0	3	12	
06:30:00	1	3	1	0	0	5	0	0	0	0	0	0	0	5	0	0	0	5	0	0	1	0	0	1	11	
06:45:00	0	2	1	0	0	3	1	0	0	0	0	1	0	3	0	0	1	3	0	0	3	0	0	3	10	40
07:00:00	0	7	1	0	0	8	3	1	0	0	0	4	0	5	0	0	0	5	0	0	2	0	0	2	19	52
07:15:00	6	6	0	0	0	12	0	0	1	0	0	1	0	4	0	0	0	4	0	1	5	0	0	6	23	63
07:30:00	3	2	4	0	1	9	0	0	0	0	2	0	0	9	1	0	0	10	1	0	5	0	2	6	25	77
07:45:00	1	5	1	0	0	7	1	0	0	0	0	1	0	5	0	0	1	5	0	2	5	0	1	7	20	87
08:00:00	3	1	2	0	0	6	7	0	0	0	0	7	0	9	0	0	3	9	0	0	4	0	0	4	26	94
08:15:00	0	3	0	0	0	3	0	1	0	0	0	1	1	7	0	0	0	8	0	1	4	0	0	5	17	88
08:30:00	2	3	3	0	0	8	2	0	0	0	0	2	1	10	0	0	1	11	0	2	2	0	0	4	25	88
08:45:00	0	4	1	0	0	5	1	0	0	0	0	1	0	6	0	0	0	6	0	0	6	0	0	6	18	86
09:00:00	4	2	1	0	0	7	0	0	1	0	0	1	0	9	0	0	0	9	0	1	2	0	0	3	20	80
09:15:00	2	5	0	0	0	7	0	0	0	0	0	0	0	1	0	0	0	1	0	0	3	0	0	3	11	74
09:30:00	1	3	1	0	0	5	2	0	0	0	0	2	0	6	0	0	0	6	0	0	0	0	0	0	13	62
09:45:00	5	6	0	0	0	11	0	0	0	0	0	0	0	4	0	0	0	4	1	0	1	0	0	2	17	61
BREAK																										
15:00:00	0	9	4	0	0	13	2	0	1	0	0	3	0	11	0	0	0	11	0	0	3	0	0	3	30	
15:15:00	2	9	2	0	0	13	0	0	1	0	0	1	0	8	0	0	1	8	1	1	2	0	0	4	26	
15:30:00	7	4	1	0	0	12	2	0	0	0	0	2	1	3	1	0	0	5	0	1	3	0	0	4	23	
15:45:00	3	6	2	0	0	11	1	0	1	0	0	2	0	7	0	0	0	7	0	0	1	0	0	1	21	100
16:00:00	2	4	0	1	0	7	1	0	0	0	1	1	0	8	0	0	0	8	0	0	8	0	0	8	24	94
16:15:00	3	8	3	0	0	14	3	0	0	0	1	3	0	7	0	0	0	7	0	3	7	0	0	10	34	102
16:30:00	6	8	4	0	0	18	0	0	0	0	0	0	0	7	0	0	0	7	0	1	1	0	1	2	27	106
16:45:00	7	8	2	1	0	18	2	0	1	0	0	3	1	5	0	0	0	6	0	0	2	0	2	2	29	114
17:00:00	3	8	3	0	0	14	2	0	0	0	0	2	0	11	2	0	0	13	0	4	5	0	0	9	38	128
17:15:00	4	7	1	0	0	12	0	0	0	0	0	0	0	4	0	0	0	4	0	0	3	0	1	3	19	113
17:30:00	6	5	2	0	0	13	0	0	0	0	0	0	0	4	0	0	0	4	0	1	7	0	2	8	25	111
17:45:00	4	4	1	0	0	9	3	0	0	0	1	3	0	5	0	0	1	5	0	1	6	0	3	7	24	106
18:00:00	2	3	2	0	0	7	1	0	0	0	0	1	0	2	0	0	0	2	0	0	4	0	1	4	14	82
18:15:00	5	7	3	0	0	15	0	0	0	0	0	0	0	4	0	0	0	4	0	0	1	0	0	1	20	83
18:30:00	3	4	3	0	0	10	2	0	0	0	0	2	1	1	0	0	2	2	0	2	2	0	0	4	18	76
18:45:00	0	7	0	0	0	7	1	0	0	0	0	1	0	3	0	0	0	3	0	0	5	0	1	5	16	68
Grand Total	86	155	50	2	1	293	38	2	6	0	5	46	5	183	4	0	10	192	3	21	107	0	14	131	662	-
Approach%	29.4%	52.9%	17.1%	0.7%	-	-	82.6%	4.3%	13%	0%	-	-	2.6%	95.3%	2.1%	0%	-	-	2.3%	16%	81.7%	0%	-	-	-	-
Totals %	13%	23.4%	7.6%	0.3%	-	44.3%	5.7%	0.3%	0.9%	0%	-	6.9%	0.8%	27.6%	0.6%	0%	-	29%	0.5%	3.2%	16.2%	0%	-	19.8%	-	-
Heavy	3	6	3	0	-	-	2	1	1	0	-	-	1	7	0	0	-	-	0	1	7	0	-	-	-	-
Heavy %	3.5%	3.9%	6%	0%	-	-	5.3%	50%	16.7%	0%	-	-	20%	3.8%	0%	0%	-	-	0%	4.8%	6.5%	0%	-	-	-	-
Bicycles	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bicycle %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Peak Hour: 07:15 AM - 08:15 AM Weather: Clear Sky (8.9 °C)

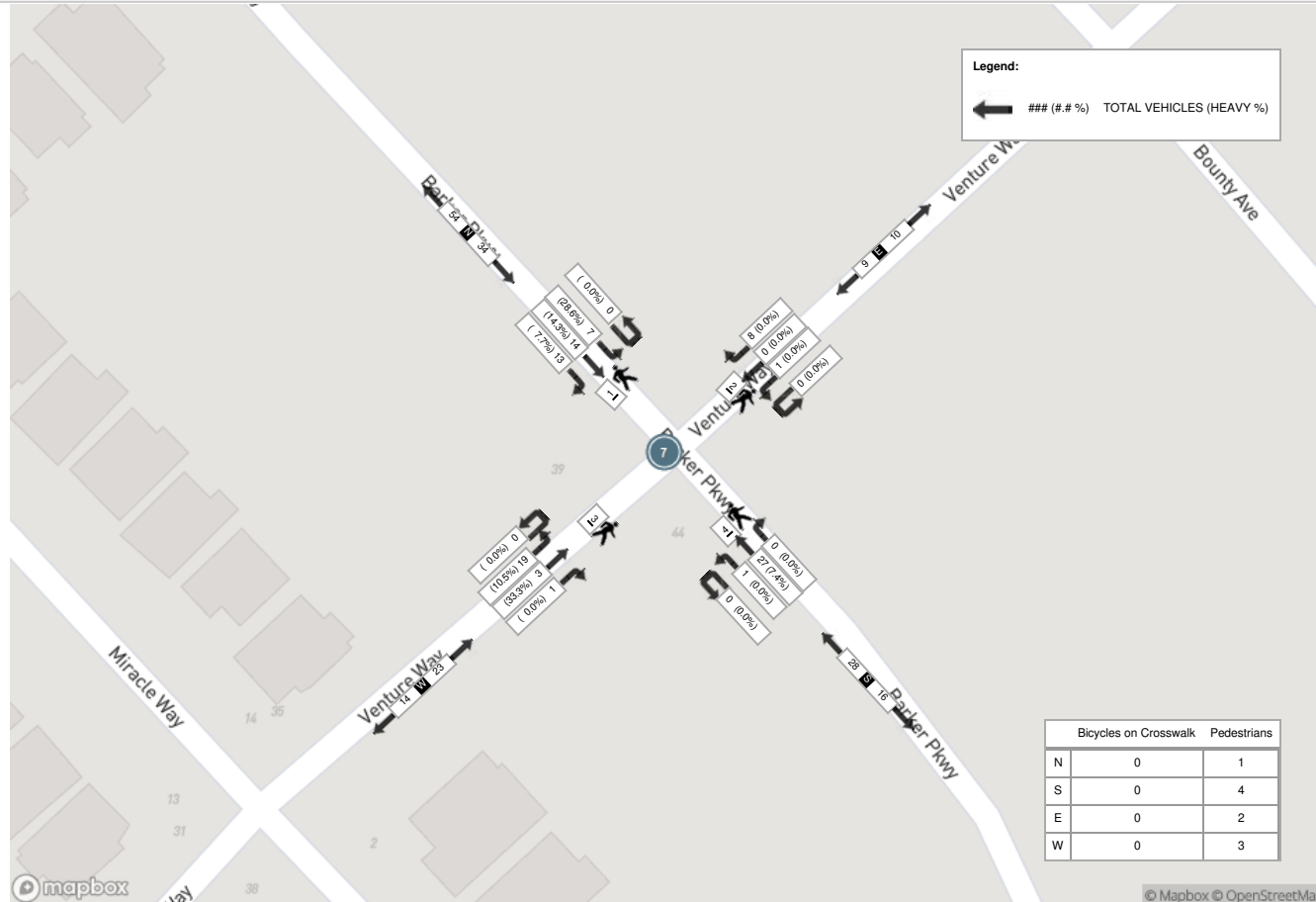
Start Time	N Approach						E Approach						S Approach						W Approach						Int. Total (15 min)
	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	
07:15:00	6	6	0	0	0	12	0	0	1	0	0	1	0	4	0	0	0	4	0	1	5	0	0	6	23
07:30:00	3	2	4	0	1	9	0	0	0	0	2	0	0	9	1	0	0	10	1	0	5	0	2	6	25
07:45:00	1	5	1	0	0	7	1	0	0	0	0	1	0	5	0	0	1	5	0	2	5	0	1	7	20
08:00:00	3	1	2	0	0	6	7	0	0	0	0	7	0	9	0	0	3	9	0	0	4	0	0	4	26
Grand Total	13	14	7	0	1	34	8	0	1	0	2	9	0	27	1	0	4	28	1	3	19	0	3	23	94
Approach%	38.2%	41.2%	20.6%	0%		-	88.9%	0%	11.1%	0%		-	0%	96.4%	3.6%	0%		-	4.3%	13%	82.6%	0%		-	-
Totals %	13.8%	14.9%	7.4%	0%		36.2%	8.5%	0%	1.1%	0%		9.6%	0%	28.7%	1.1%	0%		29.8%	1.1%	3.2%	20.2%	0%		24.5%	-
PHF	0.54	0.58	0.44	0		0.71	0.29	0	0.25	0		0.32	0	0.75	0.25	0		0.7	0.25	0.38	0.95	0		0.82	-
Heavy	1	2	2	0		5	0	0	0	0		0	0	2	0	0		2	0	1	2	0		3	-
Heavy %	7.7%	14.3%	28.6%	0%		14.7%	0%	0%	0%	0%		0%	0%	7.4%	0%	0%		7.1%	0%	33.3%	10.5%	0%		13%	-
Lights	12	12	5	0		29	8	0	1	0		9	0	25	1	0		26	1	2	17	0		20	-
Lights %	92.3%	85.7%	71.4%	0%		85.3%	100%	0%	100%	0%		100%	0%	92.6%	100%	0%		92.9%	100%	66.7%	89.5%	0%		87%	-
Single-Unit Trucks	1	2	0	0		3	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	-
Single-Unit Trucks %	7.7%	14.3%	0%	0%		8.8%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	-
Buses	0	0	2	0		2	0	0	0	0		0	0	2	0	0		2	0	1	2	0		3	-
Buses %	0%	0%	28.6%	0%		5.9%	0%	0%	0%	0%		0%	0%	7.4%	0%	0%		7.1%	0%	33.3%	10.5%	0%		13%	-
Articulated Trucks	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	-
Articulated Trucks %	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	-
Bicycles on Road	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	-
Bicycles on Road %	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	-
Pedestrians	-	-	-	-	1	-	-	-	-	-	2	-	-	-	-	-	4	-	-	-	-	-	3	-	-
Pedestrians%	-	-	-	-	10%	-	-	-	-	-	20%	-	-	-	-	-	40%	-	-	-	-	-	30%	-	-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-



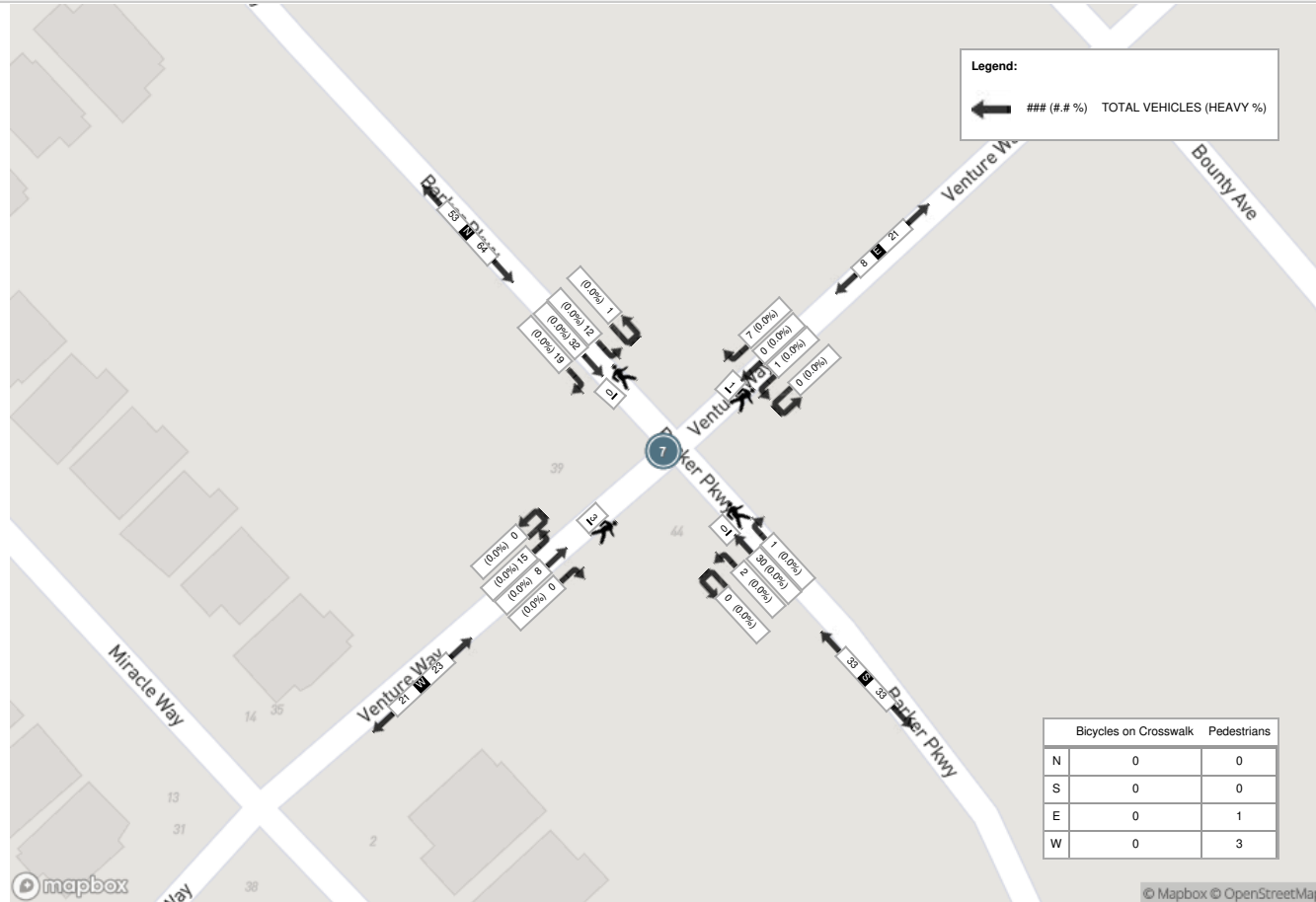
Peak Hour: 04:15 PM - 05:15 PM Weather: Broken Clouds (21.96 °C)

Start Time	N Approach						E Approach						S Approach						W Approach						Int. Total (15 min)
	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	
16:15:00	3	8	3	0	0	14	3	0	0	0	1	3	0	7	0	0	0	7	0	3	7	0	0	10	34
16:30:00	6	8	4	0	0	18	0	0	0	0	0	0	0	7	0	0	0	7	0	1	1	0	1	2	27
16:45:00	7	8	2	1	0	18	2	0	1	0	0	3	1	5	0	0	0	6	0	0	2	0	2	2	29
17:00:00	3	8	3	0	0	14	2	0	0	0	0	2	0	11	2	0	0	13	0	4	5	0	0	9	38
Grand Total	19	32	12	1	0	64	7	0	1	0	1	8	1	30	2	0	0	33	0	8	15	0	3	23	128
Approach%	29.7%	50%	18.8%	1.6%	-	-	87.5%	0%	12.5%	0%	-	-	3%	90.9%	6.1%	0%	-	0%	34.8%	65.2%	0%	-	-	-	-
Totals %	14.8%	25%	9.4%	0.8%	-	50%	5.5%	0%	0.8%	0%	-	6.3%	0.8%	23.4%	1.6%	0%	-	25.8%	0%	6.3%	11.7%	0%	-	18%	-
PHF	0.68	1	0.75	0.25	-	0.89	0.58	0	0.25	0	-	0.67	0.25	0.68	0.25	0	-	0.63	0	0.5	0.54	0	-	0.58	-
Heavy	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	-
Heavy %	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	-
Lights	19	32	12	1	-	64	7	0	1	0	-	8	1	30	2	0	-	33	0	3	15	0	-	18	-
Lights %	100%	100%	100%	100%	-	100%	100%	0%	100%	0%	-	100%	100%	100%	100%	0%	-	100%	0%	37.5%	100%	0%	-	78.3%	-
Single-Unit Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	-
Single-Unit Trucks %	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	-
Buses	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	-
Buses %	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	-
Articulated Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	-
Articulated Trucks %	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	-
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	5	0	0	-	5	-
Bicycles on Road %	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	0%	62.5%	0%	0%	-	21.7%	-
Pedestrians	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	3	-	-
Pedestrians%	-	-	-	-	0%	-	-	-	-	-	25%	-	-	-	-	-	0%	-	-	-	-	-	75%	-	-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-

Peak Hour: 07:15 AM - 08:15 AM Weather: Clear Sky (8.9 °C)



Peak Hour: 04:15 PM - 05:15 PM Weather: Broken Clouds (21.96 °C)





Turning Movement Count (5 . HIGHWAY 20 & BARKER PKWY)

Start Time	N Approach BARKER PKWY					E Approach HWY 20					W Approach HWY 20					Int. Total (15 min)	Int. Total (1 hr)
	Right N:W	Left N:E	UTurn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	UTurn E:E	Peds E:	Approach Total	Thru W:E	Left W:N	UTurn W:W	Peds W:	Approach Total		
06:00:00	3	0	0	0	3	2	37	0	0	39	32	0	0	0	32	74	
06:15:00	4	0	0	0	4	0	40	0	0	40	52	1	0	0	53	97	
06:30:00	5	4	0	0	9	1	64	0	0	65	79	6	0	0	85	159	
06:45:00	4	3	0	0	7	11	57	0	0	68	69	14	0	0	83	158	488
07:00:00	8	6	0	0	14	5	56	0	0	61	69	16	0	0	85	160	574
07:15:00	8	6	0	0	14	9	51	0	0	60	99	19	0	0	118	192	669
07:30:00	13	10	1	0	24	9	68	1	0	78	95	10	0	0	105	207	717
07:45:00	13	7	0	0	20	9	86	0	0	95	123	5	0	0	128	243	802
08:00:00	8	8	0	0	16	5	62	0	0	67	94	7	0	0	101	184	826
08:15:00	11	13	0	0	24	12	64	0	0	76	103	8	0	0	111	211	845
08:30:00	15	10	0	0	25	7	102	0	0	109	81	5	1	0	87	221	859
08:45:00	19	7	0	0	26	10	87	0	0	97	92	9	0	0	101	224	840
09:00:00	9	4	0	0	13	4	73	2	0	79	76	10	0	0	86	178	834
09:15:00	5	5	0	0	10	7	72	0	0	79	31	7	0	0	38	127	750
09:30:00	9	6	0	0	15	5	74	0	0	79	101	8	0	0	109	203	732
09:45:00	6	6	0	0	12	3	79	0	0	82	77	5	0	0	82	176	684
BREAK																	
15:00:00	15	9	0	0	24	9	135	0	0	144	113	15	0	0	128	296	
15:15:00	10	5	0	0	15	11	108	1	0	120	79	10	0	0	89	224	
15:30:00	16	4	0	0	20	10	129	0	0	139	119	14	0	0	133	292	
15:45:00	12	12	0	0	24	7	119	0	0	126	115	5	0	0	120	270	1082
16:00:00	9	10	0	0	19	18	134	1	0	153	102	3	0	0	105	277	1063
16:15:00	10	6	0	0	16	7	114	0	0	121	52	8	0	0	60	197	1036
16:30:00	13	7	0	0	20	8	122	1	0	131	97	10	0	0	107	258	1002
16:45:00	9	6	0	0	15	6	138	0	0	144	127	14	0	0	141	300	1032
17:00:00	21	18	0	0	39	8	139	0	0	147	66	12	0	0	78	264	1019
17:15:00	14	8	0	0	22	8	131	0	0	139	174	12	0	0	186	347	1169
17:30:00	16	8	0	0	24	15	145	1	0	161	156	8	0	0	164	349	1260
17:45:00	11	8	0	0	19	3	99	0	0	102	114	5	0	0	119	240	1200
18:00:00	11	4	0	0	15	14	97	0	0	111	105	12	0	0	117	243	1179
18:15:00	4	10	0	0	14	12	111	0	0	123	101	5	1	0	107	244	1076
18:30:00	11	7	0	0	18	9	84	0	0	93	107	13	0	0	120	231	958
18:45:00	11	8	0	0	19	5	80	0	0	85	105	12	0	0	117	221	939



Grand Total	333	225	1	0	559	249	2957	7	0	3213	3005	288	2	0	3295	7067	-
Approach%	59.6%	40.3%	0.2%		-	7.7%	92%	0.2%		-	91.2%	8.7%	0.1%		-	-	-
Totals %	4.7%	3.2%	0%		7.9%	3.5%	41.8%	0.1%		45.5%	42.5%	4.1%	0%		46.6%	-	-
Heavy	19	16	0		-	19	92	0		-	83	22	0		-	-	-
Heavy %	5.7%	7.1%	0%		-	7.6%	3.1%	0%		-	2.8%	7.6%	0%		-	-	-
Bicycles	-	-	-		-	-	-	-		-	-	-	-		-	-	-
Bicycle %	-	-	-		-	-	-	-		-	-	-	-		-	-	-



Peak Hour: 07:45 AM - 08:45 AM Weather: Clear Sky (8.9 °C)

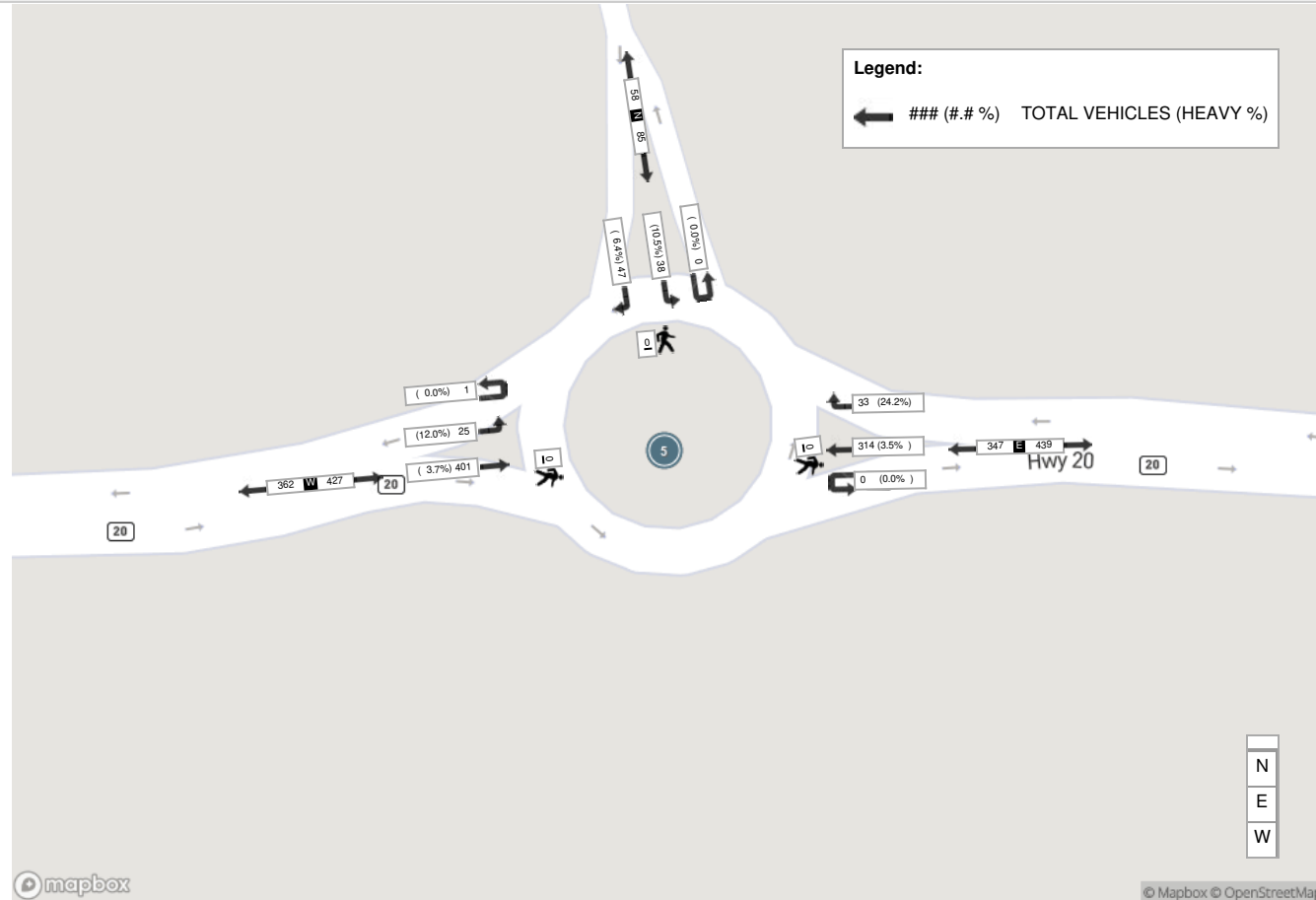
Start Time	N Approach BARKER PKWY					E Approach HWY 20					W Approach HWY 20					Int. Total (15 min)
	Right	Left	UTurn	Peds	Approach Total	Right	Thru	UTurn	Peds	Approach Total	Thru	Left	UTurn	Peds	Approach Total	
07:45:00	13	7	0	0	20	9	86	0	0	95	123	5	0	0	128	243
08:00:00	8	8	0	0	16	5	62	0	0	67	94	7	0	0	101	184
08:15:00	11	13	0	0	24	12	64	0	0	76	103	8	0	0	111	211
08:30:00	15	10	0	0	25	7	102	0	0	109	81	5	1	0	87	221
Grand Total	47	38	0	0	85	33	314	0	0	347	401	25	1	0	427	859
Approach%	55.3%	44.7%	0%		-	9.5%	90.5%	0%		-	93.9%	5.9%	0.2%		-	-
Totals %	5.5%	4.4%	0%		9.9%	3.8%	36.6%	0%		40.4%	46.7%	2.9%	0.1%		49.7%	-
PHF	0.78	0.73	0		0.85	0.69	0.77	0		0.8	0.82	0.78	0.25		0.83	-
Heavy	3	4	0		7	8	11	0		19	15	3	0		18	-
Heavy %	6.4%	10.5%	0%		8.2%	24.2%	3.5%	0%		5.5%	3.7%	12%	0%		4.2%	-
Lights	44	34	0		78	25	303	0		328	386	22	1		409	-
Lights %	93.6%	89.5%	0%		91.8%	75.8%	96.5%	0%		94.5%	96.3%	88%	100%		95.8%	-
Single-Unit Trucks	1	3	0		4	5	11	0		16	8	3	0		11	-
Single-Unit Trucks %	2.1%	7.9%	0%		4.7%	15.2%	3.5%	0%		4.6%	2%	12%	0%		2.6%	-
Buses	2	1	0		3	3	0	0		3	5	0	0		5	-
Buses %	4.3%	2.6%	0%		3.5%	9.1%	0%	0%		0.9%	1.2%	0%	0%		1.2%	-
Articulated Trucks	0	0	0		0	0	0	0		0	2	0	0		2	-
Articulated Trucks %	0%	0%	0%		0%	0%	0%	0%		0%	0.5%	0%	0%		0.5%	-
Bicycles on Road	0	0	0		0	0	0	0		0	0	0	0		0	-
Bicycles on Road %	0%	0%	0%		0%	0%	0%	0%		0%	0%	0%	0%		0%	-



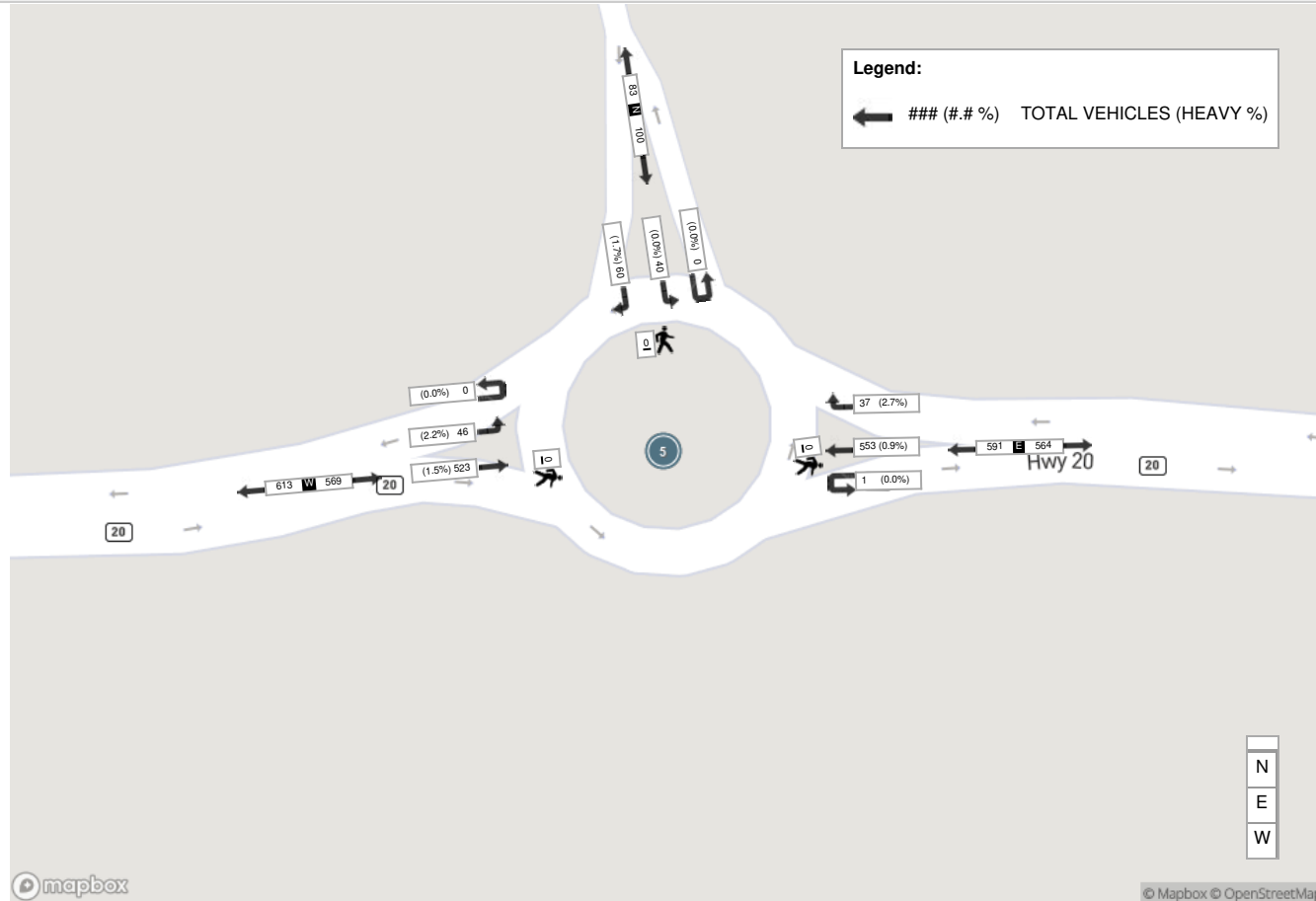
Peak Hour: 04:45 PM - 05:45 PM Weather: Broken Clouds (21.96 °C)

Start Time	N Approach BARKER PKWY					E Approach HWY 20					W Approach HWY 20					Int. Total (15 min)
	Right	Left	UTurn	Peds	Approach Total	Right	Thru	UTurn	Peds	Approach Total	Thru	Left	UTurn	Peds	Approach Total	
16:45:00	9	6	0	0	15	6	138	0	0	144	127	14	0	0	141	300
17:00:00	21	18	0	0	39	8	139	0	0	147	66	12	0	0	78	264
17:15:00	14	8	0	0	22	8	131	0	0	139	174	12	0	0	186	347
17:30:00	16	8	0	0	24	15	145	1	0	161	156	8	0	0	164	349
Grand Total	60	40	0	0	100	37	553	1	0	591	523	46	0	0	569	1260
Approach%	60%	40%	0%		-	6.3%	93.6%	0.2%		-	91.9%	8.1%	0%		-	-
Totals %	4.8%	3.2%	0%		7.9%	2.9%	43.9%	0.1%		46.9%	41.5%	3.7%	0%		45.2%	-
PHF	0.71	0.56	0		0.64	0.62	0.95	0.25		0.92	0.75	0.82	0		0.76	-
Heavy	1	0	0		1	1	5	0		6	8	1	0		9	-
Heavy %	1.7%	0%	0%		1%	2.7%	0.9%	0%		1%	1.5%	2.2%	0%		1.6%	-
Lights	59	40	0		99	36	548	1		585	514	45	0		559	-
Lights %	98.3%	100%	0%		99%	97.3%	99.1%	100%		99%	98.3%	97.8%	0%		98.2%	-
Single-Unit Trucks	1	0	0		1	1	4	0		5	6	0	0		6	-
Single-Unit Trucks %	1.7%	0%	0%		1%	2.7%	0.7%	0%		0.8%	1.1%	0%	0%		1.1%	-
Buses	0	0	0		0	0	0	0		0	2	1	0		3	-
Buses %	0%	0%	0%		0%	0%	0%	0%		0%	0.4%	2.2%	0%		0.5%	-
Articulated Trucks	0	0	0		0	0	1	0		1	0	0	0		0	-
Articulated Trucks %	0%	0%	0%		0%	0%	0.2%	0%		0.2%	0%	0%	0%		0%	-
Bicycles on Road	0	0	0		0	0	0	0		0	1	0	0		1	-
Bicycles on Road %	0%	0%	0%		0%	0%	0%	0%		0%	0.2%	0%	0%		0.2%	-

Peak Hour: 07:45 AM - 08:45 AM Weather: Clear Sky (8.9 °C)



Peak Hour: 04:45 PM - 05:45 PM Weather: Broken Clouds (21.96 °C)





Turning Movement Count (3 . THOROLD TOWNLIN RD & BEAVERDAMS ROAD)

Start Time	N Approach THOROLD TOWNLINE ROAD						E Approach BEAVERDAMS ROAD						S Approach THOROLD TOWNLINE ROAD						W Approach BEAVERDAMS ROAD						Int. Total (15 min)	Int. Total (1 hr)	
	Right N:W	Thru N:S	Left N:E	UTurn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	Left E:S	UTurn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	Left S:W	UTurn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	Left W:N	UTurn W:W	Peds W:	Approach Total			
06:00:00	2	7	0	0	0	9	3	7	0	0	0	10	0	13	1	0	0	14	0	3	1	0	0	4	37		
06:15:00	1	9	4	0	0	14	4	11	0	0	0	15	1	13	2	0	0	16	3	9	0	0	0	12	57		
06:30:00	2	15	0	0	0	17	3	15	0	0	0	18	0	24	0	0	0	24	4	17	4	0	0	25	84		
06:45:00	7	14	1	0	0	22	8	16	0	0	0	24	1	20	4	0	0	25	7	11	2	0	0	20	91	269	
07:00:00	2	22	3	0	0	27	8	22	0	0	0	30	1	28	4	0	0	33	5	12	4	0	0	21	111	343	
07:15:00	2	20	3	0	0	25	9	19	0	0	0	28	1	22	7	0	0	30	8	20	10	0	0	38	121	407	
07:30:00	9	20	3	0	0	32	1	35	3	0	0	39	2	33	6	0	0	41	9	27	4	0	0	40	152	475	
07:45:00	10	14	2	0	0	26	13	43	2	0	0	58	1	40	12	0	0	53	6	28	7	0	0	41	178	562	
08:00:00	3	26	1	0	0	30	12	32	1	0	0	45	0	24	6	0	0	30	5	25	8	0	0	38	143	594	
08:15:00	3	23	11	0	0	37	9	55	0	0	0	64	1	35	10	0	0	46	13	29	8	0	0	50	197	670	
08:30:00	9	21	6	0	0	36	8	33	1	0	0	42	0	36	6	0	0	42	8	26	11	0	0	45	165	683	
08:45:00	3	26	4	0	0	33	7	28	2	0	0	37	1	28	1	0	0	30	8	21	9	0	0	38	138	643	
09:00:00	4	33	7	0	0	44	4	35	0	0	0	39	0	32	4	0	0	36	9	26	8	0	0	43	162	662	
09:15:00	9	25	4	0	0	38	5	15	2	0	0	22	1	29	2	0	0	32	4	21	12	0	0	37	129	594	
09:30:00	7	27	4	0	0	38	9	24	0	0	0	33	0	31	6	0	0	37	6	17	1	0	0	24	132	561	
09:45:00	4	34	4	0	0	42	6	21	1	0	0	28	3	34	5	0	0	42	3	19	10	0	0	32	144	567	
BREAK																											
15:00:00	11	51	6	0	0	68	15	34	4	0	0	53	0	33	3	0	0	36	6	30	4	0	0	40	197		
15:15:00	11	32	11	0	0	54	8	23	1	0	0	32	1	26	12	0	0	39	9	32	7	0	0	48	173		
15:30:00	10	39	10	0	0	59	9	31	1	0	0	41	2	31	16	0	0	49	4	43	5	0	0	52	201		
15:45:00	14	38	9	0	0	61	11	33	1	0	0	45	1	23	9	0	0	33	5	38	5	0	0	48	187	758	
16:00:00	5	40	9	0	0	54	9	43	4	0	0	56	3	25	11	0	0	39	12	43	8	0	0	63	212	773	
16:15:00	12	46	13	0	0	71	8	32	2	0	0	42	1	27	14	0	0	42	8	41	10	0	0	59	214	814	
16:30:00	7	37	9	0	0	53	5	40	2	0	0	47	0	34	11	0	0	45	14	49	7	0	0	70	215	828	
16:45:00	16	44	12	0	0	72	11	42	1	0	0	54	3	37	8	0	0	48	9	44	10	0	0	63	237	878	
17:00:00	14	45	9	0	0	68	7	39	1	0	0	47	0	31	9	0	0	40	15	48	9	0	0	72	227	893	
17:15:00	20	46	10	0	0	76	4	43	1	0	0	48	1	26	11	0	0	38	9	40	4	0	0	53	215	894	
17:30:00	7	33	9	0	0	49	5	28	0	0	0	33	1	25	5	0	0	31	7	41	4	0	0	52	165	844	
17:45:00	7	33	9	0	1	49	5	28	1	0	0	34	0	28	6	0	0	34	4	23	4	0	0	31	148	755	
18:00:00	10	28	7	0	0	45	5	34	0	0	0	39	0	26	5	0	0	31	7	23	4	0	0	34	149	677	
18:15:00	11	37	3	0	0	51	5	22	1	0	0	28	0	32	6	0	0	38	13	20	1	0	0	34	151	613	
18:30:00	6	20	3	0	0	29	0	21	1	0	0	22	1	12	1	0	0	14	3	23	5	0	0	31	96	544	
18:45:00	7	21	3	0	0	31	6	29	1	0	0	36	0	9	3	0	0	12	2	20	6	0	0	28	107	503	
Grand Total	245	926	189	0	1	1360	222	933	34	0	0	1189	27	867	206	0	0	1100	225	869	192	0	0	1286	4935	-	
Approach%	18%	68.1%	13.9%	0%	-	-	18.7%	78.5%	2.9%	0%	-	-	2.5%	78.8%	18.7%	0%	-	-	17.5%	67.6%	14.9%	0%	-	-	-	-	
Totals %	5%	18.8%	3.8%	0%	-	27.6%	4.5%	18.9%	0.7%	0%	-	24.1%	0.5%	17.6%	4.2%	0%	-	22.3%	4.6%	17.6%	3.9%	0%	-	26.1%	-	-	
Heavy	12	80	3	0	-	-	2	9	2	0	-	-	0	85	2	0	-	-	7	7	9	0	-	-	-	-	
Heavy %	4.9%	8.6%	1.6%	0%	-	-	0.9%	1%	5.9%	0%	-	-	0%	9.8%	1%	0%	-	-	3.1%	0.8%	4.7%	0%	-	-	-	-	
Bicycles	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Bicycle %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	



Peak Hour: 07:45 AM - 08:45 AM Weather: Clear Sky (8.9 °C)

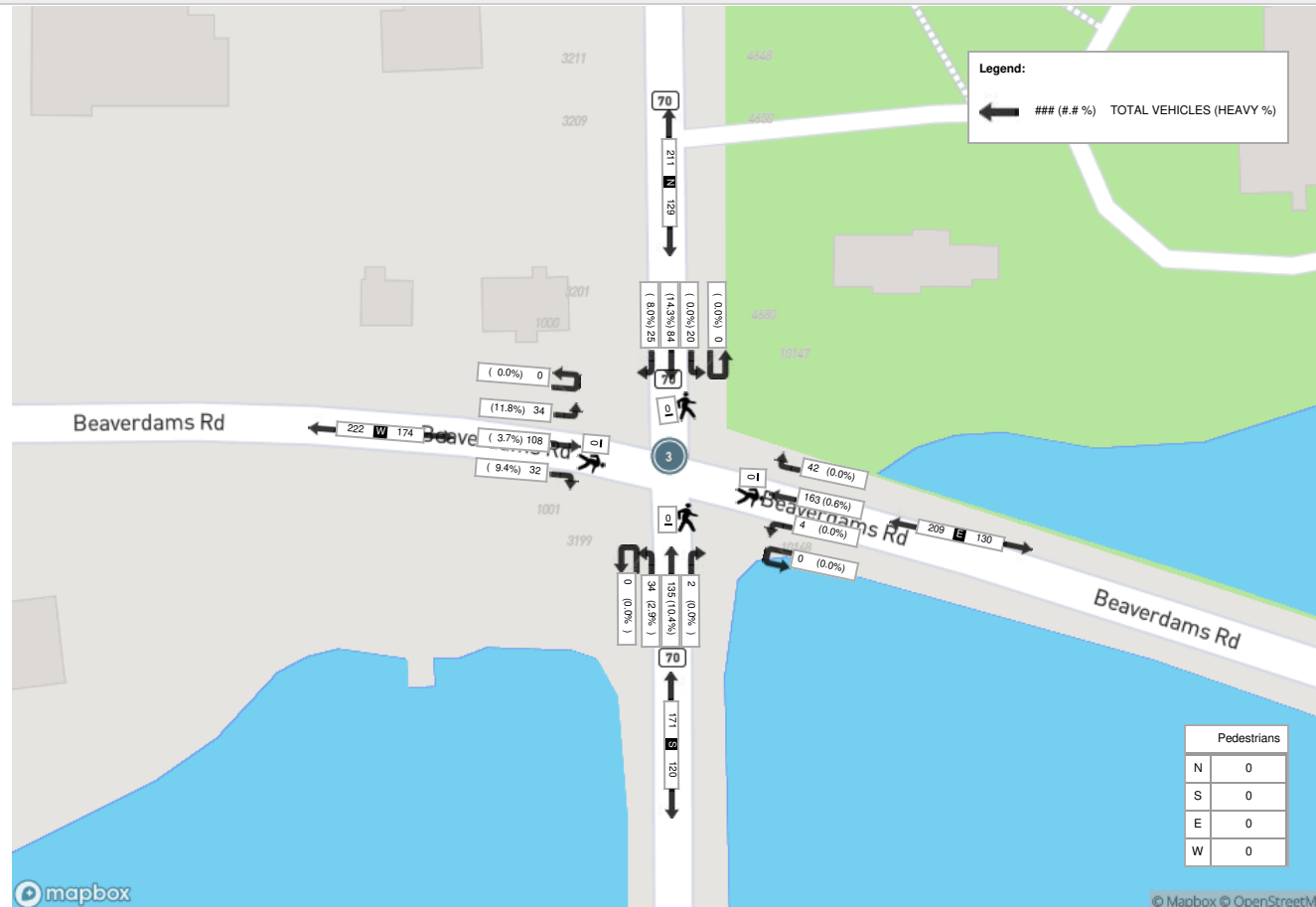
Start Time	N Approach THOROLD TOWNLINE ROAD						E Approach BEAVERDAMS ROAD						S Approach THOROLD TOWNLINE ROAD						W Approach BEAVERDAMS ROAD						Int. Total (15 min)
	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	
07:45:00	10	14	2	0	0	26	13	43	2	0	0	58	1	40	12	0	0	53	6	28	7	0	0	41	178
08:00:00	3	26	1	0	0	30	12	32	1	0	0	45	0	24	6	0	0	30	5	25	8	0	0	38	143
08:15:00	3	23	11	0	0	37	9	55	0	0	0	64	1	35	10	0	0	46	13	29	8	0	0	50	197
08:30:00	9	21	6	0	0	36	8	33	1	0	0	42	0	36	6	0	0	42	8	26	11	0	0	45	165
Grand Total	25	84	20	0	0	129	42	163	4	0	0	209	2	135	34	0	0	171	32	108	34	0	0	174	683
Approach%	19.4%	65.1%	15.5%	0%		-	20.1%	78%	1.9%	0%		-	1.2%	78.9%	19.9%	0%		-	18.4%	62.1%	19.5%	0%		-	-
Totals %	3.7%	12.3%	2.9%	0%		18.9%	6.1%	23.9%	0.6%	0%		30.6%	0.3%	19.8%	5%	0%		25%	4.7%	15.8%	5%	0%		25.5%	-
PHF	0.63	0.81	0.45	0		0.87	0.81	0.74	0.5	0		0.82	0.5	0.84	0.71	0		0.81	0.62	0.93	0.77	0		0.87	-
Heavy	2	12	0	0		14	0	1	0	0		1	0	14	1	0		15	3	4	4	0		11	-
Heavy %	8%	14.3%	0%	0%		10.9%	0%	0.6%	0%	0%		0.5%	0%	10.4%	2.9%	0%		8.8%	9.4%	3.7%	11.8%	0%		6.3%	-
Lights	23	71	20	0		114	42	162	4	0		208	2	121	33	0		156	29	104	30	0		163	-
Lights %	92%	84.5%	100%	0%		88.4%	100%	99.4%	100%	0%		99.5%	100%	89.6%	97.1%	0%		91.2%	90.6%	96.3%	88.2%	0%		93.7%	-
Single-Unit Trucks	2	12	0	0		14	0	1	0	0		1	0	11	1	0		12	0	1	2	0		3	-
Single-Unit Trucks %	8%	14.3%	0%	0%		10.9%	0%	0.6%	0%	0%		0.5%	0%	8.1%	2.9%	0%		7%	0%	0.9%	5.9%	0%		1.7%	-
Buses	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	2	3	1	0		6	-
Buses %	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	6.3%	2.8%	2.9%	0%		3.4%	-
Articulated Trucks	0	0	0	0		0	0	0	0	0		0	0	3	0	0		3	1	0	1	0		2	-
Articulated Trucks %	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	2.2%	0%	0%		1.8%	3.1%	0%	2.9%	0%		1.1%	-
Bicycles on Road	0	1	0	0		1	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	-
Bicycles on Road %	0%	1.2%	0%	0%		0.8%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	-
Pedestrians	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
Pedestrians%	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-



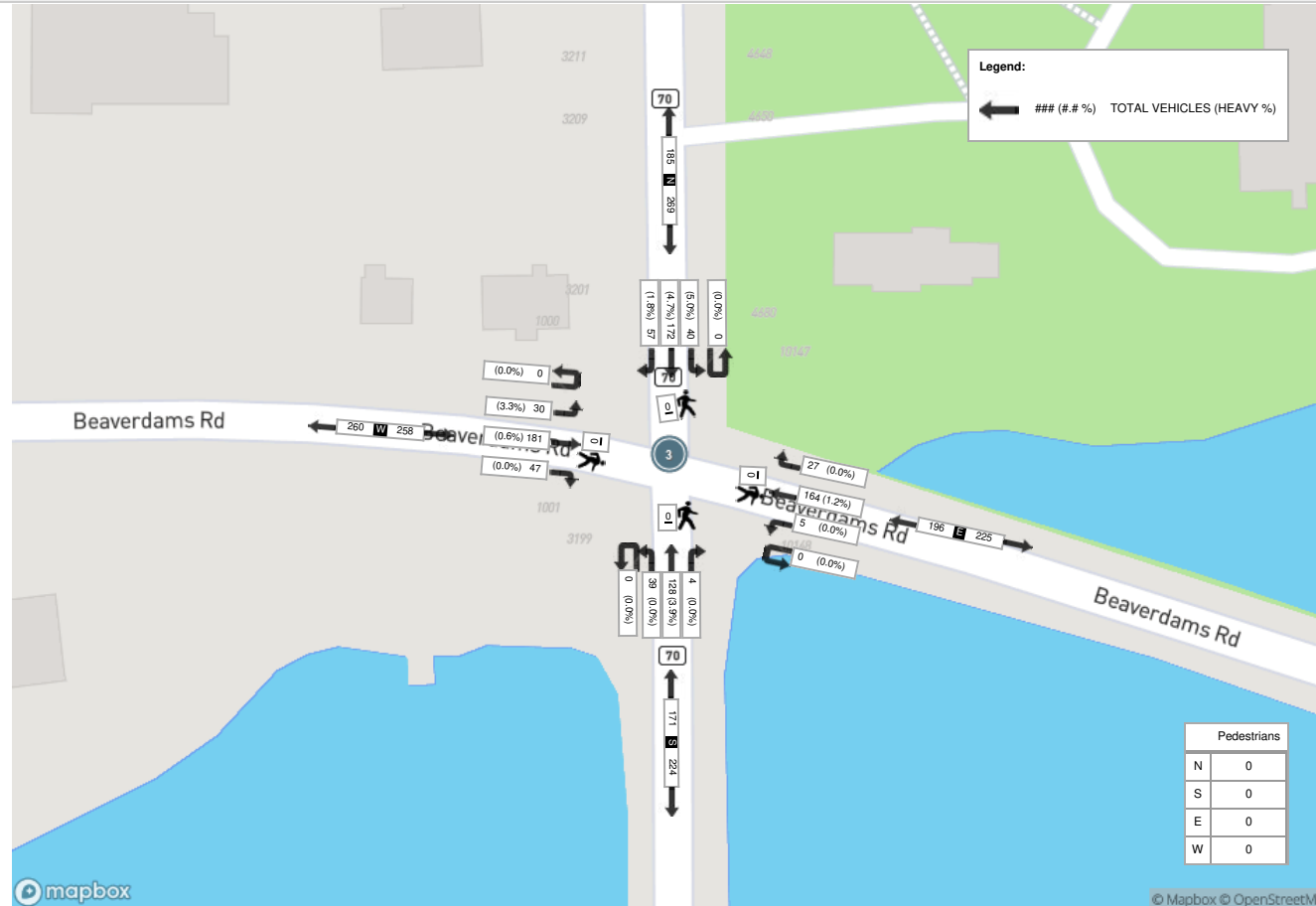
Peak Hour: 04:30 PM - 05:30 PM Weather: Broken Clouds (21.96 °C)

Start Time	N Approach THOROLD TOWNLINE ROAD						E Approach BEAVERDAMS ROAD						S Approach THOROLD TOWNLINE ROAD						W Approach BEAVERDAMS ROAD						Int. Total (15 min)
	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	
16:30:00	7	37	9	0	0	53	5	40	2	0	0	47	0	34	11	0	0	45	14	49	7	0	0	70	215
16:45:00	16	44	12	0	0	72	11	42	1	0	0	54	3	37	8	0	0	48	9	44	10	0	0	63	237
17:00:00	14	45	9	0	0	68	7	39	1	0	0	47	0	31	9	0	0	40	15	48	9	0	0	72	227
17:15:00	20	46	10	0	0	76	4	43	1	0	0	48	1	26	11	0	0	38	9	40	4	0	0	53	215
Grand Total	57	172	40	0	0	269	27	164	5	0	0	196	4	128	39	0	0	171	47	181	30	0	0	258	894
Approach%	21.2%	63.9%	14.9%	0%		-	13.8%	83.7%	2.6%	0%		-	2.3%	74.9%	22.8%	0%		-	18.2%	70.2%	11.6%	0%		-	-
Totals %	6.4%	19.2%	4.5%	0%		30.1%	3%	18.3%	0.6%	0%		21.9%	0.4%	14.3%	4.4%	0%		19.1%	5.3%	20.2%	3.4%	0%		28.9%	-
PHF	0.71	0.93	0.83	0		0.88	0.61	0.95	0.63	0		0.91	0.33	0.86	0.89	0		0.89	0.78	0.92	0.75	0		0.9	-
Heavy	1	8	2	0		11	0	2	0	0		2	0	5	0	0		5	0	1	1	0		2	-
Heavy %	1.8%	4.7%	5%	0%		4.1%	0%	1.2%	0%	0%		1%	0%	3.9%	0%	0%		2.9%	0%	0.6%	3.3%	0%		0.8%	-
Lights	56	164	38	0		258	27	162	5	0		194	4	123	39	0		166	47	180	29	0		256	-
Lights %	98.2%	95.3%	95%	0%		95.9%	100%	98.8%	100%	0%		99%	100%	96.1%	100%	0%		97.1%	100%	99.4%	96.7%	0%		99.2%	-
Single-Unit Trucks	0	4	1	0		5	0	0	0	0		0	0	3	0	0		3	0	1	0	0		1	-
Single-Unit Trucks %	0%	2.3%	2.5%	0%		1.9%	0%	0%	0%	0%		0%	0%	2.3%	0%	0%		1.8%	0%	0.6%	0%	0%		0.4%	-
Buses	0	0	0	0		0	0	1	0	0		1	0	0	0	0		0	0	0	0	0		0	-
Buses %	0%	0%	0%	0%		0%	0%	0.6%	0%	0%		0.5%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	-
Articulated Trucks	1	4	1	0		6	0	1	0	0		1	0	2	0	0		2	0	0	1	0		1	-
Articulated Trucks %	1.8%	2.3%	2.5%	0%		2.2%	0%	0.6%	0%	0%		0.5%	0%	1.6%	0%	0%		1.2%	0%	0%	3.3%	0%		0.4%	-
Bicycles on Road	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	-
Bicycles on Road %	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	-
Pedestrians	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
Pedestrians%	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-

Peak Hour: 07:45 AM - 08:45 AM Weather: Clear Sky (8.9 °C)



Peak Hour: 04:30 PM - 05:30 PM Weather: Broken Clouds (21.96 °C)





Turning Movement Count (4 . THOROLD TOWNLINE RD & LUNDYTMS LN / HIGHWAY 20)

Start Time	N Approach THOROLD TOWNLINE ROAD						E Approach HIGHWAY 20						S Approach THOROLD TOWNLINE ROAD						W Approach HIGHWAY 20						Int. Total (15 min)	Int. Total (1 hr)	
	Right N-W	Thru N-S	Left N-E	UTurn N-N	Peds N:	Approach Total	Right E-N	Thru E-W	Left E-S	UTurn E-E	Peds E:	Approach Total	Right S-E	Thru S-N	Left S-W	UTurn S-S	Peds S:	Approach Total	Right W-S	Thru W-E	Left W-N	UTurn W-W	Peds W:	Approach Total			
06:00:00	2	6	0	0	0	8	2	29	3	0	0	34	5	11	6	0	0	22	5	26	2	0	0	33	97		
06:15:00	1	11	0	0	0	12	0	28	5	0	0	33	6	11	11	0	0	28	13	36	4	0	0	53	126		
06:30:00	1	18	0	0	0	19	5	51	9	0	0	65	9	18	13	0	0	40	26	42	5	0	0	73	197		
06:45:00	2	16	0	0	0	18	1	61	11	0	0	73	12	21	7	0	0	40	20	51	2	0	0	73	204	624	
07:00:00	4	20	1	0	0	25	3	44	3	0	0	50	6	22	11	0	0	39	19	44	10	0	0	73	187	714	
07:15:00	5	17	1	0	0	23	3	43	8	0	0	54	11	29	16	0	0	56	22	84	3	0	0	109	242	830	
07:30:00	6	26	2	0	0	34	5	56	9	0	0	70	10	22	14	0	0	46	26	70	7	0	0	103	253	886	
07:45:00	7	16	2	0	0	25	5	72	7	0	0	84	9	40	20	0	0	69	20	105	9	0	0	134	312	994	
08:00:00	2	30	4	0	0	36	3	54	11	0	0	68	4	24	9	0	0	37	19	72	6	0	0	97	238	1045	
08:15:00	3	23	2	0	0	28	5	68	13	0	0	86	8	35	18	0	0	61	23	84	7	0	0	114	289	1092	
08:30:00	11	19	1	0	0	31	4	77	11	0	0	92	13	27	16	0	0	56	19	65	12	0	0	96	275	1114	
08:45:00	14	23	3	0	0	40	2	69	9	0	0	80	6	27	14	0	0	47	23	81	4	0	0	108	275	1077	
09:00:00	7	34	5	0	0	46	0	52	4	0	0	56	15	35	13	0	1	63	13	64	4	0	0	81	246	1085	
09:15:00	9	16	9	0	0	34	1	58	7	0	0	66	7	21	16	0	0	44	7	14	4	0	0	25	169	965	
09:30:00	8	20	4	0	0	32	3	51	12	0	0	66	7	27	24	0	0	58	30	60	11	0	0	101	257	947	
09:45:00	7	24	5	0	0	36	12	63	3	0	0	78	11	22	11	0	0	44	25	62	11	0	0	98	256	928	
BREAK																											
15:00:00	13	42	6	0	0	61	4	104	16	0	0	124	9	30	25	0	0	64	15	84	7	0	0	106	355		
15:15:00	11	38	0	0	0	49	0	92	5	0	0	97	12	36	19	0	0	67	24	72	1	0	0	97	310		
15:30:00	8	31	3	0	0	42	9	108	15	0	0	132	16	33	27	0	0	76	27	85	6	0	0	118	368		
15:45:00	10	29	5	0	0	44	4	90	14	0	0	108	9	21	28	0	0	58	27	99	7	1	0	134	344	1377	
16:00:00	10	37	5	0	0	52	3	120	11	0	0	134	16	33	25	0	0	74	28	79	5	0	0	112	372	1394	
16:15:00	13	37	5	0	0	55	4	77	17	0	0	98	12	32	32	0	0	76	14	36	3	0	0	53	282	1366	
16:30:00	7	36	8	0	0	51	7	106	7	0	0	120	7	37	29	0	0	73	23	86	5	0	0	114	358	1356	
16:45:00	9	43	7	0	0	59	5	97	8	0	0	110	16	36	33	0	0	85	22	94	7	0	0	123	377	1389	
17:00:00	6	45	4	0	0	55	2	99	12	0	0	113	27	28	27	0	0	82	18	66	8	0	0	92	342	1359	
17:15:00	8	46	6	0	0	60	0	105	7	0	0	112	8	36	29	0	0	73	37	137	5	0	0	179	424	1501	
17:30:00	8	28	2	0	0	38	1	109	4	0	0	114	11	22	45	0	0	78	35	125	7	0	0	167	397	1540	
17:45:00	8	29	4	0	0	41	0	77	8	0	0	85	10	27	16	0	1	53	25	98	8	0	0	131	310	1473	
18:00:00	6	25	3	0	0	34	5	85	9	0	0	99	9	26	21	0	0	56	26	73	3	0	0	102	291	1422	
18:15:00	4	31	5	0	0	40	1	90	12	0	0	103	10	22	27	0	0	59	32	78	8	0	0	118	320	1318	
18:30:00	4	18	1	0	0	23	1	67	8	0	0	76	9	11	21	0	0	41	24	76	5	0	0	105	245	1166	
18:45:00	2	19	3	0	0	24	2	63	6	0	0	71	10	5	20	0	0	35	18	96	4	0	0	118	248	1104	
Grand Total	216	853	106	0	0	1175	102	2365	284	0	0	2751	330	827	643	0	2	1800	705	2344	190	1	0	3240	8966	-	
Approach%	18.4%	72.6%	9%	0%		-	3.7%	86%	10.3%	0%		-	18.3%	45.9%	35.7%	0%		-	21.8%	72.3%	5.9%	0%		-	-	-	
Totals %	2.4%	9.5%	1.2%	0%		13.1%	1.1%	26.4%	3.2%	0%		30.7%	3.7%	9.2%	7.2%	0%		20.1%	7.9%	26.1%	2.1%	0%		36.1%	-	-	
Heavy	19	59	8	0		-	6	48	3	0		-	6	78	40	0		-	42	37	10	0		-	-	-	
Heavy %	8.8%	6.9%	7.5%	0%		-	5.9%	2%	1.1%	0%		-	1.8%	9.4%	6.2%	0%		-	6%	1.6%	5.3%	0%		-	-	-	
Bicycles	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	
Bicycle %	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	



Peak Hour: 07:45 AM - 08:45 AM Weather: Clear Sky (8.9 °C)

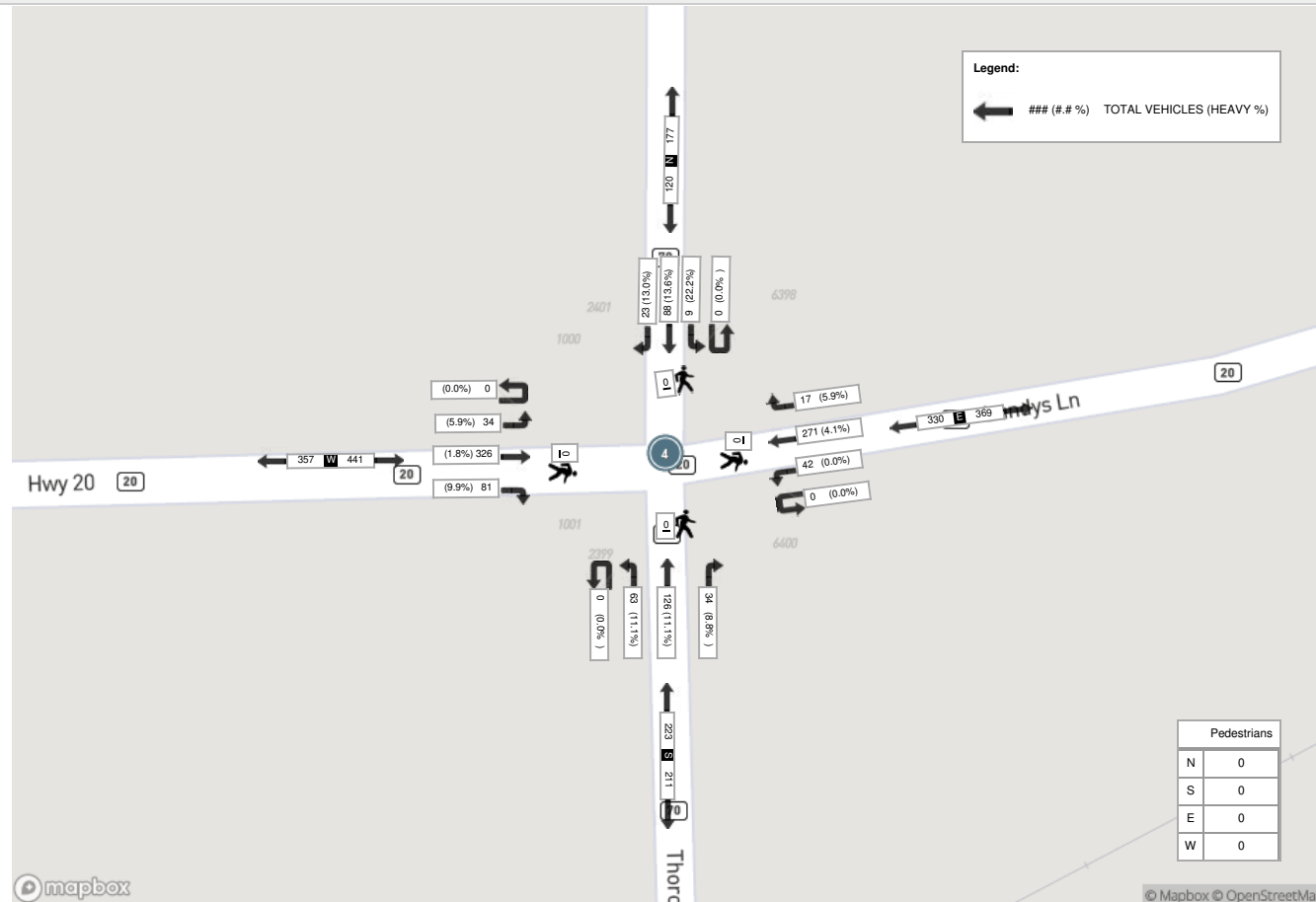
Start Time	N Approach THOROLD TOWNLINE ROAD						E Approach HIGHWAY 20						S Approach THOROLD TOWNLINE ROAD						W Approach HIGHWAY 20						Int. Total (15 min)
	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	
07:45:00	7	16	2	0	0	25	5	72	7	0	0	84	9	40	20	0	0	69	20	105	9	0	0	134	312
08:00:00	2	30	4	0	0	36	3	54	11	0	0	68	4	24	9	0	0	37	19	72	6	0	0	97	238
08:15:00	3	23	2	0	0	28	5	68	13	0	0	86	8	35	18	0	0	61	23	84	7	0	0	114	289
08:30:00	11	19	1	0	0	31	4	77	11	0	0	92	13	27	16	0	0	56	19	65	12	0	0	96	275
Grand Total	23	88	9	0	0	120	17	271	42	0	0	330	34	126	63	0	0	223	81	326	34	0	0	441	1114
Approach%	19.2%	73.3%	7.5%	0%		-	5.2%	82.1%	12.7%	0%		-	15.2%	56.5%	28.3%	0%		-	18.4%	73.9%	7.7%	0%		-	-
Totals %	2.1%	7.9%	0.8%	0%		10.8%	1.5%	24.3%	3.8%	0%		29.6%	3.1%	11.3%	5.7%	0%		20%	7.3%	29.3%	3.1%	0%		39.6%	-
PHF	0.52	0.73	0.56	0		0.83	0.85	0.88	0.81	0		0.9	0.65	0.79	0.79	0		0.81	0.88	0.78	0.71	0		0.82	-
Heavy	3	12	2	0		17	1	11	0	0		12	3	14	7	0		24	8	6	2	0		16	-
Heavy %	13%	13.6%	22.2%	0%		14.2%	5.9%	4.1%	0%	0%		3.6%	8.8%	11.1%	11.1%	0%		10.8%	9.9%	1.8%	5.9%	0%		3.6%	-
Lights	20	75	7	0		102	16	260	42	0		318	31	112	56	0		199	73	320	32	0		425	-
Lights %	87%	85.2%	77.8%	0%		85%	94.1%	95.9%	100%	0%		96.4%	91.2%	88.9%	88.9%	0%		89.2%	90.1%	98.2%	94.1%	0%		96.4%	-
Single-Unit Trucks	1	11	1	0		13	1	10	0	0		11	1	11	7	0		19	6	4	1	0		11	-
Single-Unit Trucks %	4.3%	12.5%	11.1%	0%		10.8%	5.9%	3.7%	0%	0%		3.3%	2.9%	8.7%	11.1%	0%		8.5%	7.4%	1.2%	2.9%	0%		2.5%	-
Buses	2	0	0	0		2	0	1	0	0		1	2	0	0	0		2	2	2	1	0		5	-
Buses %	8.7%	0%	0%	0%		1.7%	0%	0.4%	0%	0%		0.3%	5.9%	0%	0%	0%		0.9%	2.5%	0.6%	2.9%	0%		1.1%	-
Articulated Trucks	0	1	1	0		2	0	0	0	0		0	0	3	0	0		3	0	0	0	0		0	-
Articulated Trucks %	0%	1.1%	11.1%	0%		1.7%	0%	0%	0%	0%		0%	0%	2.4%	0%	0%		1.3%	0%	0%	0%	0%		0%	-
Bicycles on Road	0	1	0	0		1	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	-
Bicycles on Road %	0%	1.1%	0%	0%		0.8%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	-
Pedestrians	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
Pedestrians%	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-



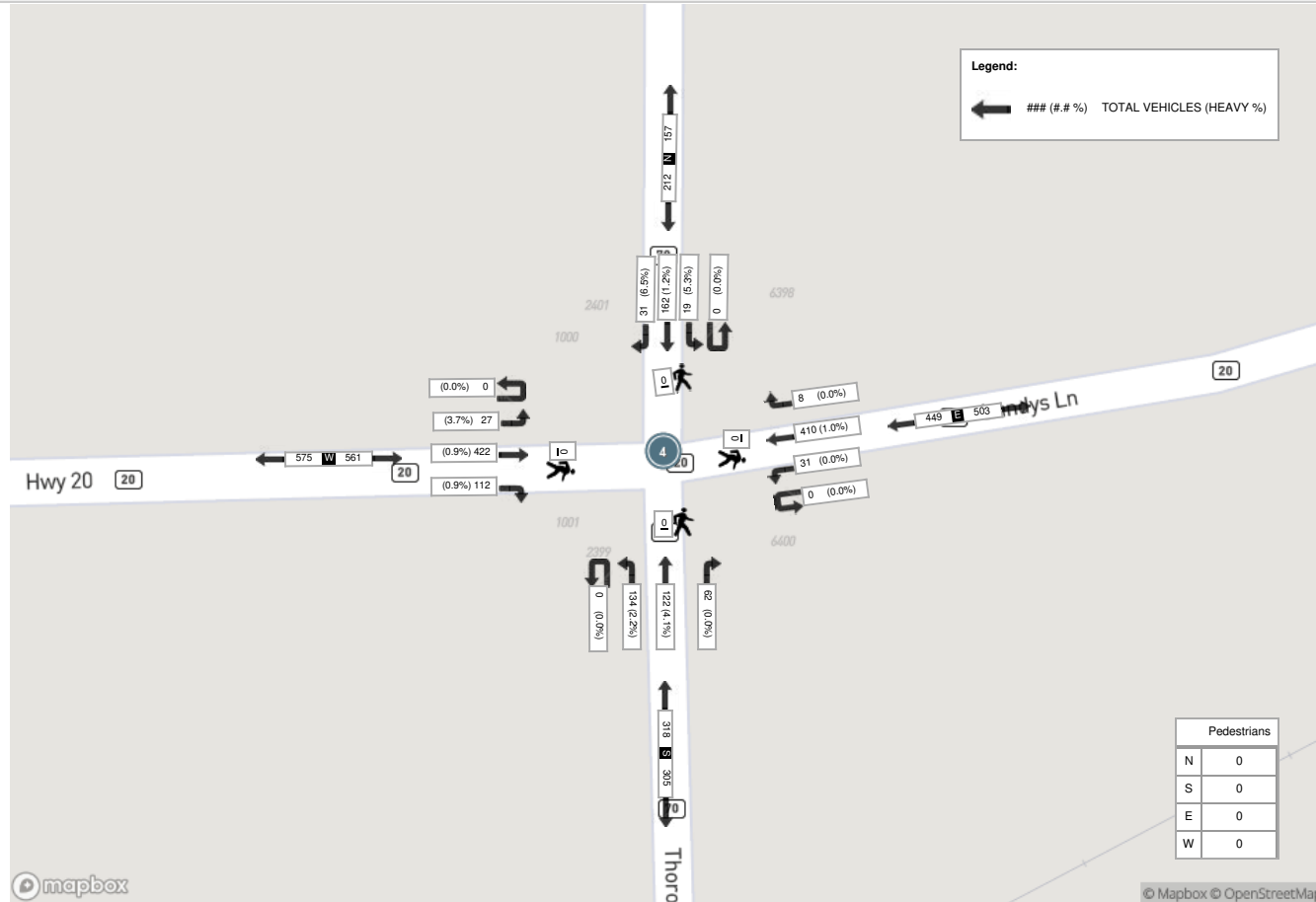
Peak Hour: 04:45 PM - 05:45 PM Weather: Broken Clouds (21.96 °C)

Start Time	N Approach THOROLD TOWNLINE ROAD						E Approach HIGHWAY 20						S Approach THOROLD TOWNLINE ROAD						W Approach HIGHWAY 20						Int. Total (15 min)
	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	
16:45:00	9	43	7	0	0	59	5	97	8	0	0	110	16	36	33	0	0	85	22	94	7	0	0	123	377
17:00:00	6	45	4	0	0	55	2	99	12	0	0	113	27	28	27	0	0	82	18	66	8	0	0	92	342
17:15:00	8	46	6	0	0	60	0	105	7	0	0	112	8	36	29	0	0	73	37	137	5	0	0	179	424
17:30:00	8	28	2	0	0	38	1	109	4	0	0	114	11	22	45	0	0	78	35	125	7	0	0	167	397
Grand Total	31	162	19	0	0	212	8	410	31	0	0	449	62	122	134	0	0	318	112	422	27	0	0	561	1540
Approach%	14.6%	76.4%	9%	0%		-	1.8%	91.3%	6.9%	0%		-	19.5%	38.4%	42.1%	0%		-	20%	75.2%	4.8%	0%		-	-
Totals %	2%	10.5%	1.2%	0%		13.8%	0.5%	26.6%	2%	0%		29.2%	4%	7.9%	8.7%	0%		20.6%	7.3%	27.4%	1.8%	0%		36.4%	-
PHF	0.86	0.88	0.68	0		0.88	0.4	0.94	0.65	0		0.98	0.57	0.85	0.74	0		0.94	0.76	0.77	0.84	0		0.78	-
Heavy	2	2	1	0		5	0	4	0	0		4	0	5	3	0		8	1	4	1	0		6	-
Heavy %	6.5%	1.2%	5.3%	0%		2.4%	0%	1%	0%	0%		0.9%	0%	4.1%	2.2%	0%		2.5%	0.9%	0.9%	3.7%	0%		1.1%	-
Lights	29	160	18	0		207	8	406	31	0		445	62	116	131	0		309	111	417	26	0		554	-
Lights %	93.5%	98.8%	94.7%	0%		97.6%	100%	99%	100%	0%		99.1%	100%	95.1%	97.8%	0%		97.2%	99.1%	98.8%	96.3%	0%		98.8%	-
Single-Unit Trucks	0	2	0	0		2	0	4	0	0		4	0	3	3	0		6	1	2	1	0		4	-
Single-Unit Trucks %	0%	1.2%	0%	0%		0.9%	0%	1%	0%	0%		0.9%	0%	2.5%	2.2%	0%		1.9%	0.9%	0.5%	3.7%	0%		0.7%	-
Buses	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	2	0	0		2	-
Buses %	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0.5%	0%	0%		0.4%	-
Articulated Trucks	2	0	1	0		3	0	0	0	0		0	0	2	0	0		2	0	0	0	0		0	-
Articulated Trucks %	6.5%	0%	5.3%	0%		1.4%	0%	0%	0%	0%		0%	0%	1.6%	0%	0%		0.6%	0%	0%	0%	0%		0%	-
Bicycles on Road	0	0	0	0		0	0	0	0	0		0	0	1	0	0		1	0	1	0	0		1	-
Bicycles on Road %	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0.8%	0%	0%		0.3%	0%	0.2%	0%	0%		0.2%	-
Pedestrians	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
Pedestrians%	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-

Peak Hour: 07:45 AM - 08:45 AM Weather: Clear Sky (8.9 °C)



Peak Hour: 04:45 PM - 05:45 PM Weather: Broken Clouds (21.96 °C)



Signal Code: 070H20**Intersection: RR70 (TOWNLINE RD.) & HWY 20 (LUNDYS LANE)****Municipality: thorold****Owner: MTO****Last Modified: 2018-03-28 11:28:16 AM**

Timing Parameters	EBD & WBD LUNDY'S LANE	NBD & SBD TOWNLINE RD.	-	n/a	-	-
Min Green	20	10	0	0	0	0
Walk	15	15	0	0	0	0
Ped Clearance	7	14	0	0	0	0
Vehicle Ext.	5	5	0	0	0	0
Max Green	50	40	0	0	0	0
Yellow	5	4	0	0	0	0
All Red	2	2	0	0	0	0

Offset

Minimum Cycle	43	0
Pedestrian Cycle	64	
Maximum Cycle	103	0
Operation	FA	

Installed On: 2001-05-02

Count Date: 2008-05-14

FA = Fully Actuated

SA = Semi Actuated

FT = Fixed Time

Copyright 2001 © Regional Niagara



Turning Movement Count (2 . UPPERS LANE & DAVIS RD (HWY 58))

Start Time	N Approach HIGHWAY 58						E Approach UPPER'S LANE						S Approach HIGHWAY 58						W Approach UPPER'S LANE						Int. Total (15 min)	Int. Total (1 hr)	
	Right N-W	Thru N-S	Left N-E	UTurn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	Left E:S	UTurn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	Left S:W	UTurn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	Left W:N	UTurn W:W	Peds W:	Approach Total			
06:00:00	4	13	2	0	0	19	0	0	3	0	0	3	3	25	12	0	0	40	11	0	3	0	0	14	76		
06:15:00	6	31	4	0	0	41	2	0	2	0	0	4	6	36	16	0	0	58	21	0	7	0	0	28	131		
06:30:00	7	53	4	0	0	64	0	0	5	0	0	5	12	60	12	0	0	84	24	0	6	0	0	30	183		
06:45:00	8	67	6	0	0	81	1	1	11	0	0	13	8	32	9	0	0	49	19	0	5	0	0	24	167	557	
07:00:00	2	39	5	0	0	46	5	0	9	0	0	14	12	38	15	0	0	65	14	0	9	0	0	23	148	629	
07:15:00	2	35	6	0	0	43	3	1	10	0	0	14	7	57	22	0	0	86	22	1	16	0	0	39	182	680	
07:30:00	5	45	4	0	0	54	1	2	11	0	0	14	7	70	14	0	0	91	12	1	24	0	0	37	196	693	
07:45:00	13	41	10	0	0	64	3	0	8	0	0	11	15	51	13	0	0	79	20	1	10	0	0	31	185	711	
08:00:00	9	46	6	0	0	61	1	2	4	0	0	7	7	54	14	1	0	76	16	0	13	0	0	29	173	736	
08:15:00	7	38	6	0	0	51	1	2	14	0	0	17	11	62	17	0	0	90	25	3	6	0	0	34	192	746	
08:30:00	10	41	6	0	0	57	3	2	16	0	0	21	7	55	12	0	0	74	16	2	15	0	0	33	185	735	
08:45:00	10	30	4	0	0	44	7	7	7	0	0	21	12	51	17	0	0	80	29	6	14	0	0	49	194	744	
09:00:00	7	38	4	0	0	49	1	6	12	0	0	19	12	44	12	0	0	68	16	8	14	0	0	38	174	745	
09:15:00	8	38	6	0	0	52	2	3	6	0	0	11	4	39	6	0	0	49	10	2	6	0	0	18	130	683	
09:30:00	3	35	1	0	0	39	8	0	7	0	0	15	8	36	16	0	0	60	14	0	14	0	0	28	142	640	
09:45:00	4	27	4	0	0	35	2	1	4	0	0	7	11	48	6	0	0	65	11	0	10	0	0	21	128	574	
BREAK																											
15:00:00	12	49	1	0	0	62	2	1	8	0	0	11	8	41	20	0	0	69	17	1	5	0	0	23	165		
15:15:00	12	49	1	0	0	62	4	3	5	0	0	12	7	45	24	0	0	76	25	1	9	0	0	35	185		
15:30:00	6	58	5	0	0	69	6	1	17	0	0	24	4	65	28	0	0	97	24	6	14	0	0	44	234		
15:45:00	16	52	7	0	0	75	5	3	10	0	0	18	11	45	18	0	0	74	17	1	11	0	0	29	196	780	
16:00:00	10	49	6	0	0	65	17	1	16	0	0	34	21	83	18	0	0	122	31	3	11	0	0	45	266	881	
16:15:00	10	62	10	0	0	82	12	0	13	0	0	25	5	59	18	0	0	82	23	2	5	0	0	30	219	915	
16:30:00	13	63	5	0	0	81	7	4	12	0	0	23	7	79	18	0	0	104	37	3	5	0	0	45	253	934	
16:45:00	21	61	8	0	0	90	5	2	15	0	0	22	22	67	22	0	0	111	20	1	8	0	0	29	252	990	
17:00:00	13	56	12	0	0	81	9	2	17	0	0	28	6	67	27	0	0	100	25	1	15	0	0	41	250	974	
17:15:00	19	62	7	0	0	88	2	0	12	0	0	14	21	68	34	0	0	123	25	0	7	0	0	32	257	1012	
17:30:00	11	51	12	0	0	74	5	1	10	0	0	16	20	45	27	0	0	92	21	2	14	0	0	37	219	978	
17:45:00	7	46	10	0	0	63	5	1	12	0	0	18	10	49	20	1	0	80	24	1	9	0	0	34	195	921	
18:00:00	6	49	3	0	0	58	1	0	8	0	0	9	11	35	17	0	0	63	14	1	6	0	0	21	151	822	
18:15:00	9	47	8	0	0	64	2	0	8	0	0	10	12	47	15	0	0	74	15	0	1	0	0	16	164	729	
18:30:00	5	40	2	0	0	47	5	2	10	0	0	17	19	49	15	0	1	83	12	2	9	0	1	23	170	680	
18:45:00	8	47	4	0	0	59	2	0	8	0	0	10	3	39	23	0	0	65	12	0	9	0	0	21	155	640	
Grand Total	283	1458	179	0	0	1920	129	48	310	0	0	487	329	1641	557	2	1	2529	622	49	310	0	1	981	5917	-	
Approach%	14.7%	75.9%	9.3%	0%		-	26.5%	9.9%	63.7%	0%		-	13%	64.9%	22%	0.1%		-	63.4%	5%	31.6%	0%		-	-	-	
Totals %	4.8%	24.6%	3%	0%		32.4%	2.2%	0.8%	5.2%	0%		8.2%	5.6%	27.7%	9.4%	0%		42.7%	10.5%	0.8%	5.2%	0%		16.6%	-	-	
Heavy	20	96	7	0		-	4	4	9	0		-	8	108	32	0		-	38	4	15	0		-	-	-	
Heavy %	7.1%	6.6%	3.9%	0%		-	3.1%	8.3%	2.9%	0%		-	2.4%	6.6%	5.7%	0%		-	6.1%	8.2%	4.8%	0%		-	-	-	
Bicycles	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	
Bicycle %	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	



Peak Hour: 07:30 AM - 08:30 AM Weather: Clear Sky (8.9 °C)

Start Time	N Approach HIGHWAY 58						E Approach UPPER'S LANE						S Approach HIGHWAY 58						W Approach UPPER'S LANE						Int. Total (15 min)
	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	
07:30:00	5	45	4	0	0	54	1	2	11	0	0	14	7	70	14	0	0	91	12	1	24	0	0	37	196
07:45:00	13	41	10	0	0	64	3	0	8	0	0	11	15	51	13	0	0	79	20	1	10	0	0	31	185
08:00:00	9	46	6	0	0	61	1	2	4	0	0	7	7	54	14	1	0	76	16	0	13	0	0	29	173
08:15:00	7	38	6	0	0	51	1	2	14	0	0	17	11	62	17	0	0	90	25	3	6	0	0	34	192
Grand Total	34	170	26	0	0	230	6	6	37	0	0	49	40	237	58	1	0	336	73	5	53	0	0	131	746
Approach%	14.8%	73.9%	11.3%	0%		-	12.2%	12.2%	75.5%	0%		-	11.9%	70.5%	17.3%	0.3%		-	55.7%	3.8%	40.5%	0%		-	-
Totals %	4.6%	22.8%	3.5%	0%		30.8%	0.8%	0.8%	5%	0%		6.6%	5.4%	31.8%	7.8%	0.1%		45%	9.8%	0.7%	7.1%	0%		17.6%	-
PHF	0.65	0.92	0.65	0		0.9	0.5	0.75	0.66	0		0.72	0.67	0.85	0.85	0.25		0.92	0.73	0.42	0.55	0		0.89	-
Heavy	3	11	0	0		14	2	3	2	0		7	3	20	6	0		29	7	1	1	0		9	-
Heavy %	8.8%	6.5%	0%	0%		6.1%	33.3%	50%	5.4%	0%		14.3%	7.5%	8.4%	10.3%	0%		8.6%	9.6%	20%	1.9%	0%		6.9%	-
Lights	31	159	26	0		216	4	3	35	0		42	37	217	52	1		307	66	4	52	0		122	-
Lights %	91.2%	93.5%	100%	0%		93.9%	66.7%	50%	94.6%	0%		85.7%	92.5%	91.6%	89.7%	100%		91.4%	90.4%	80%	98.1%	0%		93.1%	-
Single-Unit Trucks	1	7	0	0		8	1	0	1	0		2	1	11	4	0		16	5	0	0	0		5	-
Single-Unit Trucks %	2.9%	4.1%	0%	0%		3.5%	16.7%	0%	2.7%	0%		4.1%	2.5%	4.6%	6.9%	0%		4.8%	6.8%	0%	0%	0%		3.8%	-
Buses	1	4	0	0		5	1	3	0	0		4	2	4	1	0		7	0	1	1	0		2	-
Buses %	2.9%	2.4%	0%	0%		2.2%	16.7%	50%	0%	0%		8.2%	5%	1.7%	1.7%	0%		2.1%	0%	20%	1.9%	0%		1.5%	-
Articulated Trucks	1	0	0	0		1	0	0	1	0		1	0	5	1	0		6	2	0	0	0		2	-
Articulated Trucks %	2.9%	0%	0%	0%		0.4%	0%	0%	2.7%	0%		2%	0%	2.1%	1.7%	0%		1.8%	2.7%	0%	0%	0%		1.5%	-
Bicycles on Road	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	-
Bicycles on Road %	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	-
Pedestrians	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
Pedestrians%	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-



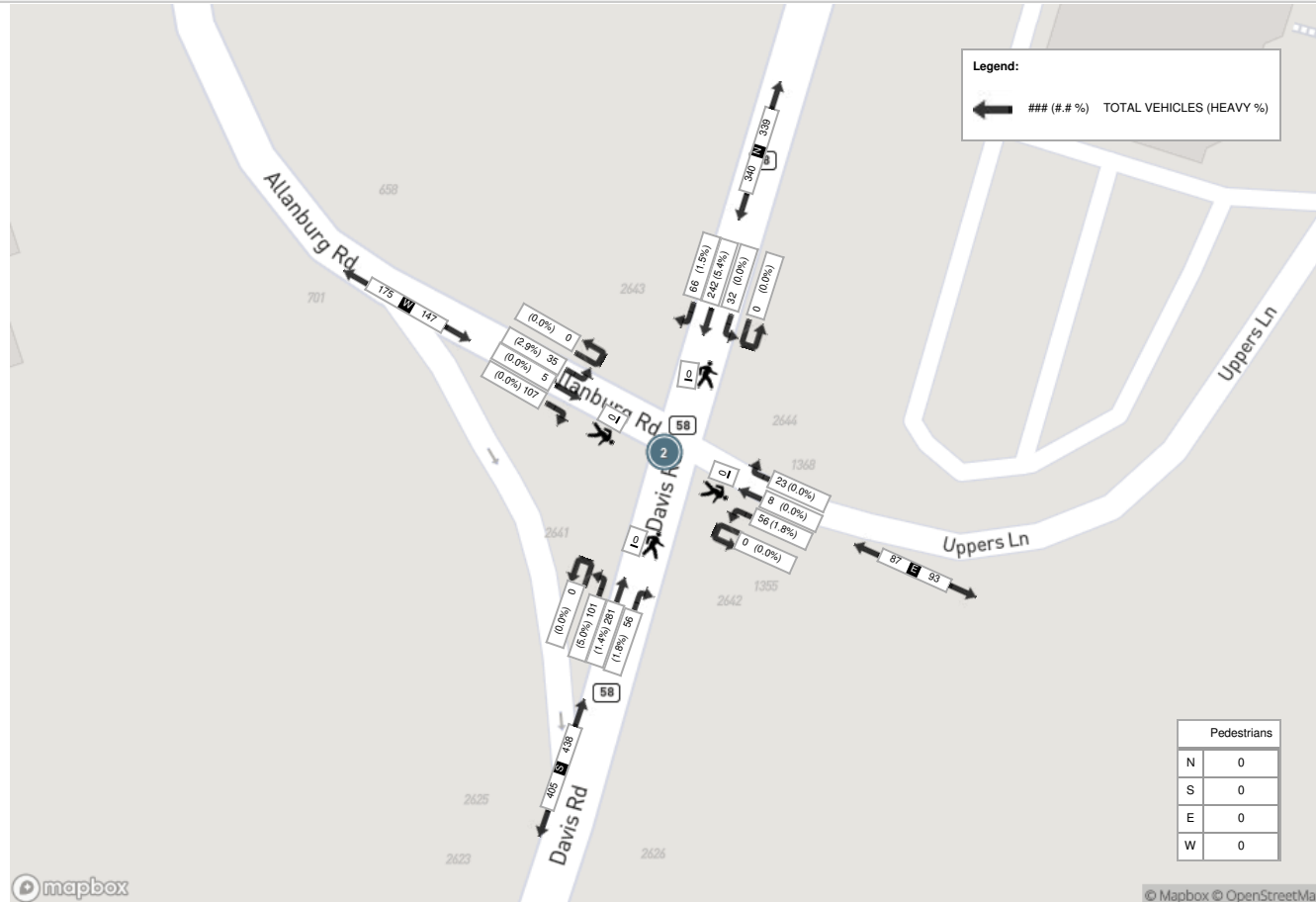
Peak Hour: 04:30 PM - 05:30 PM Weather: Broken Clouds (21.96 °C)

Start Time	N Approach HIGHWAY 58						E Approach UPPER'S LANE						S Approach HIGHWAY 58						W Approach UPPER'S LANE						Int. Total (15 min)
	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	
16:30:00	13	63	5	0	0	81	7	4	12	0	0	23	7	79	18	0	0	104	37	3	5	0	0	45	253
16:45:00	21	61	8	0	0	90	5	2	15	0	0	22	22	67	22	0	0	111	20	1	8	0	0	29	252
17:00:00	13	56	12	0	0	81	9	2	17	0	0	28	6	67	27	0	0	100	25	1	15	0	0	41	250
17:15:00	19	62	7	0	0	88	2	0	12	0	0	14	21	68	34	0	0	123	25	0	7	0	0	32	257
Grand Total	66	242	32	0	0	340	23	8	56	0	0	87	56	281	101	0	0	438	107	5	35	0	0	147	1012
Approach%	19.4%	71.2%	9.4%	0%		-	26.4%	9.2%	64.4%	0%		-	12.8%	64.2%	23.1%	0%		-	72.8%	3.4%	23.8%	0%		-	-
Totals %	6.5%	23.9%	3.2%	0%		33.6%	2.3%	0.8%	5.5%	0%		8.6%	5.5%	27.8%	10%	0%		43.3%	10.6%	0.5%	3.5%	0%		14.5%	-
PHF	0.79	0.96	0.67	0		0.94	0.64	0.5	0.82	0		0.78	0.64	0.89	0.74	0		0.89	0.72	0.42	0.58	0		0.82	-
Heavy	1	13	0	0		14	0	0	1	0		1	1	4	5	0		10	0	0	1	0		1	-
Heavy %	1.5%	5.4%	0%	0%		4.1%	0%	0%	1.8%	0%		1.1%	1.8%	1.4%	5%	0%		2.3%	0%	0%	2.9%	0%		0.7%	-
Lights	65	229	32	0		326	23	8	54	0		85	55	277	96	0		428	106	5	34	0		145	-
Lights %	98.5%	94.6%	100%	0%		95.9%	100%	100%	96.4%	0%		97.7%	98.2%	98.6%	95%	0%		97.7%	99.1%	100%	97.1%	0%		98.6%	-
Single-Unit Trucks	1	8	0	0		9	0	0	1	0		1	1	3	4	0		8	0	0	0	0		0	-
Single-Unit Trucks %	1.5%	3.3%	0%	0%		2.6%	0%	0%	1.8%	0%		1.1%	1.8%	1.1%	4%	0%		1.8%	0%	0%	0%	0%		0%	-
Buses	0	2	0	0		2	0	0	0	0		0	0	0	0	0		0	0	0	1	0		1	-
Buses %	0%	0.8%	0%	0%		0.6%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	2.9%	0%		0.7%	-
Articulated Trucks	0	3	0	0		3	0	0	0	0		0	0	1	1	0		2	0	0	0	0		0	-
Articulated Trucks %	0%	1.2%	0%	0%		0.9%	0%	0%	0%	0%		0%	0%	0.4%	1%	0%		0.5%	0%	0%	0%	0%		0%	-
Bicycles on Road	0	0	0	0		0	0	0	1	0		1	0	0	0	0		0	1	0	0	0		1	-
Bicycles on Road %	0%	0%	0%	0%		0%	0%	0%	1.8%	0%		1.1%	0%	0%	0%	0%		0%	0.9%	0%	0%	0%		0.7%	-
Pedestrians	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
Pedestrians%	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-

Peak Hour: 07:30 AM - 08:30 AM Weather: Clear Sky (8.9 °C)



Peak Hour: 04:30 PM - 05:30 PM Weather: Broken Clouds (21.96 °C)





Turning Movement Count (1 . UPPERS LANE & THOROLD TOWNLINE RD)

Start Time	N Approach THOROLD TOWNLINE RD					E Approach UPPERS LANE					S Approach THOROLD TOWNLINE RD					Int. Total (15 min)	Int. Total (1 hr)
	Thru N:S	Left N:E	UTurn N:N	Peds N:	Approach Total	Right E:N	Left E:S	UTurn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	UTurn S:S	Peds S:	Approach Total		
06:00:00	8	0	0	0	8	0	0	0	0	0	0	14	0	0	14	22	
06:15:00	13	0	0	0	13	0	0	0	0	0	0	16	0	0	16	29	
06:30:00	19	0	0	0	19	0	0	0	0	0	0	26	0	0	26	45	
06:45:00	20	1	0	0	21	0	0	0	0	0	0	24	0	0	24	45	141
07:00:00	24	0	0	0	24	0	0	0	0	0	0	34	0	0	34	58	177
07:15:00	25	1	0	0	26	0	0	0	0	0	0	28	0	0	28	54	202
07:30:00	35	0	0	0	35	0	0	0	0	0	0	41	0	0	41	76	233
07:45:00	23	0	0	0	23	0	0	0	0	0	0	53	0	0	53	76	264
08:00:00	34	0	0	0	34	0	0	0	0	0	0	33	0	0	33	67	273
08:15:00	28	1	0	0	29	1	0	0	0	1	1	46	0	0	47	77	296
08:30:00	34	1	0	0	35	0	0	0	0	0	1	42	0	0	43	78	298
08:45:00	36	0	0	0	36	0	0	0	0	0	0	34	0	0	34	70	292
09:00:00	42	1	0	0	43	0	0	0	0	0	0	35	0	0	35	78	303
09:15:00	32	0	0	0	32	0	0	0	0	0	0	31	0	0	31	63	289
09:30:00	32	0	0	0	32	1	1	0	0	2	1	36	0	0	37	71	282
09:45:00	34	1	0	0	35	0	0	0	0	0	0	47	0	0	47	82	294
BREAK																	
15:00:00	61	0	0	0	61	0	0	0	0	0	0	40	0	0	40	101	
15:15:00	45	1	0	0	46	1	1	0	0	2	1	36	0	0	37	85	
15:30:00	44	0	0	0	44	0	0	0	0	0	1	49	0	0	50	94	
15:45:00	47	1	0	0	48	1	0	0	0	1	2	32	0	0	34	83	363
16:00:00	56	0	0	0	56	1	0	0	0	1	0	43	0	0	43	100	362
16:15:00	50	0	0	0	50	0	2	0	0	2	1	37	0	0	38	90	367
16:30:00	57	0	0	0	57	0	0	0	0	0	0	52	1	0	53	110	383
16:45:00	53	0	0	0	53	0	0	0	0	0	0	47	0	0	47	100	400
17:00:00	61	0	0	0	61	2	0	0	0	2	0	39	0	0	39	102	402
17:15:00	61	0	0	0	61	0	0	0	0	0	0	35	0	0	35	96	408
17:30:00	35	0	0	0	35	0	1	0	0	1	0	31	0	0	31	67	365
17:45:00	44	0	0	0	44	0	2	0	0	2	0	34	0	0	34	80	345
18:00:00	35	1	0	0	36	0	2	0	0	2	0	31	0	0	31	69	312
18:15:00	49	0	0	0	49	2	0	0	0	2	0	36	0	0	36	87	303
18:30:00	22	2	0	0	24	0	0	0	0	0	0	13	0	0	13	37	273
18:45:00	25	0	0	0	25	0	0	0	0	0	0	13	0	0	13	38	231



Grand Total	1184	11	0	0	1195	9	9	0	0	18	8	1108	1	0	1117	2330	-
Approach%	99.1%	0.9%	0%		-	50%	50%	0%		-	0.7%	99.2%	0.1%		-	-	-
Totals %	50.8%	0.5%	0%		51.3%	0.4%	0.4%	0%		0.8%	0.3%	47.6%	0%		47.9%	-	-
Heavy	84	0	0		-	0	0	0		-	1	98	0		-	-	-
Heavy %	7.1%	0%	0%		-	0%	0%	0%		-	12.5%	8.8%	0%		-	-	-
Bicycles	-	-	-		-	-	-	-		-	-	-	-		-	-	-
Bicycle %	-	-	-		-	-	-	-		-	-	-	-		-	-	-



Peak Hour: 08:15 AM - 09:15 AM Weather: Clear Sky (8.9 °C)

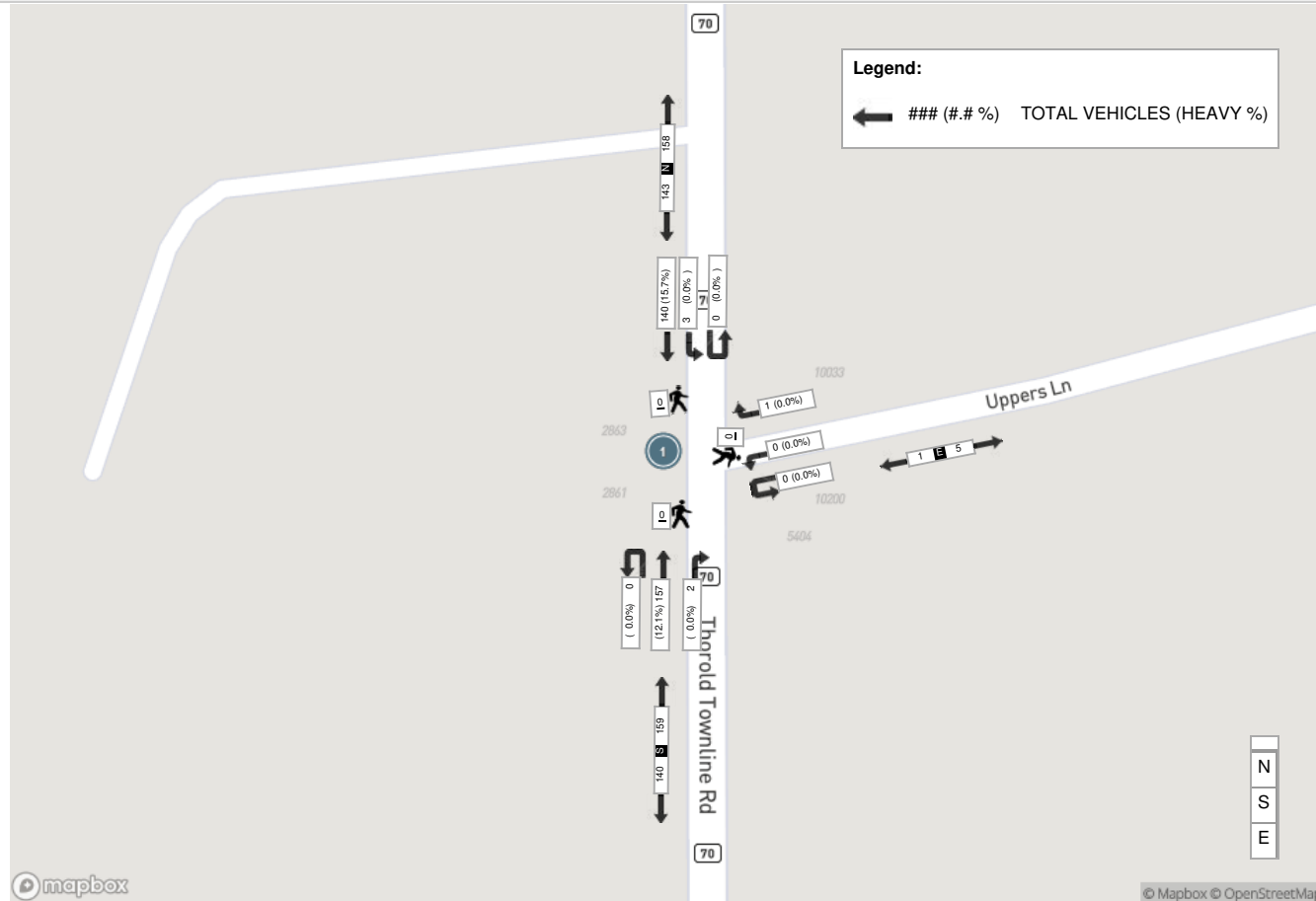
Start Time	N Approach THOROLD TOWNLINE RD					E Approach UPPERS LANE					S Approach THOROLD TOWNLINE RD					Int. Total (15 min)
	Thru	Left	UTurn	Peds	Approach Total	Right	Left	UTurn	Peds	Approach Total	Right	Thru	UTurn	Peds	Approach Total	
08:15:00	28	1	0	0	29	1	0	0	0	1	1	46	0	0	47	77
08:30:00	34	1	0	0	35	0	0	0	0	0	1	42	0	0	43	78
08:45:00	36	0	0	0	36	0	0	0	0	0	0	34	0	0	34	70
09:00:00	42	1	0	0	43	0	0	0	0	0	0	35	0	0	35	78
Grand Total	140	3	0	0	143	1	0	0	0	1	2	157	0	0	159	303
Approach%	97.9%	2.1%	0%		-	100%	0%	0%		-	1.3%	98.7%	0%		-	-
Totals %	46.2%	1%	0%		47.2%	0.3%	0%	0%		0.3%	0.7%	51.8%	0%		52.5%	-
PHF	0.83	0.75	0		0.83	0.25	0	0		0.25	0.5	0.85	0		0.85	-
Heavy	22	0	0		22	0	0	0		0	0	19	0		19	-
Heavy %	15.7%	0%	0%		15.4%	0%	0%	0%		0%	0%	12.1%	0%		11.9%	-
Lights	118	3	0		121	1	0	0		1	2	138	0		140	-
Lights %	84.3%	100%	0%		84.6%	100%	0%	0%		100%	100%	87.9%	0%		88.1%	-
Single-Unit Trucks	17	0	0		17	0	0	0		0	0	15	0		15	-
Single-Unit Trucks %	12.1%	0%	0%		11.9%	0%	0%	0%		0%	0%	9.6%	0%		9.4%	-
Buses	2	0	0		2	0	0	0		0	0	1	0		1	-
Buses %	1.4%	0%	0%		1.4%	0%	0%	0%		0%	0%	0.6%	0%		0.6%	-
Articulated Trucks	3	0	0		3	0	0	0		0	0	3	0		3	-
Articulated Trucks %	2.1%	0%	0%		2.1%	0%	0%	0%		0%	0%	1.9%	0%		1.9%	-
Bicycles on Road	0	0	0		0	0	0	0		0	0	0	0		0	-
Bicycles on Road %	0%	0%	0%		0%	0%	0%	0%		0%	0%	0%	0%		0%	-



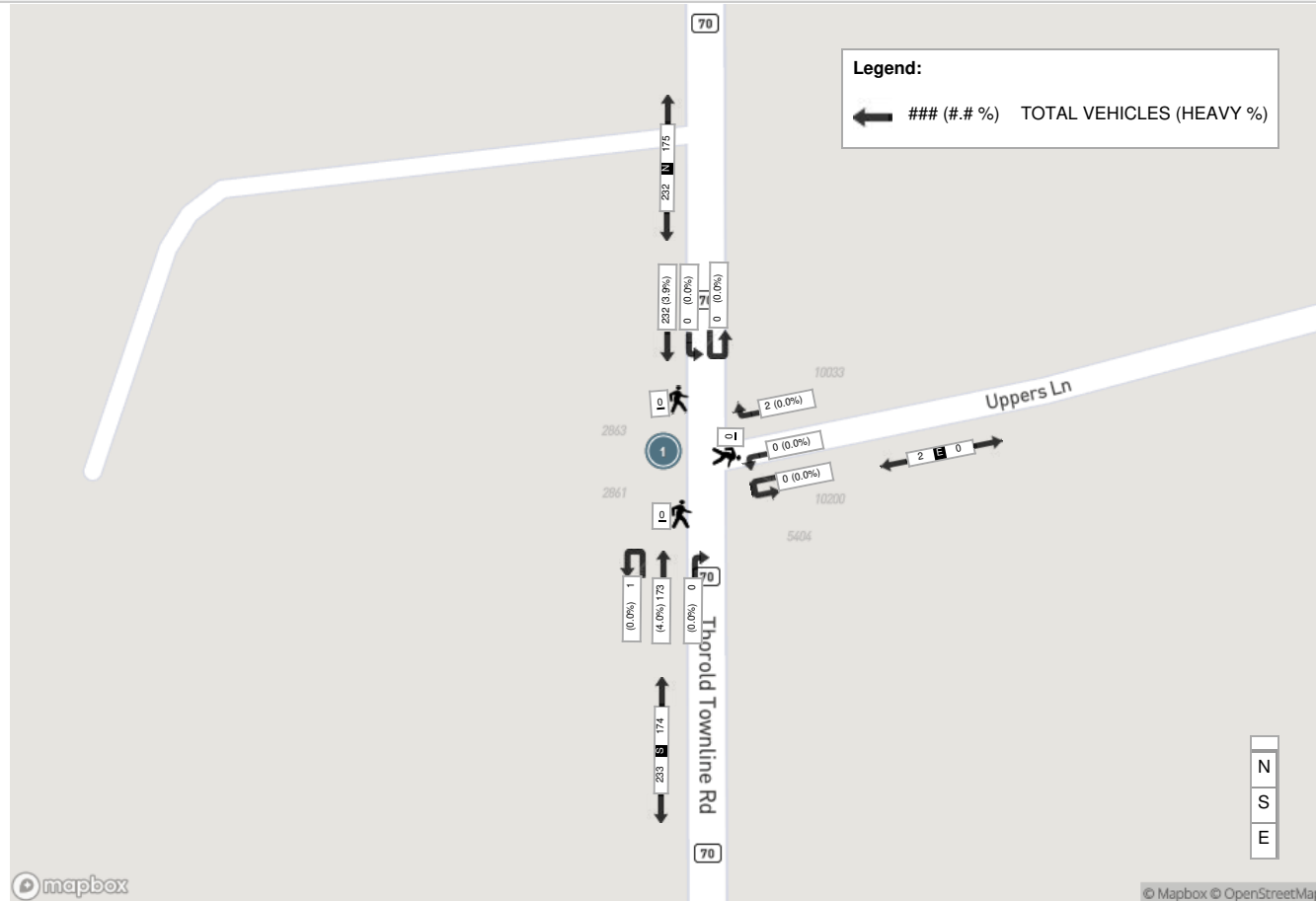
Peak Hour: 04:30 PM - 05:30 PM Weather: Broken Clouds (21.96 °C)

Start Time	N Approach THOROLD TOWNLINE RD					E Approach UPPERS LANE					S Approach THOROLD TOWNLINE RD					Int. Total (15 min)
	Thru	Left	UTurn	Peds	Approach Total	Right	Left	UTurn	Peds	Approach Total	Right	Thru	UTurn	Peds	Approach Total	
16:30:00	57	0	0	0	57	0	0	0	0	0	0	52	1	0	53	110
16:45:00	53	0	0	0	53	0	0	0	0	0	0	47	0	0	47	100
17:00:00	61	0	0	0	61	2	0	0	0	2	0	39	0	0	39	102
17:15:00	61	0	0	0	61	0	0	0	0	0	0	35	0	0	35	96
Grand Total	232	0	0	0	232	2	0	0	0	2	0	173	1	0	174	408
Approach%	100%	0%	0%		-	100%	0%	0%		-	0%	99.4%	0.6%		-	-
Totals %	56.9%	0%	0%		56.9%	0.5%	0%	0%		0.5%	0%	42.4%	0.2%		42.6%	-
PHF	0.95	0	0		0.95	0.25	0	0		0.25	0	0.83	0.25		0.82	-
Heavy	9	0	0		9	0	0	0		0	0	7	0		7	-
Heavy %	3.9%	0%	0%		3.9%	0%	0%	0%		0%	0%	4%	0%		4%	-
Lights	223	0	0		223	2	0	0		2	0	166	1		167	-
Lights %	96.1%	0%	0%		96.1%	100%	0%	0%		100%	0%	96%	100%		96%	-
Single-Unit Trucks	5	0	0		5	0	0	0		0	0	5	0		5	-
Single-Unit Trucks %	2.2%	0%	0%		2.2%	0%	0%	0%		0%	0%	2.9%	0%		2.9%	-
Buses	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%	-
Articulated Trucks	4	0	0		4	0	0	0		0	0	2	0		2	-
Articulated Trucks %	1.7%	0%	0%		1.7%	0%	0%	0%		0%	0%	1.2%	0%		1.1%	-
Bicycles on Road	0	0	0		0	0	0	0		0	0	0	0		0	-
Bicycles on Road %	0%	0%	0%		0%	0%	0%	0%		0%	0%	0%	0%		0%	-

Peak Hour: 08:15 AM - 09:15 AM Weather: Clear Sky (8.9 °C)



Peak Hour: 04:30 PM - 05:30 PM Weather: Broken Clouds (21.96 °C)



APPENDIX E

Level of Service Definitions

Level of Service Definitions

Two-Way Stop Controlled Intersections

Level of Service	Control Delay per Vehicle (seconds)	Interpretation
A	≤ 10	EXCELLENT. Large and frequent gaps in traffic on the main roadway. Queuing on the minor street is rare.
B	> 10 and ≤ 15	VERY GOOD. Many gaps exist in traffic on the main roadway. Queuing on the minor street is minimal.
C	> 15 and ≤ 25	GOOD. Fewer gaps exist in traffic on the main roadway. Delay on minor approach becomes more noticeable.
D	> 25 and ≤ 35	FAIR. Infrequent and shorter gaps in traffic on the main roadway. Queue lengths develop on the minor street.
E	> 35 and ≤ 50	POOR. Very infrequent gaps in traffic on the main roadway. Queue lengths become noticeable.
F	> 50	UNSATISFACTORY. Very few gaps in traffic on the main roadway. Excessive delay with significant queue lengths on the minor street.

Adapted from Highway Capacity Manual 2000, Transportation Research Board

Signalized Intersections

Level of Service	Control Delay per Vehicle (seconds)	Interpretation
A	≤ 10	EXCELLENT. Extremely favourable progression with most vehicles arriving during the green phase. Most vehicles do not stop and short cycle lengths may contribute to low delay.
B	> 10 and ≤ 20	VERY GOOD. Very good progression and/or short cycle lengths with slightly more vehicles stopping than LOS "A" causing slightly higher levels of average delay.
C	> 20 and ≤ 35	GOOD. Fair progression and longer cycle lengths lead to a greater number of vehicles stopping than LOS "B".
D	> 35 and ≤ 55	FAIR. Congestion becomes noticeable with higher average delays resulting from a combination of long cycle lengths, high volume-to-capacity ratios and unfavourable progression.
E	> 55 and ≤ 80	POOR. Lengthy delays values are indicative of poor progression, long cycle lengths and high volume-to-capacity ratios. Individual cycle failures are common with individual movement failures also common.
F	> 80	UNSATISFACTORY. Indicative of oversaturated conditions with vehicular demand greater than the capacity of the intersection.

Adapted from Highway Capacity Manual 2000, Transportation Research Board

Arcady Junctions 8 User Guide – Level of Service Definition

(Highway Capacity Manual (HMC 2000))

The transportation LOS system uses the letters A through F, with the definitions below being typical:

A = Free Flow

B = Reasonably Free Flow

C = Stable Flow

D = Approaching Unstable Flow

E = Unstable Flow

F = Forced or Breakdown Flow

The thresholds A-F are based on the queuing delay on each arm, and these thresholds differ for unsignalized and signalized junctions. Note that the LOS in **Junction 8** is based purely on the queueing delay, taking into account delay experienced in previous time segments (i.e. The Average Delay Per Arriving Vehicle).

APPENDIX F

Synchro Analysis Worksheets

Lanes, Volumes, Timings

1: Barker Pkwy & Davis Road/Hwy 58

06-26-2023

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	20	132	278	16	45	213
Future Volume (vph)	20	132	278	16	45	213
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0		118.0	135.0	
Storage Lanes	1	0		1	1	
Taper Length (m)	7.5				7.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.884			0.850		
Flt Protected	0.993				0.950	
Satd. Flow (prot)	1578	0	1827	1170	1504	1776
Flt Permitted	0.993				0.950	
Satd. Flow (perm)	1578	0	1827	1170	1504	1776
Link Speed (k/h)	50		50			50
Link Distance (m)	345.6		411.8			484.4
Travel Time (s)	24.9		29.6			34.9
Peak Hour Factor	0.71	0.79	0.83	0.50	0.75	0.90
Heavy Vehicles (%)	10%	5%	4%	38%	20%	7%
Adj. Flow (vph)	28	167	335	32	60	237
Shared Lane Traffic (%)						
Lane Group Flow (vph)	195	0	335	32	60	237
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.6		3.6			3.6
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	37.2%			ICU Level of Service A		
Analysis Period (min)	15					

Lanes, Volumes, Timings

2: Uppers Lane & Davis Road

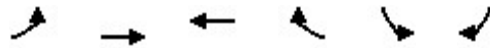
06-26-2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	49	19	86	49	17	12	58	212	42	20	147	34
Future Volume (vph)	49	19	86	49	17	12	58	212	42	20	147	34
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	170.0		0.0	140.0		117.0
Storage Lanes	0		0	0		0	1		0	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
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		0.925			0.968			0.976				0.850
Flt Protected		0.986			0.974		0.950			0.950		
Satd. Flow (prot)	0	1597	0	0	1767	0	1656	1766	0	1719	1681	1482
Flt Permitted		0.986			0.974		0.950			0.950		
Satd. Flow (perm)	0	1597	0	0	1767	0	1656	1766	0	1719	1681	1482
Link Speed (k/h)		50			50			50				50
Link Distance (m)		190.8			63.3			356.3			336.3	
Travel Time (s)		13.7			4.6			25.7			24.2	
Peak Hour Factor	0.82	0.59	0.74	0.77	0.61	0.43	0.85	0.85	0.88	0.83	0.90	0.85
Heavy Vehicles (%)	14%	0%	8%	0%	6%	0%	9%	6%	0%	5%	13%	9%
Adj. Flow (vph)	60	32	116	64	28	28	68	249	48	24	163	40
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	208	0	0	120	0	68	297	0	24	163	40
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	36.3%						ICU Level of Service A					
Analysis Period (min)	15											

Lanes, Volumes, Timings

3: Lundy's Lane & Barker Parkway

06-26-2023



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔↔	↔↔		↔	↔
Traffic Volume (vph)	49	19	17	144	38	47
Future Volume (vph)	49	19	17	144	38	47
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	0.95	0.95	1.00	1.00
Frt			0.864			0.850
Flt Protected		0.965			0.950	
Satd. Flow (prot)	0	3171	2555	0	1626	1509
Flt Permitted		0.965			0.950	
Satd. Flow (perm)	0	3171	2555	0	1626	1509
Link Speed (k/h)		50	50		50	
Link Distance (m)		269.5	290.5		183.4	
Travel Time (s)		19.4	20.9		13.2	
Peak Hour Factor	0.78	0.82	0.77	0.69	0.73	0.78
Heavy Vehicles (%)	12%	4%	4%	24%	11%	7%
Adj. Flow (vph)	63	23	22	209	52	60
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	86	231	0	52	60
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25			15	25	15
Sign Control		Yield	Yield		Yield	
Intersection Summary						
Area Type: Other						
Control Type: Roundabout						
Intersection Capacity Utilization 21.8%						
ICU Level of Service A						
Analysis Period (min) 15						

Lanes, Volumes, Timings

4: Thorold Townline Road 70 & Lundy's Lane

06-26-2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	34	326	81	42	271	17	63	126	34	9	88	23
Future Volume (vph)	34	326	81	42	271	17	63	126	34	9	88	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	150.0		32.0	76.0		0.0	30.0		0.0	40.0		0.0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.991			0.963			0.960	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1703	1863	1468	1805	1808	0	1626	1656	0	1467	1604	0
Flt Permitted	0.464			0.370			0.653			0.626		
Satd. Flow (perm)	832	1863	1468	703	1808	0	1118	1656	0	967	1604	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			84		5			21			23	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		307.3			478.1			247.2			197.8	
Travel Time (s)		22.1			34.4			17.8			14.2	
Peak Hour Factor	0.71	0.78	0.88	0.81	0.88	0.85	0.79	0.79	0.65	0.56	0.73	0.52
Heavy Vehicles (%)	6%	2%	10%	0%	4%	6%	11%	11%	9%	23%	14%	13%
Adj. Flow (vph)	48	418	92	52	308	20	80	159	52	16	121	44
Shared Lane Traffic (%)												
Lane Group Flow (vph)	48	418	92	52	328	0	80	211	0	16	165	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	

Lanes, Volumes, Timings

4: Thorold Townline Road 70 & Lundy's Lane

06-26-2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4		4	8			2			6		
Detector Phase	4	4	4	8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	20.0	20.0	20.0	20.0	20.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	33.0	33.0	33.0	32.0	32.0		35.0	35.0		35.0	35.0	
Total Split (s)	50.0	50.0	50.0	50.0	50.0		40.0	40.0		40.0	40.0	
Total Split (%)	55.6%	55.6%	55.6%	55.6%	55.6%		44.4%	44.4%		44.4%	44.4%	
Maximum Green (s)	43.0	43.0	43.0	44.0	44.0		34.0	34.0		34.0	34.0	
Yellow Time (s)	5.0	5.0	5.0	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)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	7.0	7.0	7.0	6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Recall Mode	None	None	None	None	None		Max	Max		Max	Max	
Walk Time (s)	15.0	15.0	15.0	15.0	15.0		15.0	15.0		15.0	15.0	
Flash Dont Walk (s)	7.0	7.0	7.0	7.0	7.0		14.0	14.0		14.0	14.0	
Pedestrian Calls (#/hr)	0	0	0	0	0		0	0		0	0	
Act Effect Green (s)	24.5	24.5	24.5	25.5	25.5		34.2	34.2		34.2	34.2	
Actuated g/C Ratio	0.34	0.34	0.34	0.36	0.36		0.48	0.48		0.48	0.48	
v/c Ratio	0.17	0.66	0.17	0.21	0.51		0.15	0.26		0.03	0.21	
Control Delay	17.5	25.3	5.3	17.8	20.6		13.3	12.3		12.6	11.5	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	17.5	25.3	5.3	17.8	20.6		13.3	12.3		12.6	11.5	
LOS	B	C	A	B	C		B	B		B	B	
Approach Delay		21.3			20.2			12.6			11.6	
Approach LOS		C			C			B			B	

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 71.8

Natural Cycle: 70

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.66

Intersection Signal Delay: 18.0

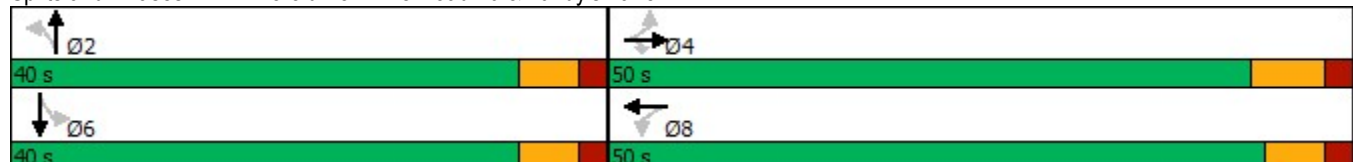
Intersection LOS: B

Intersection Capacity Utilization 57.5%

ICU Level of Service B

Analysis Period (min) 15

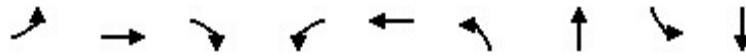
Splits and Phases: 4: Thorold Townline Road 70 & Lundy's Lane



Queues

4: Thorold Townline Road 70 & Lundy's Lane

06-26-2023



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	48	418	92	52	328	80	211	16	165
v/c Ratio	0.17	0.66	0.17	0.21	0.51	0.15	0.26	0.03	0.21
Control Delay	17.5	25.3	5.3	17.8	20.6	13.3	12.3	12.6	11.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.5	25.3	5.3	17.8	20.6	13.3	12.3	12.6	11.5
Queue Length 50th (m)	4.6	49.1	0.7	5.0	35.0	5.7	14.3	1.1	10.3
Queue Length 95th (m)	9.0	62.4	8.6	11.1	54.7	14.7	29.7	3.2	20.9
Internal Link Dist (m)	283.3				454.1	223.2		173.8	
Turn Bay Length (m)	150.0			32.0	76.0	30.0		40.0	
Base Capacity (vph)	501	1122	917	433	1116	532	799	460	776
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	0.37	0.10	0.12	0.29	0.15	0.26	0.03	0.21
Intersection Summary									

Lanes, Volumes, Timings
5: Upper's Lane & Thorold Townline Road

06-26-2023

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	1	157	2	3	140
Future Volume (vph)	0	1	157	2	3	140
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.865		0.997			
Flt Protected						0.999
Satd. Flow (prot)	1644	0	1695	0	0	1862
Flt Permitted						0.999
Satd. Flow (perm)	1644	0	1695	0	0	1862
Link Speed (k/h)	50		50			50
Link Distance (m)	329.0		132.8			239.1
Travel Time (s)	23.7		9.6			17.2
Peak Hour Factor	0.25	0.25	0.85	0.50	0.75	0.83
Heavy Vehicles (%)	0%	0%	12%	0%	0%	2%
Adj. Flow (vph)	0	4	185	4	4	169
Shared Lane Traffic (%)						
Lane Group Flow (vph)	4	0	189	0	0	173
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.6		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	19.8%			ICU Level of Service A		
Analysis Period (min)	15					

Lanes, Volumes, Timings

6: Thorold Townline Road & Venture Street

06-26-2023



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	0	0	0	0
Future Volume (vph)	0	0	0	0	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
Frnt						
Flt Protected						
Satd. Flow (prot)	1863	0	0	1863	1863	0
Flt Permitted						
Satd. Flow (perm)	1863	0	0	1863	1863	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	574.7			239.1	102.8	
Travel Time (s)	41.4			17.2	7.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	100	100	100			100
Sign Control	Stop			Stop	Stop	
Intersection Summary						
Area Type:	Other					
Control Type: Unsignalized						
Intersection Capacity Utilization 0.0%				ICU Level of Service A		
Analysis Period (min) 15						

Lanes, Volumes, Timings

7: Beaverdams Road & Thorold Townline Road

06-26-2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	34	108	32	4	163	42	34	135	2	20	84	25
Future Volume (vph)	34	108	32	4	163	42	34	135	2	20	84	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.967			0.975			0.997			0.971	
Flt Protected		0.990			0.999			0.989			0.988	
Satd. Flow (prot)	0	1698	0	0	1836	0	0	1731	0	0	1665	0
Flt Permitted		0.990			0.999			0.989			0.988	
Satd. Flow (perm)	0	1698	0	0	1836	0	0	1731	0	0	1665	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		197.0			309.7			169.2			132.8	
Travel Time (s)		14.2			22.3			12.2			9.6	
Peak Hour Factor	0.77	0.93	0.62	0.50	0.74	0.81	0.71	0.84	0.50	0.45	0.81	0.63
Heavy Vehicles (%)	12%	4%	10%	0%	1%	0%	3%	10%	0%	0%	14%	8%
Adj. Flow (vph)	44	116	52	8	220	52	48	161	4	44	104	40
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	212	0	0	280	0	0	213	0	0	188	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	44.2%											
Analysis Period (min)	15											
	ICU Level of Service A											

Lanes, Volumes, Timings

8: Barker Pkwy

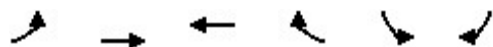
06-26-2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	19	3	1	1	0	8	1	27	0	7	14	13
Future Volume (vph)	19	3	1	1	0	8	1	27	0	7	14	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.994			0.881						0.927	
Flt Protected		0.957			0.994			0.998			0.996	
Satd. Flow (prot)	0	1801	0	0	1582	0	0	1896	0	0	1545	0
Flt Permitted		0.957			0.994			0.998			0.996	
Satd. Flow (perm)	0	1801	0	0	1582	0	0	1896	0	0	1545	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		143.7			157.1			135.3			345.6	
Travel Time (s)		10.3			11.3			9.7			24.9	
Peak Hour Factor	0.25	0.75	0.25	0.44	0.58	0.54	0.25	0.25	0.29	0.95	0.38	0.25
Heavy Vehicles (%)	0%	7%	0%	29%	14%	2%	0%	0%	0%	11%	33%	0%
Adj. Flow (vph)	76	4	4	2	0	15	4	108	0	7	37	52
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	84	0	0	17	0	0	112	0	0	96	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	17.6%											
Analysis Period (min)	15											
ICU Level of Service A												

Lanes, Volumes, Timings

9:

06-26-2023



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	0	0	0	0
Future Volume (vph)	0	0	0	0	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)	0	1863	1863	0	1863	0
Flt Permitted						
Satd. Flow (perm)	0	1863	1863	0	1863	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		461.7	162.2		264.6	
Travel Time (s)		33.2	11.7		19.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	100			100	100	100
Sign Control		Stop	Stop		Stop	
Intersection Summary						
Area Type:	Other					
Control Type: Unsignalized						
Intersection Capacity Utilization 0.0%				ICU Level of Service A		
Analysis Period (min) 15						

Lanes, Volumes, Timings

1: Barker Pkwy & Davis Road/Hwy 58

06-26-2023

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	20	80	322	17	134	322
Future Volume (vph)	20	80	322	17	134	322
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0		118.0	135.0	
Storage Lanes	1	0		1	1	
Taper Length (m)	7.5				7.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.900			0.850		
Flt Protected	0.987				0.950	
Satd. Flow (prot)	1663	0	1863	1524	1787	1827
Flt Permitted	0.987				0.950	
Satd. Flow (perm)	1663	0	1863	1524	1787	1827
Link Speed (k/h)	50		50			50
Link Distance (m)	345.6		411.8			484.4
Travel Time (s)	24.9		29.6			34.9
Peak Hour Factor	0.63	0.87	0.89	0.85	0.88	0.91
Heavy Vehicles (%)	0%	2%	2%	6%	1%	4%
Adj. Flow (vph)	32	92	362	20	152	354
Shared Lane Traffic (%)						
Lane Group Flow (vph)	124	0	362	20	152	354
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.6		3.6			3.6
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	40.4%			ICU Level of Service A		
Analysis Period (min)	15					

Lanes, Volumes, Timings

2: Uppers Lane & Davis Road

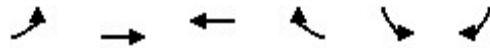
06-26-2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	35	5	107	56	8	23	101	281	56	32	242	66
Future Volume (vph)	35	5	107	56	8	23	101	281	56	32	242	66
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	170.0		0.0	140.0		117.0
Storage Lanes	0		0	0		0	1		0	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
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		0.909			0.959			0.967				0.850
Flt Protected		0.987			0.972		0.950			0.950		
Satd. Flow (prot)	0	1561	0	0	1757	0	1656	1755	0	1719	1681	1482
Flt Permitted		0.987			0.972		0.950			0.950		
Satd. Flow (perm)	0	1561	0	0	1757	0	1656	1755	0	1719	1681	1482
Link Speed (k/h)		50			50			50				50
Link Distance (m)		190.8			63.3			356.3			336.3	
Travel Time (s)		13.7			4.6			25.7			24.2	
Peak Hour Factor	0.58	0.42	0.72	0.82	0.50	0.64	0.74	0.89	0.64	0.67	0.96	0.79
Heavy Vehicles (%)	14%	0%	8%	0%	6%	0%	9%	6%	0%	5%	13%	9%
Adj. Flow (vph)	60	12	149	68	16	36	136	316	88	48	252	84
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	221	0	0	120	0	136	404	0	48	252	84
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	42.9%						ICU Level of Service A					
Analysis Period (min)	15											

Lanes, Volumes, Timings

3: Lundy's Lane & Barker Parkway

06-26-2023



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔↔	↔↔		↔	↔
Traffic Volume (vph)	46	523	553	37	40	60
Future Volume (vph)	46	523	553	37	40	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	0.95	0.95	1.00	1.00
Frt			0.986			0.850
Flt Protected		0.996			0.950	
Satd. Flow (prot)	0	3525	3518	0	1805	1583
Flt Permitted		0.996			0.950	
Satd. Flow (perm)	0	3525	3518	0	1805	1583
Link Speed (k/h)		50	50		50	
Link Distance (m)		269.5	290.5		183.4	
Travel Time (s)		19.4	20.9		13.2	
Peak Hour Factor	0.82	0.75	0.95	0.62	0.56	0.71
Heavy Vehicles (%)	2%	2%	1%	3%	0%	2%
Adj. Flow (vph)	56	697	582	60	71	85
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	753	642	0	71	85
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25			15	25	15
Sign Control		Yield	Yield		Yield	
Intersection Summary						
Area Type:	Other					
Control Type:	Roundabout					
Intersection Capacity Utilization	45.6%			ICU Level of Service A		
Analysis Period (min)	15					

Lanes, Volumes, Timings

4: Thorold Townline Road 70 & Lundy's Lane

06-26-2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	27	442	112	31	410	8	134	122	62	19	162	31
Future Volume (vph)	27	442	112	31	410	8	134	122	62	19	162	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	150.0		32.0	76.0		0.0	30.0		0.0	40.0		0.0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.993			0.935			0.975	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1736	1881	1599	1805	1869	0	1770	1737	0	1719	1817	0
Flt Permitted	0.345			0.239			0.617			0.580		
Satd. Flow (perm)	630	1881	1599	454	1869	0	1149	1737	0	1050	1817	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			98		4			49			13	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		307.3			478.1			247.2			197.8	
Travel Time (s)		22.1			34.4			17.8			14.2	
Peak Hour Factor	0.84	0.77	0.76	0.65	0.94	0.40	0.74	0.85	0.57	0.68	0.88	0.86
Heavy Vehicles (%)	4%	1%	1%	0%	1%	0%	2%	4%	0%	5%	1%	7%
Adj. Flow (vph)	32	574	147	48	436	20	181	144	109	28	184	36
Shared Lane Traffic (%)												
Lane Group Flow (vph)	32	574	147	48	456	0	181	253	0	28	220	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	

Lanes, Volumes, Timings

4: Thorold Townline Road 70 & Lundy's Lane

06-26-2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4		4	8			2			6		
Detector Phase	4	4	4	8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	20.0	20.0	20.0	20.0	20.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	33.0	33.0	33.0	32.0	32.0		35.0	35.0		35.0	35.0	
Total Split (s)	50.0	50.0	50.0	50.0	50.0		40.0	40.0		40.0	40.0	
Total Split (%)	55.6%	55.6%	55.6%	55.6%	55.6%		44.4%	44.4%		44.4%	44.4%	
Maximum Green (s)	43.0	43.0	43.0	44.0	44.0		34.0	34.0		34.0	34.0	
Yellow Time (s)	5.0	5.0	5.0	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)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	7.0	7.0	7.0	6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Recall Mode	None	None	None	None	None		Max	Max		Max	Max	
Walk Time (s)	15.0	15.0	15.0	15.0	15.0		15.0	15.0		15.0	15.0	
Flash Dont Walk (s)	7.0	7.0	7.0	7.0	7.0		14.0	14.0		14.0	14.0	
Pedestrian Calls (#/hr)	0	0	0	0	0		0	0		0	0	
Act Effect Green (s)	31.5	31.5	31.5	32.5	32.5		34.4	34.4		34.4	34.4	
Actuated g/C Ratio	0.40	0.40	0.40	0.41	0.41		0.44	0.44		0.44	0.44	
v/c Ratio	0.13	0.77	0.21	0.26	0.59		0.36	0.32		0.06	0.28	
Control Delay	15.3	27.6	6.3	18.4	20.8		20.0	14.8		16.7	16.6	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	15.3	27.6	6.3	18.4	20.8		20.0	14.8		16.7	16.6	
LOS	B	C	A	B	C		C	B		B	B	
Approach Delay		22.9			20.6			17.0			16.6	
Approach LOS		C			C			B			B	

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 79

Natural Cycle: 70

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.77

Intersection Signal Delay: 20.2

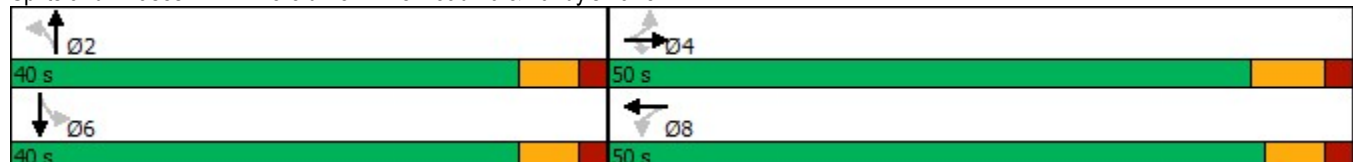
Intersection LOS: C

Intersection Capacity Utilization 59.6%

ICU Level of Service B

Analysis Period (min) 15

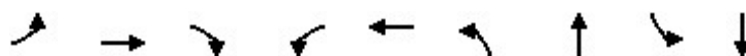
Splits and Phases: 4: Thorold Townline Road 70 & Lundy's Lane



Queues

4: Thorold Townline Road 70 & Lundy's Lane

06-26-2023



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	32	574	147	48	456	181	253	28	220
v/c Ratio	0.13	0.77	0.21	0.26	0.59	0.36	0.32	0.06	0.28
Control Delay	15.3	27.6	6.3	18.4	20.8	20.0	14.8	16.7	16.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.3	27.6	6.3	18.4	20.8	20.0	14.8	16.7	16.6
Queue Length 50th (m)	3.1	75.3	4.6	4.8	53.2	18.7	20.2	2.5	20.4
Queue Length 95th (m)	7.9	87.1	10.7	8.4	79.9	33.4	41.9	6.6	42.7
Internal Link Dist (m)	283.3				454.1		223.2		173.8
Turn Bay Length (m)	150.0			32.0	76.0			30.0	40.0
Base Capacity (vph)	346	1034	923	255	1053	499	782	456	797
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	0.09	0.56	0.16	0.19	0.43	0.36	0.32	0.06	0.28
Intersection Summary									

Lanes, Volumes, Timings

5: Upper's Lane & Thorold Townline Road

06-26-2023

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	2	173	0	0	232
Future Volume (vph)	0	2	173	0	0	232
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.865					
Flt Protected						
Satd. Flow (prot)	1644	0	1827	0	0	1827
Flt Permitted						
Satd. Flow (perm)	1644	0	1827	0	0	1827
Link Speed (k/h)	50		50			50
Link Distance (m)	329.0		132.8			239.1
Travel Time (s)	23.7		9.6			17.2
Peak Hour Factor	0.25	0.25	0.83	0.25	0.25	0.95
Heavy Vehicles (%)	0%	0%	4%	0%	0%	4%
Adj. Flow (vph)	0	8	208	0	0	244
Shared Lane Traffic (%)						
Lane Group Flow (vph)	8	0	208	0	0	244
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.6		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	22.2%			ICU Level of Service A		
Analysis Period (min)	15					

Lanes, Volumes, Timings

6: Thorold Townline Road & Venture Street

06-26-2023



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	0	0	0	0
Future Volume (vph)	0	0	0	0	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)	1863	0	0	1863	1863	0
Flt Permitted						
Satd. Flow (perm)	1863	0	0	1863	1863	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	574.7			239.1	102.8	
Travel Time (s)	41.4			17.2	7.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	100	100	100			100
Sign Control	Stop			Stop	Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	0.0%			ICU Level of Service A		
Analysis Period (min)	15					

Lanes, Volumes, Timings

7: Beaverdams Road & Thorold Townline Road

06-26-2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	181	47	5	164	27	39	128	4	40	172	57
Future Volume (vph)	30	181	47	5	164	27	39	128	4	40	172	57
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.973			0.974			0.992			0.965	
Flt Protected		0.993			0.998			0.989			0.992	
Satd. Flow (prot)	0	1816	0	0	1831	0	0	1811	0	0	1745	0
Flt Permitted		0.993			0.998			0.989			0.992	
Satd. Flow (perm)	0	1816	0	0	1831	0	0	1811	0	0	1745	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		197.0			309.7			169.2			132.8	
Travel Time (s)		14.2			22.3			12.2			9.6	
Peak Hour Factor	0.75	0.92	0.78	0.63	0.95	0.61	0.89	0.86	0.33	0.83	0.93	0.71
Heavy Vehicles (%)	3%	1%	0%	3%	1%	0%	0%	4%	0%	5%	5%	2%
Adj. Flow (vph)	40	197	60	8	173	44	44	149	12	48	185	80
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	297	0	0	225	0	0	205	0	0	313	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	52.0%						ICU Level of Service A					
Analysis Period (min)	15											

Lanes, Volumes, Timings

8: Barker Pkwy

06-26-2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	8	0	1	0	7	2	30	1	12	32	19
Future Volume (vph)	15	8	0	1	0	7	2	30	1	12	32	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.877			0.998			0.937	
Flt Protected		0.960			0.995			0.997			0.993	
Satd. Flow (prot)	0	1824	0	0	1658	0	0	1891	0	0	1768	0
Flt Permitted		0.960			0.995			0.997			0.993	
Satd. Flow (perm)	0	1824	0	0	1658	0	0	1891	0	0	1768	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		143.7			157.1			135.3			345.6	
Travel Time (s)		10.3			11.3			9.7			24.9	
Peak Hour Factor	0.25	0.68	0.25	0.75	1.00	0.68	0.25	0.25	0.58	0.54	0.50	0.25
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	60	12	0	1	0	10	8	120	2	22	64	76
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	72	0	0	11	0	0	130	0	0	162	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	18.3%											
Analysis Period (min)	15											
ICU Level of Service A												

Lanes, Volumes, Timings

9:

06-26-2023

						
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	0	0	0	0
Future Volume (vph)	0	0	0	0	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)	0	1863	1863	0	1863	0
Flt Permitted						
Satd. Flow (perm)	0	1863	1863	0	1863	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		461.7	162.2		264.6	
Travel Time (s)		33.2	11.7		19.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	100			100	100	100
Sign Control		Stop	Stop		Stop	
Intersection Summary						
Area Type:	Other					
Control Type: Unsignalized						
Intersection Capacity Utilization 0.0%				ICU Level of Service A		
Analysis Period (min) 15						

Lanes, Volumes, Timings

1: Barker Pkwy & Davis Road/Hwy 58

06-26-2023

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	20	132	301	16	45	231
Future Volume (vph)	20	132	301	16	45	231
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0		118.0	135.0	
Storage Lanes	1	0		1	1	
Taper Length (m)	7.5				7.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.884			0.850		
Flt Protected	0.993				0.950	
Satd. Flow (prot)	1578	0	1827	1170	1504	1776
Flt Permitted	0.993				0.950	
Satd. Flow (perm)	1578	0	1827	1170	1504	1776
Link Speed (k/h)	50		50			50
Link Distance (m)	345.6		411.8			484.4
Travel Time (s)	24.9		29.6			34.9
Peak Hour Factor	0.71	0.79	0.83	0.50	0.75	0.90
Heavy Vehicles (%)	10%	5%	4%	38%	20%	7%
Adj. Flow (vph)	28	167	363	32	60	257
Shared Lane Traffic (%)						
Lane Group Flow (vph)	195	0	363	32	60	257
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.6		3.6			3.6
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	38.4%			ICU Level of Service A		
Analysis Period (min)	15					

Lanes, Volumes, Timings

2: Uppers Lane & Davis Road

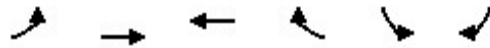
06-26-2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	49	21	86	49	19	12	58	230	42	20	160	34
Future Volume (vph)	49	21	86	49	19	12	58	230	42	20	160	34
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	170.0		0.0	140.0		117.0
Storage Lanes	0		0	0		0	1		0	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
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		0.926			0.969			0.977				0.850
Flt Protected		0.986			0.975		0.950			0.950		
Satd. Flow (prot)	0	1601	0	0	1768	0	1656	1766	0	1719	1681	1482
Flt Permitted		0.986			0.975		0.950			0.950		
Satd. Flow (perm)	0	1601	0	0	1768	0	1656	1766	0	1719	1681	1482
Link Speed (k/h)		50			50			50				50
Link Distance (m)		190.8			63.3			356.3			336.3	
Travel Time (s)		13.7			4.6			25.7			24.2	
Peak Hour Factor	0.82	0.59	0.74	0.77	0.61	0.43	0.85	0.85	0.88	0.83	0.90	0.85
Heavy Vehicles (%)	14%	0%	8%	0%	6%	0%	9%	6%	0%	5%	13%	9%
Adj. Flow (vph)	60	36	116	64	31	28	68	271	48	24	178	40
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	212	0	0	123	0	68	319	0	24	178	40
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	37.4%						ICU Level of Service A					
Analysis Period (min)	15											

Lanes, Volumes, Timings

3: Lundy's Lane & Barker Parkway

06-26-2023



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔↔	↔↔		↗	↗
Traffic Volume (vph)	49	21	19	144	38	47
Future Volume (vph)	49	21	19	144	38	47
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	0.95	0.95	1.00	1.00
Frt			0.866			0.850
Flt Protected		0.966			0.950	
Satd. Flow (prot)	0	3180	2565	0	1626	1509
Flt Permitted		0.966			0.950	
Satd. Flow (perm)	0	3180	2565	0	1626	1509
Link Speed (k/h)		50	50		50	
Link Distance (m)		269.5	290.5		183.4	
Travel Time (s)		19.4	20.9		13.2	
Peak Hour Factor	0.78	0.82	0.77	0.69	0.73	0.78
Heavy Vehicles (%)	12%	4%	4%	24%	11%	7%
Adj. Flow (vph)	63	26	25	209	52	60
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	89	234	0	52	60
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25			15	25	15
Sign Control		Yield	Yield		Yield	
Intersection Summary						
Area Type:	Other					
Control Type:	Roundabout					
Intersection Capacity Utilization	21.9%			ICU Level of Service A		
Analysis Period (min)	15					

Lanes, Volumes, Timings

4: Thorold Townline Road 70 & Lundy's Lane

06-26-2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	34	353	81	42	294	17	63	137	34	9	96	23
Future Volume (vph)	34	353	81	42	294	17	63	137	34	9	96	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	150.0		32.0	76.0		0.0	30.0		0.0	40.0		0.0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.992			0.965			0.962	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1703	1863	1468	1805	1810	0	1626	1659	0	1467	1607	0
Flt Permitted	0.438			0.338			0.646			0.618		
Satd. Flow (perm)	785	1863	1468	642	1810	0	1106	1659	0	955	1607	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			78		5			19			21	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		307.3			478.1			247.2			197.8	
Travel Time (s)		22.1			34.4			17.8			14.2	
Peak Hour Factor	0.71	0.78	0.88	0.81	0.88	0.85	0.79	0.79	0.65	0.56	0.73	0.52
Heavy Vehicles (%)	6%	2%	10%	0%	4%	6%	11%	11%	9%	23%	14%	13%
Adj. Flow (vph)	48	453	92	52	334	20	80	173	52	16	132	44
Shared Lane Traffic (%)												
Lane Group Flow (vph)	48	453	92	52	354	0	80	225	0	16	176	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	

Lanes, Volumes, Timings

4: Thorold Townline Road 70 & Lundy's Lane

06-26-2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4		4	8			2			6		
Detector Phase	4	4	4	8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	20.0	20.0	20.0	20.0	20.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	33.0	33.0	33.0	32.0	32.0		35.0	35.0		35.0	35.0	
Total Split (s)	50.0	50.0	50.0	50.0	50.0		40.0	40.0		40.0	40.0	
Total Split (%)	55.6%	55.6%	55.6%	55.6%	55.6%		44.4%	44.4%		44.4%	44.4%	
Maximum Green (s)	43.0	43.0	43.0	44.0	44.0		34.0	34.0		34.0	34.0	
Yellow Time (s)	5.0	5.0	5.0	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)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	7.0	7.0	7.0	6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Recall Mode	None	None	None	None	None		Max	Max		Max	Max	
Walk Time (s)	15.0	15.0	15.0	15.0	15.0		15.0	15.0		15.0	15.0	
Flash Dont Walk (s)	7.0	7.0	7.0	7.0	7.0		14.0	14.0		14.0	14.0	
Pedestrian Calls (#/hr)	0	0	0	0	0		0	0		0	0	
Act Effect Green (s)	26.3	26.3	26.3	27.3	27.3		34.2	34.2		34.2	34.2	
Actuated g/C Ratio	0.36	0.36	0.36	0.37	0.37		0.46	0.46		0.46	0.46	
v/c Ratio	0.17	0.68	0.16	0.22	0.53		0.16	0.29		0.04	0.23	
Control Delay	17.1	25.6	5.7	17.7	20.5		14.4	13.7		13.8	12.8	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	17.1	25.6	5.7	17.7	20.5		14.4	13.7		13.8	12.8	
LOS	B	C	A	B	C		B	B		B	B	
Approach Delay		21.8			20.2			13.9			12.9	
Approach LOS		C			C			B			B	

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 73.6

Natural Cycle: 70

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.68

Intersection Signal Delay: 18.6

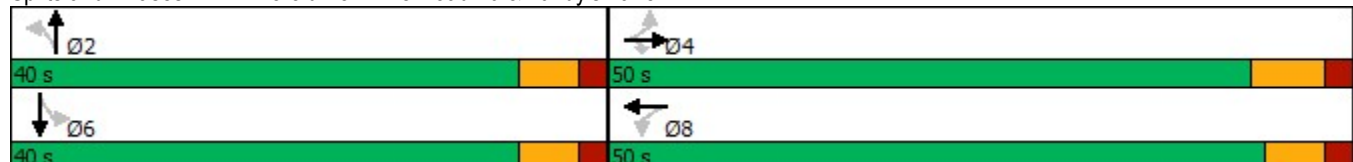
Intersection LOS: B

Intersection Capacity Utilization 57.5%

ICU Level of Service B

Analysis Period (min) 15

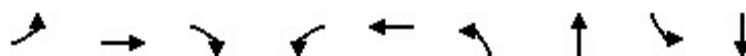
Splits and Phases: 4: Thorold Townline Road 70 & Lundy's Lane



Queues

4: Thorold Townline Road 70 & Lundy's Lane

06-26-2023



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	48	453	92	52	354	80	225	16	176
v/c Ratio	0.17	0.68	0.16	0.22	0.53	0.16	0.29	0.04	0.23
Control Delay	17.1	25.6	5.7	17.7	20.5	14.4	13.7	13.8	12.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.1	25.6	5.7	17.7	20.5	14.4	13.7	13.8	12.8
Queue Length 50th (m)	4.7	54.6	1.3	5.0	38.6	6.2	17.0	1.2	12.4
Queue Length 95th (m)	8.9	68.0	9.2	11.1	59.1	15.5	33.7	3.3	23.7
Internal Link Dist (m)	283.3				454.1		223.2		173.8
Turn Bay Length (m)	150.0			32.0	76.0			30.0	40.0
Base Capacity (vph)	461	1095	895	386	1091	514	781	444	758
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	0.41	0.10	0.13	0.32	0.16	0.29	0.04	0.23
Intersection Summary									

Lanes, Volumes, Timings

5: Thorold Townline Road

06-26-2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	0	1	0	170	2	3	152	0
Future Volume (vph)	0	0	0	0	0	1	0	170	2	3	152	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.865					0.997						
Flt Protected											0.999	
Satd. Flow (prot)	0	1863	0	0	1644	0	0	1695	0	0	1862	0
Flt Permitted											0.999	
Satd. Flow (perm)	0	1863	0	0	1644	0	0	1695	0	0	1862	0
Link Speed (k/h)	50				50				50			
Link Distance (m)	488.7				510.1				142.0			
Travel Time (s)	35.2				36.7				10.2			
Peak Hour Factor	0.92	0.92	0.92	0.25	0.25	0.25	0.92	0.85	0.50	0.75	0.83	0.25
Heavy Vehicles (%)	2%	2%	2%	0%	0%	0%	0%	12%	0%	0%	2%	0%
Adj. Flow (vph)	0	0	0	0	0	4	0	200	4	4	183	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	4	0	0	204	0	0	187	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)	0.0				0.0				0.0			
Link Offset(m)	0.0				0.0				0.0			
Crosswalk Width(m)	4.8				4.8				4.8			
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	100		100	100		100	100		100	100		100
Sign Control	Stop				Stop				Stop			
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	20.4%				ICU Level of Service A							
Analysis Period (min)	15											

Lanes, Volumes, Timings

6: Thorold Townline Road & Venture Street

06-26-2023



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	0	0	0	0
Future Volume (vph)	0	0	0	0	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
Fr't						
Flt Protected						
Satd. Flow (prot)	1863	0	0	1863	1863	0
Flt Permitted						
Satd. Flow (perm)	1863	0	0	1863	1863	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	574.7			229.8	102.8	
Travel Time (s)	41.4			16.5	7.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	100	100	100			100
Sign Control	Stop			Stop	Stop	
Intersection Summary						
Area Type:	Other					
Control Type: Unsignalized						
Intersection Capacity Utilization 0.0%				ICU Level of Service A		
Analysis Period (min) 15						

Lanes, Volumes, Timings

7: Beaverdams Road & Thorold Townline Road

06-26-2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	34	117	32	4	177	42	34	147	2	20	91	25
Future Volume (vph)	34	117	32	4	177	42	34	147	2	20	91	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.968			0.977			0.998			0.972	
Flt Protected		0.990			0.999			0.990			0.989	
Satd. Flow (prot)	0	1702	0	0	1840	0	0	1733	0	0	1666	0
Flt Permitted		0.990			0.999			0.990			0.989	
Satd. Flow (perm)	0	1702	0	0	1840	0	0	1733	0	0	1666	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		197.0			309.7			169.2			132.8	
Travel Time (s)		14.2			22.3			12.2			9.6	
Peak Hour Factor	0.77	0.93	0.62	0.50	0.74	0.81	0.71	0.84	0.50	0.45	0.81	0.63
Heavy Vehicles (%)	12%	4%	10%	0%	1%	0%	3%	10%	0%	0%	14%	8%
Adj. Flow (vph)	44	126	52	8	239	52	48	175	4	44	112	40
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	222	0	0	299	0	0	227	0	0	196	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	46.2%											
Analysis Period (min)	15											
ICU Level of Service A												

Lanes, Volumes, Timings

8: Barker Pkwy

06-26-2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	19	4	1	1	0	8	1	30	0	7	16	13
Future Volume (vph)	19	4	1	1	0	8	1	30	0	7	16	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.994			0.881						0.930	
Flt Protected		0.957			0.994			0.998			0.997	
Satd. Flow (prot)	0	1800	0	0	1582	0	0	1896	0	0	1539	0
Flt Permitted		0.957			0.994			0.998			0.997	
Satd. Flow (perm)	0	1800	0	0	1582	0	0	1896	0	0	1539	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		143.7			157.1			135.3			345.6	
Travel Time (s)		10.3			11.3			9.7			24.9	
Peak Hour Factor	0.25	0.75	0.25	0.44	0.58	0.54	0.25	0.25	0.29	0.95	0.38	0.25
Heavy Vehicles (%)	0%	7%	0%	29%	14%	2%	0%	0%	0%	11%	33%	0%
Adj. Flow (vph)	76	5	4	2	0	15	4	120	0	7	42	52
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	85	0	0	17	0	0	124	0	0	101	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	17.9%											
Analysis Period (min)	15											
ICU Level of Service A												

Lanes, Volumes, Timings

9:

06-26-2023



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	0	0	0	0
Future Volume (vph)	0	0	0	0	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
Frnt						
Flt Protected						
Satd. Flow (prot)	0	1863	1863	0	1863	0
Flt Permitted						
Satd. Flow (perm)	0	1863	1863	0	1863	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		461.7	162.2		264.6	
Travel Time (s)		33.2	11.7		19.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	100			100	100	100
Sign Control		Stop	Stop		Stop	
Intersection Summary						
Area Type:	Other					
Control Type: Unsignalized						
Intersection Capacity Utilization 0.0%				ICU Level of Service A		
Analysis Period (min) 15						

Lanes, Volumes, Timings

1: Barker Pkwy & Davis Road/Hwy 58

06-26-2023

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	20	80	349	17	134	349
Future Volume (vph)	20	80	349	17	134	349
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0		118.0	135.0	
Storage Lanes	1	0		1	1	
Taper Length (m)	7.5				7.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.900			0.850		
Flt Protected	0.987				0.950	
Satd. Flow (prot)	1663	0	1863	1524	1787	1827
Flt Permitted	0.987				0.950	
Satd. Flow (perm)	1663	0	1863	1524	1787	1827
Link Speed (k/h)	50		50			50
Link Distance (m)	345.6		411.8			484.4
Travel Time (s)	24.9		29.6			34.9
Peak Hour Factor	0.63	0.87	0.89	0.85	0.88	0.91
Heavy Vehicles (%)	0%	2%	2%	6%	1%	4%
Adj. Flow (vph)	32	92	392	20	152	384
Shared Lane Traffic (%)						
Lane Group Flow (vph)	124	0	392	20	152	384
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.6		3.6			3.6
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type: Unsignalized						
Intersection Capacity Utilization 41.8%						
ICU Level of Service A						
Analysis Period (min) 15						

Lanes, Volumes, Timings

2: Uppers Lane & Davis Road

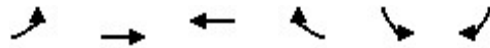
06-26-2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	35	6	107	56	9	23	101	305	56	32	262	66
Future Volume (vph)	35	6	107	56	9	23	101	305	56	32	262	66
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	170.0		0.0	140.0		117.0
Storage Lanes	0		0	0		0	1		0	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
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		0.910			0.960			0.969				0.850
Flt Protected		0.987			0.973		0.950			0.950		
Satd. Flow (prot)	0	1564	0	0	1759	0	1656	1757	0	1719	1681	1482
Flt Permitted		0.987			0.973		0.950			0.950		
Satd. Flow (perm)	0	1564	0	0	1759	0	1656	1757	0	1719	1681	1482
Link Speed (k/h)		50			50			50				50
Link Distance (m)		190.8			63.3			356.3			336.3	
Travel Time (s)		13.7			4.6			25.7			24.2	
Peak Hour Factor	0.58	0.42	0.72	0.82	0.50	0.64	0.74	0.89	0.64	0.67	0.96	0.79
Heavy Vehicles (%)	14%	0%	8%	0%	6%	0%	9%	6%	0%	5%	13%	9%
Adj. Flow (vph)	60	14	149	68	18	36	136	343	88	48	273	84
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	223	0	0	122	0	136	431	0	48	273	84
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	44.3%						ICU Level of Service A					
Analysis Period (min)	15											

Lanes, Volumes, Timings

3: Lundy's Lane & Barker Parkway

06-26-2023



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔↔	↔↔		↔	↔
Traffic Volume (vph)	46	567	599	37	40	60
Future Volume (vph)	46	567	599	37	40	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	0.95	0.95	1.00	1.00
Frt			0.987			0.850
Flt Protected		0.997			0.950	
Satd. Flow (prot)	0	3529	3522	0	1805	1583
Flt Permitted		0.997			0.950	
Satd. Flow (perm)	0	3529	3522	0	1805	1583
Link Speed (k/h)		50	50		50	
Link Distance (m)		269.5	290.5		183.4	
Travel Time (s)		19.4	20.9		13.2	
Peak Hour Factor	0.82	0.75	0.95	0.62	0.56	0.71
Heavy Vehicles (%)	2%	2%	1%	3%	0%	2%
Adj. Flow (vph)	56	756	631	60	71	85
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	812	691	0	71	85
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25			15	25	15
Sign Control		Yield	Yield		Yield	
Intersection Summary						
Area Type:	Other					
Control Type:	Roundabout					
Intersection Capacity Utilization	48.1%			ICU Level of Service A		
Analysis Period (min)	15					

Lanes, Volumes, Timings

4: Thorold Townline Road 70 & Lundy's Lane

06-26-2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	27	479	112	31	444	8	134	133	62	19	176	31
Future Volume (vph)	27	479	112	31	444	8	134	133	62	19	176	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	150.0		32.0	76.0		0.0	30.0		0.0	40.0		0.0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.994			0.938			0.977	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1736	1881	1599	1805	1871	0	1770	1741	0	1719	1821	0
Flt Permitted	0.321			0.209			0.592			0.559		
Satd. Flow (perm)	586	1881	1599	397	1871	0	1103	1741	0	1012	1821	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			91		3			45			12	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		307.3			478.1			247.2			197.8	
Travel Time (s)		22.1			34.4			17.8			14.2	
Peak Hour Factor	0.84	0.77	0.76	0.65	0.94	0.40	0.74	0.85	0.57	0.68	0.88	0.86
Heavy Vehicles (%)	4%	1%	1%	0%	1%	0%	2%	4%	0%	5%	1%	7%
Adj. Flow (vph)	32	622	147	48	472	20	181	156	109	28	200	36
Shared Lane Traffic (%)												
Lane Group Flow (vph)	32	622	147	48	492	0	181	265	0	28	236	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	

Lanes, Volumes, Timings

4: Thorold Townline Road 70 & Lundy's Lane

06-26-2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4		4	8			2			6		
Detector Phase	4	4	4	8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	20.0	20.0	20.0	20.0	20.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	33.0	33.0	33.0	32.0	32.0		35.0	35.0		35.0	35.0	
Total Split (s)	50.0	50.0	50.0	50.0	50.0		40.0	40.0		40.0	40.0	
Total Split (%)	55.6%	55.6%	55.6%	55.6%	55.6%		44.4%	44.4%		44.4%	44.4%	
Maximum Green (s)	43.0	43.0	43.0	44.0	44.0		34.0	34.0		34.0	34.0	
Yellow Time (s)	5.0	5.0	5.0	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)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	7.0	7.0	7.0	6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Recall Mode	None	None	None	None	None		Max	Max		Max	Max	
Walk Time (s)	15.0	15.0	15.0	15.0	15.0		15.0	15.0		15.0	15.0	
Flash Dont Walk (s)	7.0	7.0	7.0	7.0	7.0		14.0	14.0		14.0	14.0	
Pedestrian Calls (#/hr)	0	0	0	0	0		0	0		0	0	
Act Effect Green (s)	34.0	34.0	34.0	35.0	35.0		34.3	34.3		34.3	34.3	
Actuated g/C Ratio	0.42	0.42	0.42	0.43	0.43		0.42	0.42		0.42	0.42	
v/c Ratio	0.13	0.79	0.20	0.28	0.61		0.39	0.35		0.07	0.30	
Control Delay	15.1	28.6	6.7	19.3	21.0		21.7	16.3		17.6	17.9	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	15.1	28.6	6.7	19.3	21.0		21.7	16.3		17.6	17.9	
LOS	B	C	A	B	C		C	B		B	B	
Approach Delay		24.0			20.9			18.5			17.9	
Approach LOS		C			C			B			B	

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 81.4

Natural Cycle: 70

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.79

Intersection Signal Delay: 21.2

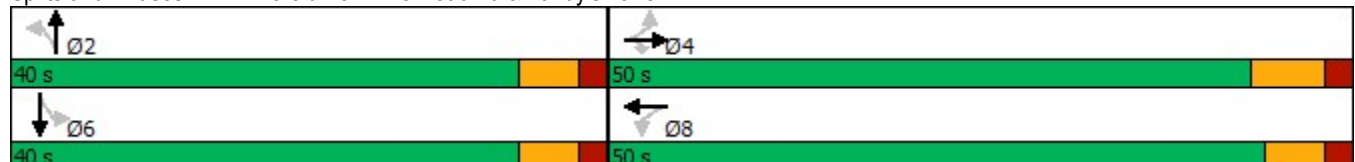
Intersection LOS: C

Intersection Capacity Utilization 60.5%

ICU Level of Service B

Analysis Period (min) 15

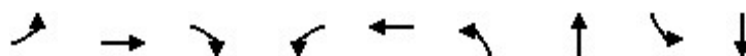
Splits and Phases: 4: Thorold Townline Road 70 & Lundy's Lane



Queues

4: Thorold Townline Road 70 & Lundy's Lane

06-26-2023



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	32	622	147	48	492	181	265	28	236
v/c Ratio	0.13	0.79	0.20	0.28	0.61	0.39	0.35	0.07	0.30
Control Delay	15.1	28.6	6.7	19.3	21.0	21.7	16.3	17.6	17.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.1	28.6	6.7	19.3	21.0	21.7	16.3	17.6	17.9
Queue Length 50th (m)	3.1	84.8	5.3	4.9	59.0	20.2	23.5	2.7	23.8
Queue Length 95th (m)	8.0	96.7	11.4	8.6	88.3	33.8	45.0	6.6	46.0
Internal Link Dist (m)	283.3				454.1		223.2		173.8
Turn Bay Length (m)	150.0			32.0	76.0			30.0	40.0
Base Capacity (vph)	312	1002	894	216	1022	464	760	426	774
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	0.62	0.16	0.22	0.48	0.39	0.35	0.07	0.30
Intersection Summary									

Lanes, Volumes, Timings

5: Thorold Townline Road

06-26-2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	0	2	0	188	0	0	252	0
Future Volume (vph)	0	0	0	0	0	2	0	188	0	0	252	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.865											
Flt Protected												
Satd. Flow (prot)	0	1863	0	0	1644	0	0	1827	0	0	1827	0
Flt Permitted												
Satd. Flow (perm)	0	1863	0	0	1644	0	0	1827	0	0	1827	0
Link Speed (k/h)	50			50			50			50		
Link Distance (m)	488.7			510.1			142.0			229.8		
Travel Time (s)	35.2			36.7			10.2			16.5		
Peak Hour Factor	0.92	0.92	0.92	0.25	0.92	0.25	0.92	0.83	0.25	0.25	0.95	0.92
Heavy Vehicles (%)	2%	2%	2%	0%	2%	0%	2%	4%	0%	0%	4%	2%
Adj. Flow (vph)	0	0	0	0	0	8	0	227	0	0	265	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	8	0	0	227	0	0	265	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)	0.0			0.0			0.0			0.0		
Link Offset(m)	0.0			0.0			0.0			0.0		
Crosswalk Width(m)	4.8			4.8			4.8			4.8		
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15		25	15		25	15		25	15	
Sign Control	Stop			Stop			Stop			Stop		
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	23.3%				ICU Level of Service A							
Analysis Period (min)	15											

Lanes, Volumes, Timings

6: Thorold Townline Road & Venture Street

06-26-2023

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	0	0	0	0
Future Volume (vph)	0	0	0	0	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)	1863	0	0	1863	1863	0
Flt Permitted						
Satd. Flow (perm)	1863	0	0	1863	1863	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	574.7			229.8	102.8	
Travel Time (s)	41.4			16.5	7.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	100	100	100			100
Sign Control	Stop			Stop	Stop	
Intersection Summary						
Area Type:	Other					
Control Type: Unsignalized						
Intersection Capacity Utilization 0.0%				ICU Level of Service A		
Analysis Period (min) 15						

Lanes, Volumes, Timings

7: Beaverdams Road & Thorold Townline Road

06-26-2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	196	47	5	178	27	39	139	4	40	187	57
Future Volume (vph)	30	196	47	5	178	27	39	139	4	40	187	57
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.974			0.975			0.993			0.967	
Flt Protected		0.994			0.998			0.990			0.993	
Satd. Flow (prot)	0	1820	0	0	1833	0	0	1814	0	0	1750	0
Flt Permitted		0.994			0.998			0.990			0.993	
Satd. Flow (perm)	0	1820	0	0	1833	0	0	1814	0	0	1750	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		197.0			309.7			169.2			132.8	
Travel Time (s)		14.2			22.3			12.2			9.6	
Peak Hour Factor	0.75	0.92	0.78	0.63	0.95	0.61	0.89	0.86	0.33	0.83	0.93	0.71
Heavy Vehicles (%)	3%	1%	0%	3%	1%	0%	0%	4%	0%	5%	5%	2%
Adj. Flow (vph)	40	213	60	8	187	44	44	162	12	48	201	80
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	313	0	0	239	0	0	218	0	0	329	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	54.1%				ICU Level of Service A							
Analysis Period (min)	15											

Lanes, Volumes, Timings

8: Barker Pkwy

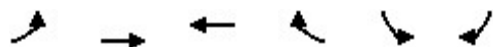
06-26-2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	9	0	1	0	7	2	33	1	12	35	19
Future Volume (vph)	15	9	0	1	0	7	2	33	1	12	35	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.877			0.998			0.939	
Flt Protected		0.961			0.995			0.997			0.993	
Satd. Flow (prot)	0	1826	0	0	1658	0	0	1891	0	0	1772	0
Flt Permitted		0.961			0.995			0.997			0.993	
Satd. Flow (perm)	0	1826	0	0	1658	0	0	1891	0	0	1772	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		143.7			157.1			135.3			345.6	
Travel Time (s)		10.3			11.3			9.7			24.9	
Peak Hour Factor	0.25	0.68	0.25	0.75	1.00	0.68	0.25	0.25	0.58	0.54	0.50	0.25
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	60	13	0	1	0	10	8	132	2	22	70	76
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	73	0	0	11	0	0	142	0	0	168	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	18.6%											
Analysis Period (min)	15											
ICU Level of Service A												

Lanes, Volumes, Timings

9:

06-26-2023



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	0	0	0	0
Future Volume (vph)	0	0	0	0	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
Frnt						
Flt Protected						
Satd. Flow (prot)	0	1863	1863	0	1863	0
Flt Permitted						
Satd. Flow (perm)	0	1863	1863	0	1863	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		461.7	162.2		264.6	
Travel Time (s)		33.2	11.7		19.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	100			100	100	100
Sign Control		Stop	Stop		Stop	
Intersection Summary						
Area Type:	Other					
Control Type: Unsignalized						
Intersection Capacity Utilization 0.0%				ICU Level of Service A		
Analysis Period (min) 15						

Lanes, Volumes, Timings

1: Barker Pkwy & Davis Road/Hwy 58

06-26-2023

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	20	132	333	16	45	255
Future Volume (vph)	20	132	333	16	45	255
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0		118.0	135.0	
Storage Lanes	1	0		1	1	
Taper Length (m)	7.5				7.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.884			0.850		
Flt Protected	0.993				0.950	
Satd. Flow (prot)	1578	0	1827	1170	1504	1776
Flt Permitted	0.993				0.950	
Satd. Flow (perm)	1578	0	1827	1170	1504	1776
Link Speed (k/h)	50		50			50
Link Distance (m)	345.6		411.8			484.4
Travel Time (s)	24.9		29.6			34.9
Peak Hour Factor	0.71	0.79	0.83	0.50	0.75	0.90
Heavy Vehicles (%)	10%	5%	4%	38%	20%	7%
Adj. Flow (vph)	28	167	401	32	60	283
Shared Lane Traffic (%)						
Lane Group Flow (vph)	195	0	401	32	60	283
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.6		3.6			3.6
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	40.1%			ICU Level of Service A		
Analysis Period (min)	15					

Lanes, Volumes, Timings

2: Uppers Lane & Davis Road

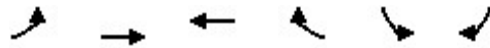
06-26-2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	49	23	86	49	21	12	58	254	42	20	176	34
Future Volume (vph)	49	23	86	49	21	12	58	254	42	20	176	34
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	170.0		0.0	140.0		117.0
Storage Lanes	0		0	0		0	1		0	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
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		0.927			0.970			0.979				0.850
Flt Protected		0.986			0.975		0.950			0.950		
Satd. Flow (prot)	0	1605	0	0	1768	0	1656	1769	0	1719	1681	1482
Flt Permitted		0.986			0.975		0.950			0.950		
Satd. Flow (perm)	0	1605	0	0	1768	0	1656	1769	0	1719	1681	1482
Link Speed (k/h)		50			50			50				50
Link Distance (m)		190.8			63.3			356.3			336.3	
Travel Time (s)		13.7			4.6			25.7			24.2	
Peak Hour Factor	0.82	0.59	0.74	0.77	0.61	0.43	0.85	0.85	0.88	0.83	0.90	0.85
Heavy Vehicles (%)	14%	0%	8%	0%	6%	0%	9%	6%	0%	5%	13%	9%
Adj. Flow (vph)	60	39	116	64	34	28	68	299	48	24	196	40
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	215	0	0	126	0	68	347	0	24	196	40
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	38.8%						ICU Level of Service A					
Analysis Period (min)	15											

Lanes, Volumes, Timings

3: Lundy's Lane & Barker Parkway

06-26-2023



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔↔	↔↔		↔	↔
Traffic Volume (vph)	49	23	21	144	38	47
Future Volume (vph)	49	23	21	144	38	47
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	0.95	0.95	1.00	1.00
Frt			0.867			0.850
Flt Protected		0.967			0.950	
Satd. Flow (prot)	0	3187	2572	0	1626	1509
Flt Permitted		0.967			0.950	
Satd. Flow (perm)	0	3187	2572	0	1626	1509
Link Speed (k/h)		50	50		50	
Link Distance (m)		269.5	290.5		183.4	
Travel Time (s)		19.4	20.9		13.2	
Peak Hour Factor	0.78	0.82	0.77	0.69	0.73	0.78
Heavy Vehicles (%)	12%	4%	4%	24%	11%	7%
Adj. Flow (vph)	63	28	27	209	52	60
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	91	236	0	52	60
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25			15	25	15
Sign Control		Yield	Yield		Yield	
Intersection Summary						
Area Type:	Other					
Control Type:	Roundabout					
Intersection Capacity Utilization 21.9%				ICU Level of Service A		
Analysis Period (min) 15						

Lanes, Volumes, Timings

4: Thorold Townline Road 70 & Lundy's Lane

06-26-2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	34	390	81	42	324	17	63	151	34	9	106	23
Future Volume (vph)	34	390	81	42	324	17	63	151	34	9	106	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	150.0		32.0	76.0		0.0	30.0		0.0	40.0		0.0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.992			0.968			0.965	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1703	1863	1468	1805	1811	0	1626	1663	0	1467	1612	0
Flt Permitted	0.406			0.297			0.639			0.600		
Satd. Flow (perm)	728	1863	1468	564	1811	0	1094	1663	0	927	1612	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			70		4			18			20	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		307.3			478.1			247.2			197.8	
Travel Time (s)		22.1			34.4			17.8			14.2	
Peak Hour Factor	0.71	0.78	0.88	0.81	0.88	0.85	0.79	0.79	0.65	0.56	0.73	0.52
Heavy Vehicles (%)	6%	2%	10%	0%	4%	6%	11%	11%	9%	23%	14%	13%
Adj. Flow (vph)	48	500	92	52	368	20	80	191	52	16	145	44
Shared Lane Traffic (%)												
Lane Group Flow (vph)	48	500	92	52	388	0	80	243	0	16	189	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	

Lanes, Volumes, Timings

4: Thorold Townline Road 70 & Lundy's Lane

06-26-2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4		4	8			2			6		
Detector Phase	4	4	4	8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	20.0	20.0	20.0	20.0	20.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	33.0	33.0	33.0	32.0	32.0		35.0	35.0		35.0	35.0	
Total Split (s)	50.0	50.0	50.0	50.0	50.0		40.0	40.0		40.0	40.0	
Total Split (%)	55.6%	55.6%	55.6%	55.6%	55.6%		44.4%	44.4%		44.4%	44.4%	
Maximum Green (s)	43.0	43.0	43.0	44.0	44.0		34.0	34.0		34.0	34.0	
Yellow Time (s)	5.0	5.0	5.0	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)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	7.0	7.0	7.0	6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Recall Mode	None	None	None	None	None		Max	Max		Max	Max	
Walk Time (s)	15.0	15.0	15.0	15.0	15.0		15.0	15.0		15.0	15.0	
Flash Dont Walk (s)	7.0	7.0	7.0	7.0	7.0		14.0	14.0		14.0	14.0	
Pedestrian Calls (#/hr)	0	0	0	0	0		0	0		0	0	
Act Effect Green (s)	28.4	28.4	28.4	29.4	29.4		34.3	34.3		34.3	34.3	
Actuated g/C Ratio	0.37	0.37	0.37	0.39	0.39		0.45	0.45		0.45	0.45	
v/c Ratio	0.18	0.72	0.16	0.24	0.55		0.16	0.32		0.04	0.26	
Control Delay	16.6	26.3	6.2	17.8	20.6		16.0	15.4		15.2	14.4	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	16.6	26.3	6.2	17.8	20.6		16.0	15.4		15.2	14.4	
LOS	B	C	A	B	C		B	B		B	B	
Approach Delay		22.6			20.3			15.6			14.5	
Approach LOS		C			C			B			B	

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 75.8

Natural Cycle: 70

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.72

Intersection Signal Delay: 19.5

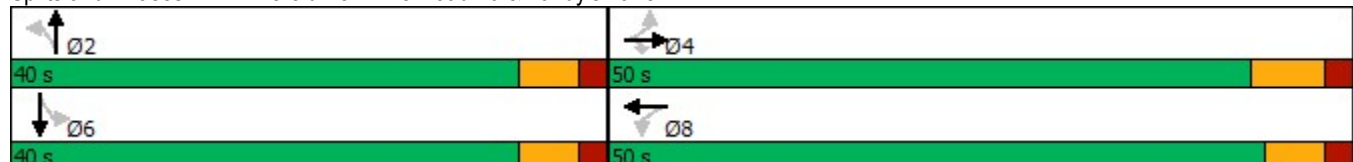
Intersection LOS: B

Intersection Capacity Utilization 68.2%

ICU Level of Service C

Analysis Period (min) 15

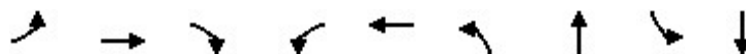
Splits and Phases: 4: Thorold Townline Road 70 & Lundy's Lane



Queues

4: Thorold Townline Road 70 & Lundy's Lane

06-26-2023



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	48	500	92	52	388	80	243	16	189
v/c Ratio	0.18	0.72	0.16	0.24	0.55	0.16	0.32	0.04	0.26
Control Delay	16.6	26.3	6.2	17.8	20.6	16.0	15.4	15.2	14.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.6	26.3	6.2	17.8	20.6	16.0	15.4	15.2	14.4
Queue Length 50th (m)	4.7	62.3	2.0	5.1	43.5	6.7	20.0	1.3	14.5
Queue Length 95th (m)	8.9	75.5	9.8	11.4	65.0	16.7	40.0	3.6	27.8
Internal Link Dist (m)	283.3				454.1	223.2		173.8	
Turn Bay Length (m)	150.0			32.0	76.0	30.0		40.0	
Base Capacity (vph)	416	1065	870	330	1062	494	762	419	740
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	0.12	0.47	0.11	0.16	0.37	0.16	0.32	0.04	0.26
Intersection Summary									

Lanes, Volumes, Timings

5: Thorold Townline Road

06-26-2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	0	1	0	188	2	3	168	0
Future Volume (vph)	0	0	0	0	0	1	0	188	2	3	168	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.865					0.998						
Flt Protected												0.999
Satd. Flow (prot)	0	1863	0	0	1644	0	0	1696	0	0	1862	0
Flt Permitted												0.999
Satd. Flow (perm)	0	1863	0	0	1644	0	0	1696	0	0	1862	0
Link Speed (k/h)	50				50				50			
Link Distance (m)	488.7				510.1				142.0			
Travel Time (s)	35.2				36.7				10.2			
Peak Hour Factor	0.92	0.92	0.92	0.25	0.25	0.25	0.92	0.85	0.50	0.75	0.83	0.25
Heavy Vehicles (%)	2%	2%	2%	0%	0%	0%	0%	12%	0%	0%	2%	0%
Adj. Flow (vph)	0	0	0	0	0	4	0	221	4	4	202	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	4	0	0	225	0	0	206	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)	0.0				0.0				0.0			
Link Offset(m)	0.0				0.0				0.0			
Crosswalk Width(m)	4.8				4.8				4.8			
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	100		100	100		100	100		100	100		100
Sign Control	Stop				Stop				Stop			
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	21.2%				ICU Level of Service A							
Analysis Period (min)	15											

Lanes, Volumes, Timings

6: Thorold Townline Road & Venture Street

06-26-2023



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	0	0	0	0
Future Volume (vph)	0	0	0	0	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
Frnt						
Flt Protected						
Satd. Flow (prot)	1863	0	0	1863	1863	0
Flt Permitted						
Satd. Flow (perm)	1863	0	0	1863	1863	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	574.7			229.8	102.8	
Travel Time (s)	41.4			16.5	7.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	100	100	100			100
Sign Control	Stop			Stop	Stop	
Intersection Summary						
Area Type:	Other					
Control Type: Unsignalized						
Intersection Capacity Utilization 0.0%				ICU Level of Service A		
Analysis Period (min) 15						

Lanes, Volumes, Timings

7: Beaverdams Road & Thorold Townline Road

06-26-2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	34	130	32	4	195	42	34	162	2	20	101	25
Future Volume (vph)	34	130	32	4	195	42	34	162	2	20	101	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.970			0.978			0.998			0.974	
Flt Protected		0.991			0.999			0.990			0.990	
Satd. Flow (prot)	0	1710	0	0	1841	0	0	1731	0	0	1667	0
Flt Permitted		0.991			0.999			0.990			0.990	
Satd. Flow (perm)	0	1710	0	0	1841	0	0	1731	0	0	1667	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		197.0			309.7			169.2			132.8	
Travel Time (s)		14.2			22.3			12.2			9.6	
Peak Hour Factor	0.77	0.93	0.62	0.50	0.74	0.81	0.71	0.84	0.50	0.45	0.81	0.63
Heavy Vehicles (%)	12%	4%	10%	0%	1%	0%	3%	10%	0%	0%	14%	8%
Adj. Flow (vph)	44	140	52	8	264	52	48	193	4	44	125	40
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	236	0	0	324	0	0	245	0	0	209	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	48.9%											
Analysis Period (min)	15											
	ICU Level of Service A											

Lanes, Volumes, Timings

8: Barker Pkwy

06-26-2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	19	4	1	1	0	8	1	33	0	7	17	13
Future Volume (vph)	19	4	1	1	0	8	1	33	0	7	17	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.994			0.881						0.932	
Flt Protected		0.957			0.994			0.999			0.997	
Satd. Flow (prot)	0	1800	0	0	1582	0	0	1898	0	0	1535	0
Flt Permitted		0.957			0.994			0.999			0.997	
Satd. Flow (perm)	0	1800	0	0	1582	0	0	1898	0	0	1535	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		143.7			157.1			135.3			345.6	
Travel Time (s)		10.3			11.3			9.7			24.9	
Peak Hour Factor	0.25	0.75	0.25	0.44	0.58	0.54	0.25	0.25	0.29	0.95	0.38	0.25
Heavy Vehicles (%)	0%	7%	0%	29%	14%	2%	0%	0%	0%	11%	33%	0%
Adj. Flow (vph)	76	5	4	2	0	15	4	132	0	7	45	52
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	85	0	0	17	0	0	136	0	0	104	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	18.1%											
Analysis Period (min)	15											
	ICU Level of Service A											

Lanes, Volumes, Timings

9:

06-26-2023

						
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	0	0	0	0
Future Volume (vph)	0	0	0	0	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
Frst						
Flt Protected						
Satd. Flow (prot)	0	1863	1863	0	1863	0
Flt Permitted						
Satd. Flow (perm)	0	1863	1863	0	1863	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		461.7	162.2		264.6	
Travel Time (s)		33.2	11.7		19.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	100			100	100	100
Sign Control		Stop	Stop		Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization 0.0%	ICU Level of Service A					
Analysis Period (min) 15						

Lanes, Volumes, Timings

1: Barker Pkwy & Davis Road/Hwy 58

06-26-2023

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	20	80	385	17	134	385
Future Volume (vph)	20	80	385	17	134	385
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0		118.0	135.0	
Storage Lanes	1	0		1	1	
Taper Length (m)	7.5				7.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.900			0.850		
Flt Protected	0.987				0.950	
Satd. Flow (prot)	1663	0	1863	1524	1787	1827
Flt Permitted	0.987				0.950	
Satd. Flow (perm)	1663	0	1863	1524	1787	1827
Link Speed (k/h)	50		50			50
Link Distance (m)	345.6		411.8			484.4
Travel Time (s)	24.9		29.6			34.9
Peak Hour Factor	0.63	0.87	0.89	0.85	0.88	0.91
Heavy Vehicles (%)	0%	2%	2%	6%	1%	4%
Adj. Flow (vph)	32	92	433	20	152	423
Shared Lane Traffic (%)						
Lane Group Flow (vph)	124	0	433	20	152	423
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.6		3.6			3.6
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	43.7%			ICU Level of Service A		
Analysis Period (min)	15					

Lanes, Volumes, Timings

2: Uppers Lane & Davis Road

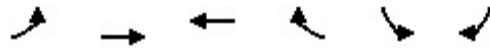
06-26-2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	35	6	107	56	10	23	101	336	56	32	290	66
Future Volume (vph)	35	6	107	56	10	23	101	336	56	32	290	66
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	170.0		0.0	140.0		117.0
Storage Lanes	0		0	0		0	1		0	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
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		0.910			0.961			0.972				0.850
Flt Protected		0.987			0.973		0.950			0.950		
Satd. Flow (prot)	0	1564	0	0	1760	0	1656	1761	0	1719	1681	1482
Flt Permitted		0.987			0.973		0.950			0.950		
Satd. Flow (perm)	0	1564	0	0	1760	0	1656	1761	0	1719	1681	1482
Link Speed (k/h)		50			50			50				50
Link Distance (m)		190.8			63.3			356.3			336.3	
Travel Time (s)		13.7			4.6			25.7			24.2	
Peak Hour Factor	0.58	0.42	0.72	0.82	0.50	0.64	0.74	0.89	0.64	0.67	0.96	0.79
Heavy Vehicles (%)	14%	0%	8%	0%	6%	0%	9%	6%	0%	5%	13%	9%
Adj. Flow (vph)	60	14	149	68	20	36	136	378	88	48	302	84
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	223	0	0	124	0	136	466	0	48	302	84
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	45.9%						ICU Level of Service A					
Analysis Period (min)	15											

Lanes, Volumes, Timings

3: Lundy's Lane & Barker Parkway

06-26-2023



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕↕	↕↕		↕	↕
Traffic Volume (vph)	46	626	661	37	40	60
Future Volume (vph)	46	626	661	37	40	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	0.95	0.95	1.00	1.00
Frt			0.988			0.850
Flt Protected		0.997			0.950	
Satd. Flow (prot)	0	3529	3526	0	1805	1583
Flt Permitted		0.997			0.950	
Satd. Flow (perm)	0	3529	3526	0	1805	1583
Link Speed (k/h)		50	50		50	
Link Distance (m)		269.5	290.5		183.4	
Travel Time (s)		19.4	20.9		13.2	
Peak Hour Factor	0.82	0.75	0.95	0.62	0.56	0.71
Heavy Vehicles (%)	2%	2%	1%	3%	0%	2%
Adj. Flow (vph)	56	835	696	60	71	85
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	891	756	0	71	85
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25			15	25	15
Sign Control		Yield	Yield		Yield	
Intersection Summary						
Area Type:	Other					
Control Type:	Roundabout					
Intersection Capacity Utilization	51.4%			ICU Level of Service A		
Analysis Period (min)	15					

Lanes, Volumes, Timings

4: Thorold Townline Road 70 & Lundy's Lane

06-26-2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	27	529	112	31	490	8	134	146	62	19	194	31
Future Volume (vph)	27	529	112	31	490	8	134	146	62	19	194	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	150.0		32.0	76.0		0.0	30.0		0.0	40.0		0.0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.994			0.942			0.979	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1736	1881	1599	1805	1871	0	1770	1747	0	1719	1826	0
Flt Permitted	0.288			0.167			0.561			0.532		
Satd. Flow (perm)	526	1881	1599	317	1871	0	1045	1747	0	963	1826	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			82		3			41			11	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		307.3			478.1			247.2			197.8	
Travel Time (s)		22.1			34.4			17.8			14.2	
Peak Hour Factor	0.84	0.77	0.76	0.65	0.94	0.40	0.74	0.85	0.57	0.68	0.88	0.86
Heavy Vehicles (%)	4%	1%	1%	0%	1%	0%	2%	4%	0%	5%	1%	7%
Adj. Flow (vph)	32	687	147	48	521	20	181	172	109	28	220	36
Shared Lane Traffic (%)												
Lane Group Flow (vph)	32	687	147	48	541	0	181	281	0	28	256	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	

Lanes, Volumes, Timings

4: Thorold Townline Road 70 & Lundy's Lane

06-26-2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4		4	8			2			6		
Detector Phase	4	4	4	8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	20.0	20.0	20.0	20.0	20.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	33.0	33.0	33.0	32.0	32.0		35.0	35.0		35.0	35.0	
Total Split (s)	50.0	50.0	50.0	50.0	50.0		40.0	40.0		40.0	40.0	
Total Split (%)	55.6%	55.6%	55.6%	55.6%	55.6%		44.4%	44.4%		44.4%	44.4%	
Maximum Green (s)	43.0	43.0	43.0	44.0	44.0		34.0	34.0		34.0	34.0	
Yellow Time (s)	5.0	5.0	5.0	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)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	7.0	7.0	7.0	6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Recall Mode	None	None	None	None	None		Max	Max		Max	Max	
Walk Time (s)	15.0	15.0	15.0	15.0	15.0		15.0	15.0		15.0	15.0	
Flash Dont Walk (s)	7.0	7.0	7.0	7.0	7.0		14.0	14.0		14.0	14.0	
Pedestrian Calls (#/hr)	0	0	0	0	0		0	0		0	0	
Act Effect Green (s)	36.7	36.7	36.7	37.7	37.7		34.2	34.2		34.2	34.2	
Actuated g/C Ratio	0.44	0.44	0.44	0.45	0.45		0.41	0.41		0.41	0.41	
v/c Ratio	0.14	0.84	0.20	0.34	0.64		0.42	0.38		0.07	0.34	
Control Delay	15.2	31.1	7.2	22.3	21.6		23.6	18.0		18.3	19.4	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	15.2	31.1	7.2	22.3	21.6		23.6	18.0		18.3	19.4	
LOS	B	C	A	C	C		C	B		B	B	
Approach Delay		26.5			21.6			20.2			19.3	
Approach LOS		C			C			C			B	

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 84

Natural Cycle: 70

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.84

Intersection Signal Delay: 22.9

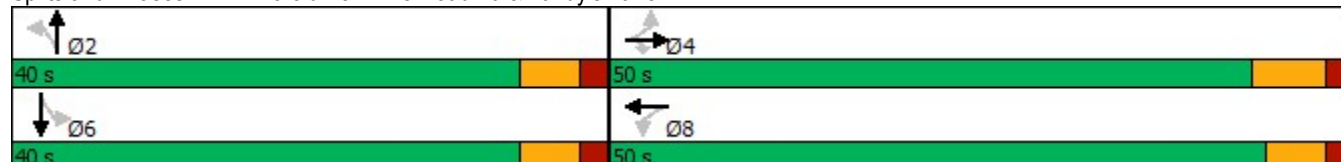
Intersection LOS: C

Intersection Capacity Utilization 64.1%

ICU Level of Service C

Analysis Period (min) 15

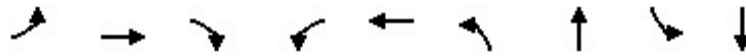
Splits and Phases: 4: Thorold Townline Road 70 & Lundy's Lane



Queues

4: Thorold Townline Road 70 & Lundy's Lane

06-26-2023



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	32	687	147	48	541	181	281	28	256
v/c Ratio	0.14	0.84	0.20	0.34	0.64	0.42	0.38	0.07	0.34
Control Delay	15.2	31.1	7.2	22.3	21.6	23.6	18.0	18.3	19.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.2	31.1	7.2	22.3	21.6	23.6	18.0	18.3	19.4
Queue Length 50th (m)	3.1	98.7	6.2	5.0	67.3	22.9	29.2	3.0	29.6
Queue Length 95th (m)	8.1	111.0	12.4	9.2	100.0	34.3	48.7	6.6	50.0
Internal Link Dist (m)		283.3			454.1		223.2		173.8
Turn Bay Length (m)	150.0		32.0	76.0		30.0		40.0	
Base Capacity (vph)	271	969	864	167	988	426	736	392	750
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	0.12	0.71	0.17	0.29	0.55	0.42	0.38	0.07	0.34
Intersection Summary									

Lanes, Volumes, Timings

5: Thorold Townline Road

06-26-2023

													
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	0	0	0	0	0	2	0	207	0	0	278	0	
Future Volume (vph)	0	0	0	0	0	2	0	207	0	0	278	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	0.865												
Flt Protected													
Satd. Flow (prot)	0	1863	0	0	1644	0	0	1827	0	0	1827	0	
Flt Permitted													
Satd. Flow (perm)	0	1863	0	0	1644	0	0	1827	0	0	1827	0	
Link Speed (k/h)	50												
Link Distance (m)	488.7				510.1				142.0				229.8
Travel Time (s)	35.2				36.7				10.2				16.5
Peak Hour Factor	0.92	0.92	0.92	0.25	0.92	0.25	0.92	0.83	0.25	0.25	0.95	0.92	
Heavy Vehicles (%)	2%	2%	2%	0%	2%	0%	2%	4%	0%	0%	4%	2%	
Adj. Flow (vph)	0	0	0	0	0	8	0	249	0	0	293	0	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	0	0	0	8	0	0	249	0	0	293	0	
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No	
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right	
Median Width(m)	0.0												
Link Offset(m)	0.0												
Crosswalk Width(m)	4.8				4.8				4.8				4.8
Two way Left Turn Lane													
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Turning Speed (k/h)	25		15	25		15	25		15	25		15	
Sign Control	Stop												
Intersection Summary													
Area Type:	Other												
Control Type:	Unsignalized												
Intersection Capacity Utilization	24.6%				ICU Level of Service A								
Analysis Period (min)	15												

Lanes, Volumes, Timings

6: Thorold Townline Road & Venture Street

06-26-2023



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	0	0	0	0
Future Volume (vph)	0	0	0	0	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)	1863	0	0	1863	1863	0
Flt Permitted						
Satd. Flow (perm)	1863	0	0	1863	1863	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	574.7			229.8	102.8	
Travel Time (s)	41.4			16.5	7.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	100	100	100			100
Sign Control	Stop			Stop	Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	0.0%			ICU Level of Service A		
Analysis Period (min)	15					

Lanes, Volumes, Timings

7: Beaverdams Road & Thorold Townline Road

06-26-2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	217	47	5	196	27	39	153	4	40	206	57
Future Volume (vph)	30	217	47	5	196	27	39	153	4	40	206	57
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.976			0.977			0.993			0.969	
Flt Protected		0.994			0.998			0.991			0.993	
Satd. Flow (prot)	0	1824	0	0	1836	0	0	1815	0	0	1753	0
Flt Permitted		0.994			0.998			0.991			0.993	
Satd. Flow (perm)	0	1824	0	0	1836	0	0	1815	0	0	1753	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		197.0			309.7			169.2			132.8	
Travel Time (s)		14.2			22.3			12.2			9.6	
Peak Hour Factor	0.75	0.92	0.78	0.63	0.95	0.61	0.89	0.86	0.33	0.83	0.93	0.71
Heavy Vehicles (%)	3%	1%	0%	3%	1%	0%	0%	4%	0%	5%	5%	2%
Adj. Flow (vph)	40	236	60	8	206	44	44	178	12	48	222	80
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	336	0	0	258	0	0	234	0	0	350	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	56.9%						ICU Level of Service B					
Analysis Period (min)	15											

Lanes, Volumes, Timings

8: Barker Pkwy

06-26-2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	10	0	1	0	7	2	36	1	12	39	19
Future Volume (vph)	15	10	0	1	0	7	2	36	1	12	39	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.877			0.998			0.942	
Flt Protected		0.962			0.995			0.997			0.994	
Satd. Flow (prot)	0	1828	0	0	1658	0	0	1891	0	0	1779	0
Flt Permitted		0.962			0.995			0.997			0.994	
Satd. Flow (perm)	0	1828	0	0	1658	0	0	1891	0	0	1779	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		143.7			157.1			135.3			345.6	
Travel Time (s)		10.3			11.3			9.7			24.9	
Peak Hour Factor	0.25	0.68	0.25	0.75	1.00	0.68	0.25	0.25	0.58	0.54	0.50	0.25
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	60	15	0	1	0	10	8	144	2	22	78	76
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	75	0	0	11	0	0	154	0	0	176	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	19.0%											
Analysis Period (min)	15											
ICU Level of Service A												

Lanes, Volumes, Timings

9:

06-26-2023



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	0	0	0	0
Future Volume (vph)	0	0	0	0	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)	0	1863	1863	0	1863	0
Flt Permitted						
Satd. Flow (perm)	0	1863	1863	0	1863	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		461.7	162.2		264.6	
Travel Time (s)		33.2	11.7		19.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	100			100	100	100
Sign Control		Stop	Stop		Stop	
Intersection Summary						
Area Type:	Other					
Control Type: Unsignalized						
Intersection Capacity Utilization 0.0%				ICU Level of Service A		
Analysis Period (min) 15						

Lanes, Volumes, Timings

1: Barker Pkwy & Davis Road/Hwy 58

06-26-2023

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	20	132	367	16	45	282
Future Volume (vph)	20	132	367	16	45	282
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0		118.0	135.0	
Storage Lanes	1	0		1	1	
Taper Length (m)	7.5				7.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.884			0.850		
Flt Protected	0.993				0.950	
Satd. Flow (prot)	1578	0	1827	1170	1504	1776
Flt Permitted	0.993				0.950	
Satd. Flow (perm)	1578	0	1827	1170	1504	1776
Link Speed (k/h)	50		50			50
Link Distance (m)	345.6		411.8			484.4
Travel Time (s)	24.9		29.6			34.9
Peak Hour Factor	0.71	0.79	0.83	0.50	0.75	0.90
Heavy Vehicles (%)	10%	5%	4%	38%	20%	7%
Adj. Flow (vph)	28	167	442	32	60	313
Shared Lane Traffic (%)						
Lane Group Flow (vph)	195	0	442	32	60	313
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.6		3.6			3.6
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	41.9%			ICU Level of Service A		
Analysis Period (min)	15					

Lanes, Volumes, Timings

2: Uppers Lane & Davis Road

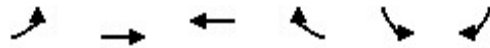
06-26-2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	49	26	86	49	23	12	58	280	42	20	194	34
Future Volume (vph)	49	26	86	49	23	12	58	280	42	20	194	34
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	170.0		0.0	140.0		117.0
Storage Lanes	0		0	0		0	1		0	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.929			0.971			0.981				0.850
Flt Protected		0.987			0.976		0.950			0.950		
Satd. Flow (prot)	0	1613	0	0	1770	0	1656	1771	0	1719	1681	1482
Flt Permitted		0.987			0.976		0.950			0.950		
Satd. Flow (perm)	0	1613	0	0	1770	0	1656	1771	0	1719	1681	1482
Link Speed (k/h)		50			50			50				50
Link Distance (m)		190.8			63.3			356.3			336.3	
Travel Time (s)		13.7			4.6			25.7			24.2	
Peak Hour Factor	0.82	0.59	0.74	0.77	0.61	0.43	0.85	0.85	0.88	0.83	0.90	0.85
Heavy Vehicles (%)	14%	0%	8%	0%	6%	0%	9%	6%	0%	5%	13%	9%
Adj. Flow (vph)	60	44	116	64	38	28	68	329	48	24	216	40
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	220	0	0	130	0	68	377	0	24	216	40
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization 40.4%												
ICU Level of Service A												
Analysis Period (min) 15												

Lanes, Volumes, Timings

3: Lundy's Lane & Barker Parkway

06-26-2023



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔↔	↔↔		↔	↔
Traffic Volume (vph)	49	26	23	144	38	47
Future Volume (vph)	49	26	23	144	38	47
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	0.95	0.95	1.00	1.00
Frt			0.869			0.850
Flt Protected		0.968			0.950	
Satd. Flow (prot)	0	3197	2582	0	1626	1509
Flt Permitted		0.968			0.950	
Satd. Flow (perm)	0	3197	2582	0	1626	1509
Link Speed (k/h)		50	50		50	
Link Distance (m)		269.5	290.5		183.4	
Travel Time (s)		19.4	20.9		13.2	
Peak Hour Factor	0.78	0.82	0.77	0.69	0.73	0.78
Heavy Vehicles (%)	12%	4%	4%	24%	11%	7%
Adj. Flow (vph)	63	32	30	209	52	60
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	95	239	0	52	60
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25			15	25	15
Sign Control		Yield	Yield		Yield	
Intersection Summary						
Area Type: Other						
Control Type: Roundabout						
Intersection Capacity Utilization 22.0% ICU Level of Service A						
Analysis Period (min) 15						

Lanes, Volumes, Timings

4: Thorold Townline Road 70 & Lundy's Lane

06-26-2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	34	431	81	42	358	17	63	167	34	9	117	23
Future Volume (vph)	34	431	81	42	358	17	63	167	34	9	117	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	150.0		32.0	76.0		0.0	30.0		0.0	40.0		0.0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.993			0.970			0.968	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1703	1863	1468	1805	1813	0	1626	1666	0	1467	1616	0
Flt Permitted	0.371			0.253			0.630			0.572		
Satd. Flow (perm)	665	1863	1468	481	1813	0	1078	1666	0	884	1616	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			64		4			16			18	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		307.3			478.1			247.2			197.8	
Travel Time (s)		22.1			34.4			17.8			14.2	
Peak Hour Factor	0.71	0.78	0.88	0.81	0.88	0.85	0.79	0.79	0.65	0.56	0.73	0.52
Heavy Vehicles (%)	6%	2%	10%	0%	4%	6%	11%	11%	9%	23%	14%	13%
Adj. Flow (vph)	48	553	92	52	407	20	80	211	52	16	160	44
Shared Lane Traffic (%)												
Lane Group Flow (vph)	48	553	92	52	427	0	80	263	0	16	204	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	

Lanes, Volumes, Timings

4: Thorold Townline Road 70 & Lundy's Lane

06-26-2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4		4	8			2			6		
Detector Phase	4	4	4	8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	20.0	20.0	20.0	20.0	20.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	33.0	33.0	33.0	32.0	32.0		35.0	35.0		35.0	35.0	
Total Split (s)	50.0	50.0	50.0	50.0	50.0		40.0	40.0		40.0	40.0	
Total Split (%)	55.6%	55.6%	55.6%	55.6%	55.6%		44.4%	44.4%		44.4%	44.4%	
Maximum Green (s)	43.0	43.0	43.0	44.0	44.0		34.0	34.0		34.0	34.0	
Yellow Time (s)	5.0	5.0	5.0	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)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	7.0	7.0	7.0	6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Recall Mode	None	None	None	None	None		Max	Max		Max	Max	
Walk Time (s)	15.0	15.0	15.0	15.0	15.0		15.0	15.0		15.0	15.0	
Flash Dont Walk (s)	7.0	7.0	7.0	7.0	7.0		14.0	14.0		14.0	14.0	
Pedestrian Calls (#/hr)	0	0	0	0	0		0	0		0	0	
Act Effect Green (s)	30.4	30.4	30.4	31.4	31.4		34.4	34.4		34.4	34.4	
Actuated g/C Ratio	0.39	0.39	0.39	0.40	0.40		0.44	0.44		0.44	0.44	
v/c Ratio	0.19	0.76	0.15	0.27	0.58		0.17	0.35		0.04	0.28	
Control Delay	16.5	27.7	6.5	18.6	20.9		17.2	17.1		16.3	15.9	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	16.5	27.7	6.5	18.6	20.9		17.2	17.1		16.3	15.9	
LOS	B	C	A	B	C		B	B		B	B	
Approach Delay		24.1			20.7			17.1			15.9	
Approach LOS		C			C			B			B	

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 77.9

Natural Cycle: 70

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.76

Intersection Signal Delay: 20.7

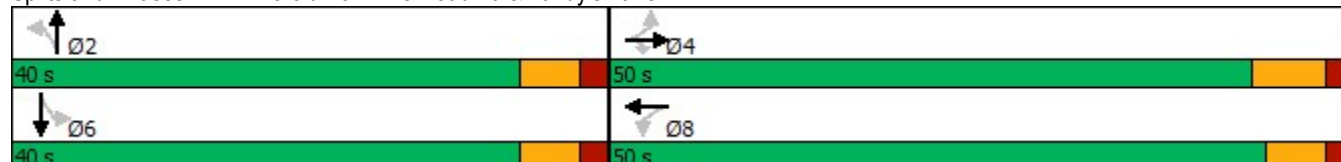
Intersection LOS: C

Intersection Capacity Utilization 69.1%

ICU Level of Service C

Analysis Period (min) 15

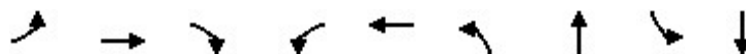
Splits and Phases: 4: Thorold Townline Road 70 & Lundy's Lane



Queues

4: Thorold Townline Road 70 & Lundy's Lane

06-26-2023



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	48	553	92	52	427	80	263	16	204
v/c Ratio	0.19	0.76	0.15	0.27	0.58	0.17	0.35	0.04	0.28
Control Delay	16.5	27.7	6.5	18.6	20.9	17.2	17.1	16.3	15.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.5	27.7	6.5	18.6	20.9	17.2	17.1	16.3	15.9
Queue Length 50th (m)	4.7	71.7	2.6	5.2	49.2	7.2	24.1	1.4	17.5
Queue Length 95th (m)	8.9	85.1	10.3	11.7	72.4	17.4	45.2	3.7	31.5
Internal Link Dist (m)	283.3				454.1		223.2		173.8
Turn Bay Length (m)	150.0			32.0	76.0			30.0	40.0
Base Capacity (vph)	370	1039	847	274	1036	475	743	389	722
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	0.53	0.11	0.19	0.41	0.17	0.35	0.04	0.28
Intersection Summary									

Lanes, Volumes, Timings

5: Thorold Townline Road

06-26-2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	0	1	0	208	2	3	185	0
Future Volume (vph)	0	0	0	0	0	1	0	208	2	3	185	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.865					0.998						
Flt Protected											0.999	
Satd. Flow (prot)	0	1863	0	0	1644	0	0	1696	0	0	1862	0
Flt Permitted											0.999	
Satd. Flow (perm)	0	1863	0	0	1644	0	0	1696	0	0	1862	0
Link Speed (k/h)	50				50				50			
Link Distance (m)	488.7				510.1				142.0			
Travel Time (s)	35.2				36.7				10.2			
Peak Hour Factor	0.92	0.92	0.92	0.25	0.25	0.25	0.92	0.85	0.50	0.75	0.83	0.25
Heavy Vehicles (%)	2%	2%	2%	0%	0%	0%	0%	12%	0%	0%	2%	0%
Adj. Flow (vph)	0	0	0	0	0	4	0	245	4	4	223	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	4	0	0	249	0	0	227	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)	0.0				0.0				0.0			
Link Offset(m)	0.0				0.0				0.0			
Crosswalk Width(m)	4.8				4.8				4.8			
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	100		100	100		100	100		100	100		100
Sign Control	Stop				Stop				Stop			
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	22.1%											
Analysis Period (min)	15											
ICU Level of Service A												

Lanes, Volumes, Timings

6: Thorold Townline Road & Venture Street

06-26-2023



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	0	0	0	0
Future Volume (vph)	0	0	0	0	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
Fr't						
Flt Protected						
Satd. Flow (prot)	1863	0	0	1863	1863	0
Flt Permitted						
Satd. Flow (perm)	1863	0	0	1863	1863	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	574.7			229.8	102.8	
Travel Time (s)	41.4			16.5	7.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	100	100	100			100
Sign Control	Stop			Stop	Stop	
Intersection Summary						
Area Type:	Other					
Control Type: Unsignalized						
Intersection Capacity Utilization 0.0%				ICU Level of Service A		
Analysis Period (min) 15						

Lanes, Volumes, Timings

7: Beaverdams Road & Thorold Townline Road

06-26-2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	34	143	32	4	216	42	34	179	2	20	111	25
Future Volume (vph)	34	143	32	4	216	42	34	179	2	20	111	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.972			0.980			0.998			0.976	
Flt Protected		0.991			0.999			0.991			0.990	
Satd. Flow (prot)	0	1716	0	0	1845	0	0	1731	0	0	1667	0
Flt Permitted		0.991			0.999			0.991			0.990	
Satd. Flow (perm)	0	1716	0	0	1845	0	0	1731	0	0	1667	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		197.0			309.7			169.2			132.8	
Travel Time (s)		14.2			22.3			12.2			9.6	
Peak Hour Factor	0.77	0.93	0.62	0.50	0.74	0.81	0.71	0.84	0.50	0.45	0.81	0.63
Heavy Vehicles (%)	12%	4%	10%	0%	1%	0%	3%	10%	0%	0%	14%	8%
Adj. Flow (vph)	44	154	52	8	292	52	48	213	4	44	137	40
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	250	0	0	352	0	0	265	0	0	221	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	51.8%											
Analysis Period (min)	15											
ICU Level of Service A												

Lanes, Volumes, Timings

8: Barker Pkwy

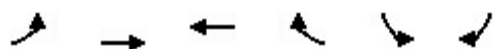
06-26-2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	19	4	1	1	0	8	1	36	0	7	19	13
Future Volume (vph)	19	4	1	1	0	8	1	36	0	7	19	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.994			0.881						0.936	
Flt Protected		0.957			0.994			0.999			0.997	
Satd. Flow (prot)	0	1800	0	0	1582	0	0	1898	0	0	1531	0
Flt Permitted		0.957			0.994			0.999			0.997	
Satd. Flow (perm)	0	1800	0	0	1582	0	0	1898	0	0	1531	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		143.7			157.1			135.3			345.6	
Travel Time (s)		10.3			11.3			9.7			24.9	
Peak Hour Factor	0.25	0.75	0.25	0.44	0.58	0.54	0.25	0.25	0.29	0.95	0.38	0.25
Heavy Vehicles (%)	0%	7%	0%	29%	14%	2%	0%	0%	0%	11%	33%	0%
Adj. Flow (vph)	76	5	4	2	0	15	4	144	0	7	50	52
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	85	0	0	17	0	0	148	0	0	109	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	18.3%											
Analysis Period (min)	15											
	ICU Level of Service A											

Lanes, Volumes, Timings

9:

06-26-2023



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	0	0	0	0
Future Volume (vph)	0	0	0	0	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)	0	1863	1863	0	1863	0
Flt Permitted						
Satd. Flow (perm)	0	1863	1863	0	1863	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		461.7	162.2		264.6	
Travel Time (s)		33.2	11.7		19.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	100			100	100	100
Sign Control		Stop	Stop		Stop	
Intersection Summary						
Area Type:	Other					
Control Type: Unsignalized						
Intersection Capacity Utilization 0.0%				ICU Level of Service A		
Analysis Period (min) 15						

Lanes, Volumes, Timings

1: Barker Pkwy & Davis Road/Hwy 58

06-26-2023

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	20	80	425	17	134	425
Future Volume (vph)	20	80	425	17	134	425
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0		118.0	135.0	
Storage Lanes	1	0		1	1	
Taper Length (m)	7.5				7.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.900			0.850		
Flt Protected	0.987				0.950	
Satd. Flow (prot)	1663	0	1863	1524	1787	1827
Flt Permitted	0.987				0.950	
Satd. Flow (perm)	1663	0	1863	1524	1787	1827
Link Speed (k/h)	50		50			50
Link Distance (m)	345.6		411.8			484.4
Travel Time (s)	24.9		29.6			34.9
Peak Hour Factor	0.63	0.87	0.89	0.85	0.88	0.91
Heavy Vehicles (%)	0%	2%	2%	6%	1%	4%
Adj. Flow (vph)	32	92	478	20	152	467
Shared Lane Traffic (%)						
Lane Group Flow (vph)	124	0	478	20	152	467
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.6		3.6			3.6
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	45.8%			ICU Level of Service A		
Analysis Period (min)	15					

Lanes, Volumes, Timings

2: Uppers Lane & Davis Road

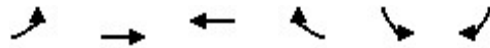
06-26-2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	35	7	107	56	11	23	101	371	56	32	320	66
Future Volume (vph)	35	7	107	56	11	23	101	371	56	32	320	66
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	170.0		0.0	140.0		117.0
Storage Lanes	0		0	0		0	1		0	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
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		0.911			0.961			0.974				0.850
Flt Protected		0.987			0.974		0.950			0.950		
Satd. Flow (prot)	0	1567	0	0	1760	0	1656	1763	0	1719	1681	1482
Flt Permitted		0.987			0.974		0.950			0.950		
Satd. Flow (perm)	0	1567	0	0	1760	0	1656	1763	0	1719	1681	1482
Link Speed (k/h)		50			50			50				50
Link Distance (m)		190.8			63.3			356.3			336.3	
Travel Time (s)		13.7			4.6			25.7			24.2	
Peak Hour Factor	0.58	0.42	0.72	0.82	0.50	0.64	0.74	0.89	0.64	0.67	0.96	0.79
Heavy Vehicles (%)	14%	0%	8%	0%	6%	0%	9%	6%	0%	5%	13%	9%
Adj. Flow (vph)	60	17	149	68	22	36	136	417	88	48	333	84
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	226	0	0	126	0	136	505	0	48	333	84
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization 47.8%				ICU Level of Service A								
Analysis Period (min) 15												

Lanes, Volumes, Timings

3: Lundy's Lane & Barker Parkway

06-26-2023



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔↔	↔↔		↔	↔
Traffic Volume (vph)	46	691	730	37	40	60
Future Volume (vph)	46	691	730	37	40	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	0.95	0.95	1.00	1.00
Frt			0.989			0.850
Flt Protected		0.997			0.950	
Satd. Flow (prot)	0	3529	3530	0	1805	1583
Flt Permitted		0.997			0.950	
Satd. Flow (perm)	0	3529	3530	0	1805	1583
Link Speed (k/h)		50	50		50	
Link Distance (m)		269.5	290.5		183.4	
Travel Time (s)		19.4	20.9		13.2	
Peak Hour Factor	0.82	0.75	0.95	0.62	0.56	0.71
Heavy Vehicles (%)	2%	2%	1%	3%	0%	2%
Adj. Flow (vph)	56	921	768	60	71	85
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	977	828	0	71	85
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25			15	25	15
Sign Control		Yield	Yield		Yield	
Intersection Summary						
Area Type:	Other					
Control Type:	Roundabout					
Intersection Capacity Utilization	55.1%			ICU Level of Service B		
Analysis Period (min)	15					

Lanes, Volumes, Timings

4: Thorold Townline Road 70 & Lundy's Lane

06-26-2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	27	584	112	31	541	8	134	161	62	19	214	31
Future Volume (vph)	27	584	112	31	541	8	134	161	62	19	214	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	150.0		32.0	76.0		0.0	30.0		0.0	40.0		0.0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.995			0.945			0.981	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1736	1881	1599	1805	1872	0	1770	1751	0	1719	1831	0
Flt Permitted	0.252			0.123			0.526			0.504		
Satd. Flow (perm)	460	1881	1599	234	1872	0	980	1751	0	912	1831	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			74		3			37			10	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		307.3			478.1			247.2			197.8	
Travel Time (s)		22.1			34.4			17.8			14.2	
Peak Hour Factor	0.84	0.77	0.76	0.65	0.94	0.40	0.74	0.85	0.57	0.68	0.88	0.86
Heavy Vehicles (%)	4%	1%	1%	0%	1%	0%	2%	4%	0%	5%	1%	7%
Adj. Flow (vph)	32	758	147	48	576	20	181	189	109	28	243	36
Shared Lane Traffic (%)												
Lane Group Flow (vph)	32	758	147	48	596	0	181	298	0	28	279	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	

Lanes, Volumes, Timings

4: Thorold Townline Road 70 & Lundy's Lane

06-26-2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4		4	8			2			6		
Detector Phase	4	4	4	8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	20.0	20.0	20.0	20.0	20.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	33.0	33.0	33.0	32.0	32.0		35.0	35.0		35.0	35.0	
Total Split (s)	50.0	50.0	50.0	50.0	50.0		40.0	40.0		40.0	40.0	
Total Split (%)	55.6%	55.6%	55.6%	55.6%	55.6%		44.4%	44.4%		44.4%	44.4%	
Maximum Green (s)	43.0	43.0	43.0	44.0	44.0		34.0	34.0		34.0	34.0	
Yellow Time (s)	5.0	5.0	5.0	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)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	7.0	7.0	7.0	6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Recall Mode	None	None	None	None	None		Max	Max		Max	Max	
Walk Time (s)	15.0	15.0	15.0	15.0	15.0		15.0	15.0		15.0	15.0	
Flash Dont Walk (s)	7.0	7.0	7.0	7.0	7.0		14.0	14.0		14.0	14.0	
Pedestrian Calls (#/hr)	0	0	0	0	0		0	0		0	0	
Act Effect Green (s)	39.3	39.3	39.3	40.3	40.3		34.1	34.1		34.1	34.1	
Actuated g/C Ratio	0.45	0.45	0.45	0.47	0.47		0.39	0.39		0.39	0.39	
v/c Ratio	0.15	0.89	0.19	0.44	0.68		0.47	0.42		0.08	0.38	
Control Delay	15.6	35.4	7.8	30.4	22.5		25.7	19.6		18.8	20.9	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	15.6	35.4	7.8	30.4	22.5		25.7	19.6		18.8	20.9	
LOS	B	D	A	C	C		C	B		B	C	
Approach Delay		30.4			23.1			21.9			20.7	
Approach LOS		C			C			C			C	

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 86.5

Natural Cycle: 75

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.89

Intersection Signal Delay: 25.4

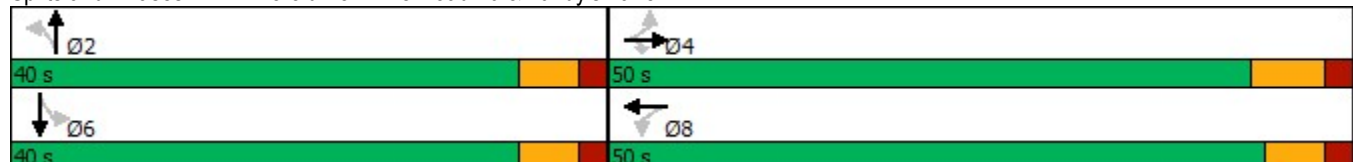
Intersection LOS: C

Intersection Capacity Utilization 68.0%

ICU Level of Service C

Analysis Period (min) 15

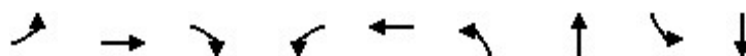
Splits and Phases: 4: Thorold Townline Road 70 & Lundy's Lane



Queues

4: Thorold Townline Road 70 & Lundy's Lane

06-26-2023



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	32	758	147	48	596	181	298	28	279
v/c Ratio	0.15	0.89	0.19	0.44	0.68	0.47	0.42	0.08	0.38
Control Delay	15.6	35.4	7.8	30.4	22.5	25.7	19.6	18.8	20.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.6	35.4	7.8	30.4	22.5	25.7	19.6	18.8	20.9
Queue Length 50th (m)	3.1	115.8	7.0	5.4	77.2	24.7	34.4	3.2	35.1
Queue Length 95th (m)	8.3	127.8	13.2	10.4	114.5	35.0	52.7	6.6	55.1
Internal Link Dist (m)		283.3			454.1		223.2		173.8
Turn Bay Length (m)	150.0		32.0	76.0		30.0		40.0	
Base Capacity (vph)	229	938	834	119	956	386	713	359	728
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	0.14	0.81	0.18	0.40	0.62	0.47	0.42	0.08	0.38
Intersection Summary									

Lanes, Volumes, Timings

5: Thorold Townline Road

06-26-2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	0	2	0	229	0	0	307	0
Future Volume (vph)	0	0	0	0	0	2	0	229	0	0	307	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.865											
Flt Protected												
Satd. Flow (prot)	0	1863	0	0	1644	0	0	1827	0	0	1827	0
Flt Permitted												
Satd. Flow (perm)	0	1863	0	0	1644	0	0	1827	0	0	1827	0
Link Speed (k/h)	50			50			50			50		
Link Distance (m)	488.7			510.1			142.0			229.8		
Travel Time (s)	35.2			36.7			10.2			16.5		
Peak Hour Factor	0.92	0.92	0.92	0.25	0.92	0.25	0.92	0.83	0.25	0.25	0.95	0.92
Heavy Vehicles (%)	2%	2%	2%	0%	2%	0%	2%	4%	0%	0%	4%	2%
Adj. Flow (vph)	0	0	0	0	0	8	0	276	0	0	323	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	8	0	0	276	0	0	323	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)	0.0			0.0			0.0			0.0		
Link Offset(m)	0.0			0.0			0.0			0.0		
Crosswalk Width(m)	4.8			4.8			4.8			4.8		
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15		25	15		25	15		25	15	
Sign Control	Stop			Stop			Stop			Stop		
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	26.2%				ICU Level of Service A							
Analysis Period (min)	15											

Lanes, Volumes, Timings

6: Thorold Townline Road & Venture Street

06-26-2023



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	0	0	0	0
Future Volume (vph)	0	0	0	0	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
Fr't						
Flt Protected						
Satd. Flow (prot)	1863	0	0	1863	1863	0
Flt Permitted						
Satd. Flow (perm)	1863	0	0	1863	1863	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	574.7			229.8	102.8	
Travel Time (s)	41.4			16.5	7.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	100	100	100			100
Sign Control	Stop			Stop	Stop	
Intersection Summary						
Area Type:	Other					
Control Type: Unsignalized						
Intersection Capacity Utilization 0.0%				ICU Level of Service A		
Analysis Period (min) 15						

Lanes, Volumes, Timings

7: Beaverdams Road & Thorold Townline Road

06-26-2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	239	47	5	217	27	39	169	4	40	227	57
Future Volume (vph)	30	239	47	5	217	27	39	169	4	40	227	57
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.977			0.979			0.994			0.971	
Flt Protected		0.994			0.999			0.991			0.994	
Satd. Flow (prot)	0	1826	0	0	1842	0	0	1815	0	0	1757	0
Flt Permitted		0.994			0.999			0.991			0.994	
Satd. Flow (perm)	0	1826	0	0	1842	0	0	1815	0	0	1757	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		197.0			309.7			169.2			132.8	
Travel Time (s)		14.2			22.3			12.2			9.6	
Peak Hour Factor	0.75	0.92	0.78	0.63	0.95	0.61	0.89	0.86	0.33	0.83	0.93	0.71
Heavy Vehicles (%)	3%	1%	0%	3%	1%	0%	0%	4%	0%	5%	5%	2%
Adj. Flow (vph)	40	260	60	8	228	44	44	197	12	48	244	80
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	360	0	0	280	0	0	253	0	0	372	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	59.9%				ICU Level of Service B							
Analysis Period (min)	15											

Lanes, Volumes, Timings

8: Barker Pkwy

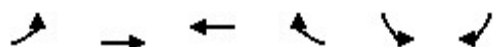
06-26-2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	11	0	1	0	7	2	40	1	12	43	19
Future Volume (vph)	15	11	0	1	0	7	2	40	1	12	43	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.877			0.998			0.944	
Flt Protected		0.962			0.995			0.998			0.994	
Satd. Flow (prot)	0	1828	0	0	1658	0	0	1892	0	0	1783	0
Flt Permitted		0.962			0.995			0.998			0.994	
Satd. Flow (perm)	0	1828	0	0	1658	0	0	1892	0	0	1783	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		143.7			157.1			135.3			345.6	
Travel Time (s)		10.3			11.3			9.7			24.9	
Peak Hour Factor	0.25	0.68	0.25	0.75	1.00	0.68	0.25	0.25	0.58	0.54	0.50	0.25
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	60	16	0	1	0	10	8	160	2	22	86	76
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	76	0	0	11	0	0	170	0	0	184	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	19.5%											
Analysis Period (min)	15											
	ICU Level of Service A											

Lanes, Volumes, Timings

9:

06-26-2023



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	0	0	0	0
Future Volume (vph)	0	0	0	0	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
Frnt						
Flt Protected						
Satd. Flow (prot)	0	1863	1863	0	1863	0
Flt Permitted						
Satd. Flow (perm)	0	1863	1863	0	1863	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		461.7	162.2		264.6	
Travel Time (s)		33.2	11.7		19.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	100			100	100	100
Sign Control		Stop	Stop		Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	0.0%			ICU Level of Service A		
Analysis Period (min)	15					

Lanes, Volumes, Timings
1: Davis Road & Barker Parkway

2026 Future Total AM
01-30-2024

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	24	154	301	25	54	235
Future Volume (vph)	24	154	301	25	54	235
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0		118.0	135.0	
Storage Lanes	1	0		1	1	
Taper Length (m)	7.5				7.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.885			0.850		
Flt Protected	0.993				0.950	
Satd. Flow (prot)	1579	0	1827	1170	1504	1776
Flt Permitted	0.993				0.950	
Satd. Flow (perm)	1579	0	1827	1170	1504	1776
Link Speed (k/h)	50		50			50
Link Distance (m)	345.6		411.8			484.4
Travel Time (s)	24.9		29.6			34.9
Peak Hour Factor	0.71	0.79	0.83	0.50	0.75	0.90
Heavy Vehicles (%)	10%	5%	4%	38%	20%	7%
Adj. Flow (vph)	34	195	363	50	72	261
Shared Lane Traffic (%)						
Lane Group Flow (vph)	229	0	363	50	72	261
Sign Control	Stop		Free			Free

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 40.0% ICU Level of Service A

Analysis Period (min) 15

HCM Unsignalized Intersection Capacity Analysis

1: Davis Road & Barker Parkway

2026 Future Total AM
01-30-2024

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	24	154	301	25	54	235
Future Volume (Veh/h)	24	154	301	25	54	235
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.71	0.79	0.83	0.50	0.75	0.90
Hourly flow rate (vph)	34	195	363	50	72	261
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None		None	
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	768	363			413	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	768	363			413	
tC, single (s)	6.5	6.2			4.3	
tC, 2 stage (s)						
tF (s)	3.6	3.3			2.4	
p0 queue free %	90	71			93	
cM capacity (veh/h)	334	675			1055	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	229	363	50	72	261	
Volume Left	34	0	0	72	0	
Volume Right	195	0	50	0	0	
cSH	586	1700	1700	1055	1700	
Volume to Capacity	0.39	0.21	0.03	0.07	0.15	
Queue Length 95th (m)	14.8	0.0	0.0	1.8	0.0	
Control Delay (s)	15.0	0.0	0.0	8.7	0.0	
Lane LOS	C			A		
Approach Delay (s)	15.0	0.0		1.9		
Approach LOS	C					
Intersection Summary						
Average Delay			4.2			
Intersection Capacity Utilization			40.0%	ICU Level of Service		A
Analysis Period (min)			15			

Lanes, Volumes, Timings
2: Davis Road & Upper's Lane

2026 Future Total AM
01-30-2024

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	49	28	86	58	33	12	58	239	48	24	164	34
Future Volume (vph)	49	28	86	58	33	12	58	239	48	24	164	34
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	170.0		0.0	140.0		117.0
Storage Lanes	0		0	0		0	1		0	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
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		0.930			0.976			0.975				0.850
Flt Protected		0.987			0.977		0.950			0.950		
Satd. Flow (prot)	0	1616	0	0	1775	0	1656	1764	0	1719	1681	1482
Flt Permitted		0.987			0.977		0.950			0.950		
Satd. Flow (perm)	0	1616	0	0	1775	0	1656	1764	0	1719	1681	1482
Link Speed (k/h)		50			50			50				50
Link Distance (m)		190.8			63.3			356.3			336.3	
Travel Time (s)		13.7			4.6			25.7			24.2	
Peak Hour Factor	0.82	0.59	0.74	0.77	0.61	0.43	0.85	0.85	0.88	0.83	0.90	0.85
Heavy Vehicles (%)	14%	0%	8%	0%	6%	0%	9%	6%	0%	5%	13%	9%
Adj. Flow (vph)	60	47	116	75	54	28	68	281	55	29	182	40
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	223	0	0	157	0	68	336	0	29	182	40
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 39.1% ICU Level of Service A

Analysis Period (min) 15

HCM Unsignalized Intersection Capacity Analysis

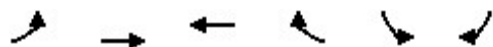
2: Davis Road & Upper's Lane

2026 Future Total AM
01-30-2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	49	28	86	58	33	12	58	239	48	24	164	34
Future Volume (Veh/h)	49	28	86	58	33	12	58	239	48	24	164	34
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.82	0.59	0.74	0.77	0.61	0.43	0.85	0.85	0.88	0.83	0.90	0.85
Hourly flow rate (vph)	60	47	116	75	54	28	68	281	55	29	182	40
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None						None					
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	712	712	182	708	724	308	222	336				
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	712	712	182	708	724	308	222	336				
tC, single (s)	7.2	6.5	6.3	7.1	6.6	6.2	4.2	4.1				
tC, 2 stage (s)												
tF (s)	3.6	4.0	3.4	3.5	4.1	3.3	2.3	2.2				
p0 queue free %	77	86	86	71	83	96	95	98				
cM capacity (veh/h)	263	333	845	256	321	736	1307	1207				
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3					
Volume Total	223	157	68	336	29	182	40					
Volume Left	60	75	68	0	29	0	0					
Volume Right	116	28	0	55	0	0	40					
cSH	440	314	1307	1700	1207	1700	1700					
Volume to Capacity	0.51	0.50	0.05	0.20	0.02	0.11	0.02					
Queue Length 95th (m)	22.3	21.1	1.3	0.0	0.6	0.0	0.0					
Control Delay (s)	21.3	27.4	7.9	0.0	8.1	0.0	0.0					
Lane LOS	C	D	A	A								
Approach Delay (s)	21.3	27.4	1.3	0.9								
Approach LOS	C	D										
Intersection Summary												
Average Delay	9.5											
Intersection Capacity Utilization	39.1%			ICU Level of Service					A			
Analysis Period (min)	15											

Lanes, Volumes, Timings
3: Lundy's Lane & Barker Parkway

2026 Future Total AM
01-30-2024



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕↕	↕↕		↕	↕
Traffic Volume (vph)	49	30	19	149	61	47
Future Volume (vph)	49	30	19	149	61	47
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	0.95	0.95	1.00	1.00
Frt			0.866			0.850
Flt Protected		0.969			0.950	
Satd. Flow (prot)	0	3208	2564	0	1626	1509
Flt Permitted		0.969			0.950	
Satd. Flow (perm)	0	3208	2564	0	1626	1509
Link Speed (k/h)		50	50		50	
Link Distance (m)		269.5	290.5		183.4	
Travel Time (s)		19.4	20.9		13.2	
Peak Hour Factor	0.78	0.82	0.77	0.69	0.73	0.78
Heavy Vehicles (%)	12%	4%	4%	24%	11%	7%
Adj. Flow (vph)	63	37	25	216	84	60
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	100	241	0	84	60
Sign Control		Yield	Yield		Yield	

Intersection Summary

Area Type: Other

Control Type: Roundabout

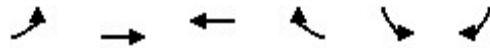
Intersection Capacity Utilization 22.1% ICU Level of Service A

Analysis Period (min) 15

HCM Unsignalized Intersection Capacity Analysis

3: Lundy's Lane & Barker Parkway

2026 Future Total AM
01-30-2024



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Right Turn Channelized						
Traffic Volume (veh/h)	49	30	19	149	61	47
Future Volume (veh/h)	49	30	19	149	61	47
Peak Hour Factor	0.78	0.82	0.77	0.69	0.73	0.78
Hourly flow rate (vph)	63	37	25	216	84	60
Approach Volume (veh/h)		100	241		144	
Crossing Volume (veh/h)		84	63		25	
High Capacity (veh/h)		1297	1318		1358	
High v/c (veh/h)		0.08	0.18		0.11	
Low Capacity (veh/h)		1081	1101		1137	
Low v/c (veh/h)		0.09	0.22		0.13	
Intersection Summary						
Maximum v/c High			0.18			
Maximum v/c Low			0.22			
Intersection Capacity Utilization			22.1%		ICU Level of Service	A

Lanes, Volumes, Timings
4: Thorold Townline Road & Lundy's Lane

2026 Future Total AM
01-30-2024

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	34	385	81	42	297	29	66	146	34	102	96	23
Future Volume (vph)	34	385	81	42	297	29	66	146	34	102	96	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	150.0		32.0	76.0		0.0	30.0		0.0	40.0		0.0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.986			0.967			0.962	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1703	1863	1468	1805	1798	0	1626	1662	0	1467	1607	0
Flt Permitted	0.424			0.303			0.646			0.607		
Satd. Flow (perm)	760	1863	1468	576	1798	0	1106	1662	0	938	1607	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			71		8			18			21	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		307.3			478.1			247.2			197.8	
Travel Time (s)		22.1			34.4			17.8			14.2	
Peak Hour Factor	0.71	0.78	0.88	0.81	0.88	0.85	0.79	0.79	0.65	0.56	0.73	0.52
Heavy Vehicles (%)	6%	2%	10%	0%	4%	6%	11%	11%	9%	23%	14%	13%
Adj. Flow (vph)	48	494	92	52	338	34	84	185	52	182	132	44
Shared Lane Traffic (%)												
Lane Group Flow (vph)	48	494	92	52	372	0	84	237	0	182	176	0
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Detector Phase	4	4	4	8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	20.0	20.0	20.0	20.0	20.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	33.0	33.0	33.0	32.0	32.0		35.0	35.0		35.0	35.0	
Total Split (s)	50.0	50.0	50.0	50.0	50.0		40.0	40.0		40.0	40.0	
Total Split (%)	55.6%	55.6%	55.6%	55.6%	55.6%		44.4%	44.4%		44.4%	44.4%	
Yellow Time (s)	5.0	5.0	5.0	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)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	7.0	7.0	7.0	6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None		Max	Max		Max	Max	
Act Effct Green (s)	28.2	28.2	28.2	29.2	29.2		34.3	34.3		34.3	34.3	
Actuated g/C Ratio	0.37	0.37	0.37	0.39	0.39		0.45	0.45		0.45	0.45	
v/c Ratio	0.17	0.71	0.16	0.23	0.53		0.17	0.31		0.43	0.24	
Control Delay	16.5	26.1	6.1	17.8	20.1		15.8	15.2		20.2	13.9	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	16.5	26.1	6.1	17.8	20.1		15.8	15.2		20.2	13.9	
LOS	B	C	A	B	C		B	B		C	B	
Approach Delay		22.5			19.8			15.3			17.1	
Approach LOS		C			B			B			B	
Queue Length 50th (m)	4.7	61.3	2.0	5.1	40.7		6.9	19.2		17.3	13.1	

Lanes, Volumes, Timings
4: Thorold Townline Road & Lundy's Lane

2026 Future Total AM
01-30-2024

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (m)	8.8	74.7	9.7	11.3	61.7		17.4	38.4		23.7	25.6	
Internal Link Dist (m)		283.3			454.1			223.2			173.8	
Turn Bay Length (m)	150.0		32.0	76.0			30.0			40.0		
Base Capacity (vph)	436	1069	872	338	1059		501	764		425	740	
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	0.11	0.46	0.11	0.15	0.35		0.17	0.31		0.43	0.24	

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 75.6

Natural Cycle: 70

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.71

Intersection Signal Delay: 19.4

Intersection LOS: B

Intersection Capacity Utilization 68.0%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 4: Thorold Townline Road & Lundy's Lane

 Ø2	 Ø4
40 s	50 s
 Ø6	 Ø8
40 s	50 s

Lanes, Volumes, Timings
5: Thorold Townline Road & Upper's Lane

2026 Future Total AM
01-30-2024

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	0	14	0	0	1	6	184	2	3	245	4
Future Volume (vph)	5	0	14	0	0	1	6	184	2	3	245	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.899			0.865			0.998			0.993	
Flt Protected		0.988						0.998			0.999	
Satd. Flow (prot)	0	1655	0	0	1644	0	0	1698	0	0	1850	0
Flt Permitted		0.988						0.998			0.999	
Satd. Flow (perm)	0	1655	0	0	1644	0	0	1698	0	0	1850	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		488.7			510.1			142.0			229.8	
Travel Time (s)		35.2			36.7			10.2			16.5	
Peak Hour Factor	0.92	0.92	0.92	0.25	0.25	0.25	0.92	0.85	0.50	0.75	0.83	0.25
Heavy Vehicles (%)	2%	2%	2%	0%	0%	0%	0%	12%	0%	0%	2%	0%
Adj. Flow (vph)	5	0	15	0	0	4	7	216	4	4	295	16
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	20	0	0	4	0	0	227	0	0	315	0
Sign Control		Stop			Stop			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	26.8%						ICU Level of Service A					
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis 5: Thorold Townline Road & Upper's Lane

2026 Future Total AM
01-30-2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control	Stop			Stop			Stop			Stop		
Traffic Volume (vph)	5	0	14	0	0	1	6	184	2	3	245	4
Future Volume (vph)	5	0	14	0	0	1	6	184	2	3	245	4
Peak Hour Factor	0.92	0.92	0.92	0.25	0.25	0.25	0.92	0.85	0.50	0.75	0.83	0.25
Hourly flow rate (vph)	5	0	15	0	0	4	7	216	4	4	295	16
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	20	4	227	315								
Volume Left (vph)	5	0	7	4								
Volume Right (vph)	15	4	4	16								
Hadj (s)	-0.37	-0.60	0.19	0.00								
Departure Headway (s)	4.7	4.5	4.5	4.2								
Degree Utilization, x	0.03	0.01	0.28	0.37								
Capacity (veh/h)	676	699	789	837								
Control Delay (s)	7.8	7.5	9.2	9.6								
Approach Delay (s)	7.8	7.5	9.2	9.6								
Approach LOS	A	A	A	A								
Intersection Summary												
Delay				9.4								
Level of Service				A								
Intersection Capacity Utilization				26.8%	ICU Level of Service	A						
Analysis Period (min)				15								

Lanes, Volumes, Timings
6: Thorold Townline Road & Venture Way

2026 Future Total AM
01-30-2024

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	33	90	19	0	4	13
Future Volume (vph)	33	90	19	0	4	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.901	0.895				
Flt Protected	0.987	0.950				
Satd. Flow (prot)	1657	0	0	1770	1667	0
Flt Permitted	0.987	0.950				
Satd. Flow (perm)	1657	0	0	1770	1667	0
Link Speed (k/h)	50	50				
Link Distance (m)	574.7	229.8				
Travel Time (s)	41.4	7.4				
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	36	98	21	0	4	14
Shared Lane Traffic (%)						
Lane Group Flow (vph)	134	0	0	21	18	0
Sign Control	Stop	Stop				
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	21.8%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis 6: Thorold Townline Road & Venture Way

2026 Future Total AM
01-30-2024

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Traffic Volume (vph)	33	90	19	0	4	13
Future Volume (vph)	33	90	19	0	4	13
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	36	98	21	0	4	14
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total (vph)	134	21	18			
Volume Left (vph)	36	21	0			
Volume Right (vph)	98	0	14			
Hadj (s)	-0.35	0.23	-0.43			
Departure Headway (s)	3.6	4.4	3.8			
Degree Utilization, x	0.14	0.03	0.02			
Capacity (veh/h)	975	782	921			
Control Delay (s)	7.2	7.5	6.8			
Approach Delay (s)	7.2	7.5	6.8			
Approach LOS	A	A	A			
Intersection Summary						
Delay			7.2			
Level of Service			A			
Intersection Capacity Utilization			21.8%	ICU Level of Service	A	
Analysis Period (min)			15			

Lanes, Volumes, Timings
7: Beaverdams Road & Thorold Townline Road

2026 Future Total AM
01-30-2024

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	34	117	32	14	177	42	34	147	35	20	97	25
Future Volume (vph)	34	117	32	14	177	42	34	147	35	20	97	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.968			0.978			0.968			0.974	
Flt Protected		0.990			0.996			0.992			0.989	
Satd. Flow (prot)	0	1702	0	0	1837	0	0	1714	0	0	1667	0
Flt Permitted		0.990			0.996			0.992			0.989	
Satd. Flow (perm)	0	1702	0	0	1837	0	0	1714	0	0	1667	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		197.0			309.7			169.2			132.8	
Travel Time (s)		14.2			22.3			12.2			9.6	
Peak Hour Factor	0.77	0.93	0.62	0.50	0.74	0.81	0.71	0.84	0.50	0.45	0.81	0.63
Heavy Vehicles (%)	12%	4%	10%	0%	1%	0%	3%	10%	0%	0%	14%	8%
Adj. Flow (vph)	44	126	52	28	239	52	48	175	70	44	120	40
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	222	0	0	319	0	0	293	0	0	204	0
Sign Control		Stop			Stop			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	42.9%						ICU Level of Service A					
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis 7: Beaverdams Road & Thorold Townline Road

2026 Future Total AM
01-30-2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	34	117	32	14	177	42	34	147	35	20	97	25
Future Volume (vph)	34	117	32	14	177	42	34	147	35	20	97	25
Peak Hour Factor	0.77	0.93	0.62	0.50	0.74	0.81	0.71	0.84	0.50	0.45	0.81	0.63
Hourly flow rate (vph)	44	126	52	28	239	52	48	175	70	44	120	40
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	222	319	293	204								
Volume Left (vph)	44	28	48	44								
Volume Right (vph)	52	52	70	40								
Hadj (s)	0.02	-0.07	0.00	0.09								
Departure Headway (s)	6.1	5.9	6.0	6.3								
Degree Utilization, x	0.38	0.52	0.49	0.36								
Capacity (veh/h)	528	570	550	503								
Control Delay (s)	12.8	15.0	14.6	12.7								
Approach Delay (s)	12.8	15.0	14.6	12.7								
Approach LOS	B	C	B	B								
Intersection Summary												
Delay				14.0								
Level of Service				B								
Intersection Capacity Utilization				42.9%	ICU Level of Service	A						
Analysis Period (min)				15								

Lanes, Volumes, Timings
8: Barker Parkway & Venture Way

2026 Future Total AM
01-30-2024

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	19	4	1	1	0	8	1	55	0	24	16	13
Future Volume (vph)	19	4	1	1	0	8	1	55	0	24	16	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.994			0.881						0.941	
Flt Protected		0.957			0.994			0.999			0.990	
Satd. Flow (prot)	0	1800	0	0	1582	0	0	1898	0	0	1553	0
Flt Permitted		0.957			0.994			0.999			0.990	
Satd. Flow (perm)	0	1800	0	0	1582	0	0	1898	0	0	1553	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		143.7			157.1			135.3			345.6	
Travel Time (s)		10.3			11.3			9.7			24.9	
Peak Hour Factor	0.25	0.75	0.25	0.44	0.58	0.54	0.25	0.25	0.29	0.95	0.38	0.25
Heavy Vehicles (%)	0%	7%	0%	29%	14%	2%	0%	0%	0%	11%	33%	0%
Adj. Flow (vph)	76	5	4	2	0	15	4	220	0	25	42	52
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	85	0	0	17	0	0	224	0	0	119	0
Sign Control		Stop			Stop			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	22.4%						ICU Level of Service A					
Analysis Period (min)	15											

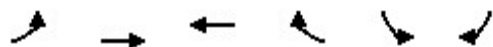
HCM Unsignalized Intersection Capacity Analysis 8: Barker Parkway & Venture Way

2026 Future Total AM
01-30-2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control	Stop			Stop			Stop			Stop		
Traffic Volume (vph)	19	4	1	1	0	8	1	55	0	24	16	13
Future Volume (vph)	19	4	1	1	0	8	1	55	0	24	16	13
Peak Hour Factor	0.25	0.75	0.25	0.44	0.58	0.54	0.25	0.25	0.29	0.95	0.38	0.25
Hourly flow rate (vph)	76	5	4	2	0	15	4	220	0	25	42	52
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	85	17	224	119								
Volume Left (vph)	76	2	4	25								
Volume Right (vph)	4	15	0	52								
Hadj (s)	0.16	-0.42	0.00	0.02								
Departure Headway (s)	4.9	4.4	4.3	4.4								
Degree Utilization, x	0.11	0.02	0.27	0.15								
Capacity (veh/h)	686	746	813	779								
Control Delay (s)	8.5	7.5	8.8	8.2								
Approach Delay (s)	8.5	7.5	8.8	8.2								
Approach LOS	A	A	A	A								
Intersection Summary												
Delay				8.5								
Level of Service				A								
Intersection Capacity Utilization				22.4%	ICU Level of Service	A						
Analysis Period (min)				15								

Lanes, Volumes, Timings
9: Upper's Lane & Street C

2026 Future Total AM
01-30-2024



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	22	0	0	10	19	45
Future Volume (vph)	22	0	0	10	19	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.865		0.905	
Flt Protected		0.950			0.985	
Satd. Flow (prot)	0	1770	1611	0	1660	0
Flt Permitted		0.950			0.985	
Satd. Flow (perm)	0	1770	1611	0	1660	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		461.7	162.2		264.6	
Travel Time (s)		33.2	11.7		19.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	24	0	0	11	21	49
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	24	11	0	70	0
Sign Control		Stop	Stop		Stop	

Intersection Summary

Area Type: Other

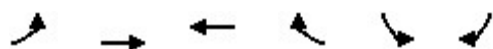
Control Type: Unsignalized

Intersection Capacity Utilization 18.4% ICU Level of Service A

Analysis Period (min) 15

HCM Unsignalized Intersection Capacity Analysis 9: Upper's Lane & Street C

2026 Future Total AM
01-30-2024



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Stop	Stop		Stop	
Traffic Volume (vph)	22	0	0	10	19	45
Future Volume (vph)	22	0	0	10	19	45
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	24	0	0	11	21	49
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total (vph)	24	11	70			
Volume Left (vph)	24	0	21			
Volume Right (vph)	0	11	49			
Hadj (s)	0.23	-0.57	-0.33			
Departure Headway (s)	4.3	3.5	3.6			
Degree Utilization, x	0.03	0.01	0.07			
Capacity (veh/h)	822	1003	965			
Control Delay (s)	7.4	6.5	6.9			
Approach Delay (s)	7.4	6.5	6.9			
Approach LOS	A	A	A			
Intersection Summary						
Delay			7.0			
Level of Service			A			
Intersection Capacity Utilization			18.4%	ICU Level of Service	A	
Analysis Period (min)			15			

Lanes, Volumes, Timings
1: Davis Road & Barker Parkway

2026 Future Total PM
01-30-2024

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	23	94	349	46	162	361
Future Volume (vph)	23	94	349	46	162	361
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0		118.0	135.0	
Storage Lanes	1	0		1	1	
Taper Length (m)	7.5				7.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.899			0.850		
Flt Protected	0.987				0.950	
Satd. Flow (prot)	1661	0	1863	1524	1787	1827
Flt Permitted	0.987				0.950	
Satd. Flow (perm)	1661	0	1863	1524	1787	1827
Link Speed (k/h)	50		50			50
Link Distance (m)	345.6		411.8			484.4
Travel Time (s)	24.9		29.6			34.9
Peak Hour Factor	0.63	0.87	0.89	0.85	0.88	0.91
Heavy Vehicles (%)	0%	2%	2%	6%	1%	4%
Adj. Flow (vph)	37	108	392	54	184	397
Shared Lane Traffic (%)						
Lane Group Flow (vph)	145	0	392	54	184	397
Sign Control	Stop		Free			Free

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization 44.4%	ICU Level of Service A
Analysis Period (min) 15	

HCM Unsignalized Intersection Capacity Analysis

1: Davis Road & Barker Parkway

2026 Future Total PM
01-30-2024

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	23	94	349	46	162	361
Future Volume (Veh/h)	23	94	349	46	162	361
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.63	0.87	0.89	0.85	0.88	0.91
Hourly flow rate (vph)	37	108	392	54	184	397
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1157	392			446	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1157	392			446	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	80	84			84	
cM capacity (veh/h)	183	657			1120	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	145	392	54	184	397	
Volume Left	37	0	0	184	0	
Volume Right	108	0	54	0	0	
cSH	396	1700	1700	1120	1700	
Volume to Capacity	0.37	0.23	0.03	0.16	0.23	
Queue Length 95th (m)	13.2	0.0	0.0	4.7	0.0	
Control Delay (s)	19.3	0.0	0.0	8.8	0.0	
Lane LOS	C			A		
Approach Delay (s)	19.3	0.0		2.8		
Approach LOS	C					
Intersection Summary						
Average Delay			3.8			
Intersection Capacity Utilization		44.4%		ICU Level of Service		A
Analysis Period (min)			15			

Lanes, Volumes, Timings
2: Davis Road & Upper's Lane

2026 Future Total PM
01-30-2024

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	35	30	107	62	18	23	101	334	76	44	265	66
Future Volume (vph)	35	30	107	62	18	23	101	334	76	44	265	66
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	170.0		0.0	140.0		117.0
Storage Lanes	0		0	0		0	1		0	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
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		0.928			0.967			0.964				0.850
Flt Protected		0.989			0.975		0.950			0.950		
Satd. Flow (prot)	0	1626	0	0	1766	0	1656	1752	0	1719	1681	1482
Flt Permitted		0.989			0.975		0.950			0.950		
Satd. Flow (perm)	0	1626	0	0	1766	0	1656	1752	0	1719	1681	1482
Link Speed (k/h)		50			50			50				50
Link Distance (m)		190.8			63.3			356.3			336.3	
Travel Time (s)		13.7			4.6			25.7			24.2	
Peak Hour Factor	0.58	0.42	0.72	0.82	0.50	0.64	0.74	0.89	0.64	0.67	0.96	0.79
Heavy Vehicles (%)	14%	0%	8%	0%	6%	0%	9%	6%	0%	5%	13%	9%
Adj. Flow (vph)	60	71	149	76	36	36	136	375	119	66	276	84
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	280	0	0	148	0	136	494	0	66	276	84
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 49.7% ICU Level of Service A

Analysis Period (min) 15

HCM Unsignalized Intersection Capacity Analysis

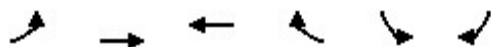
2: Davis Road & Upper's Lane

2026 Future Total PM
01-30-2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	35	30	107	62	18	23	101	334	76	44	265	66
Future Volume (Veh/h)	35	30	107	62	18	23	101	334	76	44	265	66
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.58	0.42	0.72	0.82	0.50	0.64	0.74	0.89	0.64	0.67	0.96	0.79
Hourly flow rate (vph)	60	71	149	76	36	36	136	375	119	66	276	84
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None								None			
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1109	1174	276	1150	1198	434	360	494				
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1109	1174	276	1150	1198	434	360	494				
tC, single (s)	7.2	6.5	6.3	7.1	6.6	6.2	4.2	4.1				
tC, 2 stage (s)												
tF (s)	3.6	4.0	3.4	3.5	4.1	3.3	2.3	2.2				
p0 queue free %	50	56	80	6	76	94	88	94				
cM capacity (veh/h)	119	160	749	81	151	626	1161	1054				
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3					
Volume Total	280	148	136	494	66	276	84					
Volume Left	60	76	136	0	66	0	0					
Volume Right	149	36	0	119	0	0	84					
cSH	244	120	1161	1700	1054	1700	1700					
Volume to Capacity	1.15	1.23	0.12	0.29	0.06	0.16	0.05					
Queue Length 95th (m)	101.9	75.1	3.2	0.0	1.6	0.0	0.0					
Control Delay (s)	146.1	226.2	8.5	0.0	8.6	0.0	0.0					
Lane LOS	F	F	A	A								
Approach Delay (s)	146.1	226.2	1.8	1.3								
Approach LOS	F	F										
Intersection Summary												
Average Delay			51.3									
Intersection Capacity Utilization			49.7%	ICU Level of Service					A			
Analysis Period (min)			15									

Lanes, Volumes, Timings
3: Lundy's Lane & Barker Parkway

2026 Future Total PM
01-30-2024



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕↕	↕↕		↕	↕
Traffic Volume (vph)	46	573	599	54	55	60
Future Volume (vph)	46	573	599	54	55	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	0.95	0.95	1.00	1.00
Frt			0.982			0.850
Flt Protected		0.997			0.950	
Satd. Flow (prot)	0	3529	3502	0	1805	1583
Flt Permitted		0.997			0.950	
Satd. Flow (perm)	0	3529	3502	0	1805	1583
Link Speed (k/h)		50	50		50	
Link Distance (m)		269.5	290.5		183.4	
Travel Time (s)		19.4	20.9		13.2	
Peak Hour Factor	0.82	0.75	0.95	0.62	0.56	0.71
Heavy Vehicles (%)	2%	2%	1%	3%	0%	2%
Adj. Flow (vph)	56	764	631	87	98	85
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	820	718	0	98	85
Sign Control		Yield	Yield		Yield	

Intersection Summary

Area Type: Other

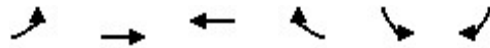
Control Type: Roundabout

Intersection Capacity Utilization 48.8% ICU Level of Service A

Analysis Period (min) 15

HCM Unsignalized Intersection Capacity Analysis 3: Lundy's Lane & Barker Parkway

2026 Future Total PM
01-30-2024



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Right Turn Channelized						
Traffic Volume (veh/h)	46	573	599	54	55	60
Future Volume (veh/h)	46	573	599	54	55	60
Peak Hour Factor	0.82	0.75	0.95	0.62	0.56	0.71
Hourly flow rate (vph)	56	764	631	87	98	85
Approach Volume (veh/h)		820	718		183	
Crossing Volume (veh/h)		98	56		631	
High Capacity (veh/h)		1283	1326		840	
High v/c (veh/h)		0.64	0.54		0.22	
Low Capacity (veh/h)		1068	1107		672	
Low v/c (veh/h)		0.77	0.65		0.27	
Intersection Summary						
Maximum v/c High			0.64			
Maximum v/c Low			0.77			
Intersection Capacity Utilization			48.8%		ICU Level of Service	A

Lanes, Volumes, Timings
4: Thorold Townline Road & Lundy's Lane

2026 Future Total PM
01-30-2024

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	27	500	112	31	455	49	141	161	62	87	176	31
Future Volume (vph)	27	500	112	31	455	49	141	161	62	87	176	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	150.0		32.0	76.0		0.0	30.0		0.0	40.0		0.0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.970			0.945			0.977	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1736	1881	1599	1805	1828	0	1770	1751	0	1719	1821	0
Flt Permitted	0.218			0.191			0.589			0.518		
Satd. Flow (perm)	398	1881	1599	363	1828	0	1097	1751	0	937	1821	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			87		20			37			12	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		307.3			478.1			247.2			197.8	
Travel Time (s)		22.1			34.4			17.8			14.2	
Peak Hour Factor	0.84	0.77	0.76	0.65	0.94	0.40	0.74	0.85	0.57	0.68	0.88	0.86
Heavy Vehicles (%)	4%	1%	1%	0%	1%	0%	2%	4%	0%	5%	1%	7%
Adj. Flow (vph)	32	649	147	48	484	123	191	189	109	128	200	36
Shared Lane Traffic (%)												
Lane Group Flow (vph)	32	649	147	48	607	0	191	298	0	128	236	0
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Detector Phase	4	4	4	8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	20.0	20.0	20.0	20.0	20.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	33.0	33.0	33.0	32.0	32.0		35.0	35.0		35.0	35.0	
Total Split (s)	50.0	50.0	50.0	50.0	50.0		40.0	40.0		40.0	40.0	
Total Split (%)	55.6%	55.6%	55.6%	55.6%	55.6%		44.4%	44.4%		44.4%	44.4%	
Yellow Time (s)	5.0	5.0	5.0	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)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	7.0	7.0	7.0	6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None		Max	Max		Max	Max	
Act Effct Green (s)	35.2	35.2	35.2	36.2	36.2		34.3	34.3		34.3	34.3	
Actuated g/C Ratio	0.43	0.43	0.43	0.44	0.44		0.42	0.42		0.42	0.42	
v/c Ratio	0.19	0.81	0.20	0.30	0.75		0.42	0.40		0.33	0.31	
Control Delay	17.1	29.5	6.9	20.2	24.9		22.8	18.2		21.7	18.4	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	17.1	29.5	6.9	20.2	24.9		22.8	18.2		21.7	18.4	
LOS	B	C	A	C	C		C	B		C	B	
Approach Delay		25.0			24.5			20.0			19.6	
Approach LOS		C			C			B			B	
Queue Length 50th (m)	3.2	90.4	5.7	4.9	77.7		22.9	30.5		14.7	25.3	

Lanes, Volumes, Timings
4: Thorold Townline Road & Lundy's Lane

2026 Future Total PM
01-30-2024

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (m)	8.6	102.6	11.8	8.9	116.7		35.6	52.7		22.6	46.0	
Internal Link Dist (m)		283.3			454.1			223.2			173.8	
Turn Bay Length (m)	150.0		32.0	76.0			30.0			40.0		
Base Capacity (vph)	209	988	881	195	991		455	748		389	763	
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	0.15	0.66	0.17	0.25	0.61		0.42	0.40		0.33	0.31	

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 82.6

Natural Cycle: 70

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.81

Intersection Signal Delay: 23.0

Intersection LOS: C

Intersection Capacity Utilization 62.7%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 4: Thorold Townline Road & Lundy's Lane

 Ø2	 Ø4
40 s	50 s
 Ø6	 Ø8
40 s	50 s

Lanes, Volumes, Timings
5: Thorold Townline Road & Upper's Lane

2026 Future Total PM
01-30-2024

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	0	9	0	0	2	21	236	0	0	320	11
Future Volume (vph)	3	0	9	0	0	2	21	236	0	0	320	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.896			0.865						0.995	
Flt Protected		0.989						0.996				
Satd. Flow (prot)	0	1651	0	0	1644	0	0	1822	0	0	1819	0
Flt Permitted		0.989						0.996				
Satd. Flow (perm)	0	1651	0	0	1644	0	0	1822	0	0	1819	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		488.7			510.1			142.0			229.8	
Travel Time (s)		35.2			36.7			10.2			16.5	
Peak Hour Factor	0.92	0.92	0.92	0.25	0.92	0.25	0.92	0.83	0.25	0.25	0.95	0.92
Heavy Vehicles (%)	2%	2%	2%	0%	2%	0%	2%	4%	0%	0%	4%	2%
Adj. Flow (vph)	3	0	10	0	0	8	23	284	0	0	337	12
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	13	0	0	8	0	0	307	0	0	349	0
Sign Control		Stop			Stop			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	40.0%				ICU Level of Service A							
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis 5: Thorold Townline Road & Upper's Lane

2026 Future Total PM
01-30-2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control	Stop			Stop			Stop			Stop		
Traffic Volume (vph)	3	0	9	0	0	2	21	236	0	0	320	11
Future Volume (vph)	3	0	9	0	0	2	21	236	0	0	320	11
Peak Hour Factor	0.92	0.92	0.92	0.25	0.92	0.25	0.92	0.83	0.25	0.25	0.95	0.92
Hourly flow rate (vph)	3	0	10	0	0	8	23	284	0	0	337	12
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	13	8	307	349								
Volume Left (vph)	3	0	23	0								
Volume Right (vph)	10	8	0	12								
Hadj (s)	-0.38	-0.60	0.08	0.05								
Departure Headway (s)	5.0	4.7	4.4	4.3								
Degree Utilization, x	0.02	0.01	0.37	0.42								
Capacity (veh/h)	634	656	804	816								
Control Delay (s)	8.0	7.8	10.0	10.4								
Approach Delay (s)	8.0	7.8	10.0	10.4								
Approach LOS	A	A	A	B								
Intersection Summary												
Delay				10.1								
Level of Service				B								
Intersection Capacity Utilization				40.0%	ICU Level of Service	A						
Analysis Period (min)				15								

Lanes, Volumes, Timings
6: Thorold Townline Road & Venture Way

2026 Future Total PM
01-30-2024

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	21	58	51	0	11	42
Future Volume (vph)	21	58	51	0	11	42
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	0.901				0.893	
Flt Protected	0.987				0.950	
Satd. Flow (prot)	1657	0	0	1770	1663	0
Flt Permitted	0.987				0.950	
Satd. Flow (perm)	1657	0	0	1770	1663	0
Link Speed (k/h)	50				50	50
Link Distance (m)	574.7				229.8	102.8
Travel Time (s)	41.4				16.5	7.4
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	23	63	55	0	12	46
Shared Lane Traffic (%)						
Lane Group Flow (vph)	86	0	0	55	58	0
Sign Control	Stop				Stop	Stop
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	20.9%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis 6: Thorold Townline Road & Venture Way

2026 Future Total PM
01-30-2024

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Traffic Volume (vph)	21	58	51	0	11	42
Future Volume (vph)	21	58	51	0	11	42
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	23	63	55	0	12	46
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total (vph)	86	55	58			
Volume Left (vph)	23	55	0			
Volume Right (vph)	63	0	46			
Hadj (s)	-0.35	0.23	-0.44			
Departure Headway (s)	3.8	4.4	3.7			
Degree Utilization, x	0.09	0.07	0.06			
Capacity (veh/h)	920	798	947			
Control Delay (s)	7.2	7.7	6.9			
Approach Delay (s)	7.2	7.7	6.9			
Approach LOS	A	A	A			
Intersection Summary						
Delay			7.2			
Level of Service			A			
Intersection Capacity Utilization			20.9%	ICU Level of Service	A	
Analysis Period (min)			15			

Lanes, Volumes, Timings
7: Beaverdams Road & Thorold Townline Road

2026 Future Total PM
01-30-2024

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	196	47	37	178	27	39	139	25	40	207	57
Future Volume (vph)	30	196	47	37	178	27	39	139	25	40	207	57
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.974			0.980			0.964			0.969	
Flt Protected		0.994			0.990			0.992			0.993	
Satd. Flow (prot)	0	1820	0	0	1821	0	0	1776	0	0	1753	0
Flt Permitted		0.994			0.990			0.992			0.993	
Satd. Flow (perm)	0	1820	0	0	1821	0	0	1776	0	0	1753	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		197.0			309.7			169.2			132.8	
Travel Time (s)		14.2			22.3			12.2			9.6	
Peak Hour Factor	0.75	0.92	0.78	0.63	0.95	0.61	0.89	0.86	0.33	0.83	0.93	0.71
Heavy Vehicles (%)	3%	1%	0%	3%	1%	0%	0%	4%	0%	5%	5%	2%
Adj. Flow (vph)	40	213	60	59	187	44	44	162	76	48	223	80
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	313	0	0	290	0	0	282	0	0	351	0
Sign Control		Stop			Stop			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	46.1%				ICU Level of Service A							
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis 7: Beaverdams Road & Thorold Townline Road

2026 Future Total PM
01-30-2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	30	196	47	37	178	27	39	139	25	40	207	57
Future Volume (vph)	30	196	47	37	178	27	39	139	25	40	207	57
Peak Hour Factor	0.75	0.92	0.78	0.63	0.95	0.61	0.89	0.86	0.33	0.83	0.93	0.71
Hourly flow rate (vph)	40	213	60	59	187	44	44	162	76	48	223	80
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	313	290	282	351								
Volume Left (vph)	40	59	44	48								
Volume Right (vph)	60	44	76	80								
Hadj (s)	-0.07	-0.03	-0.09	-0.04								
Departure Headway (s)	6.8	7.0	6.9	6.8								
Degree Utilization, x	0.60	0.56	0.54	0.66								
Capacity (veh/h)	477	465	462	493								
Control Delay (s)	19.4	18.4	17.7	21.9								
Approach Delay (s)	19.4	18.4	17.7	21.9								
Approach LOS	C	C	C	C								
Intersection Summary												
Delay				19.5								
Level of Service				C								
Intersection Capacity Utilization				46.1%	ICU Level of Service	A						
Analysis Period (min)				15								

Lanes, Volumes, Timings
8: Barker Parkway & Venture Way

2026 Future Total PM
01-30-2024

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	9	0	1	0	7	2	49	1	69	35	19
Future Volume (vph)	15	9	0	1	0	7	2	49	1	69	35	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.877			0.999			0.963	
Flt Protected		0.961			0.995			0.998			0.977	
Satd. Flow (prot)	0	1826	0	0	1658	0	0	1894	0	0	1788	0
Flt Permitted		0.961			0.995			0.998			0.977	
Satd. Flow (perm)	0	1826	0	0	1658	0	0	1894	0	0	1788	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		143.7			157.1			135.3			345.6	
Travel Time (s)		10.3			11.3			9.7			24.9	
Peak Hour Factor	0.25	0.68	0.25	0.75	1.00	0.68	0.25	0.25	0.58	0.54	0.50	0.25
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	60	13	0	1	0	10	8	196	2	128	70	76
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	73	0	0	11	0	0	206	0	0	274	0
Sign Control		Stop			Stop			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	24.7%						ICU Level of Service A					
Analysis Period (min)	15											

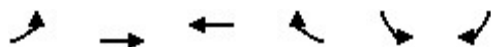
HCM Unsignalized Intersection Capacity Analysis 8: Barker Parkway & Venture Way

2026 Future Total PM
01-30-2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control	Stop			Stop			Stop			Stop		
Traffic Volume (vph)	15	9	0	1	0	7	2	49	1	69	35	19
Future Volume (vph)	15	9	0	1	0	7	2	49	1	69	35	19
Peak Hour Factor	0.25	0.68	0.25	0.75	1.00	0.68	0.25	0.25	0.58	0.54	0.50	0.25
Hourly flow rate (vph)	60	13	0	1	0	10	8	196	2	128	70	76
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	73	11	206	274								
Volume Left (vph)	60	1	8	128								
Volume Right (vph)	0	10	2	76								
Hadj (s)	0.16	-0.53	0.00	-0.07								
Departure Headway (s)	5.1	4.5	4.4	4.3								
Degree Utilization, x	0.10	0.01	0.25	0.33								
Capacity (veh/h)	636	696	788	813								
Control Delay (s)	8.7	7.6	8.9	9.3								
Approach Delay (s)	8.7	7.6	8.9	9.3								
Approach LOS	A	A	A	A								
Intersection Summary												
Delay				9.1								
Level of Service				A								
Intersection Capacity Utilization				24.7%	ICU Level of Service	A						
Analysis Period (min)				15								

Lanes, Volumes, Timings
9: Upper's Lane & Street C

2026 Future Total PM
01-30-2024



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	72	0	0	31	12	29
Future Volume (vph)	72	0	0	31	12	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.865		0.904	
Flt Protected		0.950			0.986	
Satd. Flow (prot)	0	1770	1611	0	1660	0
Flt Permitted		0.950			0.986	
Satd. Flow (perm)	0	1770	1611	0	1660	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		461.7	162.2		264.6	
Travel Time (s)		33.2	11.7		19.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	78	0	0	34	13	32
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	78	34	0	45	0
Sign Control		Stop	Stop		Stop	

Intersection Summary

Area Type: Other

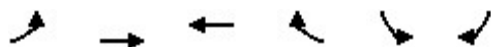
Control Type: Unsignalized

Intersection Capacity Utilization 20.7% ICU Level of Service A

Analysis Period (min) 15

HCM Unsignalized Intersection Capacity Analysis 9: Upper's Lane & Street C

2026 Future Total PM
01-30-2024



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Stop	Stop		Stop	
Traffic Volume (vph)	72	0	0	31	12	29
Future Volume (vph)	72	0	0	31	12	29
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	78	0	0	34	13	32
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total (vph)	78	34	45			
Volume Left (vph)	78	0	13			
Volume Right (vph)	0	34	32			
Hadj (s)	0.23	-0.57	-0.33			
Departure Headway (s)	4.3	3.5	3.8			
Degree Utilization, x	0.09	0.03	0.05			
Capacity (veh/h)	831	1005	910			
Control Delay (s)	7.7	6.6	7.0			
Approach Delay (s)	7.7	6.6	7.0			
Approach LOS	A	A	A			
Intersection Summary						
Delay			7.3			
Level of Service			A			
Intersection Capacity Utilization			20.7%	ICU Level of Service	A	
Analysis Period (min)			15			

Lanes, Volumes, Timings
1: Davis Road & Barker Parkway

2031 Future Total AM
01-30-2024

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	24	154	333	25	54	259
Future Volume (vph)	24	154	333	25	54	259
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0		118.0	135.0	
Storage Lanes	1	0		1	1	
Taper Length (m)	7.5				7.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.885			0.850		
Flt Protected	0.993				0.950	
Satd. Flow (prot)	1579	0	1827	1170	1504	1776
Flt Permitted	0.993				0.950	
Satd. Flow (perm)	1579	0	1827	1170	1504	1776
Link Speed (k/h)	50		50			50
Link Distance (m)	345.6		411.8			484.4
Travel Time (s)	24.9		29.6			34.9
Peak Hour Factor	0.71	0.79	0.83	0.50	0.75	0.90
Heavy Vehicles (%)	10%	5%	4%	38%	20%	7%
Adj. Flow (vph)	34	195	401	50	72	288
Shared Lane Traffic (%)						
Lane Group Flow (vph)	229	0	401	50	72	288
Sign Control	Stop		Free			Free

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization 41.7%	ICU Level of Service A
Analysis Period (min) 15	

HCM Unsignalized Intersection Capacity Analysis

1: Davis Road & Barker Parkway

2031 Future Total AM
01-30-2024

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	24	154	333	25	54	259
Future Volume (Veh/h)	24	154	333	25	54	259
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.71	0.79	0.83	0.50	0.75	0.90
Hourly flow rate (vph)	34	195	401	50	72	288
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	833	401			451	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	833	401			451	
tC, single (s)	6.5	6.2			4.3	
tC, 2 stage (s)						
tF (s)	3.6	3.3			2.4	
p0 queue free %	89	70			93	
cM capacity (veh/h)	305	643			1021	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	229	401	50	72	288	
Volume Left	34	0	0	72	0	
Volume Right	195	0	50	0	0	
cSH	552	1700	1700	1021	1700	
Volume to Capacity	0.41	0.24	0.03	0.07	0.17	
Queue Length 95th (m)	16.2	0.0	0.0	1.8	0.0	
Control Delay (s)	16.1	0.0	0.0	8.8	0.0	
Lane LOS	C			A		
Approach Delay (s)	16.1	0.0		1.8		
Approach LOS	C					
Intersection Summary						
Average Delay			4.1			
Intersection Capacity Utilization			41.7%	ICU Level of Service		A
Analysis Period (min)			15			

Lanes, Volumes, Timings
2: Davis Road & Upper's Lane

2031 Future Total AM
01-30-2024

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	49	30	86	58	35	12	58	263	48	24	180	34
Future Volume (vph)	49	30	86	58	35	12	58	263	48	24	180	34
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	170.0		0.0	140.0		117.0
Storage Lanes	0		0	0		0	1		0	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
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		0.931			0.976			0.977				0.850
Flt Protected		0.987			0.977		0.950			0.950		
Satd. Flow (prot)	0	1620	0	0	1774	0	1656	1766	0	1719	1681	1482
Flt Permitted		0.987			0.977		0.950			0.950		
Satd. Flow (perm)	0	1620	0	0	1774	0	1656	1766	0	1719	1681	1482
Link Speed (k/h)		50			50			50				50
Link Distance (m)		190.8			63.3			356.3			336.3	
Travel Time (s)		13.7			4.6			25.7			24.2	
Peak Hour Factor	0.82	0.59	0.74	0.77	0.61	0.43	0.85	0.85	0.88	0.83	0.90	0.85
Heavy Vehicles (%)	14%	0%	8%	0%	6%	0%	9%	6%	0%	5%	13%	9%
Adj. Flow (vph)	60	51	116	75	57	28	68	309	55	29	200	40
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	227	0	0	160	0	68	364	0	29	200	40
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 40.5% ICU Level of Service A

Analysis Period (min) 15

HCM Unsignalized Intersection Capacity Analysis

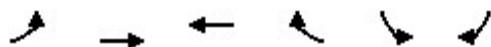
2: Davis Road & Upper's Lane

2031 Future Total AM
01-30-2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	49	30	86	58	35	12	58	263	48	24	180	34
Future Volume (Veh/h)	49	30	86	58	35	12	58	263	48	24	180	34
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.82	0.59	0.74	0.77	0.61	0.43	0.85	0.85	0.88	0.83	0.90	0.85
Hourly flow rate (vph)	60	51	116	75	57	28	68	309	55	29	200	40
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type							None			None		
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	760	758	200	756	770	336	240				364	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	760	758	200	756	770	336	240				364	
tC, single (s)	7.2	6.5	6.3	7.1	6.6	6.2	4.2				4.1	
tC, 2 stage (s)												
tF (s)	3.6	4.0	3.4	3.5	4.1	3.3	2.3				2.2	
p0 queue free %	75	84	86	68	81	96	95				98	
cM capacity (veh/h)	239	313	826	232	301	710	1287				1178	
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3					
Volume Total	227	160	68	364	29	200	40					
Volume Left	60	75	68	0	29	0	0					
Volume Right	116	28	0	55	0	0	40					
cSH	409	290	1287	1700	1178	1700	1700					
Volume to Capacity	0.55	0.55	0.05	0.21	0.02	0.12	0.02					
Queue Length 95th (m)	26.1	24.8	1.3	0.0	0.6	0.0	0.0					
Control Delay (s)	24.2	31.7	8.0	0.0	8.1	0.0	0.0					
Lane LOS	C	D	A		A							
Approach Delay (s)	24.2	31.7	1.3		0.9							
Approach LOS	C	D										
Intersection Summary												
Average Delay				10.4								
Intersection Capacity Utilization				40.5%	ICU Level of Service				A			
Analysis Period (min)				15								

Lanes, Volumes, Timings
3: Lundy's Lane & Barker Parkway

2031 Future Total AM
01-30-2024



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕↕	↕↕		↗	↗
Traffic Volume (vph)	49	32	21	149	61	47
Future Volume (vph)	49	32	21	149	61	47
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	0.95	0.95	1.00	1.00
Frt			0.867			0.850
Flt Protected		0.970			0.950	
Satd. Flow (prot)	0	3214	2570	0	1626	1509
Flt Permitted		0.970			0.950	
Satd. Flow (perm)	0	3214	2570	0	1626	1509
Link Speed (k/h)		50	50		50	
Link Distance (m)		269.5	290.5		183.4	
Travel Time (s)		19.4	20.9		13.2	
Peak Hour Factor	0.78	0.82	0.77	0.69	0.73	0.78
Heavy Vehicles (%)	12%	4%	4%	24%	11%	7%
Adj. Flow (vph)	63	39	27	216	84	60
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	102	243	0	84	60
Sign Control		Yield	Yield		Yield	

Intersection Summary

Area Type: Other

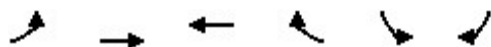
Control Type: Roundabout

Intersection Capacity Utilization 22.1% ICU Level of Service A

Analysis Period (min) 15

HCM Unsignalized Intersection Capacity Analysis 3: Lundy's Lane & Barker Parkway

2031 Future Total AM
01-30-2024



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Right Turn Channelized						
Traffic Volume (veh/h)	49	32	21	149	61	47
Future Volume (veh/h)	49	32	21	149	61	47
Peak Hour Factor	0.78	0.82	0.77	0.69	0.73	0.78
Hourly flow rate (vph)	63	39	27	216	84	60
Approach Volume (veh/h)		102	243		144	
Crossing Volume (veh/h)		84	63		27	
High Capacity (veh/h)		1297	1318		1356	
High v/c (veh/h)		0.08	0.18		0.11	
Low Capacity (veh/h)		1081	1101		1135	
Low v/c (veh/h)		0.09	0.22		0.13	
Intersection Summary						
Maximum v/c High			0.18			
Maximum v/c Low			0.22			
Intersection Capacity Utilization			22.1%		ICU Level of Service	A

Lanes, Volumes, Timings
4: Thorold Townline Road & Lundy's Lane

2031 Future Total AM
01-30-2024

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	34	422	81	42	327	29	66	160	34	102	106	23
Future Volume (vph)	34	422	81	42	327	29	66	160	34	102	106	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	150.0		32.0	76.0		0.0	30.0		0.0	40.0		0.0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.987			0.969			0.965	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1703	1863	1468	1805	1800	0	1626	1665	0	1467	1612	0
Flt Permitted	0.392			0.263			0.639			0.582		
Satd. Flow (perm)	703	1863	1468	500	1800	0	1094	1665	0	899	1612	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			65		7			16			20	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		307.3			478.1			247.2			197.8	
Travel Time (s)		22.1			34.4			17.8			14.2	
Peak Hour Factor	0.71	0.78	0.88	0.81	0.88	0.85	0.79	0.79	0.65	0.56	0.73	0.52
Heavy Vehicles (%)	6%	2%	10%	0%	4%	6%	11%	11%	9%	23%	14%	13%
Adj. Flow (vph)	48	541	92	52	372	34	84	203	52	182	145	44
Shared Lane Traffic (%)												
Lane Group Flow (vph)	48	541	92	52	406	0	84	255	0	182	189	0
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Detector Phase	4	4	4	8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	20.0	20.0	20.0	20.0	20.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	33.0	33.0	33.0	32.0	32.0		35.0	35.0		35.0	35.0	
Total Split (s)	50.0	50.0	50.0	50.0	50.0		40.0	40.0		40.0	40.0	
Total Split (%)	55.6%	55.6%	55.6%	55.6%	55.6%		44.4%	44.4%		44.4%	44.4%	
Yellow Time (s)	5.0	5.0	5.0	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)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	7.0	7.0	7.0	6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None		Max	Max		Max	Max	
Act Effct Green (s)	30.0	30.0	30.0	31.0	31.0		34.3	34.3		34.3	34.3	
Actuated g/C Ratio	0.39	0.39	0.39	0.40	0.40		0.44	0.44		0.44	0.44	
v/c Ratio	0.18	0.75	0.15	0.26	0.56		0.17	0.34		0.46	0.26	
Control Delay	16.3	27.2	6.4	18.4	20.4		17.0	16.7		22.4	15.3	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	16.3	27.2	6.4	18.4	20.4		17.0	16.7		22.4	15.3	
LOS	B	C	A	B	C		B	B		C	B	
Approach Delay		23.7			20.1			16.8			18.7	
Approach LOS		C			C			B			B	
Queue Length 50th (m)	4.7	69.6	2.5	5.2	45.7		7.4	22.8		18.6	15.4	

Lanes, Volumes, Timings
4: Thorold Townline Road & Lundy's Lane

2031 Future Total AM
01-30-2024

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (m)	8.8	82.9	10.2	11.6	68.0		18.0	43.8		25.0	28.7	
Internal Link Dist (m)		283.3			454.1			223.2			173.8	
Turn Bay Length (m)	150.0		32.0	76.0			30.0			40.0		
Base Capacity (vph)	394	1044	851	286	1035		484	746		398	725	
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	0.12	0.52	0.11	0.18	0.39		0.17	0.34		0.46	0.26	

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 77.5

Natural Cycle: 70

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.75

Intersection Signal Delay: 20.5

Intersection LOS: C

Intersection Capacity Utilization 68.7%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 4: Thorold Townline Road & Lundy's Lane

 Ø2	 Ø4
40 s	50 s
 Ø6	 Ø8
40 s	50 s

Lanes, Volumes, Timings
5: Thorold Townline Road & Upper's Lane

2031 Future Total AM
01-30-2024

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	0	14	0	0	1	6	202	2	3	261	4
Future Volume (vph)	5	0	14	0	0	1	6	202	2	3	261	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.899			0.865			0.998			0.994	
Flt Protected		0.988						0.999			0.999	
Satd. Flow (prot)	0	1655	0	0	1644	0	0	1699	0	0	1852	0
Flt Permitted		0.988						0.999			0.999	
Satd. Flow (perm)	0	1655	0	0	1644	0	0	1699	0	0	1852	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		488.7			510.1			142.0			229.8	
Travel Time (s)		35.2			36.7			10.2			16.5	
Peak Hour Factor	0.92	0.92	0.92	0.25	0.25	0.25	0.92	0.85	0.50	0.75	0.83	0.25
Heavy Vehicles (%)	2%	2%	2%	0%	0%	0%	0%	12%	0%	0%	2%	0%
Adj. Flow (vph)	5	0	15	0	0	4	7	238	4	4	314	16
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	20	0	0	4	0	0	249	0	0	334	0
Sign Control		Stop			Stop			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	27.7%						ICU Level of Service A					
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis 5: Thorold Townline Road & Upper's Lane

2031 Future Total AM
01-30-2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control	Stop			Stop			Stop			Stop		
Traffic Volume (vph)	5	0	14	0	0	1	6	202	2	3	261	4
Future Volume (vph)	5	0	14	0	0	1	6	202	2	3	261	4
Peak Hour Factor	0.92	0.92	0.92	0.25	0.25	0.25	0.92	0.85	0.50	0.75	0.83	0.25
Hourly flow rate (vph)	5	0	15	0	0	4	7	238	4	4	314	16
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	20	4	249	334								
Volume Left (vph)	5	0	7	4								
Volume Right (vph)	15	4	4	16								
Hadj (s)	-0.37	-0.60	0.19	0.01								
Departure Headway (s)	4.8	4.6	4.5	4.2								
Degree Utilization, x	0.03	0.01	0.31	0.39								
Capacity (veh/h)	660	681	786	832								
Control Delay (s)	7.9	7.6	9.5	9.9								
Approach Delay (s)	7.9	7.6	9.5	9.9								
Approach LOS	A	A	A	A								
Intersection Summary												
Delay				9.7								
Level of Service				A								
Intersection Capacity Utilization				27.7%	ICU Level of Service	A						
Analysis Period (min)				15								

Lanes, Volumes, Timings
6: Thorold Townline Road & Venture Way

2031 Future Total AM
01-30-2024

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	33	90	19	0	4	13
Future Volume (vph)	33	90	19	0	4	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.901	0.895				
Flt Protected	0.987	0.950				
Satd. Flow (prot)	1657	0	0	1770	1667	0
Flt Permitted	0.987	0.950				
Satd. Flow (perm)	1657	0	0	1770	1667	0
Link Speed (k/h)	50	50				
Link Distance (m)	574.7	229.8				
Travel Time (s)	41.4	7.4				
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	36	98	21	0	4	14
Shared Lane Traffic (%)						
Lane Group Flow (vph)	134	0	0	21	18	0
Sign Control	Stop	Stop				
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	21.8%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis 6: Thorold Townline Road & Venture Way

2031 Future Total AM
01-30-2024

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Traffic Volume (vph)	33	90	19	0	4	13
Future Volume (vph)	33	90	19	0	4	13
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	36	98	21	0	4	14
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total (vph)	134	21	18			
Volume Left (vph)	36	21	0			
Volume Right (vph)	98	0	14			
Hadj (s)	-0.35	0.23	-0.43			
Departure Headway (s)	3.6	4.4	3.8			
Degree Utilization, x	0.14	0.03	0.02			
Capacity (veh/h)	975	782	921			
Control Delay (s)	7.2	7.5	6.8			
Approach Delay (s)	7.2	7.5	6.8			
Approach LOS	A	A	A			
Intersection Summary						
Delay			7.2			
Level of Service			A			
Intersection Capacity Utilization			21.8%	ICU Level of Service	A	
Analysis Period (min)			15			

Lanes, Volumes, Timings
7: Beaverdams Road & Thorold Townline Road

2031 Future Total AM
01-30-2024

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	34	130	32	14	195	42	34	162	35	20	107	25
Future Volume (vph)	34	130	32	14	195	42	34	162	35	20	107	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.970			0.980			0.970			0.975	
Flt Protected		0.991			0.996			0.992			0.990	
Satd. Flow (prot)	0	1710	0	0	1840	0	0	1714	0	0	1667	0
Flt Permitted		0.991			0.996			0.992			0.990	
Satd. Flow (perm)	0	1710	0	0	1840	0	0	1714	0	0	1667	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		197.0			309.7			169.2			132.8	
Travel Time (s)		14.2			22.3			12.2			9.6	
Peak Hour Factor	0.77	0.93	0.62	0.50	0.74	0.81	0.71	0.84	0.50	0.45	0.81	0.63
Heavy Vehicles (%)	12%	4%	10%	0%	1%	0%	3%	10%	0%	0%	14%	8%
Adj. Flow (vph)	44	140	52	28	264	52	48	193	70	44	132	40
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	236	0	0	344	0	0	311	0	0	216	0
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 45.1% ICU Level of Service A

Analysis Period (min) 15

HCM Unsignalized Intersection Capacity Analysis

7: Beaverdams Road & Thorold Townline Road

2031 Future Total AM
01-30-2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	34	130	32	14	195	42	34	162	35	20	107	25
Future Volume (vph)	34	130	32	14	195	42	34	162	35	20	107	25
Peak Hour Factor	0.77	0.93	0.62	0.50	0.74	0.81	0.71	0.84	0.50	0.45	0.81	0.63
Hourly flow rate (vph)	44	140	52	28	264	52	48	193	70	44	132	40
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	236	344	311	216								
Volume Left (vph)	44	28	48	44								
Volume Right (vph)	52	52	70	40								
Hadj (s)	0.02	-0.06	0.01	0.10								
Departure Headway (s)	6.4	6.1	6.3	6.6								
Degree Utilization, x	0.42	0.58	0.54	0.40								
Capacity (veh/h)	493	541	528	480								
Control Delay (s)	14.0	17.3	16.4	13.8								
Approach Delay (s)	14.0	17.3	16.4	13.8								
Approach LOS	B	C	C	B								
Intersection Summary												
Delay				15.7								
Level of Service				C								
Intersection Capacity Utilization				45.1%	ICU Level of Service	A						
Analysis Period (min)				15								

Lanes, Volumes, Timings
8: Barker Parkway & Venture Way

2031 Future Total AM
01-30-2024

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	19	4	1	1	0	8	1	58	0	24	17	13
Future Volume (vph)	19	4	1	1	0	8	1	58	0	24	17	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.994			0.881						0.942	
Flt Protected		0.957			0.994			0.999			0.990	
Satd. Flow (prot)	0	1800	0	0	1582	0	0	1898	0	0	1549	0
Flt Permitted		0.957			0.994			0.999			0.990	
Satd. Flow (perm)	0	1800	0	0	1582	0	0	1898	0	0	1549	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		143.7			157.1			135.3			345.6	
Travel Time (s)		10.3			11.3			9.7			24.9	
Peak Hour Factor	0.25	0.75	0.25	0.44	0.58	0.54	0.25	0.25	0.29	0.95	0.38	0.25
Heavy Vehicles (%)	0%	7%	0%	29%	14%	2%	0%	0%	0%	11%	33%	0%
Adj. Flow (vph)	76	5	4	2	0	15	4	232	0	25	45	52
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	85	0	0	17	0	0	236	0	0	122	0
Sign Control		Stop			Stop			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	22.4%											
Analysis Period (min)	15											
ICU Level of Service A												

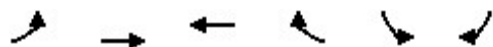
HCM Unsignalized Intersection Capacity Analysis 8: Barker Parkway & Venture Way

2031 Future Total AM
01-30-2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	19	4	1	1	0	8	1	58	0	24	17	13
Future Volume (vph)	19	4	1	1	0	8	1	58	0	24	17	13
Peak Hour Factor	0.25	0.75	0.25	0.44	0.58	0.54	0.25	0.25	0.29	0.95	0.38	0.25
Hourly flow rate (vph)	76	5	4	2	0	15	4	232	0	25	45	52
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	85	17	236	122								
Volume Left (vph)	76	2	4	25								
Volume Right (vph)	4	15	0	52								
Hadj (s)	0.16	-0.42	0.00	0.03								
Departure Headway (s)	4.9	4.4	4.3	4.4								
Degree Utilization, x	0.12	0.02	0.28	0.15								
Capacity (veh/h)	680	738	812	774								
Control Delay (s)	8.5	7.5	9.0	8.2								
Approach Delay (s)	8.5	7.5	9.0	8.2								
Approach LOS	A	A	A	A								
Intersection Summary												
Delay			8.6									
Level of Service			A									
Intersection Capacity Utilization			22.4%		ICU Level of Service				A			
Analysis Period (min)			15									

Lanes, Volumes, Timings
9: Upper's Lane & Street C

2031 Future Total AM
01-30-2024



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	22	0	0	10	19	45
Future Volume (vph)	22	0	0	10	19	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.865		0.905	
Flt Protected		0.950			0.985	
Satd. Flow (prot)	0	1770	1611	0	1660	0
Flt Permitted		0.950			0.985	
Satd. Flow (perm)	0	1770	1611	0	1660	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		461.7	162.2		264.6	
Travel Time (s)		33.2	11.7		19.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	24	0	0	11	21	49
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	24	11	0	70	0
Sign Control		Stop	Stop		Stop	

Intersection Summary

Area Type: Other

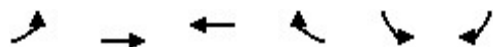
Control Type: Unsignalized

Intersection Capacity Utilization 18.4% ICU Level of Service A

Analysis Period (min) 15

HCM Unsignalized Intersection Capacity Analysis 9: Upper's Lane & Street C

2031 Future Total AM
01-30-2024



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Stop	Stop		Stop	
Traffic Volume (vph)	22	0	0	10	19	45
Future Volume (vph)	22	0	0	10	19	45
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	24	0	0	11	21	49
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total (vph)	24	11	70			
Volume Left (vph)	24	0	21			
Volume Right (vph)	0	11	49			
Hadj (s)	0.23	-0.57	-0.33			
Departure Headway (s)	4.3	3.5	3.6			
Degree Utilization, x	0.03	0.01	0.07			
Capacity (veh/h)	822	1003	965			
Control Delay (s)	7.4	6.5	6.9			
Approach Delay (s)	7.4	6.5	6.9			
Approach LOS	A	A	A			
Intersection Summary						
Delay			7.0			
Level of Service			A			
Intersection Capacity Utilization			18.4%	ICU Level of Service	A	
Analysis Period (min)			15			

Lanes, Volumes, Timings
1: Davis Road & Barker Parkway

2031 Future Total PM
01-30-2024

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	23	94	385	46	162	397
Future Volume (vph)	23	94	385	46	162	397
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0		118.0	135.0	
Storage Lanes	1	0		1	1	
Taper Length (m)	7.5				7.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.899			0.850		
Flt Protected	0.987				0.950	
Satd. Flow (prot)	1661	0	1863	1524	1787	1827
Flt Permitted	0.987				0.950	
Satd. Flow (perm)	1661	0	1863	1524	1787	1827
Link Speed (k/h)	50		50			50
Link Distance (m)	345.6		411.8			484.4
Travel Time (s)	24.9		29.6			34.9
Peak Hour Factor	0.63	0.87	0.89	0.85	0.88	0.91
Heavy Vehicles (%)	0%	2%	2%	6%	1%	4%
Adj. Flow (vph)	37	108	433	54	184	436
Shared Lane Traffic (%)						
Lane Group Flow (vph)	145	0	433	54	184	436
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	46.3%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis

1: Davis Road & Barker Parkway

2031 Future Total PM
01-30-2024

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	23	94	385	46	162	397
Future Volume (Veh/h)	23	94	385	46	162	397
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.63	0.87	0.89	0.85	0.88	0.91
Hourly flow rate (vph)	37	108	433	54	184	436
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None		None	
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1237	433			487	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1237	433			487	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	77	83			83	
cM capacity (veh/h)	163	623			1081	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	145	433	54	184	436	
Volume Left	37	0	0	184	0	
Volume Right	108	0	54	0	0	
cSH	362	1700	1700	1081	1700	
Volume to Capacity	0.40	0.25	0.03	0.17	0.26	
Queue Length 95th (m)	15.0	0.0	0.0	4.9	0.0	
Control Delay (s)	21.5	0.0	0.0	9.0	0.0	
Lane LOS	C			A		
Approach Delay (s)	21.5	0.0		2.7		
Approach LOS	C					
Intersection Summary						
Average Delay			3.8			
Intersection Capacity Utilization		46.3%		ICU Level of Service		A
Analysis Period (min)			15			

Lanes, Volumes, Timings
2: Davis Road & Upper's Lane

2031 Future Total PM
01-30-2024

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	35	30	107	62	19	23	101	365	76	44	293	66
Future Volume (vph)	35	30	107	62	19	23	101	365	76	44	293	66
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	170.0		0.0	140.0		117.0
Storage Lanes	0		0	0		0	1		0	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
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		0.928			0.968			0.966				0.850
Flt Protected		0.989			0.975		0.950			0.950		
Satd. Flow (prot)	0	1626	0	0	1766	0	1656	1754	0	1719	1681	1482
Flt Permitted		0.989			0.975		0.950			0.950		
Satd. Flow (perm)	0	1626	0	0	1766	0	1656	1754	0	1719	1681	1482
Link Speed (k/h)		50			50			50				50
Link Distance (m)		190.8			63.3			356.3			336.3	
Travel Time (s)		13.7			4.6			25.7			24.2	
Peak Hour Factor	0.58	0.42	0.72	0.82	0.50	0.64	0.74	0.89	0.64	0.67	0.96	0.79
Heavy Vehicles (%)	14%	0%	8%	0%	6%	0%	9%	6%	0%	5%	13%	9%
Adj. Flow (vph)	60	71	149	76	38	36	136	410	119	66	305	84
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	280	0	0	150	0	136	529	0	66	305	84
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 51.3% ICU Level of Service A

Analysis Period (min) 15

HCM Unsignalized Intersection Capacity Analysis

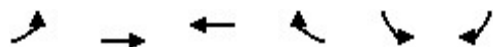
2: Davis Road & Upper's Lane

2031 Future Total PM
01-30-2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	35	30	107	62	19	23	101	365	76	44	293	66
Future Volume (Veh/h)	35	30	107	62	19	23	101	365	76	44	293	66
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.58	0.42	0.72	0.82	0.50	0.64	0.74	0.89	0.64	0.67	0.96	0.79
Hourly flow rate (vph)	60	71	149	76	38	36	136	410	119	66	305	84
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None						None					
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1174	1238	305	1214	1262	470	389	529				
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1174	1238	305	1214	1262	470	389	529				
tC, single (s)	7.2	6.5	6.3	7.1	6.6	6.2	4.2	4.1				
tC, 2 stage (s)												
tF (s)	3.6	4.0	3.4	3.5	4.1	3.3	2.3	2.2				
p0 queue free %	42	51	79	0	72	94	88	94				
cM capacity (veh/h)	103	146	721	69	137	598	1132	1023				
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3					
Volume Total	280	150	136	529	66	305	84					
Volume Left	60	76	136	0	66	0	0					
Volume Right	149	36	0	119	0	0	84					
cSH	219	104	1132	1700	1023	1700	1700					
Volume to Capacity	1.28	1.44	0.12	0.31	0.06	0.18	0.05					
Queue Length 95th (m)	117.9	87.4	3.3	0.0	1.7	0.0	0.0					
Control Delay (s)	199.5	320.0	8.6	0.0	8.8	0.0	0.0					
Lane LOS	F	F	A	A								
Approach Delay (s)	199.5	320.0	1.8	1.3								
Approach LOS	F	F										
Intersection Summary												
Average Delay	68.1											
Intersection Capacity Utilization	51.3%			ICU Level of Service					A			
Analysis Period (min)	15											

Lanes, Volumes, Timings
3: Lundy's Lane & Barker Parkway

2031 Future Total PM
01-30-2024



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕↕	↕↕		↕	↕
Traffic Volume (vph)	46	632	661	54	55	60
Future Volume (vph)	46	632	661	54	55	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	0.95	0.95	1.00	1.00
Frt			0.983			0.850
Flt Protected		0.997			0.950	
Satd. Flow (prot)	0	3529	3506	0	1805	1583
Flt Permitted		0.997			0.950	
Satd. Flow (perm)	0	3529	3506	0	1805	1583
Link Speed (k/h)		50	50		50	
Link Distance (m)		269.5	290.5		183.4	
Travel Time (s)		19.4	20.9		13.2	
Peak Hour Factor	0.82	0.75	0.95	0.62	0.56	0.71
Heavy Vehicles (%)	2%	2%	1%	3%	0%	2%
Adj. Flow (vph)	56	843	696	87	98	85
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	899	783	0	98	85
Sign Control		Yield	Yield		Yield	

Intersection Summary

Area Type: Other

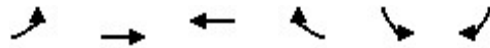
Control Type: Roundabout

Intersection Capacity Utilization 52.1% ICU Level of Service A

Analysis Period (min) 15

HCM Unsignalized Intersection Capacity Analysis 3: Lundy's Lane & Barker Parkway

2031 Future Total PM
01-30-2024



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Right Turn Channelized						
Traffic Volume (veh/h)	46	632	661	54	55	60
Future Volume (veh/h)	46	632	661	54	55	60
Peak Hour Factor	0.82	0.75	0.95	0.62	0.56	0.71
Hourly flow rate (vph)	56	843	696	87	98	85
Approach Volume (veh/h)		899	783		183	
Crossing Volume (veh/h)		98	56		696	
High Capacity (veh/h)		1283	1326		797	
High v/c (veh/h)		0.70	0.59		0.23	
Low Capacity (veh/h)		1068	1107		634	
Low v/c (veh/h)		0.84	0.71		0.29	
Intersection Summary						
Maximum v/c High			0.70			
Maximum v/c Low			0.84			
Intersection Capacity Utilization			52.1%		ICU Level of Service	A

Lanes, Volumes, Timings
4: Thorold Townline Road & Lundy's Lane

2031 Future Total PM
01-30-2024

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	27	550	112	31	501	49	141	174	62	87	194	31
Future Volume (vph)	27	550	112	31	501	49	141	174	62	87	194	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	150.0		32.0	76.0		0.0	30.0		0.0	40.0		0.0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.972			0.948			0.979	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1736	1881	1599	1805	1832	0	1770	1755	0	1719	1826	0
Flt Permitted	0.191			0.150			0.558			0.490		
Satd. Flow (perm)	349	1881	1599	285	1832	0	1039	1755	0	887	1826	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			79		18			34			11	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		307.3			478.1			247.2			197.8	
Travel Time (s)		22.1			34.4			17.8			14.2	
Peak Hour Factor	0.84	0.77	0.76	0.65	0.94	0.40	0.74	0.85	0.57	0.68	0.88	0.86
Heavy Vehicles (%)	4%	1%	1%	0%	1%	0%	2%	4%	0%	5%	1%	7%
Adj. Flow (vph)	32	714	147	48	533	123	191	205	109	128	220	36
Shared Lane Traffic (%)												
Lane Group Flow (vph)	32	714	147	48	656	0	191	314	0	128	256	0
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Detector Phase	4	4	4	8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	20.0	20.0	20.0	20.0	20.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	33.0	33.0	33.0	32.0	32.0		35.0	35.0		35.0	35.0	
Total Split (s)	50.0	50.0	50.0	50.0	50.0		40.0	40.0		40.0	40.0	
Total Split (%)	55.6%	55.6%	55.6%	55.6%	55.6%		44.4%	44.4%		44.4%	44.4%	
Yellow Time (s)	5.0	5.0	5.0	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)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	7.0	7.0	7.0	6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None		Max	Max		Max	Max	
Act Effct Green (s)	37.9	37.9	37.9	38.9	38.9		34.2	34.2		34.2	34.2	
Actuated g/C Ratio	0.44	0.44	0.44	0.46	0.46		0.40	0.40		0.40	0.40	
v/c Ratio	0.21	0.85	0.19	0.37	0.78		0.46	0.43		0.36	0.35	
Control Delay	17.9	32.3	7.4	24.3	25.9		24.8	19.8		23.3	19.9	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	17.9	32.3	7.4	24.3	25.9		24.8	19.8		23.3	19.9	
LOS	B	C	A	C	C		C	B		C	B	
Approach Delay		27.7			25.8			21.7			21.0	
Approach LOS		C			C			C			C	
Queue Length 50th (m)	3.2	105.0	6.5	5.1	88.0		25.7	36.9		16.4	31.1	

Lanes, Volumes, Timings
4: Thorold Townline Road & Lundy's Lane

2031 Future Total PM
01-30-2024

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (m)	8.8	117.2	12.7	9.6	131.6		36.2	56.4		22.9	50.0	
Internal Link Dist (m)		283.3			454.1			223.2			173.8	
Turn Bay Length (m)	150.0		32.0	76.0			30.0			40.0		
Base Capacity (vph)	177	955	851	148	960		417	725		356	739	
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	0.18	0.75	0.17	0.32	0.68		0.46	0.43		0.36	0.35	

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 85.2

Natural Cycle: 70

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.85

Intersection Signal Delay: 24.9

Intersection LOS: C

Intersection Capacity Utilization 66.0%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 4: Thorold Townline Road & Lundy's Lane

 Ø2	 Ø4
40 s	50 s
 Ø6	 Ø8
40 s	50 s

Lanes, Volumes, Timings
5: Thorold Townline Road & Upper's Lane

2031 Future Total PM
01-30-2024

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	0	9	0	0	2	21	255	0	0	346	11
Future Volume (vph)	3	0	9	0	0	2	21	255	0	0	346	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.896			0.865						0.996	
Flt Protected		0.989						0.997				
Satd. Flow (prot)	0	1651	0	0	1644	0	0	1824	0	0	1821	0
Flt Permitted		0.989						0.997				
Satd. Flow (perm)	0	1651	0	0	1644	0	0	1824	0	0	1821	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		488.7			510.1			142.0			229.8	
Travel Time (s)		35.2			36.7			10.2			16.5	
Peak Hour Factor	0.92	0.92	0.92	0.25	0.92	0.25	0.92	0.83	0.25	0.25	0.95	0.92
Heavy Vehicles (%)	2%	2%	2%	0%	2%	0%	2%	4%	0%	0%	4%	2%
Adj. Flow (vph)	3	0	10	0	0	8	23	307	0	0	364	12
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	13	0	0	8	0	0	330	0	0	376	0
Sign Control		Stop			Stop			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	40.9%				ICU Level of Service A							
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis 5: Thorold Townline Road & Upper's Lane

2031 Future Total PM
01-30-2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control	Stop			Stop			Stop			Stop		
Traffic Volume (vph)	3	0	9	0	0	2	21	255	0	0	346	11
Future Volume (vph)	3	0	9	0	0	2	21	255	0	0	346	11
Peak Hour Factor	0.92	0.92	0.92	0.25	0.92	0.25	0.92	0.83	0.25	0.25	0.95	0.92
Hourly flow rate (vph)	3	0	10	0	0	8	23	307	0	0	364	12
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	13	8	330	376								
Volume Left (vph)	3	0	23	0								
Volume Right (vph)	10	8	0	12								
Hadj (s)	-0.38	-0.60	0.08	0.05								
Departure Headway (s)	5.1	4.9	4.4	4.3								
Degree Utilization, x	0.02	0.01	0.40	0.45								
Capacity (veh/h)	617	637	799	811								
Control Delay (s)	8.2	7.9	10.4	10.9								
Approach Delay (s)	8.2	7.9	10.4	10.9								
Approach LOS	A	A	B	B								
Intersection Summary												
Delay				10.6								
Level of Service				B								
Intersection Capacity Utilization				40.9%	ICU Level of Service				A			
Analysis Period (min)				15								

Lanes, Volumes, Timings
6: Thorold Townline Road & Venture Way

2031 Future Total PM
01-30-2024

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	21	58	51	0	11	42
Future Volume (vph)	21	58	51	0	11	42
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	0.901				0.893	
Flt Protected	0.987				0.950	
Satd. Flow (prot)	1657	0	0	1770	1663	0
Flt Permitted	0.987				0.950	
Satd. Flow (perm)	1657	0	0	1770	1663	0
Link Speed (k/h)	50				50	50
Link Distance (m)	574.7				229.8	102.8
Travel Time (s)	41.4				16.5	7.4
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	23	63	55	0	12	46
Shared Lane Traffic (%)						
Lane Group Flow (vph)	86	0	0	55	58	0
Sign Control	Stop				Stop	Stop
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	20.9%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis 6: Thorold Townline Road & Venture Way

2031 Future Total PM
01-30-2024

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Traffic Volume (vph)	21	58	51	0	11	42
Future Volume (vph)	21	58	51	0	11	42
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	23	63	55	0	12	46
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total (vph)	86	55	58			
Volume Left (vph)	23	55	0			
Volume Right (vph)	63	0	46			
Hadj (s)	-0.35	0.23	-0.44			
Departure Headway (s)	3.8	4.4	3.7			
Degree Utilization, x	0.09	0.07	0.06			
Capacity (veh/h)	920	798	947			
Control Delay (s)	7.2	7.7	6.9			
Approach Delay (s)	7.2	7.7	6.9			
Approach LOS	A	A	A			
Intersection Summary						
Delay			7.2			
Level of Service			A			
Intersection Capacity Utilization			20.9%	ICU Level of Service	A	
Analysis Period (min)			15			

Lanes, Volumes, Timings
7: Beaverdams Road & Thorold Townline Road

2031 Future Total PM
01-30-2024

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	217	47	37	196	27	39	153	25	40	226	57
Future Volume (vph)	30	217	47	37	196	27	39	153	25	40	226	57
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.976			0.981			0.966			0.971	
Flt Protected		0.994			0.991			0.993			0.994	
Satd. Flow (prot)	0	1824	0	0	1825	0	0	1780	0	0	1757	0
Flt Permitted		0.994			0.991			0.993			0.994	
Satd. Flow (perm)	0	1824	0	0	1825	0	0	1780	0	0	1757	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		197.0			309.7			169.2			132.8	
Travel Time (s)		14.2			22.3			12.2			9.6	
Peak Hour Factor	0.75	0.92	0.78	0.63	0.95	0.61	0.89	0.86	0.33	0.83	0.93	0.71
Heavy Vehicles (%)	3%	1%	0%	3%	1%	0%	0%	4%	0%	5%	5%	2%
Adj. Flow (vph)	40	236	60	59	206	44	44	178	76	48	243	80
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	336	0	0	309	0	0	298	0	0	371	0
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 48.7%

ICU Level of Service A

Analysis Period (min) 15

HCM Unsignalized Intersection Capacity Analysis

7: Beaverdams Road & Thorold Townline Road

2031 Future Total PM
01-30-2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	30	217	47	37	196	27	39	153	25	40	226	57
Future Volume (vph)	30	217	47	37	196	27	39	153	25	40	226	57
Peak Hour Factor	0.75	0.92	0.78	0.63	0.95	0.61	0.89	0.86	0.33	0.83	0.93	0.71
Hourly flow rate (vph)	40	236	60	59	206	44	44	178	76	48	243	80
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	336	309	298	371								
Volume Left (vph)	40	59	44	48								
Volume Right (vph)	60	44	76	80								
Hadj (s)	-0.07	-0.03	-0.08	-0.03								
Departure Headway (s)	7.3	7.4	7.4	7.2								
Degree Utilization, x	0.68	0.64	0.61	0.74								
Capacity (veh/h)	450	437	439	466								
Control Delay (s)	24.6	22.6	21.4	28.4								
Approach Delay (s)	24.6	22.6	21.4	28.4								
Approach LOS	C	C	C	D								
Intersection Summary												
Delay			24.5									
Level of Service			C									
Intersection Capacity Utilization			48.7%	ICU Level of Service					A			
Analysis Period (min)			15									

Lanes, Volumes, Timings
8: Barker Parkway & Venture Way

2031 Future Total PM
01-30-2024

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	10	0	1	0	7	2	52	1	69	39	19
Future Volume (vph)	15	10	0	1	0	7	2	52	1	69	39	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.877			0.999			0.964	
Flt Protected		0.962			0.995			0.998			0.978	
Satd. Flow (prot)	0	1828	0	0	1658	0	0	1894	0	0	1791	0
Flt Permitted		0.962			0.995			0.998			0.978	
Satd. Flow (perm)	0	1828	0	0	1658	0	0	1894	0	0	1791	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		143.7			157.1			135.3			345.6	
Travel Time (s)		10.3			11.3			9.7			24.9	
Peak Hour Factor	0.25	0.68	0.25	0.75	1.00	0.68	0.25	0.25	0.58	0.54	0.50	0.25
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	60	15	0	1	0	10	8	208	2	128	78	76
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	75	0	0	11	0	0	218	0	0	282	0
Sign Control		Stop			Stop			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	24.9%						ICU Level of Service A					
Analysis Period (min)	15											

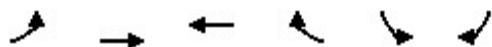
HCM Unsignalized Intersection Capacity Analysis 8: Barker Parkway & Venture Way

2031 Future Total PM
01-30-2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control	Stop			Stop			Stop			Stop		
Traffic Volume (vph)	15	10	0	1	0	7	2	52	1	69	39	19
Future Volume (vph)	15	10	0	1	0	7	2	52	1	69	39	19
Peak Hour Factor	0.25	0.68	0.25	0.75	1.00	0.68	0.25	0.25	0.58	0.54	0.50	0.25
Hourly flow rate (vph)	60	15	0	1	0	10	8	208	2	128	78	76
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	75	11	218	282								
Volume Left (vph)	60	1	8	128								
Volume Right (vph)	0	10	2	76								
Hadj (s)	0.16	-0.53	0.00	-0.07								
Departure Headway (s)	5.2	4.6	4.4	4.3								
Degree Utilization, x	0.11	0.01	0.27	0.34								
Capacity (veh/h)	629	685	785	809								
Control Delay (s)	8.8	7.7	9.0	9.5								
Approach Delay (s)	8.8	7.7	9.0	9.5								
Approach LOS	A	A	A	A								
Intersection Summary												
Delay				9.2								
Level of Service				A								
Intersection Capacity Utilization				24.9%	ICU Level of Service	A						
Analysis Period (min)				15								

Lanes, Volumes, Timings
9: Upper's Lane & Street C

2031 Future Total PM
01-30-2024



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	72	0	0	31	12	29
Future Volume (vph)	72	0	0	31	12	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.865		0.904	
Flt Protected		0.950			0.986	
Satd. Flow (prot)	0	1770	1611	0	1660	0
Flt Permitted		0.950			0.986	
Satd. Flow (perm)	0	1770	1611	0	1660	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		461.7	162.2		264.6	
Travel Time (s)		33.2	11.7		19.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	78	0	0	34	13	32
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	78	34	0	45	0
Sign Control		Stop	Stop		Stop	

Intersection Summary

Area Type: Other

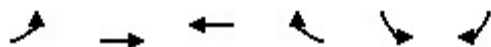
Control Type: Unsignalized

Intersection Capacity Utilization 20.7% ICU Level of Service A

Analysis Period (min) 15

HCM Unsignalized Intersection Capacity Analysis 9: Upper's Lane & Street C

2031 Future Total PM
01-30-2024



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Stop	Stop		Stop	
Traffic Volume (vph)	72	0	0	31	12	29
Future Volume (vph)	72	0	0	31	12	29
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	78	0	0	34	13	32
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total (vph)	78	34	45			
Volume Left (vph)	78	0	13			
Volume Right (vph)	0	34	32			
Hadj (s)	0.23	-0.57	-0.33			
Departure Headway (s)	4.3	3.5	3.8			
Degree Utilization, x	0.09	0.03	0.05			
Capacity (veh/h)	831	1005	910			
Control Delay (s)	7.7	6.6	7.0			
Approach Delay (s)	7.7	6.6	7.0			
Approach LOS	A	A	A			
Intersection Summary						
Delay			7.3			
Level of Service			A			
Intersection Capacity Utilization			20.7%	ICU Level of Service	A	
Analysis Period (min)			15			

Lanes, Volumes, Timings
1: Davis Road & Barker Parkway

2036 Future Total AM
01-30-2024

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	24	154	367	25	54	286
Future Volume (vph)	24	154	367	25	54	286
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0		118.0	135.0	
Storage Lanes	1	0		1	1	
Taper Length (m)	7.5				7.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.885			0.850		
Flt Protected	0.993				0.950	
Satd. Flow (prot)	1579	0	1827	1170	1504	1776
Flt Permitted	0.993				0.950	
Satd. Flow (perm)	1579	0	1827	1170	1504	1776
Link Speed (k/h)	50		50			50
Link Distance (m)	345.6		411.8			484.4
Travel Time (s)	24.9		29.6			34.9
Peak Hour Factor	0.71	0.79	0.83	0.50	0.75	0.90
Heavy Vehicles (%)	10%	5%	4%	38%	20%	7%
Adj. Flow (vph)	34	195	442	50	72	318
Shared Lane Traffic (%)						
Lane Group Flow (vph)	229	0	442	50	72	318
Sign Control	Stop		Free			Free

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 43.5% ICU Level of Service A

Analysis Period (min) 15

HCM Unsignalized Intersection Capacity Analysis

1: Davis Road & Barker Parkway

2036 Future Total AM
01-30-2024

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	24	154	367	25	54	286
Future Volume (Veh/h)	24	154	367	25	54	286
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.71	0.79	0.83	0.50	0.75	0.90
Hourly flow rate (vph)	34	195	442	50	72	318
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	904	442			492	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	904	442			492	
tC, single (s)	6.5	6.2			4.3	
tC, 2 stage (s)						
tF (s)	3.6	3.3			2.4	
p0 queue free %	88	68			93	
cM capacity (veh/h)	276	609			985	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	229	442	50	72	318	
Volume Left	34	0	0	72	0	
Volume Right	195	0	50	0	0	
cSH	516	1700	1700	985	1700	
Volume to Capacity	0.44	0.26	0.03	0.07	0.19	
Queue Length 95th (m)	18.0	0.0	0.0	1.9	0.0	
Control Delay (s)	17.4	0.0	0.0	8.9	0.0	
Lane LOS	C			A		
Approach Delay (s)	17.4	0.0		1.7		
Approach LOS	C					
Intersection Summary						
Average Delay			4.2			
Intersection Capacity Utilization			43.5%		ICU Level of Service	A
Analysis Period (min)			15			

Lanes, Volumes, Timings
2: Davis Road & Upper's Lane

2036 Future Total AM
01-30-2024

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	49	33	86	58	37	12	58	289	48	24	198	34
Future Volume (vph)	49	33	86	58	37	12	58	289	48	24	198	34
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	170.0		0.0	140.0		117.0
Storage Lanes	0		0	0		0	1		0	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
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		0.932			0.977			0.979				0.850
Flt Protected		0.987			0.978		0.950			0.950		
Satd. Flow (prot)	0	1624	0	0	1776	0	1656	1769	0	1719	1681	1482
Flt Permitted		0.987			0.978		0.950			0.950		
Satd. Flow (perm)	0	1624	0	0	1776	0	1656	1769	0	1719	1681	1482
Link Speed (k/h)		50			50			50				50
Link Distance (m)		190.8			63.3			356.3			336.3	
Travel Time (s)		13.7			4.6			25.7			24.2	
Peak Hour Factor	0.82	0.59	0.74	0.77	0.61	0.43	0.85	0.85	0.88	0.83	0.90	0.85
Heavy Vehicles (%)	14%	0%	8%	0%	6%	0%	9%	6%	0%	5%	13%	9%
Adj. Flow (vph)	60	56	116	75	61	28	68	340	55	29	220	40
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	232	0	0	164	0	68	395	0	29	220	40
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 42.0% ICU Level of Service A

Analysis Period (min) 15

HCM Unsignalized Intersection Capacity Analysis

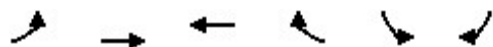
2: Davis Road & Upper's Lane

2036 Future Total AM
01-30-2024

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (veh/h)	49	33	86	58	37	12	58	289	48	24	198	34	
Future Volume (Veh/h)	49	33	86	58	37	12	58	289	48	24	198	34	
Sign Control	Stop				Stop				Free				
Grade	0%				0%				0%				
Peak Hour Factor	0.82	0.59	0.74	0.77	0.61	0.43	0.85	0.85	0.88	0.83	0.90	0.85	
Hourly flow rate (vph)	60	56	116	75	61	28	68	340	55	29	220	40	
Pedestrians													
Lane Width (m)													
Walking Speed (m/s)													
Percent Blockage													
Right turn flare (veh)													
Median type	None						None						
Median storage veh													
Upstream signal (m)													
pX, platoon unblocked													
vC, conflicting volume	812	809	220	810	822	368	260						395
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	812	809	220	810	822	368	260						395
tC, single (s)	7.2	6.5	6.3	7.1	6.6	6.2	4.2						4.1
tC, 2 stage (s)													
tF (s)	3.6	4.0	3.4	3.5	4.1	3.3	2.3						2.2
p0 queue free %	72	81	86	64	78	96	95						97
cM capacity (veh/h)	214	292	805	207	281	682	1265						1147
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3						
Volume Total	232	164	68	395	29	220	40						
Volume Left	60	75	68	0	29	0	0						
Volume Right	116	28	0	55	0	0	40						
cSH	376	264	1265	1700	1147	1700	1700						
Volume to Capacity	0.62	0.62	0.05	0.23	0.03	0.13	0.02						
Queue Length 95th (m)	31.7	30.2	1.4	0.0	0.6	0.0	0.0						
Control Delay (s)	28.8	38.5	8.0	0.0	8.2	0.0	0.0						
Lane LOS	D	E	A	A									
Approach Delay (s)	28.8	38.5	1.2	0.8									
Approach LOS	D	E											
Intersection Summary													
Average Delay			12.0										
Intersection Capacity Utilization			42.0%		ICU Level of Service				A				
Analysis Period (min)			15										

Lanes, Volumes, Timings
3: Lundy's Lane & Barker Parkway

2036 Future Total AM
01-30-2024



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕↕	↕↕		↕	↕
Traffic Volume (vph)	49	35	23	149	61	47
Future Volume (vph)	49	35	23	149	61	47
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	0.95	0.95	1.00	1.00
Frt			0.868			0.850
Flt Protected		0.971			0.950	
Satd. Flow (prot)	0	3223	2578	0	1626	1509
Flt Permitted		0.971			0.950	
Satd. Flow (perm)	0	3223	2578	0	1626	1509
Link Speed (k/h)		50	50		50	
Link Distance (m)		269.5	290.5		183.4	
Travel Time (s)		19.4	20.9		13.2	
Peak Hour Factor	0.78	0.82	0.77	0.69	0.73	0.78
Heavy Vehicles (%)	12%	4%	4%	24%	11%	7%
Adj. Flow (vph)	63	43	30	216	84	60
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	106	246	0	84	60
Sign Control		Yield	Yield		Yield	

Intersection Summary

Area Type: Other

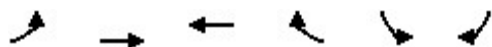
Control Type: Roundabout

Intersection Capacity Utilization 22.2% ICU Level of Service A

Analysis Period (min) 15

HCM Unsignalized Intersection Capacity Analysis 3: Lundy's Lane & Barker Parkway

2036 Future Total AM
01-30-2024



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Right Turn Channelized						
Traffic Volume (veh/h)	49	35	23	149	61	47
Future Volume (veh/h)	49	35	23	149	61	47
Peak Hour Factor	0.78	0.82	0.77	0.69	0.73	0.78
Hourly flow rate (vph)	63	43	30	216	84	60
Approach Volume (veh/h)		106	246		144	
Crossing Volume (veh/h)		84	63		30	
High Capacity (veh/h)		1297	1318		1353	
High v/c (veh/h)		0.08	0.19		0.11	
Low Capacity (veh/h)		1081	1101		1132	
Low v/c (veh/h)		0.10	0.22		0.13	
Intersection Summary						
Maximum v/c High			0.19			
Maximum v/c Low			0.22			
Intersection Capacity Utilization			22.2%		ICU Level of Service	A

Lanes, Volumes, Timings
4: Thorold Townline Road & Lundy's Lane

2036 Future Total AM
01-30-2024

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	34	463	81	42	361	29	66	176	34	102	117	23
Future Volume (vph)	34	463	81	42	361	29	66	176	34	102	117	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	150.0		32.0	76.0		0.0	30.0		0.0	40.0		0.0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.989			0.972			0.968	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1703	1863	1468	1805	1804	0	1626	1669	0	1467	1616	0
Flt Permitted	0.364			0.227			0.630			0.552		
Satd. Flow (perm)	652	1863	1468	431	1804	0	1078	1669	0	853	1616	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			59		6			15			18	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		307.3			478.1			247.2			197.8	
Travel Time (s)		22.1			34.4			17.8			14.2	
Peak Hour Factor	0.71	0.78	0.88	0.81	0.88	0.85	0.79	0.79	0.65	0.56	0.73	0.52
Heavy Vehicles (%)	6%	2%	10%	0%	4%	6%	11%	11%	9%	23%	14%	13%
Adj. Flow (vph)	48	594	92	52	410	34	84	223	52	182	160	44
Shared Lane Traffic (%)												
Lane Group Flow (vph)	48	594	92	52	444	0	84	275	0	182	204	0
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Detector Phase	4	4	4	8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	20.0	20.0	20.0	20.0	20.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	33.0	33.0	33.0	32.0	32.0		35.0	35.0		35.0	35.0	
Total Split (s)	50.0	50.0	50.0	50.0	50.0		40.0	40.0		40.0	40.0	
Total Split (%)	55.6%	55.6%	55.6%	55.6%	55.6%		44.4%	44.4%		44.4%	44.4%	
Yellow Time (s)	5.0	5.0	5.0	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)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	7.0	7.0	7.0	6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None		Max	Max		Max	Max	
Act Effct Green (s)	32.6	32.6	32.6	33.6	33.6		34.4	34.4		34.4	34.4	
Actuated g/C Ratio	0.41	0.41	0.41	0.42	0.42		0.43	0.43		0.43	0.43	
v/c Ratio	0.18	0.78	0.15	0.29	0.58		0.18	0.38		0.50	0.29	
Control Delay	16.1	28.4	6.8	19.2	20.5		18.3	18.5		25.1	16.9	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	16.1	28.4	6.8	19.2	20.5		18.3	18.5		25.1	16.9	
LOS	B	C	A	B	C		B	B		C	B	
Approach Delay		24.9			20.4			18.4			20.7	
Approach LOS		C			C			B			C	
Queue Length 50th (m)	4.7	79.5	3.1	5.3	51.6		8.2	27.8		20.9	19.0	

Lanes, Volumes, Timings
4: Thorold Townline Road & Lundy's Lane

2036 Future Total AM
01-30-2024

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (m)	8.9	93.5	10.8	12.0	75.7		18.0	47.6		25.4	31.5	
Internal Link Dist (m)		283.3			454.1			223.2			173.8	
Turn Bay Length (m)	150.0		32.0	76.0			30.0			40.0		
Base Capacity (vph)	353	1010	823	239	1004		462	724		365	703	
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	0.14	0.59	0.11	0.22	0.44		0.18	0.38		0.50	0.29	

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 80.1

Natural Cycle: 70

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.78

Intersection Signal Delay: 21.8

Intersection LOS: C

Intersection Capacity Utilization 69.6%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 4: Thorold Townline Road & Lundy's Lane

 Ø2	 Ø4
40 s	50 s
 Ø6	 Ø8
40 s	50 s

Lanes, Volumes, Timings
5: Thorold Townline Road & Upper's Lane

2036 Future Total AM
01-30-2024

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	0	14	0	0	1	6	222	2	3	278	4
Future Volume (vph)	5	0	14	0	0	1	6	222	2	3	278	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.899			0.865			0.998			0.994	
Flt Protected		0.988						0.999			0.999	
Satd. Flow (prot)	0	1655	0	0	1644	0	0	1699	0	0	1852	0
Flt Permitted		0.988						0.999			0.999	
Satd. Flow (perm)	0	1655	0	0	1644	0	0	1699	0	0	1852	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		488.7			510.1			142.0			229.8	
Travel Time (s)		35.2			36.7			10.2			16.5	
Peak Hour Factor	0.92	0.92	0.92	0.25	0.25	0.25	0.92	0.85	0.50	0.75	0.83	0.25
Heavy Vehicles (%)	2%	2%	2%	0%	0%	0%	0%	12%	0%	0%	2%	0%
Adj. Flow (vph)	5	0	15	0	0	4	7	261	4	4	335	16
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	20	0	0	4	0	0	272	0	0	355	0
Sign Control		Stop			Stop			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	28.6%				ICU Level of Service A							
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis 5: Thorold Townline Road & Upper's Lane

2036 Future Total AM
01-30-2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control	Stop			Stop			Stop			Stop		
Traffic Volume (vph)	5	0	14	0	0	1	6	222	2	3	278	4
Future Volume (vph)	5	0	14	0	0	1	6	222	2	3	278	4
Peak Hour Factor	0.92	0.92	0.92	0.25	0.25	0.25	0.92	0.85	0.50	0.75	0.83	0.25
Hourly flow rate (vph)	5	0	15	0	0	4	7	261	4	4	335	16
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	20	4	272	355								
Volume Left (vph)	5	0	7	4								
Volume Right (vph)	15	4	4	16								
Hadj (s)	-0.37	-0.60	0.19	0.01								
Departure Headway (s)	4.9	4.7	4.5	4.3								
Degree Utilization, x	0.03	0.01	0.34	0.42								
Capacity (veh/h)	644	663	782	827								
Control Delay (s)	8.0	7.7	9.8	10.3								
Approach Delay (s)	8.0	7.7	9.8	10.3								
Approach LOS	A	A	A	B								
Intersection Summary												
Delay				10.0								
Level of Service				B								
Intersection Capacity Utilization				28.6%	ICU Level of Service	A						
Analysis Period (min)				15								

Lanes, Volumes, Timings
6: Thorold Townline Road & Venture Way

2036 Future Total AM
01-30-2024

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	33	90	19	0	4	13
Future Volume (vph)	33	90	19	0	4	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.901	0.895				
Flt Protected	0.987	0.950				
Satd. Flow (prot)	1657	0	0	1770	1667	0
Flt Permitted	0.987	0.950				
Satd. Flow (perm)	1657	0	0	1770	1667	0
Link Speed (k/h)	50	50				
Link Distance (m)	574.7	229.8				
Travel Time (s)	41.4	7.4				
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	36	98	21	0	4	14
Shared Lane Traffic (%)						
Lane Group Flow (vph)	134	0	0	21	18	0
Sign Control	Stop	Stop				
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	21.8%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis

6: Thorold Townline Road & Venture Way

2036 Future Total AM
01-30-2024

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Traffic Volume (vph)	33	90	19	0	4	13
Future Volume (vph)	33	90	19	0	4	13
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	36	98	21	0	4	14
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total (vph)	134	21	18			
Volume Left (vph)	36	21	0			
Volume Right (vph)	98	0	14			
Hadj (s)	-0.35	0.23	-0.43			
Departure Headway (s)	3.6	4.4	3.8			
Degree Utilization, x	0.14	0.03	0.02			
Capacity (veh/h)	975	782	921			
Control Delay (s)	7.2	7.5	6.8			
Approach Delay (s)	7.2	7.5	6.8			
Approach LOS	A	A	A			
Intersection Summary						
Delay			7.2			
Level of Service			A			
Intersection Capacity Utilization			21.8%	ICU Level of Service	A	
Analysis Period (min)			15			

Lanes, Volumes, Timings
7: Beaverdams Road & Thorold Townline Road

2036 Future Total AM
01-30-2024

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	34	143	32	14	216	42	34	179	35	20	117	25
Future Volume (vph)	34	143	32	14	216	42	34	179	35	20	117	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.972			0.981			0.971			0.976	
Flt Protected		0.991			0.996			0.993			0.990	
Satd. Flow (prot)	0	1716	0	0	1842	0	0	1714	0	0	1665	0
Flt Permitted		0.991			0.996			0.993			0.990	
Satd. Flow (perm)	0	1716	0	0	1842	0	0	1714	0	0	1665	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		197.0			309.7			169.2			132.8	
Travel Time (s)		14.2			22.3			12.2			9.6	
Peak Hour Factor	0.77	0.93	0.62	0.50	0.74	0.81	0.71	0.84	0.50	0.45	0.81	0.63
Heavy Vehicles (%)	12%	4%	10%	0%	1%	0%	3%	10%	0%	0%	14%	8%
Adj. Flow (vph)	44	154	52	28	292	52	48	213	70	44	144	40
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	250	0	0	372	0	0	331	0	0	228	0
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 47.4%

ICU Level of Service A

Analysis Period (min) 15

HCM Unsignalized Intersection Capacity Analysis

7: Beaverdams Road & Thorold Townline Road

2036 Future Total AM
01-30-2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control	Stop			Stop			Stop			Stop		
Traffic Volume (vph)	34	143	32	14	216	42	34	179	35	20	117	25
Future Volume (vph)	34	143	32	14	216	42	34	179	35	20	117	25
Peak Hour Factor	0.77	0.93	0.62	0.50	0.74	0.81	0.71	0.84	0.50	0.45	0.81	0.63
Hourly flow rate (vph)	44	154	52	28	292	52	48	213	70	44	144	40
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	250	372	331	228								
Volume Left (vph)	44	28	48	44								
Volume Right (vph)	52	52	70	40								
Hadj (s)	0.02	-0.06	0.02	0.11								
Departure Headway (s)	6.8	6.4	6.6	6.9								
Degree Utilization, x	0.47	0.66	0.61	0.44								
Capacity (veh/h)	470	520	503	452								
Control Delay (s)	15.6	20.9	19.2	15.3								
Approach Delay (s)	15.6	20.9	19.2	15.3								
Approach LOS	C	C	C	C								
Intersection Summary												
Delay				18.2								
Level of Service				C								
Intersection Capacity Utilization				47.4%	ICU Level of Service				A			
Analysis Period (min)				15								

Lanes, Volumes, Timings
8: Barker Parkway & Venture Way

2036 Future Total AM
01-30-2024

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	19	4	1	1	0	8	1	61	0	24	19	13
Future Volume (vph)	19	4	1	1	0	8	1	61	0	24	19	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.994			0.881						0.945	
Flt Protected		0.957			0.994			0.999			0.990	
Satd. Flow (prot)	0	1800	0	0	1582	0	0	1898	0	0	1544	0
Flt Permitted		0.957			0.994			0.999			0.990	
Satd. Flow (perm)	0	1800	0	0	1582	0	0	1898	0	0	1544	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		143.7			157.1			135.3			345.6	
Travel Time (s)		10.3			11.3			9.7			24.9	
Peak Hour Factor	0.25	0.75	0.25	0.44	0.58	0.54	0.25	0.25	0.29	0.95	0.38	0.25
Heavy Vehicles (%)	0%	7%	0%	29%	14%	2%	0%	0%	0%	11%	33%	0%
Adj. Flow (vph)	76	5	4	2	0	15	4	244	0	25	50	52
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	85	0	0	17	0	0	248	0	0	127	0
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 22.5%

ICU Level of Service A

Analysis Period (min) 15

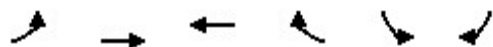
HCM Unsignalized Intersection Capacity Analysis 8: Barker Parkway & Venture Way

2036 Future Total AM
01-30-2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control	Stop			Stop			Stop			Stop		
Traffic Volume (vph)	19	4	1	1	0	8	1	61	0	24	19	13
Future Volume (vph)	19	4	1	1	0	8	1	61	0	24	19	13
Peak Hour Factor	0.25	0.75	0.25	0.44	0.58	0.54	0.25	0.25	0.29	0.95	0.38	0.25
Hourly flow rate (vph)	76	5	4	2	0	15	4	244	0	25	50	52
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	85	17	248	127								
Volume Left (vph)	76	2	4	25								
Volume Right (vph)	4	15	0	52								
Hadj (s)	0.16	-0.42	0.00	0.05								
Departure Headway (s)	4.9	4.4	4.3	4.5								
Degree Utilization, x	0.12	0.02	0.30	0.16								
Capacity (veh/h)	673	729	811	768								
Control Delay (s)	8.6	7.5	9.1	8.3								
Approach Delay (s)	8.6	7.5	9.1	8.3								
Approach LOS	A	A	A	A								
Intersection Summary												
Delay				8.7								
Level of Service				A								
Intersection Capacity Utilization				22.5%	ICU Level of Service	A						
Analysis Period (min)				15								

Lanes, Volumes, Timings
9: Upper's Lane & Street C

2036 Future Total AM
01-30-2024



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	22	0	0	10	19	45
Future Volume (vph)	22	0	0	10	19	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.865		0.905	
Flt Protected		0.950			0.985	
Satd. Flow (prot)	0	1770	1611	0	1660	0
Flt Permitted		0.950			0.985	
Satd. Flow (perm)	0	1770	1611	0	1660	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		461.7	162.2		264.6	
Travel Time (s)		33.2	11.7		19.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	24	0	0	11	21	49
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	24	11	0	70	0
Sign Control		Stop	Stop		Stop	

Intersection Summary

Area Type: Other

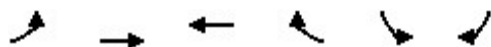
Control Type: Unsignalized

Intersection Capacity Utilization 18.4% ICU Level of Service A

Analysis Period (min) 15

HCM Unsignalized Intersection Capacity Analysis 9: Upper's Lane & Street C

2036 Future Total AM
01-30-2024



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Stop	Stop		Stop	
Traffic Volume (vph)	22	0	0	10	19	45
Future Volume (vph)	22	0	0	10	19	45
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	24	0	0	11	21	49
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total (vph)	24	11	70			
Volume Left (vph)	24	0	21			
Volume Right (vph)	0	11	49			
Hadj (s)	0.23	-0.57	-0.33			
Departure Headway (s)	4.3	3.5	3.6			
Degree Utilization, x	0.03	0.01	0.07			
Capacity (veh/h)	822	1003	965			
Control Delay (s)	7.4	6.5	6.9			
Approach Delay (s)	7.4	6.5	6.9			
Approach LOS	A	A	A			
Intersection Summary						
Delay			7.0			
Level of Service			A			
Intersection Capacity Utilization			18.4%	ICU Level of Service	A	
Analysis Period (min)			15			

Lanes, Volumes, Timings
1: Davis Road & Barker Parkway

2036 Future Total PM
01-30-2024

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	23	94	425	46	162	437
Future Volume (vph)	23	94	425	46	162	437
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0		118.0	135.0	
Storage Lanes	1	0		1	1	
Taper Length (m)	7.5				7.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.899			0.850		
Flt Protected	0.987				0.950	
Satd. Flow (prot)	1661	0	1863	1524	1787	1827
Flt Permitted	0.987				0.950	
Satd. Flow (perm)	1661	0	1863	1524	1787	1827
Link Speed (k/h)	50		50			50
Link Distance (m)	345.6		411.8			484.4
Travel Time (s)	24.9		29.6			34.9
Peak Hour Factor	0.63	0.87	0.89	0.85	0.88	0.91
Heavy Vehicles (%)	0%	2%	2%	6%	1%	4%
Adj. Flow (vph)	37	108	478	54	184	480
Shared Lane Traffic (%)						
Lane Group Flow (vph)	145	0	478	54	184	480
Sign Control	Stop		Free			Free

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 48.4% ICU Level of Service A

Analysis Period (min) 15

HCM Unsignalized Intersection Capacity Analysis

1: Davis Road & Barker Parkway

2036 Future Total PM
01-30-2024

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	23	94	425	46	162	437
Future Volume (Veh/h)	23	94	425	46	162	437
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.63	0.87	0.89	0.85	0.88	0.91
Hourly flow rate (vph)	37	108	478	54	184	480
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None		None	
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1326	478			532	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1326	478			532	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	74	82			82	
cM capacity (veh/h)	143	587			1041	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	145	478	54	184	480	
Volume Left	37	0	0	184	0	
Volume Right	108	0	54	0	0	
cSH	327	1700	1700	1041	1700	
Volume to Capacity	0.44	0.28	0.03	0.18	0.28	
Queue Length 95th (m)	17.4	0.0	0.0	5.1	0.0	
Control Delay (s)	24.5	0.0	0.0	9.2	0.0	
Lane LOS	C			A		
Approach Delay (s)	24.5	0.0		2.5		
Approach LOS	C					
Intersection Summary						
Average Delay			3.9			
Intersection Capacity Utilization			48.4%	ICU Level of Service		A
Analysis Period (min)			15			

Lanes, Volumes, Timings
2: Davis Road & Upper's Lane

2036 Future Total PM
01-30-2024

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	35	31	107	62	20	23	101	400	76	44	323	66
Future Volume (vph)	35	31	107	62	20	23	101	400	76	44	323	66
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	170.0		0.0	140.0		117.0
Storage Lanes	0		0	0		0	1		0	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.929			0.968			0.969				0.850
Flt Protected		0.990			0.976		0.950			0.950		
Satd. Flow (prot)	0	1630	0	0	1767	0	1656	1758	0	1719	1681	1482
Flt Permitted		0.990			0.976		0.950			0.950		
Satd. Flow (perm)	0	1630	0	0	1767	0	1656	1758	0	1719	1681	1482
Link Speed (k/h)		50			50			50				50
Link Distance (m)		190.8			63.3			356.3			336.3	
Travel Time (s)		13.7			4.6			25.7			24.2	
Peak Hour Factor	0.58	0.42	0.72	0.82	0.50	0.64	0.74	0.89	0.64	0.67	0.96	0.79
Heavy Vehicles (%)	14%	0%	8%	0%	6%	0%	9%	6%	0%	5%	13%	9%
Adj. Flow (vph)	60	74	149	76	40	36	136	449	119	66	336	84
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	283	0	0	152	0	136	568	0	66	336	84
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 53.2% ICU Level of Service A

Analysis Period (min) 15

HCM Unsignalized Intersection Capacity Analysis

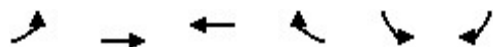
2: Davis Road & Upper's Lane

2036 Future Total PM
01-30-2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	35	31	107	62	20	23	101	400	76	44	323	66
Future Volume (Veh/h)	35	31	107	62	20	23	101	400	76	44	323	66
Sign Control	Stop				Stop				Free			
Grade	0%				0%				0%			
Peak Hour Factor	0.58	0.42	0.72	0.82	0.50	0.64	0.74	0.89	0.64	0.67	0.96	0.79
Hourly flow rate (vph)	60	74	149	76	40	36	136	449	119	66	336	84
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type							None			None		
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1245	1308	336	1286	1332	508	420				568	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1245	1308	336	1286	1332	508	420				568	
tC, single (s)	7.2	6.5	6.3	7.1	6.6	6.2	4.2				4.1	
tC, 2 stage (s)												
tF (s)	3.6	4.0	3.4	3.5	4.1	3.3	2.3				2.2	
p0 queue free %	31	44	78	0	68	94	88				93	
cM capacity (veh/h)	87	132	692	54	124	569	1103				989	
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3					
Volume Total	283	152	136	568	66	336	84					
Volume Left	60	76	136	0	66	0	0					
Volume Right	149	36	0	119	0	0	84					
cSH	193	85	1103	1700	989	1700	1700					
Volume to Capacity	1.47	1.78	0.12	0.33	0.07	0.20	0.05					
Queue Length 95th (m)	139.1	102.4	3.4	0.0	1.7	0.0	0.0					
Control Delay (s)	282.2	478.6	8.7	0.0	8.9	0.0	0.0					
Lane LOS	F	F	A			A						
Approach Delay (s)	282.2	478.6	1.7			1.2						
Approach LOS	F	F										
Intersection Summary												
Average Delay	95.0											
Intersection Capacity Utilization	53.2%			ICU Level of Service				A				
Analysis Period (min)	15											

Lanes, Volumes, Timings
3: Lundy's Lane & Barker Parkway

2036 Future Total PM
01-30-2024



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕↕	↕↕		↕	↕
Traffic Volume (vph)	46	697	730	54	55	60
Future Volume (vph)	46	697	730	54	55	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	0.95	0.95	1.00	1.00
Frt			0.985			0.850
Flt Protected		0.997			0.950	
Satd. Flow (prot)	0	3529	3514	0	1805	1583
Flt Permitted		0.997			0.950	
Satd. Flow (perm)	0	3529	3514	0	1805	1583
Link Speed (k/h)		50	50		50	
Link Distance (m)		269.5	290.5		183.4	
Travel Time (s)		19.4	20.9		13.2	
Peak Hour Factor	0.82	0.75	0.95	0.62	0.56	0.71
Heavy Vehicles (%)	2%	2%	1%	3%	0%	2%
Adj. Flow (vph)	56	929	768	87	98	85
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	985	855	0	98	85
Sign Control		Yield	Yield		Yield	

Intersection Summary

Area Type: Other

Control Type: Roundabout

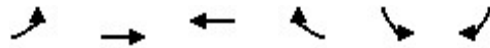
Intersection Capacity Utilization 55.8% ICU Level of Service B

Analysis Period (min) 15

HCM Unsignalized Intersection Capacity Analysis

3: Lundy's Lane & Barker Parkway

2036 Future Total PM
01-30-2024



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Right Turn Channelized						
Traffic Volume (veh/h)	46	697	730	54	55	60
Future Volume (veh/h)	46	697	730	54	55	60
Peak Hour Factor	0.82	0.75	0.95	0.62	0.56	0.71
Hourly flow rate (vph)	56	929	768	87	98	85
Approach Volume (veh/h)		985	855		183	
Crossing Volume (veh/h)		98	56		768	
High Capacity (veh/h)		1283	1326		752	
High v/c (veh/h)		0.77	0.65		0.24	
Low Capacity (veh/h)		1068	1107		595	
Low v/c (veh/h)		0.92	0.77		0.31	
Intersection Summary						
Maximum v/c High			0.77			
Maximum v/c Low			0.92			
Intersection Capacity Utilization			55.8%		ICU Level of Service	B

Lanes, Volumes, Timings
4: Thorold Townline Road & Lundy's Lane

2036 Future Total PM
01-30-2024

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	27	605	112	31	552	49	141	189	62	87	214	31
Future Volume (vph)	27	605	112	31	552	49	141	189	62	87	214	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	150.0		32.0	76.0		0.0	30.0		0.0	40.0		0.0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.974			0.951			0.981	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1736	1881	1599	1805	1835	0	1770	1760	0	1719	1831	0
Flt Permitted	0.161			0.107			0.522			0.461		
Satd. Flow (perm)	294	1881	1599	203	1835	0	972	1760	0	834	1831	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			72		16			32			10	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		307.3			478.1			247.2			197.8	
Travel Time (s)		22.1			34.4			17.8			14.2	
Peak Hour Factor	0.84	0.77	0.76	0.65	0.94	0.40	0.74	0.85	0.57	0.68	0.88	0.86
Heavy Vehicles (%)	4%	1%	1%	0%	1%	0%	2%	4%	0%	5%	1%	7%
Adj. Flow (vph)	32	786	147	48	587	123	191	222	109	128	243	36
Shared Lane Traffic (%)												
Lane Group Flow (vph)	32	786	147	48	710	0	191	331	0	128	279	0
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Detector Phase	4	4	4	8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	20.0	20.0	20.0	20.0	20.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	33.0	33.0	33.0	32.0	32.0		35.0	35.0		35.0	35.0	
Total Split (s)	50.0	50.0	50.0	50.0	50.0		40.0	40.0		40.0	40.0	
Total Split (%)	55.6%	55.6%	55.6%	55.6%	55.6%		44.4%	44.4%		44.4%	44.4%	
Yellow Time (s)	5.0	5.0	5.0	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)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	7.0	7.0	7.0	6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None		Max	Max		Max	Max	
Act Effct Green (s)	40.6	40.6	40.6	41.6	41.6		34.1	34.1		34.1	34.1	
Actuated g/C Ratio	0.46	0.46	0.46	0.47	0.47		0.39	0.39		0.39	0.39	
v/c Ratio	0.24	0.90	0.19	0.50	0.81		0.51	0.47		0.40	0.39	
Control Delay	19.4	37.3	7.9	37.4	27.8		27.1	21.3		25.0	21.2	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	19.4	37.3	7.9	37.4	27.8		27.1	21.3		25.0	21.2	
LOS	B	D	A	D	C		C	C		C	C	
Approach Delay		32.2			28.4			23.4			22.4	
Approach LOS		C			C			C			C	
Queue Length 50th (m)	3.3	123.1	7.2	5.6	100.2		26.4	40.4		16.8	35.1	

Lanes, Volumes, Timings
4: Thorold Townline Road & Lundy's Lane

2036 Future Total PM
01-30-2024

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (m)	9.3	135.5	13.4	11.3	149.8		37.0	60.3		23.2	55.1	
Internal Link Dist (m)		283.3			454.1			223.2			173.8	
Turn Bay Length (m)	150.0		32.0	76.0			30.0			40.0		
Base Capacity (vph)	144	924	822	102	931		378	703		324	717	
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	0.22	0.85	0.18	0.47	0.76		0.51	0.47		0.40	0.39	

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 87.7

Natural Cycle: 75

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.90

Intersection Signal Delay: 27.9

Intersection LOS: C

Intersection Capacity Utilization 69.7%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 4: Thorold Townline Road & Lundy's Lane

 Ø2	 Ø4
40 s	50 s
 Ø6	 Ø8
40 s	50 s

Lanes, Volumes, Timings
5: Thorold Townline Road & Upper's Lane

2036 Future Total PM
01-30-2024

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	0	9	0	0	2	21	277	0	0	375	11
Future Volume (vph)	3	0	9	0	0	2	21	277	0	0	375	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.896			0.865						0.996	
Flt Protected		0.989						0.997				
Satd. Flow (prot)	0	1651	0	0	1644	0	0	1824	0	0	1821	0
Flt Permitted		0.989						0.997				
Satd. Flow (perm)	0	1651	0	0	1644	0	0	1824	0	0	1821	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		488.7			510.1			142.0			229.8	
Travel Time (s)		35.2			36.7			10.2			16.5	
Peak Hour Factor	0.92	0.92	0.92	0.25	0.92	0.25	0.92	0.83	0.25	0.25	0.95	0.92
Heavy Vehicles (%)	2%	2%	2%	0%	2%	0%	2%	4%	0%	0%	4%	2%
Adj. Flow (vph)	3	0	10	0	0	8	23	334	0	0	395	12
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	13	0	0	8	0	0	357	0	0	407	0
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 42.0%

ICU Level of Service A

Analysis Period (min) 15

HCM Unsignalized Intersection Capacity Analysis 5: Thorold Townline Road & Upper's Lane

2036 Future Total PM
01-30-2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	3	0	9	0	0	2	21	277	0	0	375	11
Future Volume (vph)	3	0	9	0	0	2	21	277	0	0	375	11
Peak Hour Factor	0.92	0.92	0.92	0.25	0.92	0.25	0.92	0.83	0.25	0.25	0.95	0.92
Hourly flow rate (vph)	3	0	10	0	0	8	23	334	0	0	395	12
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	13	8	357	407								
Volume Left (vph)	3	0	23	0								
Volume Right (vph)	10	8	0	12								
Hadj (s)	-0.38	-0.60	0.08	0.05								
Departure Headway (s)	5.2	5.0	4.4	4.4								
Degree Utilization, x	0.02	0.01	0.44	0.49								
Capacity (veh/h)	597	615	794	806								
Control Delay (s)	8.3	8.0	10.9	11.6								
Approach Delay (s)	8.3	8.0	10.9	11.6								
Approach LOS	A	A	B	B								
Intersection Summary												
Delay				11.2								
Level of Service				B								
Intersection Capacity Utilization				42.0%	ICU Level of Service	A						
Analysis Period (min)				15								

Lanes, Volumes, Timings
6: Thorold Townline Road & Venture Way

2036 Future Total PM
01-30-2024

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	21	58	51	0	11	42
Future Volume (vph)	21	58	51	0	11	42
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	0.901				0.893	
Flt Protected	0.987				0.950	
Satd. Flow (prot)	1657	0	0	1770	1663	0
Flt Permitted	0.987				0.950	
Satd. Flow (perm)	1657	0	0	1770	1663	0
Link Speed (k/h)	50				50	50
Link Distance (m)	574.7				229.8	102.8
Travel Time (s)	41.4				16.5	7.4
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	23	63	55	0	12	46
Shared Lane Traffic (%)						
Lane Group Flow (vph)	86	0	0	55	58	0
Sign Control	Stop				Stop	Stop
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	20.9%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis 6: Thorold Townline Road & Venture Way

2036 Future Total PM
01-30-2024

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Traffic Volume (vph)	21	58	51	0	11	42
Future Volume (vph)	21	58	51	0	11	42
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	23	63	55	0	12	46
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total (vph)	86	55	58			
Volume Left (vph)	23	55	0			
Volume Right (vph)	63	0	46			
Hadj (s)	-0.35	0.23	-0.44			
Departure Headway (s)	3.8	4.4	3.7			
Degree Utilization, x	0.09	0.07	0.06			
Capacity (veh/h)	920	798	947			
Control Delay (s)	7.2	7.7	6.9			
Approach Delay (s)	7.2	7.7	6.9			
Approach LOS	A	A	A			
Intersection Summary						
Delay			7.2			
Level of Service			A			
Intersection Capacity Utilization			20.9%	ICU Level of Service	A	
Analysis Period (min)			15			

Lanes, Volumes, Timings
7: Beaverdams Road & Thorold Townline Road

2036 Future Total PM
01-30-2024

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	239	47	37	217	27	39	169	25	40	247	57
Future Volume (vph)	30	239	47	37	217	27	39	169	25	40	247	57
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.977			0.982			0.968			0.973	
Flt Protected		0.994			0.991			0.993			0.994	
Satd. Flow (prot)	0	1826	0	0	1827	0	0	1782	0	0	1760	0
Flt Permitted		0.994			0.991			0.993			0.994	
Satd. Flow (perm)	0	1826	0	0	1827	0	0	1782	0	0	1760	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		197.0			309.7			169.2			132.8	
Travel Time (s)		14.2			22.3			12.2			9.6	
Peak Hour Factor	0.75	0.92	0.78	0.63	0.95	0.61	0.89	0.86	0.33	0.83	0.93	0.71
Heavy Vehicles (%)	3%	1%	0%	3%	1%	0%	0%	4%	0%	5%	5%	2%
Adj. Flow (vph)	40	260	60	59	228	44	44	197	76	48	266	80
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	360	0	0	331	0	0	317	0	0	394	0
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 51.5%

ICU Level of Service A

Analysis Period (min) 15

HCM Unsignalized Intersection Capacity Analysis

7: Beaverdams Road & Thorold Townline Road

2036 Future Total PM
01-30-2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	30	239	47	37	217	27	39	169	25	40	247	57
Future Volume (vph)	30	239	47	37	217	27	39	169	25	40	247	57
Peak Hour Factor	0.75	0.92	0.78	0.63	0.95	0.61	0.89	0.86	0.33	0.83	0.93	0.71
Hourly flow rate (vph)	40	260	60	59	228	44	44	197	76	48	266	80
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	360	331	317	394								
Volume Left (vph)	40	59	44	48								
Volume Right (vph)	60	44	76	80								
Hadj (s)	-0.06	-0.02	-0.07	-0.02								
Departure Headway (s)	8.2	8.3	8.3	8.0								
Degree Utilization, x	0.82	0.76	0.73	0.88								
Capacity (veh/h)	418	402	404	394								
Control Delay (s)	38.3	33.5	30.8	46.7								
Approach Delay (s)	38.3	33.5	30.8	46.7								
Approach LOS	E	D	D	E								
Intersection Summary												
Delay				37.8								
Level of Service				E								
Intersection Capacity Utilization				51.5%	ICU Level of Service				A			
Analysis Period (min)				15								

Lanes, Volumes, Timings
8: Barker Parkway & Venture Way

2036 Future Total PM
01-30-2024

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	11	0	1	0	7	2	56	1	69	43	19
Future Volume (vph)	15	11	0	1	0	7	2	56	1	69	43	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.877			0.999			0.965	
Flt Protected		0.962			0.995			0.998			0.978	
Satd. Flow (prot)	0	1828	0	0	1658	0	0	1894	0	0	1793	0
Flt Permitted		0.962			0.995			0.998			0.978	
Satd. Flow (perm)	0	1828	0	0	1658	0	0	1894	0	0	1793	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		143.7			157.1			135.3			345.6	
Travel Time (s)		10.3			11.3			9.7			24.9	
Peak Hour Factor	0.25	0.68	0.25	0.75	1.00	0.68	0.25	0.25	0.58	0.54	0.50	0.25
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	60	16	0	1	0	10	8	224	2	128	86	76
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	76	0	0	11	0	0	234	0	0	290	0
Sign Control		Stop			Stop			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	25.1%						ICU Level of Service A					
Analysis Period (min)	15											

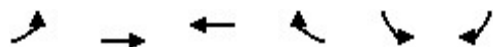
HCM Unsignalized Intersection Capacity Analysis 8: Barker Parkway & Venture Way

2036 Future Total PM
01-30-2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control	Stop			Stop			Stop			Stop		
Traffic Volume (vph)	15	11	0	1	0	7	2	56	1	69	43	19
Future Volume (vph)	15	11	0	1	0	7	2	56	1	69	43	19
Peak Hour Factor	0.25	0.68	0.25	0.75	1.00	0.68	0.25	0.25	0.58	0.54	0.50	0.25
Hourly flow rate (vph)	60	16	0	1	0	10	8	224	2	128	86	76
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	76	11	234	290								
Volume Left (vph)	60	1	8	128								
Volume Right (vph)	0	10	2	76								
Hadj (s)	0.16	-0.53	0.00	-0.07								
Departure Headway (s)	5.2	4.7	4.4	4.3								
Degree Utilization, x	0.11	0.01	0.29	0.35								
Capacity (veh/h)	621	673	783	804								
Control Delay (s)	8.9	7.7	9.2	9.6								
Approach Delay (s)	8.9	7.7	9.2	9.6								
Approach LOS	A	A	A	A								
Intersection Summary												
Delay				9.3								
Level of Service				A								
Intersection Capacity Utilization				25.1%	ICU Level of Service	A						
Analysis Period (min)				15								

Lanes, Volumes, Timings
9: Upper's Lane & Street C

2036 Future Total PM
01-30-2024



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	72	0	0	31	12	29
Future Volume (vph)	72	0	0	31	12	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.865		0.904	
Flt Protected		0.950			0.986	
Satd. Flow (prot)	0	1770	1611	0	1660	0
Flt Permitted		0.950			0.986	
Satd. Flow (perm)	0	1770	1611	0	1660	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		461.7	162.2		264.6	
Travel Time (s)		33.2	11.7		19.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	78	0	0	34	13	32
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	78	34	0	45	0
Sign Control		Stop	Stop		Stop	

Intersection Summary

Area Type: Other

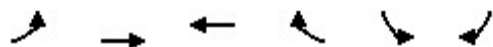
Control Type: Unsignalized

Intersection Capacity Utilization 20.7% ICU Level of Service A

Analysis Period (min) 15

HCM Unsignalized Intersection Capacity Analysis 9: Upper's Lane & Street C

2036 Future Total PM
01-30-2024



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Stop	Stop		Stop	
Traffic Volume (vph)	72	0	0	31	12	29
Future Volume (vph)	72	0	0	31	12	29
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	78	0	0	34	13	32
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total (vph)	78	34	45			
Volume Left (vph)	78	0	13			
Volume Right (vph)	0	34	32			
Hadj (s)	0.23	-0.57	-0.33			
Departure Headway (s)	4.3	3.5	3.8			
Degree Utilization, x	0.09	0.03	0.05			
Capacity (veh/h)	831	1005	910			
Control Delay (s)	7.7	6.6	7.0			
Approach Delay (s)	7.7	6.6	7.0			
Approach LOS	A	A	A			
Intersection Summary						
Delay			7.3			
Level of Service			A			
Intersection Capacity Utilization			20.7%	ICU Level of Service	A	
Analysis Period (min)			15			

Lanes, Volumes, Timings
1: Davis Road & Barker Parkway

2036 Future Total AM - Scenario 2

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	23	175	367	23	61	276
Future Volume (vph)	23	175	367	23	61	276
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0		118.0	135.0	
Storage Lanes	1	0		1	1	
Taper Length (m)	7.5				7.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.882			0.850		
Flt Protected	0.994				0.950	
Satd. Flow (prot)	1577	0	1827	1170	1504	1776
Flt Permitted	0.994				0.950	
Satd. Flow (perm)	1577	0	1827	1170	1504	1776
Link Speed (k/h)	50		50			50
Link Distance (m)	345.6		411.8			484.4
Travel Time (s)	24.9		29.6			34.9
Peak Hour Factor	0.71	0.79	0.83	0.50	0.75	0.90
Heavy Vehicles (%)	10%	5%	4%	38%	20%	7%
Adj. Flow (vph)	32	222	442	46	81	307
Shared Lane Traffic (%)						
Lane Group Flow (vph)	254	0	442	46	81	307
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	44.8%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis

1: Davis Road & Barker Parkway

2036 Future Total AM - Scenario 2

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	23	175	367	23	61	276
Future Volume (Veh/h)	23	175	367	23	61	276
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.71	0.79	0.83	0.50	0.75	0.90
Hourly flow rate (vph)	32	222	442	46	81	307
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	911	442			488	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	911	442			488	
tC, single (s)	6.5	6.2			4.3	
tC, 2 stage (s)						
tF (s)	3.6	3.3			2.4	
p0 queue free %	88	64			92	
cM capacity (veh/h)	270	609			988	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	254	442	46	81	307	
Volume Left	32	0	0	81	0	
Volume Right	222	0	46	0	0	
cSH	526	1700	1700	988	1700	
Volume to Capacity	0.48	0.26	0.03	0.08	0.18	
Queue Length 95th (m)	20.8	0.0	0.0	2.1	0.0	
Control Delay (s)	18.1	0.0	0.0	9.0	0.0	
Lane LOS	C			A		
Approach Delay (s)	18.1	0.0		1.9		
Approach LOS	C					
Intersection Summary						
Average Delay			4.7			
Intersection Capacity Utilization			44.8%	ICU Level of Service		A
Analysis Period (min)			15			

Lanes, Volumes, Timings
2: Davis Road & Upper's Lane

2036 Future Total AM - Scenario 2

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	49	32	86	62	43	12	58	287	52	23	197	34
Future Volume (vph)	49	32	86	62	43	12	58	287	52	23	197	34
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	170.0		0.0	140.0		117.0
Storage Lanes	0		0	0		0	1		0	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
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		0.932			0.979			0.978				0.850
Flt Protected		0.987			0.978		0.950			0.950		
Satd. Flow (prot)	0	1623	0	0	1777	0	1656	1768	0	1719	1681	1482
Flt Permitted		0.987			0.978		0.950			0.950		
Satd. Flow (perm)	0	1623	0	0	1777	0	1656	1768	0	1719	1681	1482
Link Speed (k/h)		50			50			50				50
Link Distance (m)		190.8			63.3			356.3			336.3	
Travel Time (s)		13.7			4.6			25.7			24.2	
Peak Hour Factor	0.82	0.59	0.74	0.77	0.61	0.43	0.85	0.85	0.88	0.83	0.90	0.85
Heavy Vehicles (%)	14%	0%	8%	0%	6%	0%	9%	6%	0%	5%	13%	9%
Adj. Flow (vph)	60	54	116	81	70	28	68	338	59	28	219	40
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	230	0	0	179	0	68	397	0	28	219	40
Sign Control		Stop			Stop			Free			Free	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization 42.9%	ICU Level of Service A											
Analysis Period (min) 15												

HCM Unsignalized Intersection Capacity Analysis 2: Davis Road & Upper's Lane

2036 Future Total AM - Scenario 2

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	49	32	86	62	43	12	58	287	52	23	197	34
Future Volume (Veh/h)	49	32	86	62	43	12	58	287	52	23	197	34
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.82	0.59	0.74	0.77	0.61	0.43	0.85	0.85	0.88	0.83	0.90	0.85
Hourly flow rate (vph)	60	54	116	81	70	28	68	338	59	28	219	40
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type							None			None		
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	812	808	219	806	818	368	259				397	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	812	808	219	806	818	368	259				397	
tC, single (s)	7.2	6.5	6.3	7.1	6.6	6.2	4.2				4.1	
tC, 2 stage (s)												
tF (s)	3.6	4.0	3.4	3.5	4.1	3.3	2.3				2.2	
p0 queue free %	71	82	86	61	75	96	95				98	
cM capacity (veh/h)	208	293	806	210	282	682	1266				1145	
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3					
Volume Total	230	179	68	397	28	219	40					
Volume Left	60	81	68	0	28	0	0					
Volume Right	116	28	0	59	0	0	40					
cSH	373	265	1266	1700	1145	1700	1700					
Volume to Capacity	0.62	0.67	0.05	0.23	0.02	0.13	0.02					
Queue Length 95th (m)	31.7	35.3	1.4	0.0	0.6	0.0	0.0					
Control Delay (s)	29.0	42.8	8.0	0.0	8.2	0.0	0.0					
Lane LOS	D	E	A		A							
Approach Delay (s)	29.0	42.8	1.2		0.8							
Approach LOS	D	E										
Intersection Summary												
Average Delay				13.0								
Intersection Capacity Utilization				42.9%	ICU Level of Service			A				
Analysis Period (min)				15								

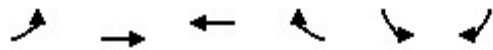
Lanes, Volumes, Timings
3: Lundy's Lane & Barker Parkway

2036 Future Total AM - Scenario 2

						
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	25	543	415	52	85	47
Future Volume (vph)	25	543	415	52	85	47
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	0.95	0.95	1.00	1.00
Frt			0.982			0.850
Flt Protected		0.998			0.950	
Satd. Flow (prot)	0	3452	3330	0	1626	1509
Flt Permitted		0.998			0.950	
Satd. Flow (perm)	0	3452	3330	0	1626	1509
Link Speed (k/h)		50	50		50	
Link Distance (m)		269.5	290.5		183.4	
Travel Time (s)		19.4	20.9		13.2	
Peak Hour Factor	0.78	0.82	0.77	0.69	0.73	0.78
Heavy Vehicles (%)	12%	4%	4%	24%	11%	7%
Adj. Flow (vph)	32	662	539	75	116	60
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	694	614	0	116	60
Sign Control		Yield	Yield		Yield	
Intersection Summary						
Area Type:	Other					
Control Type:	Roundabout					
Intersection Capacity Utilization	43.6%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis 3: Lundy's Lane & Barker Parkway

2036 Future Total AM - Scenario 2



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Right Turn Channelized						
Traffic Volume (veh/h)	25	543	415	52	85	47
Future Volume (veh/h)	25	543	415	52	85	47
Peak Hour Factor	0.78	0.82	0.77	0.69	0.73	0.78
Hourly flow rate (vph)	32	662	539	75	116	60
Approach Volume (veh/h)		694	614		176	
Crossing Volume (veh/h)		116	32		539	
High Capacity (veh/h)		1265	1351		905	
High v/c (veh/h)		0.55	0.45		0.19	
Low Capacity (veh/h)		1052	1130		729	
Low v/c (veh/h)		0.66	0.54		0.24	
Intersection Summary						
Maximum v/c High			0.55			
Maximum v/c Low			0.66			
Intersection Capacity Utilization			43.6%		ICU Level of Service	A

Lanes, Volumes, Timings
4: Thorold Townline Road & Lundy's Lane

2036 Future Total AM - Scenario 2

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	74	451	81	42	369	17	71	167	34	9	117	25
Future Volume (vph)	74	451	81	42	369	17	71	167	34	9	117	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	150.0		32.0	76.0		0.0	30.0		0.0	40.0		0.0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.993			0.970			0.965	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1703	1863	1468	1805	1813	0	1626	1666	0	1467	1612	0
Flt Permitted	0.365			0.237			0.628			0.568		
Satd. Flow (perm)	654	1863	1468	450	1813	0	1075	1666	0	877	1612	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			61		4			16			19	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		307.3			478.1			247.2			197.8	
Travel Time (s)		22.1			34.4			17.8			14.2	
Peak Hour Factor	0.71	0.78	0.88	0.81	0.88	0.85	0.79	0.79	0.65	0.56	0.73	0.52
Heavy Vehicles (%)	6%	2%	10%	0%	4%	6%	11%	11%	9%	23%	14%	13%
Adj. Flow (vph)	104	578	92	52	419	20	90	211	52	16	160	48
Shared Lane Traffic (%)												
Lane Group Flow (vph)	104	578	92	52	439	0	90	263	0	16	208	0
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Detector Phase	4	4	4	8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	20.0	20.0	20.0	20.0	20.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	33.0	33.0	33.0	32.0	32.0		35.0	35.0		35.0	35.0	
Total Split (s)	50.0	50.0	50.0	50.0	50.0		40.0	40.0		40.0	40.0	
Total Split (%)	55.6%	55.6%	55.6%	55.6%	55.6%		44.4%	44.4%		44.4%	44.4%	
Yellow Time (s)	5.0	5.0	5.0	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)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	7.0	7.0	7.0	6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None		Max	Max		Max	Max	
Act Effct Green (s)	31.9	31.9	31.9	32.9	32.9		34.4	34.4		34.4	34.4	
Actuated g/C Ratio	0.40	0.40	0.40	0.41	0.41		0.43	0.43		0.43	0.43	
v/c Ratio	0.40	0.77	0.15	0.28	0.58		0.19	0.36		0.04	0.29	
Control Delay	21.1	27.9	6.7	18.9	20.7		18.2	17.8		17.0	16.6	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	21.1	27.9	6.7	18.9	20.7		18.2	17.8		17.0	16.6	
LOS	C	C	A	B	C		B	B		B	B	
Approach Delay		24.5			20.5			17.9			16.6	
Approach LOS		C			C			B			B	
Queue Length 50th (m)	11.3	76.4	2.9	5.2	51.0		8.7	25.6		1.5	18.9	

Lanes, Volumes, Timings
4: Thorold Townline Road & Lundy's Lane

2036 Future Total AM - Scenario 2

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (m)	17.6	90.2	10.7	11.9	74.8		19.2	45.2		3.7	31.8	
Internal Link Dist (m)		283.3			454.1			223.2			173.8	
Turn Bay Length (m)	150.0		32.0	76.0			30.0			40.0		
Base Capacity (vph)	357	1019	831	252	1016		465	730		379	708	
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	0.29	0.57	0.11	0.21	0.43		0.19	0.36		0.04	0.29	

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 79.4

Natural Cycle: 70

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.77

Intersection Signal Delay: 21.2

Intersection LOS: C

Intersection Capacity Utilization 80.4%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 4: Thorold Townline Road & Lundy's Lane

 Ø2	 Ø4
40 s	50 s
 Ø6	 Ø8
40 s	50 s

Lanes, Volumes, Timings
5: Thorold Townline Road & Upper's Lane

2036 Future Total AM - Scenario 2

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	1	248	2	3	187
Future Volume (vph)	0	1	248	2	3	187
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.865		0.998			
Flt Protected						0.999
Satd. Flow (prot)	1644	0	1695	0	0	1862
Flt Permitted						0.999
Satd. Flow (perm)	1644	0	1695	0	0	1862
Link Speed (k/h)	50		50			50
Link Distance (m)	510.1		142.0			229.8
Travel Time (s)	36.7		10.2			16.5
Peak Hour Factor	0.25	0.25	0.85	0.50	0.75	0.83
Heavy Vehicles (%)	0%	0%	12%	0%	0%	2%
Adj. Flow (vph)	0	4	292	4	4	225
Shared Lane Traffic (%)						
Lane Group Flow (vph)	4	0	296	0	0	229
Sign Control	Stop		Stop			Stop
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	23.2%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis 5: Thorold Townline Road & Upper's Lane

2036 Future Total AM - Scenario 2

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Stop			Stop
Traffic Volume (vph)	0	1	248	2	3	187
Future Volume (vph)	0	1	248	2	3	187
Peak Hour Factor	0.25	0.25	0.85	0.50	0.75	0.83
Hourly flow rate (vph)	0	4	292	4	4	225
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total (vph)	4	296	229			
Volume Left (vph)	0	0	4			
Volume Right (vph)	4	4	0			
Hadj (s)	-0.60	0.19	0.04			
Departure Headway (s)	4.4	4.3	4.2			
Degree Utilization, x	0.00	0.36	0.27			
Capacity (veh/h)	718	819	828			
Control Delay (s)	7.5	9.7	8.8			
Approach Delay (s)	7.5	9.7	8.8			
Approach LOS	A	A	A			
Intersection Summary						
Delay			9.3			
Level of Service			A			
Intersection Capacity Utilization			23.2%	ICU Level of Service	A	
Analysis Period (min)			15			

Lanes, Volumes, Timings
7: Beaverdams Road & Thorold Townline Road

2036 Future Total AM - Scenario 2

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	34	143	32	6	221	42	34	179	42	20	111	30
Future Volume (vph)	34	143	32	6	221	42	34	179	42	20	111	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.972			0.981			0.967			0.972	
Flt Protected		0.991			0.998			0.993			0.990	
Satd. Flow (prot)	0	1716	0	0	1845	0	0	1712	0	0	1661	0
Flt Permitted		0.991			0.998			0.993			0.990	
Satd. Flow (perm)	0	1716	0	0	1845	0	0	1712	0	0	1661	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		197.0			309.7			169.2			132.8	
Travel Time (s)		14.2			22.3			12.2			9.6	
Peak Hour Factor	0.77	0.93	0.62	0.50	0.74	0.81	0.71	0.84	0.50	0.45	0.81	0.63
Heavy Vehicles (%)	12%	4%	10%	0%	1%	0%	3%	10%	0%	0%	14%	8%
Adj. Flow (vph)	44	154	52	12	299	52	48	213	84	44	137	48
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	250	0	0	363	0	0	345	0	0	229	0
Sign Control		Stop			Stop			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	53.8%				ICU Level of Service A							
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis 7: Beaverdams Road & Thorold Townline Road

2036 Future Total AM - Scenario 2

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	34	143	32	6	221	42	34	179	42	20	111	30
Future Volume (vph)	34	143	32	6	221	42	34	179	42	20	111	30
Peak Hour Factor	0.77	0.93	0.62	0.50	0.74	0.81	0.71	0.84	0.50	0.45	0.81	0.63
Hourly flow rate (vph)	44	154	52	12	299	52	48	213	84	44	137	48
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	250	363	345	229								
Volume Left (vph)	44	12	48	44								
Volume Right (vph)	52	52	84	48								
Hadj (s)	0.02	-0.07	-0.01	0.08								
Departure Headway (s)	6.8	6.4	6.5	6.9								
Degree Utilization, x	0.47	0.65	0.63	0.44								
Capacity (veh/h)	467	515	499	453								
Control Delay (s)	15.7	20.5	19.9	15.3								
Approach Delay (s)	15.7	20.5	19.9	15.3								
Approach LOS	C	C	C	C								
Intersection Summary												
Delay				18.3								
Level of Service				C								
Intersection Capacity Utilization				53.8%	ICU Level of Service	A						
Analysis Period (min)				15								

Lanes, Volumes, Timings
8: Barker Parkway & Venture Way

2036 Future Total AM - Scenario 2

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	19	4	1	30	0	34	1	82	11	30	19	13
Future Volume (vph)	19	4	1	30	0	34	1	82	11	30	19	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.994			0.935			0.986			0.948	
Flt Protected		0.957			0.975			0.999			0.988	
Satd. Flow (prot)	0	1800	0	0	1493	0	0	1872	0	0	1548	0
Flt Permitted		0.957			0.975			0.999			0.988	
Satd. Flow (perm)	0	1800	0	0	1493	0	0	1872	0	0	1548	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		143.7			157.1			135.3			345.6	
Travel Time (s)		10.3			11.3			9.7			24.9	
Peak Hour Factor	0.25	0.75	0.25	0.44	0.58	0.54	0.25	0.25	0.29	0.95	0.38	0.25
Heavy Vehicles (%)	0%	7%	0%	29%	14%	2%	0%	0%	0%	11%	33%	0%
Adj. Flow (vph)	76	5	4	68	0	63	4	328	38	32	50	52
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	85	0	0	131	0	0	370	0	0	134	0
Sign Control		Stop			Stop			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	20.5%						ICU Level of Service A					
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis 8: Barker Parkway & Venture Way

2036 Future Total AM - Scenario 2

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	19	4	1	30	0	34	1	82	11	30	19	13
Future Volume (vph)	19	4	1	30	0	34	1	82	11	30	19	13
Peak Hour Factor	0.25	0.75	0.25	0.44	0.58	0.54	0.25	0.25	0.29	0.95	0.38	0.25
Hourly flow rate (vph)	76	5	4	68	0	63	4	328	38	32	50	52
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	85	131	370	134								
Volume Left (vph)	76	68	4	32								
Volume Right (vph)	4	63	38	52								
Hadj (s)	0.16	0.09	-0.06	0.07								
Departure Headway (s)	5.5	5.4	4.6	5.0								
Degree Utilization, x	0.13	0.19	0.48	0.19								
Capacity (veh/h)	584	608	749	663								
Control Delay (s)	9.3	9.6	11.7	9.2								
Approach Delay (s)	9.3	9.6	11.7	9.2								
Approach LOS	A	A	B	A								
Intersection Summary												
Delay				10.6								
Level of Service				B								
Intersection Capacity Utilization				20.5%	ICU Level of Service	A						
Analysis Period (min)				15								

Lanes, Volumes, Timings
9: Upper's Lane & Street C

2036 Future Total AM - Scenario 2

						
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	30	0	0	0	0	51
Future Volume (vph)	30	0	0	0	0	51
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.865					
Flt Protected		0.950				
Satd. Flow (prot)	0	1770	1863	0	1611	0
Flt Permitted		0.950				
Satd. Flow (perm)	0	1770	1863	0	1611	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		461.7	162.2		264.6	
Travel Time (s)		33.2	11.7		19.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	33	0	0	0	0	55
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	33	0	0	55	0
Sign Control		Stop	Stop		Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	13.3%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis 9: Upper's Lane & Street C

2036 Future Total AM - Scenario 2

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Stop	Stop		Stop	
Traffic Volume (vph)	30	0	0	0	0	51
Future Volume (vph)	30	0	0	0	0	51
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	33	0	0	0	0	55
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total (vph)	33	0	55			
Volume Left (vph)	33	0	0			
Volume Right (vph)	0	0	55			
Hadj (s)	0.23	0.00	-0.57			
Departure Headway (s)	4.2	4.0	3.4			
Degree Utilization, x	0.04	0.00	0.05			
Capacity (veh/h)	834	884	1043			
Control Delay (s)	7.4	7.0	6.6			
Approach Delay (s)	7.4	0.0	6.6			
Approach LOS	A	A	A			
Intersection Summary						
Delay			6.9			
Level of Service			A			
Intersection Capacity Utilization			13.3%	ICU Level of Service	A	
Analysis Period (min)			15			

Lanes, Volumes, Timings
1: Davis Road & Barker Parkway

2036 Future Total PM - Scenario 2

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	22	106	425	40	188	434
Future Volume (vph)	22	106	425	40	188	434
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0		118.0	135.0	
Storage Lanes	1	0		1	1	
Taper Length (m)	7.5				7.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.895			0.850		
Flt Protected	0.989				0.950	
Satd. Flow (prot)	1656	0	1863	1524	1787	1827
Flt Permitted	0.989				0.950	
Satd. Flow (perm)	1656	0	1863	1524	1787	1827
Link Speed (k/h)	50		50			50
Link Distance (m)	345.6		411.8			484.4
Travel Time (s)	24.9		29.6			34.9
Peak Hour Factor	0.63	0.87	0.89	0.85	0.88	0.91
Heavy Vehicles (%)	0%	2%	2%	6%	1%	4%
Adj. Flow (vph)	35	122	478	47	214	477
Shared Lane Traffic (%)						
Lane Group Flow (vph)	157	0	478	47	214	477
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	50.5%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis

1: Davis Road & Barker Parkway

2036 Future Total PM - Scenario 2

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	22	106	425	40	188	434
Future Volume (Veh/h)	22	106	425	40	188	434
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.63	0.87	0.89	0.85	0.88	0.91
Hourly flow rate (vph)	35	122	478	47	214	477
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1383	478			525	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1383	478			525	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	73	79			80	
cM capacity (veh/h)	127	587			1047	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	157	478	47	214	477	
Volume Left	35	0	0	214	0	
Volume Right	122	0	47	0	0	
cSH	325	1700	1700	1047	1700	
Volume to Capacity	0.48	0.28	0.03	0.20	0.28	
Queue Length 95th (m)	20.0	0.0	0.0	6.1	0.0	
Control Delay (s)	26.0	0.0	0.0	9.3	0.0	
Lane LOS	D			A		
Approach Delay (s)	26.0	0.0		2.9		
Approach LOS	D					
Intersection Summary						
Average Delay			4.4			
Intersection Capacity Utilization			50.5%	ICU Level of Service		A
Analysis Period (min)			15			

Lanes, Volumes, Timings
2: Davis Road & Upper's Lane

2036 Future Total PM - Scenario 2

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	35	26	107	61	18	23	101	394	71	42	322	66
Future Volume (vph)	35	26	107	61	18	23	101	394	71	42	322	66
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	170.0		0.0	140.0		117.0
Storage Lanes	0		0	0		0	1		0	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
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		0.926			0.967			0.970				0.850
Flt Protected		0.989			0.975		0.950			0.950		
Satd. Flow (prot)	0	1619	0	0	1765	0	1656	1759	0	1719	1681	1482
Flt Permitted		0.989			0.975		0.950			0.950		
Satd. Flow (perm)	0	1619	0	0	1765	0	1656	1759	0	1719	1681	1482
Link Speed (k/h)		50			50			50				50
Link Distance (m)		190.8			63.3			356.3			336.3	
Travel Time (s)		13.7			4.6			25.7			24.2	
Peak Hour Factor	0.58	0.42	0.72	0.82	0.50	0.64	0.74	0.89	0.64	0.67	0.96	0.79
Heavy Vehicles (%)	14%	0%	8%	0%	6%	0%	9%	6%	0%	5%	13%	9%
Adj. Flow (vph)	60	62	149	74	36	36	136	443	111	63	335	84
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	271	0	0	146	0	136	554	0	63	335	84
Sign Control		Stop			Stop			Free			Free	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization 52.1%	ICU Level of Service A											
Analysis Period (min) 15												

HCM Unsignalized Intersection Capacity Analysis 2: Davis Road & Upper's Lane

2036 Future Total PM - Scenario 2

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	35	26	107	61	18	23	101	394	71	42	322	66
Future Volume (Veh/h)	35	26	107	61	18	23	101	394	71	42	322	66
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.58	0.42	0.72	0.82	0.50	0.64	0.74	0.89	0.64	0.67	0.96	0.79
Hourly flow rate (vph)	60	62	149	74	36	36	136	443	111	63	335	84
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type							None			None		
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1230	1287	335	1262	1316	498	419				554	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1230	1287	335	1262	1316	498	419				554	
tC, single (s)	7.2	6.5	6.3	7.1	6.6	6.2	4.2				4.1	
tC, 2 stage (s)												
tF (s)	3.6	4.0	3.4	3.5	4.1	3.3	2.3				2.2	
p0 queue free %	35	54	79	0	72	94	88				94	
cM capacity (veh/h)	93	136	693	65	127	576	1103				1001	
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3					
Volume Total	271	146	136	554	63	335	84					
Volume Left	60	74	136	0	63	0	0					
Volume Right	149	36	0	111	0	0	84					
cSH	206	99	1103	1700	1001	1700	1700					
Volume to Capacity	1.32	1.48	0.12	0.33	0.06	0.20	0.05					
Queue Length 95th (m)	119.5	87.3	3.4	0.0	1.6	0.0	0.0					
Control Delay (s)	217.7	338.0	8.7	0.0	8.8	0.0	0.0					
Lane LOS	F	F	A	A								
Approach Delay (s)	217.7	338.0	1.7	1.2								
Approach LOS	F	F										
Intersection Summary												
Average Delay				69.3								
Intersection Capacity Utilization				52.1%	ICU Level of Service				A			
Analysis Period (min)				15								

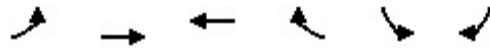
Lanes, Volumes, Timings
3: Lundy's Lane & Barker Parkway

2036 Future Total PM - Scenario 2

						
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	46	696	730	111	95	60
Future Volume (vph)	46	696	730	111	95	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	0.95	0.95	1.00	1.00
Frt			0.972			0.850
Flt Protected		0.997			0.950	
Satd. Flow (prot)	0	3529	3461	0	1805	1583
Flt Permitted		0.997			0.950	
Satd. Flow (perm)	0	3529	3461	0	1805	1583
Link Speed (k/h)		50	50		50	
Link Distance (m)		269.5	290.5		183.4	
Travel Time (s)		19.4	20.9		13.2	
Peak Hour Factor	0.82	0.75	0.95	0.62	0.56	0.71
Heavy Vehicles (%)	2%	2%	1%	3%	0%	2%
Adj. Flow (vph)	56	928	768	179	170	85
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	984	947	0	170	85
Sign Control		Yield	Yield		Yield	
Intersection Summary						
Area Type:	Other					
Control Type:	Roundabout					
Intersection Capacity Utilization	59.6%			ICU Level of Service B		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis 3: Lundy's Lane & Barker Parkway

2036 Future Total PM - Scenario 2



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Right Turn Channelized						
Traffic Volume (veh/h)	46	696	730	111	95	60
Future Volume (veh/h)	46	696	730	111	95	60
Peak Hour Factor	0.82	0.75	0.95	0.62	0.56	0.71
Hourly flow rate (vph)	56	928	768	179	170	85
Approach Volume (veh/h)		984	947		255	
Crossing Volume (veh/h)		170	56		768	
High Capacity (veh/h)		1212	1326		752	
High v/c (veh/h)		0.81	0.71		0.34	
Low Capacity (veh/h)		1005	1107		595	
Low v/c (veh/h)		0.98	0.86		0.43	
Intersection Summary						
Maximum v/c High			0.81			
Maximum v/c Low			0.98			
Intersection Capacity Utilization			59.6%		ICU Level of Service	B

Lanes, Volumes, Timings
4: Thorold Townline Road & Lundy's Lane

2036 Future Total PM - Scenario 2

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	27	644	112	31	581	8	160	161	62	19	214	39
Future Volume (vph)	27	644	112	31	581	8	160	161	62	19	214	39
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	150.0		32.0	76.0		0.0	30.0		0.0	40.0		0.0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.995			0.945			0.977	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1736	1881	1599	1805	1872	0	1770	1751	0	1719	1821	0
Flt Permitted	0.228			0.093			0.507			0.495		
Satd. Flow (perm)	417	1881	1599	177	1872	0	944	1751	0	896	1821	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			67		3			37			12	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		307.3			478.1			247.2			197.8	
Travel Time (s)		22.1			34.4			17.8			14.2	
Peak Hour Factor	0.84	0.77	0.76	0.65	0.94	0.40	0.74	0.85	0.57	0.68	0.88	0.86
Heavy Vehicles (%)	4%	1%	1%	0%	1%	0%	2%	4%	0%	5%	1%	7%
Adj. Flow (vph)	32	836	147	48	618	20	216	189	109	28	243	45
Shared Lane Traffic (%)												
Lane Group Flow (vph)	32	836	147	48	638	0	216	298	0	28	288	0
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Detector Phase	4	4	4	8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	20.0	20.0	20.0	20.0	20.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	33.0	33.0	33.0	32.0	32.0		35.0	35.0		35.0	35.0	
Total Split (s)	50.0	50.0	50.0	50.0	50.0		40.0	40.0		40.0	40.0	
Total Split (%)	55.6%	55.6%	55.6%	55.6%	55.6%		44.4%	44.4%		44.4%	44.4%	
Yellow Time (s)	5.0	5.0	5.0	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)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	7.0	7.0	7.0	6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None		Max	Max		Max	Max	
Act Effct Green (s)	42.0	42.0	42.0	43.0	43.0		34.0	34.0		34.0	34.0	
Actuated g/C Ratio	0.47	0.47	0.47	0.48	0.48		0.38	0.38		0.38	0.38	
v/c Ratio	0.16	0.94	0.19	0.56	0.71		0.60	0.43		0.08	0.41	
Control Delay	16.0	43.1	8.2	47.0	23.1		30.8	20.3		18.9	21.7	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	16.0	43.1	8.2	47.0	23.1		30.8	20.3		18.9	21.7	
LOS	B	D	A	D	C		C	C		B	C	
Approach Delay		37.2			24.8			24.7			21.5	
Approach LOS		D			C			C			C	
Queue Length 50th (m)	3.2	137.2	7.7	5.9	85.5		31.1	34.4		3.2	36.2	

Lanes, Volumes, Timings
4: Thorold Townline Road & Lundy's Lane

2036 Future Total PM - Scenario 2

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (m)	8.5	149.1	14.0	12.4	126.9		42.7	52.7		6.7	56.7	
Internal Link Dist (m)		283.3			454.1			223.2			173.8	
Turn Bay Length (m)	150.0		32.0	76.0			30.0			40.0		
Base Capacity (vph)	201	909	807	87	927		360	692		342	703	
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	0.16	0.92	0.18	0.55	0.69		0.60	0.43		0.08	0.41	

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 89

Natural Cycle: 80

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.94

Intersection Signal Delay: 29.3

Intersection LOS: C

Intersection Capacity Utilization 72.2%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 4: Thorold Townline Road & Lundy's Lane

 Ø2	 Ø4
40 s	50 s
 Ø6	 Ø8
40 s	50 s

Lanes, Volumes, Timings
5: Thorold Townline Road & Upper's Lane

2036 Future Total PM - Scenario 2

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	2	229	0	0	315
Future Volume (vph)	0	2	229	0	0	315
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.865					
Flt Protected						
Satd. Flow (prot)	1644	0	1827	0	0	1827
Flt Permitted						
Satd. Flow (perm)	1644	0	1827	0	0	1827
Link Speed (k/h)	50		50			50
Link Distance (m)	510.1		142.0			229.8
Travel Time (s)	36.7		10.2			16.5
Peak Hour Factor	0.25	0.25	0.83	0.25	0.25	0.95
Heavy Vehicles (%)	0%	0%	4%	0%	0%	4%
Adj. Flow (vph)	0	8	276	0	0	332
Shared Lane Traffic (%)						
Lane Group Flow (vph)	8	0	276	0	0	332
Sign Control	Stop		Stop			Stop
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	26.6%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis 5: Thorold Townline Road & Upper's Lane

2036 Future Total PM - Scenario 2

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Stop			Stop
Traffic Volume (vph)	0	2	229	0	0	315
Future Volume (vph)	0	2	229	0	0	315
Peak Hour Factor	0.25	0.25	0.83	0.25	0.25	0.95
Hourly flow rate (vph)	0	8	276	0	0	332
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total (vph)	8	276	332			
Volume Left (vph)	0	0	0			
Volume Right (vph)	8	0	0			
Hadj (s)	-0.60	0.07	0.07			
Departure Headway (s)	4.6	4.3	4.3			
Degree Utilization, x	0.01	0.33	0.39			
Capacity (veh/h)	683	818	827			
Control Delay (s)	7.6	9.4	10.0			
Approach Delay (s)	7.6	9.4	10.0			
Approach LOS	A	A	A			
Intersection Summary						
Delay			9.7			
Level of Service			A			
Intersection Capacity Utilization			26.6%	ICU Level of Service	A	
Analysis Period (min)			15			

Lanes, Volumes, Timings
7: Beaverdams Road & Thorold Townline Road

2036 Future Total PM - Scenario 2

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	239	47	13	242	27	39	169	17	40	227	72
Future Volume (vph)	30	239	47	13	242	27	39	169	17	40	227	72
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.977			0.981			0.976			0.965	
Flt Protected		0.994			0.997			0.993			0.994	
Satd. Flow (prot)	0	1826	0	0	1840	0	0	1793	0	0	1749	0
Flt Permitted		0.994			0.997			0.993			0.994	
Satd. Flow (perm)	0	1826	0	0	1840	0	0	1793	0	0	1749	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		197.0			309.7			169.2			132.8	
Travel Time (s)		14.2			22.3			12.2			9.6	
Peak Hour Factor	0.75	0.92	0.78	0.63	0.95	0.61	0.89	0.86	0.33	0.83	0.93	0.71
Heavy Vehicles (%)	3%	1%	0%	3%	1%	0%	0%	4%	0%	5%	5%	2%
Adj. Flow (vph)	40	260	60	21	255	44	44	197	52	48	244	101
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	360	0	0	320	0	0	293	0	0	393	0
Sign Control		Stop			Stop			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	55.9%				ICU Level of Service B							
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis 7: Beaverdams Road & Thorold Townline Road

2036 Future Total PM - Scenario 2

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	30	239	47	13	242	27	39	169	17	40	227	72
Future Volume (vph)	30	239	47	13	242	27	39	169	17	40	227	72
Peak Hour Factor	0.75	0.92	0.78	0.63	0.95	0.61	0.89	0.86	0.33	0.83	0.93	0.71
Hourly flow rate (vph)	40	260	60	21	255	44	44	197	52	48	244	101
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	360	320	293	393								
Volume Left (vph)	40	21	44	48								
Volume Right (vph)	60	44	52	101								
Hadj (s)	-0.06	-0.05	-0.03	-0.06								
Departure Headway (s)	7.7	7.9	8.0	7.6								
Degree Utilization, x	0.77	0.70	0.65	0.83								
Capacity (veh/h)	438	417	412	454								
Control Delay (s)	32.2	27.1	24.6	37.8								
Approach Delay (s)	32.2	27.1	24.6	37.8								
Approach LOS	D	D	C	E								
Intersection Summary												
Delay				31.0								
Level of Service				D								
Intersection Capacity Utilization				55.9%	ICU Level of Service				B			
Analysis Period (min)				15								

Lanes, Volumes, Timings
8: Barker Parkway & Venture Way

2036 Future Total PM - Scenario 2

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	11	0	46	0	23	2	53	40	88	43	19
Future Volume (vph)	15	11	0	46	0	23	2	53	40	88	43	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.952			0.968			0.968	
Flt Protected		0.962			0.969			0.999			0.976	
Satd. Flow (prot)	0	1828	0	0	1753	0	0	1837	0	0	1795	0
Flt Permitted		0.962			0.969			0.999			0.976	
Satd. Flow (perm)	0	1828	0	0	1753	0	0	1837	0	0	1795	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		143.7			157.1			135.3			345.6	
Travel Time (s)		10.3			11.3			9.7			24.9	
Peak Hour Factor	0.25	0.68	0.25	0.75	1.00	0.68	0.25	0.25	0.58	0.54	0.50	0.25
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	60	16	0	61	0	34	8	212	69	163	86	76
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	76	0	0	95	0	0	289	0	0	325	0
Sign Control		Stop			Stop			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	26.7%				ICU Level of Service A							
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis 8: Barker Parkway & Venture Way

2036 Future Total PM - Scenario 2

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	15	11	0	46	0	23	2	53	40	88	43	19
Future Volume (vph)	15	11	0	46	0	23	2	53	40	88	43	19
Peak Hour Factor	0.25	0.68	0.25	0.75	1.00	0.68	0.25	0.25	0.58	0.54	0.50	0.25
Hourly flow rate (vph)	60	16	0	61	0	34	8	212	69	163	86	76
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	76	95	289	325								
Volume Left (vph)	60	61	8	163								
Volume Right (vph)	0	34	69	76								
Hadj (s)	0.16	-0.09	-0.14	-0.04								
Departure Headway (s)	5.7	5.4	4.7	4.7								
Degree Utilization, x	0.12	0.14	0.37	0.42								
Capacity (veh/h)	557	586	739	732								
Control Delay (s)	9.4	9.3	10.4	11.1								
Approach Delay (s)	9.4	9.3	10.4	11.1								
Approach LOS	A	A	B	B								
Intersection Summary												
Delay				10.5								
Level of Service				B								
Intersection Capacity Utilization				26.7%	ICU Level of Service	A						
Analysis Period (min)				15								

Lanes, Volumes, Timings
9: Upper's Lane & Street C

2036 Future Total PM - Scenario 2

						
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	72	0	0	0	0	30
Future Volume (vph)	72	0	0	0	0	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.865					
Flt Protected		0.950				
Satd. Flow (prot)	0	1770	1863	0	1611	0
Flt Permitted		0.950				
Satd. Flow (perm)	0	1770	1863	0	1611	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		461.7	162.2		264.6	
Travel Time (s)		33.2	11.7		19.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	78	0	0	0	0	33
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	78	0	0	33	0
Sign Control		Stop	Stop		Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	14.0%			ICU Level of Service A		
Analysis Period (min)	15					

2036 Future Total PM - Scenario 2

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Stop	Stop		Stop	
Traffic Volume (vph)	72	0	0	0	0	30
Future Volume (vph)	72	0	0	0	0	30
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	78	0	0	0	0	33
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total (vph)	78	0	33			
Volume Left (vph)	78	0	0			
Volume Right (vph)	0	0	33			
Hadj (s)	0.23	0.00	-0.57			
Departure Headway (s)	4.2	4.0	3.5			
Degree Utilization, x	0.09	0.00	0.03			
Capacity (veh/h)	846	885	991			
Control Delay (s)	7.6	7.0	6.6			
Approach Delay (s)	7.6	0.0	6.6			
Approach LOS	A	A	A			
Intersection Summary						
Delay			7.3			
Level of Service			A			
Intersection Capacity Utilization			14.0%	ICU Level of Service	A	
Analysis Period (min)			15			

APPENDIX G

ITE Trip Generation 11th Edition

Land Use: 220

Multifamily Housing (Low-Rise)

Description

Low-rise multifamily housing includes apartments, townhouses, and condominiums located within the same building with at least three other dwelling units and that have two or three floors (levels). Various configurations fit this description, including walkup apartment, mansion apartment, and stacked townhouse.

- A walkup apartment typically is two or three floors in height with dwelling units that are accessed by a single or multiple entrances with stairways and hallways.
- A mansion apartment is a single structure that contains several apartments within what appears to be a single-family dwelling unit.
- A fourplex is a single two-story structure with two matching dwelling units on the ground and second floors. Access to the individual units is typically internal to the structure and provided through a central entry and stairway.
- A stacked townhouse is designed to match the external appearance of a townhouse. But, unlike a townhouse dwelling unit that only shares walls with an adjoining unit, the stacked townhouse units share both floors and walls. Access to the individual units is typically internal to the structure and provided through a central entry and stairway.

Multifamily housing (mid-rise) (Land Use 221), multifamily housing (high-rise) (Land Use 222), affordable housing (Land Use 223), and off-campus student apartment (low-rise) (Land Use 225) are related land uses.

Land Use Subcategory

Data are presented for two subcategories for this land use: (1) not close to rail transit and (2) close to rail transit. A site is considered close to rail transit if the walking distance between the residential site entrance and the closest rail transit station entrance is ½ mile or less.

Additional Data

For the three sites for which both the number of residents and the number of occupied dwelling units were available, there were an average of 2.72 residents per occupied dwelling unit.

For the two sites for which the numbers of both total dwelling units and occupied dwelling units were available, an average of 96.2 percent of the total dwelling units were occupied.

The technical appendices provide supporting information on time-of-day distributions for this land use. The appendices can be accessed through either the ITETripGen web app or the trip

generation resource page on the ITE website (<https://www.ite.org/technical-resources/topics/trip-and-parking-generation/>).

For the three sites for which data were provided for both occupied dwelling units and residents, there was an average of 2.72 residents per occupied dwelling unit.

It is expected that the number of bedrooms and number of residents are likely correlated to the trips generated by a residential site. To assist in future analysis, trip generation studies of all multifamily housing should attempt to obtain information on occupancy rate and on the mix of residential unit sizes (i.e., number of units by number of bedrooms at the site complex).

The sites were surveyed in the 1980s, the 1990s, the 2000s, the 2010s, and the 2020s in British Columbia (CAN), California, Delaware, Florida, Georgia, Illinois, Indiana, Maine, Maryland, Massachusetts, Minnesota, New Jersey, Ontario (CAN), Oregon, Pennsylvania, South Carolina, South Dakota, Tennessee, Texas, Utah, and Washington.

Source Numbers

188, 204, 237, 300, 305, 306, 320, 321, 357, 390, 412, 525, 530, 579, 583, 638, 864, 866, 896, 901, 903, 904, 936, 939, 944, 946, 947, 948, 963, 964, 966, 967, 1012, 1013, 1014, 1036, 1047, 1056, 1071, 1076

Multifamily Housing (Low-Rise) Not Close to Rail Transit (220)

Vehicle Trip Ends vs: Dwelling Units
On a: Weekday

Setting/Location: General Urban/Suburban

Number of Studies: 22

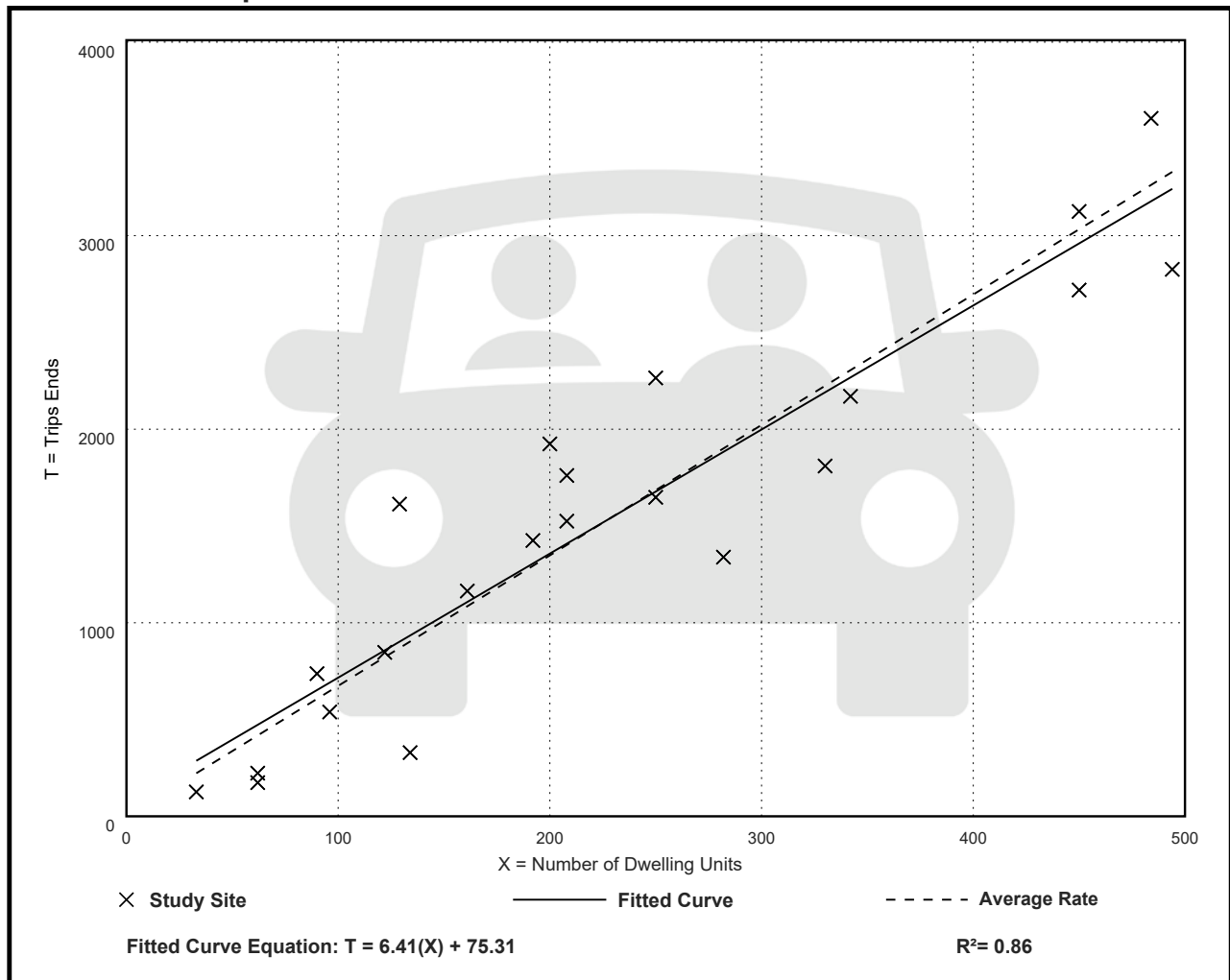
Avg. Num. of Dwelling Units: 229

Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
6.74	2.46 - 12.50	1.79

Data Plot and Equation



Multifamily Housing (Low-Rise) Not Close to Rail Transit (220)

Vehicle Trip Ends vs: Dwelling Units

On a: Weekday,

Peak Hour of Adjacent Street Traffic,

One Hour Between 7 and 9 a.m.

Setting/Location: General Urban/Suburban

Number of Studies: 49

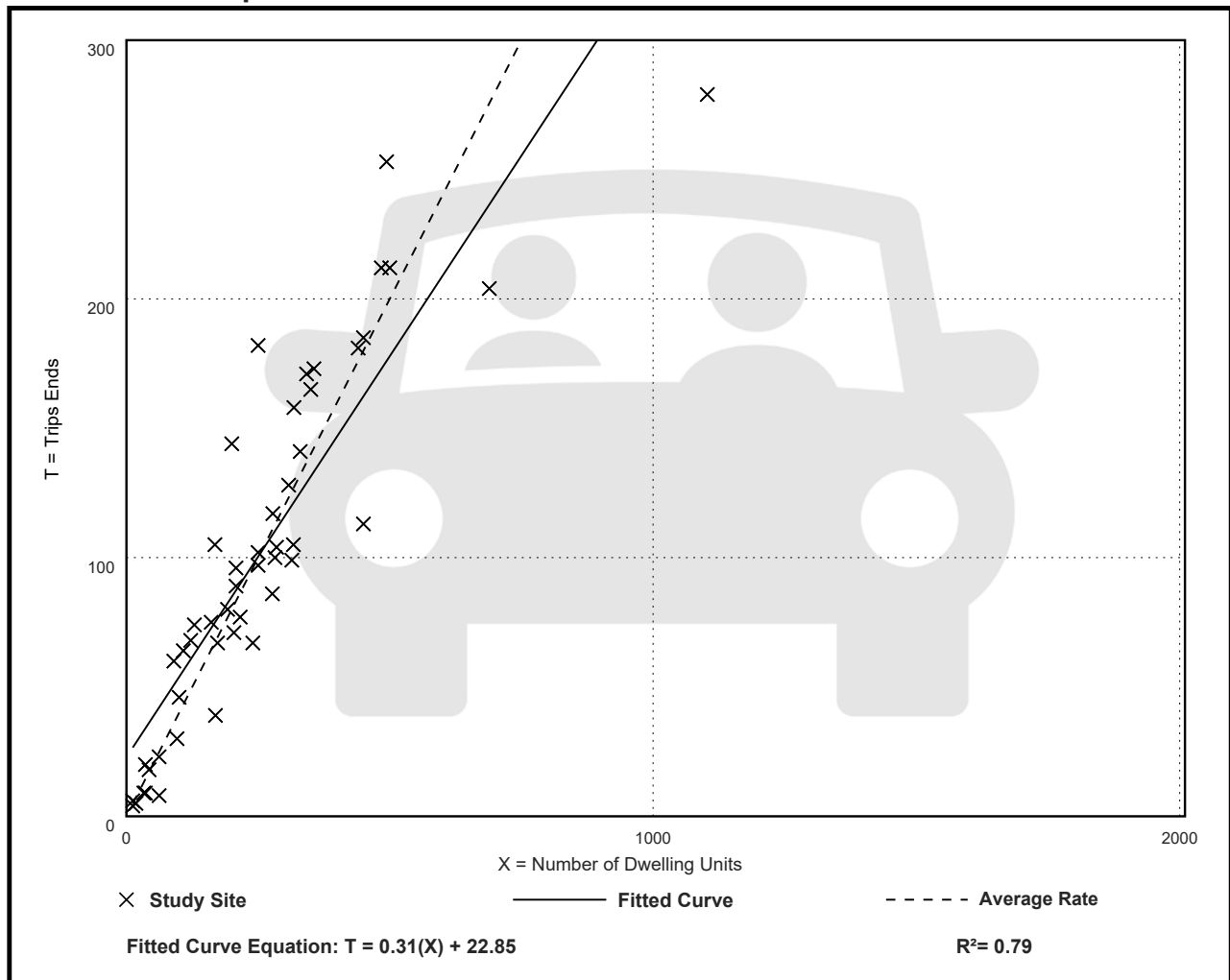
Avg. Num. of Dwelling Units: 249

Directional Distribution: 24% entering, 76% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.40	0.13 - 0.73	0.12

Data Plot and Equation



Multifamily Housing (Low-Rise) Not Close to Rail Transit (220)

Vehicle Trip Ends vs: Dwelling Units

On a: Weekday,

Peak Hour of Adjacent Street Traffic,

One Hour Between 4 and 6 p.m.

Setting/Location: General Urban/Suburban

Number of Studies: 59

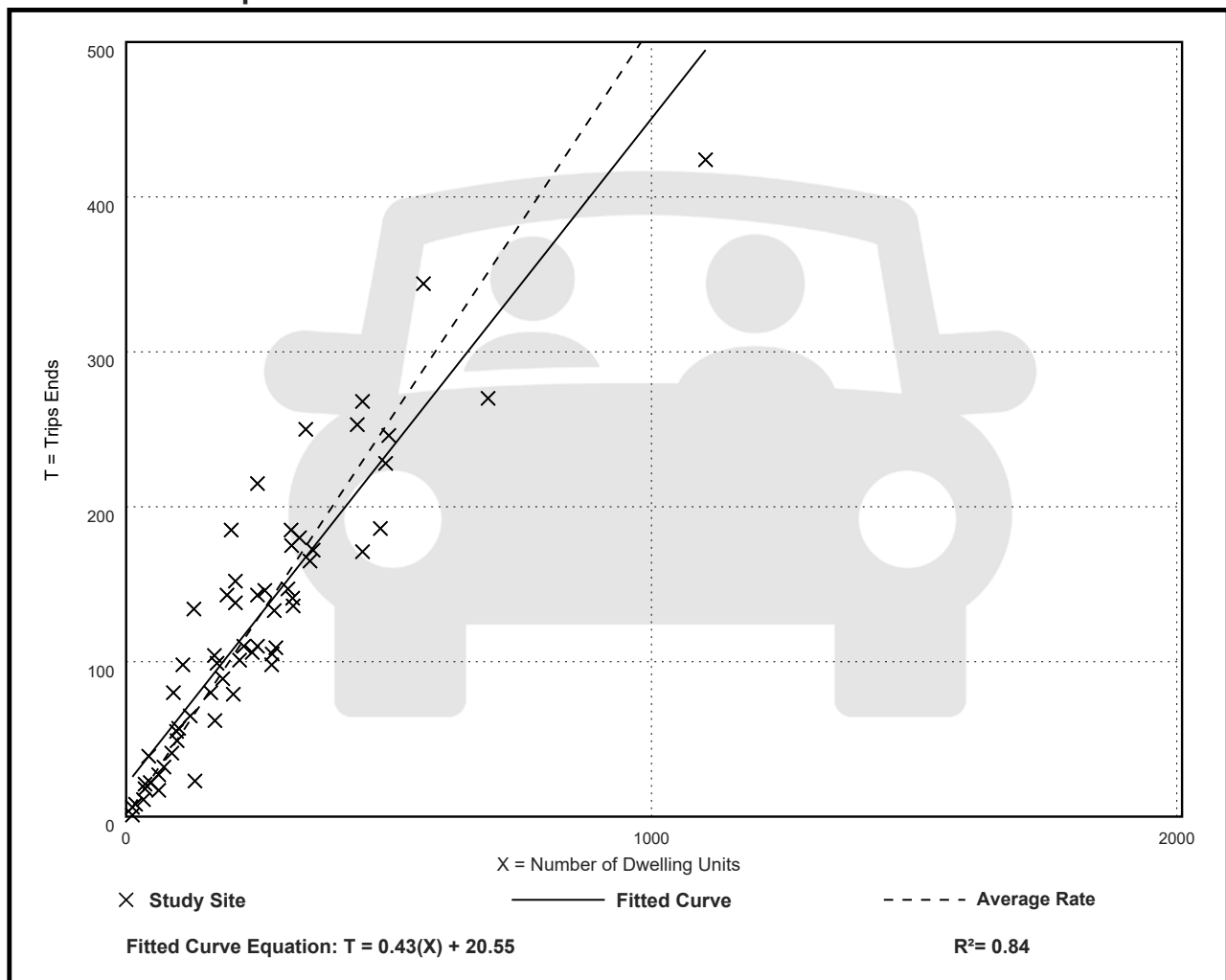
Avg. Num. of Dwelling Units: 241

Directional Distribution: 63% entering, 37% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.51	0.08 - 1.04	0.15

Data Plot and Equation



Multifamily Housing (Low-Rise) Not Close to Rail Transit (220)

Vehicle Trip Ends vs: Dwelling Units

On a: Weekday,

AM Peak Hour of Generator

Setting/Location: General Urban/Suburban

Number of Studies: 40

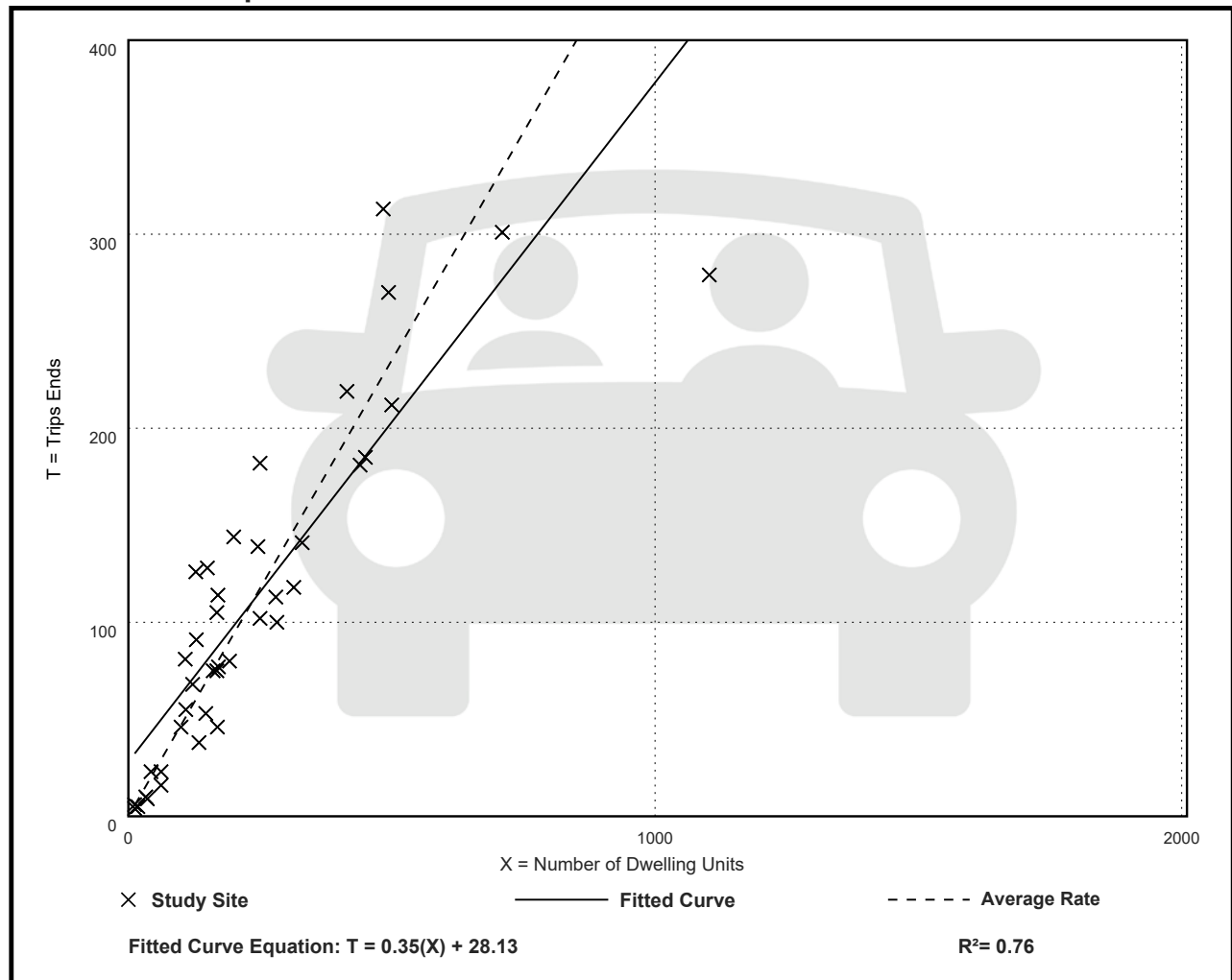
Avg. Num. of Dwelling Units: 234

Directional Distribution: 24% entering, 76% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.47	0.25 - 0.98	0.16

Data Plot and Equation



Multifamily Housing (Low-Rise) Not Close to Rail Transit (220)

Vehicle Trip Ends vs: Dwelling Units

On a: Weekday,

PM Peak Hour of Generator

Setting/Location: General Urban/Suburban

Number of Studies: 38

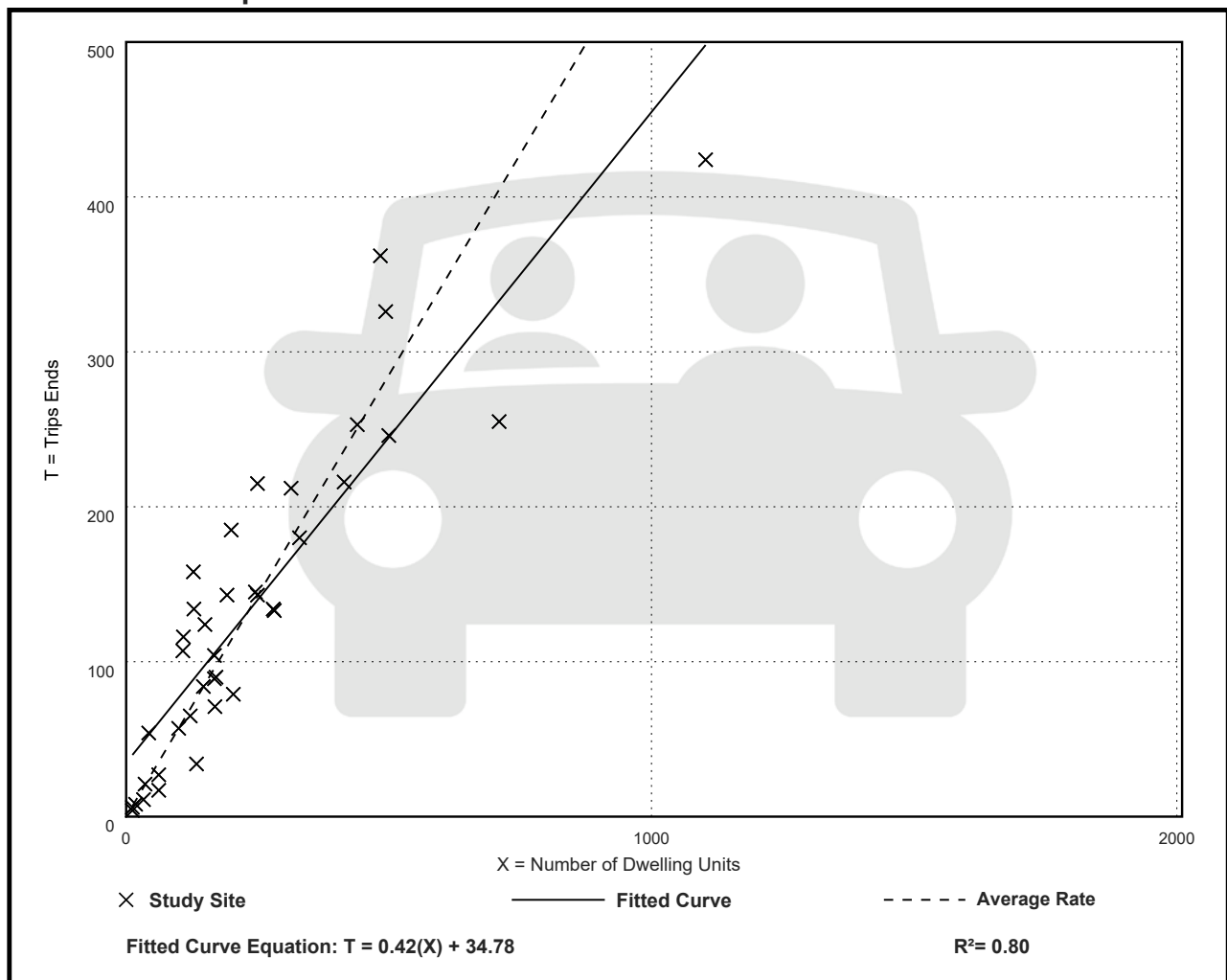
Avg. Num. of Dwelling Units: 231

Directional Distribution: 62% entering, 38% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.57	0.25 - 1.26	0.20

Data Plot and Equation



Multifamily Housing (Low-Rise) Not Close to Rail Transit (220)

Vehicle Trip Ends vs: Dwelling Units

On a: Saturday

Setting/Location: General Urban/Suburban

Number of Studies: 1

Avg. Num. of Dwelling Units: 282

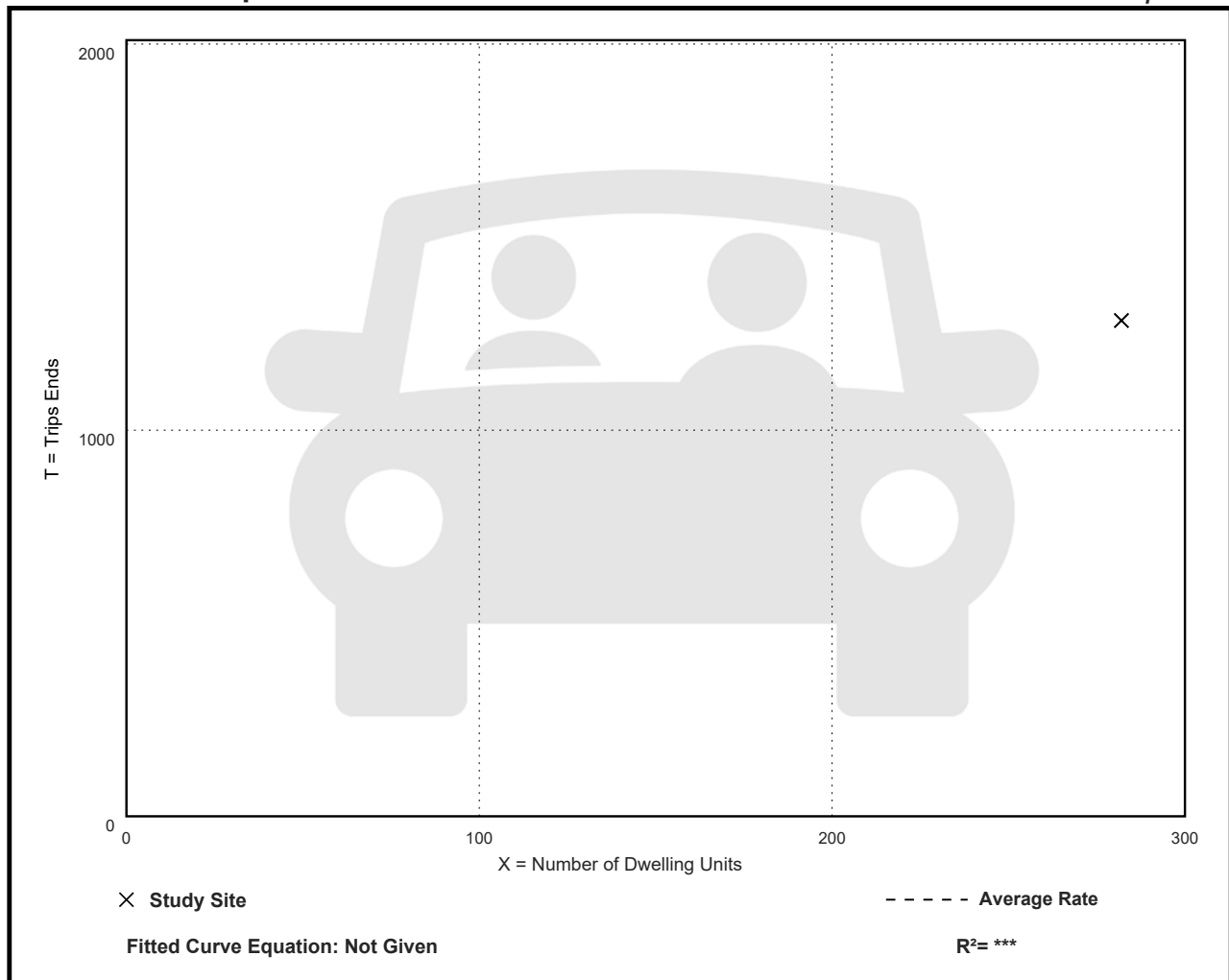
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
4.55	4.55 - 4.55	***

Data Plot and Equation

Caution – Small Sample Size



Multifamily Housing (Low-Rise) Not Close to Rail Transit (220)

Vehicle Trip Ends vs: Dwelling Units

On a: Saturday, Peak Hour of Generator

Setting/Location: General Urban/Suburban

Number of Studies: 1

Avg. Num. of Dwelling Units: 282

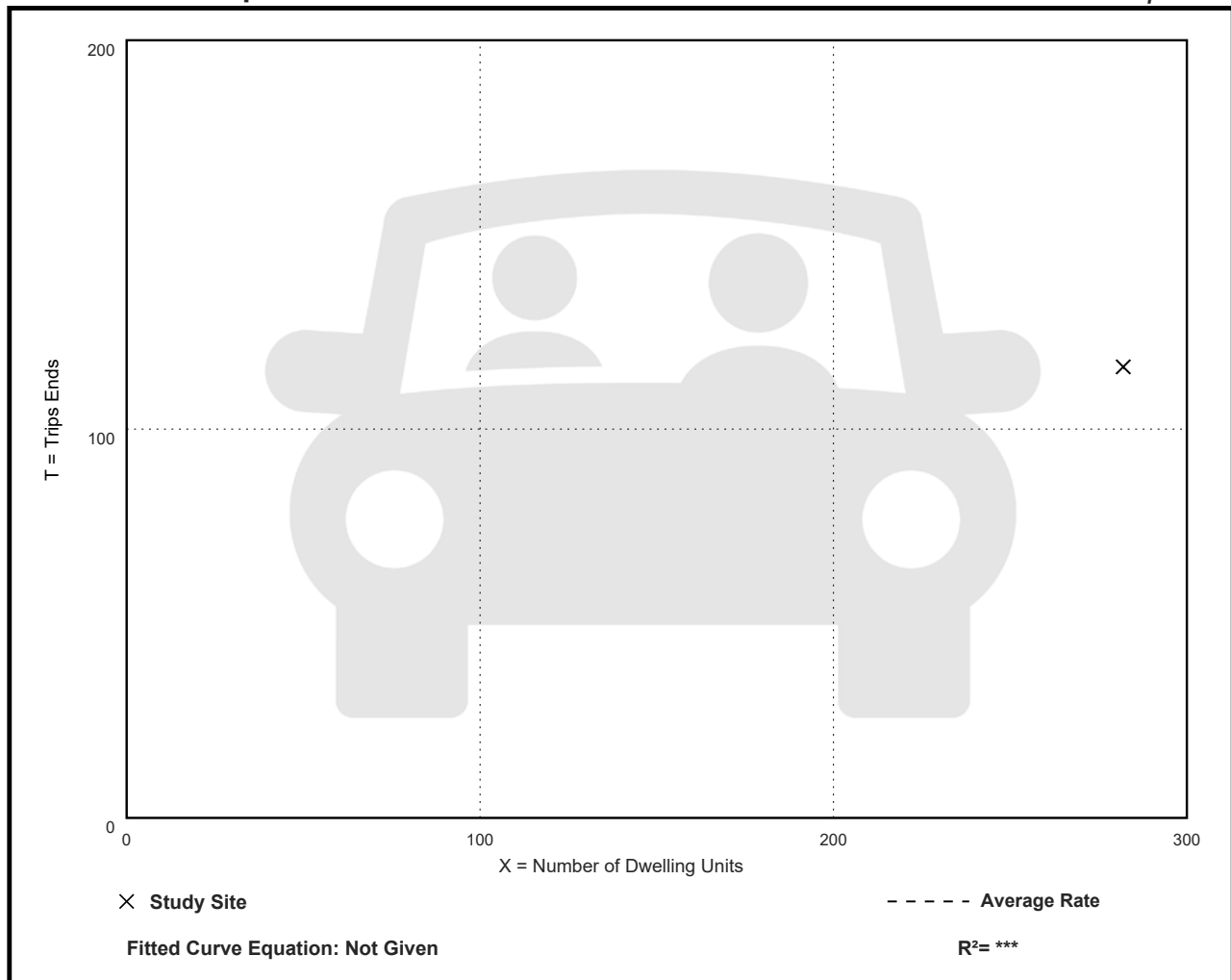
Directional Distribution: Not Available

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.41	0.41 - 0.41	***

Data Plot and Equation

Caution – Small Sample Size



Multifamily Housing (Low-Rise) Not Close to Rail Transit (220)

Vehicle Trip Ends vs: Dwelling Units

On a: Sunday

Setting/Location: General Urban/Suburban

Number of Studies: 1

Avg. Num. of Dwelling Units: 282

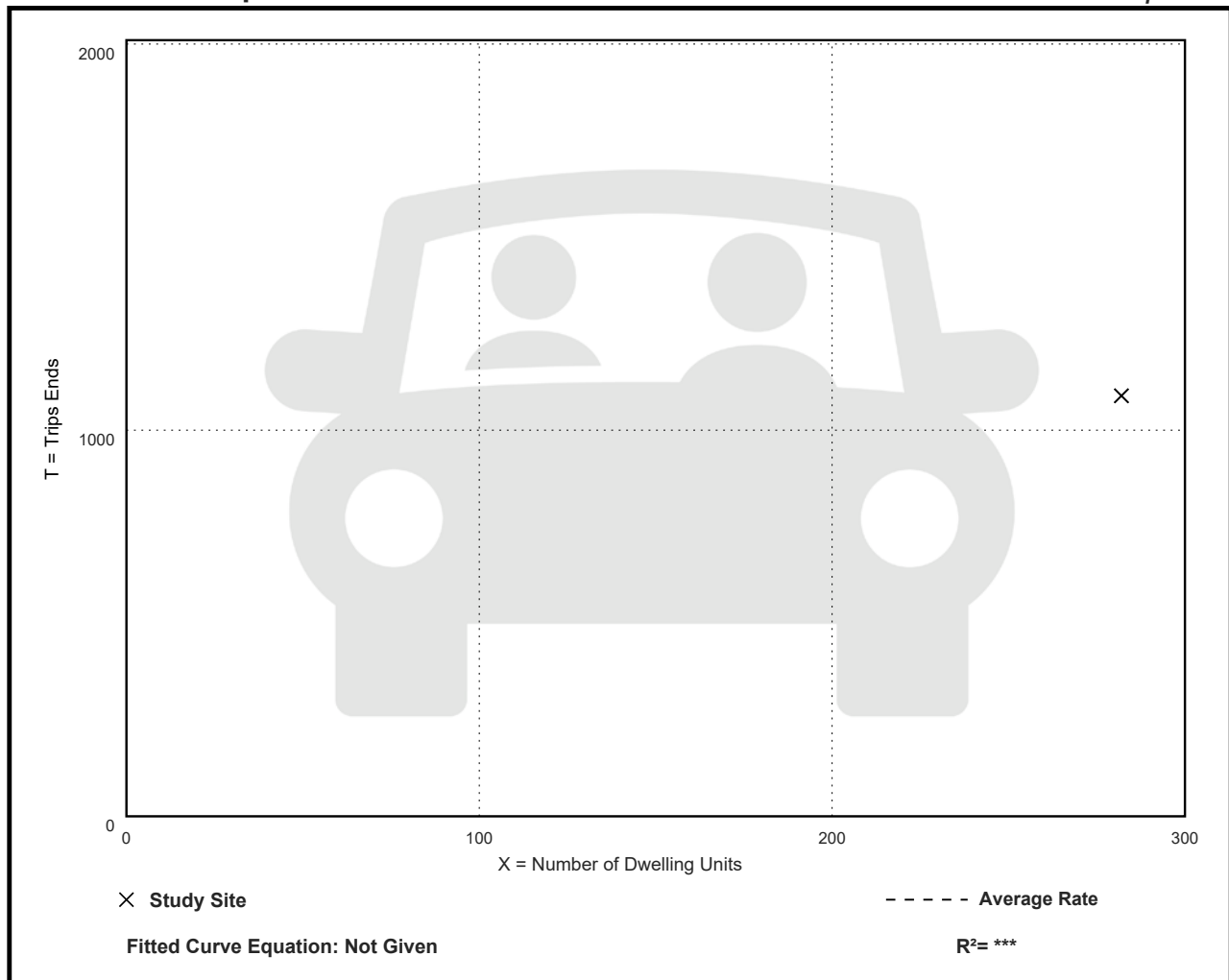
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
3.86	3.86 - 3.86	***

Data Plot and Equation

Caution – Small Sample Size



Multifamily Housing (Low-Rise) Not Close to Rail Transit (220)

Vehicle Trip Ends vs: Dwelling Units

On a: Sunday, Peak Hour of Generator

Setting/Location: General Urban/Suburban

Number of Studies: 1

Avg. Num. of Dwelling Units: 282

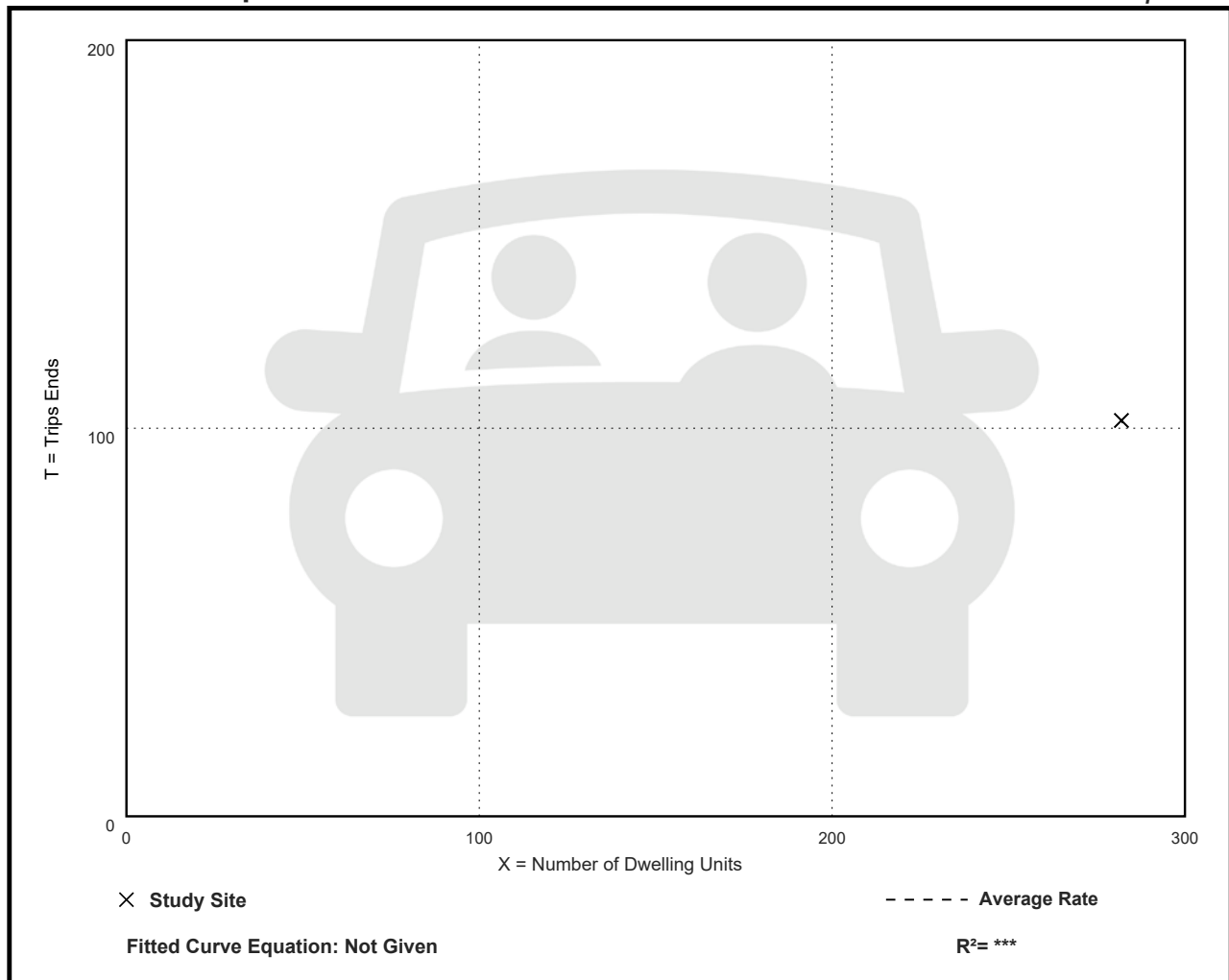
Directional Distribution: Not Available

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.36	0.36 - 0.36	***

Data Plot and Equation

Caution – Small Sample Size



Multifamily Housing (Low-Rise) Not Close to Rail Transit (220)

Vehicle Trip Ends vs: Residents

On a: Weekday

Setting/Location: General Urban/Suburban

Number of Studies: 1

Avg. Num. of Residents: 177

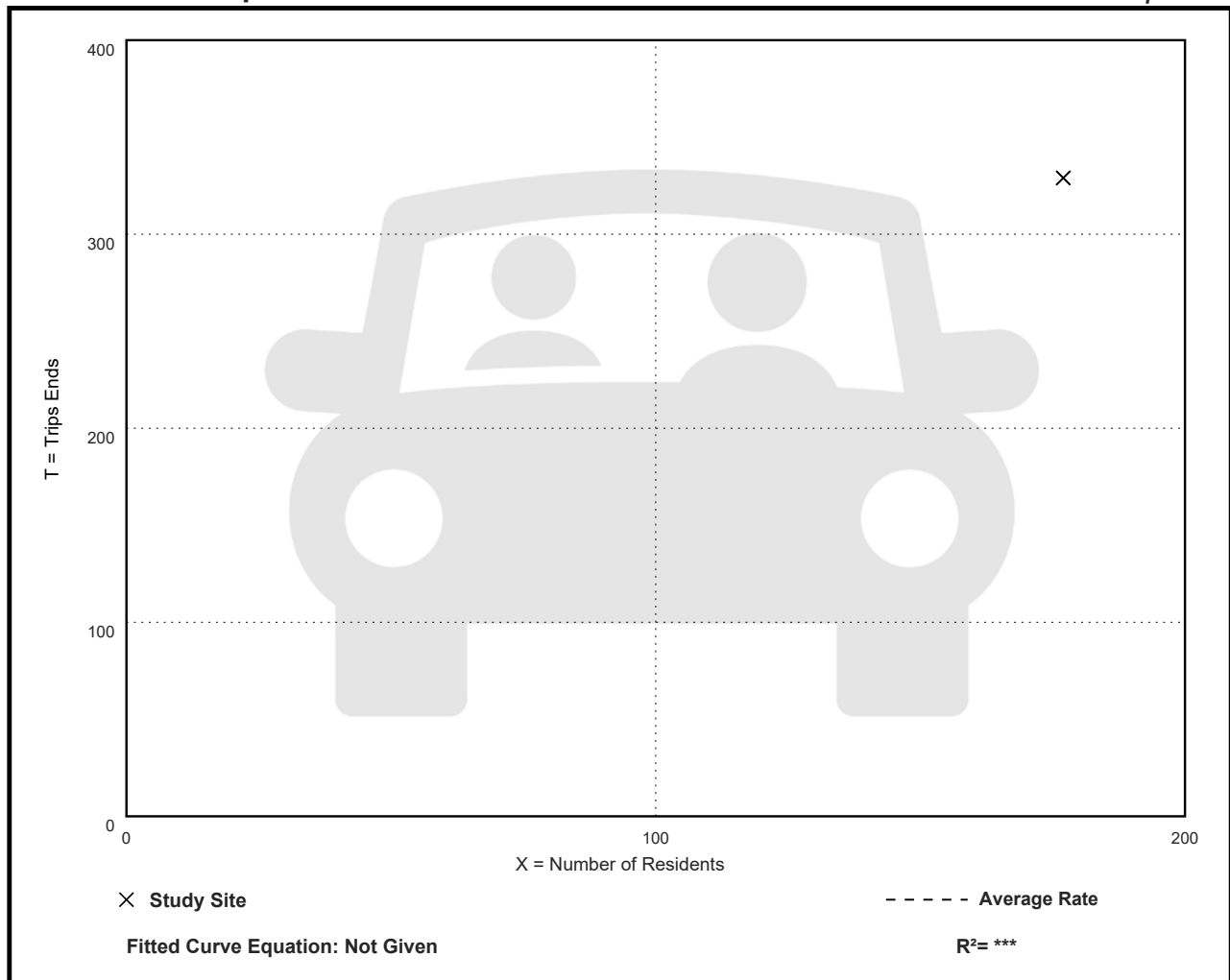
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Resident

Average Rate	Range of Rates	Standard Deviation
1.86	1.86 - 1.86	***

Data Plot and Equation

Caution – Small Sample Size



Multifamily Housing (Low-Rise) Not Close to Rail Transit (220)

Vehicle Trip Ends vs: Residents

On a: Weekday,

AM Peak Hour of Generator

Setting/Location: General Urban/Suburban

Number of Studies: 9

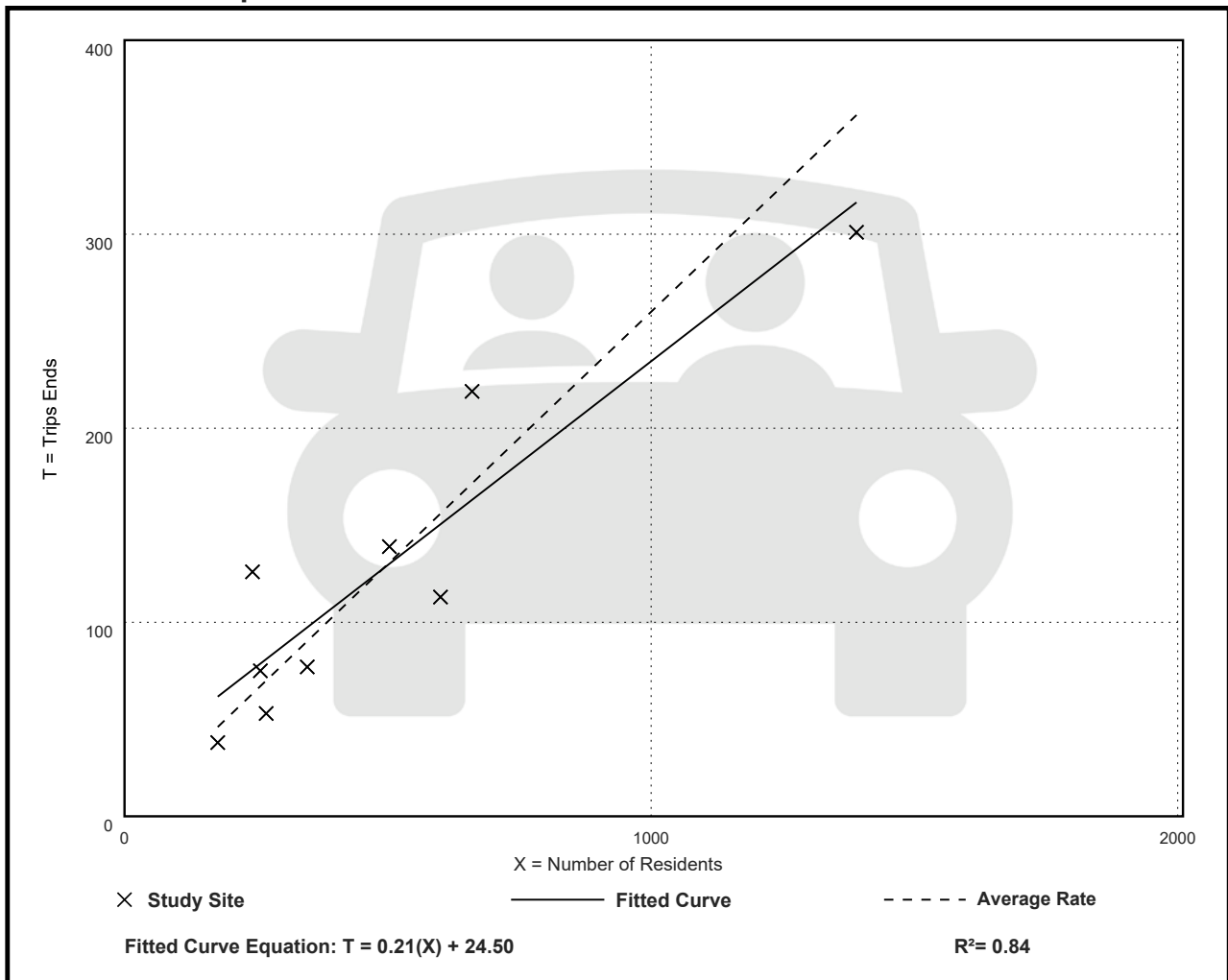
Avg. Num. of Residents: 494

Directional Distribution: 17% entering, 83% exiting

Vehicle Trip Generation per Resident

Average Rate	Range of Rates	Standard Deviation
0.26	0.19 - 0.52	0.08

Data Plot and Equation



Multifamily Housing (Low-Rise) Not Close to Rail Transit (220)

Vehicle Trip Ends vs: Residents

On a: Weekday,

PM Peak Hour of Generator

Setting/Location: General Urban/Suburban

Number of Studies: 9

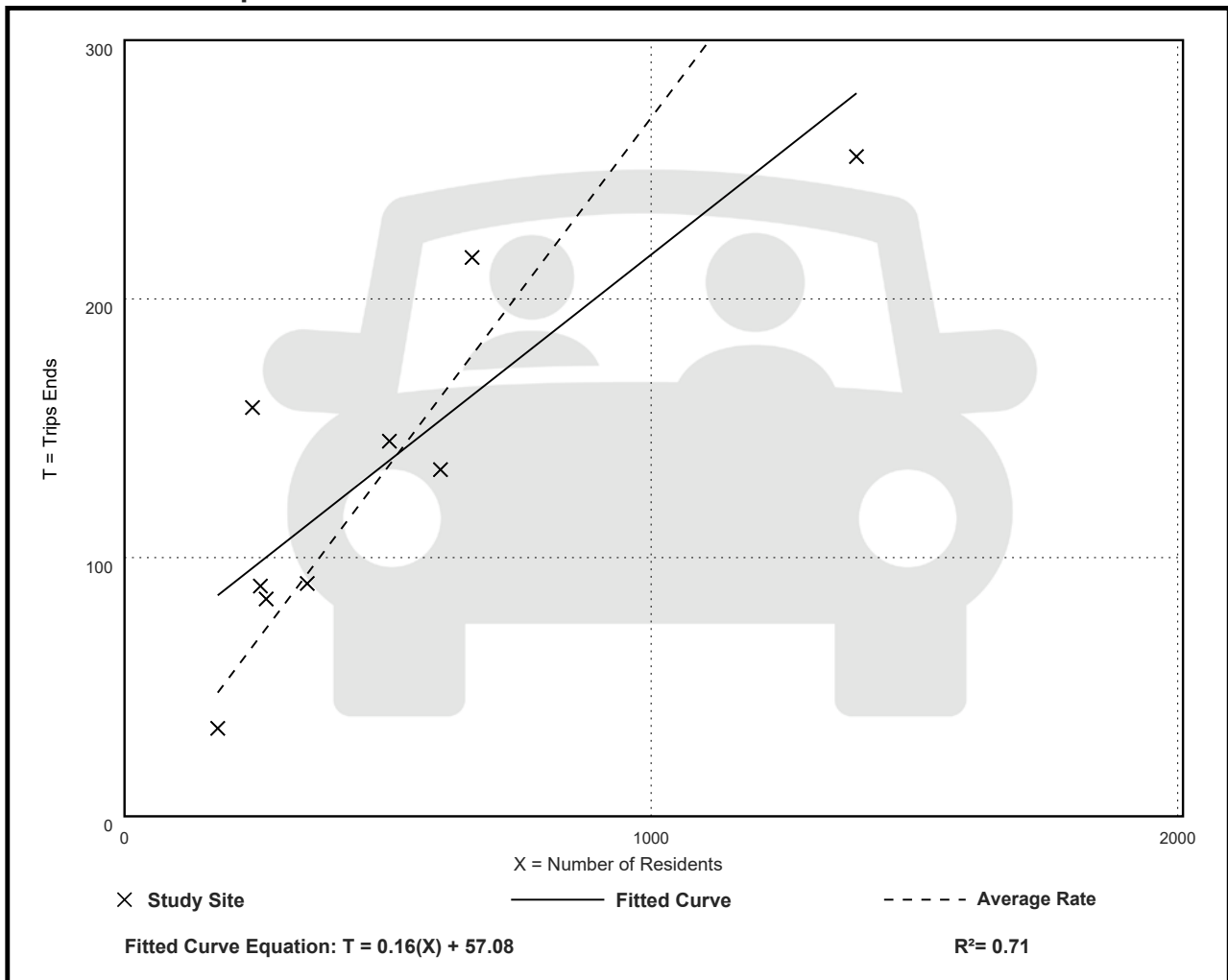
Avg. Num. of Residents: 494

Directional Distribution: 66% entering, 34% exiting

Vehicle Trip Generation per Resident

Average Rate	Range of Rates	Standard Deviation
0.27	0.18 - 0.65	0.11

Data Plot and Equation



Multifamily Housing (Low-Rise) Not Close to Rail Transit (220)

Walk+Bike+Transit Trip Ends vs: Dwelling Units

On a: Weekday,

Peak Hour of Adjacent Street Traffic,

One Hour Between 7 and 9 a.m.

Setting/Location: General Urban/Suburban

Number of Studies: 8

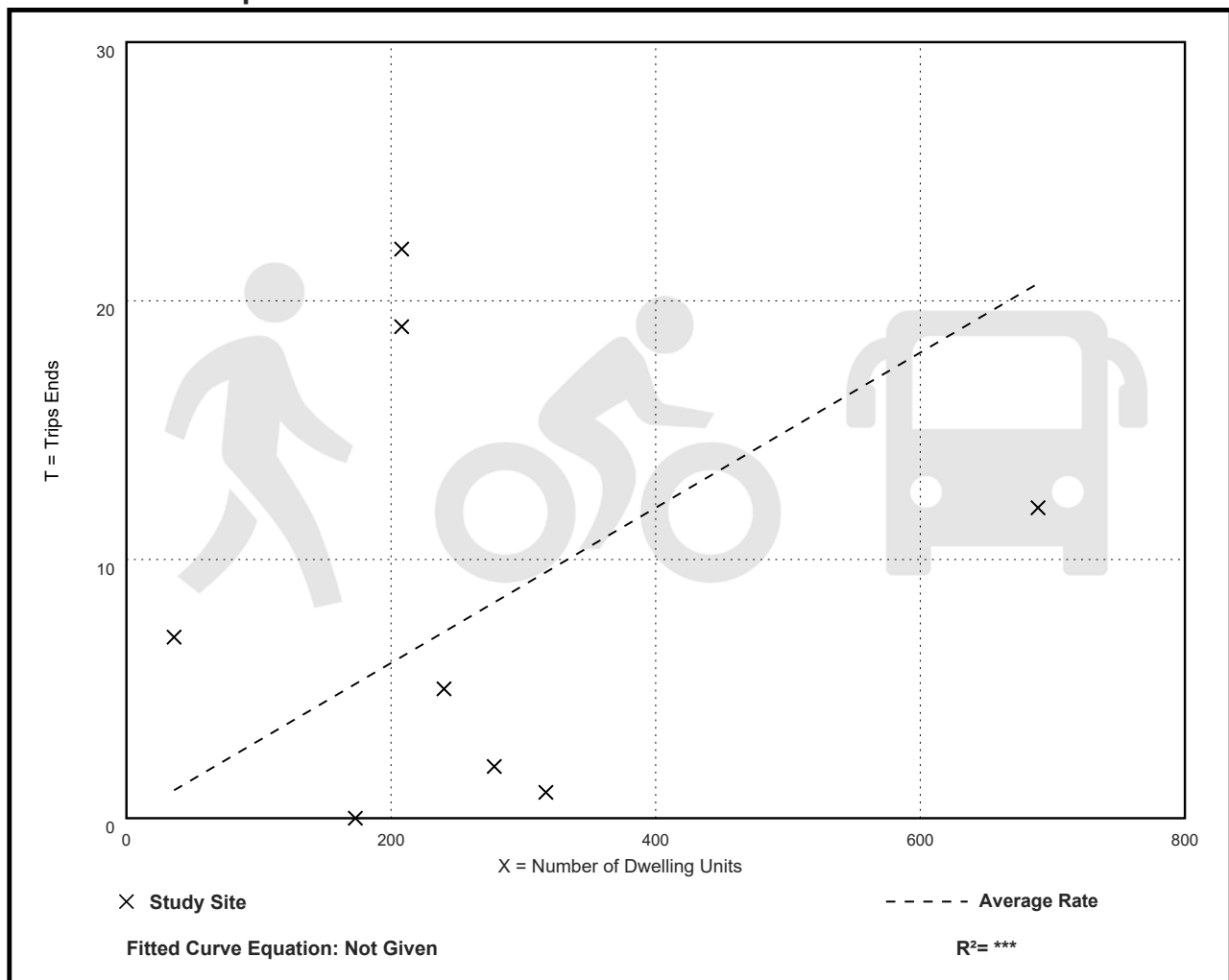
Avg. Num. of Dwelling Units: 269

Directional Distribution: 43% entering, 57% exiting

Walk+Bike+Transit Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.03	0.00 - 0.19	0.04

Data Plot and Equation



Multifamily Housing (Low-Rise) Not Close to Rail Transit (220)

Walk+Bike+Transit Trip Ends vs: Dwelling Units

On a: Weekday,

Peak Hour of Adjacent Street Traffic,

One Hour Between 4 and 6 p.m.

Setting/Location: General Urban/Suburban

Number of Studies: 10

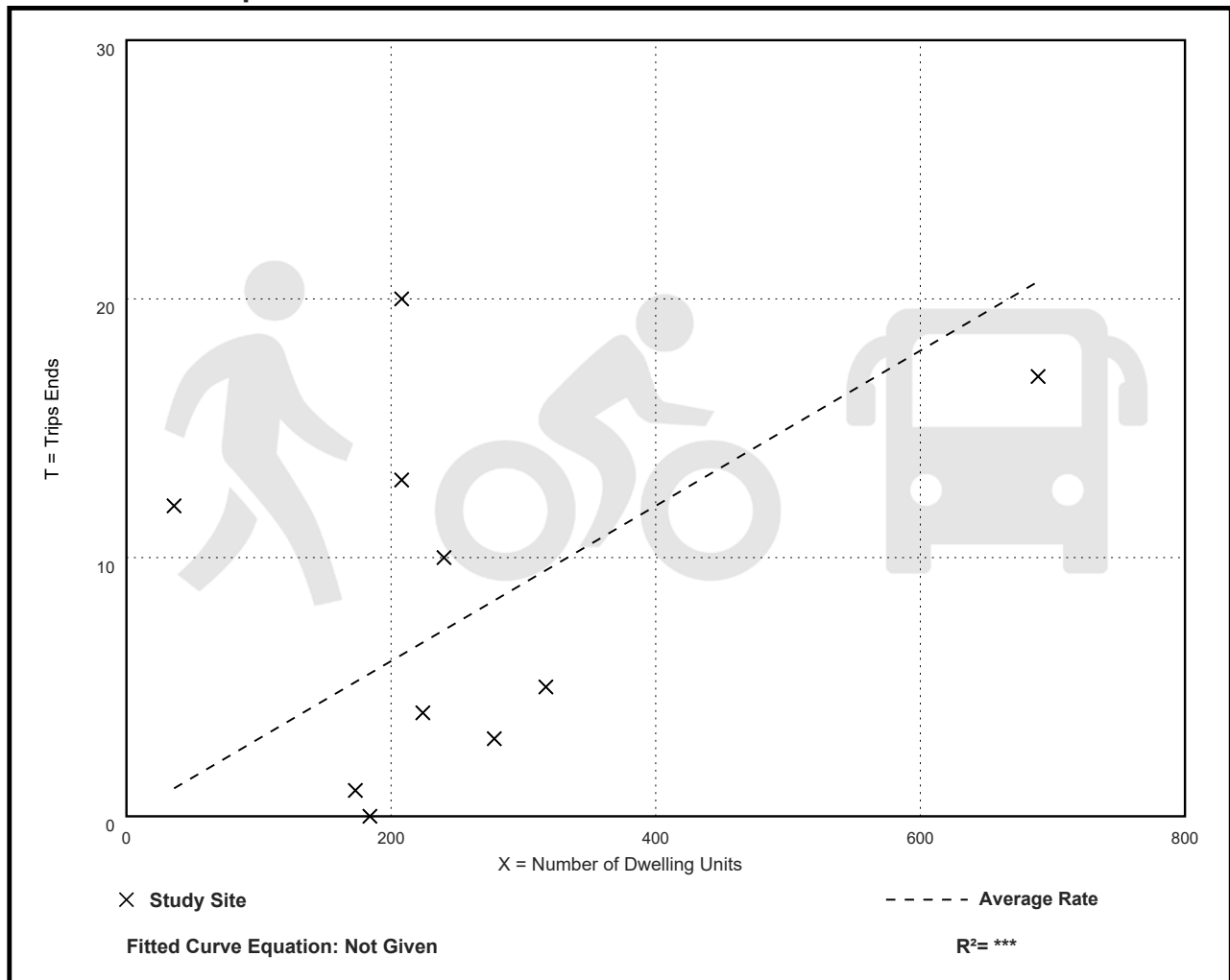
Avg. Num. of Dwelling Units: 256

Directional Distribution: 50% entering, 50% exiting

Walk+Bike+Transit Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.03	0.00 - 0.33	0.05

Data Plot and Equation



Multifamily Housing (Low-Rise) Close to Rail Transit (220)

Vehicle Trip Ends vs: Dwelling Units
On a: Weekday

Setting/Location: General Urban/Suburban

Number of Studies: 9

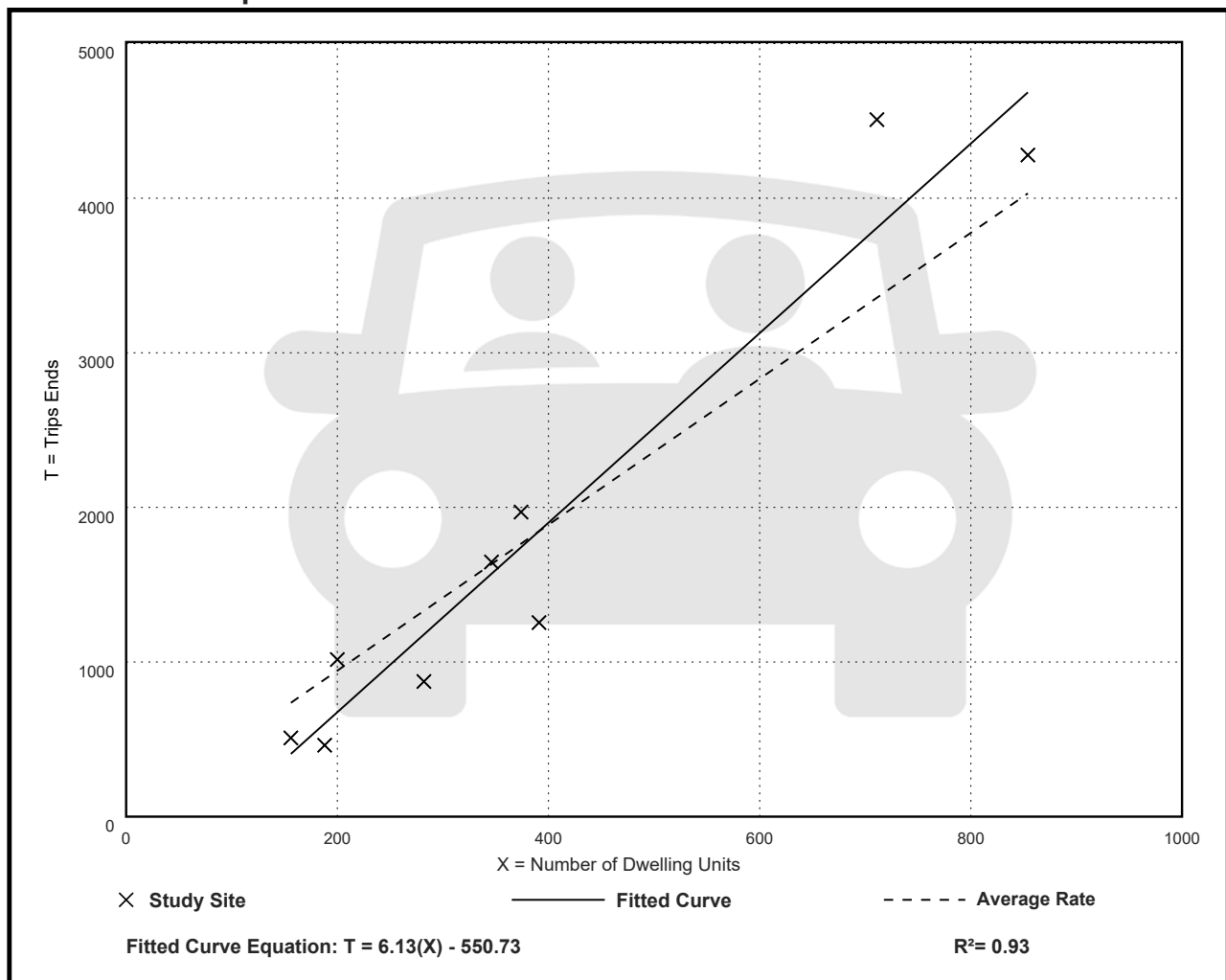
Avg. Num. of Dwelling Units: 389

Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
4.72	2.46 - 6.34	1.27

Data Plot and Equation



Multifamily Housing (Low-Rise) Close to Rail Transit (220)

Vehicle Trip Ends vs: Dwelling Units

On a: Weekday,

Peak Hour of Adjacent Street Traffic,

One Hour Between 7 and 9 a.m.

Setting/Location: General Urban/Suburban

Number of Studies: 1

Avg. Num. of Dwelling Units: 374

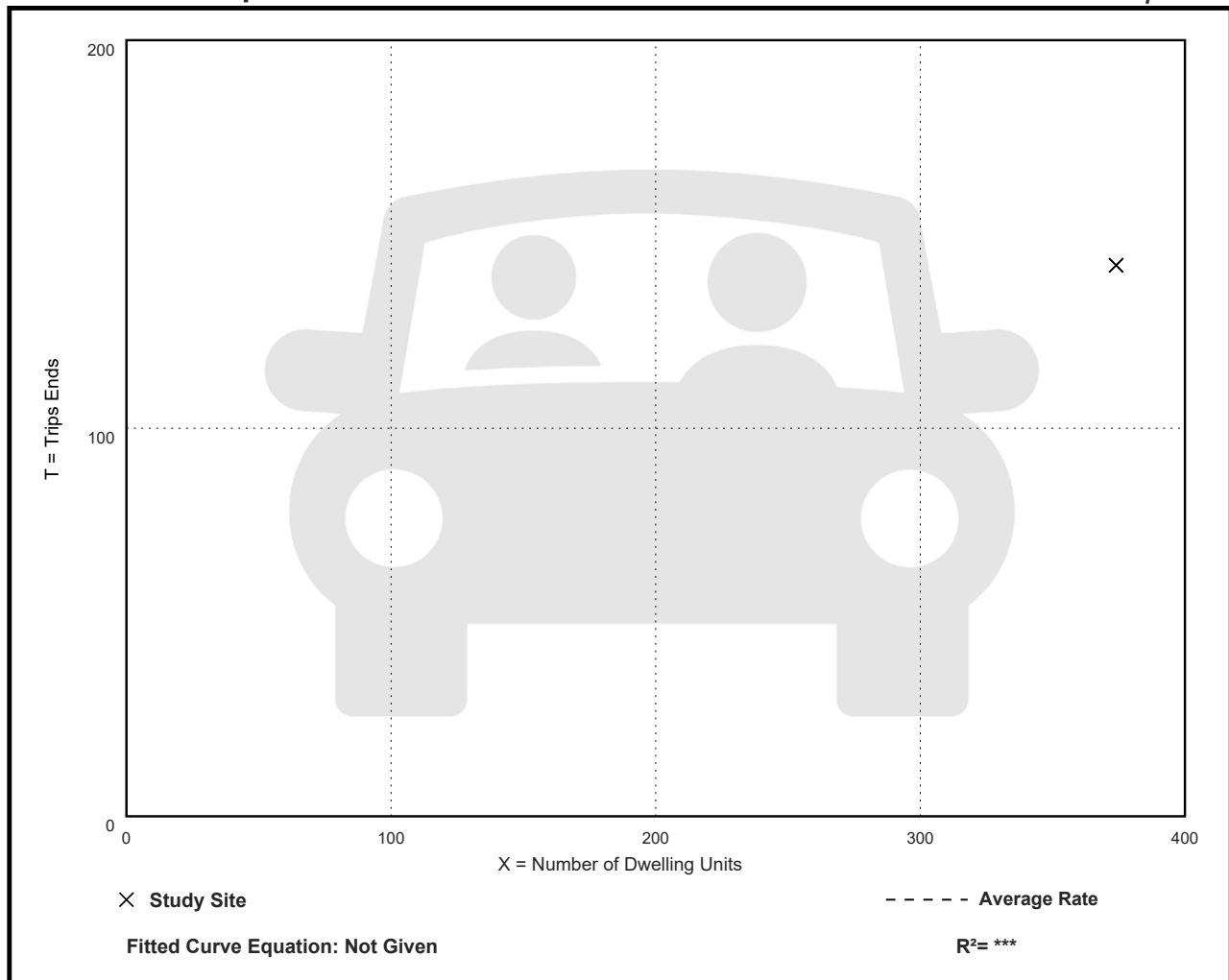
Directional Distribution: 29% entering, 71% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.38	0.38 - 0.38	***

Data Plot and Equation

Caution – Small Sample Size



Multifamily Housing (Low-Rise) Close to Rail Transit (220)

Vehicle Trip Ends vs: Dwelling Units

On a: Weekday,

Peak Hour of Adjacent Street Traffic,

One Hour Between 4 and 6 p.m.

Setting/Location: General Urban/Suburban

Number of Studies: 1

Avg. Num. of Dwelling Units: 374

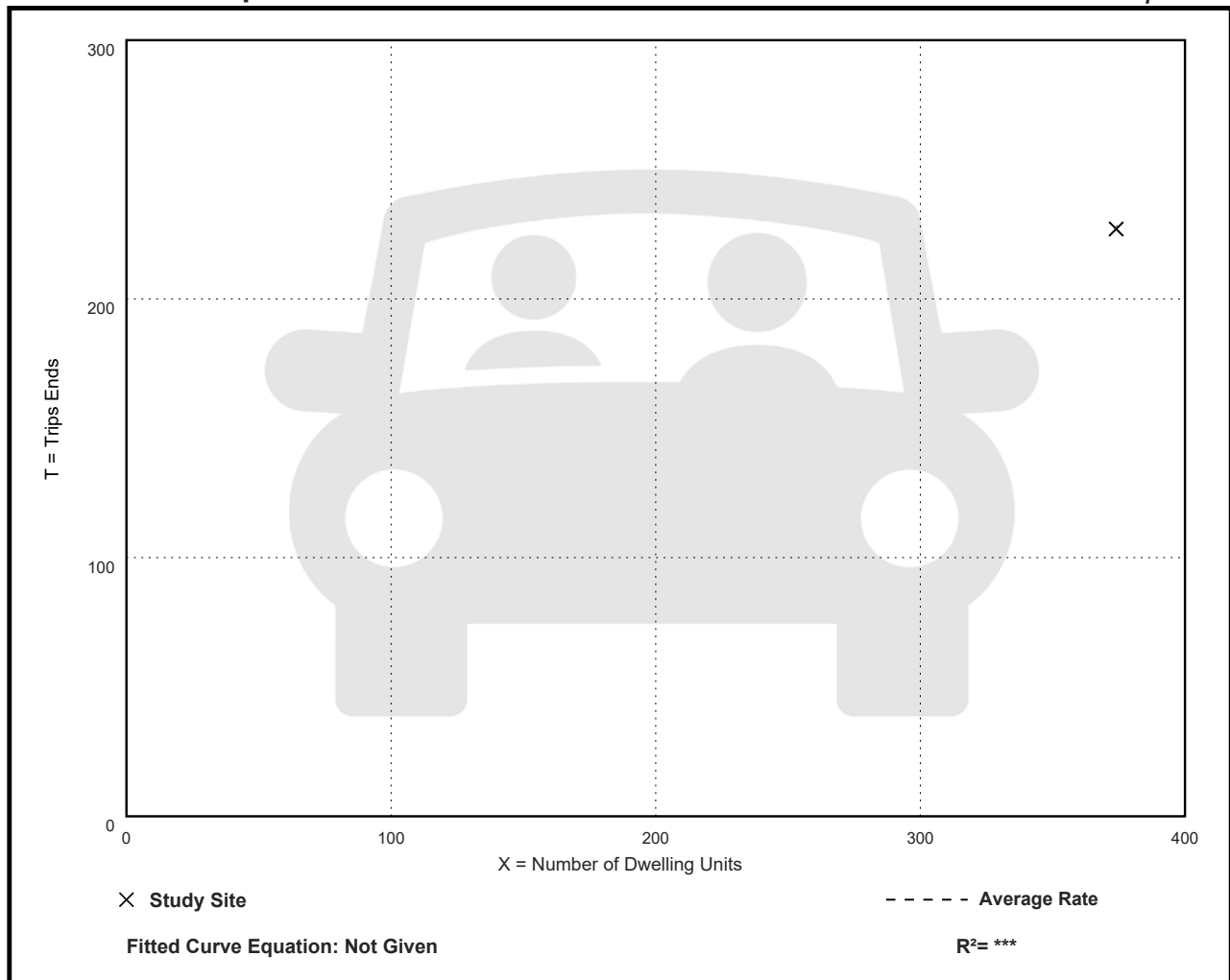
Directional Distribution: 60% entering, 40% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.61	0.61 - 0.61	***

Data Plot and Equation

Caution – Small Sample Size



Multifamily Housing (Low-Rise) Close to Rail Transit (220)

Vehicle Trip Ends vs: Dwelling Units

On a: Weekday,

AM Peak Hour of Generator

Setting/Location: General Urban/Suburban

Number of Studies: 1

Avg. Num. of Dwelling Units: 374

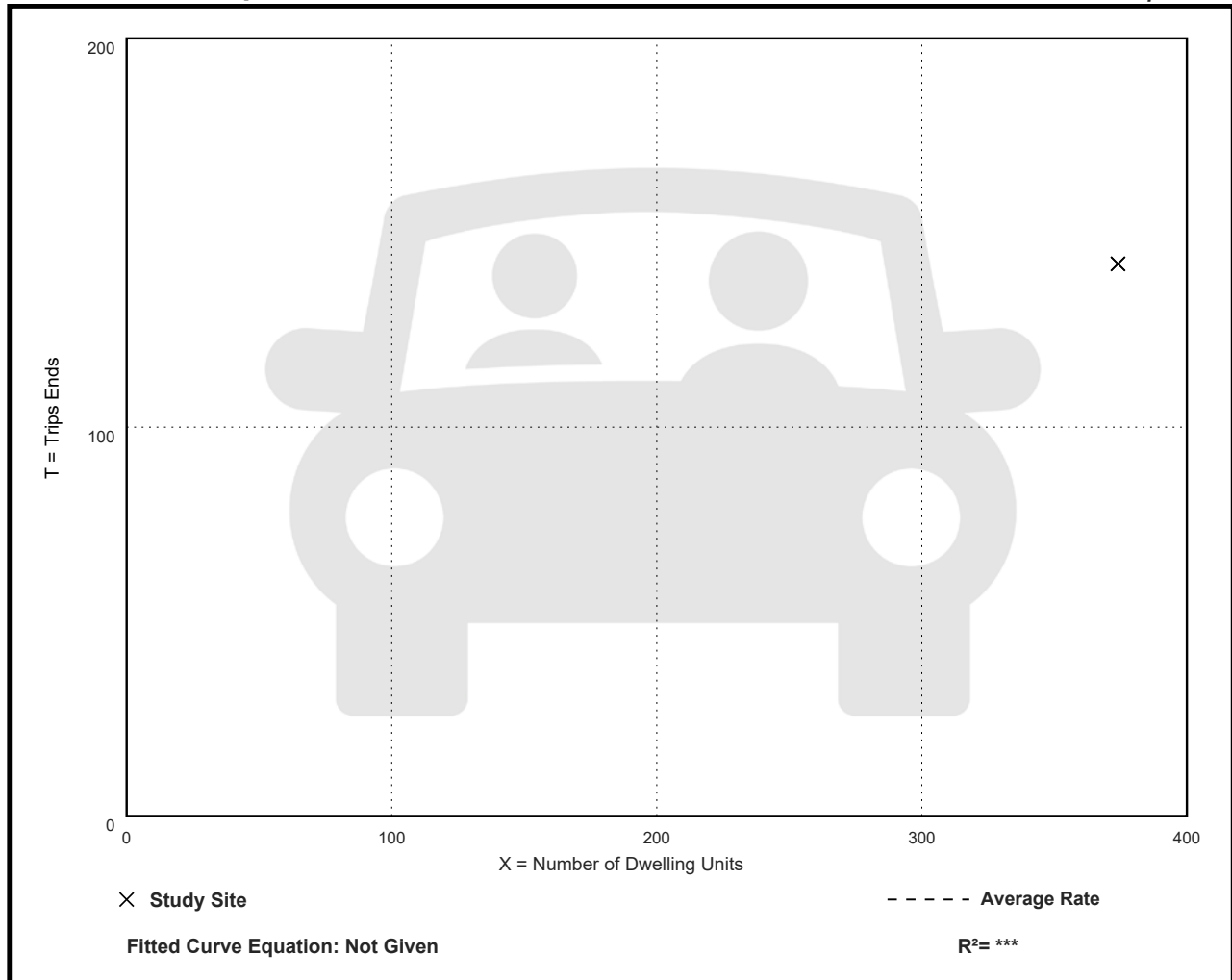
Directional Distribution: 29% entering, 71% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.38	0.38 - 0.38	***

Data Plot and Equation

Caution – Small Sample Size



Multifamily Housing (Low-Rise) Close to Rail Transit (220)

Vehicle Trip Ends vs: Dwelling Units

On a: Weekday,

PM Peak Hour of Generator

Setting/Location: General Urban/Suburban

Number of Studies: 1

Avg. Num. of Dwelling Units: 374

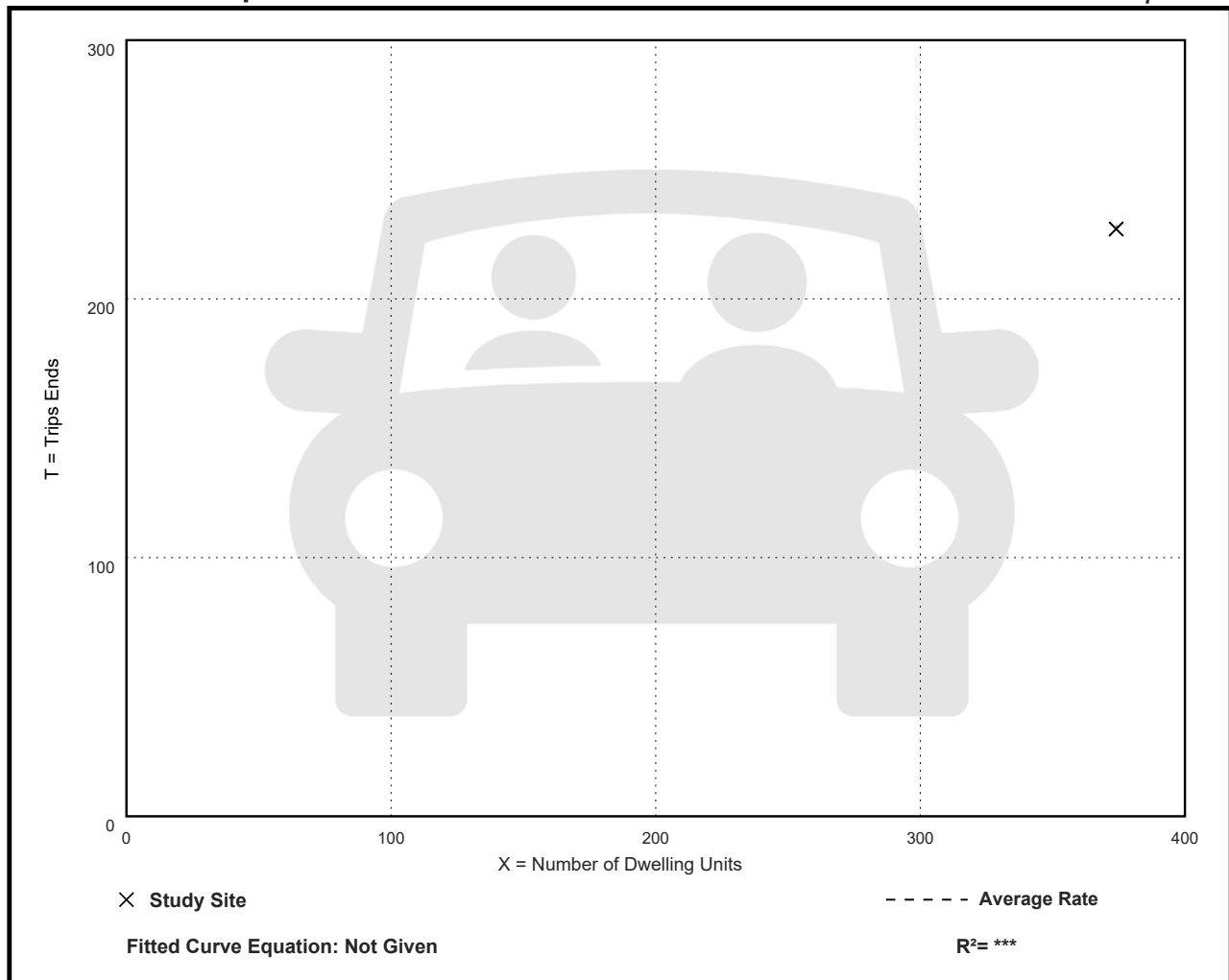
Directional Distribution: 60% entering, 40% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.61	0.61 - 0.61	***

Data Plot and Equation

Caution – Small Sample Size



APPENDIX H

Transportation Tomorrow Survey Data

Thu Jun 01 2023 10:29:57 GMT-0400 (Eastern Daylight Time) - Run Time: 2527ms

Cross Tabulation Query Form - Trip - 2016 v1.1

Row: 2006 GTA zone of origin - gta06_orig
Column: 2006 GTA zone of destination - gta06_dest

Filters:
(2006 GTA zone of destination - gta06_dest In 6182,6223,6175
and
Start time of trip - start_time In 0630-0930
and
Trip purpose of destination - purp_dest In H,)

Trip 2016
Table:

,6175,6182,6223
6052,0,0,55
6071,0,0,17
6146,0,4,0
6172,22,0,0
6219,0,0,57
6223,0,0,57
6228,0,0,82
6230,0,0,32
6258,0,34,0
6342,0,16,0
9998,0,0,40

Thu Jun 01 2023 10:33:52 GMT-0400 (Eastern Daylight Time) - Run Time: 2572ms

Cross Tabulation Query Form - Trip - 2016 v1.1

Row: 2006 GTA zone of destination - gta06_dest
Column: 2006 GTA zone of origin - gta06_orig

Filters:
(2006 GTA zone of origin - gta06_orig In 6182,6223,6175
and
Start time of trip - start_time In 0630-0930
and
Trip purpose of origin - purp_orig In H,)

Trip 2016

Table:

,6175,6182,6223
5066,0,0,10
5111,0,0,15
6013,0,0,12
6048,0,4,27
6050,0,13,0
6052,0,0,150
6079,0,0,55
6096,0,0,36
6100,0,17,0
6116,22,0,0
6144,0,0,36
6146,0,4,0
6157,0,58,0
6163,0,19,0
6171,0,12,0
6172,22,0,0
6174,0,18,0
6176,0,64,0
6177,21,0,0
6182,0,62,0
6198,0,0,32
6199,0,16,328
6201,30,0,0
6202,0,0,25
6203,0,20,0
6212,0,24,0
6215,0,0,17
6217,0,0,82
6219,0,0,62
6223,0,0,67
6225,0,0,34
6226,0,0,130
6228,0,0,55
6230,0,0,64
6233,0,0,87
6236,0,0,69
6255,0,0,44
6258,18,67,4
6340,0,0,30
6344,0,15,42



Thu Jun 01 2023 10:37:06 GMT-0400 (Eastern Daylight Time) - Run Time: 2476ms

Cross Tabulation Query Form - Trip - 2016 v1.1

Row: 2006 GTA zone of origin - gta06_orig

Column: 2006 GTA zone of destination - gta06_dest

Filters:

(2006 GTA zone of destination - gta06_dest In 6182,6223,6175

and

Start time of trip - start_time In 1530-1830

and

Trip purpose of destination - purp_dest In H,)

Trip 2016

Table:

,6175,6182,6223

52,0,42,0

393,0,6,0

5148,0,42,0

6002,0,49,0

6013,0,0,12

6026,0,17,0

6038,0,0,15

6044,0,18,0

6048,0,4,27

6052,0,0,55

6079,0,0,55

6084,6,0,0

6091,0,0,11

6094,0,0,11

6096,0,0,36

6111,0,11,0

6129,0,34,0

6130,0,0,17

6144,0,0,36

6146,0,36,0

6157,9,97,0

6158,20,0,0

6159,0,17,0

6172,22,0,0

6174,27,18,0

6182,0,4,0

6191,0,0,4

6192,0,0,10

6198,0,4,32
6199,0,0,92
6201,30,0,0
6202,0,0,25
6203,0,20,0
6210,0,4,0
6212,0,24,0
6215,0,0,17
6219,0,0,5
6222,0,0,34
6223,0,0,10
6225,0,0,15
6226,0,0,90
6228,0,0,12
6233,0,0,87
6236,0,0,69
6241,0,0,20
6248,0,0,64
6255,0,0,44
6257,0,0,12
6258,18,0,4
6276,0,36,0
6277,0,12,0
6321,0,20,0
6342,0,0,30
6344,0,0,42



Thu Jun 01 2023 10:40:29 GMT-0400 (Eastern Daylight Time) - Run Time: 2832ms

Cross Tabulation Query Form - Trip - 2016 v1.1

Row: 2006 GTA zone of destination - gta06_dest

Column: 2006 GTA zone of origin - gta06_orig

Filters:

(2006 GTA zone of origin - gta06_orig In 6182,6223,6175

and

Start time of trip - start_time In 1530-1830

and

Trip purpose of origin - purp_orig In H,)

Trip 2016

Table:

,6175,6182,6223

5141,22,0,0

6052,0,21,30

6084,0,0,11

6087,0,0,82

6118,0,13,0

6129,0,34,0

6135,0,0,14

6136,0,36,0

6147,0,17,0

6171,0,10,0

6174,9,0,0

6176,0,58,16

6198,0,24,0

6199,0,0,84

6214,0,12,0

6218,0,0,57

6219,0,0,82

6220,0,20,0

6222,0,0,34

6232,0,4,0

6248,0,0,64

APPENDIX I

Recommendations

Lanes, Volumes, Timings

1: Barker Pkwy & Davis Road/Hwy 58

06-26-2023

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	24	154	301	25	54	235
Future Volume (vph)	24	154	301	25	54	235
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0		118.0	135.0	
Storage Lanes	1	0		1	1	
Taper Length (m)	7.5				7.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.885			0.850		
Flt Protected	0.993				0.950	
Satd. Flow (prot)	1579	0	1827	1170	1504	1776
Flt Permitted	0.993				0.950	
Satd. Flow (perm)	1579	0	1827	1170	1504	1776
Link Speed (k/h)	50		50			50
Link Distance (m)	345.6		411.8			484.4
Travel Time (s)	24.9		29.6			34.9
Peak Hour Factor	0.71	0.79	0.83	0.50	0.75	0.90
Heavy Vehicles (%)	10%	5%	4%	38%	20%	7%
Adj. Flow (vph)	34	195	363	50	72	261
Shared Lane Traffic (%)						
Lane Group Flow (vph)	229	0	363	50	72	261
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.6		3.6			3.6
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	40.0%			ICU Level of Service A		
Analysis Period (min)	15					

Lanes, Volumes, Timings

2: Uppers Lane & Davis Road

06-26-2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	49	28	86	58	33	12	58	239	48	24	164	34
Future Volume (vph)	49	28	86	58	33	12	58	239	48	24	164	34
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	170.0		0.0	140.0		117.0
Storage Lanes	0		0	0		0	1		0	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
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		0.930			0.976			0.975				0.850
Flt Protected		0.987			0.977		0.950			0.950		
Satd. Flow (prot)	0	1616	0	0	1775	0	1656	1764	0	1719	1681	1482
Flt Permitted		0.858			0.819		0.643			0.558		
Satd. Flow (perm)	0	1405	0	0	1488	0	1121	1764	0	1010	1681	1482
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		116			28			26				40
Link Speed (k/h)		50			50			50				50
Link Distance (m)		190.8			63.3			356.3			336.3	
Travel Time (s)		13.7			4.6			25.7			24.2	
Peak Hour Factor	0.82	0.59	0.74	0.77	0.61	0.43	0.85	0.85	0.88	0.83	0.90	0.85
Heavy Vehicles (%)	14%	0%	8%	0%	6%	0%	9%	6%	0%	5%	13%	9%
Adj. Flow (vph)	60	47	116	75	54	28	68	281	55	29	182	40
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	223	0	0	157	0	68	336	0	29	182	40
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	

Lanes, Volumes, Timings

2: Uppers Lane & Davis Road

06-26-2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		8	8		2	2		6	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	22.5
Total Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	22.5
Total Split (%)	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%		50.0%	50.0%	50.0%
Maximum Green (s)	18.0	18.0		18.0	18.0		18.0	18.0		18.0	18.0	18.0
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)		4.5			4.5		4.5	4.5		4.5	4.5	4.5
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		Min	Min		Min	Min	Min
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	7.0
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	0
Act Effect Green (s)		8.3			8.3		14.7	14.7		14.7	14.7	14.7
Actuated g/C Ratio		0.29			0.29		0.51	0.51		0.51	0.51	0.51
v/c Ratio		0.46			0.35		0.12	0.37		0.06	0.21	0.05
Control Delay		8.2			9.7		7.0	7.7		6.5	7.2	3.0
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Total Delay		8.2			9.7		7.0	7.7		6.5	7.2	3.0
LOS		A			A		A	A		A	A	A
Approach Delay		8.2			9.7			7.6			6.5	
Approach LOS		A			A			A			A	

Intersection Summary

Area Type: Other

Cycle Length: 45

Actuated Cycle Length: 29

Natural Cycle: 45

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.46

Intersection Signal Delay: 7.8

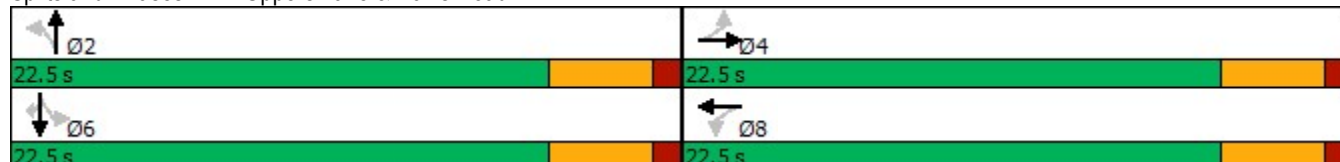
Intersection LOS: A

Intersection Capacity Utilization 41.1%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 2: Uppers Lane & Davis Road



Queues

2: Uppers Lane & Davis Road

06-26-2023

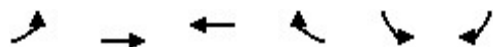


Lane Group	EBT	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	223	157	68	336	29	182	40
v/c Ratio	0.46	0.35	0.12	0.37	0.06	0.21	0.05
Control Delay	8.2	9.7	7.0	7.7	6.5	7.2	3.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.2	9.7	7.0	7.7	6.5	7.2	3.0
Queue Length 50th (m)	3.3	4.0	1.7	9.1	0.7	4.9	0.0
Queue Length 95th (m)	7.7	9.6	7.1	25.5	3.7	16.2	3.0
Internal Link Dist (m)	166.8	39.3		332.3		312.3	
Turn Bay Length (m)			170.0		140.0		117.0
Base Capacity (vph)	940	961	782	1238	704	1172	1046
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.24	0.16	0.09	0.27	0.04	0.16	0.04
Intersection Summary							

Lanes, Volumes, Timings

3: Lundy's Lane & Barker Parkway

06-26-2023



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕↕	↕↕		↕	↕
Traffic Volume (vph)	49	30	19	149	61	47
Future Volume (vph)	49	30	19	149	61	47
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	0.95	0.95	1.00	1.00
Frt			0.866			0.850
Flt Protected		0.969			0.950	
Satd. Flow (prot)	0	3208	2564	0	1626	1509
Flt Permitted		0.969			0.950	
Satd. Flow (perm)	0	3208	2564	0	1626	1509
Link Speed (k/h)		50	50		50	
Link Distance (m)		269.5	290.5		183.4	
Travel Time (s)		19.4	20.9		13.2	
Peak Hour Factor	0.78	0.82	0.77	0.69	0.73	0.78
Heavy Vehicles (%)	12%	4%	4%	24%	11%	7%
Adj. Flow (vph)	63	37	25	216	84	60
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	100	241	0	84	60
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25			15	25	15
Sign Control		Yield	Yield		Yield	
Intersection Summary						
Area Type:	Other					
Control Type:	Roundabout					
Intersection Capacity Utilization	22.1%			ICU Level of Service A		
Analysis Period (min)	15					

Lanes, Volumes, Timings

4: Thorold Townline Road 70 & Lundy's Lane

06-26-2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	34	385	81	42	297	29	66	146	34	102	96	23
Future Volume (vph)	34	385	81	42	297	29	66	146	34	102	96	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	150.0		32.0	76.0		0.0	30.0		0.0	40.0		0.0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.986			0.967			0.962	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1703	1863	1468	1805	1798	0	1626	1662	0	1467	1607	0
Flt Permitted	0.424			0.303			0.646			0.607		
Satd. Flow (perm)	760	1863	1468	576	1798	0	1106	1662	0	938	1607	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			71		8			18			21	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		307.3			478.1			247.2			197.8	
Travel Time (s)		22.1			34.4			17.8			14.2	
Peak Hour Factor	0.71	0.78	0.88	0.81	0.88	0.85	0.79	0.79	0.65	0.56	0.73	0.52
Heavy Vehicles (%)	6%	2%	10%	0%	4%	6%	11%	11%	9%	23%	14%	13%
Adj. Flow (vph)	48	494	92	52	338	34	84	185	52	182	132	44
Shared Lane Traffic (%)												
Lane Group Flow (vph)	48	494	92	52	372	0	84	237	0	182	176	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	

Lanes, Volumes, Timings

4: Thorold Townline Road 70 & Lundy's Lane

06-26-2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4		4	8			2			6		
Detector Phase	4	4	4	8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	20.0	20.0	20.0	20.0	20.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	33.0	33.0	33.0	32.0	32.0		35.0	35.0		35.0	35.0	
Total Split (s)	50.0	50.0	50.0	50.0	50.0		40.0	40.0		40.0	40.0	
Total Split (%)	55.6%	55.6%	55.6%	55.6%	55.6%		44.4%	44.4%		44.4%	44.4%	
Maximum Green (s)	43.0	43.0	43.0	44.0	44.0		34.0	34.0		34.0	34.0	
Yellow Time (s)	5.0	5.0	5.0	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)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	7.0	7.0	7.0	6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Recall Mode	None	None	None	None	None		Max	Max		Max	Max	
Walk Time (s)	15.0	15.0	15.0	15.0	15.0		15.0	15.0		15.0	15.0	
Flash Dont Walk (s)	7.0	7.0	7.0	7.0	7.0		14.0	14.0		14.0	14.0	
Pedestrian Calls (#/hr)	0	0	0	0	0		0	0		0	0	
Act Effect Green (s)	28.2	28.2	28.2	29.2	29.2		34.3	34.3		34.3	34.3	
Actuated g/C Ratio	0.37	0.37	0.37	0.39	0.39		0.45	0.45		0.45	0.45	
v/c Ratio	0.17	0.71	0.16	0.23	0.53		0.17	0.31		0.43	0.24	
Control Delay	16.5	26.1	6.1	17.8	20.1		15.8	15.2		20.2	13.9	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	16.5	26.1	6.1	17.8	20.1		15.8	15.2		20.2	13.9	
LOS	B	C	A	B	C		B	B		C	B	
Approach Delay		22.5			19.8			15.3			17.1	
Approach LOS		C			B			B			B	

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 75.6

Natural Cycle: 70

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.71

Intersection Signal Delay: 19.4

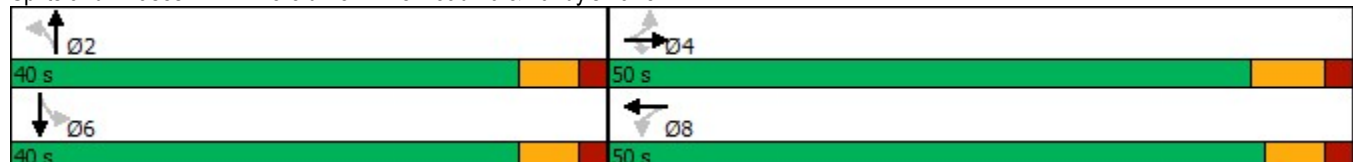
Intersection LOS: B

Intersection Capacity Utilization 68.0%

ICU Level of Service C

Analysis Period (min) 15

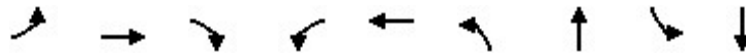
Splits and Phases: 4: Thorold Townline Road 70 & Lundy's Lane



Queues

4: Thorold Townline Road 70 & Lundy's Lane

06-26-2023



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	48	494	92	52	372	84	237	182	176
v/c Ratio	0.17	0.71	0.16	0.23	0.53	0.17	0.31	0.43	0.24
Control Delay	16.5	26.1	6.1	17.8	20.1	15.8	15.2	20.2	13.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.5	26.1	6.1	17.8	20.1	15.8	15.2	20.2	13.9
Queue Length 50th (m)	4.7	61.3	2.0	5.1	40.7	6.9	19.2	17.3	13.1
Queue Length 95th (m)	8.8	74.7	9.7	11.3	61.7	17.4	38.4	23.7	25.6
Internal Link Dist (m)	283.3				454.1		223.2		173.8
Turn Bay Length (m)	150.0			32.0	76.0			30.0	40.0
Base Capacity (vph)	436	1069	872	338	1059	501	764	425	740
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	0.11	0.46	0.11	0.15	0.35	0.17	0.31	0.43	0.24
Intersection Summary									

Lanes, Volumes, Timings

5: Thorold Townline Road

06-26-2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	0	14	0	0	1	6	184	2	3	245	4
Future Volume (vph)	5	0	14	0	0	1	6	184	2	3	245	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.899			0.865			0.998			0.993	
Flt Protected		0.988						0.998			0.999	
Satd. Flow (prot)	0	1655	0	0	1644	0	0	1698	0	0	1850	0
Flt Permitted		0.988						0.998			0.999	
Satd. Flow (perm)	0	1655	0	0	1644	0	0	1698	0	0	1850	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		488.7			510.1			142.0			229.8	
Travel Time (s)		35.2			36.7			10.2			16.5	
Peak Hour Factor	0.92	0.92	0.92	0.25	0.25	0.25	0.92	0.85	0.50	0.75	0.83	0.25
Heavy Vehicles (%)	2%	2%	2%	0%	0%	0%	0%	12%	0%	0%	2%	0%
Adj. Flow (vph)	5	0	15	0	0	4	7	216	4	4	295	16
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	20	0	0	4	0	0	227	0	0	315	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	100		100	100		100	100		100	100		100
Sign Control		Stop			Stop			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	26.8%											
Analysis Period (min)	15											
	ICU Level of Service A											

Lanes, Volumes, Timings
6: Thorold Townline Road & Venture Street

06-26-2023

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	33	90	19	0	4	13
Future Volume (vph)	33	90	19	0	4	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.901				0.895	
Flt Protected	0.987				0.950	
Satd. Flow (prot)	1657	0	0	1770	1667	0
Flt Permitted	0.987				0.950	
Satd. Flow (perm)	1657	0	0	1770	1667	0
Link Speed (k/h)	50				50	50
Link Distance (m)	574.7				229.8	102.8
Travel Time (s)	41.4				16.5	7.4
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	36	98	21	0	4	14
Shared Lane Traffic (%)						
Lane Group Flow (vph)	134	0	0	21	18	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6				0.0	0.0
Link Offset(m)	0.0				0.0	0.0
Crosswalk Width(m)	4.8				4.8	4.8
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	100	100	100	100		
Sign Control	Stop				Stop	Stop
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	21.8%			ICU Level of Service A		
Analysis Period (min)	15					

Lanes, Volumes, Timings

7: Beaverdams Road & Thorold Townline Road

06-26-2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	34	117	32	14	177	42	34	147	35	20	97	25
Future Volume (vph)	34	117	32	14	177	42	34	147	35	20	97	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.968			0.978			0.968			0.974	
Flt Protected		0.990			0.996			0.992			0.989	
Satd. Flow (prot)	0	1702	0	0	1837	0	0	1714	0	0	1667	0
Flt Permitted		0.897			0.950			0.924			0.888	
Satd. Flow (perm)	0	1542	0	0	1752	0	0	1596	0	0	1497	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		41			26			42			33	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		197.0			309.7			169.2			132.8	
Travel Time (s)		14.2			22.3			12.2			9.6	
Peak Hour Factor	0.77	0.93	0.62	0.50	0.74	0.81	0.71	0.84	0.50	0.45	0.81	0.63
Heavy Vehicles (%)	12%	4%	10%	0%	1%	0%	3%	10%	0%	0%	14%	8%
Adj. Flow (vph)	44	126	52	28	239	52	48	175	70	44	120	40
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	222	0	0	319	0	0	293	0	0	204	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												

Lanes, Volumes, Timings

7: Beaverdams Road & Thorold Townline Road

06-26-2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (%)	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%		50.0%	50.0%	
Maximum Green (s)	18.0	18.0		18.0	18.0		18.0	18.0		18.0	18.0	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		4.5			4.5			4.5			4.5	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Min	Min		Min	Min	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		10.3			10.7			14.6			14.6	
Actuated g/C Ratio		0.34			0.36			0.49			0.49	
v/c Ratio		0.40			0.50			0.37			0.28	
Control Delay		9.1			10.8			8.8			8.1	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		9.1			10.8			8.8			8.1	
LOS		A			B			A			A	
Approach Delay		9.1			10.8			8.8			8.1	
Approach LOS		A			B			A			A	
Intersection Summary												
Area Type:	Other											
Cycle Length: 45												
Actuated Cycle Length: 30.1												
Natural Cycle: 45												
Control Type: Actuated-Uncoordinated												
Maximum v/c Ratio: 0.50												
Intersection Signal Delay: 9.3												
Intersection Capacity Utilization 43.8%												
Analysis Period (min) 15												
Intersection LOS: A												
ICU Level of Service A												

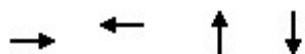
Splits and Phases: 7: Beaverdams Road & Thorold Townline Road

	
Ø2	Ø4
22.5 s	22.5 s
	
Ø6	Ø8
22.5 s	22.5 s

Queues

7: Beaverdams Road & Thorold Townline Road

06-26-2023



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	222	319	293	204
v/c Ratio	0.40	0.50	0.37	0.28
Control Delay	9.1	10.8	8.8	8.1
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	9.1	10.8	8.8	8.1
Queue Length 50th (m)	5.9	10.1	8.6	5.6
Queue Length 95th (m)	21.0	23.7	25.5	17.0
Internal Link Dist (m)	173.0	285.7	145.2	108.8
Turn Bay Length (m)				
Base Capacity (vph)	1001	1130	1036	970
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.22	0.28	0.28	0.21
Intersection Summary				

Lanes, Volumes, Timings

8: Barker Pkwy

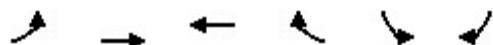
06-26-2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	19	4	1	1	0	8	1	55	0	24	16	13
Future Volume (vph)	19	4	1	1	0	8	1	55	0	24	16	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.994			0.881						0.941	
Flt Protected		0.957			0.994			0.999			0.990	
Satd. Flow (prot)	0	1800	0	0	1582	0	0	1898	0	0	1553	0
Flt Permitted		0.957			0.994			0.999			0.990	
Satd. Flow (perm)	0	1800	0	0	1582	0	0	1898	0	0	1553	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		143.7			157.1			135.3			345.6	
Travel Time (s)		10.3			11.3			9.7			24.9	
Peak Hour Factor	0.25	0.75	0.25	0.44	0.58	0.54	0.25	0.25	0.29	0.95	0.38	0.25
Heavy Vehicles (%)	0%	7%	0%	29%	14%	2%	0%	0%	0%	11%	33%	0%
Adj. Flow (vph)	76	5	4	2	0	15	4	220	0	25	42	52
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	85	0	0	17	0	0	224	0	0	119	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	22.4%											
Analysis Period (min)	15											
ICU Level of Service A												

Lanes, Volumes, Timings

9:

06-26-2023



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	22	0	0	10	19	45
Future Volume (vph)	22	0	0	10	19	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.865		0.905	
Flt Protected		0.950			0.985	
Satd. Flow (prot)	0	1770	1611	0	1660	0
Flt Permitted		0.950			0.985	
Satd. Flow (perm)	0	1770	1611	0	1660	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		461.7	162.2		264.6	
Travel Time (s)		33.2	11.7		19.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	24	0	0	11	21	49
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	24	11	0	70	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	100			100	100	100
Sign Control		Stop	Stop		Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization 18.4%				ICU Level of Service A		
Analysis Period (min) 15						

Lanes, Volumes, Timings

1: Barker Pkwy & Davis Road/Hwy 58

06-26-2023

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	23	94	349	46	162	361
Future Volume (vph)	23	94	349	46	162	361
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0		118.0	135.0	
Storage Lanes	1	0		1	1	
Taper Length (m)	7.5				7.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.899			0.850		
Flt Protected	0.987				0.950	
Satd. Flow (prot)	1661	0	1863	1524	1787	1827
Flt Permitted	0.987				0.950	
Satd. Flow (perm)	1661	0	1863	1524	1787	1827
Link Speed (k/h)	50		50			50
Link Distance (m)	345.6		411.8			484.4
Travel Time (s)	24.9		29.6			34.9
Peak Hour Factor	0.63	0.87	0.89	0.85	0.88	0.91
Heavy Vehicles (%)	0%	2%	2%	6%	1%	4%
Adj. Flow (vph)	37	108	392	54	184	397
Shared Lane Traffic (%)						
Lane Group Flow (vph)	145	0	392	54	184	397
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.6		3.6			3.6
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	44.4%			ICU Level of Service A		
Analysis Period (min)	15					

Lanes, Volumes, Timings

2: Uppers Lane & Davis Road

06-26-2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	35	30	107	62	18	23	101	334	76	44	265	66
Future Volume (vph)	35	30	107	62	18	23	101	334	76	44	265	66
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	170.0		0.0	140.0		117.0
Storage Lanes	0		0	0		0	1		0	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
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		0.928			0.967			0.964				0.850
Flt Protected		0.989			0.975		0.950			0.950		
Satd. Flow (prot)	0	1626	0	0	1766	0	1656	1752	0	1719	1681	1482
Flt Permitted		0.895			0.740		0.590			0.431		
Satd. Flow (perm)	0	1471	0	0	1340	0	1028	1752	0	780	1681	1482
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		149			36			42				84
Link Speed (k/h)		50			50			50				50
Link Distance (m)		190.8			63.3			356.3				336.3
Travel Time (s)		13.7			4.6			25.7				24.2
Peak Hour Factor	0.58	0.42	0.72	0.82	0.50	0.64	0.74	0.89	0.64	0.67	0.96	0.79
Heavy Vehicles (%)	14%	0%	8%	0%	6%	0%	9%	6%	0%	5%	13%	9%
Adj. Flow (vph)	60	71	149	76	36	36	136	375	119	66	276	84
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	280	0	0	148	0	136	494	0	66	276	84
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	

Lanes, Volumes, Timings

2: Uppers Lane & Davis Road

06-26-2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		8	8		2	2		6	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	22.5
Total Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	22.5
Total Split (%)	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%		50.0%	50.0%	50.0%
Maximum Green (s)	18.0	18.0		18.0	18.0		18.0	18.0		18.0	18.0	18.0
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)		4.5			4.5		4.5	4.5		4.5	4.5	4.5
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		Min	Min		Min	Min	Min
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	7.0
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	0
Act Effect Green (s)		8.9			8.9		17.6	17.6		17.6	17.6	17.6
Actuated g/C Ratio		0.28			0.28		0.54	0.54		0.54	0.54	0.54
v/c Ratio		0.54			0.37		0.24	0.51		0.16	0.30	0.10
Control Delay		9.6			10.8		8.3	9.1		7.8	7.8	2.6
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Total Delay		9.6			10.8		8.3	9.1		7.8	7.8	2.6
LOS		A			B		A	A		A	A	A
Approach Delay		9.6			10.8			8.9			6.7	
Approach LOS		A			B			A			A	

Intersection Summary

Area Type: Other

Cycle Length: 45

Actuated Cycle Length: 32.3

Natural Cycle: 50

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.54

Intersection Signal Delay: 8.6

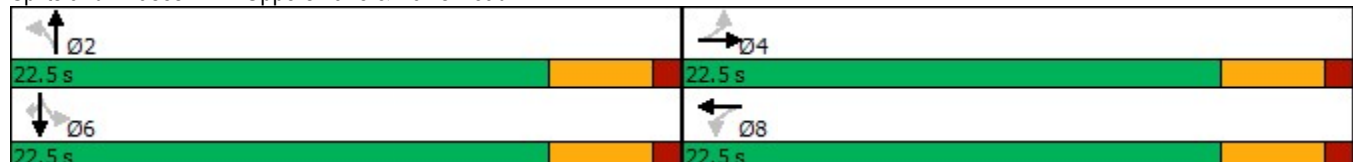
Intersection LOS: A

Intersection Capacity Utilization 51.7%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 2: Uppers Lane & Davis Road



Queues

2: Uppers Lane & Davis Road

06-26-2023



Lane Group	EBT	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	280	148	136	494	66	276	84
v/c Ratio	0.54	0.37	0.24	0.51	0.16	0.30	0.10
Control Delay	9.6	10.8	8.3	9.1	7.8	7.8	2.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.6	10.8	8.3	9.1	7.8	7.8	2.6
Queue Length 50th (m)	5.1	4.3	4.0	15.5	1.9	8.4	0.0
Queue Length 95th (m)	3.8	6.8	11.8	46.9	6.0	26.2	3.9
Internal Link Dist (m)	166.8	39.3		332.3		312.3	
Turn Bay Length (m)			170.0		140.0		117.0
Base Capacity (vph)	913	789	658	1138	500	1077	980
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.31	0.19	0.21	0.43	0.13	0.26	0.09
Intersection Summary							

Lanes, Volumes, Timings

3: Lundy's Lane & Barker Parkway

06-26-2023



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕↕	↕↕		↕	↕
Traffic Volume (vph)	46	573	599	54	55	60
Future Volume (vph)	46	573	599	54	55	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	0.95	0.95	1.00	1.00
Frt			0.982			0.850
Flt Protected		0.997			0.950	
Satd. Flow (prot)	0	3529	3502	0	1805	1583
Flt Permitted		0.997			0.950	
Satd. Flow (perm)	0	3529	3502	0	1805	1583
Link Speed (k/h)		50	50		50	
Link Distance (m)		269.5	290.5		183.4	
Travel Time (s)		19.4	20.9		13.2	
Peak Hour Factor	0.82	0.75	0.95	0.62	0.56	0.71
Heavy Vehicles (%)	2%	2%	1%	3%	0%	2%
Adj. Flow (vph)	56	764	631	87	98	85
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	820	718	0	98	85
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25			15	25	15
Sign Control		Yield	Yield		Yield	
Intersection Summary						
Area Type:	Other					
Control Type:	Roundabout					
Intersection Capacity Utilization	48.8%			ICU Level of Service A		
Analysis Period (min)	15					

Lanes, Volumes, Timings

4: Thorold Townline Road 70 & Lundy's Lane

06-26-2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	27	500	112	31	455	49	141	161	62	87	176	31
Future Volume (vph)	27	500	112	31	455	49	141	161	62	87	176	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	150.0		32.0	76.0		0.0	30.0		0.0	40.0		0.0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.970			0.945			0.977	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1736	1881	1599	1805	1828	0	1770	1751	0	1719	1821	0
Flt Permitted	0.218			0.191			0.589			0.518		
Satd. Flow (perm)	398	1881	1599	363	1828	0	1097	1751	0	937	1821	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			87		20			37			12	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		307.3			478.1			247.2			197.8	
Travel Time (s)		22.1			34.4			17.8			14.2	
Peak Hour Factor	0.84	0.77	0.76	0.65	0.94	0.40	0.74	0.85	0.57	0.68	0.88	0.86
Heavy Vehicles (%)	4%	1%	1%	0%	1%	0%	2%	4%	0%	5%	1%	7%
Adj. Flow (vph)	32	649	147	48	484	123	191	189	109	128	200	36
Shared Lane Traffic (%)												
Lane Group Flow (vph)	32	649	147	48	607	0	191	298	0	128	236	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	

Lanes, Volumes, Timings

4: Thorold Townline Road 70 & Lundy's Lane

06-26-2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4		4	8			2			6		
Detector Phase	4	4	4	8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	20.0	20.0	20.0	20.0	20.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	33.0	33.0	33.0	32.0	32.0		35.0	35.0		35.0	35.0	
Total Split (s)	50.0	50.0	50.0	50.0	50.0		40.0	40.0		40.0	40.0	
Total Split (%)	55.6%	55.6%	55.6%	55.6%	55.6%		44.4%	44.4%		44.4%	44.4%	
Maximum Green (s)	43.0	43.0	43.0	44.0	44.0		34.0	34.0		34.0	34.0	
Yellow Time (s)	5.0	5.0	5.0	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)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	7.0	7.0	7.0	6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Recall Mode	None	None	None	None	None		Max	Max		Max	Max	
Walk Time (s)	15.0	15.0	15.0	15.0	15.0		15.0	15.0		15.0	15.0	
Flash Dont Walk (s)	7.0	7.0	7.0	7.0	7.0		14.0	14.0		14.0	14.0	
Pedestrian Calls (#/hr)	0	0	0	0	0		0	0		0	0	
Act Effect Green (s)	35.2	35.2	35.2	36.2	36.2		34.3	34.3		34.3	34.3	
Actuated g/C Ratio	0.43	0.43	0.43	0.44	0.44		0.42	0.42		0.42	0.42	
v/c Ratio	0.19	0.81	0.20	0.30	0.75		0.42	0.40		0.33	0.31	
Control Delay	17.1	29.5	6.9	20.2	24.9		22.8	18.2		21.7	18.4	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	17.1	29.5	6.9	20.2	24.9		22.8	18.2		21.7	18.4	
LOS	B	C	A	C	C		C	B		C	B	
Approach Delay		25.0			24.5			20.0			19.6	
Approach LOS		C			C			B			B	

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 82.6

Natural Cycle: 70

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.81

Intersection Signal Delay: 23.0

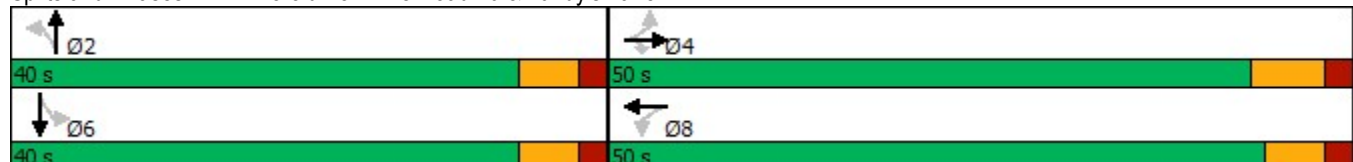
Intersection LOS: C

Intersection Capacity Utilization 62.7%

ICU Level of Service B

Analysis Period (min) 15

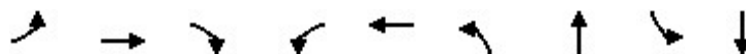
Splits and Phases: 4: Thorold Townline Road 70 & Lundy's Lane



Queues

4: Thorold Townline Road 70 & Lundy's Lane

06-26-2023



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	32	649	147	48	607	191	298	128	236
v/c Ratio	0.19	0.81	0.20	0.30	0.75	0.42	0.40	0.33	0.31
Control Delay	17.1	29.5	6.9	20.2	24.9	22.8	18.2	21.7	18.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.1	29.5	6.9	20.2	24.9	22.8	18.2	21.7	18.4
Queue Length 50th (m)	3.2	90.4	5.7	4.9	77.7	22.9	30.5	14.7	25.3
Queue Length 95th (m)	8.6	102.6	11.8	8.9	116.7	35.6	52.7	22.6	46.0
Internal Link Dist (m)		283.3			454.1		223.2		173.8
Turn Bay Length (m)	150.0		32.0	76.0		30.0		40.0	
Base Capacity (vph)	209	988	881	195	991	455	748	389	763
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	0.15	0.66	0.17	0.25	0.61	0.42	0.40	0.33	0.31
Intersection Summary									

Lanes, Volumes, Timings

5: Thorold Townline Road

06-26-2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	0	9	0	0	2	21	236	0	0	320	11
Future Volume (vph)	3	0	9	0	0	2	21	236	0	0	320	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.896			0.865						0.995	
Flt Protected		0.989						0.996				
Satd. Flow (prot)	0	1651	0	0	1644	0	0	1822	0	0	1819	0
Flt Permitted		0.989						0.996				
Satd. Flow (perm)	0	1651	0	0	1644	0	0	1822	0	0	1819	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		488.7			510.1			142.0			229.8	
Travel Time (s)		35.2			36.7			10.2			16.5	
Peak Hour Factor	0.92	0.92	0.92	0.25	0.92	0.25	0.92	0.83	0.25	0.25	0.95	0.92
Heavy Vehicles (%)	2%	2%	2%	0%	2%	0%	2%	4%	0%	0%	4%	2%
Adj. Flow (vph)	3	0	10	0	0	8	23	284	0	0	337	12
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	13	0	0	8	0	0	307	0	0	349	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	40.0%											
Analysis Period (min)	15											
ICU Level of Service A												

Lanes, Volumes, Timings
6: Thorold Townline Road & Venture Street

06-26-2023

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	21	58	51	0	11	42
Future Volume (vph)	21	58	51	0	11	42
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	0.901				0.893	
Flt Protected	0.987			0.950		
Satd. Flow (prot)	1657	0	0	1770	1663	0
Flt Permitted	0.987			0.950		
Satd. Flow (perm)	1657	0	0	1770	1663	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	574.7			229.8	102.8	
Travel Time (s)	41.4			16.5	7.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	23	63	55	0	12	46
Shared Lane Traffic (%)						
Lane Group Flow (vph)	86	0	0	55	58	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	100	100	100			100
Sign Control	Stop			Stop	Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	20.9%			ICU Level of Service A		
Analysis Period (min)	15					

Lanes, Volumes, Timings

7: Beaverdams Road & Thorold Townline Road

06-26-2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	196	47	37	178	27	39	139	25	40	207	57
Future Volume (vph)	30	196	47	37	178	27	39	139	25	40	207	57
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.974			0.980			0.964			0.969	
Flt Protected		0.994			0.990			0.992			0.993	
Satd. Flow (prot)	0	1820	0	0	1821	0	0	1776	0	0	1753	0
Flt Permitted		0.936			0.882			0.907			0.925	
Satd. Flow (perm)	0	1714	0	0	1622	0	0	1624	0	0	1633	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		32			24			49			39	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		197.0			309.7			169.2			132.8	
Travel Time (s)		14.2			22.3			12.2			9.6	
Peak Hour Factor	0.75	0.92	0.78	0.63	0.95	0.61	0.89	0.86	0.33	0.83	0.93	0.71
Heavy Vehicles (%)	3%	1%	0%	3%	1%	0%	0%	4%	0%	5%	5%	2%
Adj. Flow (vph)	40	213	60	59	187	44	44	162	76	48	223	80
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	313	0	0	290	0	0	282	0	0	351	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												

Lanes, Volumes, Timings

7: Beaverdams Road & Thorold Townline Road

06-26-2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (%)	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%		50.0%	50.0%	
Maximum Green (s)	18.0	18.0		18.0	18.0		18.0	18.0		18.0	18.0	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		4.5			4.5			4.5			4.5	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Min	Min		Min	Min	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		11.0			11.0			15.4			15.4	
Actuated g/C Ratio		0.36			0.36			0.50			0.50	
v/c Ratio		0.50			0.49			0.34			0.42	
Control Delay		11.0			11.4			8.2			9.4	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		11.0			11.4			8.2			9.4	
LOS		B			B			A			A	
Approach Delay		11.0			11.4			8.2			9.4	
Approach LOS		B			B			A			A	
Intersection Summary												
Area Type:	Other											
Cycle Length: 45												
Actuated Cycle Length: 30.9												
Natural Cycle: 45												
Control Type: Actuated-Uncoordinated												
Maximum v/c Ratio: 0.50												
Intersection Signal Delay: 10.0						Intersection LOS: A						
Intersection Capacity Utilization 46.9%						ICU Level of Service A						
Analysis Period (min) 15												

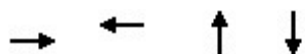
Splits and Phases: 7: Beaverdams Road & Thorold Townline Road

 Ø2	 Ø4
22.5 s	22.5 s
 Ø6	 Ø8
22.5 s	22.5 s

Queues

7: Beaverdams Road & Thorold Townline Road

06-26-2023



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	313	290	282	351
v/c Ratio	0.50	0.49	0.34	0.42
Control Delay	11.0	11.4	8.2	9.4
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	11.0	11.4	8.2	9.4
Queue Length 50th (m)	10.5	9.9	8.1	11.4
Queue Length 95th (m)	31.9	30.5	24.9	35.9
Internal Link Dist (m)	173.0	285.7	145.2	108.8
Turn Bay Length (m)				
Base Capacity (vph)	1104	1042	1052	1054
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.28	0.28	0.27	0.33
Intersection Summary				

Lanes, Volumes, Timings

8: Barker Pkwy

06-26-2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	9	0	1	0	7	2	49	1	69	35	19
Future Volume (vph)	15	9	0	1	0	7	2	49	1	69	35	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.877			0.999			0.963	
Flt Protected		0.961			0.995			0.998			0.977	
Satd. Flow (prot)	0	1826	0	0	1658	0	0	1894	0	0	1788	0
Flt Permitted		0.961			0.995			0.998			0.977	
Satd. Flow (perm)	0	1826	0	0	1658	0	0	1894	0	0	1788	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		143.7			157.1			135.3			345.6	
Travel Time (s)		10.3			11.3			9.7			24.9	
Peak Hour Factor	0.25	0.68	0.25	0.75	1.00	0.68	0.25	0.25	0.58	0.54	0.50	0.25
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	60	13	0	1	0	10	8	196	2	128	70	76
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	73	0	0	11	0	0	206	0	0	274	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	24.7%											
Analysis Period (min)	15											
	ICU Level of Service A											

Lanes, Volumes, Timings

9:

06-26-2023



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	72	0	0	31	12	29
Future Volume (vph)	72	0	0	31	12	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.865		0.904	
Flt Protected		0.950			0.986	
Satd. Flow (prot)	0	1770	1611	0	1660	0
Flt Permitted		0.950			0.986	
Satd. Flow (perm)	0	1770	1611	0	1660	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		461.7	162.2		264.6	
Travel Time (s)		33.2	11.7		19.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	78	0	0	34	13	32
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	78	34	0	45	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	100			100	100	100
Sign Control		Stop	Stop		Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization 20.7%				ICU Level of Service A		
Analysis Period (min) 15						

Lanes, Volumes, Timings

1: Barker Pkwy & Davis Road/Hwy 58

06-26-2023

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	24	154	333	25	54	259
Future Volume (vph)	24	154	333	25	54	259
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0		118.0	135.0	
Storage Lanes	1	0		1	1	
Taper Length (m)	7.5				7.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.885			0.850		
Flt Protected	0.993				0.950	
Satd. Flow (prot)	1579	0	1827	1170	1504	1776
Flt Permitted	0.993				0.950	
Satd. Flow (perm)	1579	0	1827	1170	1504	1776
Link Speed (k/h)	50		50			50
Link Distance (m)	345.6		411.8			484.4
Travel Time (s)	24.9		29.6			34.9
Peak Hour Factor	0.71	0.79	0.83	0.50	0.75	0.90
Heavy Vehicles (%)	10%	5%	4%	38%	20%	7%
Adj. Flow (vph)	34	195	401	50	72	288
Shared Lane Traffic (%)						
Lane Group Flow (vph)	229	0	401	50	72	288
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.6		3.6			3.6
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type: Unsignalized						
Intersection Capacity Utilization 41.7%						
ICU Level of Service A						
Analysis Period (min) 15						

Lanes, Volumes, Timings

2: Uppers Lane & Davis Road

06-26-2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	49	30	86	58	35	12	58	263	48	24	180	34
Future Volume (vph)	49	30	86	58	35	12	58	263	48	24	180	34
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	170.0		0.0	140.0		117.0
Storage Lanes	0		0	0		0	1		0	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
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		0.931			0.976			0.977				0.850
Flt Protected		0.987			0.977		0.950			0.950		
Satd. Flow (prot)	0	1620	0	0	1774	0	1656	1766	0	1719	1681	1482
Flt Permitted		0.869			0.819		0.632			0.544		
Satd. Flow (perm)	0	1426	0	0	1487	0	1102	1766	0	984	1681	1482
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		116			28			24				40
Link Speed (k/h)		50			50			50				50
Link Distance (m)		190.8			63.3			356.3			336.3	
Travel Time (s)		13.7			4.6			25.7			24.2	
Peak Hour Factor	0.82	0.59	0.74	0.77	0.61	0.43	0.85	0.85	0.88	0.83	0.90	0.85
Heavy Vehicles (%)	14%	0%	8%	0%	6%	0%	9%	6%	0%	5%	13%	9%
Adj. Flow (vph)	60	51	116	75	57	28	68	309	55	29	200	40
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	227	0	0	160	0	68	364	0	29	200	40
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	

Lanes, Volumes, Timings

2: Uppers Lane & Davis Road

06-26-2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		8	8		2	2		6	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	22.5
Total Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	22.5
Total Split (%)	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%		50.0%	50.0%	50.0%
Maximum Green (s)	18.0	18.0		18.0	18.0		18.0	18.0		18.0	18.0	18.0
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)		4.5			4.5		4.5	4.5		4.5	4.5	4.5
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		Min	Min		Min	Min	Min
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	7.0
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	0
Act Effect Green (s)		8.4			8.4		15.3	15.3		15.3	15.3	15.3
Actuated g/C Ratio		0.28			0.28		0.52	0.52		0.52	0.52	0.52
v/c Ratio		0.47			0.36		0.12	0.39		0.06	0.23	0.05
Control Delay		8.6			10.2		6.9	7.9		6.5	7.2	3.0
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Total Delay		8.6			10.2		6.9	7.9		6.5	7.2	3.0
LOS		A			B		A	A		A	A	A
Approach Delay		8.6			10.2			7.7			6.5	
Approach LOS		A			B			A			A	

Intersection Summary

Area Type: Other

Cycle Length: 45

Actuated Cycle Length: 29.7

Natural Cycle: 45

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.47

Intersection Signal Delay: 8.0

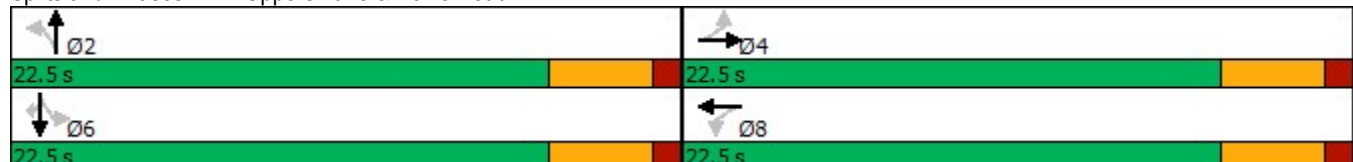
Intersection LOS: A

Intersection Capacity Utilization 42.6%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 2: Uppers Lane & Davis Road



Queues

2: Uppers Lane & Davis Road

06-26-2023

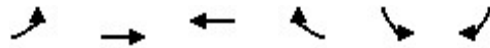


Lane Group	EBT	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	227	160	68	364	29	200	40
v/c Ratio	0.47	0.36	0.12	0.39	0.06	0.23	0.05
Control Delay	8.6	10.2	6.9	7.9	6.5	7.2	3.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.6	10.2	6.9	7.9	6.5	7.2	3.0
Queue Length 50th (m)	3.6	4.3	1.8	10.2	0.7	5.5	0.0
Queue Length 95th (m)	8.2	10.2	7.1	28.1	3.8	17.7	3.0
Internal Link Dist (m)	166.8	39.3		332.3		312.3	
Turn Bay Length (m)			170.0		140.0		117.0
Base Capacity (vph)	937	943	756	1219	675	1153	1029
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.24	0.17	0.09	0.30	0.04	0.17	0.04
Intersection Summary							

Lanes, Volumes, Timings

3: Lundy's Lane & Barker Parkway

06-26-2023



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔↔	↔↔		↗	↗
Traffic Volume (vph)	49	32	21	149	61	47
Future Volume (vph)	49	32	21	149	61	47
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	0.95	0.95	1.00	1.00
Frt			0.867			0.850
Flt Protected		0.970			0.950	
Satd. Flow (prot)	0	3214	2570	0	1626	1509
Flt Permitted		0.970			0.950	
Satd. Flow (perm)	0	3214	2570	0	1626	1509
Link Speed (k/h)		50	50		50	
Link Distance (m)		269.5	290.5		183.4	
Travel Time (s)		19.4	20.9		13.2	
Peak Hour Factor	0.78	0.82	0.77	0.69	0.73	0.78
Heavy Vehicles (%)	12%	4%	4%	24%	11%	7%
Adj. Flow (vph)	63	39	27	216	84	60
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	102	243	0	84	60
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25			15	25	15
Sign Control		Yield	Yield		Yield	
Intersection Summary						
Area Type:	Other					
Control Type:	Roundabout					
Intersection Capacity Utilization	22.1%			ICU Level of Service A		
Analysis Period (min)	15					

Lanes, Volumes, Timings

4: Thorold Townline Road 70 & Lundy's Lane

06-26-2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	34	422	81	42	327	29	66	160	34	102	106	23
Future Volume (vph)	34	422	81	42	327	29	66	160	34	102	106	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	150.0		32.0	76.0		0.0	30.0		0.0	40.0		0.0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.987			0.969			0.965	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1703	1863	1468	1805	1800	0	1626	1665	0	1467	1612	0
Flt Permitted	0.392			0.263			0.639			0.582		
Satd. Flow (perm)	703	1863	1468	500	1800	0	1094	1665	0	899	1612	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			65		7			16			20	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		307.3			478.1			247.2			197.8	
Travel Time (s)		22.1			34.4			17.8			14.2	
Peak Hour Factor	0.71	0.78	0.88	0.81	0.88	0.85	0.79	0.79	0.65	0.56	0.73	0.52
Heavy Vehicles (%)	6%	2%	10%	0%	4%	6%	11%	11%	9%	23%	14%	13%
Adj. Flow (vph)	48	541	92	52	372	34	84	203	52	182	145	44
Shared Lane Traffic (%)												
Lane Group Flow (vph)	48	541	92	52	406	0	84	255	0	182	189	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	

Lanes, Volumes, Timings

4: Thorold Townline Road 70 & Lundy's Lane

06-26-2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4		4	8			2			6		
Detector Phase	4	4	4	8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	20.0	20.0	20.0	20.0	20.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	33.0	33.0	33.0	32.0	32.0		35.0	35.0		35.0	35.0	
Total Split (s)	50.0	50.0	50.0	50.0	50.0		40.0	40.0		40.0	40.0	
Total Split (%)	55.6%	55.6%	55.6%	55.6%	55.6%		44.4%	44.4%		44.4%	44.4%	
Maximum Green (s)	43.0	43.0	43.0	44.0	44.0		34.0	34.0		34.0	34.0	
Yellow Time (s)	5.0	5.0	5.0	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)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	7.0	7.0	7.0	6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Recall Mode	None	None	None	None	None		Max	Max		Max	Max	
Walk Time (s)	15.0	15.0	15.0	15.0	15.0		15.0	15.0		15.0	15.0	
Flash Dont Walk (s)	7.0	7.0	7.0	7.0	7.0		14.0	14.0		14.0	14.0	
Pedestrian Calls (#/hr)	0	0	0	0	0		0	0		0	0	
Act Effect Green (s)	30.0	30.0	30.0	31.0	31.0		34.3	34.3		34.3	34.3	
Actuated g/C Ratio	0.39	0.39	0.39	0.40	0.40		0.44	0.44		0.44	0.44	
v/c Ratio	0.18	0.75	0.15	0.26	0.56		0.17	0.34		0.46	0.26	
Control Delay	16.3	27.2	6.4	18.4	20.4		17.0	16.7		22.4	15.3	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	16.3	27.2	6.4	18.4	20.4		17.0	16.7		22.4	15.3	
LOS	B	C	A	B	C		B	B		C	B	
Approach Delay		23.7			20.1			16.8			18.7	
Approach LOS		C			C			B			B	

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 77.5

Natural Cycle: 70

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.75

Intersection Signal Delay: 20.5

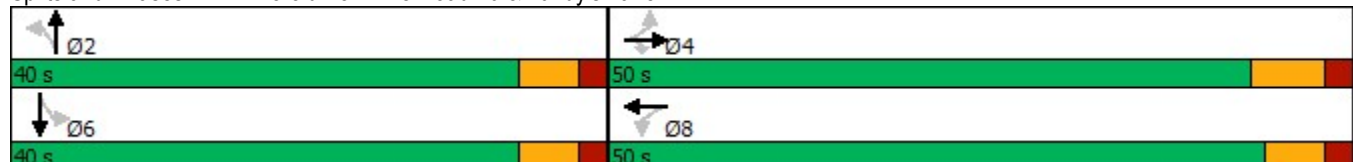
Intersection LOS: C

Intersection Capacity Utilization 68.7%

ICU Level of Service C

Analysis Period (min) 15

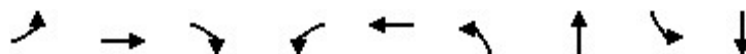
Splits and Phases: 4: Thorold Townline Road 70 & Lundy's Lane



Queues

4: Thorold Townline Road 70 & Lundy's Lane

06-26-2023



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	48	541	92	52	406	84	255	182	189
v/c Ratio	0.18	0.75	0.15	0.26	0.56	0.17	0.34	0.46	0.26
Control Delay	16.3	27.2	6.4	18.4	20.4	17.0	16.7	22.4	15.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.3	27.2	6.4	18.4	20.4	17.0	16.7	22.4	15.3
Queue Length 50th (m)	4.7	69.6	2.5	5.2	45.7	7.4	22.8	18.6	15.4
Queue Length 95th (m)	8.8	82.9	10.2	11.6	68.0	18.0	43.8	25.0	28.7
Internal Link Dist (m)	283.3				454.1		223.2		173.8
Turn Bay Length (m)	150.0			32.0	76.0			30.0	40.0
Base Capacity (vph)	394	1044	851	286	1035	484	746	398	725
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	0.12	0.52	0.11	0.18	0.39	0.17	0.34	0.46	0.26
Intersection Summary									

Lanes, Volumes, Timings

5: Thorold Townline Road

06-26-2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	0	14	0	0	1	6	202	2	3	261	4
Future Volume (vph)	5	0	14	0	0	1	6	202	2	3	261	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.899			0.865			0.998			0.994	
Flt Protected		0.988						0.999			0.999	
Satd. Flow (prot)	0	1655	0	0	1644	0	0	1699	0	0	1852	0
Flt Permitted		0.988						0.999			0.999	
Satd. Flow (perm)	0	1655	0	0	1644	0	0	1699	0	0	1852	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		488.7			510.1			142.0			229.8	
Travel Time (s)		35.2			36.7			10.2			16.5	
Peak Hour Factor	0.92	0.92	0.92	0.25	0.25	0.25	0.92	0.85	0.50	0.75	0.83	0.25
Heavy Vehicles (%)	2%	2%	2%	0%	0%	0%	0%	12%	0%	0%	2%	0%
Adj. Flow (vph)	5	0	15	0	0	4	7	238	4	4	314	16
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	20	0	0	4	0	0	249	0	0	334	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	100		100	100		100	100		100	100		100
Sign Control		Stop			Stop			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	27.7%											
Analysis Period (min)	15											
	ICU Level of Service A											

Lanes, Volumes, Timings

6: Thorold Townline Road & Venture Street

06-26-2023



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	33	90	19	0	4	13
Future Volume (vph)	33	90	19	0	4	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.901				0.895	
Flt Protected	0.987			0.950		
Satd. Flow (prot)	1657	0	0	1770	1667	0
Flt Permitted	0.987			0.950		
Satd. Flow (perm)	1657	0	0	1770	1667	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	574.7			229.8	102.8	
Travel Time (s)	41.4			16.5	7.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	36	98	21	0	4	14
Shared Lane Traffic (%)						
Lane Group Flow (vph)	134	0	0	21	18	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	100	100	100			100
Sign Control	Stop			Stop	Stop	
Intersection Summary						
Area Type:	Other					
Control Type: Unsignalized						
Intersection Capacity Utilization 21.8%				ICU Level of Service A		
Analysis Period (min) 15						

Lanes, Volumes, Timings

7: Beaverdams Road & Thorold Townline Road

06-26-2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	34	130	32	14	195	42	34	162	35	20	107	25
Future Volume (vph)	34	130	32	14	195	42	34	162	35	20	107	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.970			0.980			0.970			0.975	
Flt Protected		0.991			0.996			0.992			0.990	
Satd. Flow (prot)	0	1710	0	0	1840	0	0	1714	0	0	1667	0
Flt Permitted		0.890			0.959			0.921			0.881	
Satd. Flow (perm)	0	1536	0	0	1772	0	0	1591	0	0	1483	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		38			24			39			30	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		197.0			309.7			169.2			132.8	
Travel Time (s)		14.2			22.3			12.2			9.6	
Peak Hour Factor	0.77	0.93	0.62	0.50	0.74	0.81	0.71	0.84	0.50	0.45	0.81	0.63
Heavy Vehicles (%)	12%	4%	10%	0%	1%	0%	3%	10%	0%	0%	14%	8%
Adj. Flow (vph)	44	140	52	28	264	52	48	193	70	44	132	40
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	236	0	0	344	0	0	311	0	0	216	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												

Lanes, Volumes, Timings

7: Beaverdams Road & Thorold Townline Road

06-26-2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (%)	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%		50.0%	50.0%	
Maximum Green (s)	18.0	18.0		18.0	18.0		18.0	18.0		18.0	18.0	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		4.5			4.5			4.5			4.5	

Lead/Lag

Lead-Lag Optimize?

Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Min	Min		Min	Min	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effect Green (s)		11.2			11.2			11.6			11.6	
Actuated g/C Ratio		0.35			0.35			0.36			0.36	
v/c Ratio		0.42			0.55			0.52			0.39	
Control Delay		9.7			11.9			11.3			9.7	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		9.7			11.9			11.3			9.7	
LOS		A			B			B			A	
Approach Delay		9.7			11.9			11.3			9.7	
Approach LOS		A			B			B			A	

Intersection Summary

Area Type:	Other
Cycle Length: 45	
Actuated Cycle Length: 32.2	
Natural Cycle: 45	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.55	
Intersection Signal Delay: 10.8	Intersection LOS: B
Intersection Capacity Utilization 45.9%	ICU Level of Service A
Analysis Period (min) 15	

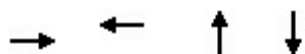
Splits and Phases: 7: Beaverdams Road & Thorold Townline Road

 Ø2	 Ø4
22.5 s	22.5 s
 Ø6	 Ø8
22.5 s	22.5 s

Queues

7: Beaverdams Road & Thorold Townline Road

06-26-2023



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	236	344	311	216
v/c Ratio	0.42	0.55	0.52	0.39
Control Delay	9.7	11.9	11.3	9.7
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	9.7	11.9	11.3	9.7
Queue Length 50th (m)	6.8	11.6	9.9	6.4
Queue Length 95th (m)	23.6	26.8	28.7	19.1
Internal Link Dist (m)	173.0	285.7	145.2	108.8
Turn Bay Length (m)				
Base Capacity (vph)	914	1046	946	879
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.26	0.33	0.33	0.25
Intersection Summary				

Lanes, Volumes, Timings

8: Barker Pkwy

06-26-2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	19	4	1	1	0	8	1	58	0	24	17	13
Future Volume (vph)	19	4	1	1	0	8	1	58	0	24	17	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.994			0.881						0.942	
Flt Protected		0.957			0.994			0.999			0.990	
Satd. Flow (prot)	0	1800	0	0	1582	0	0	1898	0	0	1549	0
Flt Permitted		0.957			0.994			0.999			0.990	
Satd. Flow (perm)	0	1800	0	0	1582	0	0	1898	0	0	1549	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		143.7			157.1			135.3			345.6	
Travel Time (s)		10.3			11.3			9.7			24.9	
Peak Hour Factor	0.25	0.75	0.25	0.44	0.58	0.54	0.25	0.25	0.29	0.95	0.38	0.25
Heavy Vehicles (%)	0%	7%	0%	29%	14%	2%	0%	0%	0%	11%	33%	0%
Adj. Flow (vph)	76	5	4	2	0	15	4	232	0	25	45	52
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	85	0	0	17	0	0	236	0	0	122	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	22.4%											
Analysis Period (min)	15											
	ICU Level of Service A											

Lanes, Volumes, Timings

9:

06-26-2023



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	22	0	0	10	19	45
Future Volume (vph)	22	0	0	10	19	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.865		0.905	
Flt Protected		0.950			0.985	
Satd. Flow (prot)	0	1770	1611	0	1660	0
Flt Permitted		0.950			0.985	
Satd. Flow (perm)	0	1770	1611	0	1660	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		461.7	162.2		264.6	
Travel Time (s)		33.2	11.7		19.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	24	0	0	11	21	49
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	24	11	0	70	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	100			100	100	100
Sign Control		Stop	Stop		Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	18.4%
Analysis Period (min)	15
	ICU Level of Service A

Lanes, Volumes, Timings

1: Barker Pkwy & Davis Road/Hwy 58

06-26-2023

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	23	94	385	46	162	397
Future Volume (vph)	23	94	385	46	162	397
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0		118.0	135.0	
Storage Lanes	1	0		1	1	
Taper Length (m)	7.5				7.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.899			0.850		
Flt Protected	0.987				0.950	
Satd. Flow (prot)	1661	0	1863	1524	1787	1827
Flt Permitted	0.987				0.950	
Satd. Flow (perm)	1661	0	1863	1524	1787	1827
Link Speed (k/h)	50		50			50
Link Distance (m)	345.6		411.8			484.4
Travel Time (s)	24.9		29.6			34.9
Peak Hour Factor	0.63	0.87	0.89	0.85	0.88	0.91
Heavy Vehicles (%)	0%	2%	2%	6%	1%	4%
Adj. Flow (vph)	37	108	433	54	184	436
Shared Lane Traffic (%)						
Lane Group Flow (vph)	145	0	433	54	184	436
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.6		3.6			3.6
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	46.3%			ICU Level of Service A		
Analysis Period (min)	15					

Lanes, Volumes, Timings

2: Uppers Lane & Davis Road

06-26-2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	35	30	107	62	19	23	101	365	76	44	293	66
Future Volume (vph)	35	30	107	62	19	23	101	365	76	44	293	66
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	170.0		0.0	140.0		117.0
Storage Lanes	0		0	0		0	1		0	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
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		0.928			0.968			0.966				0.850
Flt Protected		0.989			0.975		0.950			0.950		
Satd. Flow (prot)	0	1626	0	0	1766	0	1656	1754	0	1719	1681	1482
Flt Permitted		0.899			0.736		0.574			0.402		
Satd. Flow (perm)	0	1478	0	0	1333	0	1001	1754	0	727	1681	1482
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		149			36			39				84
Link Speed (k/h)		50			50			50				50
Link Distance (m)		190.8			63.3			356.3			336.3	
Travel Time (s)		13.7			4.6			25.7			24.2	
Peak Hour Factor	0.58	0.42	0.72	0.82	0.50	0.64	0.74	0.89	0.64	0.67	0.96	0.79
Heavy Vehicles (%)	14%	0%	8%	0%	6%	0%	9%	6%	0%	5%	13%	9%
Adj. Flow (vph)	60	71	149	76	38	36	136	410	119	66	305	84
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	280	0	0	150	0	136	529	0	66	305	84
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	

Lanes, Volumes, Timings

2: Uppers Lane & Davis Road

06-26-2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		8	8		2	2		6	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	22.5
Total Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	22.5
Total Split (%)	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%		50.0%	50.0%	50.0%
Maximum Green (s)	18.0	18.0		18.0	18.0		18.0	18.0		18.0	18.0	18.0
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)		4.5			4.5		4.5	4.5		4.5	4.5	4.5
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		Min	Min		Min	Min	Min
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	7.0
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	0
Act Effect Green (s)		9.0			9.0		18.3	18.3		18.3	18.3	18.3
Actuated g/C Ratio		0.27			0.27		0.55	0.55		0.55	0.55	0.55
v/c Ratio		0.55			0.39		0.25	0.54		0.16	0.33	0.10
Control Delay		9.8			11.2		8.3	9.9		7.9	7.9	2.6
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Total Delay		9.8			11.2		8.3	9.9		7.9	7.9	2.6
LOS		A			B		A	A		A	A	A
Approach Delay		9.8			11.2			9.6			6.9	
Approach LOS		A			B			A			A	

Intersection Summary

Area Type: Other

Cycle Length: 45

Actuated Cycle Length: 33

Natural Cycle: 50

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.55

Intersection Signal Delay: 9.0

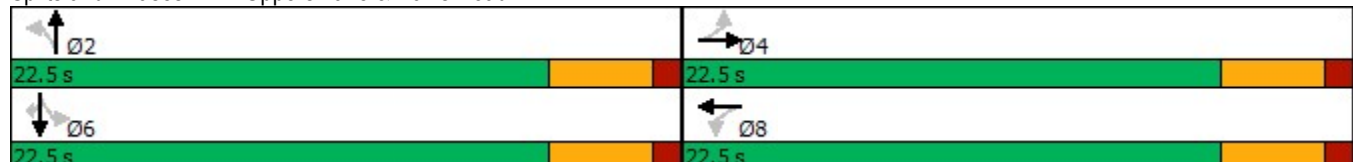
Intersection LOS: A

Intersection Capacity Utilization 53.4%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 2: Uppers Lane & Davis Road



Queues

2: Uppers Lane & Davis Road

06-26-2023



Lane Group	EBT	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	280	150	136	529	66	305	84
v/c Ratio	0.55	0.39	0.25	0.54	0.16	0.33	0.10
Control Delay	9.8	11.2	8.3	9.9	7.9	7.9	2.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.8	11.2	8.3	9.9	7.9	7.9	2.6
Queue Length 50th (m)	5.5	4.8	4.1	17.6	1.9	9.7	0.0
Queue Length 95th (m)	3.8	6.9	11.9	#53.0	6.1	29.2	3.9
Internal Link Dist (m)	166.8	39.3		332.3		312.3	
Turn Bay Length (m)			170.0		140.0		117.0
Base Capacity (vph)	898	767	630	1118	457	1057	963
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.31	0.20	0.22	0.47	0.14	0.29	0.09

Intersection Summary

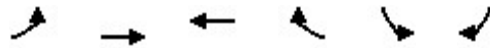
95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Lanes, Volumes, Timings

3: Lundy's Lane & Barker Parkway

06-26-2023



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕↕	↕↕		↕	↕
Traffic Volume (vph)	46	632	661	54	55	60
Future Volume (vph)	46	632	661	54	55	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	0.95	0.95	1.00	1.00
Frt			0.983			0.850
Flt Protected		0.997			0.950	
Satd. Flow (prot)	0	3529	3506	0	1805	1583
Flt Permitted		0.997			0.950	
Satd. Flow (perm)	0	3529	3506	0	1805	1583
Link Speed (k/h)		50	50		50	
Link Distance (m)		269.5	290.5		183.4	
Travel Time (s)		19.4	20.9		13.2	
Peak Hour Factor	0.82	0.75	0.95	0.62	0.56	0.71
Heavy Vehicles (%)	2%	2%	1%	3%	0%	2%
Adj. Flow (vph)	56	843	696	87	98	85
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	899	783	0	98	85
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25			15	25	15
Sign Control		Yield	Yield		Yield	
Intersection Summary						
Area Type: Other						
Control Type: Roundabout						
Intersection Capacity Utilization 52.1% ICU Level of Service A						
Analysis Period (min) 15						

Lanes, Volumes, Timings

4: Thorold Townline Road 70 & Lundy's Lane

06-26-2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	27	550	112	31	501	49	141	174	62	87	194	31
Future Volume (vph)	27	550	112	31	501	49	141	174	62	87	194	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	150.0		32.0	76.0		0.0	30.0		0.0	40.0		0.0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.972			0.948			0.979	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1736	1881	1599	1805	1832	0	1770	1755	0	1719	1826	0
Flt Permitted	0.191			0.150			0.558			0.490		
Satd. Flow (perm)	349	1881	1599	285	1832	0	1039	1755	0	887	1826	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			79		18			34			11	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		307.3			478.1			247.2			197.8	
Travel Time (s)		22.1			34.4			17.8			14.2	
Peak Hour Factor	0.84	0.77	0.76	0.65	0.94	0.40	0.74	0.85	0.57	0.68	0.88	0.86
Heavy Vehicles (%)	4%	1%	1%	0%	1%	0%	2%	4%	0%	5%	1%	7%
Adj. Flow (vph)	32	714	147	48	533	123	191	205	109	128	220	36
Shared Lane Traffic (%)												
Lane Group Flow (vph)	32	714	147	48	656	0	191	314	0	128	256	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	

Lanes, Volumes, Timings

4: Thorold Townline Road 70 & Lundy's Lane

06-26-2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4		4	8			2			6		
Detector Phase	4	4	4	8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	20.0	20.0	20.0	20.0	20.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	33.0	33.0	33.0	32.0	32.0		35.0	35.0		35.0	35.0	
Total Split (s)	50.0	50.0	50.0	50.0	50.0		40.0	40.0		40.0	40.0	
Total Split (%)	55.6%	55.6%	55.6%	55.6%	55.6%		44.4%	44.4%		44.4%	44.4%	
Maximum Green (s)	43.0	43.0	43.0	44.0	44.0		34.0	34.0		34.0	34.0	
Yellow Time (s)	5.0	5.0	5.0	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)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	7.0	7.0	7.0	6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Recall Mode	None	None	None	None	None		Max	Max		Max	Max	
Walk Time (s)	15.0	15.0	15.0	15.0	15.0		15.0	15.0		15.0	15.0	
Flash Dont Walk (s)	7.0	7.0	7.0	7.0	7.0		14.0	14.0		14.0	14.0	
Pedestrian Calls (#/hr)	0	0	0	0	0		0	0		0	0	
Act Effect Green (s)	37.9	37.9	37.9	38.9	38.9		34.2	34.2		34.2	34.2	
Actuated g/C Ratio	0.44	0.44	0.44	0.46	0.46		0.40	0.40		0.40	0.40	
v/c Ratio	0.21	0.85	0.19	0.37	0.78		0.46	0.43		0.36	0.35	
Control Delay	17.9	32.3	7.4	24.3	25.9		24.8	19.8		23.3	19.9	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	17.9	32.3	7.4	24.3	25.9		24.8	19.8		23.3	19.9	
LOS	B	C	A	C	C		C	B		C	B	
Approach Delay		27.7			25.8			21.7			21.0	
Approach LOS		C			C			C			C	

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 85.2

Natural Cycle: 70

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.85

Intersection Signal Delay: 24.9

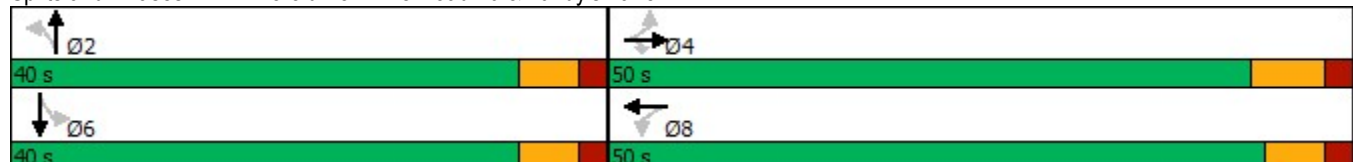
Intersection LOS: C

Intersection Capacity Utilization 66.0%

ICU Level of Service C

Analysis Period (min) 15

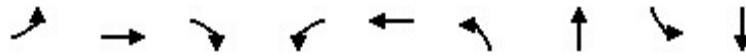
Splits and Phases: 4: Thorold Townline Road 70 & Lundy's Lane



Queues

4: Thorold Townline Road 70 & Lundy's Lane

06-26-2023



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	32	714	147	48	656	191	314	128	256
v/c Ratio	0.21	0.85	0.19	0.37	0.78	0.46	0.43	0.36	0.35
Control Delay	17.9	32.3	7.4	24.3	25.9	24.8	19.8	23.3	19.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.9	32.3	7.4	24.3	25.9	24.8	19.8	23.3	19.9
Queue Length 50th (m)	3.2	105.0	6.5	5.1	88.0	25.7	36.9	16.4	31.1
Queue Length 95th (m)	8.8	117.2	12.7	9.6	131.6	36.2	56.4	22.9	50.0
Internal Link Dist (m)		283.3			454.1		223.2		173.8
Turn Bay Length (m)	150.0		32.0	76.0		30.0		40.0	
Base Capacity (vph)	177	955	851	148	960	417	725	356	739
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	0.18	0.75	0.17	0.32	0.68	0.46	0.43	0.36	0.35
Intersection Summary									

Lanes, Volumes, Timings

5: Thorold Townline Road

06-26-2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	0	9	0	0	2	21	255	0	0	346	11
Future Volume (vph)	3	0	9	0	0	2	21	255	0	0	346	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.896			0.865						0.996	
Flt Protected		0.989						0.997				
Satd. Flow (prot)	0	1651	0	0	1644	0	0	1824	0	0	1821	0
Flt Permitted		0.989						0.997				
Satd. Flow (perm)	0	1651	0	0	1644	0	0	1824	0	0	1821	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		488.7			510.1			142.0			229.8	
Travel Time (s)		35.2			36.7			10.2			16.5	
Peak Hour Factor	0.92	0.92	0.92	0.25	0.92	0.25	0.92	0.83	0.25	0.25	0.95	0.92
Heavy Vehicles (%)	2%	2%	2%	0%	2%	0%	2%	4%	0%	0%	4%	2%
Adj. Flow (vph)	3	0	10	0	0	8	23	307	0	0	364	12
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	13	0	0	8	0	0	330	0	0	376	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	40.9%											
Analysis Period (min)	15											
ICU Level of Service A												

Lanes, Volumes, Timings

6: Thorold Townline Road & Venture Street

06-26-2023



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	21	58	51	0	11	42
Future Volume (vph)	21	58	51	0	11	42
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	0.901				0.893	
Flt Protected	0.987			0.950		
Satd. Flow (prot)	1657	0	0	1770	1663	0
Flt Permitted	0.987			0.950		
Satd. Flow (perm)	1657	0	0	1770	1663	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	574.7			229.8	102.8	
Travel Time (s)	41.4			16.5	7.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	23	63	55	0	12	46
Shared Lane Traffic (%)						
Lane Group Flow (vph)	86	0	0	55	58	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	100	100	100			100
Sign Control	Stop			Stop	Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	20.9%			ICU Level of Service A		
Analysis Period (min)	15					

Lanes, Volumes, Timings

7: Beaverdams Road & Thorold Townline Road

06-26-2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	217	47	37	196	27	39	153	25	40	226	57
Future Volume (vph)	30	217	47	37	196	27	39	153	25	40	226	57
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.976			0.981			0.966			0.971	
Flt Protected		0.994			0.991			0.993			0.994	
Satd. Flow (prot)	0	1824	0	0	1825	0	0	1780	0	0	1757	0
Flt Permitted		0.938			0.883			0.908			0.927	
Satd. Flow (perm)	0	1721	0	0	1626	0	0	1628	0	0	1639	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		29			22			46			37	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		197.0			309.7			169.2			132.8	
Travel Time (s)		14.2			22.3			12.2			9.6	
Peak Hour Factor	0.75	0.92	0.78	0.63	0.95	0.61	0.89	0.86	0.33	0.83	0.93	0.71
Heavy Vehicles (%)	3%	1%	0%	3%	1%	0%	0%	4%	0%	5%	5%	2%
Adj. Flow (vph)	40	236	60	59	206	44	44	178	76	48	243	80
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	336	0	0	309	0	0	298	0	0	371	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												

Lanes, Volumes, Timings

7: Beaverdams Road & Thorold Townline Road

06-26-2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (%)	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%		50.0%	50.0%	
Maximum Green (s)	18.0	18.0		18.0	18.0		18.0	18.0		18.0	18.0	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		4.5			4.5			4.5			4.5	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Min	Min		Min	Min	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		11.6			11.6			15.8			15.8	
Actuated g/C Ratio		0.37			0.37			0.50			0.50	
v/c Ratio		0.52			0.51			0.36			0.44	
Control Delay		11.4			11.7			8.6			9.9	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		11.4			11.7			8.6			9.9	
LOS		B			B			A			A	
Approach Delay		11.4			11.7			8.6			9.9	
Approach LOS		B			B			A			A	
Intersection Summary												
Area Type:	Other											
Cycle Length: 45												
Actuated Cycle Length: 31.5												
Natural Cycle: 45												
Control Type: Actuated-Uncoordinated												
Maximum v/c Ratio: 0.52												
Intersection Signal Delay: 10.4						Intersection LOS: B						
Intersection Capacity Utilization 49.5%						ICU Level of Service A						
Analysis Period (min) 15												

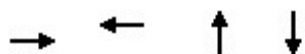
Splits and Phases: 7: Beaverdams Road & Thorold Townline Road

	
Ø2	Ø4
22.5 s	22.5 s
	
Ø6	Ø8
22.5 s	22.5 s

Queues

7: Beaverdams Road & Thorold Townline Road

06-26-2023



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	336	309	298	371
v/c Ratio	0.52	0.51	0.36	0.44
Control Delay	11.4	11.7	8.6	9.9
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	11.4	11.7	8.6	9.9
Queue Length 50th (m)	12.1	11.3	9.2	13.0
Queue Length 95th (m)	34.7	32.9	27.5	39.5
Internal Link Dist (m)	173.0	285.7	145.2	108.8
Turn Bay Length (m)				
Base Capacity (vph)	1082	1021	1031	1034
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.31	0.30	0.29	0.36
Intersection Summary				

Lanes, Volumes, Timings

8: Barker Pkwy

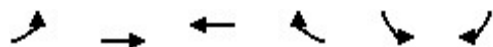
06-26-2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	10	0	1	0	7	2	52	1	69	39	19
Future Volume (vph)	15	10	0	1	0	7	2	52	1	69	39	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.877			0.999			0.964	
Flt Protected		0.962			0.995			0.998			0.978	
Satd. Flow (prot)	0	1828	0	0	1658	0	0	1894	0	0	1791	0
Flt Permitted		0.962			0.995			0.998			0.978	
Satd. Flow (perm)	0	1828	0	0	1658	0	0	1894	0	0	1791	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		143.7			157.1			135.3			345.6	
Travel Time (s)		10.3			11.3			9.7			24.9	
Peak Hour Factor	0.25	0.68	0.25	0.75	1.00	0.68	0.25	0.25	0.58	0.54	0.50	0.25
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	60	15	0	1	0	10	8	208	2	128	78	76
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	75	0	0	11	0	0	218	0	0	282	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	24.9%											
Analysis Period (min)	15											
ICU Level of Service A												

Lanes, Volumes, Timings

9:

06-26-2023



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	72	0	0	31	12	29
Future Volume (vph)	72	0	0	31	12	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.865		0.904	
Flt Protected		0.950			0.986	
Satd. Flow (prot)	0	1770	1611	0	1660	0
Flt Permitted		0.950			0.986	
Satd. Flow (perm)	0	1770	1611	0	1660	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		461.7	162.2		264.6	
Travel Time (s)		33.2	11.7		19.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	78	0	0	34	13	32
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	78	34	0	45	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	100			100	100	100
Sign Control		Stop	Stop		Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	20.7%			ICU Level of Service A		
Analysis Period (min)	15					

Lanes, Volumes, Timings

1: Barker Pkwy & Davis Road/Hwy 58

06-26-2023

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	24	154	367	25	54	286
Future Volume (vph)	24	154	367	25	54	286
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0		118.0	135.0	
Storage Lanes	1	0		1	1	
Taper Length (m)	7.5				7.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.885			0.850		
Flt Protected	0.993				0.950	
Satd. Flow (prot)	1579	0	1827	1170	1504	1776
Flt Permitted	0.993				0.950	
Satd. Flow (perm)	1579	0	1827	1170	1504	1776
Link Speed (k/h)	50		50			50
Link Distance (m)	345.6		411.8			484.4
Travel Time (s)	24.9		29.6			34.9
Peak Hour Factor	0.71	0.79	0.83	0.50	0.75	0.90
Heavy Vehicles (%)	10%	5%	4%	38%	20%	7%
Adj. Flow (vph)	34	195	442	50	72	318
Shared Lane Traffic (%)						
Lane Group Flow (vph)	229	0	442	50	72	318
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.6		3.6			3.6
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	43.5%			ICU Level of Service A		
Analysis Period (min)	15					

Lanes, Volumes, Timings

2: Uppers Lane & Davis Road

06-26-2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	49	33	86	58	37	12	58	289	48	24	198	34
Future Volume (vph)	49	33	86	58	37	12	58	289	48	24	198	34
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	170.0		0.0	140.0		117.0
Storage Lanes	0		0	0		0	1		0	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
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		0.932			0.977			0.979				0.850
Flt Protected		0.987			0.978		0.950			0.950		
Satd. Flow (prot)	0	1624	0	0	1776	0	1656	1769	0	1719	1681	1482
Flt Permitted		0.877			0.817		0.621			0.526		
Satd. Flow (perm)	0	1443	0	0	1483	0	1082	1769	0	952	1681	1482
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		116			27			22				40
Link Speed (k/h)		50			50			50				50
Link Distance (m)		190.8			63.3			356.3			336.3	
Travel Time (s)		13.7			4.6			25.7			24.2	
Peak Hour Factor	0.82	0.59	0.74	0.77	0.61	0.43	0.85	0.85	0.88	0.83	0.90	0.85
Heavy Vehicles (%)	14%	0%	8%	0%	6%	0%	9%	6%	0%	5%	13%	9%
Adj. Flow (vph)	60	56	116	75	61	28	68	340	55	29	220	40
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	232	0	0	164	0	68	395	0	29	220	40
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	

Lanes, Volumes, Timings

2: Uppers Lane & Davis Road

06-26-2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		8	8		2	2		6	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	22.5
Total Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	22.5
Total Split (%)	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%		50.0%	50.0%	50.0%
Maximum Green (s)	18.0	18.0		18.0	18.0		18.0	18.0		18.0	18.0	18.0
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)		4.5			4.5		4.5	4.5		4.5	4.5	4.5
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		Min	Min		Min	Min	Min
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	7.0
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	0
Act Effect Green (s)		8.6			8.6		15.8	15.8		15.8	15.8	15.8
Actuated g/C Ratio		0.28			0.28		0.52	0.52		0.52	0.52	0.52
v/c Ratio		0.47			0.37		0.12	0.42		0.06	0.25	0.05
Control Delay		8.7			10.5		7.0	8.3		6.5	7.4	3.0
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Total Delay		8.7			10.5		7.0	8.3		6.5	7.4	3.0
LOS		A			B		A	A		A	A	A
Approach Delay		8.7			10.5			8.1			6.7	
Approach LOS		A			B			A			A	

Intersection Summary

Area Type: Other

Cycle Length: 45

Actuated Cycle Length: 30.2

Natural Cycle: 45

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.47

Intersection Signal Delay: 8.2

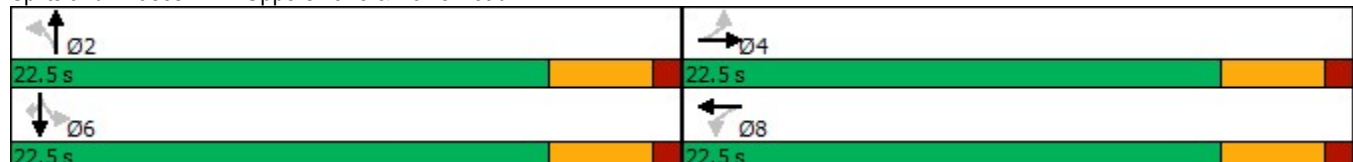
Intersection LOS: A

Intersection Capacity Utilization 44.1%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 2: Uppers Lane & Davis Road



Queues

2: Uppers Lane & Davis Road

06-26-2023

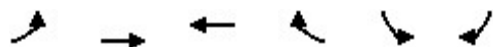


Lane Group	EBT	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	232	164	68	395	29	220	40
v/c Ratio	0.47	0.37	0.12	0.42	0.06	0.25	0.05
Control Delay	8.7	10.5	7.0	8.3	6.5	7.4	3.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.7	10.5	7.0	8.3	6.5	7.4	3.0
Queue Length 50th (m)	3.9	4.7	1.8	11.7	0.8	6.2	0.0
Queue Length 95th (m)	8.4	10.4	7.3	31.5	3.8	19.6	3.0
Internal Link Dist (m)	166.8	39.3		332.3		312.3	
Turn Bay Length (m)			170.0		140.0		117.0
Base Capacity (vph)	931	921	729	1200	642	1133	1012
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.25	0.18	0.09	0.33	0.05	0.19	0.04
Intersection Summary							

Lanes, Volumes, Timings

3: Lundy's Lane & Barker Parkway

06-26-2023



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕↕	↕↕		↗	↗
Traffic Volume (vph)	49	35	23	149	61	47
Future Volume (vph)	49	35	23	149	61	47
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	0.95	0.95	1.00	1.00
Fr _t			0.868			0.850
Fl _t Protected		0.971			0.950	
Satd. Flow (prot)	0	3223	2578	0	1626	1509
Fl _t Permitted		0.971			0.950	
Satd. Flow (perm)	0	3223	2578	0	1626	1509
Link Speed (k/h)		50	50		50	
Link Distance (m)		269.5	290.5		183.4	
Travel Time (s)		19.4	20.9		13.2	
Peak Hour Factor	0.78	0.82	0.77	0.69	0.73	0.78
Heavy Vehicles (%)	12%	4%	4%	24%	11%	7%
Adj. Flow (vph)	63	43	30	216	84	60
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	106	246	0	84	60
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25			15	25	15
Sign Control		Yield	Yield		Yield	
Intersection Summary						
Area Type:	Other					
Control Type:	Roundabout					
Intersection Capacity Utilization	22.2%			ICU Level of Service A		
Analysis Period (min)	15					

Lanes, Volumes, Timings

4: Thorold Townline Road 70 & Lundy's Lane

06-26-2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	34	463	81	42	361	29	66	176	34	102	117	23
Future Volume (vph)	34	463	81	42	361	29	66	176	34	102	117	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	150.0		32.0	76.0		0.0	30.0		0.0	40.0		0.0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.989			0.972			0.968	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1703	1863	1468	1805	1804	0	1626	1669	0	1467	1616	0
Flt Permitted	0.364			0.227			0.630			0.552		
Satd. Flow (perm)	652	1863	1468	431	1804	0	1078	1669	0	853	1616	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			59		6			15			18	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		307.3			478.1			247.2			197.8	
Travel Time (s)		22.1			34.4			17.8			14.2	
Peak Hour Factor	0.71	0.78	0.88	0.81	0.88	0.85	0.79	0.79	0.65	0.56	0.73	0.52
Heavy Vehicles (%)	6%	2%	10%	0%	4%	6%	11%	11%	9%	23%	14%	13%
Adj. Flow (vph)	48	594	92	52	410	34	84	223	52	182	160	44
Shared Lane Traffic (%)												
Lane Group Flow (vph)	48	594	92	52	444	0	84	275	0	182	204	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	

Lanes, Volumes, Timings

4: Thorold Townline Road 70 & Lundy's Lane

06-26-2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4		4	8			2			6		
Detector Phase	4	4	4	8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	20.0	20.0	20.0	20.0	20.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	33.0	33.0	33.0	32.0	32.0		35.0	35.0		35.0	35.0	
Total Split (s)	50.0	50.0	50.0	50.0	50.0		40.0	40.0		40.0	40.0	
Total Split (%)	55.6%	55.6%	55.6%	55.6%	55.6%		44.4%	44.4%		44.4%	44.4%	
Maximum Green (s)	43.0	43.0	43.0	44.0	44.0		34.0	34.0		34.0	34.0	
Yellow Time (s)	5.0	5.0	5.0	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)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	7.0	7.0	7.0	6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Recall Mode	None	None	None	None	None		Max	Max		Max	Max	
Walk Time (s)	15.0	15.0	15.0	15.0	15.0		15.0	15.0		15.0	15.0	
Flash Dont Walk (s)	7.0	7.0	7.0	7.0	7.0		14.0	14.0		14.0	14.0	
Pedestrian Calls (#/hr)	0	0	0	0	0		0	0		0	0	
Act Effect Green (s)	32.6	32.6	32.6	33.6	33.6		34.4	34.4		34.4	34.4	
Actuated g/C Ratio	0.41	0.41	0.41	0.42	0.42		0.43	0.43		0.43	0.43	
v/c Ratio	0.18	0.78	0.15	0.29	0.58		0.18	0.38		0.50	0.29	
Control Delay	16.1	28.4	6.8	19.2	20.5		18.3	18.5		25.1	16.9	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	16.1	28.4	6.8	19.2	20.5		18.3	18.5		25.1	16.9	
LOS	B	C	A	B	C		B	B		C	B	
Approach Delay		24.9			20.4			18.4			20.7	
Approach LOS		C			C			B			C	

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 80.1

Natural Cycle: 70

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.78

Intersection Signal Delay: 21.8

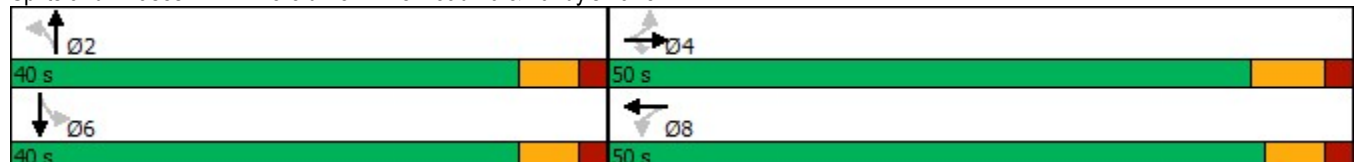
Intersection LOS: C

Intersection Capacity Utilization 69.6%

ICU Level of Service C

Analysis Period (min) 15

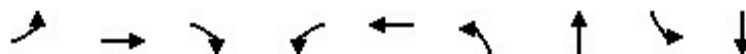
Splits and Phases: 4: Thorold Townline Road 70 & Lundy's Lane



Queues

4: Thorold Townline Road 70 & Lundy's Lane

06-26-2023



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	48	594	92	52	444	84	275	182	204
v/c Ratio	0.18	0.78	0.15	0.29	0.58	0.18	0.38	0.50	0.29
Control Delay	16.1	28.4	6.8	19.2	20.5	18.3	18.5	25.1	16.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.1	28.4	6.8	19.2	20.5	18.3	18.5	25.1	16.9
Queue Length 50th (m)	4.7	79.5	3.1	5.3	51.6	8.2	27.8	20.9	19.0
Queue Length 95th (m)	8.9	93.5	10.8	12.0	75.7	18.0	47.6	25.4	31.5
Internal Link Dist (m)	283.3				454.1		223.2		173.8
Turn Bay Length (m)	150.0			32.0	76.0			30.0	40.0
Base Capacity (vph)	353	1010	823	239	1004	462	724	365	703
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	0.14	0.59	0.11	0.22	0.44	0.18	0.38	0.50	0.29
Intersection Summary									

Lanes, Volumes, Timings

5: Thorold Townline Road

06-26-2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	0	14	0	0	1	6	222	2	3	278	4
Future Volume (vph)	5	0	14	0	0	1	6	222	2	3	278	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.899			0.865			0.998			0.994	
Flt Protected		0.988						0.999			0.999	
Satd. Flow (prot)	0	1655	0	0	1644	0	0	1699	0	0	1852	0
Flt Permitted		0.988						0.999			0.999	
Satd. Flow (perm)	0	1655	0	0	1644	0	0	1699	0	0	1852	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		488.7			510.1			142.0			229.8	
Travel Time (s)		35.2			36.7			10.2			16.5	
Peak Hour Factor	0.92	0.92	0.92	0.25	0.25	0.25	0.92	0.85	0.50	0.75	0.83	0.25
Heavy Vehicles (%)	2%	2%	2%	0%	0%	0%	0%	12%	0%	0%	2%	0%
Adj. Flow (vph)	5	0	15	0	0	4	7	261	4	4	335	16
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	20	0	0	4	0	0	272	0	0	355	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	100		100	100		100	100		100	100		100
Sign Control		Stop			Stop			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	28.6%						ICU Level of Service A					
Analysis Period (min)	15											

Lanes, Volumes, Timings
6: Thorold Townline Road & Venture Street

06-26-2023

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	33	90	19	0	4	13
Future Volume (vph)	33	90	19	0	4	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.901				0.895	
Flt Protected	0.987			0.950		
Satd. Flow (prot)	1657	0	0	1770	1667	0
Flt Permitted	0.987			0.950		
Satd. Flow (perm)	1657	0	0	1770	1667	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	574.7			229.8	102.8	
Travel Time (s)	41.4			16.5	7.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	36	98	21	0	4	14
Shared Lane Traffic (%)						
Lane Group Flow (vph)	134	0	0	21	18	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	100	100	100			100
Sign Control	Stop			Stop	Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	21.8%			ICU Level of Service A		
Analysis Period (min)	15					

Lanes, Volumes, Timings

7: Beaverdams Road & Thorold Townline Road

06-26-2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	34	143	32	14	216	42	34	179	35	20	117	25
Future Volume (vph)	34	143	32	14	216	42	34	179	35	20	117	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.972			0.981			0.971			0.976	
Flt Protected		0.991			0.996			0.993			0.990	
Satd. Flow (prot)	0	1716	0	0	1842	0	0	1714	0	0	1665	0
Flt Permitted		0.896			0.961			0.923			0.882	
Satd. Flow (perm)	0	1551	0	0	1777	0	0	1593	0	0	1484	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		35			22			36			28	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		197.0			309.7			169.2			132.8	
Travel Time (s)		14.2			22.3			12.2			9.6	
Peak Hour Factor	0.77	0.93	0.62	0.50	0.74	0.81	0.71	0.84	0.50	0.45	0.81	0.63
Heavy Vehicles (%)	12%	4%	10%	0%	1%	0%	3%	10%	0%	0%	14%	8%
Adj. Flow (vph)	44	154	52	28	292	52	48	213	70	44	144	40
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	250	0	0	372	0	0	331	0	0	228	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												

Lanes, Volumes, Timings

7: Beaverdams Road & Thorold Townline Road

06-26-2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (%)	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%		50.0%	50.0%	
Maximum Green (s)	18.0	18.0		18.0	18.0		18.0	18.0		18.0	18.0	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		4.5			4.5			4.5			4.5	

Lead/Lag

Lead-Lag Optimize?

Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Min	Min		Min	Min	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effect Green (s)		11.7			11.7			11.7			11.7	
Actuated g/C Ratio		0.36			0.36			0.36			0.36	
v/c Ratio		0.44			0.58			0.56			0.42	
Control Delay		10.1			12.6			12.3			10.3	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		10.1			12.6			12.3			10.3	
LOS		B			B			B			B	
Approach Delay		10.1			12.6			12.3			10.3	
Approach LOS		B			B			B			B	

Intersection Summary

Area Type:	Other
Cycle Length: 45	
Actuated Cycle Length: 32.8	
Natural Cycle: 45	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.58	
Intersection Signal Delay: 11.5	Intersection LOS: B
Intersection Capacity Utilization 48.2%	ICU Level of Service A
Analysis Period (min) 15	

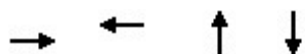
Splits and Phases: 7: Beaverdams Road & Thorold Townline Road

 Ø2	 Ø4
22.5 s	22.5 s
 Ø6	 Ø8
22.5 s	22.5 s

Queues

7: Beaverdams Road & Thorold Townline Road

06-26-2023



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	250	372	331	228
v/c Ratio	0.44	0.58	0.56	0.42
Control Delay	10.1	12.6	12.3	10.3
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	10.1	12.6	12.3	10.3
Queue Length 50th (m)	7.9	13.7	11.5	7.4
Queue Length 95th (m)	25.3	29.3	31.1	20.4
Internal Link Dist (m)	173.0	285.7	145.2	108.8
Turn Bay Length (m)				
Base Capacity (vph)	911	1036	935	869
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.27	0.36	0.35	0.26
Intersection Summary				

Lanes, Volumes, Timings

8: Barker Pkwy

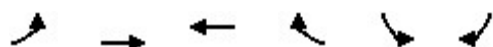
06-26-2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	19	4	1	1	0	8	1	61	0	24	19	13
Future Volume (vph)	19	4	1	1	0	8	1	61	0	24	19	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.994			0.881						0.945	
Flt Protected		0.957			0.994			0.999			0.990	
Satd. Flow (prot)	0	1800	0	0	1582	0	0	1898	0	0	1544	0
Flt Permitted		0.957			0.994			0.999			0.990	
Satd. Flow (perm)	0	1800	0	0	1582	0	0	1898	0	0	1544	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		143.7			157.1			135.3			345.6	
Travel Time (s)		10.3			11.3			9.7			24.9	
Peak Hour Factor	0.25	0.75	0.25	0.44	0.58	0.54	0.25	0.25	0.29	0.95	0.38	0.25
Heavy Vehicles (%)	0%	7%	0%	29%	14%	2%	0%	0%	0%	11%	33%	0%
Adj. Flow (vph)	76	5	4	2	0	15	4	244	0	25	50	52
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	85	0	0	17	0	0	248	0	0	127	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	22.5%											
Analysis Period (min)	15											
	ICU Level of Service A											

Lanes, Volumes, Timings

9:

06-26-2023



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	22	0	0	10	19	45
Future Volume (vph)	22	0	0	10	19	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.865		0.905	
Flt Protected		0.950			0.985	
Satd. Flow (prot)	0	1770	1611	0	1660	0
Flt Permitted		0.950			0.985	
Satd. Flow (perm)	0	1770	1611	0	1660	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		461.7	162.2		264.6	
Travel Time (s)		33.2	11.7		19.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	24	0	0	11	21	49
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	24	11	0	70	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	100			100	100	100
Sign Control		Stop	Stop		Stop	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 18.4% ICU Level of Service A

Analysis Period (min) 15

Lanes, Volumes, Timings

1: Barker Pkwy & Davis Road/Hwy 58

06-26-2023

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	23	94	425	46	162	437
Future Volume (vph)	23	94	425	46	162	437
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0		118.0	135.0	
Storage Lanes	1	0		1	1	
Taper Length (m)	7.5				7.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.899			0.850		
Flt Protected	0.987				0.950	
Satd. Flow (prot)	1661	0	1863	1524	1787	1827
Flt Permitted	0.987				0.950	
Satd. Flow (perm)	1661	0	1863	1524	1787	1827
Link Speed (k/h)	50		50			50
Link Distance (m)	345.6		411.8			484.4
Travel Time (s)	24.9		29.6			34.9
Peak Hour Factor	0.63	0.87	0.89	0.85	0.88	0.91
Heavy Vehicles (%)	0%	2%	2%	6%	1%	4%
Adj. Flow (vph)	37	108	478	54	184	480
Shared Lane Traffic (%)						
Lane Group Flow (vph)	145	0	478	54	184	480
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.6		3.6			3.6
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	48.4%			ICU Level of Service A		
Analysis Period (min)	15					

Lanes, Volumes, Timings

2: Uppers Lane & Davis Road

06-26-2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	35	31	107	62	20	23	101	400	76	44	323	66
Future Volume (vph)	35	31	107	62	20	23	101	400	76	44	323	66
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	170.0		0.0	140.0		117.0
Storage Lanes	0		0	0		0	1		0	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.929			0.968			0.969				0.850
Flt Protected		0.990			0.976		0.950			0.950		
Satd. Flow (prot)	0	1630	0	0	1767	0	1656	1758	0	1719	1681	1482
Flt Permitted		0.891			0.728		0.558			0.352		
Satd. Flow (perm)	0	1467	0	0	1318	0	973	1758	0	637	1681	1482
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		148			36			35				84
Link Speed (k/h)		50			50			50				50
Link Distance (m)		190.8			63.3			356.3			336.3	
Travel Time (s)		13.7			4.6			25.7			24.2	
Peak Hour Factor	0.58	0.42	0.72	0.82	0.50	0.64	0.74	0.89	0.64	0.67	0.96	0.79
Heavy Vehicles (%)	14%	0%	8%	0%	6%	0%	9%	6%	0%	5%	13%	9%
Adj. Flow (vph)	60	74	149	76	40	36	136	449	119	66	336	84
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	283	0	0	152	0	136	568	0	66	336	84
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	

Lanes, Volumes, Timings

2: Uppers Lane & Davis Road

06-26-2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		8	8		2	2		6	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	22.5
Total Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	22.5
Total Split (%)	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%		50.0%	50.0%	50.0%
Maximum Green (s)	18.0	18.0		18.0	18.0		18.0	18.0		18.0	18.0	18.0
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)		4.5			4.5		4.5	4.5		4.5	4.5	4.5
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		Min	Min		Min	Min	Min
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	7.0
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	0
Act Effect Green (s)		9.2			9.2		17.7	17.7		17.7	17.7	17.7
Actuated g/C Ratio		0.25			0.25		0.49	0.49		0.49	0.49	0.49
v/c Ratio		0.58			0.42		0.29	0.65		0.21	0.41	0.11
Control Delay		10.9			12.1		8.8	12.7		8.8	8.7	2.7
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Total Delay		10.9			12.1		8.8	12.7		8.8	8.7	2.7
LOS		B			B		A	B		A	A	A
Approach Delay		10.9			12.1			11.9			7.7	
Approach LOS		B			B			B			A	

Intersection Summary

Area Type: Other

Cycle Length: 45

Actuated Cycle Length: 36.1

Natural Cycle: 50

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.65

Intersection Signal Delay: 10.5

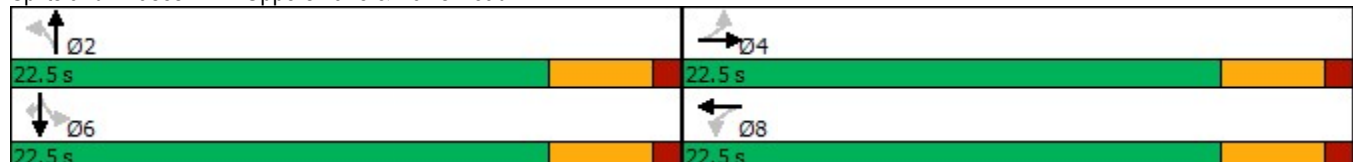
Intersection LOS: B

Intersection Capacity Utilization 55.3%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 2: Uppers Lane & Davis Road



Queues

2: Uppers Lane & Davis Road

06-26-2023



Lane Group	EBT	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	283	152	136	568	66	336	84
v/c Ratio	0.58	0.42	0.29	0.65	0.21	0.41	0.11
Control Delay	10.9	12.1	8.8	12.7	8.8	8.7	2.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	10.9	12.1	8.8	12.7	8.8	8.7	2.7
Queue Length 50th (m)	6.5	5.6	4.1	20.0	1.9	10.9	0.0
Queue Length 95th (m)	3.9	7.0	12.2	#73.1	6.3	32.9	4.0
Internal Link Dist (m)	166.8	39.3		332.3		312.3	
Turn Bay Length (m)			170.0		140.0		117.0
Base Capacity (vph)	817	687	523	961	342	904	835
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.35	0.22	0.26	0.59	0.19	0.37	0.10

Intersection Summary

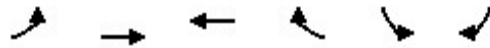
95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Lanes, Volumes, Timings

3: Lundy's Lane & Barker Parkway

06-26-2023



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔↔	↔↔		↔	↔
Traffic Volume (vph)	46	697	730	54	55	60
Future Volume (vph)	46	697	730	54	55	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	0.95	0.95	1.00	1.00
Frt			0.985			0.850
Flt Protected		0.997			0.950	
Satd. Flow (prot)	0	3529	3514	0	1805	1583
Flt Permitted		0.997			0.950	
Satd. Flow (perm)	0	3529	3514	0	1805	1583
Link Speed (k/h)		50	50		50	
Link Distance (m)		269.5	290.5		183.4	
Travel Time (s)		19.4	20.9		13.2	
Peak Hour Factor	0.82	0.75	0.95	0.62	0.56	0.71
Heavy Vehicles (%)	2%	2%	1%	3%	0%	2%
Adj. Flow (vph)	56	929	768	87	98	85
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	985	855	0	98	85
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25			15	25	15
Sign Control		Yield	Yield		Yield	
Intersection Summary						
Area Type: Other						
Control Type: Roundabout						
Intersection Capacity Utilization 55.8% ICU Level of Service B						
Analysis Period (min) 15						

Lanes, Volumes, Timings

4: Thorold Townline Road 70 & Lundy's Lane

06-26-2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	27	605	112	31	552	49	141	189	62	87	214	31
Future Volume (vph)	27	605	112	31	552	49	141	189	62	87	214	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	150.0		32.0	76.0		0.0	30.0		0.0	40.0		0.0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.974			0.951			0.981	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1736	1881	1599	1805	1835	0	1770	1760	0	1719	1831	0
Flt Permitted	0.188			0.136			0.512			0.446		
Satd. Flow (perm)	343	1881	1599	258	1835	0	954	1760	0	807	1831	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			78		18			29			9	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		307.3			478.1			247.2			197.8	
Travel Time (s)		22.1			34.4			17.8			14.2	
Peak Hour Factor	0.84	0.77	0.76	0.65	0.94	0.40	0.74	0.85	0.57	0.68	0.88	0.86
Heavy Vehicles (%)	4%	1%	1%	0%	1%	0%	2%	4%	0%	5%	1%	7%
Adj. Flow (vph)	32	786	147	48	587	123	191	222	109	128	243	36
Shared Lane Traffic (%)												
Lane Group Flow (vph)	32	786	147	48	710	0	191	331	0	128	279	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	

Lanes, Volumes, Timings

4: Thorold Townline Road 70 & Lundy's Lane

06-26-2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4		4	8			2			6		
Detector Phase	4	4	4	8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	20.0	20.0	20.0	20.0	20.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	33.0	33.0	33.0	32.0	32.0		35.0	35.0		35.0	35.0	
Total Split (s)	54.0	54.0	54.0	54.0	54.0		36.0	36.0		36.0	36.0	
Total Split (%)	60.0%	60.0%	60.0%	60.0%	60.0%		40.0%	40.0%		40.0%	40.0%	
Maximum Green (s)	47.0	47.0	47.0	48.0	48.0		30.0	30.0		30.0	30.0	
Yellow Time (s)	5.0	5.0	5.0	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)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	7.0	7.0	7.0	6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Recall Mode	None	None	None	None	None		Max	Max		Max	Max	
Walk Time (s)	15.0	15.0	15.0	15.0	15.0		15.0	15.0		15.0	15.0	
Flash Dont Walk (s)	7.0	7.0	7.0	7.0	7.0		14.0	14.0		14.0	14.0	
Pedestrian Calls (#/hr)	0	0	0	0	0		0	0		0	0	
Act Effect Green (s)	41.0	41.0	41.0	42.0	42.0		30.2	30.2		30.2	30.2	
Actuated g/C Ratio	0.49	0.49	0.49	0.50	0.50		0.36	0.36		0.36	0.36	
v/c Ratio	0.19	0.86	0.18	0.38	0.77		0.56	0.51		0.44	0.42	
Control Delay	15.0	29.8	6.3	22.6	23.0		31.3	24.0		28.9	23.7	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	15.0	29.8	6.3	22.6	23.0		31.3	24.0		28.9	23.7	
LOS	B	C	A	C	C		C	C		C	C	
Approach Delay		25.8			23.0			26.7			25.3	
Approach LOS		C			C			C			C	

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 84.3

Natural Cycle: 75

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.86

Intersection Signal Delay: 25.1

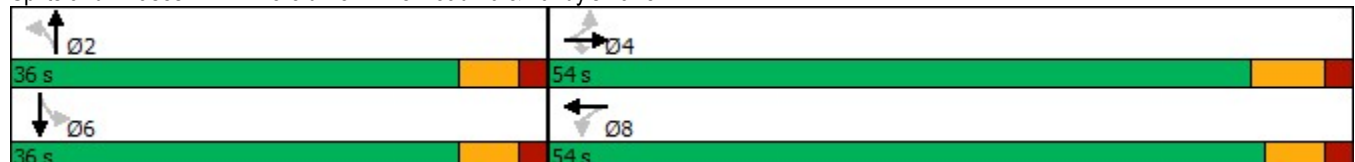
Intersection LOS: C

Intersection Capacity Utilization 69.7%

ICU Level of Service C

Analysis Period (min) 15

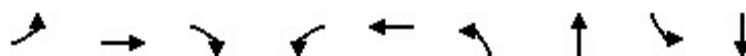
Splits and Phases: 4: Thorold Townline Road 70 & Lundy's Lane



Queues

4: Thorold Townline Road 70 & Lundy's Lane

06-26-2023



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	32	786	147	48	710	191	331	128	279
v/c Ratio	0.19	0.86	0.18	0.38	0.77	0.56	0.51	0.44	0.42
Control Delay	15.0	29.8	6.3	22.6	23.0	31.3	24.0	28.9	23.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.0	29.8	6.3	22.6	23.0	31.3	24.0	28.9	23.7
Queue Length 50th (m)	2.9	111.2	5.9	4.7	89.9	28.0	43.1	17.8	37.2
Queue Length 95th (m)	8.0	122.2	11.5	9.0	134.4	40.2	65.7	25.3	59.7
Internal Link Dist (m)		283.3			454.1		223.2		173.8
Turn Bay Length (m)	150.0		32.0	76.0		30.0		40.0	
Base Capacity (vph)	192	1056	932	147	1060	342	649	289	662
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	0.17	0.74	0.16	0.33	0.67	0.56	0.51	0.44	0.42
Intersection Summary									

Lanes, Volumes, Timings

5: Thorold Townline Road

06-26-2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	0	9	0	0	2	21	277	0	0	375	11
Future Volume (vph)	3	0	9	0	0	2	21	277	0	0	375	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.896			0.865						0.996	
Flt Protected		0.989						0.997				
Satd. Flow (prot)	0	1651	0	0	1644	0	0	1824	0	0	1821	0
Flt Permitted		0.989						0.997				
Satd. Flow (perm)	0	1651	0	0	1644	0	0	1824	0	0	1821	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		488.7			510.1			142.0			229.8	
Travel Time (s)		35.2			36.7			10.2			16.5	
Peak Hour Factor	0.92	0.92	0.92	0.25	0.92	0.25	0.92	0.83	0.25	0.25	0.95	0.92
Heavy Vehicles (%)	2%	2%	2%	0%	2%	0%	2%	4%	0%	0%	4%	2%
Adj. Flow (vph)	3	0	10	0	0	8	23	334	0	0	395	12
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	13	0	0	8	0	0	357	0	0	407	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	42.0%											
Analysis Period (min)	15											
ICU Level of Service A												

Lanes, Volumes, Timings
6: Thorold Townline Road & Venture Street

06-26-2023

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	21	58	51	0	11	42
Future Volume (vph)	21	58	51	0	11	42
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	0.901				0.893	
Flt Protected	0.987			0.950		
Satd. Flow (prot)	1657	0	0	1770	1663	0
Flt Permitted	0.987			0.950		
Satd. Flow (perm)	1657	0	0	1770	1663	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	574.7			229.8	102.8	
Travel Time (s)	41.4			16.5	7.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	23	63	55	0	12	46
Shared Lane Traffic (%)						
Lane Group Flow (vph)	86	0	0	55	58	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	100	100	100			100
Sign Control	Stop			Stop	Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	20.9%			ICU Level of Service A		
Analysis Period (min)	15					

Lanes, Volumes, Timings

7: Beaverdams Road & Thorold Townline Road

06-26-2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (vph)	30	239	47	37	217	27	39	169	25	40	247	57
Future Volume (vph)	30	239	47	37	217	27	39	169	25	40	247	57
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.977			0.982			0.968			0.973	
Flt Protected		0.994			0.991			0.993			0.994	
Satd. Flow (prot)	0	1826	0	0	1827	0	0	1782	0	0	1760	0
Flt Permitted		0.929			0.898			0.913			0.923	
Satd. Flow (perm)	0	1706	0	0	1655	0	0	1638	0	0	1635	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		27			20			42			34	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		197.0			309.7			169.2			132.8	
Travel Time (s)		14.2			22.3			12.2			9.6	
Peak Hour Factor	0.75	0.92	0.78	0.63	0.95	0.61	0.89	0.86	0.33	0.83	0.93	0.71
Heavy Vehicles (%)	3%	1%	0%	3%	1%	0%	0%	4%	0%	5%	5%	2%
Adj. Flow (vph)	40	260	60	59	228	44	44	197	76	48	266	80
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	360	0	0	331	0	0	317	0	0	394	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												

Lanes, Volumes, Timings

7: Beaverdams Road & Thorold Townline Road

06-26-2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (%)	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%		50.0%	50.0%	
Maximum Green (s)	18.0	18.0		18.0	18.0		18.0	18.0		18.0	18.0	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		4.5			4.5			4.5			4.5	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Min	Min		Min	Min	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		11.9			11.9			12.4			12.4	
Actuated g/C Ratio		0.35			0.35			0.37			0.37	
v/c Ratio		0.58			0.56			0.50			0.63	
Control Delay		13.2			12.9			10.9			13.9	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		13.2			12.9			10.9			13.9	
LOS		B			B			B			B	
Approach Delay		13.2			12.9			10.9			13.9	
Approach LOS		B			B			B			B	
Intersection Summary												
Area Type:	Other											
Cycle Length: 45												
Actuated Cycle Length: 33.8												
Natural Cycle: 45												
Control Type: Actuated-Uncoordinated												
Maximum v/c Ratio: 0.63												
Intersection Signal Delay: 12.8						Intersection LOS: B						
Intersection Capacity Utilization 52.4%						ICU Level of Service A						
Analysis Period (min) 15												

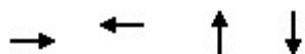
Splits and Phases: 7: Beaverdams Road & Thorold Townline Road

 Ø2	 Ø4
22.5 s	22.5 s
 Ø6	 Ø8
22.5 s	22.5 s

Queues

7: Beaverdams Road & Thorold Townline Road

06-26-2023



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	360	331	317	394
v/c Ratio	0.58	0.56	0.50	0.63
Control Delay	13.2	12.9	10.9	13.9
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	13.2	12.9	10.9	13.9
Queue Length 50th (m)	14.2	13.2	10.9	15.2
Queue Length 95th (m)	38.1	35.5	29.9	43.0
Internal Link Dist (m)	173.0	285.7	145.2	108.8
Turn Bay Length (m)				
Base Capacity (vph)	972	940	940	935
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.37	0.35	0.34	0.42
Intersection Summary				

Lanes, Volumes, Timings

8: Barker Pkwy

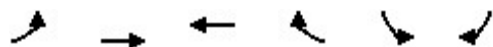
06-26-2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	11	0	1	0	7	2	56	1	69	43	19
Future Volume (vph)	15	11	0	1	0	7	2	56	1	69	43	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.877			0.999			0.965	
Flt Protected		0.962			0.995			0.998			0.978	
Satd. Flow (prot)	0	1828	0	0	1658	0	0	1894	0	0	1793	0
Flt Permitted		0.962			0.995			0.998			0.978	
Satd. Flow (perm)	0	1828	0	0	1658	0	0	1894	0	0	1793	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		143.7			157.1			135.3			345.6	
Travel Time (s)		10.3			11.3			9.7			24.9	
Peak Hour Factor	0.25	0.68	0.25	0.75	1.00	0.68	0.25	0.25	0.58	0.54	0.50	0.25
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	60	16	0	1	0	10	8	224	2	128	86	76
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	76	0	0	11	0	0	234	0	0	290	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	25.1%											
Analysis Period (min)	15											
ICU Level of Service A												

Lanes, Volumes, Timings

9:

06-26-2023



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	72	0	0	31	12	29
Future Volume (vph)	72	0	0	31	12	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.865		0.904	
Flt Protected		0.950			0.986	
Satd. Flow (prot)	0	1770	1611	0	1660	0
Flt Permitted		0.950			0.986	
Satd. Flow (perm)	0	1770	1611	0	1660	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		461.7	162.2		264.6	
Travel Time (s)		33.2	11.7		19.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	78	0	0	34	13	32
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	78	34	0	45	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	100			100	100	100
Sign Control		Stop	Stop		Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization 20.7%				ICU Level of Service A		
Analysis Period (min) 15						

APPENDIX J

TAC Excerpts

Stopping sight distance is the sum of the distance travelled during the perception and reaction time and the braking distance.

$$SSD = 0.278Vt + 0.039 \frac{V^2}{a} \quad (2.5.2)$$

Where:

SSD = Stopping sight distance (m)

t = Brake reaction time, 2.5 s

V = Design speed (km/h)

a = Deceleration rate (m/s²)

Table 2.5.2 gives the minimum stopping sight distances on level grade, on wet pavement, for a range of design speeds. These values are used for vertical curve design, intersection geometry and the placement of traffic control devices. The stopping sight distances quoted in **Table 2.5.2** may need to be increased for a variety of reasons related to grade and vehicle type as noted below.

Table 2.5.2: Stopping Sight Distance on level roadways for Automobiles⁵⁴

Design speed (km/h)	Brake reaction distance (m)	Braking distance on level (m)	Stopping sight distance	
			Calculated (m)	Design (m)
20	13.9	4.6	18.5	20
30	20.9	10.3	31.2	35
40	27.8	18.4	46.2	50
50	34.8	28.7	63.5	65
60	41.7	41.3	83.0	85
70	48.7	56.2	104.9	105
80	55.6	73.4	129.0	130
90	62.6	92.9	155.5	160
100	69.5	114.7	184.2	185
110	76.5	138.8	215.3	220
120	83.4	165.2	248.6	250
130	90.4	193.8	284.2	285

Note: Brake reaction distance predicated on a time of 2.5 s; deceleration rate of 3.4 m/s² used to determine calculated sight distance.

Table 9.9.3: Time Gap for Case B1, Left Turn from Stop

Design Vehicle	Time Gap (t_g)(s) at Design Speed of Major Road
Passenger car	7.5
Single-unit truck	9.5
Combination truck (WB 19 and WB 20)	11.5
Longer truck	To be established by road authority

Notes: Time gaps are for a stopped vehicle to turn left onto a two-lane highway with no median and with grades of 3% or less. The table values should be adjusted as follows:

- For multi-lane highways: For left turns onto two-lane highways with more than two lanes, add 0.5 s for passenger cars and 0.7 s for trucks for each additional lane, from the left, in excess of one, to be crossed by the turning vehicle.
- For minor approach grades: If the approach grade is an upgrade that exceeds 3%, add 0.2 s for each percent grade for left turns.
- Some road authorities use higher values for certain specialized vehicles (e.g., Alberta uses 22 s for very long log trucks).

The intersection sight distance along the major road (distance b in **Figure 9.9.2**) is determined by:

$$ISD = 0.278 V_{\text{major}} t_g \quad (9.9.1)$$

Where:

ISD = intersection sight distance (length of the leg of sight triangle along the major road) (m)

V_{major} = design speed of the major road (km/h)

t_g = time gap for minor road vehicle to enter the major road (s)

For example, a passenger car turning left onto a two-lane major road should be provided sight distance equivalent to a time gap of 7.5 s in major-road traffic. If the design speed of the major road is 100 km/h, this corresponds to a sight distance of $0.278(100)(7.5) = 208.5$ or 210 m, rounded for design.

A passenger car turning left onto a four-lane undivided roadway will need to cross two near lanes, rather than one. This increases the recommended gap in major-road traffic from 7.5 to 8.0 s. The corresponding value of sight distance for this example would be 223 m. If the minor-road approach to such an intersection is located on a 4% upgrade, then the time gap selected for intersection sight distance design for left turns should be increased from 8.0 to 8.8 s, equivalent to an increase of 0.2 s for each percent grade.

The design values for intersection sight distance for passenger cars are shown in **Table 9.9.4**. **Figure 9.9.4** includes design values, based on the time gaps for the design vehicles included in **Table 9.9.3**.

No adjustment of the recommended sight distance values for the major-road grade is generally needed because both the major- and minor-road vehicle will be on the same grade when departing from the intersection. However, if the minor-road design vehicle is a heavy truck and the intersection is located near a sag vertical curve with grades over 3%, then an adjustment to extend the recommended sight distance based on the major-road grade should be considered.

Table 9.9.4: Design Intersection Sight Distance – Case B1, Left Turn From Stop

Design Speed (km/h)	Stopping Sight Distance (m)	Intersection Sight Distance for Passenger Cars	
		Calculated (m)	Design (m)
20	20	41.7	45
30	35	62.6	65
40	50	83.4	85
50	65	104.3	105
60	85	125.1	130
70	105	146.0	150
80	130	166.8	170
90	160	187.7	190
100	185	208.5	210
110	220	229.4	230
120	250	250.2	255
130	285	271.1	275

Note: Intersection sight distance shown is for a stopped passenger car to turn left onto a two-lane highway with no median and grades 3% or less. For other conditions, the time gap should be adjusted and the sight distance recalculated.

Sight distance design for left turns at divided-highway intersections should consider multiple design vehicles and median width. If the design vehicle used to determine sight distance for a divided-highway intersection is larger than a passenger car, then sight distance for left turns will need to be checked for that selected design vehicle and for smaller design vehicles as well. If the divided-highway median is wide enough to store the design vehicle with a clearance to the through lanes of approximately 1 m at both ends of the vehicle, no separate analysis for the departure sight triangle for left turns is needed on the minor-road approach for the near roadway to the left. In most cases, the departure sight triangle for right turns (case B2) will provide sufficient sight distance for a passenger car to cross the near roadway to reach the median. Possible exceptions are addressed in the discussion of case B3.

The time gaps in **Table 9.9.3** can be decreased by 1.0 s for right-turn maneuvers without undue interference with major-road traffic. These adjusted time gaps for the right turn from the minor road are shown in **Table 9.9.5**. Design values based on these adjusted time gaps are shown in **Table 9.9.6** for passenger cars. **Figure 9.9.5** includes the design values for the design vehicles for each of the time gaps in **Table 9.9.5**.

Table 9.9.5: Time Gap for Case B2—Right Turn from Stop and Case B3—Crossing Maneuver

Design Vehicle	Time Gap (t_g)(s) at Design Speed of Major Road
Passenger car	6.5
Single-unit truck	8.5
Combination truck (WB 19 and WB 20)	10.5

Note: Time gaps are for a stopped vehicle to turn left onto a two-lane highway with no median and with grades of 3% or less. The table values should be adjusted as follows:

- For multi-lane highways: For left turns onto two-lane highways with more than two lanes, add 0.5 s for passenger cars and 0.7 s for trucks for each additional lane, from the left, in excess of one, to be crossed by the turning vehicle.
- For minor approach grades: If the approach grade is an upgrade that exceeds 3%, add 0.1 s for each percent grade for left turns.

Table 9.9.6: Design Intersection Sight Distance – Case B2, Right Turn from Stop, and Case B3, Crossing Maneuver

Design Speed (km/h)	Stopping Sight Distance (m)	Intersection Sight Distance for Passenger Cars	
		Calculated (m)	Design (m)
20	20	36.1	40
30	35	54.2	55
40	50	72.3	75
50	65	90.4	95
60	85	108.4	110
70	105	126.5	130
80	130	144.6	145
90	160	162.6	165
100	185	180.7	185
110	220	198.8	200
120	250	216.8	220
130	285	234.9	235

Note: Intersection sight distance shown is for a stopped passenger car to turn right onto or to cross a two-lane highway with no median and with grades of 3% or less. For other conditions, the time gap should be adjusted and the sight distance recalculated.

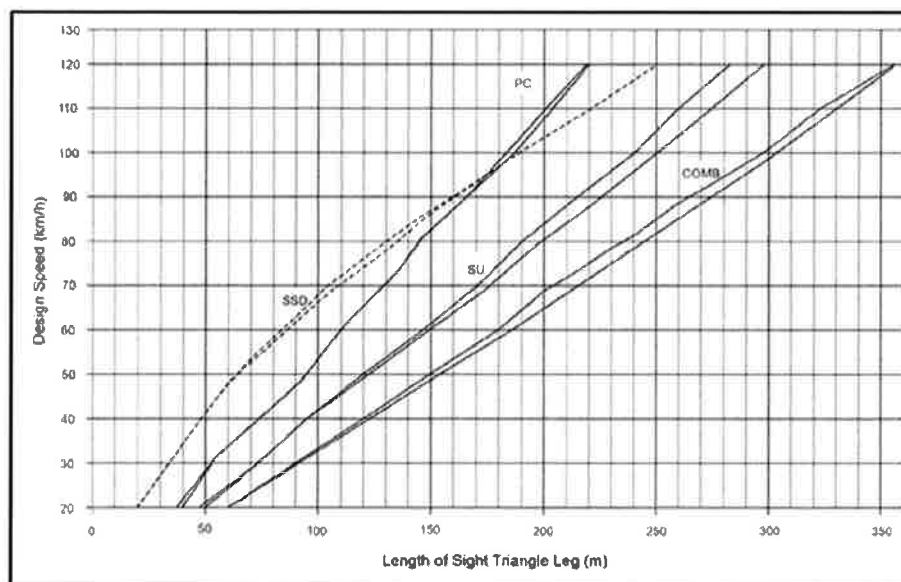


Figure 9.9.5: Intersection Sight Distance – Case B2, Right Turn from Stop, and Case B3, Crossing Maneuver (Calculated and Design Values Plotted)

Case F – Left Turns from the Major Road

All locations along a major highway from which vehicles are permitted to turn left across opposing traffic, including intersections and driveways, should have sufficient sight distance to accommodate the left-turn maneuver. Left-turning drivers need sufficient sight distance to decide when to turn left across the lane(s) used by opposing traffic. Sight distance design should be based on a left turn by a stopped vehicle, since a vehicle that turns left without stopping would need less sight distance. The sight distance along the major road to accommodate left turns is the distance traversed at the design speed of the major road in the travel time for the design vehicle given in **Table 9.9.11**.

Table 9.9.11: Time Gap for Case F, Left Turns from the Major Road

Design Vehicle	Time Gap (t_g)(s) at Design Speed of Major Road
Passenger car	5.5
Single-unit truck	6.5
Combination truck (WB 19 and WB 20)	7.5

Note: Adjustment for multi-lane highways: For turning vehicles that cross more than one opposing lane, add 0.5 s for passenger cars and 0.7 s for trucks for each additional lane to be crossed.

The table also contains appropriate adjustment factors for the number of major-road lanes to be crossed by the turning vehicle. The unadjusted time gap in **Table 9.9.11** for passenger cars was used to develop the sight distances in **Table 9.9.12** and is illustrated in **Figure 9.9.8**.

Table 9.9.12: Intersection Sight Distance – Case F, Left Turn from the Major Road

Design Speed (km/h)	Stopping Sight Distance (m)	Intersection Sight Distance	
		Passenger Cars	
		Calculated (m)	Design (m)
20	20	30.6	35
30	35	45.9	50
40	50	61.2	65
50	65	76.5	80
60	85	91.7	95
70	105	107.0	110
80	130	122.3	125
90	160	137.6	140
100	185	152.9	155
110	220	168.2	170
120	250	183.5	185
130	285	198.8	200

Note: Intersection sight distance shown is for a passenger car making a left turn from an undivided highway. For other conditions and design vehicles, the time gap should be adjusted and the sight distance recalculated.

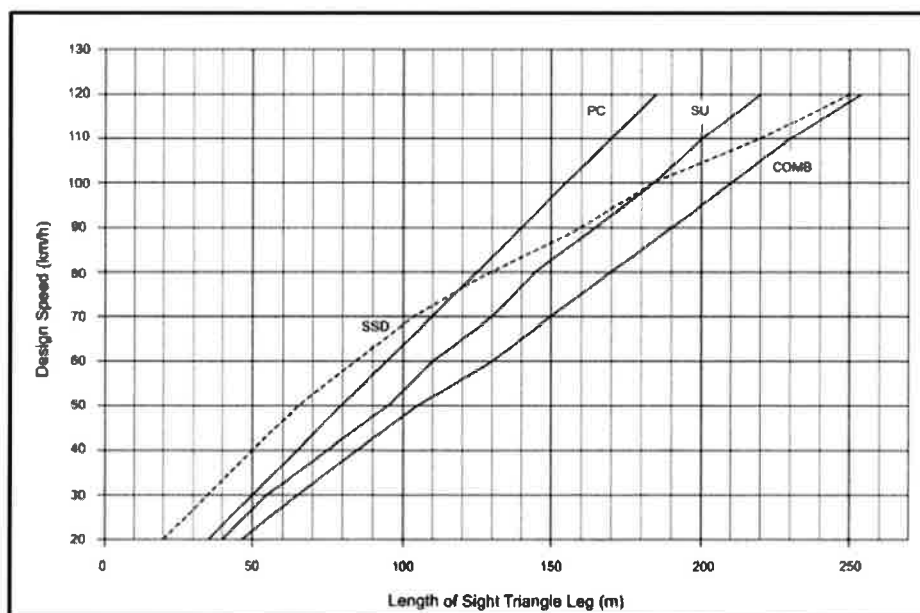


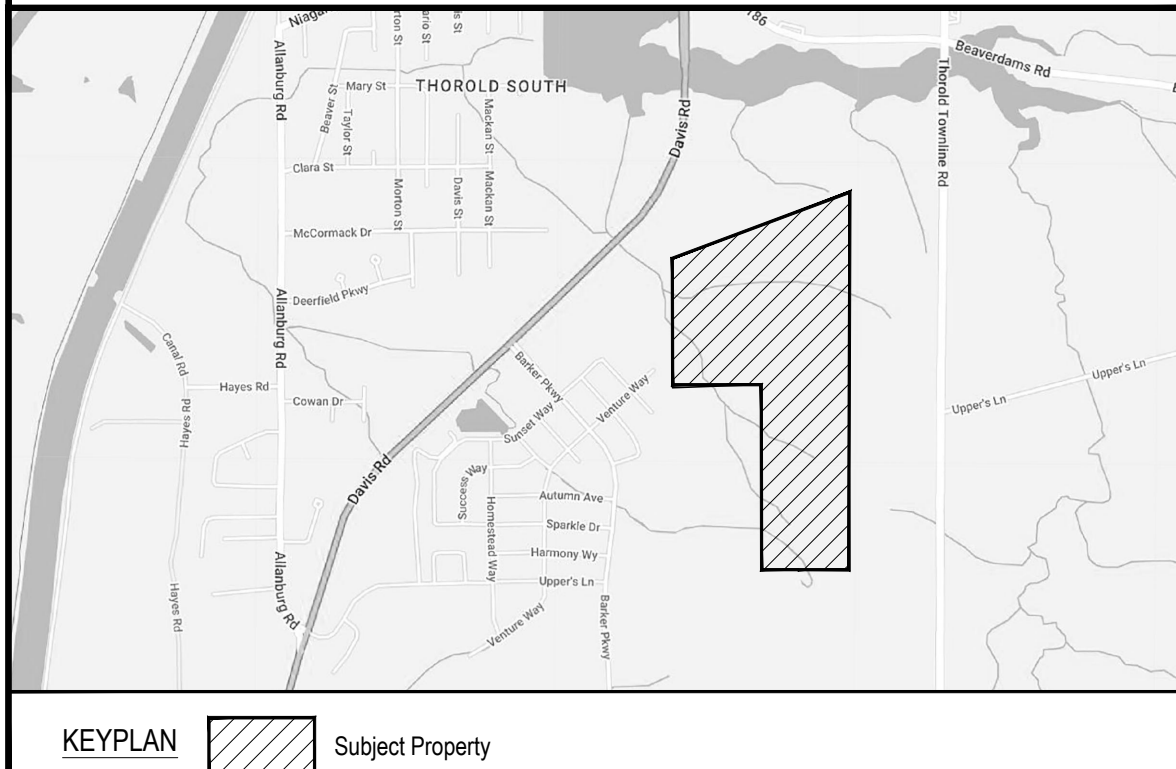
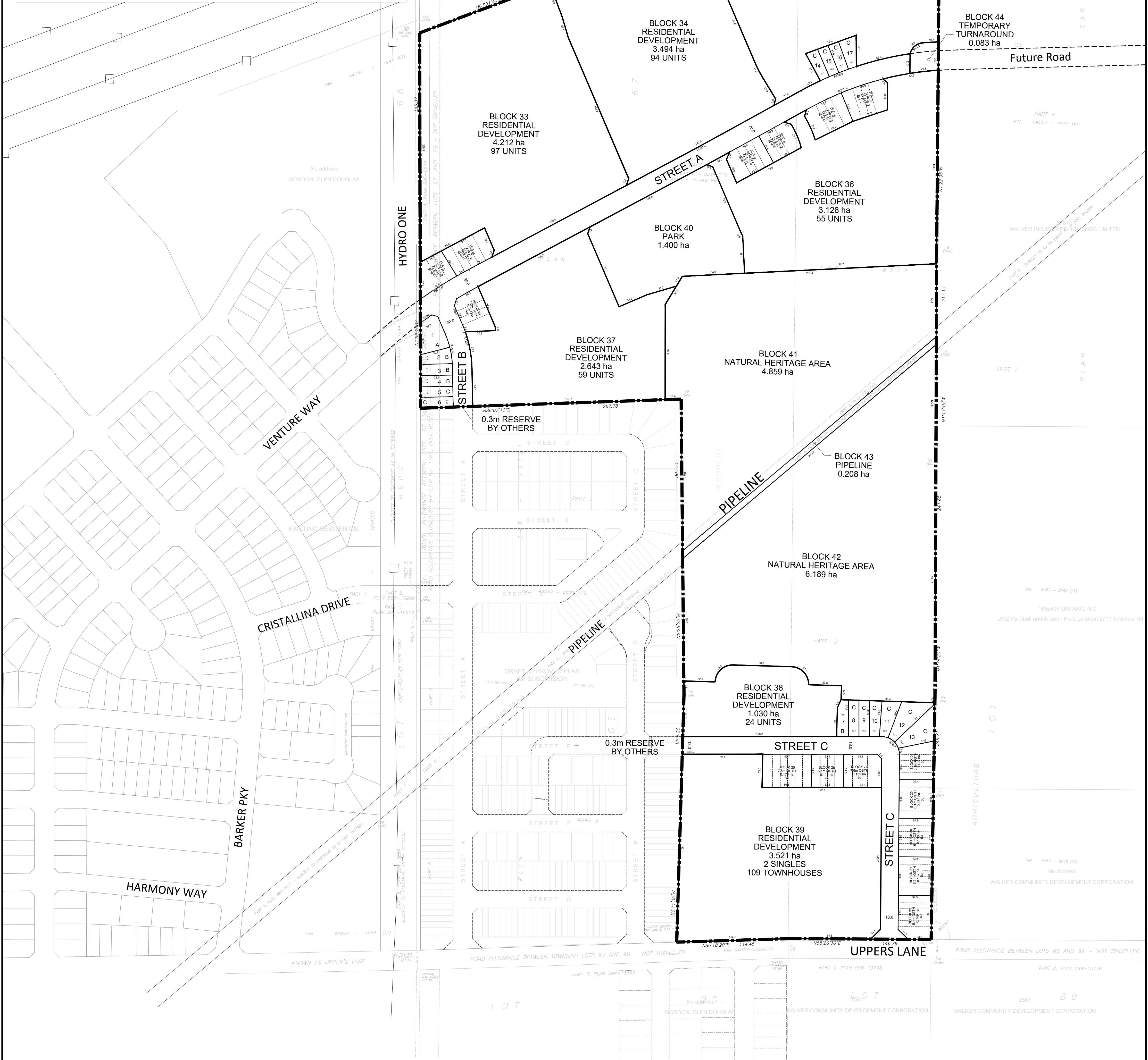
Figure 9.9.8: Intersection Sight Distance – Case F, Left Turn from the Major Road

Figures

AREA TABLE			22219 - 35dp	January 3, 2024
Residential Singles	Lots 1-17	0.832	ha±	
Townhouses	Blocks 18-32	1.992		
Residential Development	Blocks 33-39	22.181		
Park	Block 40	1.400		
Natural Heritage Area	Blocks 41-42	11.048		
Pipeline	Block 43	0.208		
Temporary Turnaround	Block 44	0.083		
Roads		2.098		
Total		39.842	ha±	

ROADS		
20.0m R.O.W.	2,796 m	1.350
18.0m R.O.W.	404 m	0.748
Total		2.098 ha

UNIT COUNT		
12.8 m Singles (42')	A	1
11.6 m Singles (38')	B	4
10.7 m Singles (35')	C	12
8.2m Bungalow Townhouse (27')	BTH	23
7.6m On St. Townhouse (25')	OSTH	18
6.1m On St. Townhouse (20')	OSTH	29
Residential Development		516
Total		603 u

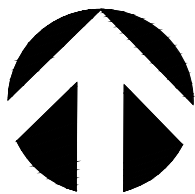


LEGEND

--- Subject Property

NOTES

All dimensions are in metres.
All area measurements are computer generated.
All elevations refer to Geodetic Datum.



ADDITIONAL INFORMATION
REQUIRED UNDER SECTION 51(17)
OF THE PLANNING ACT

- A, B, E, F, G, J, L - As Shown on Plan
C. This represents the Applicant's entire holding of undeveloped land in the vicinity.
D. Residential Singles, Bungalow Townhouses, On-Street Townhouses, Residential Development Blocks, Park, Natural Heritage Area, Pipeline Block, Future Road Block and Roads .
H. Piped water to be provided.
I. Clay loam soil.
K. Sanitary & storm sewers to be provided.

SURVEYOR'S CERTIFICATE

I certify that: the boundaries of the lands to be subdivided and their relationship to the adjacent lands are correctly shown.

Shaikat Ali Khan, O.L.S.
Surveyor General's Lic.
Ontario Land Surveyors

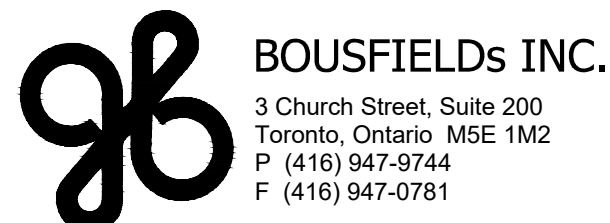
OWNER'S AUTHORIZATION

I/we, XXXXXXXXXXXXXXXXXXXX
being the registered owner(s) of the subject lands hereby authorize
BOUSFIELDS INC. to prepare and submit a
draft plan of subdivision for approval.

XXXXXXX Day Month Year

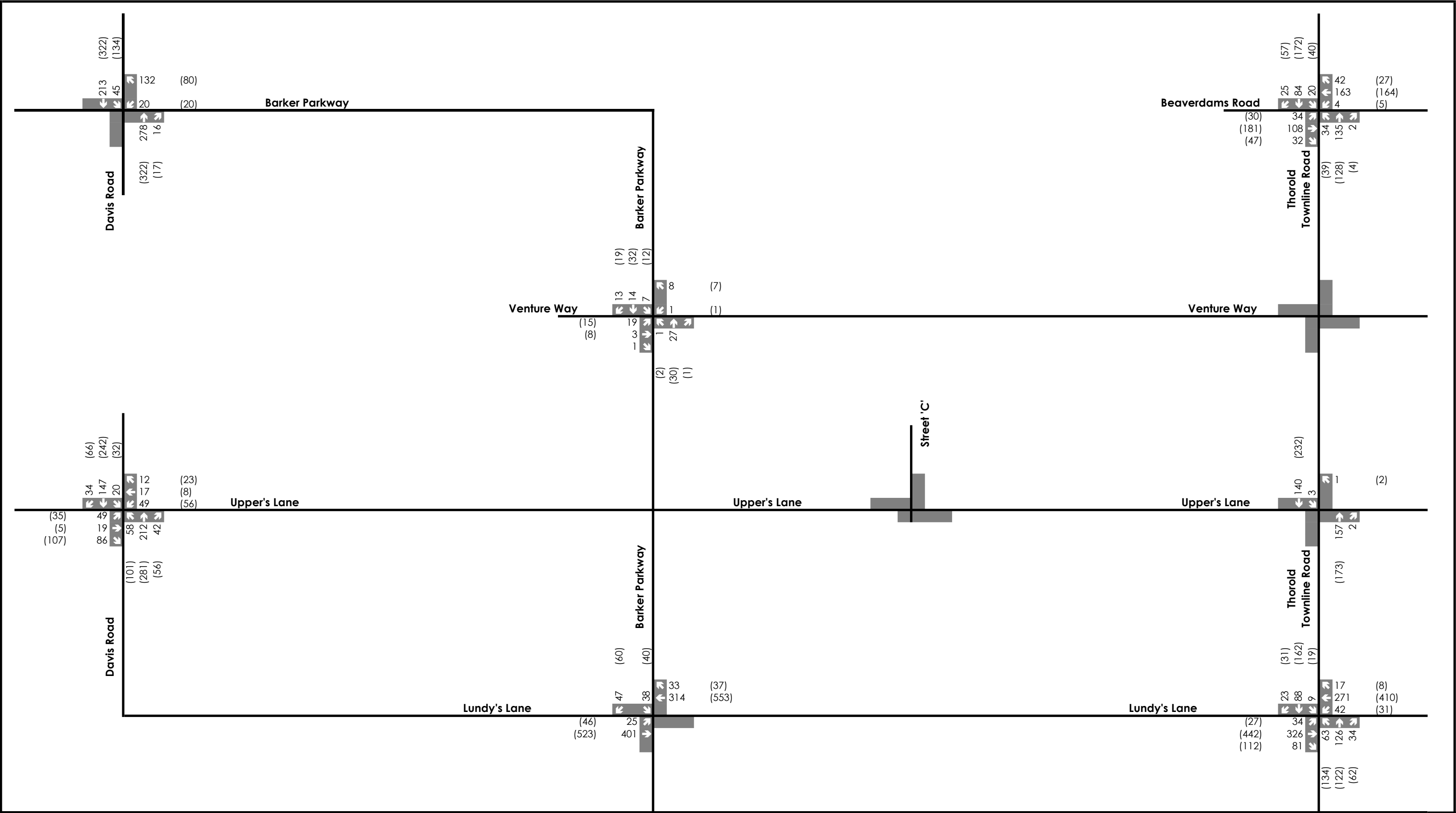
DRAFT PLAN OF
PROPOSED SUBDIVISION
PART OF LOT 67 AND
PART OF ROAD ALLOWANCE
BETWEEN 67 AND 68
(GEOGRAPHIC TOWNSHIP OF THOROLD)

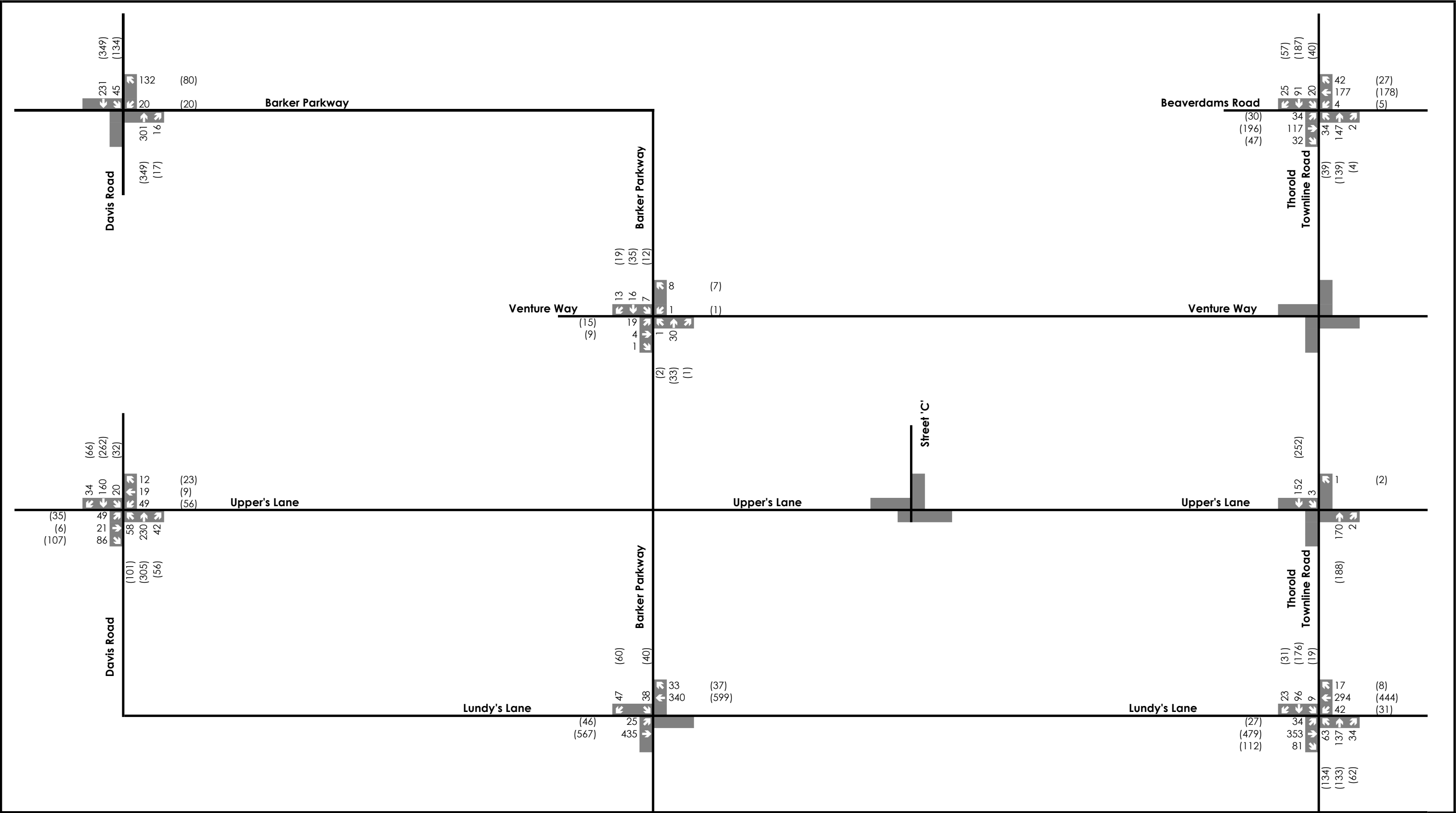
CITY OF THOROLD
REGIONAL MUNICIPALITY OF NIAGARA

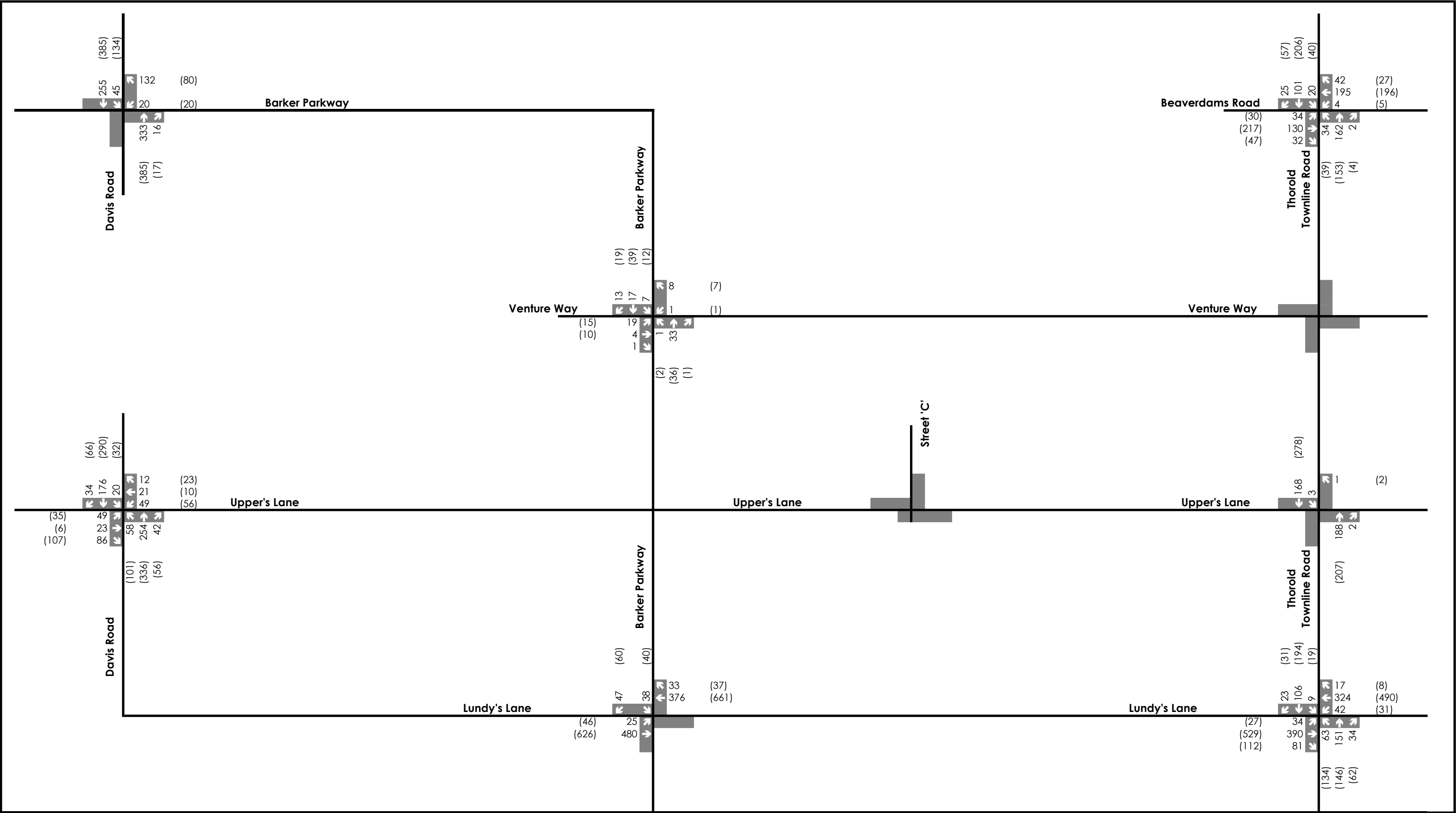


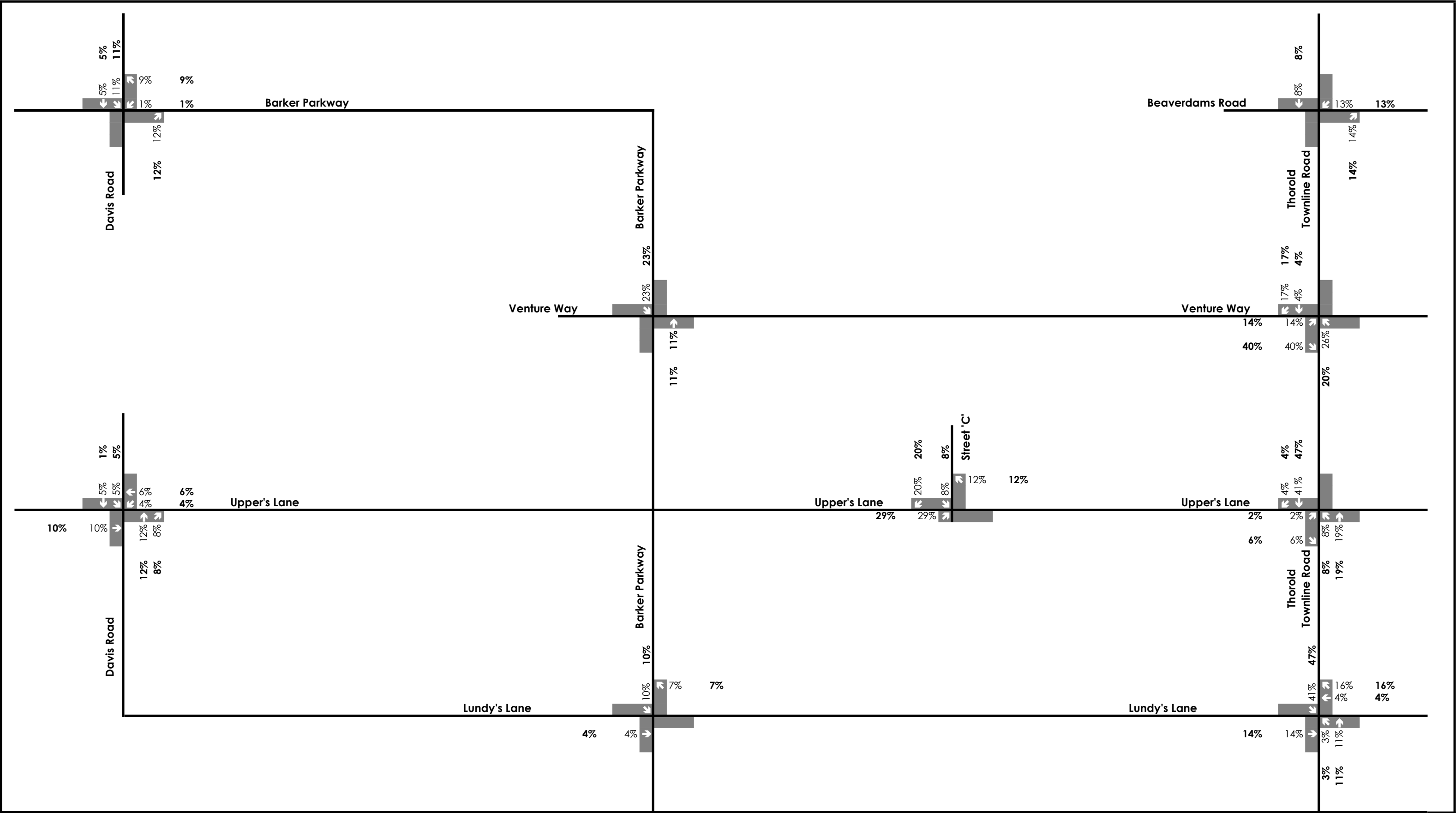
BOUSFIELDS INC.
3 Church Street, Suite 200
Toronto, Ontario M5E 1M2
P (416) 947-9744
F (416) 947-0781

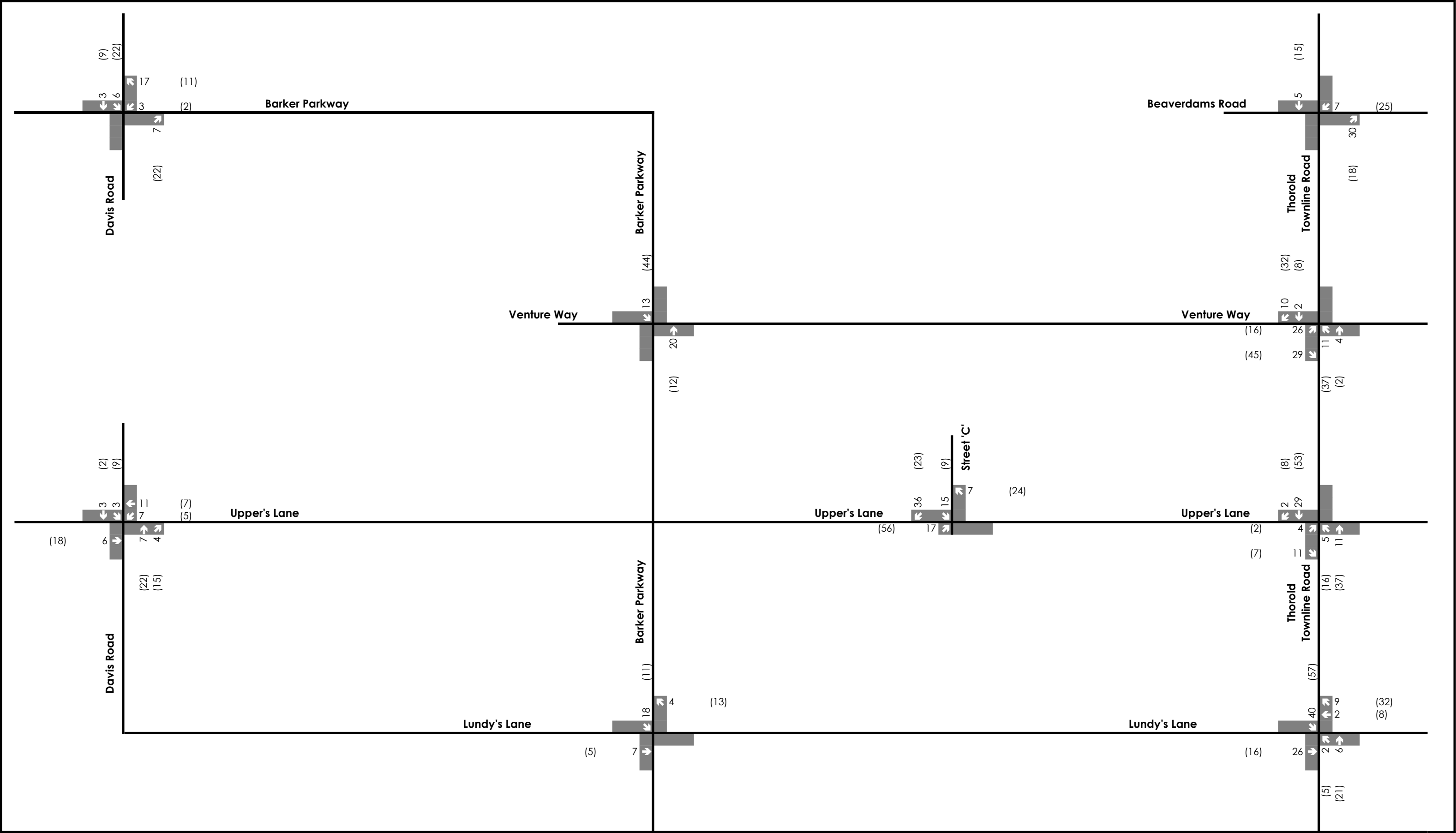
1 : 2000	January 3, 2024	22219 - 35dp
Scale	Date	Drawing Number











Legend

xx A.M. Peak Hour Traffic Volumes
(xx) P.M. Peak Hour Traffic Volumes

Parkbridge Thorold

Trip Assignment



Figure 7

Project No. 1046-6664
Date. January 30, 2024
Analyst. S.A

